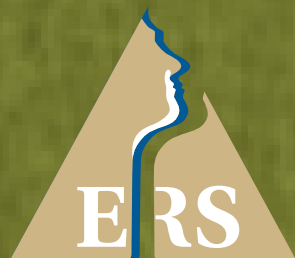




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## ***Abstract Book***

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**ERS16-0877**

**SYMPOSIUM 5: JUNIOR MEMBER SYMPOSIUM: "RHINOLOGY"**

**INSTRUCTIONAL LECTURE**

**C. Hopkins<sup>1</sup>**

<sup>1</sup>, *Orpington, United Kingdom*

This session will take a pragmatic approach to the investigation and management of patients presenting with symptoms suggestive of chronic rhinosinusitis. This will include;

Optimal use of investigations

Maximal medical therapy

Assessment of response to treatment

Indications for surgery

Optimal timing of surgery

Post-operative management

ERS16-0875

**SYMPOSIUM 13: DIAGNOSIS AND TREATMENT IN ORBITAL DISEASES**

**ORBITAL DECOMPRESSION**

**P. Sahlstrand-Johnson**<sup>1</sup>

<sup>1</sup>Lund University, Dep Otorhinolaryngology, Malmö, Sweden

Orbital decompression is an important treatment modality in endocrine opthalmopathy. At Skåne University Hospital in Malmö there is a multidisciplinary team (endocrine medicine, ophthalmology, otorhinolaryngology, plastic surgery and oncology) taking care of patients with endocrine opthalmopathy. Lateral and medial decompression is used when there is pronounced exophthalmos and optic neuropathy. The surgical technique and the results from orbital decompression during the last 15 years are presented

**ERS16-0874**

**INSTRUCTIONAL SESSION 6: HOW TO CHOOSE YOUR PATIENTS IN RHINOPLASTY**

**HOW TO CHOOSE YOUR PATIENTS IN RHINOPLASTY**

***P. Haraldsson<sup>1</sup>, S.O. Wikström<sup>2</sup>***

<sup>1</sup>, Stockholm, Sweden

<sup>2</sup>Malmö University Hospital, Dept Plastic Reconstructive Surgery, Malmö, Sweden

The selection of patients is critical when it comes to success in esthetic rhinoplasty. It is also important in functional rhinoplasty but for different reasons. In esthetic rhinoplasty the selection is mainly dependent on expectations and skin, whereas in functional rhinoplasty the nasal septum and the valves areas are in focus. The instructional course will deal with facial asymmetries, body dysmorphic disorder, skin assessment, alar insufficiency and the difficult septum. Examples of uncomplicated and difficult cases will be shown and discussed interactively with the participants.

IMMUNOCHEMICAL ASPECTS OF MUCOSAL IMMUNITY OF THE NOSE

H. Kawauchi<sup>1</sup>

<sup>1</sup>shimane university - faculty of medicine, Izumo city, Japan

It has been postulated and demonstrated that bacterial infection and its degradation product such as lipopolysaccharide (LPS) or teichoic acid (TA), induce nasopharyngeal or middle ear inflammation. Most recently, the immune reaction can be categorized as an innate immunity and acquired immunity, according to antigen specificity and various receptors on immunocompetent cells. And Toll-like receptors (TLR) expressed in dendritic cells, macrophages, endothelial cells, and  $\gamma\delta$ T cells, play an important role in a defense mechanism against bacterial infection. And on the other hand, once ostium or Eustachian-tube block is achieved by mucosal swelling, paranasal sinus or middle ear inflammation might become persistent. Furthermore, we also need to know the regulatory role of TLRs in allergic inflammation of upper respiratory tract.

Therefore, from this standpoint, we attempted to investigate the distribution of Toll-like receptor (TLR4 and TLR2) in upper respiratory epithelial cells such as human cell lines, by employing flowcytometry and northern blot analysis. And in *in vitro* study, the exact role of TLR2 and TLR4 in IL-8 and IL-15 production from upper respiratory epithelial cells was examined when these cells were stimulated with bacterial degradation product such as lipoprotein or lipopolysaccharide. And the regulatory role of TLRs in the allergic inflammation was examined at the induction and eliciting phase of murine allergic rhinitis model, employing OK432 or lipopolysaccharide.

Results: 1) Respiratory epithelial cells constitutively expressed mRNA for TLR2, 3, 6, but not for TLR4 and TLR9. 2) Respiratory epithelial cells also expressed CD14 and MyD88. 3) Lipoprotein induced IL-15 production in respiratory epithelial cells, which strictly depend on TLR2. 4) Lipoprotein-mediated IL-8 and IL-15 production in respiratory epithelial cells was abolished by NF- $\kappa$ B inhibition. 5) OK432 seems to induces IL-12 production from macrophages via TLR2, and activates Th1 response and consequently down-regulate antigen-specific Th2 response. 6) LPS aggravates nasal symptom, upregulating Th2 cytokine production of mast cells via TLR4.

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**ELUTING STENTS**

**G. Adriaensen**<sup>1</sup>

<sup>1</sup>*Academic Medical Center, ENT, Amsterdam, Netherlands*

Chronic rhinosinusitis defines a spectrum of disease in which different types of inflammation of the nasal and paranasal mucosa are the result of a dysfunctional host-environment interaction occurring at their interface. Corticosteroids and especially topical glucocorticoids are currently the first-line drugs of choice for the treatment of CRS and postoperative management after functional endoscopic sinus surgery (FESS). FESS, amongst others, opens the sinus so local pharmacotherapy can better reach its target.

New ways of delivering steroids to the nasal mucosa before and after surgery are developed in order to optimize disease control and patient symptoms as well as surgical outcome. Next to sprays, drops and rinses, drug eluting devices absorbable and nonabsorbable are being employed before and after surgery to achieve optimal results.

The rationale behind drug eluting stents / implants and an overview of the literature are provided. A division is made between the postoperative period and treatment of CRS in general. And finally data are provided on a new bioabsorbable, steroid eluting, thin film implant to be applied after endoscopic sinus surgery.

**ERS16-0878**

**WHAT RESULTS CAN WE PREDICT FOR OUR PATIENTS?**

**HOW WE CAN PREDICT AND IMPROVE OUR PATIENT'S OUTCOMES**

**C. Hopkins**<sup>1</sup>

<sup>1</sup>, Chislehurst, United Kingdom

This session will focus on how we can improve outcomes from endoscopic sinus surgery by careful patient selection, and optimal timing from surgery.

Increasing use of patient rated outcome measures such as the SNOT-22 highlight the importance of careful patient selection; operating on asymptomatic patients cannot achieve an improvement in patient symptoms. The stability of the SNOT-22 in the first 6 months following surgery may predict subsequent longer-term benefit and may identify which patients require more intensive follow-up.

There is growing evidence that delayed surgical intervention, once medical therapy has failed, may be associated with lower levels of benefit from surgery, higher ongoing health care utilisation and poorer lower respiratory function. This will be discussed.

ERS16-0876

SYMPOSIUM 42: IMPACT OF NASAL INFLAMMATION ON ...

QUALITY OF LIFE

*P. Sahlstrand-Johnson*<sup>1</sup>

<sup>1</sup>Lund University, Dep Otorhinolaryngology, Malmö, Sweden

Chronic rhinosinusitis with and without nasal polyps (CRSs/wNP) are common conditions decreasing health-related quality of life (HRQOL). Individual symptoms capable of predicting outcome after endoscopic sinus surgery (ESS) are defined, and absenteeism due to CRS in Europe is reported. Results from a Swedish cohort, like the UK prospective audit, suggest greater benefits from early surgery, but uniquely have shown this benefit to be detected using the SF-36, a global quality of life instrument. Therefore, it is important that ESS remains part of our management pathway for patients with CRS, despite the lack of level 1 evidence. Identifying factors predictive of success with aid of our patients in making decisions regarding surgical management could be one way to improve the further improve HRQOL of patients. The importance is pointed out of using the entire SNOT-22 in pre-operative assessment of patients with CRS.

**ERS16-0879**

**INSTRUCTIONAL SESSION 24: HOW TO DILATE THE SINUSES WITH BALLOONS?**

**HOW TO DILATE THE SINUSES WITH BALLOONS?**

**C. Hopkins**<sup>1</sup>

<sup>1</sup>, Chislehurst, United Kingdom

This session will discuss indications for balloon dilatation and tips for practical application.

**ERS16-0853**

**WORKSHOP SESSION 5: INTRODUCTION TO FESS**

**INTRODUCTION TO FESS**

**M. Lindén<sup>1</sup>**

<sup>1</sup>, Falun, Sweden

Introduction to FESS

Sunday 3 July Hall F 14.10-15.40

Abstract topic n:o 4

INTRODUCTION TO FESS

Functional endoscopic sinus surgery- FESS- has spread worldwide and is now since more than 30 years an accepted method for treating chronic rhinosinusitis.

The concept and surgical technique was born in the early 1980-ies by Prof Walter Messerklinger ,Prof Heinz Stammberger Graz,Austria and Prof.David Kennedy USA. The concept is that most sinus infections are rhinogenic in origin and becomes "chronic" when the mucociliary clearance is compromised.

Furthermore the new theory claims that the sinus mucosa is not irreversibly diseased but reversible as soon as drainage and aeration is reestablished.

To achieve this goal – undisturbed mucociliary clearance - FESS was born. FESS is a surgical technique using endoscopes to reestablish sinus drainage by using minimal trauma to mucosa.

The introduction of FESS has also led to great development of other endonasal endoscopic procedures giving possibilities to treat other nasal and intracranial disorders such as tumors with improved results.

**FUTURE CHALLENGES IN RHINOLOGY**

**P. Stjärne**<sup>1</sup>

<sup>1</sup>*Karolinska Institute, ENT, Stockholm, Sweden*

The field of rhinology ranges from diseases that are major health problems for society such as allergic rhinitis and chronic rhinosinusitis to afflictions of the very few like sinonasal tumours.

During the last decades the advances in the management of sinonasal disease has been very much linked to technical progress in surgery such as the introduction of endoscopic sinus surgery and the development of tools and devices like powered instrumentation and navigation. In parallel to this development researchers have developed a fundamental understanding of the immune system and inflammatory mechanisms and now have biologic tools that can inhibit many immune cascade mechanisms. However, we are still mainly administering symptomatic treatment and many times struggling with patients with severe disease.

Some of the major challenges for rhinology are precision medicine, the need to increase our understanding and clinical identification of endotypes within the phenotypes of CRS and integration of biologics in treatment strategy.

The movement in the surgical field towards endoscopic solutions for skull base lesions is also an important challenge for our community. The development of 3D surgery, robotic solutions and advanced intraoperative imaging will enhance the possibilities for endoscopic resection beyond the skull base.

But the future also calls for new strategies for surgical training in a situation where caseload per surgeon is diminishing. Solutions for computerized simulation and dissection are necessary to increase patient safety and minimize complications.

Finally, increased networking and cooperation within our community and with other specialities is a necessary tool for new treatment development.

**ERS16-0846**

**SYMPOSIUM 2: HOW TO SUCCEED IN SEPTAL CORRECTION**

**SWEDISH AUDIT**

**C. Ahlström-Emanuelsson<sup>1</sup>**

<sup>1</sup>, Lund, Sweden

The Swedish Nasal Septal Surgery Register concerns respiratory-enhancing surgery of the nasal septum, with or without concurrent surgery of the nasal turbinates. Procedures in conjunction with other types of nasal or sinus surgery are not included.

The register was started in 1997 and underwent a major revision in 2012-13. Under the auspices of the Swedish Rhinologic Society, a reference group has analyzed inclusion criteria, surgical techniques, complications, patient information and other patient-related issues.

In the new version of the register it will be possible to measure the degree of change in nasal congestion after surgery. It will also be possible to record different surgical techniques, possible postoperative infections, lasting complications, and use of antibiotic therapy. The results will be used to refine patient selection criteria, and to compare the results of different surgical techniques. Ultimately, this will lead to improved quality and patient safety.

**EXTRACORPORAL AND OPEN APPROACH TO THE SEPTUM**

**A. Rabie**<sup>1</sup>

<sup>1</sup>*Ain Shams University, Otolaryngology, Cairo, Egypt*

Open approach to the septum refers to the use of the open rhinoplasty approach to address septal deviations while extracorporeal septoplasty refers to removing the quadrangular cartilage and constructing a neoseptum. Most of septal deviations can be managed by the usual closed approach through hemitransfixation incision, however some cases with high dorsal deviations, multiple fractures, fractured septum associating saddle or short nose deformity, or severe deviations in the caudal 1 cm of the septum may be challenging necessitating open approach to the septum. Through this approach the surgeon can have better control of the dorsal septum, to correct deviations with spreader grafts, batten grafts, septal replacement or extension grafts. Severe septal deviations may require extracorporeal septoplasty however we leave a small piece of cartilage at the keystone area to rigidly fix the neoseptum that is fabricated from septal, ear or costal cartilage. Aesthetic septal reconstruction refers to constructing a deep layer of septal L strut covered by diced cartilage in fascia and using columellar strut to get the nasal tip above the dorsal line. The indications, advantages, disadvantages and surgical techniques are discussed.



ENDOSCOPIC TECHNIQUE

S. Haruna<sup>1</sup>

<sup>1</sup>, Japan

Endoscopic reconstruction for deformities of nasal septum

The septal surgery is not easy operation, because the operator has to operate in the very narrow space even using endoscopy and there is much variation of the morphology of septum.

Initially, surface and infiltration anesthesia are very important.

Incision is made 1 cm from anterior edge of septal cartilage. the plain tip of the elevator is inserted through the incision and pushed forward along the upper anterior border and then, using the hooked end, the elevator is swept downward to the posterior part and withdrawn along the lower portion.

The incision in the cartilage is 2-3 mm posteriorly and 2/3 of its thickness.

The tip of the elevator is slowly glided in between the cartilage and perichondrium on the opposite side. Also the tip of the elevator must be always kept to contact with the surface of the cartilage.

When there are prominent ridges or spurs, elevation below the apex of the ridge or spur requires care.

There are two methods to remove bone and cartilage, with re-insertion and without resection of cartilage.

Precaution in regard to nasal columella and dorsum of the nose , because too much resection of cartilage of upper side become saddle nose.

When deviation of nasal septum is mainly anterior portion of cartilage, after removing septal cartilage, cartilage is trimmed as graft and graft is inserted into the anterior deviated portion and several times sutured with anterior deviated cartilage and the anterior portion become the flat .

Finally, round quilting suture by using Septum Stitch (special instrument) is performed.

**OLFACTORY TRAINING**

**T. Hummel<sup>1</sup>**

<sup>1</sup>, Dresden, Germany

*Aim:* Olfactory function is known to be modulated by repeated exposition to odors. Aim of this investigation was whether patients with olfactory loss would benefit from “training” with odors in terms of an improvement of their general olfactory function. It was hypothesized that olfactory training should produce both an improved sensitivity towards the odors used in the training process and an overall increase of olfactory function.

*Material and methods:* In a number of studies “olfactory training” was performed by patients with impaired olfactory function. Patients exposed themselves twice daily to 4 intense odors (for example, phenyl ethyl alcohol: “rose”, eucalyptol: “eucalyptus”, citronellal: “lemon”, eugenol: “cloves”). Olfactory testing was performed before and after training using the “Sniffin’ Sticks”.

*Results:* Compared to baseline, following patients experienced an increase in their olfactory function which was observed for the “Sniffin’ Sticks” test scores. In contrast, olfactory function was unchanged in patients who did not perform olfactory training.

*Conclusions:* These results indicate that the structured, short-term exposition to selected odors may increase olfactory sensitivity.

TOPICAL THERAPIES

T. Miwa<sup>1</sup>

<sup>1</sup>, Japan

The cause of olfactory dysfunction can be classified mainly as conductive or sensorineural loss. The major causes of conductive olfactory dysfunction are rhinosinusitis or allergic rhinitis. Sensorineural olfactory disorders may result from viral infection, head trauma, aging, drugs or neurodegenerative diseases. Although, various methods for the treatment of conductive olfactory loss have been used, treatment strategies for sensorineural olfactory disorders have been limited. Oral or topical corticosteroids are the most frequent medications prescribed for the treatment of olfactory disorders. Topical steroid have been used for patients with sensorineural olfactory dysfunction as a regenerative agent for olfactory neurons in Japan, however it has been shown clinically that there was no evidence of improvement in these patients. In this symposium, I will present the indications for topical steroid treatment, data and results for the treatment of conductive olfactory dysfunction and the body position for intranasal administration of corticosteroid. Finally I plan to discuss the future prospects of topical treatments using another drugs for olfactory disorder.

**SURGICAL TREATMENT OF OLFACTORY LOSS**

**E. Hedén Blomqvist<sup>1</sup>**

<sup>1</sup>Serafens Specialistmottagning, ÖNH ENT-dept, Stockholm, Sweden

**Aims**

**Method**

**Results**

**Conclusion**

Olfactory loss can sometimes be treated with surgery. For example, various authors have reported improvement in olfaction after sinus surgery. However, in several of these studies, the importance of simultaneous medical treatment is not clear.

Some recent studies have showed that functional endoscopic sinus surgery (FESS) significantly improved all nasal symptoms measured by subjective and butanol tests in patients with nasal polyposis. In another study extensive endoscopic sinus surgery (EESS) resulted in better improvement in the olfactory VAS score compared with FESS in patients with nasal polyposis and asthma.

We compared the effects of medical treatment and combined surgical / medical treatment on olfaction, polyp scores and symptoms in patients with nasal polyposis. We have showed that the combination of local and oral steroids, improved the sense of smell, but surgery had no additional effect. Symptom scores became significantly better with medical treatment alone, but surgery had additional beneficial effects on nasal obstruction and secretions as well as polyp scores.

Surgical treatment can improve nasal respiratory airflow in patients without inflammatory disease. One recent study has showed that septoplasty may improve olfaction. Another study showed improvement in olfactory function after nasal septal perforation repair with the “cross-stealing” technique.

**DIFFERENTIAL DIAGNOSIS: ALLERGY, ADENOIDS OR CRS**

**F. Baroody**<sup>1</sup>

<sup>1</sup>, Chicago, USA

Nasal congestion and drainage are common complaints in the pediatric age group. They are manifestations of sino-nasal or adenoid pathology. History, physical examination (including nasal endoscopy), serum and skin allergy testing, as well as imaging help point to the appropriate etiology. Chronic rhinosinusitis (CRS) is defined as symptoms of nasal congestion with anterior/posterior purulent nasal drainage and cough for 12 or more weeks. Chronic adenoiditis presents with similar symptoms and differentiating between these entities is challenging. CT scanning helps with differentiation with a Lund McKay score of >5 being more suggestive of CRS as opposed to an adenoid problem. Moreover, symptoms of obstructive sleep apnea, mouth breathing and chronic nasal drainage are more consistent with obstructive adenoids with superimposed infection. Allergic rhinitis also causes nasal congestion and drainage but the nasal drainage is usually clear in color and the symptoms correlate with exposure to outdoor or indoor allergens. Skin testing or serum testing for specific IgE usually helps identify the offending allergens and confirm the diagnosis of allergic rhinitis. Treatment strategy is dependent on making the appropriate diagnosis. Large adenoids leading to sleep apnea are best managed surgically. As far as medical management for CRS and adenoiditis, intranasal steroids and saline irrigations are mainstay and surgery is useful in the patients who fail maximal therapy and might include one or more of the following: adenoidectomy, sinus irrigation or endoscopic sinus surgery. The treatment of nasal allergies is medical and the mainstay of therapy is intranasal steroids or combination pharmacotherapy.

**ANTI-ALLERGIC EFFECTS OF ANTI-IL-33 IS ASSOCIATED WITH SUPPRESSION OF IMMUNOGLOBULIN LIGHT CHAIN AND INDUCIBLE NITRIC OXIDE SYNTHASE**

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<sup>2</sup>Inha University College of Medicine, Department of Pharmacology, Incheon, Republic of Korea

**Aims**

We aimed to find genes significantly induced in allergic mice and that significantly are down-regulated with anti-IL-33 treatment.

**Method**

Thirty-six mice were allocated into each of Group A (intraperitoneally sensitized and intranasally challenged to saline), Group B (sensitized and challenged to ovalbumin), Group C (sensitized and challenged with ovalbumin, and null treatment with intraperitoneal saline), and Group D (sensitized and challenged with ovalbumin, and treatment with anti-IL-33 intraperitoneal injection). We checked the number of nose-scratching in 10 minutes, serum ovalbumin-specific Immunoglobulin E, and titers of cytokines in bronchoalveolar lavage fluid. Using one whole lung from each mouse, we performed microarray and real-time Polymerase Chain Reaction.

**Results**

Group D showed significantly reduced nose-scratching events and lower serum ovalbumin-specific IgE compared to Groups B and C. All cytokines in bronchoalveolar lavage fluid were significantly decreased after anti-IL-33 treatment. Microarray analysis revealed that Group B (Immunoglobulin free light chain (*IgFLC*): 89.1 times, Nitric Oxide Synthase 2 (*NOS2*): 11.5 times) and Group C (*IgFLC*: 141.6 times, *NOS2*: 11.7 times) had significantly increased expression of *IgFLC* and *NOS2* gene compared to Group A. Group D showed significantly decreased expression of *IgFLC* (49.3 times) and *NOS2* (6.5 times). In real-time PCR, Group B and C had significantly increased expression of these genes (*IgFLC*: 10.4 times and 29 times, respectively; *NOS2*: 3.8 times and 4.5 times). Group D showed significantly decreased expression of *IgFLC* (5.0 times) and *NOS2* (2.5 times).

**Conclusion**

The anti-allergic effect of anti-IL-33 can be explained by suppression of *IgFLC* and *NOS2* in mice with allergic rhinitis.

**DUPILUMAB REDUCES LOCAL TYPE 2 PROINFLAMMATORY BIOMARKERS IN PATIENTS WITH CHRONIC SINUSITIS AND NASAL POLYPOSIS**

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**Aims**

In Europe and the US, chronic sinusitis with nasal polyps (CSwNP) mainly represents a disease driven by Th2-inflammation with elevated levels of ECP, total IgE, and Th2 cytokines. In a phase 2 study (ClinicalTrials.gov: NCT01920893), dupilumab, an anti-IL-4R $\alpha$  antibody targeting the IL-4/IL-13 pathways, reduced Th2 biomarkers in the blood (e.g. IgE and eotaxin-3), and significantly improved endoscopic, radiographic, symptom, and quality of life endpoints. Injection site reactions, headache, and nasopharyngitis were most frequently reported adverse events. We now report the effect of dupilumab treatment on inflammatory biomarkers in nasal secretions (NS) and polyp tissue.

**Method**

Adults with CSwNP received subcutaneous dupilumab 300 mg (N=30) or placebo (PBO) (N=30) weekly (qw) for 16 weeks added to daily intranasal mometasone furoate treatment. Nasal polyp biopsies were collected (15 of 60 patients) at baseline and week (wk) 16. Biomarkers were assayed in NS and homogenized polyp tissue.

**Results**

In NS, eotaxin-3 and total IgE levels (mean area under curve for changes from baseline, 0–16 wks) were significantly lower on dupilumab versus PBO ( $p < 0.001$ ,  $p < 0.022$ , respectively). In nasal polyp tissue, there was a significant decrease in IgE ( $p = 0.047$ ), ECP ( $p = 0.008$ ), Eotaxin-2 ( $p = 0.008$ ), Eotaxin-3 ( $p = 0.031$ ), and PARC ( $p = 0.016$ ) after treatment with dupilumab compared with baseline, and no significant changes were seen on PBO.

**Conclusion**

In patients with chronic sinusitis and nasal polyposis, treatment with dupilumab 300 mg qw reduces Type 2 inflammation markers such as IgE and chemokines in blood and NS; moreover, in polyp tissue, this also includes the eosinophil marker ECP.

**A RANDOMISED CONTROLLED TRIAL OF SODIUM CITRATE SPRAY FOR NON-CONDUCTIVE OLFACTORY DISORDERS**

***C. philpott<sup>1</sup>, S. Erskine<sup>2</sup>, A. clark<sup>3</sup>, A. leeper<sup>4</sup>, R. sharma<sup>3</sup>, S. patel<sup>4</sup>, G. murty<sup>5</sup>***

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**Aims**

Previous research has suggested that sodium citrate improves hyposmia by decreasing mucus calcium levels in the nose. This study aimed to confirm or refute this effect in a single application including the peak and duration of the effect.

**Method**

Fifty patients with non-conductive olfactory loss confirmed on endoscopic examination and Sniffin' Sticks olfactory test were randomised to receive the intervention (sodium citrate nasal spray) or placebo (sterile water). Outcome measures included Improvement in olfactory thresholds of  $\geq 2$  threshold dilutions over 2 hours; peak and duration of effect; adverse effects of citrate.

**Results**

A significant effect was seen in the intervention arm for 2 of the 4 odours (phenyl ethyl alcohol and eucalyptol) when compared to the control arm ( $P < 0.05$ ). From the 29 participants randomised to the intervention arm, at least 8 showed a temporary improvement in olfactory performance with a peak effect at 15-30 minutes after application and lasting no longer than 2 hours. Minor adverse effects noted included sore throat and nasal paraesthesia.

**Conclusion**

Sodium citrate yields some potential as a treatment for non-conductive olfactory loss, however these findings require corroboration in further clinical trials looking at longer-term regular use of the spray to see if it is a viable therapeutic option for patients.



**ERS16-0814**

**SYMPOSIUM 6: PRECISION MEDICINE IN RHINOLOGY DISEASES**

**CRSwNP**

**C. Bachert<sup>1</sup>**

<sup>1</sup>, Ghent, Belgium

**Precision medicine in rhinology diseases – CRSwNP**

Claus Bachert MD, PhD, Ghent University Hospital and Upper Airways Research Laboratory, Belgium

About 50% of CRSwNP patients also develop asthma, and more than one third will need revision surgery or even several surgeries after a first sinus surgery. Nowadays, based on the inflammatory mediators, we are able to differentiate “endotypes” within the “phenotype” CRSwNP, clearly different in the mediators involved in the inflammation. Those endotypes are helpful in determining the prognosis after surgery and the likelihood for asthma comorbidity; they also form the basis for innovative treatment approaches such as humanized monoclonal antibodies. We here present a scheme to endotype CRS, and show the distribution of endotypes of CRS in 3 continents. It is evident that there is a worldwide variation in specific endotypes, which need to be appreciated to optimize treatment from surgery to pharmacotherapy and finally biologics.

**ERS16-0801**

**SYMPOSIUM 7: THE INNATE IMMUNE SYSTEM IN CRS**

**THE ROLE OF ANTIMICROBIAL PEPTIDES IN THE NOSE**

**S. Carney<sup>1</sup>**

<sup>1</sup>, *Adelaide, Australia*

The innate immune system consists of several layers of defense against invading micro-organisms. Membrane-bound receptors, epithelial defenses and secreted anti-microbial peptides are three critical components of the system.

Lysozyme, lactoferrin, defensins and cathelicidins are among the numerous secreted anti-microbial peptides and these are now known to have activity against bacteria and fungi.

This talk will summarize the current evidence about the role these peptides play in protecting the human nose against CRS.

Nasal saline irrigation is known to reduce their activity and there is also evidence that different formulations may be more beneficial than others.

Bitter taste receptors are one of the current hot research topics in rhinology. There is now evidence their stimulation can lead to enhanced secretion of anti-microbial peptides and this asks the question whether this could be used as a novel treatment methodology for CRS.

**TARGETING THE INNATE IMMUNE SYSTEM FOR TREATMENT**

**N. Cohen**<sup>1</sup>

<sup>1</sup>*University of Pennsylvania, Otorhinolaryngology - Head and Neck Surgery, Philadelphia, USA*

Taste receptors on the tongue communicate information to the brain about the nutrient content or potential toxicity of ingested foods. However, recent research has now shown that taste receptors are also expressed far beyond the tongue, from the airway and gastrointestinal epithelia to the pancreas and brain. The functions of many of these so-called “extraoral” taste receptors remain unknown, but emerging experimental evidence suggests that bitter and sweet taste receptors in the upper airway are important in sensing bacteria and regulating innate immunity. In the upper airway epithelium two distinct cell types have been demonstrated to express taste receptors. Bitter taste receptors localizing to ciliated cells regulate production of nitric oxide resulting in increased mucociliary clearance and direct bactericidal activity while sweet and bitter taste receptors expressed on solitary chemosensory cells regulate the release of antimicrobial peptides into the airway mucus. Thus, activating either of these innate immune pathways has therapeutic implications. We will review these two novel complimentary arms of upper airway innate defense in the context of novel therapeutic strategies in combating upper respiratory infections.

ERS16-0266

FREE PAPER SESSION 1: DIAGNOSIS OF CHRONIC RHINOSINUSITIS

**MEDICATION USE BETWEEN CHRONIC RHINOSINUSITIS SUBTYPES: DATA FROM THE CHRONIC RHINOSINUSITIS EPIDEMIOLOGICAL STUDY (CRES) PRESENTED ON BEHALF OF THE CRES GROUP**  
***S. Erskine<sup>1</sup>, A. Clark<sup>2</sup>, C. Philpott<sup>2</sup>, . The CRES Group<sup>3</sup>***

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**Aims**

To establish any differences in medication use, for both CRS and other medical problems, between those with CRSwNPs and eCRSsNPs.

**Method**

Data were obtained from the Chronic Rhinosinusitis Epidemiological Study (CRES). This questionnaire study involved patients with CRS (defined by EPOS guidelines) attending ENT clinics from 30 centres across the UK. The study-specific questionnaire included asking patients to list all medications they were currently taking.

**Results**

Completed questionnaires were collected from 1470 participants; CRSsNP (n=553), CRSwNP (n=651). There were significant differences in medication use between groups; a greater proportion of those with CRSsNP took opiate analgesics (6.3% vs 3.1%), NSAIDs (4.9% vs 1.7%), beta blockers (5.8% vs 2.6) and antidepressants (13.6% vs 7.1), whilst those with CRSwNP used more steroid inhalers (20.3% vs 8.7%). A low proportion of patients reported use of sinus rinses (CRSwNP vs CRSsNP 1.7% vs 0.9) or nasal sprays (18.7% vs 12.1%).

**Conclusion**

Whilst there are obvious reasons for some medication differences (for example higher rates of asthma amongst those with CRSwNPs would lead to greater use of steroid inhalers and lower use of beta blockers/NSAIDs), other differences such as use of opiate analgesics and antidepressants have more complex explanations and may provide more information about the different natures of these patient groups. The low reported use of nasal medications may reflect poor compliance with EPOS guidelines (by clinicians or patients) or may indicate that patients do not perceive these to be medications, both of which should be addressed by Rhinologists to improve management of those with CRS.

**CHARACTERIZATION OF CT-SCAN HYPERDENSITIES IN FUNGUS BALL OF THE PARANASAL SINUSES: PRELIMINARY RESULTS**

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**Aims**

CT-Scan hyperdensities are described in more than 60% of all paranasal sinuses fungus ball (FB). Two types of hypersensitivities could be distinguished according to their densities: calcium-type and metal-type. Our aim was to describe the prevalence, densities and relation to dental factors of the hyperdensities observed in sphenoid and maxillary sinuses FB.

**Method**

This retrospective study included the patients operated in a tertiary referral centre for a unilateral maxillary or sphenoidal FB diagnosed by histology or mycology. The pre-operative CT-scans were analyzed by three independent observers (2 ENT, 1 radiologist).

**Results**

Twenty-three patients have been included in this preliminary study. There were 17 maxillary and 6 sphenoid FB. All FB showed hyperdensities. Metal-type hyperdensities were observed in 11 maxillary FB but not in sphenoid sinus. Their maximal density was  $2935 \pm 164$  UH. The presence of maxillary metal-type hyperdensities was significantly associated with the presence of endodontic treatment in the ipsilateral teeth ( $p=0.03$ ). Their maximal density correlate with maximal density of endodontic material implanted ( $r=0.87$ ;  $p=0.004$ ). Calcium-like hyperdensities appeared in 14 maxillary and 6 sphenoid FB. Their maximal density was  $533 \pm 312$  UH. They were associated to metal-type hyperdensities in 8 maxillary FB.

**Conclusion**

This preliminary study highlights the existence of two different hyperdensities inside FB of the paranasal sinuses. Metal-type hyperdensities seems to be associated to endodontic treatments and may consist of endodontic material extrusion. Further inclusions are planned and may help to understand the nature of these hyperdensities and the physiopathogeny of paranasal FB.

**NASAL AND SINUS SYMPTOMS IN CHRONIC RHINOSINUSITIS AND NASAL ALLERGY; IMAGING OF THE NASAL SINUS IN THE NORMAL POPULATION**

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**Aims**

To verify whether the epidemiological definition of EPOS is a proper estimation of the prevalence of chronic rhinosinusitis (CRS) using radiology as golden standard we examined the symptoms and scans of people having CT or MRI for any non-ENT indication.

**Method**

We asked patients who had a CT or MRI scan of the head for any non-ENT indication to fill in the GA2LEN survey containing the EPOS symptom criteria. The scans were evaluated according to the Lund-Mackay (LM) scoring system. CRS was defined by the EPOS symptom criteria. Allergic rhinitis (AR) was defined by self-reported history of 'nasal allergy or hay fever'.

**Results**

729 patients were included, 36% male, with an average age of 53 years (SD: 16, range: 8-89). EPOS symptom criteria for CRS were fulfilled in 12,9% of participants and self-reported doctor-diagnose of CRS in 4,7%. AR was reported by 20%. Of the participants that fulfilled the EPOS criteria 53% had a LM score of >0. 24% had a LM score of  $\geq 4$ . For self-reported doctor-diagnosed CRS these figures were 62% and 29%. For AR: LM<sub>>0</sub>: 54%, LM <sub>$\geq 4$</sub> : 20%. In patients that did not report upper airway symptoms: LM<sub>>0</sub>: 40%, LM <sub>$\geq 4$</sub> : 13%.

**Conclusion**

In a population having CT or MRI of the head 53% of the participants that fulfilled the EPOS symptom criteria for CRS had abnormalities on imaging, and 24% a LM score of  $\geq 4$ .

**NASAL NITRIC OXIDE MEASUREMENT IN MANAGEMENT OF CHRONIC RHINOSINUSITIS**

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<sup>1</sup>*Clinical Centre of Vojvodina- ENT Clinic- University of Novi Sad- Faculty of Medicine, Rhinology, Novi Sad, Serbia*

**Aims**

The aim of this study was to determine the nasal nitric oxide concentration in patients with chronic rhinosinusitis (CRS), with and without nasal polyps, and its possible role in management of patients with CRS.

**Method**

The study encompassed 90 patients, divided in two groups: 30 healthy (control group) and 60 with CRS (30 with and 30 without nasal polyps). The nasal NO concentration was measured by NIOX MINO® analyzer, by its lower airways mode (nasal exhalation through the mask, with and without humming maneuver - nasal FENO).

**Results**

The mean concentration of nasal FENO in all 60 patients with CRS was significantly lower than control group, regardless of presence of nasal polyps, and the method of measurement. The mean concentration of nasal FENO in patients with CRS with nasal polyps, measured by both silent and humming exhalation, was significantly decreased compared to patients with CRS without nasal polyps. In patients with OMC blockage, there was no significant increase in nasal FENO concentrations obtained by humming maneuver compared to values of nasal FENO obtained by silent exhalation.

**Conclusion**

The patients with CRS have significantly lower nasal NO concentrations than healthy, with the patients with nasal polyps having significantly lower findings than patients without nasal polyps. Measurements of FENO with humming maneuver can be used as a test of sinus ostia patency.

**THE IMPORTANCE OF ENT EVALUATION IN PERSONS WITH NSAID INTOLERANCE**

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<sup>1</sup>Odense University Hospital, Department of Otorhinolaryngology, Odense, Denmark

<sup>2</sup>Odense University Hospital, Department of Dermatology and Allergy Centre, Odense, Denmark

**Aims**

To estimate the prevalence of chronic rhinosinusitis (CRS) with and without polyps in persons with NSAID intolerance and to evaluate QoL and the need of ENT intervention.

**Method**

Persons positive of having NSAID intolerance at the Department of Dermatology and Allergy Centre were prospectively referred to the Department of Otorhinolaryngology where they were examined by an ENT doctor. All persons completed the Sino Nasal Outcome Test 22 (SNOT 22) and underwent nasal endoscopy and smell test.

**Results**

A total of 28 persons with NSAID intolerance were included. CRS was diagnosed in 13 persons of whom 9 persons had polyps. The mean SNOT 22 score was 41 and 12 in persons with and without CRS respectively. The sense of smell was decreased in persons with CRS. Nine persons were using nasal steroid (NS) and another 6 persons were recommended NS. Six persons had former sinus surgery. Nine persons underwent new sinus surgery.

**Conclusion**

Almost 50% of persons with NSAID intolerance have CRS and decreased QoL. In persons with sinonasal problems medical and surgical advice and treatment is important. It is recommended that persons with NSAID intolerance are evaluated for sinonasal symptoms ideally by an ENT doctor.



**EOSINOPHIL FUNGAL RHINOSINUSITIS: A SEPARATE CLINICAL ENTITY ?**

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<sup>1</sup>, Brugge, Belgium

<sup>2</sup>AZ St-Johns Hospital Bruges, Rhinology, Bruges, Belgium

**Aims**

Prospectively 118 patients between 1992 and 2006 were retained with the diagnosis of Eosinophilic Fungal Rhino sinusitis (EFRS). This is the largest group to date observed in a single centre.

**Method**

Diagnosis of EFRS WAS based on the pathological findings of eosinophilic mucin with (necrotic) eosinophils typically in layers, Charcot-Leyden crystals and fungal hyphae in different stages of decomposition. .

**Results**

Sixty-seven patients (57 %) were female and 51 (43 %) male. Patients with diabetes and immunodeficient disorders were excluded. Diagnosis was obtained through sampling at surgery in 45 (38%) cases . In the remaining 73 (61.8%) cases diagnosis was obtained through secretion samplings. Of interest 59 patients 50 % were diagnosed as EFRS-like lacking the finding of hyphae in their first samplings. In 71 (60%) patients, only one operation was performed. Forty-two (35.6%) patients needed more operations to a maximum of 7 operations in one patient. In 5 (4%) CRS patients diagnosis was based on sampling materials.

In 109 (92%) of the patients a pan sinusitis was observed. Unilateral disease occurred in 9 (8%) patients; Nasal Polyposis (NP) was noted in 70 (59%) OF CRS patients.

Allergy in 39 (33%); asthma 39 (33%); allergy and asthma together in 24 (20%) cases. APA syndrome was retained in 15 (13%) cases.

**Conclusion**

Pansinusitis mainly occurs with Nasal Polyposis (NP) but importantly also without. Bad prognostic features for recurrence seem to be -amongst others- the intensity of eosinophils in the mucus plugs and the presence of NP. Diagnosis is mainly based on (repeated) samplings of nasal secretions.

**DISCRIMINATION BETWEEN RHINOSINUSITIS AND RHINITIS IN ASTHMA USING LOSS OF SMELL AS A SYMPTOM-GUIDE**

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**Aims**

Rhinitis and chronic rhinosinusitis (CRS) are associated with asthma. International guidelines (ARIA, EPOS) recommend, in addition to nasal endoscopy, CT scan, and skin prick test, the use of sinonasal symptoms to define rhinitis and CRS. We aimed to assess the disease prevalence and the reliability of sinonasal symptoms to discriminate between rhinitis and CRS in asthma patients.

**Method**

Asthmatic patients (N=492, 45(±15) yo, 70.5% female) were recruited (GINA): 17.3% intermittent and 82.7% persistent [24.6% mild, 31.4% moderate, 26.7% severe] in a prospective study by pneumonologists and ENT specialists. Allergic (AR) and non-allergic (NAR) rhinitis and CRS with (CRSwNP) and without (CRSsNP) nasal polyps were evaluated according (ARIA, EPOS) based on nasal symptoms, SPT, nasal endoscopy, and sinus CT scan.

**Results**

Half of asthma patients (49.6%) had rhinitis (AR: 37.0%; NAR: 12.6%), 36.2% CRS (CRSsNP: 16.7%; CRSwNP: 19.5%), while 14.2% had no sinonasal disease. Loss of smell significantly ( $p<0.001$ ) discriminated between CRS and rhinitis (76.4% vs 41.0%). In addition, loss of smell was more prevalent in CRSwNP compared to CRSsNP (83.3% vs 68.3%,  $p<0.001$ ) but similar in AR and NAR (43.5% vs 41.7%). Differences on other common symptoms didn't discriminate between CRS and rhinitis: sneezing (87.1% vs 86.6%), ocular itching (73.6% vs 68.6%), rhinorrhea (83.1% vs 78.2%), and nasal obstruction (88.8% vs 82.8%).

**Conclusion**

Most asthmatic patients (86%) have nasal symptoms, 50% of them having rhinitis alone and 36% CRS. The loss of smell may be considered the symptom-guide to discriminate CRS (predominantly nasal polyps) from rhinitis alone in asthma patients

**MORPHOLOGICAL CONCORDANCE BETWEEN CBCT AND MDCT: PRELIMINARY RESULTS**

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**Aims**

Cone-beam computed tomography (CBCT) is an imaging technique, first developed for use during oral and pre-implant surgery. In sinonasal surgery, CBCT might represent a valuable tool for anatomical research given its high spatial resolution and low irradiation dose. However, clinical and anatomical evidence pertaining to its efficacy is lacking. This study assessed the morphological concordance between CBCT and multislice detector computed tomography (MDCT) in the context of sinonasal diseases.

**Method**

In this prospective study one neuro-radiologist and one ENT surgeon evaluated 15 patients with sinonasal complaints. Each patient underwent both CBCT and MDCT. Reviewers evaluated 26 notable anatomical landmarks. The primary outcome was the overall morphological concordance between the two imaging techniques. Secondary objectives included assessment of inter-rater agreement and comparison of the radiation doses received.

**Results**

Overall morphological concordance between the two imaging techniques was excellent (95%); the inter-rater agreement for CBCT was approximately 98%, which is highly similar to MDCT, but achieved using a significantly decreased irradiation dose.

**Conclusion**

Our preliminary study indicates that CBCT represents a valid, reproducible and safe technique for the identification of relevant sinonasal anatomical structures in pathological contexts. Further research, particularly for presurgical evaluation (chronic rhinosinusitis, poliposis), is required.

**IMPLICATING PATIENTS IN SINUS CARE: THE CHRONIC SINUSITIS ACTION PLAN (CSAP)**

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**Aims**

Chronic rhinosinusitis (CRS) requires ongoing management to prevent exacerbations. Written asthma action plans, which describe progressive management of the disease, have been shown to improve health outcomes in patients with asthma. Published patient self-education written action plans for CRS however do not yet exist. Our objective was to develop an action plan for CRS.

**Method**

The chronic sinusitis action plan (CSAP) was developed in both English and French based on a literature review of the published guidelines, expert feedback and patient feedback. The primary goal of the CSAP is to increase knowledge of symptoms and recognition of exacerbations as well as the associated treatments. The CSAP is divided into 3 categories: baseline, exacerbation and emergency. Experts and patients then validated the developed CSAP. A readability assessment was also undertaken.

**Results**

The CSAP has gone through two separate validation phases. Seven rhinologists with a tertiary practice validated the CSAP through expert consensus based on Delphi techniques with a Likert-based survey and all agreed (score of 4/5) that the CSAP described the important symptoms and associated management for the three categories. Sixteen patients completed a survey for the secondary validation phase, with a 100% finding the CSAP a very helpful instrument that their physicians should use. The CSAP meets the recommended readability criteria.

**Conclusion**

The CSAP is a novel patient self-education tool that both patients and their rhinologists can easily use for CRS. Future directions include prospective validation of the CSAP to evaluate the clinical impact on patients with CRS.

**PUBLIC OUTREACH IN CRS: THE CANADIAN RHINOSINUSITIS WORKING GROUP INITIATIVE**

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**Aims**

Sinusitis is a frequent entity that has a significant impact upon patients as well as society with increasing health care costs and antibiotic resistance. Despite this, patients, physicians and policy makers are rarely familiar with sinusitis as a disease entity. This lack of understanding leads to sub-optimal patient care, underfunding of research, and poor allocation of health care resources.

**Method**

In order to improve physician, public and government awareness of sinusitis in Canada, we have developed an outreach and advocacy effort aimed at increased recognition of sinusitis. The Canadian Rhinosinusitis Best Practices and Working Group (CRSWG) is an offshoot of the Canadian Guidelines in Acute and Chronic Rhinosinusitis effort and was launched in 2012. This effort incorporates ongoing input from all stakeholder groups implicated in acute and chronic rhinosinusitis, including ENT, allergy, microbiology, and the primary care respiratory group.

**Results**

We initially used this forum ([www.sinuscanada.com](http://www.sinuscanada.com)) to offer physician education resources, highlight pharmacoeconomic and policy issues and promote Canadian contributions to sinusitis research. Over time, this effort has moved beyond physician education to be more closely target patients by changing the format of the site to be mobile friendly, having additional patient resources, and adding a weekly 'blog' on selected topics, which is 'Tweeted' to our followers.

**Conclusion**

While this effort is still nascent, the goal is to help improve sinus care at multiple levels, resulting in better recognition and funding of sinus disease, improved care via increased adoption of optimal practices, increased patient compliance, and enhanced patient satisfaction.

**THE RELATIONSHIPS OF RHINOENDOSCOPY, CRP LEVELS AND POSITIVE CULTURE WITH QUALITY OF LIFE IN ACUTE RHINOSINUSITIS**

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**Aims**

Acute rhinosinusitis (ARS) has been shown to significantly reduce patient quality of life (QoL). The aim of this study was to determine the relationship between the QoL and rhinoendoscopy and parameters suggestive of acute bacterial rhinosinusitis (CRP levels and positive culture) and to see if measurement of the QoL could be used as an indicator for antibiotic treatment in ARS.

**Method**

Eighty patients with ARS were enrolled in the study. A novel QoL instrument for patients with ARS, called MARS (Measurement of Acute Rhinosinusitis), was given to patients at the time of diagnosis. We assessed patient QoL, rhinoendoscopy, obtained endoscopically guided cultures from the middle meatus, and measured levels of CRP. The relationship between QoL MARS scores (QoL-Mscores) and CRP was determined using a correlation coefficient and between rhinoendoscopy and QoL using ANOVA test. To compare QoL-Mscores, relative to in culture-positive and culture-negative patients, the t-test was used.

**Results**

No correlation between the QoL, assessed using the MARS questionnaire, and positive middle meatus culture and QoL and rhinoendoscopy was demonstrated ( $p = 0.332$  and  $p = 0.669$  respectively). A weak correlation was found between QoL-Mscores and CRP values, with a correlation coefficient of 0.221 and  $p = 0.0498$ .

**Conclusion**

No correlation between the QoL in ARS patients and positive culture and QoL and rhinoendoscopy was found in this study. The clinical significance of the correlation between QoL-Mscores and CRP values in the antibiotic decision making process needs further research

**ENDOSCOPIC SURGERY FOR THE TREATMENT OF ACUTE INVASIVE FUNGAL SINUSITIS IN HAEMATOLOGICAL PATIENTS: ANALYSIS OF 16 PATIENTS.**

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**Aims**

Invasive fungal sinusitis (IFS) represents a rare infectious disease bearing a poor prognosis that affects most commonly immunocompromised patients. IFS comprises 3 different forms of infection, among which the Acute invasive type (AIFS) represents the most common type in haematological patients. The aim of this study was to analyze the clinical features and prognostic factors of those patients affected by AIFS and surgically treated via an endoscopic surgery.

**Method**

We analyzed a group of 16 patients affected by AIFS and surgically treated with a transnasal endoscopic approach between 2003 and 2015 at the University of Bologna-Italy . We analyzed clinical, radiological and microbiologic data, environmental factors and timing of the treatment.

**Results**

13 patients were male while 3 female. Among the different diagnostic procedures, nasal endoscopy resulted the most accurate assessment when compared to nasal swabs, serum galactomannan (both poorly sensitive) or unenhanced CT scan (poorly specific). Endoscopic surgical treatment in association to antifungal medical management obtained a 75% rate of success for the complete control of AIFS. The delay between symptoms onset and surgical therapy resulted the only variable (inversely) associated with survival ( $p= 0.043$ ).

**Conclusion**

Patients receiving a sino-nasal endoscopic surgery in association with antifungal treatment showed a better survival rate when compared to the average data of the literature. In our series, early diagnosis and prompt surgical treatment appeared to improve survival. Therefore, we recommend the early use of the nasal endoscopy in order to achieve an effective and swift diagnosis.

**THE BURDEN AND MANAGEMENT OF RHINITIS AND RHINOSINUSITIS IN PRIMARY CARE**W. Fokkens<sup>1</sup>, A. Nibber<sup>2</sup>, A. Chisholm<sup>3</sup>, P. Hellings<sup>4</sup>, D. Nibber<sup>5</sup>, D. Price<sup>6</sup><sup>1</sup>Academic Medical Centre, Otorhinolaryngology, Amsterdam, Netherlands<sup>2</sup>Research in Real Ltd, Research in Real Ltd, Cambridge, United Kingdom<sup>3</sup>Respiratory Effectiveness Group, Respiratory Effectiveness Group, Cambridge, United Kingdom<sup>4</sup>University Hospital Leuven, Department of Otorhinolaryngology, Leuven, Belgium<sup>5</sup>Optimum Patient Care Ltd, Optimum Patient Care Ltd, Cambridge, United Kingdom<sup>6</sup>University of Aberdeen, Centre of Academic Primary Care-, Aberdeen, United Kingdom**Aims**

Rhinitis and rhinosinusitis are diseases of the upper airways with a high prevalence and when they are chronic with a high quality of life burden on patients and costs for society. To date, data on the primary care burden of rhinitis and rhinosinusitis are limited as is knowledge of how primary care physicians currently manage these patients. This study aims to quantify the burden of rhinitis and rhinosinusitis and characterize related management approaches in UK primary care.

**Method**

Patients with diagnostic codes for rhinitis and rhinosinusitis were identified within the UK's Optimum Patient Care Research Database (OPCRD), a respiratory enriched primary care database. Consultations over a 5-year period (latest for each patient) code for rhinitis and rhinosinusitis symptoms resulting in prescriptions for antibiotics, oral steroids and/or antihistamines were identified. Prescribed therapies were mapped across rhinitis/rhinosinusitis and allergic/non-allergic patient subgroups.

**Results**

685,429 patients were identified with rhinitis and rhinosinusitis. Of these patients: 5% had a diagnostic code for acute rhinitis, 26% for acute rhinosinusitis, 10% for chronic rhinosinusitis, 45% for chronic allergic rhinitis, 1% for chronic non-allergic rhinitis and 8% undefined chronic rhinitis. A total of 1,664,068 consultations for rhinitis and rhinosinusitis symptoms were identified, of which 27% resulted in an antibiotic prescription. See Table for other medication.

Subgroup	Antibiotics (n=185,730)	Steroids (n=98,518)			Anti-histamines (n=123,709)		Sodium Cromoglycate (n=1,424)
		Oral (n=5,597)	Nasal Spray (n=92,671)	Nose Drop (n=250)	Oral (n=122,582)	Nasal Spray (n=1,127)	
Acute Rhinosinusitis (n=176,353)	125,848 (71%)	1,099 (1%)	11,605 (7%)	94 (1%)	3,061 (2%)	69 (0%)	22 (0%)
Acute Rhinitis (n=80,900)	9,450 (12%)	526 (1%)	3,927 (5%)	15 (0%)	3,046 (4%)	44 (0%)	47 (0%)
Chronic Rhinosinusitis (n=65,510)	38,218 (58%)	446 (1%)	9,292 (14%)	20 (0%)	1,773 (3%)	52 (0%)	41 (0%)
Chronic Allergic Rhinitis (n=306,030)	8,329 (3%)	2,999 (1%)	45,516 (15%)	58 (0%)	108,909 (36%)	721 (0%)	1073 (0%)
Chronic Non-allergic Rhinitis (n=4,746)	112 (0%)	22 (0%)	1,075 (23%)	0 (0%)	260 (5%)	14 (0%)	6 (0%)
Chronic Rhinitis (undefined, n=51,790)*	3,773 (7%)	505 (1%)	21,256 (41%)	63 (0%)	5,533 (11%)	227 (0%)	235 (0%)

\*Patients undefined in terms of allergic or non-allergic disease

**Conclusion**

In the OPCRD, rhinosinusitis consultations make up 35% of primary care consultations for rhinitis and rhinosinusitis. Interestingly, almost three-quarters of patients (71%) consulting for acute rhinosinusitis and 58% of patients with chronic rhinosinusitis receive an antibiotic prescription.



**SINUS SURGERY POSTPONES CHRONIC GRAM-NEGATIVE LUNG INFECTION: COHORT STUDY OF 106 PATIENTS WITH CYSTIC FIBROSIS**

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**Aims**

In patients with cystic fibrosis (CF) the sinuses are a bacterial reservoir for Gram-negative bacteria (GNB). From the sinuses the GNB can repeatedly migrate to the lungs. In a one-year follow-up study, endoscopic sinus surgery (ESS) with adjuvant therapy reduced the frequency of pulmonary samples positive for GNB. We investigated whether the effect is sustained

**Method**

We report the effect of ESS and adjuvant therapy three years postoperatively in a CF cohort participating in this prospective clinical follow-up study. The primary endpoint was the lung infection status defined by Leeds criteria

**Results**

One hundred and six CF patients underwent ESS; 27 had improved lung infection status after three years. The prevalence of patients free of lung colonization with GNB significantly increased from 16/106 patients (15%) preoperatively to 35/106 patients (33%) after three years. The total cohort had decreasing lung function during follow-up; however, in 27 patients with improved lung infection status lung function was stable. Revision surgery was performed in 31 patients (28%)

**Conclusion**

ESS with adjuvant therapy significantly improves the lung infection status for at least three years in our cohort of patients with CF and may postpone chronic lung infection with GNB and thus stabilize lung function

**THE PRESENCE OF EOSINOPHILIC MUCIN AND FUNGAL HYPHAE INFLUENCES THE SURGICAL OUTCOME IN NASAL POLYP PATIENTS**

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**Aims**

**BACKGROUND:** The influence on clinical outcome after ESS of eosinophils, eosinophilic mucin (EM) and Fungal Hyphae (FH) remain unclear. Based on the finding of eosinophils, EM and FH, differences in recurrence after ESS were investigated.

**Method**

A prospective monocenter study including 180 CRSwNP patients underwent ESS, was performed. All tissue and sinonasal secretions were microscopically examined for the presence of EM and FH. Patients were followed for a minimum of 7 years after surgery. Recurrence was defined according to the European position paper on rhinosinusitis and nasal polyps (EPOS).

**Results**

(preliminary) In total 180 CRSwNP patients were included. Eosinophilic involvement was found in 142 (79.3%) of the patients. EM was found in 93 (52%) of the patients. In 33 patients (18.4%) EM and FH were present. A stepwise trend for recurrence between the three groups was observed for gender (eosinophilic without EM: 28% women, eosinophilic group with EM (no FH): 45% women; Eosinophilic group with EM and FH: 59% women. For the three groups the mean age was 51.7y, 49.4y, and 45.9y respectively; allergy : 23%, 33%, and 44% respectively; for asthma 21%, 30%, and 53% respectively. Recurrence occurred in 20% of the eosinophilic group without EM ; 52% in the EM (+) and FH(-) group and 71% in the EM(+) and FH(+) group.

**Conclusion**

The presence of EM with or without FH provides valuable information regarding the increased likelihood of recurrent disease after ESS. This implicates the possible need of permanent sustained care in some subgroups with evident bad outcome

**FUNGUS BALL OF THE PARANASAL SINUS: A 15 YEAR EXPERIENCE OF A TERTIARY BELGIAN CENTER**

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**Aims**

To report the 15 year- experience of a tertiary center in Belgium with fungus ball.

**Method**

This review includes 68 patients with positive diagnosis of a fungus ball operated in the ENT department of the CHU Dinant, Godinne, CMSE

There are 3 groups:

Maxillary sinus fungus ball: N=50; Sphenoid sinus fungus ball: N=16; Primary frontal sinus fungus ball: N=2.

All the patients had a clinical examination, an imaging (CT+/- RMI), histological confirmation of a fungus ball.

All the patients had been operated successfully endonasally with an endoscopic guidance.

**Results**

A. Maxillary sinus fungus ball: N=50 - Unilaterality: N=48

Symptoms: Rhinorhea: N=35; facial pain: N=26; Nasalobstruction: N=20; Cacosmia:N=6

Imaging: Microcalcification: N=40; sclerosis: N=35; Complete opacification: N=14; Pseudotumoral aspect: N=11

Management: Middle maxillary antrstomy: N=50; + inferior antrostomy: N=15; + Caldwell Luc: N=5

Results: recurrence: 6 out of 50 Follow up: 20 months

Sphenoid sinus fungus ball:N=16

Symptoms:Facial pain: N=11; post nasal drip: N=10; Nasal obstruction: N=5; Visual complication:N=2: Cacosmia:N=1

Imaging: Sclerois: N=12; complete opacification: N=10; polyp SER: N=6; microcalcification: N=4; pseudotumoralaspect: N=4

Management: Pure endonasal sphenoidotomy: N=10; sphenoidotomy +posterior ethmoidectomy: N=2; paraseptalapproach: N=4

Results: closure of the neoostium:2

Primary frontal sinus fungus ball: N=2

Symptoms: frontal pain

Imaging: CT: opacification of the frontal sinus and microcalcification: N=2

MRI: hypodensity on T2

Surgery: endonasal surgery: type IIb frontal sinusotomy.

Results: no recurrence.

### **Conclusion**

In conclusion, clinicians must be aware of fungus rhinosinusitis in case of a unilateral rhinosinusitis persisting despite a well-conducted medical treatment. A thorough clinical examination, imaging and histological evaluation are mandatory to make the diagnosis definitive. The endonasal approach is effective in most cases with a low postoperative morbidity.

**SYSTEMATIC REVIEW OF PATIENT REPORTED OUTCOMES FOR REVISION ENDOSCOPIC SINUS SURGERY - PRESENTATION CANCELLED**

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**Aims**

Revision endoscopic sinus surgery for chronic rhinosinusitis (CRS) is undertaken for symptom relief. This systematic review of patient reported outcome measures (PROMs) following revision endoscopic sinus surgery for CRS was undertaken to evaluate if revision sinus surgery improves patients symptoms.

**Method**

PubMed, EMBASE, the Cochrane Library, Web of Science, MEDLINE and Scopus were searched from inception up to January 20, 2016. English language studies reporting validated quality-of-life outcome tools in patients undergoing revision endoscopic sinus surgeries with a minimum follow-up of 12 months were included.

**Results**

Out of 1856 studies identified initially, seven met the inclusion criteria. There were three prospective case series, two retrospective studies, one prospective controlled clinical trial, and a retrospective analysis of prospectively collected data. Two studies involved full house functional endoscopic sinus surgery, one used endoscopic mega-antrostomy, while four studies reported outcomes following a combination of revision procedures. Follow-up time ranged from 12 months to 6.9 years. PROMs included the Sino-Nasal Outcome Tests (SNOT-20 and -22), the Rhinosinusitis Symptom Disability Index (RSDI), the Chronic Sinusitis Survey (CSS), and custom designed symptom questionnaires. SNOT-22 scores ranged from 10-19 postoperatively, compared to 29-55 preoperatively, while SNOT-20 scores decreased 30.7±1.3 preoperatively to 7.7±0.6 postoperatively. An improvement of 64.2 to 67.4% was noted on total RSDI scores postoperatively. There were favourable improvements in symptom surveys.

**Conclusion**

Revision ESS provides specific symptom relief in a majority of patients, supporting its role in the management of CRS. However, future studies should consistently use the same validated questionnaires to enable meaningful comparisons of interventions.

**FISTULA RATE ATTRIBUTABLE TO MINI-TREPHINATION IN PATIENTS WITH FRONTAL SINUS DISEASE: OUR 5 YEAR EXPERIENCE**

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**Aims**

The surgical management of acute inflammatory frontal sinusitis with complications still attracts controversy. Risks with an external trephination technique include osteomyelitis (Pott's Puffy Tumour) and potential for sino-cutaneous fistula development. We analyse our experience of mini-trephination in conjunction with endoscopic decompression of the frontal drainage pathway.

**Method**

Data was prospectively collected for outcomes over the course of 5 years (Sept 2010 – Sept 2015). Details included type of surgery performed, indications for mini-trephine placement, pathology, complications and endoscopic patency.

**Results**

Fifty-nine mini-trephines were placed on 41 patients in conjunction with an endoscopic procedure. 9 were inserted in acutely infected cases, 3 in Pott's Puffy tumours and 29 in elective cases. Indications for trephine placement were to facilitate culture aspiration, aid endoscopic dissection and post-operative irrigation to promote patency of the frontal sinus. One complication of a haematoma occurred in the immediate post-operative period, and 3 trephines extruded early. No infections at the trephine site were noted. Endoscopic patency at last visit was 90%. No fistulae were recorded in the follow-up period (ranging from 2 – 60 months with an average of 38 months). Indeed, mini-trephination was utilised in four cases to facilitate closure of a pre-existing fistula.

**Conclusion**

In our experience mini-trephination has been a safe, effective procedure even in acutely inflamed conditions, when used in conjunction with an endoscopic decompression of the frontal drainage pathway. Based on this study, the likelihood of sino-cutaneous fistula formation is low, and mini-trephination can even be used to facilitate the management of a pre-existing fistula.

**ENDOSCOPIC ENDONASAL MANAGEMENT OF RECURRENT MAXILLARY MUCOCELES USING BILIARY T-TUBE STENTING**

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**Aims**

Mucoceles of the paranasal sinus can be managed endoscopically with extremely low recurrence rate. Frontal sinus mucocele can sometimes be prevented from closing and reforming by stenting, which has been not yet reported in cases of the maxillary sinus mucocele.

**Method**

We present 5 intractable cases of recurrent maxillary sinus mucoceles managed with biliary T-tube stenting. Indications for stenting include recurrent episodes with/without lateral localization with a relatively thickened bony wall.

**Results**

A latex rubber pediatric biliary T-tube was endoscopically inserted through window opening into the marsupialized mucocele. The T-tube stent was removed 6 to 14 months postoperatively in 4 cases. In one case, the stent remained adequately positioned at 35 months postoperatively. None of the cases showed recurrent symptoms or signs.

**Conclusion**

The T-tube stent was successfully used to maintain long-term patency in recurrent and intractable maxillary mucoceles, even after removal of the stent.

**ENDOSCOPIC APPROACHES TO THE ANTERIOR SKULL BASE**

**I. Alobid**<sup>1</sup>

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Cerebrospinal fluid (CSF) leaks may be continuous or intermittent. Dura and arachnoid membranes need to be interrupted and usually there is a bony defect too. With the advent of extended endoscopic skull base resections, the need for large reconstructions has increased, including those of high pressure/high flow leaks communicating with the 3rd ventricle. Patients with a skull base defect are at risk of suffering ascending bacterial meningitis by over 10% per year, independently of the size or location of that defect. Endoscopic surgery for closure of any type of skull base defect is the gold standard approach. The size of the defects does not play a significant role in the success rate. Fascia lata and mucoperiosteum allow a reconstruction of small/mid-sized defects. For larger skull base defects, a combination of fat, fascia lata and pedicled flaps provide a successful reconstruction. Pedicled nasoseptal flaps and lateral nasal wall are most adequate for the reconstruction of larger defects which happen after tumor removal.



**SKULL BASE TUMOR SURGERY**

**H.R. Briner**<sup>1</sup>

<sup>1</sup>, Zurich, Switzerland

**Skull Base Tumor Surgery**

A majority of tumors of the anterior skull base can be resected by transnasal endoscopic approaches. However, the transnasal endoscopic technique is challenging. There are several prerequisites which must be given to perform this type of surgery. The surgical team must be trained to work with the bimanual endoscopic technique (four hand technique). There are also some surgical concepts, which must be applied to keep surgical control, such as creating a wide approach to be able to identify the landmarks of the anatomical structures around the tumor. The presentation focuses on the prerequisites and the surgical concepts of endoscopic surgery of anterior skull base lesions. Furthermore, some illustrative cases are presented.

**CHALLENGES: PAEDIATRIC RHINOPLASTY**

**P. Andrews**<sup>1</sup>

<sup>1</sup>, *United Kingdom*

Paediatric septorhinoplasty is rarely performed in our daily practice and accounts for less than 4% of my tertiary referral practice. The majority of aesthetic cases wait until maturation of nasal growth which has completed in females by 15 years of age and in males by 17 years of age. However, there are exceptions to this rule which are dependent on specific congenital and traumatic indications and include respectively cleft lip and palate repair and septal perforation repair and functional restoration.

The challenges being faced in paediatric rhinoplasty are the increasing number of septal perforations encountered following pen torch battery nasal foreign body inhalations.

In this presentation I will focus on the external approach septorhinoplasty procedure for septal perforation repair and additional external nasal valve augmentation using autologous conchal cartilage in a 6 year old boy with subsequent 2 year follow up review. The issues to be addressed include functional restoration, psychological morbidity including teasing and reduced self esteem, the facilitation of normal nasal growth and potential donor site morbidity.

**ERS16-0838**

**SYMPOSIUM 9: THE CHALLENGES OF FACIAL PLASTIC SURGERY**

**BRIDGING THE GAP BETWEEN FORM AND FUNCTION**

**A.J. Tasman<sup>1</sup>**

<sup>1</sup>, *Switzerland*

While the phrase “form follows function” has been adopted more than a century ago in upcoming modernist architecture, in nasal surgery function often follows form. This presentation will highlight aspects of simultaneous improvements in function and form in septorhinoplasty. Following the modernist intention of the original phrase, special emphasis will be given to endonasal procedures that primarily aim at efficiency.

**CAN NASAL TREATMENT EFFECT OSA**

**K. Bhik<sup>1</sup>**

<sup>1</sup>, *United Kingdom*

**Can Nasal treatment effect OSA?**

Management of sleep related breathing disorders requires multidisciplinary approach. ENT surgeons are well placed to evaluate the upper airway and if necessary rectify upper airway obstruction. Obstructive sleep apnoea (OSA) exhibits a multilevel obstruction in a large number of cases and for this reason for moderate and severe OSA the recommended treatment modality is nasal continuous positive airway pressure (CPAP).

The role of nasal treatment includes both medical and surgical approach and can be regarded as primary or secondary. The secondary role is probably more commonly adapted and by this it is inferred that nasal surgery for instance is utilised to facilitate CPAP therapy rather than completely resolving OSA. Medical treatment is useful for alleviating CPAP induced rhinitis and treating allergic rhinitis leads to an improved nasal airflow and can thus contribute to the treatment of obstructive upper airway.

Upper airway surgery has a role to play in treating OSA but nasal surgery alone perhaps serves as an adjunctive treatment in management of OSA.

**ERS16-0852**

**SYMPOSIUM 10: THE NOSE AND OSA**

**NASAL COMPLAINTS IN PATIENTS WITH OSA**

**J. Hellgren<sup>1</sup>**

*<sup>1</sup>Institute of Clinical Sciences, Otorhinolaryngology Head & Neck Surgery, Gothenburg, Sweden*

The nose is an obvious integrated part of the airway however its specific role in OSA remains unclear. Nasal obstruction, rhinorrhea and dryness of the nose have been shown to be prevalent symptoms both in untreated OSA and after treatment onset with CPAP. Efforts to relieve nasal symptoms in patients with OSA range from septoplasty to topical nasal steroids and heated humidification of the inhaled air. In this presentation aspects of nasal function and symptoms in patients with OSA will be discussed in relation to different treatments.

**WHEN TO PERFORM SURGERY**

**K. Aanaes**<sup>1</sup>

<sup>1</sup>, Denmark

Cystic fibrosis – when to perform surgery:

In patients with cystic fibrosis (CF) there are two main reasons to perform endoscopic sinus surgery; either to relieve them from symptoms of chronic rhinosinusitis or to prevent bacteria from the sinuses and nasal cavity to initiate or maintain the deleterious lung colonisations.

Previously, pulmonologists have been cautious and sceptical by referring CF patients to sinus surgery. However, though it might be temporarily sinus surgery have shown to improve quality of life in patients with CF and EPOS has stated that sinus surgery also is a safe procedure in children. Unsuccessfully initial surgery or recurrences of symptoms are not contra-indications for revision surgery. Nevertheless, it takes a rhinologist to diagnose the symptoms of chronic rhinosinusitis — it is not that easy.

The hallmark of CF is to prevent bacteria in the lungs before they become chronically infected; it reduces morbidity and mortality. This may be done by sinus surgery but must be performed before the sinuses are chronically infected so the bacteria can be eradicated. Blood samples, nasal cultures, lung function test, antibodies and clinical examination may helpful in the decision of surgery. Most important, no guidelines exist establishing the right time for sinus surgery in order to prevent lung infections. The audience is encouraged to participate in an upcoming European prospective randomized trial to evaluate the efficacy of early sinus surgery in CF patients.

**FELLOWSHIPS: WHAT ARE YOUR OPTIONS?**

**A.L. Poirrier<sup>1</sup>, P. Surda<sup>2</sup>**

<sup>1</sup>CHU SART TILMAN, Otolaryngology, LIEGE, Belgium

<sup>2</sup>AMC Amsterdam University Hospital, ENT department, Amsterdam, Netherlands

Medical and specialty training programs differ widely across Europe, but they share a common point: they always leave room for improvement. Due to their responsibilities and the complexity of human body, physicians have the privilege to constantly question their skills and knowledge. A fellowship is a way to develop further a subspecialty field while opening new horizons.

While a rhinology fellowship is not mandatory, it could easily turn into a career. Rhinology integrate various background: surgery, immuno-allergology, respiratory medicine, neurology, endoscopy, dentistry, facial plastic, sleep medicine. A fellowship aims at giving a intensive training in one focused area and integrating expertise from other backgrounds. This presentation is about how to design a career and eventually find the corresponding fellowship. It can be through official international organizations (as ERS), but also national or regional societies, universities or local hospitals, social media or locum agencies. Qualifications needed are discussed, as how to handle the duties and responsibilities. We also share our personal experience, the decision-making process including essential criteria and timetable for successful application. A fellowship is a rewarding experience to develop an independent, possibly international career while deepening expertise far beyond rhinology itself.

**ERS16-0867**

**SYMPOSIUM 12: JUNIOR MEMBER SYMPOSIUM: NOT ONLY FOR JUNIORS**

**RECENT ADVANCES IN RHINOLOGY AND TRAINING**

***P.V. Tomazic<sup>1</sup>, J. Pimentel<sup>2</sup>***

<sup>1</sup>*Dept. of General ORL, H&NS, Medical University of Graz, Graz, Austria*

<sup>2</sup>*Hospital de Egas Moniz and HEM, Dept. of Otorhinolaryngology, Lisbon, Portugal*

The authors present a lecture on the most recent advances in rhinology and training.

A literature review of new treatment strategies for sinonasal diseases will be presented. This ranges from novel biological treatment (e.g. antibodies) to novel adjuncts in surgical therapy (e.g. drug eluting stents). Results of recent papers will be presented and potential outlooks will be discussed. This should improve the junior fellow's understanding of these multifaceted diseases and should encourage them for future research.

There will also be time to reveal what is new for doctors in training that can improve their skills in both endoscopic sinus surgery and rhinoplasty (e.g. models, software). Since they recently finished their training, the authors will give an insider's perspective of which recent tools might shorten surgical learning curves and help in achieving training goals.



**COLLABORATIONS WITH EAACI**

***P.V. Tomazic<sup>1</sup>, O. Tsilochristou<sup>2</sup>***

<sup>1</sup>Dept. of General ORL, H&NS, Medical University of Graz, Graz, Austria

<sup>2</sup>St. Thomas' Hospital- GSTT, Paediatric Allergy Department, London, United Kingdom

*Introduction:* The European Academy of Allergy and Clinical Immunology (EAACI) is an association including more than 9,000 academicians, research investigators and clinicians, from 121 different countries. The academy promotes basic and clinical research in the field of allergy and clinical immunology and furthermore collaborates with patients and lay organizations to support good patient care. The Junior Members (JMs) represent the largest EAACI Section with nearly 4000 clinicians and scientists under the age of 35 years. Over the years, EAACI has developed specific activities to support and increase the influence of the younger members within the Academy. The JM Board itself runs a manifold of initiatives from collaboration with EAACI Journals to a mentorship program and offering travel grants for JM. These activities support JMs in planning and building up their career already at an early stage.

*Objective:* To intensify the collaboration between the ERS Juniors and the EAACI JM on a networking as well as scientific basis. As a first step both boards send members as representatives to the respective annual congresses of the other society.

*Outlook:* Boards will meet to discuss future initiatives that would support synergies among Juniors in the fields of rhinology and allergy.

ERS16-0813

**SYMPOSIUM 14: FROM BENCH TO BEDSIDE IN RHINOLOGY**

**NEW DRUGS FOR OLD - ARE MONOCLONAL ANTIBODIES THE ANSWER?**

**C. Bachert**<sup>1</sup>

<sup>1</sup>, Ghent, Belgium

**New drugs for old problems – are monoclonal antibodies the answer?**

Claus Bachert MD, PhD, Ghent University Hospital and Upper Airways Research Laboratory, Belgium

Patients with nasal polyps (CRSwNP) suffer from comorbid asthma in 50% of cases and often experience disease recurrence after surgery; more than 20% of the patients undergo more than 4 surgeries per lifetime, although they regularly use topical and oral glucocorticosteroids. There is an urgent need for alternatives in management for those patients.

Recently, proof-of-concept studies have been performed with monoclonal antibodies targeting one or more cytokines of the Th2 inflammatory reaction, including IgE, interleukin (IL)-5, IL-4 and IL-13. All of those studies have shown benefit, and Phase 3 trials are emerging now. Within 3 years, we will have new innovative drugs registered for the indication of CRSwNP. Further research needs to determine possibilities to predict the response to the drugs, needs to differentiate optimal patient groups (endotypes) for the different targets, and needs to progress the field of biomarkers to predict disease progression and systemic expansion.

The community of ENT physicians needs to be prepared for those new drugs, increase knowledge and understanding of upper airway immunology, and get acquainted with possible adverse events and dosing possibilities. This challenge will benefit both the patients and the physicians.

**ERS16-0797**

**SYMPOSIUM 14: FROM BENCH TO BEDSIDE IN RHINOLOGY**

**TASTE RECEPTORS AND CRS**

**N. Cohen<sup>1</sup>**

*<sup>1</sup>University of Pennsylvania, Otorhinolaryngology - Head and Neck Surgery, Philadelphia, USA*

Taste receptors on the tongue communicate information to the brain about the nutrient content or potential toxicity of ingested foods. However, recent research has now shown that taste receptors are also expressed far beyond the tongue, from the airway and gastrointestinal epithelia to the pancreas and brain. The functions of many of these so-called “extraoral” taste receptors remain unknown, but emerging basic science and clinical evidence suggests that bitter and sweet taste receptors in the airway are important in sensing bacteria and regulating innate immunity. This presentation will review recent work elucidating the role of bitter and sweet taste receptors in human upper airway innate immunity and the potential clinical relevance to airway infections. The T2R38 bitter taste receptor in sinonasal cilia detects bitter bacterial quorum-sensing molecules and activates nitric oxide-dependent innate immune responses. Polymorphisms that underlie T2R38 functionality also appear to be involved in susceptibility to upper respiratory infection and chronic rhinosinusitis (CRS). Bitter and sweet receptors in specialized sinonasal solitary chemosensory cells control antimicrobial peptide secretion, which may have important implications for airway infections in CRS patients as well as patients with diabetes mellitus. Future research on taste receptors in the airway has tremendous potential to identify immune mechanisms involved in host-pathogen interactions and thus reveal novel therapeutic targets.

**THE ROLE OF ANATOMICAL VARIATIONS (AV) IN THE DEVELOPMENT AND CURE OF CHRONIC RHINOSINUSITIS: A PROSPECTIVE STUDY**

***H. Abdel-Fattah<sup>1</sup>, Z. Mandour<sup>1</sup>, P. Eloy<sup>2</sup>***

<sup>1</sup>Alexandria university, Otolaryngology H & N Surgery, Alexandria, Egypt

<sup>2</sup>UCL, Otolaryngology, Monte-Godinne, Belgium

**Aims**

To study effect of anatomical variations on the development of chronic rhinosinusitis and assess their surgical correction on their cure.

**Method**

100 volunteer with no ENT manifestation and 150 patient prepared for FESS were prospectively studied and investigated through, Weeke scoring, nasal endoscopy scoring, CT scans for patients & controls were scored according to Multiplicity of anatomical variations (MAV) being either ,no or minimal anatomical variations (< 4) (nmMAV) , or obvious anatomical variation (=> 4) (oMAV). Smell Identification and Skin prick test were undertaken.

**Results**

No statistically significant difference between controls & patients as regard sex or age. Age , sex and symptoms severity,allergy tests did not differ between patients with oMAV or those with nmMAV. Sinuses nearer & ipsilateral to AV were significantly more affected with opacification than those distant & peripherally located ( Proximity Phenomenon). Preoperatively, objective olfaction handicap, polypoidal mucosa, postnasal discharge, and endoscopic score were more in patients with oMAV than nmMAV, revealing no statistical bias to neither group postoperatively.

**Conclusion**

Pneumatized AV of the nose & paranasal sinuses are more frequent in sinusitis-free individuals. MAV has an agonist-antagonist role in the development of rhinosinusitis. They exhibit a proximity phenomena. FESS correcting MAV and polypoidal mucosa was associated with improvement of symptom and endoscopic scores.

**SURGICAL TREATMENT OF CHRONIC MAXILLARY OSTEOMYELITIS USING BIOACTIVE GLASS S53P4.**

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<sup>2</sup>Akershus University Hospital, Otorhinolaryngology, Lørenskog, Norway

**Aims**

Acute or chronic osteomyelitis of the maxilla is a rare condition. For the treatment of chronic osteomyelitis, bioactive glass (S53P4) has shown promising results as bone replacement material in the frontal sinus, in ear and oral surgery, in orthopedics and dentistry. We present a case series on surgical treatment for chronic maxillary osteomyelitis. The patients had long-standing one-sided chronic maxillary sinusitis with radiological signs for osteomyelitis and previous medical and surgical modalities had failed to cure. A dental inflammatory focus was excluded.

**Method**

Between May and August 2015, the maxillary sinus was obliterated using bioactive glass in two adult cases after the sinus mucosa was removed radically by an endoscopic assisted Caldwell-Luc approach. Prophylactic antimicrobial therapy with cefalotin was applied for 7 – 10 days.

**Results**

A 68 year old patient with chronic fungal sinusitis and a 54 year old patient, both suffering of unilateral chronic maxillary osteomyelitis were followed for 6 - 9 months after treatment with obliteration. One patient developed a soft tissue infection postoperatively which was treated with a course of clindamycin. Both patients returned to normal activity and pain had ceased.

**Conclusion**

In chronic refractory osteomyelitis of the maxillary sinus, radical revision surgery with obliteration using bioactive glass may be a viable option. The challenge for a successful outcome remains the reconstruction of the medial maxillary wall as these patients usually have been treated with extensive antrostomy at an earlier stage.

**ENDOSCOPIC MANAGEMENT OF IATROGENIC FRONTAL SINUSITIS DUE TO FOREIGN BODY: BONE WAX SHOULD NOT BE USED FOR FRONTAL OBLITERATION**

***H. Basak<sup>1</sup>, I. Yorulmaz<sup>1</sup>, S. Beton<sup>1</sup>, S. Mulazimoglu<sup>1</sup>, H. Guliyev<sup>1</sup>, B. Kucuk<sup>1</sup>, C. Meco<sup>1,2</sup>***

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<sup>2</sup>Salzburg Paracelsus University, Otorhinolaryngology, Salzburg, Austria

**Aims**

Any foreign material that has contact with aeriated spaces like sinuses gets infected and cause inflammation. Frontal sinus drainage has always been a surgical target for external approaches. Nevertheless, obliteration of frontal sinuses with bone wax is occasionally being observed as a practice by some neurosurgical colleagues, causing serious iatrogenic frontal sinusitis due to foreign body and inflammatory obstruction of the drainage pathways. The aim of this report is to illustrate harmful effects of this practice and to discuss effectiveness of endoscopic transfrontal approaches for removing foreign materials like bone wax from frontal sinuses and keep adequate drainage postoperatively

**Method**

All patients who were operated for frontal sinusitis due to bone wax as foreign body through an endoscopic approach since 2009 were retrospectively analyzed

**Results**

Three patients were identified to be operated through an endonasal endoscopic approach for removing bone wax and establishing frontal drainage pathway. All patients had a history of external duraplasty approach at a neurosurgical unit. One patient had bilateral frontal cutaneous fistula and all had frontal headaches. It was possible to remove all bone wax in two unilateral cases through a Draf type IIB and one bilateral case through Draf type III procedure. Due to the adequate sustainable openings reached by these procedures, no problems with frontal sinuses were seen in the mean follow-up of 35.6 months.

**Conclusion**

Bone wax should not be used for frontal obliteration after external approaches. In such cases endoscopic transfrontal surgery yields its value in foreign body removal and securing frontal sinus drainage patency.

**TARGET GUIDED SURGERY (TGS) - INSTRUMENT GUIDANCE WITH BUILDING BLOCKS PLANNING AND AUGMENTED REALITY NAVIGATION IN SINUS SURGERY: AN EXPERIENCE REPORT**

***O. Kaschke<sup>1</sup>, B. Kosmecki<sup>2</sup>, C. Winne<sup>2</sup>***

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<sup>2</sup>Scopis, medical engineering, Berlin, Germany

**Aims**

Navigation systems visualize the position of navigated instruments during ENT surgery. However, they are not providing reliable instrument guidance along preplanned pathways to anatomical targets. Especially in frontal sinus surgery the pre- and intra operative identification of the natural frontal sinus drainage pathway is challenging even for experienced surgeons. Combining a novel surgical planning - based on the concept of Building Blocks by Prof. Peter J. Wormald (Australia) - as well as endoscopic Augmented Reality results in a novel Target Guided Surgery (TGS) approach. TGS can thereby provide a useful instrument guidance for the frontal sinus surgery.

**Method**

An electromagnetic navigation system (Scopis, Germany) was used to perform both surgical planning and navigation in 40 cases with pan-sinus indication. During surgical planning, diseased cells were marked using the Building Blocks approach and the drainage pathway was defined. During surgery, the planned cells and pathways were visualized with Augmented Reality in the endoscope image. This TGS support was evaluated for visual overlay accuracy, economy of time and handling.

**Results**

The usage of the new instrument guidance system showed an easy identification of the natural frontal drainage pathway during surgical planning even in case of revision surgeries. The intraoperative results indicate a faster approach to the frontal sinus along the natural drainage pathway accompanied with a better understanding of the intra-operative anatomy and the position of pre-planned targets.

**Conclusion**

Instrument guidance with TGS [KB1] in sinus surgery shows high potential with increased the safety of patients, decreased stress level of surgeons and reduced OR time.

**ENDOSCOPIC MAXILLARY MIDDLE MEATAL ANTROSTOMY WITH ADDITIONAL APPROACH THROUGH THE INFERIOR MEATUS**

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<sup>3</sup>State Scientific Institution "Scientific and Practical Centre Preventive and Clinical Medicine", Surgical center, Kyiv, Ukraine

**Aims**

Enlarging natural maxillary sinus ostium in most cases solves the problem of chronic maxillary sinusitis. But in some cases, such approach is not sufficiently effective, that may be due to the sinus anatomy or ciliary dyskinesia.

**Method**

The study included 420 cases maxillary sinusitis operated in our institutions. Before surgery computed tomography of paranasal sinuses was performed for all patients. The mucociliary transport rate was measured before surgery and intraoperatively.

Endoscopic middle meatal antrostomy was performed in classic way (including the natural ostium) singly or combined with additional approach under the inferior turbinate.

**Results**

In most cases (386) middle meatus antrostomy was performed. Other cases (34) were operated by combined approach: in 21 cases additional approach was due to the localization of lesions requiring removal (12 – the deep sinus floor, its medial extension, 9 – the prelacrima space and anterior wall), 5 – recalcitrant maxillary sinusitis, 8 – severe secondary ciliary dyskinesia.

The combined approach expands the possibilities of middle meatal antrostomy and makes it possible to reach almost all parts of the sinus, with preservation of the inferior turbinate, nasolacrimal duct, anterior wall of the sinus. Infratubinal window improves local medical care and drainage.

**Conclusion**

1. Endoscopic middle meatal antrostomy with additional approach through the inferior meatus allow to reach “difficult” parts of the sinus and to avoid radical surgery.

**2. In cases of severe secondary ciliary dyskinesia, the infratubinal window improving continuing local medical care and drainage until mucociliary clearance through natural ostium recovers.**



**MODIFIED ENDOSCOPIC LOTHROP PROCEDURE IN TREATMENT OF CHRONIC FRONTAL SINUSITIS:  
A REPORT OF 60 CASES**

***A. Mickielewicz<sup>1</sup>, I. Gwizdalska<sup>1</sup>, E. Witkowska<sup>1</sup>, A. Stepień<sup>1</sup>, H. Skarzynski<sup>1</sup>***

*<sup>1</sup>Institute of Physiology and Pathology of Hearing, World Hearing Center, Warsaw, Poland*

**Aims**

Modified endoscopic Lothrop procedure is an effective surgical method of treating different pathologies of frontal sinus resistant to conservative therapy or to treating by less invasive surgical procedures. This technique involves removal of the floor of the frontal sinus extending from orbit to orbit through a superior septum nasal defect.

**Method**

Authors present 60 patients cases operated by one surgeon using this method combined with image-guided navigational system, performed in World Hearing Center from June 2010 to December 2015. Indications were chronic sinusitis with or without polyps, mucocele, osteoma, Sjögren's syndrome, inverted papilloma and iatrogenic complications. All patients undergone at least six month follow-up period and more than half of them- three years follow-up

**Results**

Quality of life improved in vast majority of patients and only in few of them didn't change comparing to status before surgery. Efficacy of the treatment understood as lack of restenosis of frontal sinus ostium was 83,34%, ten patients needed reoperation and probably approx. 15% will need it in two years. In the first three months after surgery one can predict its effect. According to authors emphasis should be put on appropriate choice of patients also for the anatomy of the anterior-posterior dimension of the frontal ostium and bone thickness and the operating technique.

**Conclusion**

Modified endoscopic Lothrop procedure, although difficult and requiring big experience, gives great results, and according to authors, should be performed significantly more often, as a method of choice in treating frontal sinus diseases, not expecting for their intensification nor progression.

**TRANSORBITAL ENDOSCOPIC MANAGEMENT OF SUPRAORBITAL ETHMOIDAL MUCOCELES: A NOVEL APPROACH**

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**Aims**

Various surgical approaches have been employed in the management of supraorbital ethmoidal mucocoeles. The choice depends on the routes of disease extension and on the causative factors. Localization of supraorbital ethmoidal mucocoeles to the lateral portion of the frontal sinus has been treated mainly by the conventional or advanced Draf sinusotomy approaches. We introduce a simple technique to connect supraorbital ethmoidal mucocoeles into the proximal part of the frontal sinus.

**Method**

Transorbital endoscopic technique was used to treat two patients with supraorbital ethmoidal mucocoeles, sparing the medial portion of the frontal sinus and the ostiomeatal complex. With this novel technique, two separate trocars were entered through the orbital wall of the frontal sinus. A nasal endoscope and a forceps were entered through lateral and medial trocars, respectively, to remove the medial wall of the mucocoele.

**Results**

Intra- and postoperative periods were uneventful and long-term follow-up showed no recurrence of the lesions.

**Conclusion**

Transorbital endoscopic technique could be judiciously employed as an effective and cosmetically excellent alternative to previous endonasal and external methods in selected cases of far remote-access supraorbital ethmoidal and lateral frontal mucocoeles.

**MICROARRAY ANALYSIS OF EPITHELIAL AND FIBROBLAST CELLS IN CHRONIC RHINOSINUSITIS**

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<sup>2</sup>Newcastle University, Institute of Cellular Medicine, Newcastle upon Tyne, United Kingdom

**Aims**

Chronic rhinosinusitis without polyps (CRSsNP) is typified by inflammation of the sinonasal epithelium and development of fibrosis, yet its precise pathophysiology remains elusive. Recently stromal cells have been shown to act like immune effector cells in orchestrating chronic inflammation. We aimed to 1) isolate two key sinonasal mucosal cell populations; epithelial cells and fibroblasts from their associated immune cells. 2) compare their transcriptome (RNA cellular transcripts) in CRSsNP patients and healthy volunteers to identify differentially expressed genes as possible novel CRS therapeutic targets.

**Method**

Primary nasal epithelial cells (PNECs) and fibroblasts (PNFs) were isolated from 25 carefully phenotyped nonallergic CRSsNP patients and age/sex matched controls. High quality RNA was screened using 47000 probes per sample. Transcriptome analysis was performed using illumina HumanHT-12v4 microarrays. Selected signals were replicated with qRT-PCR and immunohistochemistry. Bioinformatics analysis was performed using Bioconductor with differential gene expression corrected using Benjamini-Hochberg false discovery rate.

**Results**

Fibroblast cells from CRSsNP patients showed a greater than two fold upregulation of the transcription factor NFE2L3 compared to healthy controls by microarray(p= 0.047), this was confirmed with qRT-PCR(p=0.0352) and immunohistochemistry. Epithelial cells showed no significant differentially expressed genes.

**Conclusion**

Using microarrays we have shown for the first time the transcription factor NFE2L3 to be upregulated in CRSsNP fibroblast cells compared to healthy controls. NFE2L3 is a transcription factor with roles in inflammation, injury from oxidative and electrophilic stress. This novel finding is consistent with increasing evidence that fibroblasts play key roles in inflammation within the paranasal sinuses and is the subject of our ongoing investigations.

**ACTIVATION STATE OF CIRCULATING EOSINOPHILS IN NASAL POLYPOSIS**

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<sup>1</sup>Université d'Auvergne, Puy de Dôme, Clermont Ferrand, France

**Aims**

To assess the activation status of circulating eosinophils in the blood before migration into tissues in chronic rhino sinusitis with nasal polyps (CRSwNP).

**Method**

13 patients with CRSwNP and 16 healthy volunteers were enrolled. After a blood test, several biological parameters of eosinophils were studied in vitro: blood count of eosinophils, determination of plasma eosinophil cationic protein (ECP), measurement of oxidative metabolism by chemiluminescence at baseline or activated by PMA or PAF, with or without interleukin 5 (IL-5), release of sulfidoleukotrienes at baseline or activated, percentage of granulosa cells and mean fluorescence intensity (MFI) by flow cytometry.

**Results**

The mean count of eosinophils was significantly higher in patients. ECP level in patients was higher than in controls but not to a level of significance. The eosinophils in patients with CRSwNP were characterized by increased oxidative metabolism in the basal or activated state significantly decreasing in the presence of IL-5. No difference was found in leukotriene level. There was also a higher percentage of CD49d +, CD25 + CCR3 + cells in patients, and a non-significant decrease in descending order in MFI.

**Conclusion**

This study demonstrates for the first time a priming state of circulating eosinophils in CRSwNP patients compared to healthy controls. This priming occurs before the migration of eosinophils to polyps, reflecting the systemic and not just local nature of abnormalities in CRSwNP. These results need to be confirmed by further investigations with larger populations and a closer study of the state of activation and its relationship with clinical factors.

**COULD SYSTEMIC INFLAMMATION MEDIATE THE PROPAGATION OF INFLAMMATION BETWEEN AIRWAY SEGMENTS IN CHRONIC RHINOSINUSITIS WITH NASAL POLYPS AND ASTHMA?**

***K. Håkansson<sup>1</sup>, A.E. Pedersen<sup>2</sup>, B. Claus<sup>3</sup>, K. Lars<sup>4</sup>, T. Simon Francis<sup>5</sup>, V. Backer<sup>5</sup>, C. von Buchwald<sup>1</sup>***

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**Aims**

In a previous study we showed that the Th2 airway inflammation in patients with chronic rhinosinusitis with nasal polyps (CRSwNP) is stronger in the nasal polyps compared to other segments of the airway. We therefore hypothesized that nasal polyps act as an epicentre of airway inflammation that can initiate lower airway inflammation in some patients. The aim of this study was to explore serum inflammation in search of cytokines that might mediate the propagation of inflammation between airway segments.

**Method**

Serum was collected from 26 CRSwNP patients with asthma, 11 CRSwNP patients without asthma, and 14 controls without asthma. Inflammatory cytokines were investigated using a Th1/Th2 assay. Individual Th2 cytokines (TARC, Eotaxin, MCP-1, MCP-4, IL-4, IL-5 and IL-13) were compared between patients with and without asthma and controls. An adjusted Kruskal-Wallis test and Spearman's correlation were used for analysis.

**Results**

Serum IL-5 was higher in both CRSwNP with and without asthma compared to controls ( $p=0.002$  and  $p=0.08$ , respectively); however, no significant difference was found between the CRSwNP groups. Serum MCP-4 was higher in CRSwNP with asthma compared to CRSwNP without asthma ( $p=0.06$ ) and controls.

There was no significant correlation between the concentration of IL-5 and MCP-4 in the nasal polyps and serum.

**Conclusion**

There was no significant difference in systemic inflammation between CRSwNP with or without asthma. However, there was a trend for higher serum MCP-4 in asthmatic patients only. The role of MCP-4 in CRSwNP and asthma is poorly described and needs further investigation.

**CHRONIC PM<sub>2.5</sub> EXPOSURE IS ASSOCIATED WITH TH<sub>2</sub> MEDIATED EOSINOPHILIC SINONASAL INFLAMMATION**

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**Aims**

Exposure to air pollutants are suspected to play an important role in Chronic Rhinosinusitis (CRS). Despite marked reductions in air pollution levels globally, the fine particulate component of air pollution (PM<sub>2.5</sub>) and ultrafine pollutants secondary to traffic continue to remain a recalcitrant issue. While the long term health effects of air pollution have been studied in the lower airways, few studies have examined the effects on the upper airways/sinuses. The goal of this study is to better understand the relationship between chronic PM<sub>2.5</sub> exposure and sinonasal inflammation

**Method**

C57BL/6 mice (n=40) were exposed to either PM<sub>2.5</sub> (n=20) or filtered air (n=20) using a unique versatile aerosol concentrator and exposure system chronically for 4 months. Mice were then sacrificed and sinonasal inflammation was assessed by measuring secreted nasal lavage cytokines, immunohistochemistry, and RT-PCR of sinonasal mucosal membranes. In addition, sinonasal epithelial barrier function was measured through nasal lavage albumin levels and confocal microscopy for epithelial tight junctions.

**Results**

Exposure to chronic PM<sub>2.5</sub> was associated with statistically significant increases in mucosal tissue eosinophilia and Th<sub>2</sub> cytokines including IL-13 and eotaxin measured by RT-PCR and ELISA. Furthermore, chronic PM<sub>2.5</sub> exposure was also associated with a profound epithelial barrier disruption similar to CRS.

**Conclusion**

This is the first study to demonstrate that chronic exposure to air pollution/PM<sub>2.5</sub> can induce eosinophilic Th<sub>2</sub> mediated sinonasal inflammation as seen in CRS. Further research into the mechanism of PM induced eosinophilic sinonasal inflammation warrants further study.

**DIVERSITY OF T-HELPER CYTOKINE-PROFILES IN CHRONIC RHINOSINUSITIS: A MULTICENTER STUDY IN EUROPE, ASIA AND OCEANIA**

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**Aims**

To date no study has evaluated the diversity of T-helper cell cytokine patterns of chronic rhinosinusitis (CRS) patients among centers in different continents employing identical study parameters and methods for assessment. The aim of this study was to assess T-helper cytokine-profiles in CRS patients from centers in Europe, Asia and Australia.

**Method**

CRS patients with (CRSwNP) and without nasal polyps (CRSsNP) (n=435) and control subjects (n=138) were recruited from one Australian (Adelaide), two European (Benelux, Berlin), and three Asian (Beijing, Chengdu, Tohigi) regions. Nasal mucosal concentrations of Th2, Th17 and Th1 cytokines (IL-5, IL-17 and IFN- $\gamma$ , respectively), eosinophilic cationic protein (ECP), IL-8 and tissue total and *Staphylococcus aureus* enterotoxin (SAE)-specific IgE (SAE IgE) were measured employing identical tools and inter-center controls, and compared among the different regions.

**Results**

CRS patients with (CRSwNP) and without nasal polyps (CRSsNP) (n=435) and control subjects (n=138) were recruited from one Australian (Adelaide), two European (Benelux, Berlin), and three Asian (Beijing, Chengdu, Tohigi) regions. Nasal mucosal concentrations of Th2, Th17 and Th1 cytokines (IL-5, IL-17 and IFN- $\gamma$ , respectively), eosinophilic cationic protein (ECP), IL-8 and tissue total and *Staphylococcus aureus* enterotoxin (SAE)-specific IgE (SAE IgE) were measured employing identical tools and inter-center controls, and compared among the different regions.

**Conclusion**

T helper cytokine patterns and *Staphylococcus aureus* specific IgE expressions show extreme diversity among CRS patients from Europe, Asia and Oceania. These findings suggest the need for individualized therapeutic strategies in CRS patients.

**BACTERIAL BIOFILMS IN CHRONIC RHINOSINUSITIS; DISTRIBUTION AND PREVALENCE**

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**Aims**

The role of biofilm is related to chronic and recurrent bacterial infections and the mechanisms of biofilms help us to understand the increasing failure rate of antibiotic treatment for these chronic diseases. The patterns of biofilm formation in CRS at the junction between the nasal cavity and paranasal sinuses were the aim of this cross-sectional study.

**Method**

The study group consisted of fifty-one patients with chronic rhinosinusitis with or without nasal polyps, the control group of twenty-five patients with nasal septal deviation and both groups were subjected to biopsy harvest from the middle turbinate, from the uncinate process and from the ethmoid bulla. Samples were investigated for the presence of biofilm by confocal scanning laser microscopy.

**Results**

Biofilm formation was found in 31/50 (62%) of middle turbinate, in 39/55 (71%) of uncinate process and in 43/54 (80%) of ethmoid bulla samples. There was a significant difference between patients with or without nasal polyps.

**Conclusion**

The presence of biofilm showed differences in the anatomical location and was dependent on nasal polyp formation. Biofilms are found more frequently at the paranasal sinuses when compared to the uncinate process or to the middle turbinate.



**IMPACT OF MUCUS STASIS ON MICROBIOME AND TRANS-EPITHELIAL CHLORIDE TRANSPORT IN A PRECLINICAL MODEL OF RHINOSINUSITIS**

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**Aims**

The mechanical clearance of mucus is considered the primary innate airway defense mechanism and obstruction of sinus ostia leads to a pathologic cascade involving hypoxia with increased edema, secondary ciliary dyskinesia, and subsequent bacterial overgrowth. The objective of the current study is to investigate the influence of mucus stasis on the sinus microbiome and trans-epithelial chloride transport using an *in vivo* model of rabbit rhinosinusitis.

**Method**

A preclinical model of rhinosinusitis has been generated by endoscopically placing a sterile sponge directly into the rabbit's middle meatus (N=5). Therefore, the sinuses were not violated and ostial blockage is reversible. Another five rabbits were used as controls. Packing was removed after 2 weeks and CT, endoscopy, maxillary sinus swabs (via antrostomy), histopathology, and nasal potential difference (NPD) measurements were performed. Swabs were submitted for analysis of 16S ribosomal RNA sequences and culture.

**Results**

Rhinosinusitis was confirmed by CT and endoscopy with purulence in all rabbits after sponge placement. Controls had significantly greater NPD polarization than rhinosinusitis animals ( $-28.6 \pm 4.03$  mV vs  $-6.14 \pm 1.13$  mV;  $p=0.0039$ ), representing decreased chloride secretion in rhinosinusitis. Microbiota were markedly different between the two groups: Shannon's diversity index was significantly elevated in rhinosinusitis ( $6.93 \pm 0.18$  vs  $1.68 \pm 0.64$ ;  $p < 0.0001$ ). Histologically, rhinosinusitis rabbits demonstrated substantial inflammation with neutrophilic exudate and mucosal edema.

**Conclusion**

Significant changes in sinus bacterial colonization were observed in sinuses with impaired mucociliary clearance compared to controls. Accumulated secretions and impacted mucus via blockage of sinus ostia may lead to hypoxia and result in substantial changes in the sinus microbiome and CFTR dysfunction.

## SMOKING IN CRS: DATA FROM THE CHRONIC RHINOSINUSITIS EPIDEMIOLOGY STUDY (CRES) *S. Erskine*<sup>1</sup>, *C. Hopkins*<sup>2</sup>, *C. Philpott*<sup>3</sup>, . *The CRES Group*<sup>4</sup>

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### Aims

To establish any differences in symptoms between smokers and non-smokers with CRS

### Method

Data were obtained from the Chronic Rhinosinusitis Epidemiological Study (CRES). This questionnaire study involved patients with CRS (defined by EPOS guidelines) attending ENT clinics from 30 centres across the UK. The study-specific questionnaire included SNOT-22 and questions on smoking status.

### Results

Completed questionnaires were collected from 1470 participants. subgroups comprised CRSsNP (n=546), CRSwNP/AFRS (n=685), controls (n=219). There were significant differences in SNOT-22 between smokers and non-smokers.

Disease status	N	N smokers	%	Mean Snot-22	SD
Controls	219	33	15.1	12.11	13.95
CRSsNPs	546	76	13.9	45.67	21.05
CRSwNPs	685	68	9.9	44.41	21.62

	Non-smoker		Smoker			
Disease status	Mean Snot-22	SD	Mean Snot-22	SD	Mean difference	p-value
Controls	11.23	13.08	16.82	17.77	5.59 (-1.55,12.73)	0.1204
CRSsNPs	44.35	21.02	54.66	18.99	10.30 (4.95,15.66,)	0.0002
CRSwNPs	43.47	21.25	53.64	24.14	10.17 (4.60,15.74)	0.0004
Overall	39.22	23.18	47.58	25.31	8.37 (4.49,12.25)	<0.0001

\*NB: Should be noted that there is no evidence ( $p=0.5938$ ) of a difference in the differences between smoker and non-smoker by disease status (i.e. no evidence that the effect of smoking is different for controls vs CRSsNPs).

The difference in SNOT-22 between smokers and non-smokers was  $>7$  for those with CRS; this is greater than the amount taken to indicate clinical improvement after treatment.

### Conclusion

Significant differences in SNOT-22 were identified between smokers and non-smokers, indicating the importance of smoking cessation in the management of CRS.

**MECHANISMS OF STAPHYLOCOCCUS AUREUS INTERNALISATION WITHIN MAST CELLS AND ITS RELEVANCE TO THE PATHOGENESIS OF NASAL POLYPS.**

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**Aims**

Chronic rhinosinusitis (CRS) is a common condition with 20% of patients developing nasal polyps (NPs). Staphylococcus aureus (S aureus) and Staphylococcus enterotoxin B (SEB) have been implicated as mediators of CRS. Recent published findings from our Upper Airway Research Group demonstrated intracellular S aureus within mast cells in NPs. We performed a study to explore the mechanisms surrounding S aureus internalisation into mast cells and its relevance to NP pathogenesis.

**Method**

An explant tissue model was developed using inferior turbinate mucosa from 7 patients with CRS with NPs (CRSwNP). To explore the host-environmental interface, samples were exposed to S aureus and SEB before immunohistochemical analysis. The mast cell-S aureus interaction was explored using a mast cell line (HMC-1) in a co-culture assay.

**Results**

SEB addition induced a significant increase in S aureus-containing mast cells as well as mast cell degranulation. S aureus appeared to internalise within mast cells through phagocytosis and extracellular traps. The bacteria remained viable and proliferated resulting in mast cell expansion and eventual death, with seeding of S aureus and pro-inflammatory cytokines into the extracellular space.

**Conclusion**

Within CRSwNP, certain SEB-secreting S aureus phenotypes may induce internalisation of the bacteria within mast cells as an immune evasion and bacterial survival strategy. The resulting increased rate of mast cell degranulation and cell death produces a localised build-up of pro-inflammatory mediators and cytokines. This would manifest as tissue stromal oedema and may contribute towards the formation of NPs.

**CROSS-TALK BETWEEN HUMAN MAST CELLS AND EPITHELIAL CELLS BY IGE-MEDIATED PERIOSTIN PRODUCTION IN EOSINOPHILIC NASAL POLYPS**

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<sup>3</sup>University of South Florida Morsani College of Medicine, Internal Medicine, Tampa, USA

**Aims**

To investigate the cellular origin and the role of periostin in CRSwNP.

**Method**

Expressions of periostin and its receptor, integrin  $\alpha$ V, were investigated in nasal polyps (NP) by qRT-PCR, IHC and ELISA. Immunohistochemistry and immunocytochemistry were used to determine cellular sources of periostin in NP and a human mast cell line, LAD2. LAD2 cells were stimulated with IgE, IL-4, IL-13 or TNF- $\alpha$  and periostin measured. Normal human bronchial epithelial cell (NHBE) were stimulated with periostin, IL-4, IL-13, TNF- $\alpha$ , and dsRNA alone or in combination and TSLP measured.

**Results**

Periostin was up-regulated and positively correlated with IL-5, CCL-11 and CT scores in eosinophilic NP (E-NP), but not in non-eosinophilic NP. Tryptase-positive cells were a main source of periostin in E-NP. Periostin levels were also correlated positively with total IgE in E-NP homogenate. Furthermore, IgE stimulation enhanced the mRNA and protein levels of periostin. Confocal microscopic examination of LAD2 cells showed that periostin was localized in the granules. Overexpression of integrin  $\alpha$ V was observed in epithelial layers of E-NP and correlated positively with the levels of periostin in E-NP. Periostin and integrin  $\alpha$ V expressions in the epithelia were positively associated with TSLP at mRNA and protein levels in E-NP. Treatment with periostin induced more TSLP production in NHBE than those without periostin, in combination with IL-13 or IL-4 and TNF- $\alpha$  or dsRNA.

**Conclusion**

These data suggest that periostin is upregulated in E-NP and correlates with Th2 markers. Human mast cells are a major source of NP-derived periostin, which may induce TSLP production from epithelial cells.

**SEMA4A CONTRIBUTES PHENOTYPES IN EOSINOPHILIC CHRONIC RHINOSINUSITIS (ECRS)**  
***Y. Maeda*<sup>1</sup>, *S. Koyama*<sup>2</sup>, *Y. Takeda*<sup>2</sup>, *M. Hayama*<sup>1</sup>, *T. Shikina*<sup>3</sup>, *K. Takeda*<sup>1</sup>, *S. Okazaki*<sup>1</sup>, *T. Tsuda*<sup>3</sup>,  
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**Aims**

Semaphorins have diverse functions, such as axonal guidance, vascular development, tumor progression, heart development and immune responses.

We previously reported that the class IV semaphorin SEMA4A was critical for Th1/Th2 regulation and that eosinophilic airway inflammation was enhanced in SEMA4A- deficient mice. However, the role of SEMA4A in eosinophils and human eosinophilic airway inflammation is still unknown.

The purpose of this study is to investigate how SEMA4A contributes human eosinophilic airway inflammation.

**Method**

We compared serum SEMA4A levels in patients with eosinophilic chronic rhinosinusitis (ECRS) vs healthy individuals by enzyme-linked immunosorbent assay (ELISA), and examined SEMA4A expression in nasal polyps by immunohistochemistry. We cultured bone marrow cells from Wild Type mice (WT mice) and SEMA4A deficient mice with recombinant IL-5, and evaluated the recovery of the bone marrow-derived eosinophils (BMDEos). In addition, we determined the number of eosinophils in the spleen from WT mice or SEMA4A- deficient mice.

**Results**

Levels of SEMA4A were significantly elevated in sera from patients with ECRS than healthy individuals. (mean±SEM 2403±618 versus 445±214). We found that SEMA4A was strongly expressed in eosinophils in the nasal polyps by immunohistochemistry. BMDEos and the number of splenic eosinophils from SEMA4A-deficient mice were significantly lower than those from WT mice. (mean±SEM 2.14±0.23×10<sup>7</sup> versus 1.41±0.10×10<sup>7</sup>, 5973±189/10<sup>6</sup> versus 4100±750/10<sup>6</sup>, respectively)

**Conclusion**

Our results suggested that SEMA4A had trophic functions for eosinophils in human and mice. SEMA4A may promote eosinophil survival and disease activity in patients with ECRS.

**EFFECT OF STAPHYLOCOCCAL PROTEIN A-FORMULATED IMMUNE COMPLEXES ON EXOTOXIN-INDUCED CELLULAR RESPONSES IN NASAL POLYPS: ROLE OF SERUM.**

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**Aims**

*Staphylococcus aureus* and its components participate in the pathogenesis of chronic rhinosinusitis with nasal polyps (CRSwNP). We sought to determine whether staphylococcal protein A (SpA) from *S. aureus* regulates cellular responses in nasal polyps, especially when it is in immune complexes (ICs) with immunoglobulins.

**Method**

Dispersed nasal polyp cells (DNPCs) were cultured with SpA in the presence or absence of IgG, after which the levels IL-5, IL-13, IFN- $\gamma$ , IL-17A, and IL-10 in the supernatants were measured. The effect of SpA exposure on staphylococcal enterotoxin B (SEB) and alpha-toxin (AT)-induced cytokine production by DNPCs in the presence and absence of IgG, IgA, and autologous serum was also examined.

**Results**

DNPCs produced substantial amounts of IL-10 and IL-13 and lesser amounts of IL-17A in response to SpA exposure. SpA-induced IL-10 production was mainly observed in adherent DNPCs, and its production was significantly enhanced in the presence of IgG. Formation of ICs involving SpA and IgG was confirmed by native polyacrylamide gel electrophoresis. ICs composed of SpA and IgG significantly suppressed SEB- and AT-induced IL-5, IL-13, IFN- $\gamma$ , and IL-17A production by DNPCs, but SpA alone did not. Similar inhibition was observed when DNPCs were treated with mixtures of SpA and IgA and mixtures of SpA and autologous serum.

**Conclusion**

Our results suggest that SpA may regulate the pathogenesis of exotoxins-induced inflammation via coupling to immunoglobulins in CRSwNP. Because *S. aureus* frequently colonizes the human nose, autologous serum nasal drops may be a viable option for managing CRSwNP.

**THE RELATIONSHIP BETWEEN SERUM VITAMIN D AND CHRONIC RHINOSINUSITIS: A SYSTEMATIC REVIEW**

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**Aims**

An exciting development in upper respiratory tract disease is the potential pathophysiological role of vitamin D (VD<sub>3</sub>). There is now substantial literature to suggest that VD<sub>3</sub> acts as an immunomodulator of adaptive and innate immunity locally within the respiratory epithelium. Chronic rhinosinusitis (CRS) places a relatively large socioeconomic burden on developed nations, yet remains a difficult disease to treat. VD<sub>3</sub> has therefore become an area of clinical interest as it may provide an adjunctive therapeutic option in CRS. We undertook a systematic review of the relationship between serum VD<sub>3</sub> levels, CRS phenotype and disease severity.

**Method**

A systematic search was performed using the PubMed, MEDLINE and EMBASE databases. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed. Studies that measured serum VD<sub>3</sub> levels and correlated the measurements to any subtype of CRS were included for qualitative analysis.

**Results**

Seven articles were included (four prospective and three retrospective studies) with a total of 539 patients. There were significantly lower VD<sub>3</sub> levels in the polypoid phenotypes of CRS compared to controls. Low VD<sub>3</sub> levels were often associated with an increased degree of inflammation.

**Conclusion**

The available evidence suggests that there is a significant relationship between low VD<sub>3</sub> levels and polypoid CRS phenotypes. The association between VD<sub>3</sub> levels and disease severity, and the potential therapeutic implications, remains unclear, warranting further research in the area.

**DEFINING THE HEALTHY POST-ESS SINUS CAVITY MICROBIOME FOR THERAPEUTIC SINUS MICROBIOME RE-ENGINEERING**

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**Aims**

INTRODUCTION: Microbiome dysbiosis has been established as a feature of chronic rhinosinusitis (CRS). However, there is limited understanding of what constitutes the microbiome profile of ‘healthy’ post-ESS sinus cavities compared to diseased ones,. We thus wished to determine differences in the structure and composition of the sinus microbiome in relation to disease status of CRS patients in order to identify potential areas for therapeutic microbiome manipulation.

**Method**

METHOD: Twenty patients having previously undergone ESS for CRS >6 months previously were recruited: 11 "bad evolution" and 9 "good evolution". Quality of life (QoL) was assessed using the SNOT-22 questionnaire. Endoscopic swab cultures were obtained for assessment of microbiome by sequencing of the 16s RNA subunit.

**Results**

RESULTS: SNOT-22 QOL score was lower in patients with ‘bad evolution’ ( $p = 0.0384$ ). 16s sequencing demonstrated differences in the microbiome according to evolution. “Bad-evolution” cavities showed i) A reduction in bacterial diversity of species ii) Increased overall presence of bacteria iii) An increase in the proportion of Gram-negative bacteria iv) A reduction in Gram-positive Propionobacteriaceae. In a novel observation, the number of patients with a single dominant species (>90%) was higher in ‘bad evolution’ patients. (6/11 vs. 2/9).

**Conclusion**

CONCLUSION: Compared to ‘healthy’ post-ESS cavities, ‘bad evolution’ patients have severe microbiome dysbiosis, which may offer opportunities for therapeutic microbiome ‘re-engineering’. Objectives should include restoration of bacterial diversity and reduction of Gram-negative predominance. One possible strategy may be enrichment of the microbiome of ‘bad evolution’ cavities with ‘healthy’ Gram-positive species introduced directly into the sinus cavity.



**ERS16-0421**

**FREE PAPER SESSION 7: MANAGEMENT OF CRS MEDICALLY**

**PRELIMINARY RESULTS OF A SURVEY TO IDENTIFY THE SOCIO-ECONOMIC COSTS OF CHRONIC RHINOSINUSITIS (CRS) TO PATIENTS AND THE NHS IN THE UNITED KINGDOM**

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**Aims**

This study seeks to address the lack of UK data on the direct socio-economic burden of CRS by identifying the financial and social costs to both the patient and society

**Method**

CRS patients and healthy controls were recruited from ENT clinics in several UK hospitals and asked to complete a pilot questionnaire to assess economic costs, productivity losses and quality of life over the preceding 3 months. Participants were followed up at 6 months with a second questionnaire in order to validate previous responses.

**Results**

To date, 109 baseline questionnaires have been returned (78 CRS patients and 30 controls). The average length of time since CRS diagnosis was 18.08 years. The patient group reported an average EQ-VAS score of 71.15 vs 89.63 in the control group. Sixteen of the CRS patient group (20.5%) took at least one day off work or were unable to undertake normal activities due to their CRS. Within this group the average number of days taken was 5.4 in the 3 month period surveyed. Patients reported an average out of pocket spend of £23.84 (Max £140.00) in the 3 month period on over-the-counter medications compared to £2.88 in the control group.

**Conclusion**

This ongoing study is the first to attempt to quantify such socio-economic costs of CRS in the context of the UK National Health Service. Initial data suggests that CRS patients experience significant out of pocket costs and productivity losses.

**BENZALKONIUM CHLORIDE ENHANCES THE EXPRESSION OF HISTAMINE H1 RECEPTOR MRNA IN NASAL EPITHELIAL CELLS, WHICH IS REDUCED BY PRETREATMENT WITH MOMETASONE FUROATE**

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**Aims**

To better understand the cause and exacerbation of rhinitis medicamentosa (RM) induced by oxymetazoline (OMZ) or benzalkonium chloride (BKC), we examined the impact of pretreatment with OMZ or BKC on cultured human nasal epithelial cells. We also examined the effect of mometasone furoate (MF) on the cultured human nasal epithelial cells treated with OMZ or BKC.

**Method**

HNEpCs, cells of a human nasal epithelial cell line, were treated with OMZ or BKC. OMZ- and BKC-induced expression of histamine H1 receptor (H1R) mRNA was assayed using real-time polymerase chain reaction. In some experiments,  $1.0 \times 10^{-5}$  M MF was added to the HNEpCs for 24 hours before treatment with OMZ or BKC.

**Results**

Treatment with OMZ slightly increased the expression of H1R mRNA in HNEpCs. This enhanced expression was not significantly reduced by pretreatment with MF. In contrast, treatment with BKC remarkably increased the expression of H1R mRNA in HNEpCs. In addition, this enhanced expression was significantly reduced by pretreatment with MF.

**Conclusion**

These results suggest that increased expression of H1R mRNA due to treatment with OMZ or BKC might be one of the factors underlying exacerbation of the symptoms of patients with RM and that complicated with allergic rhinitis. The use of a nasal steroid at the same time might reduce the exacerbated symptoms due to BKC, although it cannot be denied the possibility of increasing histamine hypersensitivity by long time use of topical steroid containing BKC.

**EFFECTIVENESS OF ATORVASTATIN IN SUPPRESSING MUC5AC GENE EXPRESSION IN HUMAN AIRWAY EPITHELIAL CELLS**

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**Aims**

We recently reported that chronic cholesterol depletion in NCI-H292 cells by lovastatin suppresses IL-1 $\beta$ -induced *MUC5AC* gene expression. Because there are numerous statins, we sought to determine which statin is most effective in reducing *MUC5AC* expression, and whether this activity of statins is related to IL-1 receptor (IL-1RI) and mitogen-activated protein kinase (MAPK) activity.

**Method**

Four statins, namely atorvastatin, fluvastatin, lovastatin, and simvastatin, were tested. NCI-H292 cells were pretreated with 10  $\mu$ M of each statin for 1 hour, then 10 ng/mL of IL-1 $\beta$  was added and cells were coincubated with statin and IL-1 $\beta$  for 24 hours. *MUC5AC* mRNA expression was then measured by real-time PCR. The phosphorylation levels were assayed by western blot.

**Results**

Cholesterol in the plasma membrane was markedly decreased by all four statins, of which atorvastatin was the most potent. IL-1 $\beta$ -induced *MUC5AC* mRNA expression was most significantly decreased by 10  $\mu$ M atorvastatin, to  $1.4 \pm 0.2$ -fold of the level of the untreated control group, as opposed to an increase to  $4.7 \pm 0.5$ -fold for IL-1 $\beta$  alone, and this suppression of *MUC5AC* expression was dose-dependent. This decrease in *MUC5AC* expression by atorvastatin was mediated via the IL-1 receptor and the MAPK pathway, including both phospho-p38 MAPK and phospho-ERK.

**Conclusion**

These results suggest that atorvastatin is the most potent of the assayed statins with respect to suppression of IL-1 $\beta$ -induced *MUC5AC* mRNA expression, and may be considered an antihypersecretory agent.

**CHARACTERISTICS OF MACROLIDE RESPONDERS IN PERSISTENT POST-SURGICAL RHINOSINUSITIS**

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**Aims**

The anti-inflammatory effects of long term low dose macrolide therapy has shown benefit in the management of diffuse panbronchiolitis. However, our understanding of the suitable patient characteristics that predispose to macrolide response in chronic rhinosinusitis (CRS) is limited.

**Method**

A case control study was performed of consecutive chronic rhinosinusitis patients with low dose macrolide therapy, who were failing after endoscopic sinus surgery the corticosteroid irrigation therapy in a tertiary level rhinology practice. Patients were categorized as either responders based on near normal endoscopy at 6 months or greater following endoscopic sinus surgery and commencement of clarithromycin treatment. History of asthma or reflux, allergy status, preoperative SNOT-22, and intraoperative serum and tissue histopathology results were assessed in both groups.

**Results**

Twenty-seven patients (44.4% female, 54.4 +/- 15.5 years) were assessed, of which 29.6% had a history of asthma, 22.2% a history of reflux, and all were nonsmokers. Of these, 67% were macrolide responders. Macrolide response was associated with low tissue eosinophilia (<10/HPF) compared to non-responders (84.6% vs 33.3%, p=0.02). Tissue neutrophilia was similar between the groups (61.5% vs 50%, p=0.64). Squamous metaplasia was overexpressed in non-responders (0% vs 50.0%, p=0.02). Serum eosinophil level was lower in responders (0.13 [0.11] vs 0.25 [0.13], p=0.02), whereas serum neutrophil level was similar (p=0.84). Allergy status did not predict response (60.0% v 50.0%, p=0.69).

**Conclusion**

Low tissue and serum eosinophilia, and absence of tissue squamous metaplasia may predict effective treatment response to macrolides in CRS patients.

**DEVELOPMENT OF AN ENGINEERED HONEY (SURGIHONEY™) AS A NOVEL ADJUNCTIVE BIOFILM-TARGETED THERAPY IN STAPHYLOCOCCUS AUREUS CHRONIC RHINOSINUSITIS**

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**Aims**

Chronic rhinosinusitis (CRS) is a common condition affecting up to 15% of the UK population. The disease has a significant impact on the quality of life of sufferers and places a heavy financial burden on the NHS. Many of these patients require repeated courses of antibiotics and multiple operations over their lifetime. It is well established that *Staphylococcus aureus* biofilms play a significant role in disease chronicity and recalcitrance following endoscopic sinus surgery. Surgihoney™ is a novel engineered honey, which is currently being trialed as a new generation therapy for non-healing ulcers and wounds.

The aim of this study is to investigate the *in vitro* antimicrobial profile of Surgihoney™ in CRS-related *S. aureus* biofilms.

**Method**

CRS strains of *S. aureus* were isolated from tissue samples harvested at the time of surgery. *In vitro* biofilms were formed over 24 hours under static conditions on untreated polystyrene plates at 37°C/5% CO<sub>2</sub> prior to treatment with Surgihoney™. Following treatment, biofilm biomass was assessed by confocal microscopy, and the viable cell population determined by colony forming unit enumeration.

**Results**

Surgihoney™ treated *S. aureus* biofilms displayed a 2 to 3 log fold drop in viability when compared to non-treated biofilms ( $p < 0.0001$ ). These results represent a novel advance in the treatment of Staphylococcal biofilms.

**Conclusion**

Our preliminary results suggest that Surgihoney™ represents a viable adjunctive therapy in *S. aureus*-related CRS disease. In view of the current epidemic of antimicrobial tolerance, this new treatment would help reduce antibiotic use, and improve outcomes after endoscopic sinus surgery.

**DUPILUMAB IMPROVES PATIENT-REPORTED SYMPTOMS AND REDUCES DISEASE SEVERITY IN PATIENTS WITH NASAL POLYPOSIS: RESULTS FROM A PHASE 2A TRIAL**

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**Aims**

Dupilumab, a fully-human anti-interleukin-4-receptor- $\alpha$  monoclonal antibody, inhibits IL-4/IL-13 signaling, drivers of Type 2-mediated inflammation. In nasal polyposis (NP) patients, dupilumab significantly improved endoscopic, radiographic and clinical endpoints.

Here, we evaluate the effect of dupilumab on daily symptoms and disease severity in NP.

**Method**

In this proof-of-concept, phase 2a, double-blind, placebo-controlled, parallel group clinical trial, 60 adult NP patients refractory to intranasal corticosteroids were randomly assigned to 16 weeks of weekly subcutaneous 300mg dupilumab (n=30) or placebo (n=30) on a mometasone furoate nasal spray (MFNS) background. Patient-reported symptoms of nasal congestion/obstruction, decreased/lost sense of smell, and anterior/posterior rhinorrhea were assessed daily (composite total symptom score [TSS] (range 0-9)). Patient-reported disease severity was assessed monthly using visual analog scale (VAS) (range 0-10). Effect sizes (TSS, 1.54; VAS, 0.74) were calculated using Cohen's rule to assess clinical meaningfulness.

**Results**

At 16 weeks, dupilumab showed significant and clinically meaningful improvement vs placebo on TSS (least squares [LS] mean  $-2.51$ ,  $P < 0.0001$ ) and reduced component symptoms of congestion/obstruction, anterior/posterior rhinorrhea, and loss of smell (all  $P < 0.001$ ). Furthermore, statistically and clinically relevant improvement in favor of dupilumab was observed on the VAS (LS mean  $-2.13$ ,  $P = 0.008$ ).

A moderate correlation was observed between change from baseline in TSS and change from baseline VAS for dupilumab at 16 weeks (Pearson correlation coefficient;  $\rho = 0.46$ ). Injection site reactions, headache, and nasopharyngitis were the most frequently reported adverse events with dupilumab.

**Conclusion**

**In NP patients on MFNS background therapy, dupilumab significantly improved patient-reported symptoms and reduced disease severity compared with placebo.**

**DUPILUMAB REDUCES LOCAL TYPE 2 PROINFLAMMATORY BIOMARKERS IN PATIENTS WITH CHRONIC SINUSITIS AND NASAL POLYPOSIS*****K. Jonstam*<sup>1</sup>, *G. Holtappels*<sup>2</sup>, *B. Swanson*<sup>3</sup>, *L. Mannent*<sup>4</sup>, *L.O. Cardell*<sup>1</sup>, *N. Tian*<sup>5</sup>, *Y. Wang*<sup>6</sup>, *D. Zhang*<sup>7</sup>, *C. Fan*<sup>7</sup>, *J. Hamilton*<sup>8</sup>, *A. Grabher*<sup>9</sup>, *G. Pirozzi*<sup>10</sup>, *C. Bachert*<sup>2</sup>**<sup>1</sup>Karolinska Institute, Division of ENT Diseases- Department of clinical Sciences- Intervention and Technology, Stockholm, Sweden<sup>2</sup>Ghent University Hospital, Upper Airways Research Laboratory, Ghent, Belgium<sup>3</sup>Sanofi, Clinical & Exploratory Pharmacology, Bridgewater, USA<sup>4</sup>Sanofi R&D, Research and Development, Chilly Mazarin, France<sup>5</sup>Sanofi, Clinical & Exploratory Pharmacology operations, Bridgewater, USA<sup>6</sup>Sanofi, Disposition- Safety & Animal Research, Bridgewater, USA<sup>7</sup>Sanofi R&D, Biostatistics and Programming, Bridgewater, USA<sup>8</sup>Regeneron Pharmaceuticals- Inc., Predictive Medicine, Tarrytown, USA<sup>9</sup>Sanofi R&D, Research and Development, Berlin, Germany<sup>10</sup>Sanofi R&D, Research and Development, Bridgewater, USA**Aims**

In Europe and the US, chronic sinusitis with nasal polyps (CSwNP) mainly represents a disease driven by Th2-inflammation with elevated levels of ECP, total IgE, and Th2 cytokines. In a phase 2 study (ClinicalTrials.gov: NCT01920893), dupilumab, an anti-IL-4R $\alpha$  antibody targeting the IL-4/IL-13 pathways, reduced Th2 biomarkers in the blood (e.g. IgE and eotaxin-3), and significantly improved endoscopic, radiographic, symptom, and quality of life endpoints. Injection site reactions, headache, and nasopharyngitis were most frequently reported adverse events. We now report the effect of dupilumab treatment on inflammatory biomarkers in nasal secretions (NS) and polyp tissue.

**Method**

Adults with CSwNP received subcutaneous dupilumab 300 mg (N=30) or placebo (PBO) (N=30) weekly (qw) for 16 weeks added to daily intranasal mometasone furoate treatment. Nasal polyp biopsies were collected (15 of 60 patients) at baseline and week (wk) 16. Biomarkers were assayed in NS and homogenized polyp tissue.

**Results**

In NS, eotaxin-3 and total IgE levels (mean area under curve for changes from baseline, 0–16 wks) were significantly lower on dupilumab versus PBO ( $p < 0.001$ ,  $p < 0.022$ , respectively). In nasal polyp tissue, there was a significant decrease in IgE ( $p = 0.047$ ), ECP ( $p = 0.008$ ), Eotaxin-2 ( $p = 0.008$ ), Eotaxin-3 ( $p = 0.031$ ), and PARC ( $p = 0.016$ ) after treatment with dupilumab compared with baseline, and no significant changes were seen on PBO.

**Conclusion**

In patients with chronic sinusitis and nasal polyposis, treatment with dupilumab 300 mg qw reduces Type 2 inflammation markers such as IgE and chemokines in blood and NS; moreover, in polyp tissue, this also includes the eosinophil marker ECP.

**EFFICACY OF BALLOON SINUPLASTY IN THE TREATMENT OF FRONTAL RHINOSINUSITIS: A PROSPECTIVE STUDY**

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**Aims**

To assess the efficacy of balloon sinuplasty of frontal sinus ostia for treatment of symptoms of chronic frontal rhinosinusitis and recurrent acute frontal sinusitis.

**Method**

Study design was prospective consecutive case series. Patients with symptoms of chronic frontal sinusitis or recurrent acute frontal sinusitis despite at least 3 months of full medical therapy were selected for balloon sinuplasty dilatation of the frontal recess/sinus ostia. All procedures were performed under general anaesthetic as day cases. Pre-operative screening included flexible/rigid nasendoscopy, allergy testing and CT-Sinuses. Pre-operative Sino-Nasal Outcome Test (SNOT-22) scores were compared with follow up scores at 6 weeks and 6 months.

**Results**

Total patients n=60 (age 19-79) (31 female, 29 male). Mean pre-operative SNOT-22 score was 56 (SD ±22.5), 19 (SD ±13.9) at 6 weeks ( $p < 0.0001$ ) and 14 (SD ±13.5) at 6 months ( $p < 0.0001$ ) (Gaussian distribution, parametric analyses). The frontal sinus balloon was successfully passed in all procedures. Fifteen cases required an additional procedure (septoplasty +/- out fracture of inferior turbinate) to enable access to the frontal recess. The mean 6-month SNOT-22 score in this subgroup was the same as for those undergoing sinuplasty alone (14 SD ±7.1). No adverse events were recorded.

**Conclusion**

Results analysis confirms that balloon sinuplasty is a safe and effective treatment for frontal rhinosinusitis with definite improvement in SNOT-22 scores at 6 weeks and 6 months post procedure.



**SINONASAL OUTCOME TEST-23 (SNOT-23): PATIENT REPORTED OUTCOME MEASUREMENT IN ENDOSCOPIC SINUS SURGERY**

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**Aims**

There has been a great expansion in patient reported measurements in rhinology. We have previously validated the sinonasal outcome test-23 (SNOT-23), a modification of the SNOT-22 in patients undergoing septorhinoplasty surgery. The aim of this study is to validate the modified questionnaire in patient undergoing functional endoscopic sinus surgery for chronic rhinosinusitis (CRS)

**Method**

We conducted a prospective controlled cohort study of 62 patients with an EPOS 2012 diagnosis of chronic rhinosinusitis (with or without polyps) undergoing functional endoscopic sinus surgery and a control group of healthy volunteers. Reproducibility, responsiveness to treatment, known group difference and validity of SNOT-23 were analysed. Scores were compared with visual analogue scales, nasal obstruction symptom evaluation (NOSE) score and nasal inspiratory peak flow.

**Results**

SNOT-23 has a good test-retest reliability and is a valid outcome measure for assessing response to surgery especially with regards to nasal obstruction and evaluation of quality of life

**Conclusion**

SNOT-23 is a valid and reliable tool that can assess response to endoscopic sinus surgery. It can be easily adapted for use in routine clinical practice.

## A SYSTEMATIC REVIEW OF OUTCOMES IN CHRONIC RHINOSINUSITIS

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### Aims

To perform a systematic review of the highest quality evidence for Chronic Rhinosinusitis in adults to enable the development of a Core Outcome Set (COS) for the condition. A COS is a minimum set of outcomes that are defined and measured in a standardised way. COS enables meaningful comparison between studies and can address outcome reporting bias

### Method

A search of the Cochrane database was performed with the search terms 'Rhinosinusitis, ENT, Otolaryngology'. It was felt that the Cochrane database would provide access to the majority of high quality randomised controlled trials regarding Chronic Rhinosinusitis. The included RCT's were obtained and analysed independently by two researchers. Each researcher made a long list of outcomes included within each individual paper and combined these to create an overall list.

### Results

The initial search yielded 49 reviews. Eleven reviews met the initial inclusion criteria. Three reviews were excluded (performed on allergic rhinitis or had no studies included). In total 78 papers from the included Cochrane reviews were obtained for further analysis. The following broad categories of outcome (with examples of specific measures of outcome) were agreed upon by the two researchers analysing the papers.

- Changes in patient rated severity of symptoms (e.g. VAS)
- Quality of life measures (e.g. SNOT-22, RSOM)
- Physiological and clinical assessments (e.g. endoscopic assessment, airflow measurements)
- Microbiological
- Biomarkers (e.g. nitric oxide)
- Lower airway disease
- Side effects
- Acceptability

### Conclusion

This systematic review provides the basis for the development of a COS for chronic rhinosinusitis. This represents a solution to the problems resulting from heterogeneity in studies into Chronic Rhinosinusitis.

**USE OF EPOS 2012 STAGING SYSTEM TO ASSESS DISEASE CONTROL IN TREATED CRSWNP PATIENTS: ASSOCIATION WITH CLINICAL AND BIOLOGICAL MARKERS.*****E.M. López Chacón<sup>1</sup>, I. Alobid<sup>1</sup>, M. Martel<sup>2</sup>, A. Cordero<sup>1</sup>, C. Langdon<sup>1</sup>, M. Fuentes-Prado<sup>3</sup>, J. Roca-Ferrer<sup>3</sup>, C. Picado<sup>4</sup>, J. Mullo<sup>3</sup>, L. Pujols<sup>3</sup>***<sup>1</sup>Hospital Clínic i Universitari, Otorhinolaryngology, Barcelona, Spain<sup>2</sup>Hospital de Sant Joan Despí Moisès Broggi, Otorhinolaryngology, Sant Joan Despí, Spain<sup>3</sup>IDIBAPS, Clinical and Experimental Respiratory Immunoallergy, Barcelona, Spain<sup>4</sup>Hospital Clínic i Universitari, Pneumology and Allergy, Barcelona, Spain**Aims**

To evaluate the sensitivity of EPOS2012 staging system to assess disease control in treated patients with chronic rhinosinusitis with nasal polyps (CRSwNP) and to correlate the control score with clinical and biological markers of CRSwNP severity.

**Method**

Adult CRSwNP patients treated with intranasal corticosteroids were evaluated at inclusion (v1) and after three months (v2). Nasal symptoms and severity (Visual Analogue Scale, VAS), nasal endoscopy (modified Lidholdt 0-4), olfaction (BAST-24), CRSwNP control (EPOS2012) and treatment adherence were evaluated at v1 and v2. Asthma co-morbidity, atopy (prick-test), peripheral blood eosinophilia, total and specific serum IgE, CT scan, and quality of life (SNOT-22) were evaluated at v1. Results are expressed as mean±SEM.

**Results**

CRSwNP patients (56.2±2.1y, 60% men, N=30) were recruited, 50% being partially- controlled and 50% uncontrolled by treatment. CRSwNP control was not associated with atopy, asthma, or aspirin sensitivity. Compared to partially-controlled patients, uncontrolled patients reported higher nasal symptoms (nasal obstruction:7.3±0.5vs2.2±0.4,p<0.0001; facial pain: 2±0.5vs0.3±0.2,p<0.01; anterior rhinorrhoea:4.4±0.6vs1.9±0.6,p<0.05; postnasal drip:4.2±0.8vs1.6±0.4,p<0.05; loss of sense of smell:8±0.7vs3.7±0.9,p<0.01), disease severity (6.8±0.5vs3.5±0.5,p<0.0001), and nasal endoscopy scores (5.3±0.5vs3.9±0.3,p<0.05), but lower BAST-24 scores (smell detection:35.3±10.3%vs86±9%,p<0.01; memory recognition:20.7±8.4%vs67.3±9.2%,p<0.01; forced choice:16.3±5.5%vs49.3±7.6%,p<0.01). No significant differences in SNOT-22, blood eosinophilia, and total/specific IgE levels were found between both groups. At v2, a significant decrease in CRSwNP severity (4.2±0.4vs5.2±0.5,p<0.05) and a non-significant decrease of uncontrolled patients (36.7%vs50%) was observed compared to v1. CRSwNP control evaluated by EPOS2012 was associated with disease severity measured by VAS.

**Conclusion**

The assessment of disease severity by VAS appears to be more sensitive in CRSwNP patient's follow-up than EPOS2012 control staging score.

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**INVESTIGATION OF THE INCIDENCE OF EUSTACHIAN TUBE DYSFUNCTION IN PATIENTS WITH SINONASAL DISEASE**

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**Aims**

Rhinosinusitis is characterised by inflammation affecting the respiratory mucosa of the nose and sinuses. Since the Eustachian tube and the middle ear cavity are also lined by the same mucosa, it is likely that the pathophysiological processes that give rise to rhinosinusitis will also affect these areas. Although the link between these adjacent areas has been realised for decades, the studies that have examined this interaction, and the effects of any interventions are few and mostly from the point of view of otitis media with effusion in children. Eustachian tube dysfunction (ETD) is a common, however it is often dismissed as a "minor" symptom in rhinology patients.

The aim of this study was to determine the frequency of otologic symptoms in patients attending the rhinology clinic.

**Method**

The seven-item Eustachian Tube Dysfunction Questionnaire (ETDQ-7), a validated a disease-specific instrument was used to assess symptoms with respect to ETD.

119 patients attending the rhinology outpatient clinic completed ETDQ-7, a SNOT 22 and had their NIPF measured.

**Results**

The results showed a significantly higher rate of ETD ( $p < 0.01$  paired t-test) in the rhinology patients (mean score 3.1, SD 1.64) as compared to a control population (mean 1.3, SD 0.3).

**Conclusion**

Eustachian tube dysfunction is more common in rhinology patients than the general population, and within the rhinology population those with nasal polyposis had a highest incidence of otological symptoms. The classification of this as a "minor" symptom of rhinosinusitis should be re-evaluated and the effect of treatment of sinonasal disease on ETD needs to be investigated.

## THE IMPACT OF BITTER TASTE RECEPTORS ON CULTURABLE BACTERIA IN CHRONIC RHINOSINUSITIS

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### Aims

Extra-oral bitter taste receptors have been associated with innate bacterial defence mechanisms. Genetic variation in T2R38 functionality has been shown to be associated with susceptibility to upper respiratory tract infections and chronic rhinosinusitis (CRS). We sought to independently assess the influence of bitter taste receptor genotype on the presence of culturable bacteria in the sinuses.

### Method

A cross-sectional analysis of patients with CRS undergoing surgery was performed. Middle meatal nasal swabs were sent for microbiological evaluation at the time of the procedure. Mucosal biopsies were taken and sent for bitter taste receptor genotype analysis. Sequencing of 3 polymorphisms in the TAS2R38 gene was performed to identify genotypes as super-tasters (PAV/PAV), non-tasters (AVI/AVI) or heterozygous expression (PAV/AVI). The presence of culturable organisms and common pathogens were compared with bitter taste receptor genotypes.

### Results

37 patients (51% female, age 55.2±16.42 years) were assessed. Super-tasters comprised 22% of the group, 19% were non-tasters and 49% had heterozygous expression. A cultured pathogen was grown in 48% of patients; 32% gram-positive, 20% gram-negative, 28% grew *Staphylococcus aureus* and 12% *Pseudomonas aeruginosa*. A non-taster genotype was predictive of colonised pathogens ( $X^2=9.976$ ,  $p=0.019$ ). Tissue eosinophilia (>10/HPF) was seen in 33%. An association between gram-negative growth and tissue eosinophilia was demonstrated ( $X^2=4.80$ ,  $p=0.028$ ).

### Conclusion

Even in a small sample of patients with CRS, non-taster T2R38 genotype appears to predict the presence of culturable bacteria colonising the sinus cavity at the time of surgery for their condition. A genetic link to patients more likely to become 'infected' is likely.

**THE IMPORTANCE OF LOCAL EOSINOPHILIA IN THE SURGICAL OUTCOME OF CHRONIC RHINOSINUSITIS: A 3-YEAR PROSPECTIVE OBSERVATIONAL STUDY**

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**Aims**

Patients with chronic rhinosinusitis with/without nasal polyps (CRSwNP/CRSsNP) benefit from endoscopic sinus surgery (ESS), with an estimated success rate of 80%. At present, it remains unclear to what extent the presence of eosinophils, eosinophilic mucin (EM) and fungal hyphae (FH) in secretions influence the clinical outcome and recurrence of disease after ESS.

**Method**

A prospective mono-centre study including 221 CRS patients who were unresponsive to medical treatment and underwent ESS, was performed. All tissue and sinonasal secretions were microscopically examined for the presence of eosinophils, EM and FH. Patients were followed for 3 years after surgery. Recurrence was defined according to the EPOS clinical control assessment, based on nasal endoscopy, symptoms and the need for systemic treatment.

**Results**

In total, 96 CRSwNP and 125 CRSsNP patients were included. Tissue eosinophils were found in 78% of CRSwNP patients compared to 42% in CRSsNP. Eosinophilic mucin was observed in 52% of the CRSwNP group versus 20% of the CRSsNP group. Furthermore, secretion analysis revealed FH in 7% of CRS. Recurrence in the total group was 22% over 3 years. CRSwNP patients with tissue eosinophilic involvement showed a recurrence rate of 48%. When the airway mucus secretions were positive for EM the recurrence rate was 51%.

**Conclusion**

The presence of eosinophils in the tissue or secretions greatly increases the risk of recurrent disease in CRSwNP patients. The finding of tissue eosinophilia and EM in the collected sinonasal airway mucus secretions provides valuable information regarding the clinical outcome and the increased likelihood of CRS recurrence after ESS

## ANALYSIS OF SINONASAL AIRWAY MUCUS SECRETIONS HELPS IN PREDICTING OUTCOME AFTER ESS

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### Aims

Surgery for chronic rhinosinusitis (CRS) may fail because of recurrence. Pathological analysis of available sinonasal airway mucus secretions is a simple and low cost tool that appears to be promising in predicting outcome after ESS in CRS patients.

### Method

Samplings of sinonasal airway mucus secretions were collected whenever possible in 221 consecutive operated patients besides the regular tissue materials gained at surgery and sent for pathology. Secretions obtained were prospectively analyzed for the density of eosinophil cells measured with HPF standards, the presence of Eosinophil Mucin (EM : consisting of layers of necrotic cells, Charcot Leyden Crystals (CLC) ) and the presence of Fungal Hyphae (FH) through silver staining).

### Results

In the group of chronic rhinosinusitis without nasal polyposis (N=125) (CRSsNP) a recurrence rate of 9% was found. When EM was present in sinonasal airway mucus secretions the recurrence rate approached 25%. In the group of chronic rhinosinusitis with nasal polyposis (N=96) (CRSwNP) the subgroup with EM presence showed a 50% recurrence rate whereas the presence of EM and FH showed recurrence in 75%. Overall, the global group of CRSwNP only showed 45% recurrence.

### Conclusion

The finding of tissue eosinophilia and EM in sinonasal airway mucus secretions provides valuable information regarding the increased likelihood of CRS recurrence after ESS. Consequently, every ENT surgeon should consider sending sinonasal airway mucus secretions obtained prior / during ESS for pathological analysis.

**PEAK NASAL INSPIRATORY FLOW RATES CORRELATE WITH QUALITY OF LIFE IN FUNCTIONAL ENDOSCOPIC SINUS SURGERY**

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**Aims**

The peak nasal inspiratory flow (PNIF) meter offers an objective measure of nasal patency. PNIF measurements have been shown to improve following functional endoscopic sinus surgery (FESS), and correlate with subjective nasal obstruction. However, it is not known whether PNIF correlates with subjective quality of life (QOL) measures in patients undergoing surgery for chronic rhinosinusitis (CRS). We therefore aimed to determine whether changes in PNIF correlate with changes in validated QOL assessment tools, following FESS.

**Method**

37 patients undergoing FESS for CRS (with or without polyps) were recruited into this prospective cohort study, in a tertiary referral centre. There were 21 men and 16 women, of mean age 48.8 years. PNIF, Sino-Nasal Outcome Test-22 ('SNOT-22') and Nasal Obstruction Symptom Evaluation ('NOSE') questionnaires were performed before and after surgery.

**Results**

For all patients, there was a statistically significant, strong negative correlation between change in PNIF score and change in 'SNOT-22' score following surgery (pearson  $r=-0.64$ ,  $p<0.0001$ ). Strong negative correlations were also seen during subgroup analysis of patients with and without polyps ( $r=-0.57$ ,  $p=0.006$  and  $r=-0.67$ ,  $p=0.005$  respectively). Change in PNIF score additionally correlated significantly with change in 'NOSE' score following surgery, in all patients and on subgroup analysis, in those without polyps ( $r = -0.54$ ,  $p = 0.0005$  and  $r = -0.68$ ,  $p = 0.003$ ).

**Conclusion**

Changes in PNIF seen after FESS correlate well with improvements in subjective QOL. As an investigation that is convenient and inexpensive, the PNIF meter can be successfully utilised as an objective assessment tool in functional endoscopic sinus surgery.



**PREDICTING RISK OF RECURRENT EPISTAXIS REQUIRING READMISSION: LITERATURE REVIEW. DERIVATION AND VALIDATION OF RHINO-OOZE SCORE**

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**Aims**

To develop and evaluate a new scoring tool (RHINO-ooze score) to help identify patients with high risk of recurrent epistaxis to aid early identification, operative intervention and reduce readmission rates.

**Method**

Literature search on the “factors influencing recurrent epistaxis” was performed using various medical databases. This led to the development of a risk scoring tool (RHINO-ooze score) which was validated by performing descriptive analysis on retrospective data collected on patients admitted with epistaxis between October 2013 and October 2015 at a tertiary otorhinolaryngology centre. Multiple ordinal logistic and linear regressions were used to predict recurrence of epistaxis and this was validated by analysing the receiver- operator characteristic curve (ROC).

**Results**

Five studies were analysed based on the inclusion criteria leading to the development of the RHINO-ooze score (Recent admission, Haemorrhage point unidentified, Increasing age, Nasal posterior pack on current or previous admission, Ongoing use of anticoagulants). There were 834 admissions in the study period of which 26.4 % were readmissions. The sensitivity, specificity positive and negative predictive values for recurrent epistaxis requiring readmission for the highest risk patients were 81.3%, 87.9%, 70.8% and 92.9% respectively. Area under the ROC curve demonstrated an accurate prediction (c-statistic = 0.85).

**Conclusion**

This predictive model demonstrates that three month readmission rate can be reasonably well predicted using the RHINO-ooze score and can be used as an adjunct to clinical decision making with regards to timing of operative intervention to reduce readmission rates.

**AN OLD DRUG FOR A NEW APPLICATION: CARBAZOCHROME-SODIUM-SULFONATE IN HEREDITARY HEMORRHAGIC TELEANGIECTASIA**

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**Aims**

Hereditary Hemorrhagic Teleangiectasia is a dominantly inherited genetic vascular disorder in which epistaxis is the most frequent manifestation, responsible for high morbidity and poor quality of life. We report a collection of HHT patients showing an impressive response during treatment with a haemostatic drug with capillary stabilizing action, carbazochrome-sodium-sulfonate never tested before in such patients. The mechanism of action is still unknown, but seems that it may modulate blood's fibrinolytic balance through changing the endothelial cells function.

**Method**

We successfully treated, orally, ten patients (3 male, 7 female; median age of 42.8) who had HHT with carbazochrome-sodium-sulfonate 50 mg twice per day for two months. Patients underwent Epistaxis Severity Score validate questionnaire pre and post treatment.

**Results**

We observed a reduction of the scores in all patients and in particular the pre-treatment mean score was of  $6.4 \pm 2.1$  versus a post treatment value at one month of  $4.9 \pm 1.8$  and after two months of  $3.4 \pm 1.34$ , with a significant statistical difference ( $p < 0,05$ ). Furthermore the mean hemoglobin level increased after 1 months from  $9.04 \pm 1.6$  grams per deciliter to  $9.92 \pm 1.31$  and after two months to  $10.93 \pm 1.05$  grams per deciliter; the statistical analyses showed that the differences reached levels of significance ( $p < 0,05$ )

**Conclusion**

Our observation indicates that its effect on the endothelial barrier dysfunction through inhibition of agonist-induced phosphoinositide hydrolysis could be involved in the pathogenesis of nose bleeding and it raises the hope that this safe and harmless drug may be potential therapeutic agents for HHT.

**SUPRASELECTIVE EMBOLIZATION IN INTRACTABLE EPISTAXIS: COMPLICATIONS AND OUTCOMES, LONG-TERM ANALYSIS.**

***G. de Bonnecaze<sup>1</sup>, Y. Gallois<sup>1</sup>, F. Bonneville<sup>2</sup>, S. Vergez<sup>1</sup>, E. Serrano<sup>1</sup>***

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**Aims**

Epistaxis is a common and in most cases benign event. Severe or recurrent epistaxis, however, can present therapeutic problems. The aim of our study was to assess long-term recurrence and complications after percutaneous embolization.

**Method**

We performed a retrospective study including all patients referred to our tertiary care medical center for intractable epistaxis and managed with supraselective embolization. Medical records were screened for each patient. We analyzed demographic data, associated risk factors, recurrences and complications.

**Results**

Fifty-seven procedures of supraselective embolization in intractable epistaxis are reported. Unilateral embolization was performed in 37 cases (64%), bilateral embolization in 20 (36%). The sphenopalatine artery and distal internal maxillary arteries were embolized in all patients. Additional embolization of the facial artery in 28 patients (49%). The long-term success rate was 83%. Majority of recurrence occurred in the first month after hospitalization. Major complications occurred in 14% of the cases: 7 necrosis of soft tissues and 1 ophthalmoplegia. Minor complications occurred in 21%: 10 severe facial pain, 2 edema. Bilateral embolization increased the risk of major complications. ( $p < 0.05$ , chi-square test)

**Conclusion**

Supraselective endovascular embolization proved safe and effective in controlling idiopathic epistaxis, refractory to other maneuvers.

**MANAGEMENT OF SEVERE EPISTAXIS; A TWENTY SIX YEAR PERSONAL EXPERIENCE OF FINDING THE SOURCE**

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**Aims**

To demonstrate the consistency of the site of bleeding in patients with uncontrolled severe epistaxis.

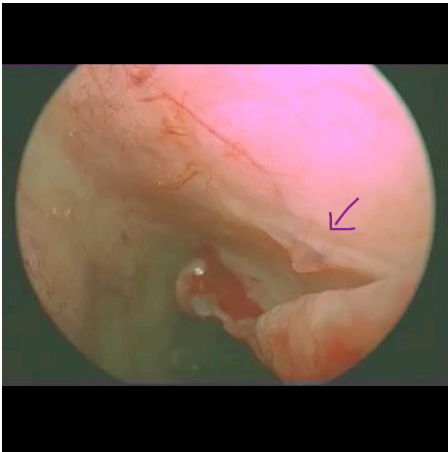
**Method**

A review was carried out from 1989-2015 in the Otolaryngology- Head and Neck department of a tertiary referral centre in Galway, Ireland. The study included all patients who presented with uncontrolled severe epistaxis where the site of bleeding was not visualised with anterior rhinoscopy and where conservative measures failed to control the bleeding.

All patients underwent a formal examination under general anaesthesia by the senior author of this article. Findings at examination were documented along with subsequent management and outcome.

**Results**

110 patients (84 males and 26 females) were included in the study. Ages ranged from 17-94 years old. A bleeding point was identified and cauterised in 92 patients. Locations included 37 on the antero-superior septum, 12 in the mid septum, 25 at the posterior end of the middle meatus and 18 at the posterior end of the inferior meatus.



No patients required further treatment with sphenopalantine/anterior ethmoidal ligation or embolisation.

**Conclusion**

We have demonstrated that the site of bleeding is remarkably consistent in severe epistaxis. All patients were managed with electrothermal cautery and did not require major artery ligation or embolisation. The bleeding point is always in the nose, the above information may help in identifying the source.

**NON-INVASIVE BLOOD TESTING IN EPISTAXIS**

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<sup>2</sup>University Hospital Zurich, ENT Department, Zurich, Switzerland

**Aims**

The aim of this study was to determine feasibility and accuracy of measuring the hemoglobin level and international normalized ratio (INR) in nasal blood from epistaxis patients.

**Method**

In a prospective study nasal blood was harvested in epistaxis patients. Hemoglobin and INR values were assessed by means of point-of-care devices and compared to standard venous blood samples.

**Results**

Twenty patients were included. The linear regression comparing the venous and nasal samples showed a strong correlation of both haemoglobin and INR results. A Bland-Altman analysis showed a mean difference between haemoglobin measurements of 2.3g/l. The mean difference in INR measurements was 0.14.

**Conclusion**

This study could show that measuring blood parameters in nasal blood is feasible, accurate and correlates with standard venous blood samples. It opens an adequate and well priced alternative of blood sampling without the need of venous or capillary puncture thus reducing cost as well as pain potentially lowering the threshold of obtaining relevant blood results.

**LONG TERM RESULTS AND MORTALITY IN EPISTAXIS PATIENTS**

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**Aims**

Long term followup results in patients who suffered from epistaxis are scarce. The presented studies intended to evaluate long term recurrences, the influence of antiaggregants and anticoagulants as well sequelae after epistaxis treatment. Furthermore, the mortality was assessed in the obtained data.

**Method**

Patients charts were reviewed retrospectively and questionnaires were sent to patients who had suffered from epistaxis several years ago. Recurrences and long term sequelae were assessed. The influence of any antithrombotic medication was evaluated. Reports on deceased patients were collected and compared to the general mortality rate in Switzerland.

**Results**

From a large cohort followup data and questionnaires were available in 109 patients for analysis. The overall recurrence rate (side independent) in 6.4 years was >40%. Discomfort due to packing was remembered by 86% of patients who had had this type of treatment, whereas surgical treatment was significantly less painful. The rate of sequelae including crusting was high. Acetylsalicylic acid was associated with sever long term recurrences, while vitamin K antagonists showed higher rates in general. Epistaxis, and interestingly especially anterior ones, were associated with significantly higher mortality rates compared to the general population.

**Conclusion**

We are able to present surprising and new results on the long term follow up in epistaxis patients. The obtained results will help to improve the assessment of epistaxis patients and optimizing the management of this frequent disease. The surprisingly high mortality rate in epistaxis patients could point to a generally poor health condition that needs to be considered when dealing with and counseling patients.

**EPISTAXIS IN NOVEL ANTICOAGULANT AGENT USE: DOES THE EVIDENCE REFLECT PATIENT EXPERIENCE?**

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**Aims**

Novel anticoagulant agents (NOAC) are a recent addition to the pharmacological arsenal. NOAC safety profiles are generally favourable, with reduced life threatening haemorrhage rate compared to warfarin, but there have been suggestions of an increased risk of mucosal bleeding from sites such as the gastrointestinal tract and nasal mucosa. We set out to conduct a pilot study of the incidence of epistaxis in NOAC users. In tandem, we performed a systematic review to examine the reported risk of epistaxis in NOAC use.

**Method**

139 patients were identified for study (86 NOAC, 56 warfarin) and the groups were well matched for sex, gender, and anticoagulant indication. Systematic review was performed by Pubmed and EMBASE search using MeSH keywords

**Results**

4 NOAC patients (5%) had suffered epistaxis in the last 3 months, compared to 5 (9%) patients on warfarin. No patients required hospital attendance or admission. Systematic review discovered no studies of NOAC use in which rate of epistaxis was the primary outcome. A total of 49 trials reporting on NOAC safety profile were found, of which 2 specifically reported on epistaxis. Both of these trials reported a higher rate of epistaxis in NOAC compared to warfarin.

**Conclusion**

In summary, there is a lack of robust evidence regarding the risk of epistaxis in NOAC use. By contrast, we found a non-significant trend of reduced epistaxis in NOAC users. Further adequately powered study is required, particularly to investigate epistaxis rates of both NOAC and warfarin when used in clinical conditions rather than tightly controlled trial environment.

**THE USE OF FLOSEAL IN THE TREATMENT OF ACUTE EPISTAXIS: A PROSPECTIVE CLINICAL TRIAL.**  
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**Aims**

At Imperial College NHS Trust 230-240 patients/year are admitted with epistaxis. 11% require surgical intervention (SPA Ligation). Admissions for epistaxis account for 670 bed days per year. FloSeal has the potential to reduce the admissions from epistaxis and hence could represent significant savings to the trust. The objective was to determine the efficacy of FloSeal in managing acute epistaxis.

**Method**

Over a six month period patients who had failed simple measures for control of their epistaxis were selected to receive FloSeal or nasal packing. Data was collected on whether or not the treatment was successful, patient comorbidities, length of stay, need for surgery, rebleed rates and patient and doctor satisfaction with the treatment.

**Results**

38 patients received FloSeal, it was successful and admission was prevented in 26 cases (68%). There were no rebleeds in the FloSeal group. Patient and clinician satisfaction was higher in the FloSeal group.

**Conclusion**

Floseal was found to be a safe and useful tool in the treatment of epistaxis. The number of patients admitted with nasal packing was significantly reduced. The reduction of hospital admissions represents significant cost savings to the trust.



**THE NATURAL HISTORY OF EOSINOPHILIC AND NON-EOSINOPHILIC CHRONIC RHINOSINUSITIS WITH NASAL POLYPS (CRSWNP).**

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**Aims**

Literature data showed that inflammation varies in CRSwNP based on race and regional differences. We tried to differentiate natural history of CRSwNP basing on different inflammatory profiles (eosinophilic versus non-eosinophilic nasal polyps).

**Method**

We retrospectively reviewed records of 294 patients diagnosed at the onset as persistent non-allergic rhinitis and followed for 10 years. Patients were clustered in Group-A of 84 eosinophilic patients, Group-B of 106 neutrophilic one and 105 Controls with non-allergic-vasomotor-rhinitis without evidence of inflammation. All patients underwent regular 6-months follow-ups to check endoscopically the onset of nasal polyps and citologically the persistence of inflammation.

**Results**

The number of patients developed nasal polyps was highest in Group-A [29/84 patients(34.52%)] compared to Group-B [17/106(16.03%)] and Controls [3/104(2.8%)]. We graphed temporal onset of nasal polyps by Kaplan Mayer curves confirming that eosinophilic group had highest risk of nasal polyps over the years. We quantified the risk by logistic regression analysis. Patients of Group-A had an Odds Ratio higher than neutrophilic one when compared to the controls (10,55 versus 3,2). In Group-A blood hypereosinophilia, asthma and ASA intolerance increased the Odds ratio whereas in Group-B only asthma increased it.

**Conclusion**

In conclusion our data shown that inflammation works in the nose for many years before nasal polyps and different patterns of inflammation are related to different risk to develop nasal polyps.

**DELAYED WOUND HEALING IN BASAL CELL RICH PRIMARY EPITHELIAL CRS CELL CULTURES: EXPLORING THE ROLE OF BASAL CELLS IN THE PATHOPHYSIOLOGY OF CRS**

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<sup>3</sup>Centre de recherche du centre hospitalier de l'université de Montréal, Respiratory Physiology, Montreal, Canada

**Aims**

Basal cells are the stem progenitor cells of the sinus epithelium. Recent findings have shown decreased growth dynamics of epithelial stem progenitor cells isolated from nasal polyps in CRS. We wished to investigate a novel pathogenesis pathway in CRS based on the wound healing properties of basal cells.

**Method**

Anterior ethmoid sinus mucosa biopsies were taken from CRS and control patients (CTRL). Wound healing assays were run on primary epithelial cell cultures in cell monolayers and air liquid interface (ALI) (fully differentiated epithelium) models. Immunohistochemistry for basal cell marker p63 was used to evaluate the basal cell content of the cell cultures. Time lapse videography of closing wounds in cell monolayers were used to study migration patterns of individual cells during the healing process.

**Results**

The median rate of closure of wounds in the cell monolayers was statistically lower in CRS (n=9) compared to CTRL (n=5) [83308  $\mu\text{m}^2/\text{h}$  VS 49442  $\mu\text{m}^2/\text{h}$ ; p= 0,037]. Cell monolayers contained 83% (CRS) and 82% (CTRL) basal cells. The difference in wound closure rates was not observed in the ALI model. No statistical difference in the speed or tortuosity of individual cell's migratory path were observed in both CRS and CTRL cultures.

**Conclusion**

Delayed wound healing exists in basal cell rich CRS cell cultures. This defect cannot be attributed to a difference in basal cell numbers. The regenerative function of basal cells in CRS should be further explored as a faulty regeneration of the epithelium can maintain a cycle of epithelial wounding and fragility

**ROLE OF IL-10 ON PATHOGENESIS OF NASAL POLYP IN PATIENTS WITH CHRONIC RHINOSINUSITIS WITH NASAL POLYPOSIS**

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**Aims**

Interleukin 10 is a potent anti-inflammatory cytokine and dysregulation of IL-10 is associated with enhanced immunopathology in response to infection. We investigated IL-10 expression in chronic rhinosinusitis with nasal polyp (CRSwNP) and assessed the possible role of IL-10 in pathogenesis of CRSwNP.

**Method**

Thirty-five patients with CRSwNP, 12 patients with chronic rhinosinusitis without nasal polyp (CRSsNP) and 10 control subjects were enrolled in this study. Nasal polyp tissue and uncinated tissue (UT) were collected for analysis. Dispersed nasal polyp cells (DNPCs) were cultured in the presence or absence of IL-25 and IL-10. Real-time PCR, enzyme linked immunosorbent assay and immunohistochemistry were performed to measure the expression levels of selected inflammatory cytokines and inflammation-associated molecules.

**Results**

The mRNA expression levels of IL-5, IL-10, IL-17A, IL-25 and interferon gamma (IFN- $\gamma$ ) were significantly higher in the NP than the UT. There were strong positive correlations between IL-10 and a variety of inflammatory cytokines (IL-5, IL-17A, IL-25, IFN- $\gamma$ ) and inflammation-associated molecules (BAFF, CD19, HLA-DR $\beta$ ). Except for the IL-25 to IL-10 ratio, the expression ratios of the other measured inflammatory cytokines to IL-10 were significantly lower in the CRSwNP group than the CRSsNP or control group. Administration of IL-25 significantly increased the production of IL-10 in cultured DNPCs, while IL-25 production was not induced by exposure to IL-10.

**Conclusion**

Increased expression of IL-10, IL-10 related B cell activation, and decreased pathogen clearance indicated that IL-10, one of the potent anti-inflammatory cytokines, has a pivotal role in the pathogenesis of CRSwNPs.

**RED WINE EXTRACT ACTIVATION OF BASOPHILS IN-VITRO, EVIDENCE FOR ETIOLOGY OF SYMPTOM EXACERBATION IN ASPIRIN EXACERBATED RESPIRATORY DISEASE?*****R. Peters<sup>1</sup>, J. Negri<sup>2</sup>, J. Steinke<sup>2</sup>, L. Borish<sup>2</sup>, S. Payne<sup>1</sup>***<sup>1</sup>University of Virginia Health System, Otolaryngology - Head and Neck Surgery, Charlottesville, USA<sup>2</sup>University of Virginia Health System, Allergy and Clinical Immunology, Charlottesville, USA**Aims**

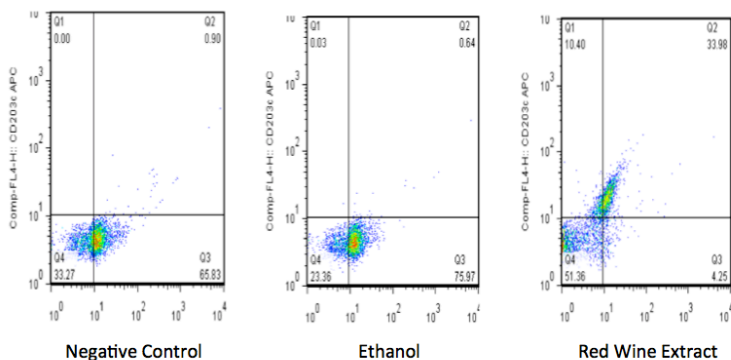
Recent evidence has shown that patients with aspirin exacerbated respiratory disease (AERD) react not only to aspirin and other non-steroidal anti-inflammatory medications but also, to a lesser extent, to alcoholic beverages. The mechanism for this is unknown. This effect appears to be greatest with red wine. We sought to explore the mechanisms of symptomatic exacerbation of patients with AERD on exposure to red wine.

**Method**

Whole blood isolates and purified granulocyte populations were obtained from patients with asthma and healthy controls. These were exposed to components of red wine including ethanol, red wine extract and a representative polyphenolic compound, resveratrol. Markers of granulocyte activation were then measured via flow cytometry and ELISA for basophils and eosinophils respectively. Additionally, culture derived mast cells were also tested via ELISA.

**Results**

Exposure to red wine extract resulted in activation of basophils in all samples. Mean basophil fluorescence increased from a baseline of 4.2 to 8.4 following exposure to red wine extract. This was not seen with ethanol or resveratrol, nor was activation detected in mast cells or eosinophils with any compound.

**Population of Activated Basophils Following Exposure to Components of Red Wine****Conclusion**

One mechanism for symptom exacerbation with exposure to red wine appears to be through basophil activation via the non-alcoholic components of red wine. This does not appear to be secondary to resveratrol. Additional studies with other phenolic compounds will need to be performed.

## SINUS BACTERIOLOGY IN CYSTIC FIBROSIS AND PRIMARY CILIARY DYSKINESIA: A SYSTEMATIC REVIEW

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### **Aims**

An association exists between the upper and lower airways in patients with cystic fibrosis (CF) and primary ciliary dyskinesia (PCD). The sinuses can function as a bacterial reservoir, where Gram-negative bacteria adapt to the airways and repeatedly migrate to and colonize the lungs. Whereas the pattern of bacterial flora in the lower airways has been extensively studied, the upper airways have drawn limited attention. We evaluated bacterial flora and method of sampling in the sinuses and nasal cavity in patients with CF and PCD.

### **Method**

PubMed, Embase and the Cochrane database were searched from 1990 until February 2016. We applied the following inclusion criteria: a minimum of one case of PCD or CF, and bacterial flora analyses from the nose or paranasal sinus.

### **Results**

In both PCD and CF patients, *Pseudomonas (P.) aeruginosa* was the most frequent cultured bacterium. In CF, *P. aeruginosa* was also the most frequent pathogenic bacterium, followed by *Staphylococcus aureus* and *Haemophilus influenzae*. Furthermore, we reviewed how samples were obtained (nasal lavage, swabs or endoscopically), which will be discussed in detail and how the different sample methods may affect the results.

### **Conclusion**

*P.aeruginosa* often colonizes the sinuses and nasal cavity in patients with CF and PCD. Other common pathogens in CF are *Staphylococcus aureus* and *Haemophilus influenzae*. We will discuss the results and compare them to what is normally found in patients with chronic rhinosinusitis.

**EXTENDED AGGER NASI CELL APPROACH FOR SINUS INVERTED PAPILOMA**

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**Aims**

Transnasal endoscopic surgery for frontal sinus inverted papilloma (IP) remains a significant challenge due to the narrow and complex structure of frontal region. The aim of this study is to validate the endoscopic expanded agger nasi (EAN) approach for frontal sinus IP.

**Method**

Prospectively collect the data of patients undergoing EAN approach for frontal sinus IP resection from January 2009 to 2013. Pedicle-oriented was coagulated by high frequency electrosurgical knife and a superficial layer of bone underlying the pedicle was drilled by a diamond burr drill during surgery.

**Results**

Fourteen patients (Male/Female: 9/5) were enrolled. The mean follow-up was 50.2 months (13 months to 66 months). One case recurred (7%) and external approach was performed. Two cases had partial stenosis of the “neo-ostium” and without tumor recurrence. The other 11 cases did not have tumor recurrence and frontal sinus ostium stenosis.

**Conclusion**

The EAN approach is an alternative choice for frontal sinus IP, which provides excellent access to frontal sinus and had a great effect for preventing re-stenosis after surgery. The success of frontal IP resection depends on fully enlarging frontal ostium. exposing the pedicle of tumor, and sufficiently extirpating all affected mucosa and bone. Long-term follow-up is recommended to prevent ostium stenosis and tumor recurrence.

### 3D ANATOMY OF PARANASAL SINUSES

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#### **Aims**

One of the indispensable requisites for approaching endoscopic sinus surgery is to be knowledgeable, not only regarding the normal and topographic anatomy of the nose and paranasal sinuses, but also of a new branch of anatomy, namely endoscopic anatomy. The endoscopic bidimensional vision offered by the endoscope involves difficulty in visualizing surgical field depth which makes it difficult to learn this surgical technique and makes it necessary for the endoscopic surgeon to mentally create a three-dimensional (3D) picture of the paranasal sinuses anatomy. Aim of this project is to help the surgeon to mentally create a 3D image of the paranasal sinuses and to approach endoscopic surgery with greater confidence and fewer risks.

#### **Method**

A detailed 3D reconstruction of the paranasal sinuses and its related structures, starting from computer tomography scans of the human skull, was realized using a professional 3D graphics software.

#### **Results**

This model permits highlighting the three-dimensional characteristics of the paranasal sinuses and also of creating all the possible anatomic variants.

#### **Conclusion**

This is the first experience reported regarding this new technique of iconographic didactics applied to endoscopic sinus surgery. The didactic objectives of this project can be integrated with the possibility of physically reconstructing the structures thus created with notable anatomic accuracy using modern 3D printers or by presenting them under the form of video with framing and rotations in the various spatial. The use of modern technologies for 3D graphic is the new frontier of the anatomical iconography, which exceeds and complements the previous teaching techniques.

**CLINICAL APPLICATION OF RESORBABLE POLYURETHANE NASAL PACKING IN ENDOSCOPIC SINUS SURGERY**

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**Aims**

Since the introduction of endoscopic sinus surgery, there still are several aspects which have remained debated, especially the issue of the postoperative nasal packing. The aim of our study was to evaluate the efficacy and the clinical effects of a totally resorbable nasal dressing (Nasopore, Poligenycs, Groningen, NL) used as a middle meatal nasal packing after functional endoscopic sinus surgery.

**Method**

Thirty patients with chronic rhinosinusitis were included in a prospective, randomized, double-blind, controlled study. Every patient underwent FESS when Nasopore was used to pack the middle meatus on one side, while the other side remained unpacked. The degree of mucosal edema, crusting, bleeding, synechia, secretion, and the patency of the ostiomeatal complex (OMC) were observed by nasal endoscopy on the 1st, 4th and 12th postoperative weeks. The patient's subjective symptoms (nasal obstruction, nasal discharge, and smelling disorders) were recorded on visual analog scales.

**Results**

Although by the end of the first postoperative week the differences between the evaluated parameters were not statistically significant, after four weeks the patency of the OMC was significantly better on the packed side and by the end of the 12-week follow-up period the resorbable packing showed better results in all the observed parameters as opposed to the untreated side. The differences regarding the patency of the OMC and the degree of nasal discharge were statistically significant.

**Conclusion**

Based on our results Nasopore is a reliable and effective alternative for nasal packing following sinus surgery, without the occurrence of any negative effect or increased likelihood of complications.



**ENDOSCOPIC TREATMENT AND COMBINED EXTERNAL-TRANSNASAL ENDOSCOPIC APPROACH FOR THE TREATMENT OF INVERTED PAPILLOMA: A REPORT OF 145 CASES**

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**Aims**

The endoscopic management of an inverted papilloma (IP) of the nose and paranasal sinuses performed at our Institutions was reviewed.

**Method**

One hundred and forty-five patients affected by an IP originating at the level of the sino-nasal tract received a surgical treatment via a purely endoscopic approach (96.5%) and via a combined endoscopic-external approach (3.5%) at the ENT Department of the Sant'Orsola Malpighi Hospital, University of Bologna and at the ENT Metropolitan Unit of Bellaria Hospital, Bologna between January 1994 and September 2015.

**Results**

145 patients have been included in this series (104 male and 41 female). The patients had a mean follow-up of 49 months (12-190 months). Mean age was 59 years ranging from 17 to 85 years. 140 cases received an endoscopic approach alone, while five cases required an endoscopic- osteoplastic combined approach due to an extensive frontal sinus involvement by the tumor. Seven cases of recurrence were observed in this series (4.8%).

**Conclusion**

In our study, the endoscopic approach showed itself to be a useful tool for the radical resection of an IP. The endoscopic approach should be tailored for the different variety of IP extensions. Wider endoscopic resections permit safer margins, and a smooth postsurgical cavity without corners in order to facilitate the detection of early stage recurrences during postoperative endoscopic surveillance.

**TRANSNASAL ENDOSCOPIC MAXILLECTOMY: OPERATIVE NUANCES AND PROPOSAL OF A NEW CLASSIFICATION SYSTEM BASED ON 1378 CASES**

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**Aims**

Despite the introduction of functional endoscopic endonasal approaches, there are still regions of the maxillary sinus that remain technically difficult to access through a standard middle antrostomy and deep-seated skull base lesions that require expanded transmaxillary approaches to be adequately managed. The aim of the study is to present our 15-years experience with transnasal endoscopic maxillectomy (TEM) for the treatment of a variety of paranasal sinuses and skull base pathologies, describing the step-by-step surgical technique and proposing a new classification system.

**Method**

All patients submitted to TEM from January 2000 to December 2014 in a single Institution were retrospectively reviewed. The TEM were classified in five types based on the anatomical structures progressively removed, as follows: TEM-1, wide antrostomy enlarged till the posterior maxillary wall; TEM-2, resection or displacement of medial maxillary wall and inferior turbinate from the infero-medial orbital angle down to the nasal floor; TEM-3, resection of nasolacrimal duct, with preservation (3A) or removal (3B) of the pyriform aperture; TEM-4, removal of the anterior maxillary wall.

**Results**

The TEM was performed in 1378 cases (59%,TEM-1; 17.7%,TEM-2; 5.3%,TEM-3A; 16.5%,TEM-3B; 1.5%,TEM-4) for the management of inflammatory diseases (37%, 513 cases), benign sinonasal tumors (31%, 425 cases), skull base cancers (21%, 285 cases) and as a corridor to address deep-lateral skull base lesions (11%, 155 cases).

**Conclusion**

The TEM is a stepwise approach of increasing access that can be tailored to different maxillary, sinonasal, and skull base pathologies with minimal morbidity for patients and reduced hospitalization time compared to traditional external techniques.

**BIPHASIC CALCIUM PHOSPHATE IMPLANT ASSESSMENT FOR COMPLEX SEPTORHINOPLASTIES: THE NASEPT STUDY**

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<sup>6</sup>INSERM, U1026, Bordeaux, France

**Aims**

Objectives: biocompatibility and efficacy assessment of a biphasic calcium phosphate (BCP) implant to replace the incompetent and useless septal skeleton.

**Method**

Methods: This is a multicentric prospective study including patients with multi-operated or saddle nose causing major functional and aesthetic disorders. To prevent iliac, rib or parietal graft, a previously validated macroporous BCP implant during animal studies was used. The operative technique was performed by external approach like an extracorporeal septoplasty associated with dedicated maneuvers of rhinoplasty. Aesthetic and functional results were compared before and 6 months after surgery with standardized photographs, nasal endoscopy, NOSE and RhinoQoL scores. Light microscopy, immunohistochemistry and transmission electron microscopy (TEM) were performed to assess foreign body reaction and differentiation. Statistical analysis was performed ( $p < 0.05$ ).

**Results**

Results: 25 patients were included. Any adverse events, as extrusion, infection, and chronic inflammatory reaction, pain, epistaxis were observed. All septa were in sagittal, straight and solid position, without extra-lobular depression. Comparisons of pre and post-operative scores were as follow:  $92 \pm 25$  vs  $36 \pm 18$  for the NOSE score ( $p < 10^{-4}$ ),  $75 \pm 17$  vs  $94 \pm 13$  for the RhinoQoL frequency score ( $p < 10^{-4}$ ),  $50 \pm 20$  vs  $90 \pm 15$  for the RHINOQoL bothersomeness score ( $p < 10^{-4}$ ) and  $64 \pm 20$  vs  $11 \pm 8$  for the impact score on quality of life ( $p < 10^{-4}$ ). Histological data comparison showed few or no inflammatory submucosa infiltration, epithelial and mucosal hyperplasia or giant cells. The epithelial cells were clearly well differentiated.

**Conclusion**

Conclusion: This study showed the good biocompatibility and restoration capabilities of the implant NASEPT to repair saddle nose.

**REVISION RHINOPLASTY: ARE THERE LESSONS TO LEARN?**

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**Aims**

To review a single consultant rhinologist's revision-septorhinoplasty operations over a 4 year period in order to assess any underlying factors at primary surgery that may predict the need for subsequent revision surgery. Observations were made regarding the grade of surgeon at primary surgery, the specific indications for revision surgery and the surgical techniques used.

**Method**

A prospectively-collected surgical database (e-logbook) and operation notes of a single consultant rhinologist's practice (NHS district-general hospital and private) were interrogated to identify all revision rhinoplasties undertaken between 2010 and 2014. Two hundred and eighty seven (287) cases of rhinoplasty/external-septoplasty/septorhinoplasty were identified, of which (11%) were identified as revision rhinoplasty cases (**N=28**) with the number of previous operations averaging 1.3.

**Results**

8/28 (30%) cases were referred from elsewhere. 6 (20%) were initially operated on by a trainee. Revision indications included cosmesis (82%), blockage (68%) and post-operative trauma (11%). Primary external procedures had lower revision rates than closed primary approaches.

Revisions incorporated: osteotomies (86%); septoplasty (68%); upper lateral (64%) and alar (18%) cartilage adjustment; grafting (32%); tip repositioning (29%) and de-humping/rasping (21%).**Conclusion**

Revision surgery can be difficult for both the patient and the surgeon. By identifying specific risk factors, the relative success rates of different surgical approaches and the techniques used in primary septorhinoplasty, one may gain a better insight into how best to optimise primary surgery for a successful outcome.

**IRRADIATED HOMOLOGOUS CADAVERIC COSTAL CARTILAGE VERSUS AUTOGENOUS COSTAL CARTILAGE FOR SEPTAL RECONSTRUCTION IN RHINOPLASTY: A COMPARATIVE MODELLED COST ANALYSIS**

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**Aims**

There is likely clinical equipoise between the use of cadaveric, irradiated, homologous costal cartilage (Tutoplast®) and autologous costal cartilage for septal reconstruction. This study considers the economic implications of both.

**Method**

The cost of materials, operating time, in-patient bed days and healthcare resources were calculated along with the potential for complications from analysis of the literature. 1376 septorhinoplasty episodes were undertaken with cartilage grafting between April 2014 - 15 in the UK, (Hospital Episode Statistics). By dividing patients between the two treatment modalities, the cost of each technique was modelled, extrapolated and compared.

**Results**

Cadaveric costal cartilage costs £536. Grafting with this material can save up to an hour over harvesting autologous costal cartilage and more likely to be a day-case procedure. Complication rates include infection (0.87%); resorption (1.01%), warping of graft (1.06%) and graft mobility (0.31%); all of which may require revision. By contrast, the complication rates of autologous rib include infection (0.56%); resorption (0.22%); warping (3.08%) and displacement (0.39%). Also, donor site morbidity can result in pneumothorax (0.32%).

The overall estimated costs of undertaking septal reconstruction with cadaveric costal grafting and autologous costal cartilage were **£3,697** and **£4,695** per patient, respectively. By utilising the former, an estimated national saving could be around **£686,487** per annum.**Conclusion**

The use of cadaveric irradiated costal cartilage for septal reconstruction may have important healthcare resource implications when compared to autologous rib, especially when budgets are being scrutinized. However, patient and surgeon preference, as well as tissue availability may result in this technique becoming less popular.

**PATIENT SATISFACTION FOLLOWING INTRANASAL Z-PLASTY TO TREAT NASAL VALVE NARROWING**

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**Aims**

Narrowing of the nasal valve and alar prolapse results in significant nasal obstruction. It can be idiopathic but is often a complication of previous rhinoplasty surgery. A number of techniques have been used to treat this condition including spreader grafts, flaring sutures, titanium-expanded polytetrafluoroethylene butterfly grafts, orbital suspension sutures, lateral batten, lateral crus pull-up, alar expansion and reinforcement, and the lateral crural “flip flop” . In this study we evaluate patient satisfaction following intranasal z-plasty a minimally invasive method to repair internal nasal valve collapse.

**Method**

A retrospective study over a 5-year period was conducted on patients who underwent Z-plasty. This is performed under general anaesthetic, with infiltration of 2% lignocaine, and 1:80,000 adrenaline to the internal valve area. A Z-plasty incision is made two triangular flaps are transposed widening the valve. Medical records were evaluated for age, sex, indication for surgery, prior surgical procedures, complications, results, and length of follow-up. A visual analog scale was used to rate nasal obstruction preoperatively and postoperatively.

**Results**

47 patients have undergone intranasal Z-plasty. All patients presented with narrowing of the nasal valve and alar collapse. All patients confirmed significant improvement in their nasal breathing following surgery. There were no post-operative complications.

**Conclusion**

Intranasal Z-plasty appears to be a safe, effective, and relatively noninvasive technique to repair internal nasal valve collapse with excellent patient satisfaction.

**ERS16-0854**

**INSTRUCTIONAL SESSION 9: WE WILL SHOW YOU HOW TO ANALYSE YOUR PREOPERATIVE CT SCAN**

**WE WILL SHOW YOU HOW TO ANALYSE YOUR PREOPERATIVE CT SCAN**

**M. Lindén<sup>1</sup>**

<sup>1</sup>, Falun, Sweden

How to analyze Your preoperative CT scan

Monday 4 july Hall F 17.00-17.45

Abstract topic n:o 39

The complex anatomy of the paranasal sinuses and the important adjacent structures needs to be monitored preoperatively for safe and targeted surgery. Computed tomography CT is the workhorse. No endoscopic sinus surgery should be done without a pre-operative CT scan.

You as a surgeon must be able to define and interpretate minor, major and important structures for safe surgery. The scan is the map for Your procedure and the most important tool in planning the oncoming procedure regarding actual pathology and extent of surgery.

I will show You how to analyze Your scan and give You some useful advice and tips how to get the most out of Your CT scan.

**A FUNCTIONAL TOOL TO CHARACTERIZE NASAL VALVE COLLAPSE: THE FRIED TEST**

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**Aims**

Nasal obstruction is a common complaint which could be explained by Nasal Valve Collapse (NVC), a dynamic abnormality, often less known. NVC is currently diagnosed purely on the basis of clinical features and thus subject to certain interpretation. The aim of this study was to develop a new and reliable functional test to objectively characterize NVC.

**Method**

This study was observational and prospective, including consecutive patients referred to our center for exploration of chronic nasal obstruction. The patients were classified into two groups according to their symptoms and clinical abnormalities: the Nasal Valve collapse (NVC+) group when nasal valve collapse was clinically detected during moderate forced inspiration and/or when the feeling of nasal congestion improved during passive nasal lateral cartilage abduction (n=32); and the no Nasal Valve collapse (NVC-) group for the others (n=23). All patients underwent nasal functional tests (posterior rhinomanometry and acoustic rhinometry) before and after topical nasal decongestion. We compared the difference between the pressure flow of the inspiratory and expiratory phases during posterior rhinomanometry (Flow Rate Inspiratory-Expiratory Difference (FRIED) test) between the two groups.

**Results**

The difference between the absolute value of inspiratory and expiratory flow was significantly higher in the NVC+ group than in the NVC- group both before and after topical decongestion. The cut-off value for the FRIED test was -0.008 L/s with a good sensitivity (82%) and a specificity of 59%.

**Conclusion**

We suggest that the FRIED test constitutes an objective and easy to apply technique to diagnose nasal NVC in daily practice.



**INTRATURBINAL VERSUS EXTRATURBINAL MICRODEBRIDER-ASSISTED INFERIOR TURBINOPLASTY; PRELIMINARY RESULTS**

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<sup>4</sup>Zagazig University, Otolaryngology, Zagazig, Egypt

**Aims**

To compare the intratubinal use of the microdebrider with the extratubinal one for inferior turbinate reduction based on subjective and objective parameters

**Method**

Forty patients with nasal obstruction due to bilateral hypertrophied inferior turbinates were included in this study. History taking, clinical assessment and CT scan of the paranasal sinuses were done for all patients. All patients underwent microdebrider-assisted inferior turbino-plasty, the microdebrider was used intratubinally on one side of the nose and extratubinally on the other side in alternate manner. The patients were blinded to the technique used.

**Results**

Ten patients were lost for follow up. The operative time and operative blood loss were less in the extratubinal group ( $p < 0.05$ ). At 1 month post operatively, the nasal obstruction VAS score showed significant improvement on the intratubinal sides only ( $p < 0.05$ ), at 2 and 6 months post operatively, the VAS score showed significant improvement on both sides with no difference between the 2 groups ( $p$  value=0.064 and 0.728 respectively). Nasal endoscopy revealed grade 2 turbinates in 30% and grade 3 in the remaining 70% of the intratubinal group with almost similar findings in the extratubinal group. At 6 months post operatively, significant improvement of the turbinate size was detected on both sides. No complications were reported in either group.

**Conclusion**

Extratubinal microdebrider-assisted inferior turbino-plasty is as effective and safe as the intratubinal one with shorter operative time and less blood loss with similar morbidity, so we recommend the extratubinal use of the microdebrider in cases of inferior turbinate hypertrophy.

**EMPTY NOSE SYNDROME AND HYPERVENTILATION SYNDROME**

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**Aims**

Patients with empty nose syndrome (ENS) after previous turbinate surgery often complain about breathing problems. We hypothesized that, in ENS, respiratory symptoms especially dyspnea could be explained by the hyperventilation syndrome (HVS).

**Method**

Observational prospective study including subjects consecutively referred to our center for ENS during 1 year. Measurement of Nijmegen score, hyperventilation test (HPVT), an arterial blood gas, lung and cardiac test were performed. HVS was defined by delayed return of the end-tidal partial pressure of carbon dioxide in the expired gas (EpCO<sub>2</sub>) to baseline during HVPT, and negatives other tests. According to the results of the HPVT, mean values of EpCO<sub>2</sub> and clinical data were compared between patients with HVS (HVS group) and patients without HVS (non HVS group) using a nonparametric Mann-Whitney test. A specific respiratory rehabilitation was proposed for all patients with HVS. SNOT 16 was evaluated before and after 8 courses of rehabilitation.

**Results**

Twenty-two out of all 29 patients referred for ENS underwent a complete workup and were considered the study population. An HVS was diagnosed in 17 out 22 patients (77.3%). EpCO<sub>2</sub> after 5 minutes of recovery was significantly lower in the HVS group vs non HVS group (23.8 vs 35; p<0.01). Only 5 patients had a respiratory rehabilitation with a significantly decreased of SNOT 16 (27.6 ± 4.1 vs 20.4 ± 2.3 after, p=0.02).

**Conclusion**

HVS is frequent in patients with ENS and pathophysiological links can be discussed.

**USAGE OF HYDRODYNAMIC RESISTANCE COEFFICIENT AS A DIAGNOSTIC PARAMETER IN THE SEPTOPLASTY DECISION-MAKING PROCESS**

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**Aims**

The aim of this study is to investigate the clinical usefulness of active anterior rhinomanometry (AAR) for septoplasty decision-making process. Existing methods for nasal obstruction assessment are based on dimension coefficients, which depend on individual anatomico-physiological characteristics of the nasal cavity. This fact reduces the diagnostic value of AAR.

**Method**

189 adult patients with septal deviation were investigated with AAR. Statistical evaluation was based on values of NAR:  $R_2$  from Broms' algorithm,  $R_{150}$  and the proposed diagnostic parameter - coefficient of hydrodynamic resistance  $\zeta$ . It is dimensionless coefficient, which inversely proportional to the square of airflow rate. The obtained dependence takes into account the Reynolds number and regimens of airflow. Thus,  $\zeta$  diminishes an influence of individual anatomico-physiological characteristics of the person's nasal cavity.

**Results**

The clinical data set for analysis consisted of  $R_2$ ,  $R_{150}$ , CT-scans, subjective complaints of patients and  $\zeta$ . Usage of standard approaches of assessment showed a necessity of septoplasty in 76 % of cases, while the adding to analysis a dependence coefficient of hydrodynamic resistance on airflow rate showed the septoplasty indicated in 64%.

**Conclusion**

A novel coefficient for nasal breathing assessment was obtained. Investigation of  $\zeta$  showed that proposed approach of processing rhinomanometric data takes into account an aerodynamics of nasal airflow. Usage of  $\zeta$  coefficient as additional diagnostic parameter for septoplasty decision-making process showed enhancement of diagnostic value of AAR.

**COMPARISON OF THERMIC EFFECTS OF COBLATION AND RADIOFREQUENCY WAVES IN A PORCINE TURBINATE MODEL**

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**Aims**

Coblation and radiofrequency surgery are competing methods for the reduction of submucosal vessels in turbinates. Reliable data of the tissue reaction and histological changes are missing. Clinical data about the effect of both methods are not sufficiently available. The expected differences in tissue damage by both methods should be estimated.

**Method**

In 10 lower turbinates of fresh pig heads after submucosal injection of saline a bipolar radiofrequency electrode (RaVor, Sutter Medizintechnik, Germany) or the turbinate wand "Reflex Ultra 45" was inserted under the mucosal surface. The "Coblator 2" (Arthrocare) was used at level 4. The temperature was measured by a thermistor measurement system (Voltcraft IR 1200) with software "Voltsoft Pro" to measure the temperature at the surface above the electrodes. A histological analysis was following.

**Results**

The insertion of the radiofrequency electrodes was easier because of the small diameter of the bipolar needles. The coblation system requires more space with a higher risk of disruption. The generated temperature differences have not been statistically significant. Because of the thickness of the coblation wand it was more difficult to preserve the integrity of the surface. The investigations will be demonstrated by video spots.

**Conclusion**

Radiofrequency and coblation are reducing the congesting tissue in the turbinates by thermic effects. The advantage of rinsing with saline solution by coblation cannot be used in a closed system. Therefore, preference has to be given to the application of radiofrequency systems for turbinate reduction.

**SEPTAL PERFORATION CLOSURE UTILIZING NASAL MUCOSAL FLAPS**

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**Aims**

Septal perforation repair can be challenging. The objective of this presentation is to report a single surgeon's experience attempting closure of perforations with mucosal flaps over the past 24 years.

**Method**

A retrospective review of one surgeon's experience attempting closure of perforations with bilateral mucosal flaps and an interposition graft over the past 24 years (November 1991 to November 2015) in a large, academic tertiary referral center. Patient characteristics, perforation size, surgical technique, graft material, and outcomes were determined. The participants of this study were 21 years of age or older.

**Results**

This review identified 272 patients. Sufficient follow-up data was available for 258 attempted closures. The male to female ratio was 1:1.4 and the average age was 51.6 years. The most common perforation etiology was prior septal surgery. The most common symptoms were obstruction/congestion, crusting, and epistaxis. Perforation size was classified by vertical height. There were 25 small (0-4 mm), 165 medium (5-14 mm), and 68 large (15-25 mm) perforations. Temporalis fascia was used as the interposition graft for most (70.2%) repairs. Successful closure was achieved in 95.0% of patients. Nineteen patients who had a successful repair required surgical revision.

**Conclusion**

This review provides further evidence supporting surgical management of the patient with a septal perforation. A technique utilizing bilateral mucosal flaps with an interposition graft has a high probability of successful closure by an experienced surgeon for selected perforations.

**EFFECTS OF NASAL WALL LATERALIZATION AND PYRIFORM TURBINOPLASTY ON NASAL CLIMATISATION**

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**Aims**

Impaired nasal breathing is a common patient complaint. Multiple surgical procedures to widen the nasal passage are described in the current literature. Many of these techniques are based on a volume-reduction or partial resection of the nasal turbinates. The “Pyriform Turbinoplasty” is a considerate way to expand the nasal passage without resection of nasal mucosa. The impact of ventilation changes on the nasal climatization before and after performing a “Pyriform Turbinoplasty” with nasal wall lateralization was analyzed.

**Method**

Pyriform turbinoplasty comprises the submucosal reduction of the bone of the frontal process of the maxilla and the lacrimal bone. The lateral margin of the nasal valve area is opened with only marginal damage to the mucosa. The Resection of the lacrimal bone that joins the uncinat process behind the lacrimal duct as well as the base of the inferior turbinate and the edge of the maxilla at the rim of the pyriform aperture (“Nasal Wall Lateralization”) enlarges the nasal passage. Nasal airflow and climatization were analyzed by Computational Fluid Dynamics.

**Results**

Analysis using Computational Fluid Dynamics showed a substantial improvement of nasal ventilation. Humidification and warming of inspired air was not substantially altered after the surgical procedure.

**Conclusion**

In contrast to inferior turbinate surgery, which can mislead the nasal airflow and seriously hamper the nasal climatization, the “Pyriform Turbinoplasty” with nasal wall lateralization seems to improve nasal ventilation without disturbing nasal physiology.

**ABOUT THE SWEDISH NASAL SEPTAL SURGERY REGISTER.**

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**Aims**

The Swedish Nasal Septal Surgery Register concerns respiratory-enhancing surgery of the nasal septum, with or without concurrent surgery of the nasal turbinates. Procedures in conjunction with other types of nasal or sinus surgery are not included. The register was started in 1997 and underwent a major revision in 2012-13. Under the supervision of the Swedish Rhinologic Society, a reference group has analyzed ways to measure inclusion criteria, selecting tools for operations, surgical techniques, complications and final results by the help of a register. Pre-(A),per(B)- and postoperatively one(C) and twelve(D) months questionnaires has been developed for this purpose. The aim is that all units dealing with this surgery in Sweden reports, in a voluntary and anonymous manner of course, to a Central Register. Fundamental data (A+B) for the years 2014 and 2015 out of 2356 cases will be presented in details and some preliminary results(C+D) discussed.

**Method**

see above

**Results**

see above

**Conclusion**

see above

**AN EXPLORATION OF THE PRACTISE OF SEPTOPLASTY IN THE UNITED KINGDOM: A QUALITATIVE STUDY**

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**Aims**

Septoplasty is a common rhinological operation, with 20,443 procedures performed in England between 2014 and 2015. Debate surrounds key areas of surgery including indications, patient selection, outcome measures, adjunctive management and procedures. Although many quantitative studies address these individual areas, many do not link themes together, and some of the aspects continue to have sparse coverage within the published literature. Qualitative methods may explore questions that are not easily answerable by traditional research methods and can bridge the gap between scientific evidence and clinical practice.

**Method**

Ten semi-structured qualitative interviews were undertaken. Participants consisted of registrars, consultants, and subspecialist rhinologists, selected from teaching hospitals and district general hospitals, both in London and other regions in England. The diversity was purposeful so as to capture the variability in practice and opinion. Transcripts underwent thematic analysis and were subsequently coded and organised using the software package Nvivo 11 for mac.

**Results**

Symptomatic indications for septoplasty were widely agreed between participants, but there were a variety of opinions as to whether there was currently enough evidence for patient selection, with some expressing they felt current evidence was conflicting and of poor quality. There were highly varied views with regards to trials of medical management and adjunctive turbinate surgery. Respondents differed regarding surgical outcome measures; some preferring patient rated outcome measures and some objective airflow measurements.

**Conclusion**

This study highlights the variation in septoplasty practice within the UK and supports the need for a high quality randomised control trial in this area to support septoplasty decision making.



**NOVEL OUTCOME MEASUREMENT TOOL OF THE NASAL VALVE SURGERY: IMAGE ANALYSIS USING ENDOSCOPIC SYSTEM FOR SMARTPHONES**

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**Aims**

The aim of this study is to introduce the image analysis using endoscopic system for smartphones which seems to be a useful outcome measurement tool of the nasal valve surgery.

**Method**

This was a prospective study of 16 consecutive patients undergoing septorhinoplasty for unilateral or bilateral nasal blockage due to internal nasal valve collapse. Study measurements were obtained of internal nasal valve areas and angles from each side immediately prior to surgery and at 1 month follow up. SNOT-22 scores were also obtained from the initial clinic evaluation and from the post-operative follow up visit. The internal nasal valve angle and area measurements were taken from endoscopic photographs using the ImageJ software. The photographs themselves were captured using an endoscope attached to a mobile phone adapter (EIAS).

**Results**

Post-operatively, all 14 completing patients reported a subjective improvement in nasal blockage and demonstrated an increase in nasal valve area and nasal valve angle as evaluated with endoscopic image analysis using smartphones. A moderate positive correlation was seen between increases in cross-sectional nasal valve areas and SNOT-22 scores.

**Conclusion**

We conclude that EIAS of the internal nasal valve area could be a useful method to objectively evaluate surgical effectiveness. This has the advantage over other objective methods of measuring nasal airway of being rapid, low cost and easily performed in a clinic setting.

**A COMPARISON OF VOLUMETRIC DATA FROM ACOUSTIC RHINOMETRY AND 3T MRI IN THE CONGESTED AND DECONGESTED STATE**

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**Aims**

Distinct from Otology, Rhinologists lack a sensitive, specific tool by which to objectively assess nasal function. Cross sectional area of nasal cavity is routinely visually assessed through anterior rhinoscopy and coronal CT; which is challenging to standardise due to differing patient position in the scanner. The internal nasal valve is the narrowest aperture in the nose, the pre and post-operative dysfunction of which, causes considerable nasal dysfunction. Objective measurements of nasal valve area can be taken from both acoustic rhinometry and more recently high resolution MR.

**Method**

19 asymptomatic volunteers with normal SNOT-22 underwent 3T MR imaging with 1.2mm slice increment and acoustic rhinometry. Cross sectional area measurements were obtained from slicing at 90 degrees to the airway pattern and correlated with area measurements from the acoustic rhinometer.

**Results**

Acoustic rhinometry correlated well with the MR data at the level of the nasal valve however posterior to this rhinometry severely overestimated the volume of the nasal cavity. The effect of decongestant is clearly visible on MR imaging.

**Conclusion**

Acoustic rhinometry continues to be a crude assessment of nasal volume which is significantly less accurate than volumetric data from high resolution MR scans of the nasal cavity. The evolution of diagnostic and evaluative tools in rhinology is likely to lie in patient specific computational airflow models accompanied by subjective patient questionnaires.

**FUNCTIONAL RESPIRATORY IMAGING-AIDED VIRTUAL PREOPERATIVE PLANNING IN NASAL SURGERY: TOWARDS A PERSONALIZED APPROACH**

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**Aims**

Objective outcomes of functional nasal surgery are difficult to assess. The use of functional respiratory imaging (FRI) in rhinology is a novel concept. FRI is a combination of advanced 3D model reconstruction from medical imaging that is updated with computational fluid dynamics (CFD) in order to obtain objective measures of nasal airway dimensions combined with the subsequent physiology of the patient specific nasal airflow. It enables surgeons to preoperatively perform virtual surgery. In this study we evaluate the feasibility of FRI-based pre-operative planning of functional nasal airway surgery.

**Method**

Pre- and postoperative 3D nasal airway models were created based on cone beam computed tomographic images in a 55 year old man that underwent functional rhinoplasty including, septoplasty and internal nasal valve repair. Virtual surgery of the preoperative 3D model was performed. CFD calculations of nasal airflow, airflow distribution, and nasal airway resistance were performed in the pre-operative model, the model with virtual surgery and the post-operative model.

**Results**

When analyzing the effects of the virtual surgery we found a reduction of nasal resistance in both the nasal vestibule and the respiratory region. Also, a more homogenous distribution of airflow between the left and right side was observed. The post-operative nasal model demonstrated similar results.

**Conclusion**

FRI-aided virtual surgery may be useful in preoperative computation of functional outcomes of nasal surgery. It has the potential to allow surgeons to perform personalized nasal surgery using preoperative virtually simulated models. Automated and less labor-intensive models should facilitate surgeons to implement this tool in an outpatient setting.

**RAPID RESORBABLE SUTURES IN CLOSING TRANSCOLUMELLAR INCISION IN OPEN RHINOPLASTY**

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<sup>1</sup>Karolinska Institute, Stockholm, Sweden

**Aims**

To investigate if rapid resorbable sutures could replace non-resorbable sutures in nasal transcolumellar incisions. The present study compared: 1) patient discomfort 2), scarring and 3) risk for postoperative infection.

**Method**

A total of 41 consecutive patients subjected to open rhinoplasty by the same surgeon using mid-columellar inverted-V incisions were investigated retrospectively. The first 21 patients were sutured with non-resorbable suture material and the subsequent 20 patients with a rapidly resorbable suture material. Discomfort from the suture extraction of the PP sutures was compared to trimming of the PGA sutures at the skin surface 1 week postoperatively and visibility of the columellar scars was evaluated by the patients themselves on a self-report questionnaire. This was done at the follow-up visit minimum 6 months postoperatively. The postoperative photographs were then assessed by 20 Rhinoplasty surgeons independently, using the same questionnaire.

**Results**

Trimming of the PGA sutures caused significantly less discomfort than the extraction of PP sutures ( $p < 0.01$ ), of which 6 (29%) found the suture extraction very painful.

Overall 40/41 (98%) found their scars non-disturbing. Moreover, 17/21 (81%) of the patients sutured with PP and 18/20 (90%) of the patients sutured with PGA considered their scars to be invisible or almost invisible. The corresponding assessments from the observers were 16/21 (76%) and 16/20 (80%), respectively. No postoperative infection was found in any group.

**Conclusion**

Suturing inverted-V transcolumellar incisions with rapid resorbable sutures caused significantly less discomfort but no difference in scarring compared to non-resorbable sutures as evaluated by patients and observers.

**LONG TERM OUTCOMES OF NASAL RECONSTRUCTION IN RELAPSING ANCA ASSOCIATED VASCULITIS**

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**Aims**

Small vessel vasculitis is frequently associated with anti-neutrophil cytoplasm antibodies (ANCA). Affected patients may present with nasal deformity as part of their systemic illness or as isolated otorhinolaryngological disease. Nasal reconstruction remains an understandable priority and the potential timing of any attempted reconstruction remains difficult as the same ongoing destructive process may also affect surgical repair. In this report we share our five year experience of five patients who underwent septorhinoplasty and had ongoing management of their relapsing vasculitis at a multidisciplinary vasculitis centre in London.

**Method**

This is a retrospective review over five years of five patients who underwent functional and cosmetic autograft nasal reconstruction for deformity secondary to small vessel vasculitis such as granulomatosis with polyangiitis (GPA) and eosinophilic granulomatosis with polyangiitis (EGPA). Patients were jointly managed at the Hammersmith Hospital Vasculitis Centre having had their nasal reconstructive surgery at either the Royal National Throat Nose and Ear Hospital or Charing Cross Hospital.

**Results**

All patients were considered to have inactive vasculitic disease at the time of surgery and underwent open-approach nasal reconstruction with most (80%) having costal cartilage grafting and the rest requiring conchal cartilage alone. None of the patients required further (revision) nasal surgery during the five year follow-up.

**Conclusion**

Our unique study of the long term outcomes of patients with ANCA associated vasculitis (AAV) who underwent nasal reconstruction has highlighted that satisfactory and stable cosmesis is achievable even in the presence of subsequent systemic relapse of the vasculitis which is actively medically managed.

**DEFINITIONS**

**S. Steinsvag<sup>1</sup>**

<sup>1</sup>, Bergen, Norway

**Rhino sinusitis**

Definition : Rhino sinusitis is an inflammation in the mucosal lining of the nose and paranasal sinuses characterized by:

- Clinical symptoms.
  - o Two or more symptoms should be present, one of which should be either

§ Nasal blockage/obstruction/congestion

or

§ Nasal discharge (anterior/posterior nasal drip)

and

§ + facial pain/pressure

§ + reduction or loss of smell

and either

- Clinical signs:
  - o Endoscopic signs of

§ Nasal polyps

and/or

§ Muco purulent discharge primarily from the middle meatus

and/or

§ Edema/mucosal obstruction primarily in the middle meatus

and/or

- CT-changes.
  - o Mucosal changes within the ostiomeatal complex and/or sinuses.

- Duration.
  - o Acute Rhino Sinusitis (ARS): Duration for less than 12 weeks.
  - o Chronic Rhino Sinusitis (CRS): Duration for more than 12 weeks.

§ Phenotypes.

- Chronic rhino sinusitis with nasal polyps (CRSwNP)
- Chronic rhino sinusitis without nasal polyps (CRS)

· Severity.

o The severity is divided into mild, moderate and severe based on feedback on a Visual Analogue Scale on the question: “How troublesome are your symptoms of rhino sinusitis?”

§ Mild:           VAS     0-30

§ Moderate:     VAS     30-70

§ Severe:        VAS     70-100

**FAILURES IN ALAR CORRECTION**

**J. Constantinidis**<sup>1</sup>

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The alar are an important anatomical area for both for functional and aesthetic reasons. *The most common complications are the alar retraction and alar-columellar disproportions resulting after overresection of the lateral crus of the lower lateral cartilage (extensive cephalic trim).* If inadequate cartilage is left, then the contractile forces of healing over time will cause the ala to retract.

The rule is to preserve 6 to 9 mm and depends on the consistency and quality of the cartilage. In order to avoid such complications I routinely turn the trimmed cephalic part into a pocket created under the remaining lateral crus (lateral crural turn-in flap technique). The suspension of the lateral crus has an impact on the alar shape and internal and external nasal valve. Alar and rim retraction may be treated by cartilage grafts (septal or auricular). The graft may be inserted into the retracted area after dissection of a precise pocket through a marginal incision. Alternatively an open approach provide a direct reconstruction of the lateral crus.

More complex are cases with vestibular mucosa or skin excision. These cases need composite grafts from the cymba concha to reconstruct the alar contour.



**FAILURES IN SEPTAL AND DORSAL CORRECTION**

**P. Haraldsson**<sup>1</sup>

<sup>1</sup>, Stockholm, Sweden

Young ENT doctors usually start operating on the turbinates and then the nasal septum, which is a lot more difficult. Failures are not uncommon and they are usually connected to incomplete surgery of the cartilaginous or bony septum. Low deviations related to the basal crest usually respond well to standard modified Cottle procedures freeing the cartilage inferiorly and towards the perpendicular plate. The discoid deviations comprising both bone and cartilage are however, more challenging. They even might call for open extracorporeal septoplasty for full alignment.

The next level in septorhinoplasty is usually dorsal corrections on demand from patients. A hump removal should be followed by osteotomies to prevent broadening and open roof. Furthermore, overresection of the dorsum might impair the balance of the nose. To restore the balance an augmentation of the dorsum and/or tip reduction surgery might be necessary.

**ERS16-0820**

**SYMPOSIUM 17: NOT ANOTHER NOSE-BLEED!**

**HOW TO MANAGE THE BLEEDING IN THE EMERGENCY-ROOM**

**K. Toll<sup>1</sup>**

<sup>1</sup>, Sweden

The management of epistaxis can be quite challenging for the physician. The anterior epistaxis is the most common but generally not severe. It is rarely serious as the bleeding point is easily identified. There are several methods to treat this bleeding - chemical cautery, electrocautery and different tamponades. The posterior epistaxis can be severe and the site of bleeding is difficult to access as the site of the origin is located more posteriorly. The treatment can be done either by using conventional pack made from Foley catheter and anterior pack with gauze ribbon or commercially available ballon).

ERS16-0860

**SYMPOSIUM 17: NOT ANOTHER NOSE-BLEED!**

**LIGATIONS VS EMBOLIZATION**

**A. Swift**<sup>1</sup>

<sup>1</sup>, Liverpool, United Kingdom

**Not another nose bleed!: Ligations vs embolization**

Arterial ligation as a means of managing epistaxis is now well established, but has moved on to refer in most cases to sphenopalatine ligation or clipping. Anterior ethmoid ligation is performed much less frequently but is an important technique to consider, particularly in managing difficult epistaxis following nasal trauma.

Embolization offers an alternative management option but within the UK, the numbers are low.

Whilst ENT surgeons are generally very familiar with sphenopalatine ligation, even if they lack direct experience of the technique, knowledge about embolization is limited. The technique will be explained to familiarize colleagues with the salient details of the procedure.

The evidence-base for both treatment modalities will be presented and will include the attributes and limitations of both procedures. The case for an increased use of embolization will be debated.

**HOW TO REDUCE PERI-OPERATIVE BLEEDING**

**V. Pundir**<sup>1</sup>

<sup>1</sup>, *United Kingdom*

Haemostasis is critical in the peri-operative period in patients undergoing Functional Endoscopic Sinus Surgery. Blood in surgical field makes it difficult to identify anatomical landmarks and obscures surgical planes thereby increasing risk of complications and reducing success rate. Reduction of peri-operative bleeding should be considered during the treatment planning and continued throughout the peri-operative period. Preoperative preparations should include detailed risk assessment for bleeding, optimisation of co-morbidities, cessation of medications that may inhibit coagulation, evaluation of preoperative imaging, reduction of inflammatory processes in the sinonasal cavity.

Measures to reduce intra-operative bleeding comprises of anaesthetic and surgical aspects. Anaesthetic measures include premedication, optimal control of hypotension during general anaesthesia, patient positioning and patient warming. Intra-operative surgical measures include judicious use of topical anaesthetics and vasoconstrictors, regional and local infiltration and blocks and appropriate surgical techniques. Prevention and control of post operative bleeding is also essential as it can not only lead to patient anxiety but also delay tissue healing. In this session we will look into all the aforementioned measures to reduce peri-operative bleeding in a patient undergoing Functional Endoscopic Sinus Surgery.

**APPROACHES TO THE SELLA**

**H.R. Briner**<sup>1</sup>

<sup>1</sup>, Zurich, Switzerland

There are various established transnasal approaches to the sella. Goal of all approaches is to allow a safe and nonrestricted dissection of the lesions of the sella, which are most often pituitary gland tumors. However, the approach to the sella should cause minimal trauma also to the structures in the nose to avoid rhinological long term side effects. If possible, the anatomy of the nose should be preserved, especially functional structures like the turbinates and the mucosa of the olfactory cleft. The presentation has a focus on the concept of a “tailored transnasal endoscopic approach” which means that the amount of dissection depends on the size and location of the lesion which has to be removed.

**ERS16-0824**

**SYMPOSIUM 21: DO EPITHELIAL CELLS RULE THE NASAL MUCOSAL?**

**EPITHELIAL BARRIER: TIGHT JUNCTIONS AND THEIR BREAKDOWN**

**M. Soyka<sup>1</sup>**

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The epithelial barrier in upper and lower airways forms the first line of defence against intruding allergens, pollutants and pathogens. It is therefore a prerequisite to maintain an intact and functioning epithelium in order to keep the submucosal equilibrium balanced and not to promote inflammation. One of the main contributors of barrier function is the tight junctional belt creating the typical apico-basolateral polarization in the ciliated epithelium. Pollen and their proteolytic enzymatic properties are capable of disrupting tight junctions facilitating their intrusion. Upper airway epithelium has been shown to have an increased permeability in Th2 driven inflammation of chronic rhinosinusitis with polyps and leakiness of sino-nasal epithelial cell cultures was promoted by IL-4 and IFN- $\gamma$ . Both in-vitro cell cultures and ex-vivo tissue explants showed decreased tight junction expression and increased permeability under inflammatory conditions. This could allow for the unwanted loss of fluids across the barrier, while promoting the intrusion of allergens and pathogens as a part of the vicious cycle in chronic rhinosinusitis.

## THE POSSIBLE ROLE OF BACTERIAL LINKED PRO-INFLAMMATORY CYTOKINES IN THE FORMATION OF NASAL POLYPS

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### Aims

There is mounting evidence that bacteria could be involved in the pathogenesis of nasal polyps. This study aimed to provide further evidence of inflammatory processes, stimulated in response to surface and intracellular bacteria, potentially participating in the formation of nasal polyps.

### Method

Cytokines associated with the T-helper (Th) 17 pathway (IL-23R and IL-23A) were measured using real time quantitative polymerase chain reaction (RT-qPCR), together with matrix metalloproteinase (MMP) 7, defensin 5, toll-like receptors (TLR) 2 and 4. Protein analysis was undertaken using Luminex examining IL-6 and MMP-7. Mucosal and/or polyp samples were obtained from 18 patients; polyp and non-polypoidal mucosa from patients with chronic rhinosinusitis with nasal polyps (CRSwNP), together with sinonasal mucosa from patients without nasal polyps (CRSsNP) and controls.

### Results

Bacterial linked pro-inflammatory cytokines (IL-23R, IL-23A, MMP-7, defensin 5, TLR-2 and TLR-4) were upregulated in CRSwNP tissues compared to CRSsNP and controls. Non-polypoidal CRSwNP tissue was found to have the greatest upregulation of bacterial linked pro-inflammatory cytokines. IL-6 and MMP-7 protein analysis confirmed RT-qPCR trends.

### Conclusion

Bacteria have been found to be associated with nasal polyps. This study has revealed upregulation of bacterial linked pro-inflammatory cytokines in CRSwNP patients, compared to CRSsNP and controls. Furthermore, the greatest upregulation of inflammatory cytokines was found to be within non-polypoidal mucosa of CRSwNP patients. This is significant as it is these areas that remain following sinus surgery, potentially contributing to the development of nasal polyps and/or recalcitrant disease.

**PERIOSTIN IN CHRONIC RHINOSINUSITIS WITH NASAL POLYPS: COMPARISON OF DIFFERENT MEDICAL TREATMENT OPTIONS**

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**Aims**

Periostin is a quite recently discovered marker downstream of IL-4-/IL-13-signals. It is considered a biomarker for eosinophilic inflammation. Chronic rhinosinusitis with nasal polyps (CRSwNP) is a T-helper 2-skewed chronic inflammatory airway disease. Medical treatments aim to relief symptoms and maintain clinical control by interfering with the inflammatory cascade. We aimed to compare serum periostin levels in different treatment approaches.

**Method**

Serum periostin was measured in 100 CRSwNP patients assigned to receive doxycycline, methylprednisolone, mepolizumab, omalizumab or placebo. Additionally, the influence of treatments on other key inflammatory markers, namely local ECP, IL5, sIL-5R $\alpha$ , total IgE, MMP-9 and MPO and serum ECP, IL5R $\alpha$ , total IgE and peripheral blood eosinophil counts was determined. Data was compared until 8 weeks from the start of treatment.

**Results**

Methylprednisolone ( $p=0.002$ ) and omalizumab ( $p=0.002$ ), significantly reduced serum periostin levels at 4 and 8 weeks, respectively, after the start of the treatment. The effect of methylprednisolone on serum periostin was transient. Both treatments predominantly influenced eosinophilic markers. Mepolizumab appeared to significantly inhibit markers of both the eosinophilic and neutrophilic cascade. Finally doxycycline mainly inhibited the neutrophilic activity, although eosinophilic markers and the markers of matrix degradation were reduced as well.

**Conclusion**

All treatment options distinctly influence serum periostin levels and eosinophilic inflammation.



**CAN DEFECTS IN EPITHELIAL REGENERATION AND REPAIR CONTRIBUTE TO CHRONIC SINUSITIS?  
LESSONS LEARNED FROM EHLERS-DANLOS SYNDROME**

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**Aims**

Introduction: Ehlers-Danlos syndrome (EDS) is a genetic syndrome characterized by dysfunctional collagen maturation secondary to mutations in several related genes of collagen synthesis. Chronic rhinosinusitis (CRS) is a frequent feature of EDS but the mechanism by which it occurs remains unexplained. We present a case of severe refractory CRS in a patient with EDS which suggests possible implications for enhancing understanding of CRS pathogenesis.

**Method**

Method: A 33-year-old patient with EDS characterized by joint hyperextensibility was referred for sinusitis unresponsive to previous sinus surgery. Revision ESS was performed, however, over 8 months the patient developed extensive osteoneogenesis which obliterated the sinus cavity, obstructing the frontal recess. The patient was subsequently managed with osteoplastic flap and obliteration with vascularised pericranium.

**Results**

Results: Given the genetic basis of EDS to genes of collagen synthesis and maturation, it is probable that in this population, defective early responses to injury and repair of mucosal epithelium may culminate in defective healing, with subsequent inflammatory changes and bacterial colonization.

**Conclusion**

Interpretation: CRS in EDS offers a unique ‘proof of principle’ that dysfunctional epithelial repair and regeneration are factors in CRS by demonstrating that genetic defects in the early phases of wound healing and repair lead to a virulent form of refractory CRS. While EDS is a rare cause of CRS, defects in associated genes and mimicry by bacterial toxins may represent additional barriers to effective repair. This underlines the exciting potential for modulation of epithelial regeneration and repair as therapeutic targets in CRS.

**THE RELATIONSHIP BETWEEN CHRONIC RHINOSINUSITIS AND METABOLIC SYNDROME**

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**Aims**

According to our previous study, hyperlipidemia is a risk factor of chronic rhinosinusitis (CRS). Meanwhile, hyperlipidemia is one of the components of metabolic syndrome, which is diagnosed when patients are positive for at least three of the following symptoms: central obesity, high triglycerides, low high-density lipoprotein levels, high blood pressure, and elevated fasting glucose. Therefore, this study sought to investigate the correlation between metabolic syndrome and CRS, as well as the related risk factors, using the Korean National Health and Nutrition Examination Survey (KNHNES).

**Method**

The data were based on KNHNES data from 2010 and 2011. Symptom-based criteria from the European Position Paper on Rhinosinusitis and Nasal Polyps 2012 were used to define CRS. Also, the American Heart Association criteria were used to define metabolic syndrome. Statistical analyses included a chi-square analysis, univariate analysis, and multivariate analysis.

**Results**

The prevalence of CRS in patients with metabolic syndrome including symptoms of high triglyceride, reduced HDL, and elevated blood pressure was significantly higher than that of non-metabolic syndrome (14.15% vs. 10.16%)( $p = 0.04$ ). Allergic rhinitis was the only significant risk factor of CRS in metabolic syndrome patients ( $p = 0.0001$ ).

**Conclusion**

CRS was more prevalent in some metabolic syndrome patients, especially those who had allergic rhinitis as a risk factor. Therefore, the possibility of CRS should be given careful consideration in metabolic syndrome patients with allergic rhinitis.

**EFFECTS OF HISTAMINE ON MIGRATION OF NASAL FIBROBLASTS**

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**Aims**

Fibroblast migration is crucial for normal wound repair after sinonasal surgery. Histamine is known to be involved in wound healing by its effects on cell proliferation and migration. This study aimed to determine whether histamine affects the migration of nasal fibroblasts and to investigate the mechanism of action of histamine on nasal fibroblasts.

**Method**

Primary cultures of nasal fibroblasts were established from inferior turbinate samples. Fibroblast migration was evaluated with scratch assays. Cells were treated with histamine and/or histamine receptor-selective antagonists. U-73122 and pertussis toxin, which are selective inhibitors of the lower signaling pathway of H1R and H4R, were used to confirm the modulation of nasal fibroblast migration by histamine. Fibroblast cytoskeletal structures were visualized with immunocytochemistry.

**Results**

Histamine significantly stimulated the migration of nasal fibroblasts. Antagonists selective for HR1 and HR4 significantly reduced nasal fibroblast migration. In immunocytochemical staining, histamine treatment increased membrane ruffling and pyrilamine, diphenhydramine, fexofenadine, and JNJ7777120 decreased histamine-induced membrane ruffling. U-73122 and pertussis toxin also decreased histamine-induced migration of fibroblasts. Histamine maintains its stimulatory effects on fibroblast migration in the presence of mitomycin C, which blocks proliferation of cells.

**Conclusion**

We showed that histamine stimulates fibroblast migration in nasal fibroblasts. This effect appeared to be mediated by HR1 and HR4. However, because fibroblast migration also can be involved in scarring and fibrosis, more research is necessary to determine the effects of antihistamine on wound healing after sinus surgery.

**EFFECT OF CORTICOSTEROIDS ON CELL PROLIFERATION IN CONTROL NASAL MUCOSA FIBROBLASTS AND IN FIBROBLASTS FROM PATIENTS WITH CRSWNP AND ASPIRIN-EXACERBATED RESPIRATORY DISEASE.**

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**Aims**

To compare the effects of corticosteroids on cell proliferation in *in vitro* cultured fibroblasts from healthy and inflamed nasal mucosa, and to evaluate the role of glucocorticoid-induced leucine zipper (GILZ) on these effects.

**Method**

Nasal polyp fibroblast cultures from patients with CRSwNP and aspirin-exacerbated respiratory disease (AERD-NP, n=12) and control nasal mucosa fibroblasts (control-NM, n=12) from patients undergoing nasal corrective surgery were incubated with dexamethasone ( $10^{-10}$ - $10^{-5}$ M, 2-24h). Cell proliferation and cycle phases (flow cytometry), JNK/ERK MAPK and retinoblastoma phosphorylation (Western-blot), c-jun, cyclin-D1 and GILZ expression (RT-PCR/Western-blot), and GILZ expression knock-down (small-interfering RNA) were analysed. Results are expressed as median(interquartile-range).

**Results**

Dexamethasone concentration-dependently decreased cell proliferation in control-NM and AERD-NP fibroblasts ( $P < 0.001$ ). Dexamethasone ( $10^{-6}$ M) inhibition of cell proliferation was lower in AERD-NP than in control-NM fibroblasts [51.4(44.2-65.1) vs 39(28.9-46.4)% of control;  $P < 0.05$ ]. Dexamethasone decreased the percentage of cells in S and G<sub>2</sub>/M phases, and increased those in G<sub>0</sub>/G<sub>1</sub> phase. Dexamethasone inhibition of G<sub>2</sub>/M phase was higher in AERD-NP than in control-NM fibroblasts [IC<sub>50</sub>: 10.1(5.4-40.7) vs 3.3(0.4-7) ×  $10^{-9}$ M;  $P < 0.05$ ]. Dexamethasone inhibited JNK and retinoblastoma phosphorylation, and c-jun and cyclin-D1 gene expression in control-NM and AERD-NP fibroblasts ( $P < 0.05$ ; NS between both groups). GILZ silencing reduced dexamethasone capacity to inhibit cell proliferation [42.1(35.6-60.5) vs 23.2(16.4-33.9)% of control;  $P < 0.05$ ]. Dexamethasone induction of GILZ mRNA was lower in AERD-NP than in control-NM fibroblasts [5(2.5-7.5) vs 11(7.5-12.5)-fold;  $P < 0.05$ ] and negatively correlated with dexamethasone inhibition of G<sub>2</sub>/M phase ( $r = -0.82$ ;  $P < 0.0001$ ).

**Conclusion**

The deficient induction of GILZ expression by corticosteroids partly explains their lower anti-proliferative effects in AERD-NP fibroblasts, thus being one potential mechanism of corticosteroid resistance in these patients.

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**DOXYCYCLINE INHIBITS TGF- $\beta$ 1-INDUCED EXTRACELLULAR MATRIX PRODUCTION IN NASAL POLYP-DERIVED FIBROBLASTS**

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**Aims**

Doxycycline has been shown to have anti-bacterial and anti-inflammatory effects and suppresses collagen biosynthesis. The purpose of this study was to evaluate the effects of doxycycline on transforming growth factor (TGF)- $\beta$ 1-induced myofibroblast differentiation and extracellular matrix production in nasal polyp-derived fibroblasts (NPDFs). We also determined the molecular mechanisms of action for doxycycline.

**Method**

NPDFs were isolated from nasal polyps from eight patients. Doxycycline was used to pre-treat TGF- $\beta$ 1-induced NPDFs. Cytotoxicity was evaluated using a 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl-tetrazolium bromide assay. Expression levels of  $\alpha$ -smooth muscle actin (SMA) and fibronectin were measured using Western blot, reverse transcription-polymerase chain reaction, and immunofluorescence staining. Total collagen production was analyzed with the Sircol collagen assay, while mitogen-activated protein kinase (MAPK) and NF- $\kappa$ B activation were determined using Western blot analysis. Luciferase assay was used to evaluate the transcriptional activity of NF- $\kappa$ B.

**Results**

While doxycycline (0 - 40  $\mu$ g/ml) had no significant cytotoxic effects in TGF- $\beta$ 1-induced NPDFs, it significantly reduced the expression levels of  $\alpha$ -SMA, fibronectin, and collagen in TGF- $\beta$ 1-induced NPDFs in a dose-dependent manner. Doxycycline also inhibited the TGF- $\beta$ 1-induced activation of p38, JNK, and NF- $\kappa$ B, and its inhibitory effects were similar to those of the specific inhibitors for each.

**Conclusion**

Doxycycline has an inhibitory effect on TGF- $\beta$ 1-induced myofibroblast differentiation and extracellular matrix production via the p38 and JNK/NF- $\kappa$ B signal pathways in NPDFs.

**CYTOKINES IN CRS WITH NASAL POLYPS AND ASTHMA**

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**Aims**

To evaluate the immunopathologic profiles of chronic rhinosinusitis without nasal polyps (CRSsNP), with nasal polyps (CRSwNP) in adult Chinese. And to first evaluate the inflammatory profiles of CRSwNP have co-existing asthma and asymptomatic airway hyper-responsiveness (AAHR).

**Method**

Expression levels of inflammatory mediators were determined by multiplex immunoassay, qPCR and histologic analysis.

**Results**

Significant differences in 13/28 of the mediators assayed were observed. Nasal polyps presented significant type-2 inflammation and mild Th17 inflammation. Both eosinophils ( $P < 0.001$ ) and neutrophils ( $P < 0.001$ ) increased significantly in nasal polyps. Type-2 mediator IL-17E ( $P < 0.001$ ) and eotaxin-3 ( $P < 0.01$ ) also evaluated significantly in CRSwNP with asthma, and higher eosinophils ( $P = 0.03$ ) and lower neutrophils ( $P < 0.001$ ) were found in this group.

**Conclusion**

CRSwNP has a predominant type-2 and mild TH17 inflammatory profile with high eosinophil and neutrophil infiltration in adult Chinese. CRSwNP with asthma was characterized by type-2 mediator and eosinophil infiltration. IL-17E may be critical in CRSwNP and asthma pathogenesis.

**CHRONIC RHINOSINUSITIS WITH NASAL POLYPS APPEARS TO BE A “SELF-LIMITING DISEASE”  
LASTING APPROXIMATELY ELEVEN YEARS**

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**Aims**

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a chronic disease that results in high costs for society, mainly because of need for repeated surgical interventions. Not much is known about influence of age on results of sinus surgery (FESS) and time interval between repeated surgical interventions. We therefore used FESS as objective sign of active disease and measured time between first and last surgical interventions in a follow-up of 10 years. We tried to answer the question, if CRSwNP is a self-limiting disease and what the time period is that the disease is active.

**Method**

We sent all patients who received FESS because of CRSwNP between 2000 and 2005 in the AMC a quality of life questionnaire (Sino-Nasal Outcome Test 22). We collected medical history, including complete sinonasal history, comorbidities and smoking. We determined relation between age, total number of times of sinus surgery and age at time of the first operation ever and calculated the mean interval time between first and last operation.

**Results**

We found no relation between age and total number of surgical procedures. When we compared age at time of the first surgery to age at time of last surgery, we found a mean time interval of 11.1 years (SD± 11.1, range 0-52 years), a positive Pearson correlation of  $r = 0,69$  ( $p = 0,01$ ) and a 95% Confidence Interval of 9.32-12.90.

**Conclusion**

We conclude that the total number of sinus surgery procedures in patients' lifetimes seems to be independent of age. We think that CRSwNP is a self-limiting disease.

**REGULATORY T CELLS IN CHRONIC RHINOSINUSITIS**

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**Aims**

Chronic rhinosinusitis is a multifactorial disease with an enormous impact on the wellbeing and quality of life of the affected individuals. So far, the underlying pathophysiology of CRS is not completely understood. Regulatory T-cells (Tregs) are known to have the ability to control and regulate the human immune system. The role of Tregs in the pathophysiology of CRS is a matter of debate. Beyond the amount of Tregs their level of activation seems to be essential for the interaction with interleukins and other mediators of inflammation. To get a closer insight into CRS pathophysiology, the aim of this study was to investigate potential differences of Treg-activation-levels in the different subtypes of CRS such as with and without nasal polyps

**Method**

In a prospective immunohistologic analysis the amount and the level of Treg activation was analysed in human mucosa samples from individuals with CRS with (CRSwNP) and without nasal polyps (CRSsNP). By FACS (Fluorescence Activated Cell Sorter) analysis CD4+, CD25high/CD127low, glycoprotein A repetitions predominant (GARP+), and forkhead box P3 (FoxP3) cells were isolated and defined as activated Tregs.

**Results**

FACS analysis revealed increased Tregs in nasal mucosa samples from individuals with CRS compared to control samples of non-inflamed nasal mucosa samples. In contrast, activated Tregs were lowered in CRS mucosa samples (CRSwNP and CRSsNP).

**Conclusion**

Tregs seem to modulate chronic rhinosinusitis but the level of Treg activation might be a crucial key factor in the pathophysiology of CRS.



**IMMUNE PROFILE MEMBRANE MODULATION ON BLOOD AND NASAL EOSINOPHILS DURING NASAL POLYPOSIS WITH CONCOMITANT ASTHMA**

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**Aims**

Mucosal eosinophil (EO) infiltrate correlates with chronic rhinosinusitis with nasal polyps (CRSwNP) disease severity and with frequent associated asthma in selected patients. The objective is to evaluate EO immunomodulation in terms of migration and survival in accordance with inflammatory proteins' profiles and asthmatic status in CRSwNP.

**Method**

93 patients (47 asthmatics) were included. Each patient was staged clinically according to symptom severity and polyp size. EOs were purified from blood samples and nasal polyps to delineate specific immunophenotypes by flow cytometry and determine in vitro EO survival in relation with asthmatic status.

**Results**

CRSwNP in asthmatic patients was characterized by eosinophilia and a high level of interleukin-5 (IL-5) in nasal secretions. There is a specific EO membrane activation profile after mucosal migration along with a down-expression of IL-5R $\alpha$  (IL-5R $\alpha$ ) on nasal EOs in asthmatic patients. EO culture with both IL-5 and interleukin-9 (IL-9) showed an anti-apoptotic effect in asthmatic patients through IL-5R $\alpha$  modulation.

**Conclusion**

Mucosal eosinophilia is induced by EO nasal trapping through adhesion receptors modulation. In asthmatic patients, the EO inflammatory level is enhanced by anti-apoptotic synergistic action of Th2 cytokines on IL-5R $\alpha$  expression. We showed for the first time that IL-9 is involved in EO homeostasis in CRSwNP and could explain the low benefit of anti-IL5 therapy for some asthmatic patients with nasal polyposis.

**EPIDERMAL GROWTH FACTOR RECEPTOR INHIBITOR AG1478 INHIBITS MUCUS HYPERSECRETION AND NEUTROPHIL INFILTRATION IN AIRWAY EPITHELIUM.**

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**Aims**

In the previous study, we found that epithelial cell-eosinophil interactions stimulated the production of MUC5AC mucin and profibrotic cytokines in eosinophilic chronic rhinosinusitis (CRS), and that epidermal growth factor receptor (EGFR) transactivation in the epithelial cells was involved in this process. To elucidate the roles of EGFR in airway inflammation, the *in vitro* effects on mucin production and IL-8 secretion from cultured airway epithelial cells and the *in vivo* effects on mucus hypersecretion and neutrophil infiltration in rat nasal mucosa of the EGFR tyrosine kinase inhibitor AG1478 were examined.

**Method**

The *in vitro* effects of AG1478 treatment of cultured NCI-H292 cells on lipopolysaccharide (LPS)- or tumor necrosis factor (TNF)- $\alpha$ -induced MUC5AC mucin and IL-8 secretion were evaluated. Hypertrophic and metaplastic changes of goblet cells, mucus production and neutrophil infiltration in rat nasal epithelium were induced by intranasal instillation of LPS *in vivo*, and the inhibitory effects of AG1478 by intraperitoneal injection or intranasal instillation were examined.

**Results**

AG1478 (1-1000 nM) significantly inhibited both LPS- and TNF- $\alpha$ -induced secretion of MUC5AC and IL-8 from cultured NCI-H292 cells in a dose-dependent manner. The expression of MUC5AC and IL-8 mRNAs was also significantly inhibited. Intranasal instillation of AG1478 1 hour after intranasal LPS instillation significantly inhibited LPS-induced goblet cell metaplasia, mucus production and neutrophil infiltration in rat nasal epithelium, as did intraperitoneal injection of AG1478 1 hour before LPS instillation.

**Conclusion**

These results suggest that local administration of an EGFR inhibitor may be a new therapeutic approach for the treatment of intractable eosinophilic CRS.

**ROLE OF VITAMIN D AND ITS RECEPTORS IN PATHOPHYSIOLOGY OF CHRONIC RHINOSINUSITIS**

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**Aims**

1. Identification of vitamin D receptors in sinunasal mucosa of CRS patients with (CRSwNP) and without nasal polyps (CRSsNP) and in healthy controls (HC). 2. Assessment of active and total amount of vitamin D in sera of CRSwNP, CRSsNP and HC. 3. Correlation of results with clinical data.

**Method**

The study included sinunasal mucosa from 35 HC, 29 patients with CRSsNP, 34 patients with CRSwNP, average age 49 years. Nasal biopsies were obtained during FESS or septoplasty. The sections were evaluated for immunohistochemical detection of receptors vitamins D<sub>3</sub> (VDR). VDR expression was performed on paraffin embedded samples using Envision System and DAB reagent (DAKO, Denmark). All patients were evaluated clinically according to the Lund- Mackay CT score, SNOT-20 and other clinical data. Additionally, concentration (level) of 25(OH)D<sub>3</sub> and 1,25(OH)<sub>2</sub>D<sub>3</sub> from blood was estimated.

**Results**

We observed that staining of nuclei in sinonasal epithelial cells after immunostaing with VDR- antibody is medium 32,75 % (P<0,05) in HC vs 14,6% (P<0,05) in CRSsNP and 15,9% (P<0,05) in CRSwNP. Additionally, we found difference in staining of main sinunasal epithelial cells. Stronger staining was found in the most external part of epithelium. VDR staining correlates with Lung- Mackay CT score and SNOT-20, however does not correlate with sera levels of 25(OH)D<sub>3</sub> and 1,25(OH)<sub>2</sub>D<sub>3</sub>.

**Conclusion**

Our data provided evidence that i) VDR receptor undergoes expression in sinunasal mucosa epithelial cells, ii) there is decreased VDR nuclear staining in CRS patients vs healthy control iii) VDR staining correlates with clinical observation.

**A RANDOMISED CONTROLLED TRIAL OF SODIUM CITRATE SPRAY FOR NON-CONDUCTIVE OLFACTORY DISORDERS**

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**Aims**

Previous research has suggested that sodium citrate improves hyposmia by decreasing mucus calcium levels in the nose. This study aimed to confirm or refute this effect in a single application including the peak and duration of the effect.

**Method**

Fifty patients with non-conductive olfactory loss confirmed on endoscopic examination and Sniffin' Sticks olfactory test were randomised to receive the intervention (sodium citrate nasal spray) or placebo (sterile water). Outcome measures included Improvement in olfactory thresholds of  $\geq 2$  threshold dilutions over 2 hours; peak and duration of effect; adverse effects of citrate.

**Results**

A significant effect was seen in the intervention arm for 2 of the 4 odours (phenyl ethyl alcohol and eucalyptol) when compared to the control arm ( $P < 0.05$ ). From the 29 participants randomised to the intervention arm, at least 8 showed a temporary improvement in olfactory performance with a peak effect at 15-30 minutes after application and lasting no longer than 2 hours. Minor adverse effects noted included sore throat and nasal paraesthesia.

**Conclusion**

Sodium citrate yields some potential as a treatment for non-conductive olfactory loss, however these findings require corroboration in further clinical trials looking at longer-term regular use of the spray to see if it is a viable therapeutic option for patients.

**BIOMARKERS IN THE OLFACTORY EPITHELIUM FOR ALZHEIMER'S DISEASE: REALLY USEFUL?**

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**Aims**

Clinical symptoms of Alzheimer's disease (AD) are preceded by a long asymptomatic period, with silent deposition of paired helical filament (PHF)-tau and amyloid- $\beta$  proteins in the brain tissue. Some studies demonstrate the same findings in the olfactory epithelium (OE), a ready accessible structure that could contribute as an useful biomarker to the precise and early histological diagnosis of AD, even during the life of the patient. The objectives of the current study were to verify the uniformity of concentrations of these proteins along different regions where the OE biopsy could be done (nasal septum, middle and superior turbinates) and correlate them with their neuropathological densities.

**Method**

We harvested blocks of olfactory mucosa, performed immunohistochemistry (for amyloid- $\beta$  and PHFtau), and collected cognitive data from 25 neuropathologically normal individuals and 11 with AD submitted to autopsy.

**Results**

Amyloid- $\beta$  correlated better than PHFtau among different OE regions, but a non-uniformity of their concentrations was evident. Almost all correlations among these proteins in different OE regions and the brain were poor; the unique significant correlation was with the PHFtau density in the middle turbinate OE ( $r=0.45$ ;  $p=0.01$ ). Absence of PHFtau and amyloid proteins in the OE harvested from the middle turbinate led to exclude diagnosis of AD and consider another type of dementia. Correlations between clinical and neuropathological diagnosis were much stronger and all statistical significant ( $p<0.01$ ).

**Conclusion**

Clinical questionnaires for cognition were much more precise to estimate AD brain pathology than OE biopsies.

**ACUTE TRAUMATIC BRAIN INJURY AND SENSE OF SMELL: THE ROLE OF SMELL ON NEUROPSYCHOLOGICAL OUTCOMES.**

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**Aims**

Traumatic Brain Injury is one of the major causes of olfactory loss (OL). The aim of this study was to assess the correlation of TBI-induced olfactory dysfunction in neuropsychological outcomes.

**Method**

Patients >18years-old and with less than 2 years after TBI were recruited from a Neurorehabilitation Unit and divided in two cohorts, TBI patients with (TBIwOL) or without (TBIsOL) subjective OL. OL in TBI patients was assessed and confirmed by visual analogue scale (VAS) and subjective olfactometry (BAST-24). Glasgow coma scale (GSC, 1-15) and functional outcomes were reported according to the Disability Rating Scale (DRS) and the Functional Independence Measure (FIM). Neuropsychological questionnaires were Stroop Task, Trail Making Test, Wisconsin Card Sorting Test, Stroop Colour-Word Test, Wechsler Adult Intelligence Scale III, language processing, eating, and behavioural changes.

**Results**

One-hundred and twelve patients were included (33±11.3 years old, 70.5% male). There were no differences between TBIwOL (N=42) and TBIsOL (N=70) in gender, age, and educational level. TBIwOL had a higher GCS (7.6±3.8 vs 5.6±3.1, p=0.007) and FIM (112.3±8.6 vs 114.8±14.5, p<0.05) compared to TBIsOL patients. Eating disorders (RR 3.4, 99% CI [1.9-6]) and behavioral changes (RR 5.1, 99% CI [1.9-13]) were associated to TBIwOL. No differences were found between both groups regarding the other neuropsychological questionnaires.

**Conclusion**

Almost 4 out of 10 patients with TBI reported a subjective loss of smell. TBI-induced loss of smell was associated to eating disorders and behavioral changes, but not to neuropsychological outcomes.

**IS ASSESSMENT OF RANDOM ANSWERS ON THE SNIFFIN' STICKS IDENTIFICATION TEST NECESSARY?**

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**Aims**

Some correct answers can be given by chance alone at the identification Sniffin' Stick test, particularly in patients with anosmia or deep hyposmia, because of forced choice from a list of four. The aim of this study was to try to differentiate real anosmia from severe hyposmia in analysing the random answers of the identification test.

**Method**

The olfactory function was assessed with the Sniffin' Stick kit by two subtests (the threshold and identification subtests) in 133 consecutive patients operated for nasal polyposis from July 2011 to March 2015. Correct identification by chance was noted as  $I_H$ . Subtraction of the correct answers by chance from the global identification score ( $I_G$ ) allowed to calculate the real score of identification ( $I_R$ ):  $I_R = I_G - I_H$ . This allowed to subclassify the hypo-anosmic identification group into "identification anosmia" ( $I_R=0$ ) and "identification hyposmia" ( $I_R \neq 0$ , patients had residual olfactory function).

**Results**

Our findings showed that: i) the pre- and post-op distributions of identification results in patients operated for NP appeared bimodal with an approximate cut-off point at 8; ii) the analysis of random factor when using identification test allows to differentiate a profound anosmia from a hyposmia; iii) an  $I_G \leq 4$  could be considered as an profound anosmia or a severe hyposmia; iv) and using  $I_R$  scores, only 3.8% of patients remained profoundly anosmic ( $I_R=0$ ) at 6 weeks after surgery.

**Conclusion**

Taking into account the identification random answers can be helpful for distinguishing from mild hyposmia to profound anosmia, which is simple to add to the Sniffin' Sticks procedure.

**EFFECT OF ORAL STEROIDS ON SMELL REDUCTION OR LOSS IN PATIENTS WITH CHRONIC RHINOSINUSITIS WITH NASAL POLYPS. FINAL RESULTS**

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**Aims**

Chronic rhinosinusitis (CRS) affect approximately 5-15% of the general population. The prevalence of CRS with nasal polyps is reported about 2.7% of total population. Medical care is mainly required from those with extensive polyposis, nasal obstruction and impairment of sense of smell.

**Method**

Hundred-forty eight patients with CRSwNP (polyps Grade II-III) were finally involved in our prospective randomized study. Patient's baseline assessment included medical history, Sinonasal Outcome Test-22 (SNOT-22) plus VAS questionnaire, and endoscopic appearance score (EAS) record. Smell was evaluated subjectively with Sniff'n Stick. After randomization, one arm underwent medical polypectomy (oral steroids) with intranasal steroids (INCS) and nasal douching, and the other received only intranasal steroids plus nasal douching. Both arms were reevaluated at 2 and 12 weeks from baseline assessment and 12 weeks after the end of medical treatment.

**Results**

Patients included in medical polypectomy arm were most improved. In statistical analysis performed with paired t-test, statistical significance level was  $p < 0.05$ . In medical polypectomy group all parameters of subjective patient's evaluation were significantly improved either from baseline assessment or in correlation with INCS group. Statistical analysis, remarks that there is enough evidence to conclude that there is difference in mean values of tests performed for both groups. Both groups maintained results, conserving non statistical significant difference 12 weeks after cessation medical treatment.

**Conclusion**

In patients with CRSwNP smell seems to be better restored when treatment includes medical polypectomy at start and results are maintained with no statistical significant difference 12 weeks after completion of medical treatment.



**USEFULNESS OF MRI SCANNING OF THE OLFACTORY BULB AND VOLUME MEASUREMENT IN PATIENTS WITH OLFACTORY DYSFUNCTION**

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**Aims**

Usefulness of MRI scanning in patients with olfactory dysfunction is still a matter of debate. The purpose of this study is to prove the concept that performing a MRI of the nose, paranasal sinuses, anterior cranial base, olfactory bulb (OB) and OB volume measurement is essential in the diagnostic work up of patients with an olfactory dysfunction without clear diagnosis after endoscopic endonasal examination.

**Method**

600 patients with an olfactory dysfunction who underwent a MRI as depicted here and without evidence of any diseases after the endoscopic endonasal evaluation. MRI scanning was performed with a special focus on the anterior cranial base, the OB and calculation of the OB volume was performed.

**Results**

Results showed that about one third of the patients have sinonasal diseases not revealed by the endoscopic evaluation. Incidental diagnosis was revealed in some cases with or without relation with the olfactory dysfunction ; Pituitary gland adenoma (3 cases), olfactory groove meningioma (4 cases), not olfactory groove meningioma (2 cases), aneurysm (2 cases), aplasia or hypoplasia of the olfactory bulb (15 cases). Specificity of the MRI increased when the olfactory bulb volume was calculated and matched to age-sex normal values (nearly 80%) the OB volume being smaller when the olfactory dysfunction is more severe. .

**Conclusion**

MRI scanning of the olfactory area is essential for an accurate diagnosis for a patient with an olfactory dysfunction. As already proven in other studies, this also helps the clinician to provide a prognosis of recovery which is essential for the patients.

**EFFECT OF OLFACTORY TRAINING IN PATIENTS WITH OLFACTORY DISORDER**

***M. Ye<sup>1</sup>, S. Shin<sup>1</sup>, H. Lee<sup>1</sup>***

*<sup>1</sup>Catholic University of Daegu hospital, Department of otolaryngology, Daegu, Republic of Korea*

**Aims**

Patients with olfactory dysfunction benefit from repeated exposure to odors, so-called olfactory training (OT). We conducted a prospective study of the impact of a 5-month period of OT in patients with olfactory dysfunction.

**Method**

Our study population was made up of 45 adults—9 men and 36 women (mean age:  $55.2 \pm 9.6$ )—with olfactory dysfunction of different etiologies (post upper respiratory tract infection:  $n = 30$ ; post-traumatic:  $n = 5$ ; and idiopathic:  $n = 10$ ). All patients had been previously treated without success with systemic or topical corticosteroids. For their training, patients exposed themselves to four different odors twice a day. Olfactory function was evaluated at baseline and again at 3 and 5 months, and results were quantified in the form of each patient's TDI (threshold, discrimination, and identification) score. All patients had received topical corticosteroids in addition to training.

**Results**

25 patients (56 %) showed an increased TDI score at 5 months. Initial severity of olfactory loss had no influence on the improvement rates after OT. However, etiology, age, and duration of olfactory loss had statistically significant influence on the improvement. Olfactory function in the post-URTI patients increased significantly at 5 months. A longer duration of training over 5 months seems to increase the effectiveness in comparison to 3 months period.

**Conclusion**

OT is a safe procedure and appears to be particularly useful in patients who start OT within 12 months after the onset of the disorder. The present study showed that OT improves olfactory function in patients with olfactory loss after postinfectious olfactory dysfunction.

**MEDICO LEGAL ASPECTS**

**M. Setzen**<sup>1</sup>

<sup>1</sup>, New York, USA

Medicolegal Aspects of Sinus Surgery – Michael Setzen MD,FACS, FAAP

Objectives of this presentation:

1. Why do complications occur during sinus surgery?
2. Why do lawsuits occur following sinus surgery?

Because of the close proximity of the sinuses to vital structures, namely the orbit and skull base, and major vessels. Complications occur due to technically anatomical challenges. Complications are most important because of the patient's demographics and expectations. Patients are usually young and healthy.

41 US cases were decided and settled between the years 1990 to 2003 due to either negligent technique or lack of consent. 56% were in favor of the doctor. 41% in favor of the patient. 2% were unknown.

The range of award was \$61,000 to 2.8 million. Alleged malpractice was generally due to (1) negligent technique; (2) lack of informed consent; (3) unnecessary surgery; (4) failure to diagnose; and (5) wrongful death.

Discussion of litigation in anosmia cases and why it is so important to discuss the presence of smell pre and postoperatively, will be discussed.

A discussion of litigation in epistaxis, CSF leak, and whether or not surgical navigation was used, will also be highlighted.

How to prevent malpractice includes a1) good preoperative communication and discussion with the patient, 2) good documentation of what was discussed, and 3) detailed patient education.

It is important to manage expectations and have a lengthy discussion of risks, benefits, and alternatives, and document this.

A bad result or outcome is not necessarily malpractice.

**ORBITAL DAMAGE**

**R. Landsberg<sup>1</sup>**

**<sup>1</sup>, Israel**

The outcome of orbital injury during endoscopic sinus surgery can range from minor and insignificant to major and irreversible. It is unlikely that an experienced endoscopic surgeon will never meet some degree of orbital complication. Some orbital fat exposure in the surgical field or periorbital emphysema are likely to end in complete recovery. However, medial rectus injury or optic nerve injury inevitably lead to permanent strabismus or blindness, respectively.

Preoperatively, the integrity and dimensions of the lamina papyracea should be carefully evaluated, especially following previous surgery. In proximity to the lamina papyracea, navigation will not replace the surgeon's anatomical orientation. The microdebrider must be handled with extreme caution near the lamina papyracea. When an orbital hematoma occurs, it is crucial that the surgeon will be promptly aware of the situation, since time may play a major role. The endoscopist must be ready to face every possible complication and should have the surgical skills to solve or minimize the damage. If necessary, a skilled oculoplastic surgeon must be available.

Serious orbital complication is a stressogenic and traumatic event for the endoscopic surgeon. However, after facing this situation, one becomes a better ESS professional.

**REASONS FOR CSF LEAKAGE**

**B. Woodworth**<sup>1</sup>

<sup>1</sup>University of Alabama at Birmingham, Otolaryngology, Birmingham, USA

**Objective:** Cerebrospinal fluid (CSF) rhinorrhea results from abnormal communication between the subarachnoid space and the sinonasal cavity. The objective of this symposium session is to highlight how etiology influences methods, perioperative care, and outcomes.

**Methods:** Review of CSF leak etiology.

**Results:** Generally, CSF leaks are characterized as traumatic, neoplastic, spontaneous, and congenital in origin. Traumatic CSF leaks may be caused by blunt or penetrating trauma. The nature (accidental trauma vs. surgical iatrogenic), extent (simple crack vs. comminuted), and location (e.g. frontal vs. ethmoid vs. sphenoid) of the injuries guide the decision for conservative or operative management, as well as choice of approach and reconstructive method. CSF leaks from neoplastic etiology are similar to either traumatic (intentional trauma from surgical resection) or spontaneous categories (skull base erosion from tumor). Large dural defects or high flow (intraventricular) leaks in this setting present unique challenges for repair. Conversely, spontaneous CSF leaks are associated with neither large defects nor high flow, but rather increased CSF pressure. Mounting evidence indicates the majority of spontaneous leaks are secondary to long-standing intracranial hypertension where constant pulsatile forces on the skull base leads to erosion at sites of inherent weakness (lateral recess of the sphenoid, cribriform plate, supraorbital ethmoid roof/lateral frontal posterior table). Finally, congenital leaks usually arise at a young age in the setting of congenital encephaloceles where small nasal cavities influence the approach and timing of intervention for these lesions.

**Conclusion:** The underlying reasons for CSF leakage will impact method of approach and repair outcomes.

**ERS16-0832**

**SYMPOSIUM 23: DEFECTS IN THE ANTERIOR SKULL BASE – TIME TO CALL THE PLUMBER!**

**DIFFERENT TECHNIQUES FOR THE PLUMBER**

**R. Casiano<sup>1</sup>**

<sup>1</sup>, USA

Successful endoscopic repair of skull base defects has been the single most important factor influencing our ability to endoscopically resect even large skull base neoplasms. Most reports show a 90% success rate in achieving a water-tight closure, for anterior skull base defects. Technical factors influencing good surgical outcomes include circumferential identification of the bony/dural defect, denuding of mucosa to allow graft/flap adherence, and elimination of all dead-space between the graft/flap and recipient site. The types of materials used in reconstruction have not been shown to influence outcomes. In select cases, the use of intrathecal fluorescein may not only identify the source of the leak, but also allows the surgeon to determine when a water-tight closure has been achieved. The decision of whether to use a simple on-lay graft technique, or a composite technique utilizing a in-lay graft plus a nasoseptal flap, is dependent on the size and location of the defect.

**NASAL STEROID IRRIGATIONS**

**B. Senior**<sup>1</sup>

<sup>1</sup>, Chapel Hill, USA

Chronic rhinosinusitis (CRS) has long been recognized as an inflammatory disease more than a simple infectious disease. As such, use of anti-inflammatories such as steroids for treatment has become a mainstay of therapy, particularly in the management of CRS with polyps. Indeed, based on the current evidence, documents such as EPOS and more recently ICARS have recommended their use in this condition. However, oral steroids, while quite efficacious, have well-known side effects of a potentially serious nature. As an alternative, many rhinologists have turned to topical steroids, both in the form of sprays and irrigations in an attempt to achieve their excellent efficacy, while minimizing the potential for systemic side effects. In this review, the author will describe the role of topical steroid irrigations in management of CRS, reviewing the evidence for their use and potential risks associated with them.

**ERS16-0855**

**SYMPOSIUM 25: HOW DO WE APPLY 3D SURGERY IN RHINOLOGY?**

**3D TECHNOLOGY PRIMER**

**M. Barnes<sup>1</sup>**

*<sup>1</sup>Southend University Hospital NHS Foundation Trust, Otorhinolaryngology, Southend on Sea, United Kingdom*

This session will be a primer for the basic concepts behind recent advances in three dimensional capture and visualisation. Not since the advent of 3 axis radiological imaging have such fundamental changes occurred with the potential to drive forward both surgical practice and education. We will discuss and demonstrate the differences between stereoscopic and true 3d imaging in terms of both capture and display technologies.

Such technologies are seeing application from facial modelling and conceptualisation in reconstruction and cosmetic surgery through to anatomical tuition in the most complex skullbase and sinonasal environments. We will demonstrate many of these novel technologies and existing implementations in the form of 3d endoscopy, the DaVinci robot, and online educational materials.



**ERS16-0866**

**SYMPOSIUM 25: HOW DO WE APPLY 3D SURGERY IN RHINOLOGY?**

**3D MODELING FROM PHOTOGRAPHY**

**T. Kanzara<sup>1</sup>**

<sup>1</sup>, *United Kingdom*

3D technology is revolutionising day to day patient care. The same technology, used in concert with, mobile, laptop and desktop platforms can be used to create innovative and engaging learning materials. We are going to demonstrate how to create 3D images from photography and showcase some of our work. Our aim is to empower all surgeons to push the boundaries in surgical education by creating innovative learning materials which can supplement traditional resources.

ERS16-0857

**SYMPOSIUM 25: HOW DO WE APPLY 3D SURGERY IN RHINOLOGY?**

**3D MODELING IN LEARNING**

**M. Barnes**<sup>1</sup>

<sup>1</sup>*Southend University Hospital NHS Foundation Trust, Otorhinolaryngology, Southend on Sea, United Kingdom*

The complex anatomy of the sinonasal cavity defies simple attempts to illustrate and remains difficult to visualise and teach even with the assistance of contemporary high resolution 3-axis radiologic imaging. Neurosurgical anatomy adds an even greater level of 3 dimensional relationships, the understanding of which are crucial in the training of the surgeons of tomorrow. Modern technology is increasingly giving us tools to better facilitate this training, even in a domestic / consumer setting. Stereoscopic visualisation in the movies and even at home with 3D TVs remains a niche or novelty concept, but applying these same technologies to anatomical and surgical study has great potential. Combining stereoscopy with 3D modelling can provide us with virtual reality learning environments that are becoming much more readily available to us all. We have been working to make such educational technologies available to everyone - released on an open access (free) basis.

**LOCAL NASAL ALLERGY - CLINICAL RELEVANCE?**

**C.L. Segboer<sup>1</sup>**

<sup>1</sup>Emma Children's Hospital/Academic Medical Center, Otolaryngology, Amsterdam, Netherlands

'Local nasal allergy- clinical relevance?'

Around 20% of the world population suffers from symptoms of chronic rhinitis; around 50% of this group is diagnosed with non-allergic rhinitis (NAR). Most of the patients with NAR have idiopathic rhinitis which is a diagnosis *per exclusionem*. This is an unsatisfying diagnosis with even more unsatisfying treatment options resulting in a significant disease burden and quality of life impairment. Recently, the diagnosis of local allergic rhinitis (LAR) was introduced, possibly explaining at least part of the idiopathic rhinitis group.

LAR is defined as a localized nasal allergic reaction in absence of systemic atopy. Patients with LAR suffer from typical allergic symptoms when they are exposed to certain allergens but have a negative skin prick test (SPT) and/ or CAP. It is thought that LAR is caused by the presence of IgE in the nasal mucosa.

The clinical diagnosis of LAR is based on positive nasal allergen provocation testing (NAPT) in the absence of manifestation of systemic IgE by measuring serum IgE or skin prick test. A positive NAPT is based on both detection of sIgE in nasal mucosa as well as a clinical reaction (increase in rhinitis symptom score and decrease in nasal airflow) after allergen provocation. In the past decade many NAPT studies have been performed in several countries, showing a wide variety in prevalence of LAR. Most studies have been performed by the Spanish study group of Rondon *et al* showing a remarkable high prevalence of LAR of 54-63%. This high prevalence number cannot be repeated in other countries, including recent studies in The Netherlands and Germany using the exact same NAPT design as the studies performed in Spain.

LAR might be an explanation for a group of patients that have a history of AR but who do not show signs of systemic sensitization. It is difficult to explain the large variety in prevalence that have been found at them moment. Possible explanations are variation between populations, in definition of patient groups or methodologically issues.

**WHAT OF NEUROPEPTIDES?**

**L.O. Cardell**<sup>1</sup>

<sup>1</sup>, Sweden

Substance P (SP), a member of the tachykinin family of neuropeptides, was first identified in the 1930s; however, SP wasn't the subject of intense research until the 1980s when neuropeptides such as SP, calcitonin gene-related peptide (CGRP) and vasoactive intestinal polypeptide (VIP) were identified as integral mediators of neurogenic inflammation. This process, by which certain neuropeptides induce vasodilation and increase vascular permeability, glandular activation and leukocyte recruitment, particularly in the airway, was shown to have an important contributory role in airway inflammation and associated pathologies in animal models. SP was identified as a key mediator of this process in guinea pigs, as animals treated with capsaicin to deplete SP, and animals treated with an SP-antagonist, did not develop vagally induced neurogenic inflammation. Neuropeptides, and their respective receptors, could be identified in human airways, and their release was shown to be induced by allergen or by hypertonic saline provocation. However, the presence and relative contribution of neurogenic inflammation to human airway disease has been difficult to demonstrate, suggesting an alternative clinically relevant role for neuropeptides. Recent findings demonstrate the ability for some neuropeptides to modulate different mechanisms of innate immunity. This talk will identify a novel role for SP in rapidly regulating the immediate host defense in the nose, and determine a key pathway in the acute and local pathogen-driven innate immune response that is of major clinical importance.

**ERS16-0816**

**SYMPOSIUM 27: EAACI SESSION: HOW TO SET UP IMMUNOTHERAPY IN YOUR ENT CLINIC**

**IMMUNOTHERAPY IN POLYSENSITIZED PATIENTS: WHEN, WHY AND HOW?**

**L. Klimek<sup>1</sup>**

<sup>1</sup>*Rhinology and Allergology Center, ORL, Wiesbaden, Germany*

Immunotherapy involves administering increasing doses of an allergen-containing extract to reduce or eliminate allergic symptoms through modulation of a patient's immune system.

Practical guidelines are important to take advantage of this kind of therapy in ENT clinics.

This workshop will give you information on standard of care in Europe as well as recent approaches with modified and recombinant allergens, immunostimulatory adjuvants, T-cell-tolerizing constructs, and improved approaches for both, subcutaneous and sublingual immunotherapy. Other delivery routes such as epicutaneous, intracutaneous and intralymphatic are also discussed.

You will end up with having an overview on practical issues of this important treatment for allergic rhinitis.

**ERS16-0831**  
**SYMPOSIUM 28: GENETICS IN RHINOLOGY**

**OVERVIEW**  
**E. Toskala<sup>1</sup>**

<sup>1</sup>Temple University, ORL-HNS, Philadelphia, USA

**Genetics of CRS-Overview**

Elina Toskala, MD, PhD

Professor of Otolaryngology

Lewis Katz School of Medicine, Temple University

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Head and Neck Institute

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**Abstract:**

This presentation will review the studies of prevalence of CRS in Europe and in US. The classification of CRS to polyps versus non-polyp form is also discussed. The results of a recent multicenter study of CRS and cluster analysis that was performed in that study are presented. General principals and genetic analysis as well as methods to study complex genetic disorder such as CRS are presented. Finally the role of environment in genetics and principals of epigenetics is discussed.

**DO YOU INHERIT NASAL POLYPOSIS?**

**A. Bohman**<sup>1</sup>

<sup>1</sup>*Uppsala University Hospital, Dept. of Otorhinolaryngology, Uppsala, Sweden*

**Do you inherit nasal polyposis?**

**Objectives:**

Nasal polyposis is a complex disease with several suggested environmental risk factors. A hereditary component has been suspected for decades. This lecture will try to summarize key findings from studies with different approaches to the question of the heredity of nasal polyposis and address research questions moving forward.

**Methodology:**

Studies on the heredity of nasal polyposis have mainly been conducted using five different approaches: a twin study, a family study, several studies on positive family history among patients with nasal polyposis, a database study and one study investigating the relatives of patients with nasal polyposis.

**Results:**

All of these studies have their own pros and cons but all of them support the idea that heredity is an important factor in nasal polyposis. The prevalence of nasal polyps among relatives ranges from 13-20% and a positive family history was found in 13-25% of patients with nasal polyposis. First-degree relatives of patients with nasal polyposis have a four- to five-fold increased risk of having nasal polyposis themselves compared to a general population.

**Conclusion:**

These studies illustrate that nasal polyposis has a hereditary component. This needs to be investigated further using genetic studies such as studies of candidate genes, genome-wide association studies and linkage analysis.

**PERMANENT POSTOPERATIVE ANOSMIA- A SYSTEMATIC REVIEW**

***N. Alotaibi<sup>1</sup>, B. Landis<sup>1</sup>***

*<sup>1</sup>Geneva University Hospitals, Service d'Oto-Rhino-Laryngologie et de Chirurgie cervico-faciale, Geneva, Switzerland*

**Aims**

Anosmia is one potential complication of endonasal surgery. It is not clear how often this occurs and remains permanent. We conducted a systematic review of the literature looking for permanent anosmia after endonasal surgery.

**Method**

We conducted a systematic review of the literature looking for permanent anosmia after endonasal surgery. We included articles in all languages and extracted details of the performed surgeries.

**Results**

A total 85 articles were selected and reviewed. Most cases with permanent anosmia occurred after septoplasty. Most surgeries were uneventful and the complication not expected.

**Conclusion**

Permanent anosmia after endonasal surgery is probably underreported. Most cases with permanent postoperative anosmia occurred after septoplasty



**APPLICABILITY OF THE "SNIFFIN"STICKS" TEST IN A NORMAL POPULATION OF SOUTH-KIVU (D.R.CONGO) AND DEVELOPMENT OF CULTURALLY ADAPTED VERSION**

***P. Balungwe<sup>1,2</sup>, C. Huart<sup>2,3</sup>, A. Mouraux<sup>2</sup>, C. de Toeuf<sup>3</sup>, T. Hummel<sup>4</sup>, G. Mapoli<sup>1</sup>, I. Bufole<sup>1</sup>, R. Matanda<sup>5</sup>, G. Bisimwa<sup>6</sup>, P. Rombaux<sup>2,3</sup>***

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<sup>6</sup>Université catholique de Bukavu, Ecole Régionale de Santé Publique, Bukavu, Democratic Republic of Congo

**Aims**

The "Sniffin' Sticks" test (SST) is widely used in Europe as a standard test to assess olfaction. Several versions, adapted to non-caucasian populations, have been developed. However there is no version adapted to Sub-Saharan African population. The aims of the present study were (1) to assess the applicability of the SST in South-Kivu population, and (2) to develop a culturally-adapted version with normative values.

**Method**

307 healthy adult volunteers were included in this study, and were tested in two stages. In the first stage, 157 volunteers were tested with the original extended version of the SST. Based on these results, we selected odors that were poorly recognized in the identification test and replaced them by culturally-adapted odors. In the second stage, we assessed the modified version of the SST in 150 volunteers and defined normative values.

**Results**

In the first study, we found that olfactory function (TDI score) significantly decreases with age and is better in female. Moreover, 5 odors were poorly recognized on identification test. They were thus replaced by culturally-adapted odors. In the second study, we found that this adapted version lead to a higher rate of correct responses in the identification test. We consequently defined normative values for the South-Kivu population (TDI score: 18-35 years: 30.4±6.0, 36-55 years: 26.2±5.3, >55 years: 25.6±5.0).

**Conclusion**

This culturally-adapted version of the SST is valuable for use in South Kivu population. These normative values provide the basis for further evaluation of pathologic population.

**DEVELOPMENT OF A NEW PSYCHOPHYSICAL METHOD TO ASSESS INTRANASAL TRIGEMINAL CHEMOSENSORY FUNCTION**

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**Aims**

The intranasal trigeminal (IT) system acts as a sentinel of the airways. However, poor attention is usually paid to it in clinical practice. The aim of this study is to develop a new psychophysical test to easily assess IT chemosensory function.

**Method**

The developed test is similar to the Sniffin' Sticks test, but using sticks impregnated with substances that preferentially activate trigeminal afferents. Our test comprises detection threshold, discrimination, identification and lateralization tasks. In a first study, we evaluated healthy controls. In a second study, we evaluated the potential usefulness of this test in a subset of patients suffering from diverse rhinologic conditions.

**Results**

66 controls were included in the first study. Threshold and lateralization scores were inversely correlated with age, and women had significantly lower thresholds. Identification performances were significantly influenced by age. In a second study, we included 64 patients (12 allergic rhinitis (AR), 12 chronic rhinosinusitis with nasal polyps (CRSwNP), 9 without nasal polyps (CRSsNP), and 31 olfactory disorder (OD)) and compared their results to those of age-matched controls. Detection thresholds of controls and AR were significantly lower as compared to CRSwNP and to OD. Lateralization scores of controls were significantly higher as compared to CRSwNP. Interestingly; OD outperformed the lateralization abilities of CRSwNP.

**Conclusion**

Our test is able to identify age-related changes of IT chemosensory function. Moreover, trigeminal function seems to be differently affected in different pathologies. Further studies are necessary to validate our results and to evaluate the impact of olfactory co-activation on the observed results.

**THE LOSS OF OLFACTORY FUNCTION CORRELATES WITH MRI BRAIN DAMAGE IN TRAUMATIC BRAIN INJURY**

***C. Langdon<sup>1</sup>, J. Berenguer<sup>2</sup>, E. Lehrer<sup>3</sup>, F. Mariño<sup>3</sup>, I. Alobid<sup>3</sup>, S. Laxe<sup>4</sup>, M. Bernabeu<sup>4</sup>, C. Marin<sup>5</sup>, J. Mullo<sup>3</sup>***

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**Aims**

Brain damage induced by traumatic brain injury (TBI) can cause olfactory loss (OL) affecting different brain areas related to smell perception. The study aim was to investigate by MRI the association of TBI-induced brain damage with the loss of olfactory function.

**Method**

Patients with TBI-induced OL (TBIwOL, N=42) were enrolled in the study. OL was assessed by a visual analogue scale (VAS: hyposmia 0-7cm, anosmia >7-10cm), and subjective olfactometry (BAST-24) for odor detection, identification and forced choice. Patients were studied by MRI of the brain, olfactory bulb (OB) and sulcus (OS). An MRI bilateral score (0-16) was developed to assess neuromalacic and chronic hemorrhagic changes of OB, frontal and temporo-medial regions. OB volume and olfactory sulcus (OS) length were also measured.

**Results**

TBIwOL patients had impaired odor detection (54.1±41.6%), identification (2.4±4.3%) and forced choice (24.4%±24.1), compared to a healthy control population (99%, 54.7%, 72.2%, respectively). Anosmic TBIwOL patients (N=29, 69%) had a higher MRI score (6.3±3 vs 1.8±2.2, p<0.001) and a lower right OS length (4.3±4.4 vs 6.7±4.2, p<0.01) compared to hyposmic (N=13, 31%). No differences were observed in relation to OB volume and left OS length. A strong correlation between total MRI score and BAST-24 detection (R=0.7; p<0.001), and forced choice (R=0.7; p<0.001) was observed in anosmic TBIwOL patients.

**Conclusion**

The brain damage of olfactory system assessed by MRI correlates with olfactory loss in TBI patients. Our MRI score is a useful imaging indicator for olfactory dysfunction in TBI patients and correlates with olfactory loss severity.

**ASSOCIATION OF TRAUMA BRAIN INJURY WITH OLFACTORY DYSFUNCTION IN THE GENERAL POPULATION (THE OLFACTAT STUDY).**

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**Aims**

Traumatic brain injury (TBI) is one of the main causes of smell loss but epidemiological studies evaluating the incidence in general population are scarce. The study aim was to investigate the prevalence of TBI-induced olfactory loss in the general population.

**Method**

Cross-sectional population-based survey (OLFACTAT) was distributed to general population (260,000 households) through a newspaper in Catalonia (Spain). The survey included four microencapsulated odorants and two self-administered questionnaires (odour description, epidemiology/health status) to assess smell loss. Normosmia, hyposmia, and anosmia were defined as participants detected, recognized, or identified all 4, 1 to 3, or none of the odours, respectively.

**Results**

From 10,783 returned surveys, 9,348 were analysed. Survey profile was a 43-yo woman with medium-high educational level, living in a city. The overall prevalence of TBI was 5% (N=464, 44.5±14.1 years-old, 57% females). Recorded causes of TBI were traffic (56.2%), domestic (35.6%), or work (8.2%) accidents. Subjects with TBI reported a poorer subjective self-perception of smell (12% vs 6%, p<0.0001). Prevalence of TBI-induced olfactory loss was 18% for hyposmia and 0.2% for anosmia in smell detection, 40% for hyposmia and 0% for anosmia in smell memory/recognition, and 49% for hyposmia and 3% for anosmia in smell identification. In the multivariate analysis, anosmia of identification was strongly associated with TBI-induced olfactory loss (OR 3.4, CI [1.7-6.7]; p=0.0006).

**Conclusion**

We did not observed a higher prevalence of olfactory loss in subjects reporting TBI. However, TBI was strongly associated with the loss of smell identification, an important cognitive aspect of olfaction.

**INTRANASAL SODIUM CITRATE IMPROVES OLFACTION IN POST-VIRAL HYPOSMIA**

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**Aims**

Calcium plays an integral role in olfactory signal transduction, including feedback inhibition. Sodium citrate acts as a calcium sequestrant and when applied intranasally, reduces free calcium available for feedback inhibition, which should theoretically improve olfaction. We aimed to investigate the utility of intranasal sodium citrate in improving the olfactory function of hyposmic patients, by performing this prospective placebo controlled, single-blind trial.

**Method**

Monorhinal olfactory testing for odour identification and threshold was performed in hyposmic patients using “Sniffin’ Sticks”, before and after treatment. Treatment consisted of one-off sodium citrate solution application to the olfactory cleft. Sodium chloride solution (at physiological concentration) was applied to the contralateral olfactory cleft, which therefore acted as placebo control. Patients were blinded to the side of sodium citrate application, and side of treatment was randomized between patients.

**Results**

57 patients participated, aged 22-79. Causes of hyposmia included: post-viral (7); posttraumatic (10); sinonasal disease (30) and idiopathic (10). Compared with placebo, there was significant improvement in the identification scores of participants with post-viral hyposmia, following sodium citrate treatment ( $2.29 \pm 1.89$ ,  $p=0.02$ ). No significant change in olfactory function occurred for either identification or threshold in any other aetiological subgroup.

**Conclusion**

Intranasal sodium citrate may be of benefit to patients with post-viral hyposmia and further research in this group is warranted.

**VOLUMETRIC ANALYSIS OF NASAL SURGERY IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA**

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**Aims**

Investigate the relation between change in nasal volume and outcome of surgery as determined by apnea-hypopnea index (AHI), and blood oxygen saturation nadir (SpO<sub>2</sub> nadir) among OSA patients who underwent nasal surgery for nasal obstruction.

**Method**

Study group included twelve patients with a diagnosis of OSA by polysomnography (PSG) who underwent nasal surgery and had available pre-operative and post-operative computed tomography (CT) images and PSG results. Nasal airway volume based on CT was measured pre- and post-operatively and correlated with the surgical outcome. OsiriX Lite software was used for volumetric analysis.

**Results**

5/12 subjects (41.7%) experienced a >50% reduction in AHI following nasal surgery. For the group as a whole, there were statistically significant differences between mean preoperative AHI (50.93 events/hour) and mean postoperative AHI (25.28 events/hour) ( $p < 0.05$ ), and mean preoperative SpO<sub>2</sub> nadir (80.67%) and mean postoperative SpO<sub>2</sub> nadir (83.88%) ( $p < 0.05$ ). There were significant differences between mean pre-operative and mean post-operative left sided ( $p < 0.05$ ), right sided ( $p < 0.05$ ), and bilateral ( $p < 0.05$ ) nasal volumes. However, there was no significant difference in nasal volumes among study subjects who experienced >50% reduction in AHI compared to those who experienced < 50% reduction in AHI.

**Conclusion**

CT-based volumetric nasal airway analysis is a useful tool to objectively demonstrate nasal airway changes following nasal surgery OSA patients. Select OSA patients may experience improved subjective and objective outcomes following nasal surgery that is reflected by an increase in nasal airway volume. Further investigation is needed to better characterize OSA patients who are more likely to respond to nasal surgery.

**THE EFFECT OF JAW THRUST ON OXYGEN SATURATIONS IN THE UNCONSCIOUS PATIENT**

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**Aims**

Assessing the airway is the first step in basic life support. Where the airway is compromised or the patient unconscious jaw thrust or head tilt and chin lift manoeuvres to open the airway are advocated. Jaw thrust has been shown to improve tidal volume, minute ventilation, and peak tidal inspiratory and expiratory flows, glottic opening and reduce stridor. However the effect on oxygen saturations has not been documented to date.

**Method**

Adults patients undergoing elective drug induced sleep nasendoscopy (DISE) for snoring had oxygen saturation monitoring using a pulse oximeter. The lowest O<sub>2</sub> saturation level during DISE was documented. A jaw thrust was subsequently performed. The saturations, along with other readings were recorded once more. No oxygen or airway adjuncts were administered during this part of assessment.

**Results**

The lowest oxygen saturation recorded was 67% this improved with the jaw thrust manoeuvre to 89%. The range for the low saturation was 68-84%. With the jaw thrust manoeuvre the range rose to 89-99%.

**Conclusion**

The jaw thrust manoeuvre alone has been shown to improve airway patency. Oxygen saturations improved by at least 10% in this study using our method of assessment. This is the first study looking at this aspect of the resuscitation advanced life support algorithm.

## THE ASSOCIATION BETWEEN THE SEVERITY OF SLEEP-DISORDERED BREATHING AND BLOOD COAGULABILITY

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### Aims

Sleep-disordered breathing (SDB) is related with the increase of risk for cardiovascular diseases including myocardial infarction, ischemic heart disease, and stroke. The aim of this study was to investigate the association between the severity of SDB and blood coagulability.

### Method

A total of 146 subjects (mean age =  $34.8 \pm 11.1$  years; male : female = 135 : 11; mean body mass index [BMI, kg/m<sup>2</sup>] =  $26.0 \pm 3.4$ ) with SDB were included in the study. All participants were divided into 4 groups according to the severity of SDB: 1) simple snoring (SS, n=41); 2) mild obstructive sleep apnea (OSA) (MiO, n=34); 3) moderate OSA (MoO, n=28); and 4) severe OSA (SeO, n=43). We examined the relationship between the severity of SDB and coagulation test results such as platelet count (PLT), bleeding time (BT), prothrombin time (PT sec, and PT INR), and activated partial thromboplastin time (aPTT).

### Results

Significant correlations were found between apnea-hypopnea index and some coagulation test results including platelet ( $r=0.225$ ,  $p=0.006$ ), PT sec ( $r=-0.297$ ,  $p=0.000$ ), and PT INR ( $r=-0.296$ ,  $p=0.000$ ). There were significant differences in PT sec ( $11.26 \pm 0.78$  [SS] vs  $10.68 \pm 0.60$  [MoO],  $p=0.020$  or  $10.67 \pm 0.77$  [SeO],  $p=0.005$ ), and PT INR ( $1.00 \pm 0.69$  [SS] vs  $0.95 \pm 0.05$  [MoO],  $p=0.002$  or  $0.94 \pm 0.07$  [SeO],  $p=0.001$ ) between SS and MoO or SeO.

### Conclusion

These results suggest that moderate to severe OSA may have elevated coagulability compared to simple snoring.



**PAEDIATRIC OBSTRUCTIVE SLEEP APNEA (OSA) - A STUDY OF 100 PATIENTS IN THE INDIAN SUBCONTINENT ; TO IDENTIFY THE ROLE OF SURGERY IN MILD OSA**

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**Aims**

**Background:** Sleep disordered breathing (SDB) is a common malaise in the paediatric age group. Untreated SDB results in complications such as learning disability, memory loss, risk of hypertension, depression and poor growth.

**Objectives:** a) To determine incidence of true OSA

b) Relationship between clinical parameters and PSG in Pediatric OSA.

c) To assess benefit of adenotonsillectomy in patients of Mild OSA who did not respond to medical treatment.

**Method**

**Methods :** We studied 100 patients with signs and symptoms suggestive of SDB.

The children underwent a detailed clinical examination by an ENT surgeon. A validated paediatric sleep questionnaire (PSQ) was administered to the caretakers of the patients. Then the children were enrolled for a level 1 PSG.

52 children had mild OSA . As per the AAP guidelines, these children were treated with intranasal corticosteroid spray and montelukast with levocetirizine. At the end of 6 weeks, the patients who did better continued the steroid spray. Those patients who did not show improvement were counselled for surgery. A repeat PSG was planned for the patients who responded well to medical line of management.

**Results**

**Results :** A paired 't' test was done to compare the AHI scores. 'p' value was significant for AHI scores and central sleep apnea indices before and after treatment. Severity of OSA was inversely proportional to BMI. Quality of life improved after medical management.

**Conclusion**

**Conclusion :** Paediatric mild OSA can be effectively managed with medical treatment. Routine PSG should be done in all children with snoring. In Mild OSA unnecessary adenotonsillectomy can be avoided.

**DRUG-INDUCED SLEEP ENDOSCOPY IN THE PEDIATRIC POPULATION: CLINICAL USEFULNESS AND LITERATURE REVIEW**

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**Aims**

The aim of this work is to review the literature about the use of Drug-induced Sleep Endoscopy (DISE) in the pediatric population, and to determine the recommendations on the use and the influence of DISE in pediatric patients.

**Method**

The authors have evaluated the English literature about the use of DISE and the effectiveness of treatment influenced by DISE findings. A comprehensive search of articles published from January 1999 to October 2015 listed in the MEDLINE/Pubmed and ScienceDirect databases was performed. The key-words used were: “Endoscopy” or “Nasoendoscopy” or “DISE” or “Sleep Endoscopy” or “Sedation Endoscopy” and “Obstructive Sleep Apnea” and “Children” or “Child” or “Pediatric”. After the databases search, a total of 273 articles were found, of which nine were selected.

**Results**

Six studies (66.7%) were retrospective studies and one (11.1%) was a case-control study. The average of children evaluated is 39.1 (13-82) and the mean age varied from 2.2 to 9.7 years. In four (44.4%) studies, the diagnosis of Obstructive Sleep Apnea (OSA) was made only by polysomnography. The majority of the studies (66.7%) in the review used Propofol. Each study used a specific classification system for the DISE findings.

**Conclusion**

Validation studies about the use of DISE on children do not exist, but sleep endoscopy is emerging to identify specific areas of obstruction in the airway. Our review suggests that the use of DISE in the pediatric population can benefit those who's OSA are associated with other comorbidities and those with persistent OSA after adenotonsillectomy.

**THE ROLES OF ALLERGIC AND NON-ALLERGIC RHINITIS ARE OVERESTIMATED IN THE ASSOCIATION WITH OBSTRUCTIVE SLEEP APNEA-HYPOPNEA SYNDROME**

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**Aims**

We aimed to investigate the prevalence of allergic rhinitis (AR) and non-allergic rhinitis (NAR) in obstructive sleep apnea-hypopnea syndrome (OSAHS) patients and their potential roles in the OSAHS.

**Method**

240 consecutive OSAHS patients confirmed by polysomnography were assessed for presence of AR and NAR, using questionnaires and skin prick tests (SPTs). AR was defined as positivity of both in the questionnaire and SPT, whereas NAR was diagnosed as the positive response in the questionnaire but with a negative SPT and no-rhinitis was diagnosed as the absence of nasal symptoms according to the questionnaire. The associations between severity of OSAHS and absence or presence of rhinitis, age, gender, and BMI were evaluated by ordinal logistic regression analysis.

**Results**

The prevalence of AR and NAR among OSAHS patients were 27.1% and 28.7%, respectively. There was no significantly different proportion of the subtypes of rhinitis based on duration and severity among the various OSAHS subgroups including mild, moderate and severe subgroup. Ordinal logistic regression analysis showed the presence of AR/NAR, age and gender were not risk factors for severity of OSAHS. There were significant differences of PSG parameters in sleep efficiency ( $79.7 \pm 2.0$  vs  $85.2 \pm 1.4$  between AR and NAR;  $79.7 \pm 2.0$  vs  $87.2 \pm 1.4$  between AR and no-rhinitis, both  $P < 0.05$ ) and arousal index between AR and no-rhinitis ( $36.8 \pm 4.1$  vs  $24.7 \pm 3.5$ ,  $P = 0.048$ ). NAR patients had lower average SaO<sub>2</sub> saturation and minimal SaO<sub>2</sub> saturation, compared with no-rhinitis subjects.

**Conclusion**

AR and NAR may be considered as symptoms potentiating, rather than risk potentiating factors in the pathophysiology of OSAHS.

**RESPONSIVENESS OF ACOUSTIC RHINOMETRY TO FUNCTIONAL SEPTORHINOPLASTY BY COMPARISON TO RHINOMANOMETRY AND PATIENT-REPORTED OUTCOME MEASURES.**

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**Aims**

Patient-reported outcome measures have become increasingly important to evaluate surgical effectiveness. Different validated tools have been developed in septorhinoplasty, such as the Sino-Nasal Outcome Test 23 (SNOT-23), Nasal Obstruction Symptom Evaluation (NOSE) score and Visual analogue scales (VAS). However, surgical effectiveness should be supported by objective evidence. Scientific publications correlating subjective tools and objective measures, such as acoustic rhinometry (AR) and rhinomanometry (RMM) have produced paradoxical results. However, few of these studies used both objective tools and no study used validated questionnaires. The aim of this study was to investigate the responsiveness of acoustic rhinometry to septorhinoplasty by comparison to patient-based validated questionnaires and rhinomanometry.

**Method**

Fifty consecutive patients undergoing functional septorhinoplasty over a one-year period were prospectively included. AR and anterior RMM were recorded preoperatively and at 3 months postoperatively. Patient-reported outcome included SNOT-23 questionnaire, NOSE score and 10-point VAS.

**Results**

Mean cross sectional area measured by AR was highly responsive to septorhinoplasty and improvement of AR measures was correlated to patient-reported outcome. Anterior RMM failed to detect significant improvement after surgery and was not correlated to AR neither to patient-reported outcomes. Improvement of nasal patency measured by acoustic rhinometry is predictive of quality of life change measured by SNOT-23.

**Conclusion**

While patient selection for septorhinoplasty should not be solely based on objective measures, acoustic rhinometry provides objective evidence of the therapeutic effectiveness of septorhinoplasty. Acoustic rhinometry is a responsive instrument and its changes are correlated to patient-reported symptoms regarding nose patency and quality of life.

## CLINICAL CLASSIFICATION OF UNILATERAL NASAL OBSTRUCTION BY 36,563 MEASUREMENTS AND TOTAL NASAL OBSTRUCTION BY 10,030 MEASUREMENTS WITH 4-PHASE RHINOMANOMETRY

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4-phase-rhinomanometry is the advanced method of rhinomanometry using parameters on an exact physical basement. Comprehensive clinical data are missing. For clinical use the definition of reference values as well as a classification of nasal obstruction is necessary.

**Method**

The rhinomanometric databases of five different German ENT- hospitals that have been using 4PR for more than 5 years are analyzed in this study. Three departments are dealing with general otorhinolaryngology and two hospitals are specialized in facial-plastic surgery. The age range of patients was 14–82 years. In 20 069 untreated nasal sides, active anterior rhinomanometry was carried out. A total of 16 494 measurements were subsequently followed by a decongestion test with xylometazoline 0.1% spray and a second measurement 10 min later. The total nasal resistance was calculated by using the formula for parallel resistors. The parameters Logarithmic Effective Resistance and Logarithmic Vertex Resistance have been evaluated. Statistical evaluation was carried out by SPSS 22

**Results**

	Class	Unilateral Resistance		Total Resistance	
		Untreated	after decongestion	Untreated	after decongestion
1	0–19%	<0.71	<0.63	<=0.42	<=0.36
2	20–39%	0.71–0.89	0.63–0.78	0.42 - 0.57	0.36 - 0.47
3	40–59%	0.89–1.08	0.78–0.94	0.57 - 0.70	0.48 - 0.59
4	60–79%	1.09–1.35	0.94–1.18	0.70 - 0.90	0.59 - 0.76
5	80–100%	>1.35	>1.18	> 0.90	> 0.76

**Conclusion**

The worldwide most comprehensive statistically representative material for caucasian noses is obtained by parameters with a significant correlation to the subjective sensing of obstruction. The parameters are replacing the incorrect and obsolete parameters of "classic" rhinomanometry for the better quality of diagnostics.

**THE RELATIONSHIP BETWEEN NASAL RESISTANCE TO AIRFLOW AND THE AIRSPACE MINIMAL CROSS-SECTIONAL AREA**

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**Aims**

The relationship between nasal anatomy and function remains unclear. Multiple investigators have used acoustic rhinometry and rhinomanometry to try to relate form with function, but found only a moderate correlation between these techniques and between their measurements and subjective patency scores. Since acoustic rhinometry and rhinomanometry are susceptible to multiple sources of error, it is unclear whether these low correlations reflect the difficulty of performing in vivo measurements or an inherent lack of correlation between nasal resistance (R) and the airspace minimal cross-sectional area (mCSA). This study aims to (1) introduce computational streamline rhinometry as a new method to quantify nasal anatomy by measuring cross-sectional areas perpendicular to flow streamlines and (2) explore the relationship between mCSA, R, and subjective patency scores.

**Method**

Pre- and post-operative computed tomography scans of 15 nasal airway obstruction patients were collected and used to develop computational fluid dynamics (CFD) models of nasal airflow at an inhalation rate of 15 L/min. Subjective scores of nasal patency were collected via the Nasal Obstruction Symptom Evaluation and a visual analog scale.

**Results**

On average, mCSA in the most obstructed cavity increased from  $0.28 \pm 0.18 \text{ cm}^2$  pre-surgery to  $0.43 \pm 0.12 \text{ cm}^2$  post-surgery ( $p = 0.0002$ ), while R decreased from  $0.49 \pm 0.54 \text{ Pa.s/ml}$  pre-surgery to  $0.15 \pm 0.07 \text{ Pa.s/ml}$  post-surgery ( $p = 0.017$ ). Both R and mCSA correlated significantly with the subjective patency scores, and correlated among themselves as  $R \sim (\text{mCSA})^{-0.92+0.10}$  with a correlation coefficient  $|r|=0.78$ .

**Conclusion**

Nasal resistance and the airspace minimal cross-sectional area obey a power law relationship similar to  $R \sim (\text{mCSA})^{-1}$ .

**A SURVEY OF CURRENT ENT PRACTICE IN THE ASSESSMENT OF NASAL PATENCY**

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**Aims**

Nasal obstruction is a common complaint in ENT and general practice, with significant economic and quality-of-life impact. Currently, evaluation of the degree and laterality of nasal obstruction is challenging. A variety of patient-reported outcome measures and objective techniques exist for the evaluation of nasal blockage. Patient dissatisfaction following surgery for nasal obstruction is high, highlighting the need for development of this area of clinical practice.

**Method**

We conducted a survey of 78 otolaryngology professionals of world-wide origin, investigating their practice in the evaluation of patients complaining of nasal obstruction.

**Results**

Clinical history and examination are used almost universally. A large majority (73%) also use nasal misting pattern on a metal spatula. The most commonly used objective measure was nasal inspiratory peak flow, with 19% uptake. The most commonly used subjective measure was SNOT-22, used by 29%.

When questioned about the reasons that objective measures were not employed in their clinical practice, 63% responded that this was due to non-availability of equipment. We surveyed opinions as to what would represent an ideal device for measurement of nasal airflow. The feature the respondents ranked highest was “better correlation with symptom scores”; a capability for “separately and simultaneously assessing both nostrils” ranked second.

**Conclusion**

This study provides evidence of that objective evaluation of nasal blockage can be challenging within the time constraints of an outpatient consultation. This is due in part to the lack of a simple and practical, non-invasive device which objectively measures physiological resting nasal breathing, correlating with subjective symptom scores.

ERS16-0044

**FREE PAPER SESSION 21: PREOPERATIVE ASSESSMENT OF RHINOPLASTY PATIENTS AND SELECTION OF PATIENTS FOR SURGERY**

**INTERNAL NASAL VALVE: VALIDATION OF A GRADING SYSTEM**

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**Aims**

The internal nasal valve is the narrowest part of the nasal valve area, and has been widely identified as a source of nasal obstruction. It lies in the coronal plane and is bordered by the head of the inferior turbinate, the caudal part of the upper lateral cartilage and the angle between this structure and the dorsal septum. There is no general consensus on how to define and quantify the degree of internal nasal valve collapse. We propose an endoscopic classification system of the internal nasal valve, based on the degree of the middle turbinate visible, with the study aiming to assess its reliability.

**Method**

This study was designed to assess inter-rater reliability for a grading system of internal nasal valve (INV) collapse. Endoscopic photographs depicting various grades of INV collapse were graded by 9 experienced ENT surgeons, this was for a total of 9 observations. A re-test was performed 4 months later.

**Results**

Inter-rater reliability was determined using Fleiss Kappa calculation. Good agreement was established between the reviewers (i.e. inter-rater reliability), with a Fleiss Kappa of 0.029 ( $p < 0.01$ ). Test-retest reliability was analysed showing a correlation and a high reliability over time.

**Conclusion**

Our proposed INV grading system has been shown to have good inter-rater reliability, and it is simple and easily reproducible. It is a reliable instrument for assessing INV collapse, and can be used as an outcome tool to potentially assess the efficacy of treatment. We hope to validate this tool clinically on patients pre and post surgical intervention.



ERS16-0414

**FREE PAPER SESSION 21: PREOPERATIVE ASSESSMENT OF RHINOPLASTY PATIENTS AND SELECTION OF PATIENTS FOR SURGERY**

**PSYCHOPHYSICS OF NASAL BREATHING: UNDERSTANDING THE CORRELATION BETWEEN MEASUREMENTS AND SENSING OF NASAL OBSTRUCTION**

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**Aims**

Numerous recent publications have been dealing with the correlation of measurements of the nasal airway resistance and the subjective sensing of obstruction. The introduction of logarithmic resistance parameters is necessary as corresponding with the basic laws of psychophysics

**Method**

1580 unilateral measurements by 4-phase-rhinomanometry have been combined with the documentation of the subjective obstruction on a visual analogue scale. The parameters Effective Resistance, Vertex Resistance, their logarithmic derivations as well as the resistances at 150 Pa as used in "classic" rhinomanometry have been correlated by Pearson-correlations with the obtained values on the VAS. All values have been classified in 5 classes of severity. SPSS 21 has been used for the statistical evaluation

**Results**

It could be clearly shown that there are no significant correlations between non-logarithmic values and VAS-values, while all logarithmic resistance values are significantly correlated. The values on the VAS-scale are steadily distributed, while for non-logarithmic values the distribution curve is shifted to the left side. After logarithmic transformation a normal GAUSS-distribution was obtained.

**Conclusion**

To get a correlation between obstruction and sensing the logarithmic resistance values have to be considered instead of non-transformed values. This is also corresponding to the basic law of psychophysics of WEBER and FECHNER, meaning that the sensation of impaired breathing is the sensing of power or load, which was the origin of this law. It states that subjective sensation is proportional to the logarithm of the stimulus intensity. The ground principle of psychophysics must be considered when discussing the relation between subjective and objective parameters

**MP-AZEFLU PROVIDES EFFECTIVE SYMPTOM RELIEF IRRESPECTIVE OF RESPONSE TO PREVIOUS THERAPY IN PATIENTS WITH MODERATE/SEVERE ALLERGIC RHINITIS**

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<sup>1</sup>, Ghent, Belgium

**Aims**

Allergic rhinitis (AR) can be difficult to control. MP-AzeFlu\* comprises azelastine hydrochloride (AZE), fluticasone propionate (FP) and a novel formulation, in a single spray.

\* Dymista

**Method**

3,398 patients (≥12 years old) were enrolled into 3 multicentre, randomised, double-blind, placebo-controlled, parallel-group trials to: MP-AzeFlu\*, AZE, FP or placebo nasal sprays (all 1 spray/nostril bd; same delivery device and formulation), for 14 days during different allergy seasons. The total daily doses of AZE and FP were 548µg and 200µg, respectively. The primary efficacy variable was change from baseline in 12-hour reflective total nasal symptom score (rTNSS; max: 24 points). Patients (n=3394) were categorised according to previous response to intranasal corticosteroids (INS) and antihistamines (AH; either oral or intranasal) *post-hoc* as (i) inadequate (i.e. troublesome symptoms despite treatment) and (ii) not documented as inadequate.

**Results**

MP-AzeFlu\*-patients experienced a significantly greater rTNSS reduction than those treated with FP or AZE, irrespective of their previous response to INS or AH. The MP-AzeFlu\*-FP treatment difference was 3-times greater in those with a documented previous INS failure (-1.54; 95% CI: -2.45, -0.63; p=0.0010) versus those without (-0.58; -1.04, -0.11; p=0.0147). Similarly, the MP-AzeFlu\*-AZE treatment difference was 2-times greater in those with a documented previous AH failure (-1.47; -2.12; -0.81; p<0.0001) versus those without (-0.70; -1.24, -0.16; p=0.0114).

**Conclusion**

MP-AzeFlu\* provides significant benefits over FP and AZE monotherapy whether it is prescribed first- or second-line. A greater advantage over monotherapy was observed in those with a documented previous treatment failure with INS and/or AH.

**RELATIONSHIP BETWEEN SPECIFIC ATOPIC DISEASES AND IN-VITRO ALLERGEN RATES**

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<sup>3</sup>case Western reserve UNiversity School of Medicine, Medical Student, Cleveland- Ohio, USA

**Aims**

Introduction: Multiple allergens may be associated with atopic disease, with large variances in the frequency of positive test results. Although certain antigens are typically found to be more common, there have not been many efforts to correlate the likelihood that a patient with a specific positive test result will have an associated atopic disease.

**Method**

Methods: Positive allergy tests obtained by ImmunoCAP® in-vitro allergy testing were identified from September 2014 until September 2015. A random selection of 1000 patients with positive tests were abstracted to determine whether they had a clinical diagnosis of allergic rhinitis (AR), asthma (AS), atopic dermatitis (AD) or allergic conjunctivitis (AC). Comparisons were made to establish proportional relationships between positive tests and specific atopic diseases.

**Results**

Results: The most common positive antigens were dog, cat, dust mites and June grass. Although the common atopic diseases of AR, AS, AD, AC were more commonly seen in patients who tested positive to these more common allergens, the higher frequency of these diseases was largely due only to the higher frequency of positive tests. When a proportional evaluation was made of positive tests and the likelihood of diagnosed clinical atopic disease, there were some differences in predictive relationships between specific positive tests and clinical atopy. These comparisons of frequency of positive allergy test and clinical atopic disease will be presented.

**Conclusion**

Conclusions: Common allergies are more likely to be associated with the atopic diseases of AR, AS, AD, and AC. Based on proportional relationships specific antigens are more strongly associated than others.

**DIAGNOSIS IN HOUSE DUST MITE ALLERGY: IS A NASAL PROVOCATION TEST NEEDED ?**

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**Aims**

The aim of this investigation was to find out which diagnostic methods in house dust mite allergy (HDM) are necessary to prove the diagnosis.

**Method**

An analysis of 161 patients with assumed HDM-allergy was performed and different testing methods (skin prick tests (SPT), intracutaneous tests (ICT) and allergen-specific IgE levels (sIgE)) were compared to the results of nasal provocation testing (NPT). The analysis included 127 NPTs for *Dermatophagoides pteronyssinus* (DP) and 104 for *Dermatophagoides farinae* (DF). Receiver operating characteristics (ROC curves) were used and the areas under the curve (AUC) were calculated.

**Results**

For DP and DF respectively, 86 and 70 complete data files were available. For both tested HDM, the results of the ROC curves showed a significant correlation for SPT and sIgE with the results of the NPT (AUCs: 0.742 to 0.763) but not for ICT. In patients with a positive SPT ( $\geq 3$ mm), an allergy was confirmed by the NPT in 69% of cases for DP and 71% for DF. A positive sIgE result (ImmunoCAP class  $\geq 2$ ) was verified by the NPT in 69% of cases (DP) and 70% (DF).

**Conclusion**

The predictability value for a positive nasal NPT is best for SPT and sIgE. Nevertheless, even if the results of both test systems are combined, the positive predictive value that is achieved is only 0.77 for DP and 0.69 for DF. Therefore, in patients eligible for immunotherapy for HDM, a nasal provocation test should be performed prior to the start of the therapy to verify a relevant allergy.

**MOLECULAR MECHANISM OF PMA-INDUCED UP-REGULATION OF INTERLEUKIN-33 GENE EXPRESSION AND THE EFFECT OF SHO-SEIRYU-TO ON IL-33 AND HISTAMINE H1 RECEPTOR GENE EXPRESSION**

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**Aims**

Interleukin-33 (IL-33) is an IL-1 family cytokine that has a role in regulating T helper type 2 cytokines and involved in the pathogenesis of chronic inflammations through the induction of eosinophilia. It was shown that serum levels of IL-33 were significantly higher in patients with Japanese cedar (JC) pollinosis than in healthy controls. Moreover, we showed that the IL-33 gene expression level in the nasal mucosa was correlated with the number of blood eosinophils in patients with JC pollinosis. However, very little is known about the pathways that regulate IL-33 expression.

**Method**

In the present study, we examined the molecular mechanism of phorbol 12-myristate 13-acetate (PMA)-induced up-regulation of IL-33 gene expression and the effect of sho-seiryu-to (SST) on IL-33 gene up-regulation in Swiss 3T3, mouse fibroblast cells.

**Results**

Stimulation with PMA but not with ionomycin induced up-regulation of IL-33 gene expression, suggesting the involvement of calcium independent protein kinase C (PKC). Pretreatment with PKC selective inhibitor and HSP90 inhibitor suppressed the up-regulation of IL-33 gene. Extracts from 5 commercially available SST dose-dependently suppressed PMA-induced up-regulation of both IL-33 gene expression in Swiss 3T3 cells and upregulation of histamine H1 receptor (H1R) gene expression in HeLa cells with similar IC<sub>50</sub> values.

**Conclusion**

These results suggest that PKC and HSP90 involved in PMA-induced up-regulation of IL-33 gene expression and that SST had the suppressive effect on both IL-33 and H1R signaling pathways, suggesting that SST could alleviate nasal symptoms of both acute and chronic inflammations in allergic rhinitis.

**PHYSICIAN HEAL THYSELF: BURDEN OF ALLERGIC RHINITIS AMONGST EAACI MEMBERS.**

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**Aims**

Rhinitis is a prevalent condition, affecting individuals irrespective of age, gender, nationality, or occupation. The aim of this survey was to assess the burden of rhinitis amongst EAACI members.

**Method**

668 EAACI members (listed in 2014) completed a digital survey, either in person at the EAACI congress via iPad, or remotely following dissemination of the survey link via e-mail. Delegates answered questions pertaining to (i) type and severity of rhinitis, (ii) symptom episode pattern, (iii) rhinitis-induced absenteeism/presenteeism and (iv) pharmacological management.

**Results**

Most participants had allergic rhinitis (AR; 69.2%). Those with intermittent disease (67.5%) recorded 5 episodes/year, each lasting 7.7 days on average, compared to 6 episodes/year of 20.6 days duration for persistent respondents (32.5%). Over half (58.0%) recorded use of multiple AR therapies, with need for additional nasal (41.1%) and ocular (23.7%) symptom relief, more targeted relief from bothersome symptoms (17.9%) and a more rapid effect (12.5%) driving that behaviour. Respondents remained symptomatic despite treatment, reporting an rTNSS of 6.5/12 and a VAS of 57/100mm when symptoms were at their worst. At that time, none had received MP-AzeFlu\*. Respondents documented an average of 5.8 days absenteeism and 11.9 days productivity loss due to rhinitis. Attributes considered most important from a new rhinitis medication included superior efficacy (47.0%), broad symptom coverage (40.7%) and rapid effect (61.9%).

**Conclusion**

EAACI members are burdened by rhinitis, despite widespread use of multiple medications, a practice not supported by scientific evidence. More effective treatments are needed to better control AR.

\*Dymista

**CHANGES IN IMMUNOLOGICAL PARAMETERS IN SUBLINGUAL IMMUNOTHERAPY FOR ALLERGIC RHINITIS**

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**Aims**

Biomarkers that enable objective evaluation of the clinical effects of allergen immunotherapy for allergic rhinitis have yet to be identified.

**Method**

A large randomized, double-blind, placebo-controlled, multicenter study examining the efficacy of sublingual immunotherapy (SLIT) using Japanese cedar (JC) pollen extract was conducted during two consecutive pollen seasons from 2010 to 2012. 40 patients allocated and enrolled in Chiba University in the study, based on changes in total nasal symptom medication score, patients in the SLIT and placebo groups were subdivided into two subgroups: good responders and poor responders. The levels of JC pollen-specific IL-10<sup>+</sup>Foxp3<sup>+</sup> cells and specific Th2 cytokine-producing cells were measured and the association with the efficacy of SLIT was analysed.

**Results**

The total nasal symptom medication score was significantly lower in the SLIT group compared with the placebo group. The number of JC pollen-specific Th2 cytokine-producing cells increased during the pollen season in the placebo group and in poor responders in the SLIT group; however, the increases were inhibited in the good responders in the SLIT group. The number of JC pollen-specific IL-10<sup>+</sup>Foxp3<sup>+</sup> cells increased only in these good responders.

**Conclusion**

Changes in levels of allergen-specific Th2 cytokine-producing cells and IL-10<sup>+</sup>Foxp3<sup>+</sup> cells could be objective biomarkers for SLIT.

**A RANDOMISED PLACEBO-CONTROLLED TRIAL OF INTRADERMAL ALLERGEN IMMUNOTHERAPY FOR SEASONAL GRASS POLLEN ALLERGY**

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**Aims**

Repeated low dose grass pollen intradermal allergen injection suppresses allergen-induced cutaneous late phase responses, comparable with conventional high dose subcutaneous and sublingual immunotherapy. Aims: To evaluate the efficacy and safety of grass pollen intradermal immunotherapy in allergic rhinitis.

**Method**

93 adults with grass pollen allergic rhinitis were randomised to receive 7 pre-seasonal intradermal allergen immunotherapy injections (containing 7 nanograms of Phl p 5 major allergen) or histamine control. The primary endpoint was daily combined symptom-medication scores during the 2013 pollen season (area under curve). Analysis was by intention-to-treat. Skin biopsies were collected following intradermal allergen challenges and late phase responses measured four and seven, ten or thirteen months post-treatment.

**Results**

There was no significant difference in primary endpoint between treatment arms (active n=46, control n=47, median difference, 14; 95% CI -172.5-215.1; P=0.80). Among secondary endpoints, nasal symptoms were worse in the intradermal treatment group, measured by daily scores (median difference, 35; 95% CI 4.0-67.5; P=.03) and visual-analog scales (median difference, 53; 95% CI -11.6-125.2; P=0.05). Intradermal immunotherapy increased serum Phl p-specific IgE (P=0.001) compared to control. T cells cultured from biopsies showed higher and lower Th2 (P=0.04) and Th1 (P=0.01) cell surface markers respectively, and interleukin-5 was differentially expressed by microarray (P=0.03). Late phase responses remained inhibited seven months after treatment (P=0.03).

**Conclusion**

Grass pollen intradermal allergen immunotherapy was not clinically effective but resulted in immunological priming and worsening of seasonal allergic rhinitis symptoms, with implications for novel immunotherapy strategies that target delivery of allergen to the skin, such as epicutaneous techniques.



**EFFICIENT CLINICAL TRIAL RECRUITMENT USING INTEGRATED WEBSITE AND MEDIA-BASED STRATEGY: EXPERIENCE FROM 2 RANDOMISED CONTROLLED TRIALS**

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**Aims**

Recruitment can represent a major challenge in the success of randomised control trials (RCTs). A Cochrane review reported less than 50% of trials achieve their recruitment target and 53% require extensions. Successful recruitment strategies are not routinely reported. Aim: We tested an integrated website and media-based strategy for recruitment to RCTs.

**Method**

Two separate RCTs of grass pollen immunotherapy were initiated in UK adults with allergic rhinitis in 2011 and 2013 (GRASS and PollenLITE phase II trials). Dedicated websites were developed for each trial encompassing: branding, study information and 7 pre-screening yes/no questions. Accompanying media campaigns advertised the trials, directing participants to relevant websites. Registrants who passed online pre-screening underwent telephone screening before a final screening visit.

**Results**

2579 of 3524 (73%: GRASS) and 1252 of 1660 (75%: PollenLITE) website registrants passed online pre-screening. Of these, 316 (GRASS) and 257 (PollenLite) responded to further communications and then completed additional telephone screening, before attending a full screening visit (228: GRASS, 172: PollenLITE). A total of 114 (GRASS) and 107 (PollenLITE) participants were eligible for randomisation. Experience with recruitment for GRASS trial facilitated improvements in the PollenLITE campaign and screening process, with the result that the entire recruitment target (100) was surpassed within a shorter time window than initially planned (10 weeks) at an overall cost of £321 per randomised participant.

**Conclusion**

A model based on a branded website with online pre-screening to filter registrants, together with linked advertising, can be a highly efficient and successful means for recruiting to RCTs.

**LONG-TERM SUBLINGUAL IMMUNOTHERAPY AND PHENOTYPE OF JAPANESE SEASONAL ALLERGIC RHINITIS.**

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**Aims**

Sublingual immunotherapy, SLIT can change the natural course of AR and is recognized as a curative treatment against type I allergy without impaired performance. In this study, we have examined which phenotype of Japanese seasonal allergic rhinitis could correlate with clinical symptoms during sublingual immunotherapy.

**Method**

We have performed the SLIT for the patients of Japanese seasonal allergic rhinitis for several years, symptom medication scores were observed during the peak of high-pollen season. The levels of cytokines, chemokines, or integrin ligands in the serum were assessed using an ELISA kits or multiple assay kits.

**Results**

The symptom medication scores of the group with the higher levels of IL-21 before SLIT were significant lower than those of the other group in year 1. In the group with the lower levels of serum thymic stromal lymphopoietin, TSLP during the peak of high-pollen season in year 1, the scores were significant lower than those of the other group in year 4. The symptom medication scores of the group with the higher levels of IL-17A during the peak of high-pollen season in year 4 were significant higher than those of the other group in year 4.

**Conclusion**

The phenotype of Japanese seasonal allergic rhinitis classified with the serum levels of IL-21, TSLP, IL-17A could correlate with clinical symptoms during SLIT.

**EVALUATION OF ENDOSCOPIC REPAIR OF SPONTANEOUS CEREBROSPINAL FLUID RHINORRHEA**

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**Aims**

The primary objective was to evaluate the endoscopic repair of spontaneous cerebrospinal fluid (CSF) rhinorrhea and to determine the success rate.

**Method**

A retrospective, clinical study was performed on patients referred to and treated at the Department of Otolaryngology, Head & Neck Surgery, in cooperation with the Department of Neurosurgery, following skull base conference at Copenhagen University Hospital. The following parameters were assessed: Sex, age, BMI, use of CT and/or MRI scan and intra-theca fluorescence in order to determine site and size, method and material used for the repair, recurrence rate and complications.

**Results**

A total of 19 patients with CSF leak were identified from January 2007 to September 2013 of which 11 patients had spontaneous CSF leak. Median age was 53 (range 80-44). Obesity was present in 90.0 % (average BMI, 35.8). Sites included ethmoid sinuses and sphenoid sinuses. Eight CSF leaks (81.8%) were successfully repaired at first attempt. Ten CSF leaks (90.9 %) were successfully repaired at second attempt. One patient was successfully repaired at third attempt. There were no complications in any of the patients either intra- or post-operatively

**Conclusion**

The site of the spontaneous cerebrospinal fluid (CSF) rhinorrhea was identified by using either CT, MRI and/or intra-theca fluorescence in all cases. All sites were repaired endoscopically with a primary repair of 81.8 %.

**CEREBROSPINAL FLUID RHINORRHEA SECONDARY TO IDIOPATHIC INTRACRANIAL HYPERTENSION: LONG-TERM OUTCOMES OF ENDOSCOPIC REPAIRS**

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**Aims**

Endoscopic endonasal repair of cerebrospinal fluid (CSF) rhinorrhea secondary to idiopathic intracranial hypertension (IIH), also known as pseudotumor cerebri or benign intracranial hypertension, has varying success rates from 25-87% with minimal morbidity. However, often these series have relatively short-term follow-up. Given the pathophysiology of IIH, long-term follow up is necessary to identify true CSF leak recurrence rates. Our investigation aimed to evaluate long-term outcomes in endoscopically repaired CSF leaks.

**Method**

Retrospective chart review of all patients with CSF rhinorrhea due to IIH who met inclusion criteria between 1996 - 2009. Outcome measures included: demographics, intracranial pressure (ICP), location of skull base defect, presence of encephalocele/meningoencephalocele, surgical repair technique, treatment with acetazolamide, whether a ventriculoperitoneal shunt (VPS) was inserted, location of recurrence, history of meningitis or prior sinus surgery and duration of follow-up.

**Results**

Thirty-two patients with a total of 44 skull base defects were reviewed over a mean follow-up of 10.2 years. Mean BMI and ICP were 36.8kg/m<sup>2</sup> and 27.7cm H<sub>2</sub>O respectively. Seven patients (18%) required revision surgery at the same or a distant site. We found no statistical significance identifying recurrence risk in the outcome measurements most likely due to our small failure rate. However, early recurrences were noted to recur at the same repair site, whereas late recurrences were noted to recur at a distant skull base site.

**Conclusion**

IIH is an increasingly recognized entity treated by otorhinolaryngologists. We present the first long-term IIH CSF leak repair series. Long-term follow up is necessary as delayed CSF leaks occur in this population.

## SEPTAL FLIP FLAP FOR ANTERIOR SKULL BASE RECONSTRUCTION AFTER ENDOSCOPIC RESECTION OF SINONASAL CANCERS: PRELIMINARY OUTCOMES

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### Aims

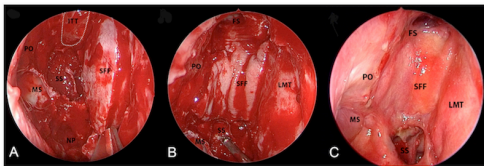
Over the past decade surgery for sinonasal malignancies encroaching into the anterior skull base (ASB) has evolved from open craniofacial resection to the use of minimally invasive endoscopic approaches. Nowadays ASB reconstruction is most often performed in a multilayer fashion with autologous free grafts which leads to the production of abundant nasal crusting in the postoperative months and patients discomfort.

In carefully selected cases we propose harvesting a flap from the contralateral nasal septum based on the septal branches of the anterior and posterior ethmoidal arteries (Septal Flip Flap, SFF), which can be rotated to resurface the ASB defect.

### Method

In our tertiary care referral center, skull base reconstruction using the SFF was performed in four patients; one was affected by ethmoidal teratocarcinoma, one by persistence of sinonasal undifferentiated carcinoma after radio-chemotherapy, another by olfactory cleft esthesioneuroblastoma and the fourth by ethmoidal squamous cell carcinoma.

The exclusion criteria for using the SFF were as follows: cases where the tumor extended on both ethmoid complexes; cases where there was nasal septum or planum sphenoidale involvement by the disease; cases of sinonasal malignant tumor with multifocal histology.



Endoscopic endonasal images of an anterior skull base reconstruction using the Septal Flip Flap (SFF). A) Intraoperative harvesting of the SFF from the septal mucoperiosteum and mucoperichondrium of the left side. It is visible an anterior skull base defect on the right side, extended from the frontal sinus back to the planum sphenoidale. B) The SFF is rotated to resurface the skull base defect at the end of the surgical procedure. C) Post-operative endoscopic control one month after surgery. Legend: SFF, septal flip flap; SS, sphenoidal sinus; FS, frontal sinus; PO, periorbit; MS, maxillary sinus; ITT, iliotibial tract; NP, nasopharynx; LMT, left middle turbinate; the white dotted line in A indicates the boundaries of the anterior skull base defect.

### Results

Successful skull base reconstruction was obtained in all four cases without any intra or post-operative complications. Currently no recurrences of disease have been observed after a mean follow-up of 19 months.

### Conclusion

The SFF proved to be a safe and effective technique for ASB reconstruction with high success rates similar to those obtained with other pedicled flaps. Larger case series are needed to validate the preliminary results obtained.

**THE USE OF COLLAGEN MATRIX COATED IN FIBRINOGEN AND THROMBIN AS AN ADJUNCT TO ANTERIOR SKULL-BASE CSF-LEAK REPAIR: OUR 5 YEAR EXPERIENCE**

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**Aims**

TachoSil® is a topical haemostatic agent which is increasingly used in epidural neurosurgery. We review our 5 year experience of TachoSil® as an adjunct in endoscopic repair of cerebro-spinal fluid (CSF) leaks.

**Method**

Data was prospectively collected for outcomes over 5 years (Sept 2010 – Sept 2015); in addition to type of repair, indication, approach and type of tissue transfer. Persistent leak-rate, thrombo-embolic events and other complications were recorded.

**Results**

Forty-eight endoscopic CSF leak repairs were carried out using the adjunct TachoSil® in 41 patients. The locations of the skull-base defects included: frontal = 6, olfactory fissure = 7, ethmoidal roof = 28 and peri-sphenoid = 17 (*some defects involved multiple sites*). In addition to free grafts, 41 repairs utilised a pedicled-flap (34 Hadad-Bassagaisteguy, 3 inferior-turbinate, 3 middle-turbinate, and one peri-cranial flap). Seven patients had persistent or recurrent CSF leaks post-operatively (15%). No leaks were observed in patients repaired just with TachoSil® and an onlay graft. Complications post-operatively included a pulmonary embolus (likely unrelated), and an epileptic fit (2%). Follow-up duration ranged from 0 – 60 months (average of 27 months).

**Conclusion**

The authors found TachoSil® especially useful to reduce residual leak-rate in cases where an intracranial, intradural underlay technique was not possible or as a rescue procedure. Low rates of complications or side effects demonstrated in this study on medium to long term follow-up further make this an attractive tool for rhinologists to utilise in the operating theatre. Large scale, randomised trials are needed before efficacy or cost-effectiveness can be fully evaluated.

**INTRANASAL SODIUM FLUORESCEIN USE IN CSF LEAKS DETECTION AND REPAIR**

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**Aims**

The use of intrathecal fluorescein injection is a proved valuable tool in endoscopic endonasal perioperative detection and closure of CSF leaks. Nevertheless, the method is not widely accepted because of the possible complications and needs a lumbar puncture trauma.

We would like to report the topical use of sodium fluorescein as a simple, secure and sensitive method to detect CSF rhinorrhea, either under local anesthesia or intraoperatively to localize it and check the closure sealing. **Method**

The sensitivity of topical fluorescein use for CSF leaks detection is illustrated in 3 clinical cases of suspected cerebrospinal rhinorrhea, either preoperatively, postoperatively or during the follow up. To prove the absence of false positive reactions with blood we used topical fluorescein at the end of 11 complete FESS cases.

**Results**

The fluorescein used intranasal permitted us to localize the skull base defect in 2 cases; the closure tightness was also checked by applying locally the solution. In one case the same method excluded the CSF leak, thus being confirmed clinically during the follow-up.

In all 11 cases of our control study the fluorescein test was negative, proving its sensitivity and specificity.

**Conclusion**

We consider that intranasal use of Sodium Fluorescein Solution is a costless tool and it might represent an alternative to intrathecal injection or beta-2 transferin biochemical detection. The method is simple, secure and sensitive and can be use under general anesthesia but also for an out-patient.

The method can be suitable also for young surgeons in case of skull base integrity doubts during FESS.

**THE ROLE OF FRONTAL SINUS DRAF PROCEDURES IN ENDOSCOPIC FRONTOETHMOID DURA REPAIRS**

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**Aims**

Frontal sinus Draf procedures gradually enable a wider opening to the frontal sinuses, improving endoscopic ease to access and manipulate around dura lesions, as well as leaving an adequate drainage postoperatively. In this study, we investigated the role of Draf procedures in endoscopic management of frontoethmoid CSF fistulas and postoperative frontal sinus drainage patency.

**Method**

During a 12-year period, 167 patients who underwent frontoethmoid duraplasty were evaluated for intraoperative requirement for Draf procedures; postoperative duraplasty success; postoperative frontal sinus drainage and recess patency for  $\geq 6$  months in follow-ups; and postoperative requirement for frontal sinus surgery and Draf procedures.

**Results**

Watertight sealing was achieved in all patients also at frontal sinuses. In 43 patients, type IIB(19 patients) or III(31 patients) drainage was needed during the initial surgery for dura repair and sinus ventilation, and among them only 5(4 type IIB, 1 type III) patients required revision surgery for obstructive frontal drainage problems during the first 6 month follow-ups. Among the rest 127 patients who did not required frontal floor drilling initially, 11 developed obstruction of frontal sinus drainage due to over healing in the first 6 months and required type IIB(4 patients) or III(7 patients) drainage with revision surgery, after which they had no more problems.

**Conclusion**

Frontal sinus Draf procedures, especially types IIB and III drainage, are important adjuncts in the endoscopic management of CSF rhinorrhea. When necessary, they do not only extend the applicability of endoscopic duraplasty techniques into the frontal sinus, but also help manage and reduce postoperative inflammatory complication rates.



**ENDONASAL ENDOSCOPIC REPAIR OF CSF LEAK RHINORRHEA: AN 18-YEAR EXPERIENCE. WHAT HAVE WE LEARNED?**

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**Aims**

We present a retrospective evaluation of our experience with endoscopically guided repair of rhinorrhea over an 18-year period. The evaluation focused on risk factors contributing to the recurrence of CSF leaks in patients previously operated for rhinorrhea.

**Method**

320 patients were included in the study. The evaluation was based on chart review, interview concerning CSF rhinorrhea, statistical analysis to reveal the risk factors of CSF leak recurrence.

**Results**

320 patients, aged 3-79 yo, had a mean age of 48,3±10,7 y.o. There were 163 (50,94 %) spontaneous leaks (mostly obese women with BMI=39,5±6,7; high ICP and accompanying pathology); 69 (21,56 %) iatrogenic, most common after meningioma neurosurgeries (4 children after PCF neurosurgeries); and 88 (27,5%) traumatic CSF leaks.

275 patients (85,9%) were successfully treated endoscopically at first approach, 45 underwent endoscopic revision; 19 posttraumatic patients (5,9%) required neurosurgeries.

We didn't find association recurrences with: size defect, its localisation; material was used for plastic and type of glue; furthermore we didn't see the necessity in lumbar shunting, which was traditionally used in our Institute.

Recurrence of CSF leak was associated with: failure of locating the initial CSF leak during the surgery ( $p=0,01$ ); patients with high ICP. We are also able to show that the surgeries performed by more experienced surgeons had a higher success rate ( $p=0,02$ ).

**Conclusion**

CSF rhinorrhea is successfully treated endoscopically. But accurate pre-op diagnosis and intraoperative localizing CSF leakage; meticulous preparation of recipient bed and grafting is needed for achieving better results. The results are much better when performed by experienced surgeons.

**A PURELY SYNTHETIC AND BIODEGRADABLE MATERIAL FOR REPAIR OF CSF RHINORRHOEA**

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**Aims**

TissuePatchDural (TPD, previously known as OBEX) is a purely synthetic and biodegradable material with an adhesive surface. It has a multi-laminated structure containing patented reactive polymers providing fast and strong chemical bonding of the patch with the underlying biological surface.

**Method**

TPD was used for endoscopic repair of Cerebrospinal fluid (CSF) rhinorrhoea in four patients. The site of a leak was identified pre-operatively using radiological investigations. Surgical technique, postoperative complications and outcomes were analysed.

**Results**

The size of the bony defects ranged from 4 to 20 mm. None of our patients had postoperative CSF leakage. No postoperative complications or foreign body reactions were observed. The follow-up period ranged from 21 to 39 months.

**Conclusion**

The use of TPD for CSF rhinorrhoea repair is a novel technique. It reduces the morbidity associated with harvesting of autologous grafts and shortens the operating time. The inherent adhesive properties and transparency of this sealant film makes the surgical handling and placement easier. This is the first case series reporting endoscopic endonasal use of TPD in the published literature of patients who have been treated for CSF rhinorrhoea. This article is protected by copyright. All rights reserved.

**A CASE SERIES OF ENDOSCOPIC NASOPHARYNGECTOMY FOR UNDIFFERENTIATED NASOPHARYNGEAL CARCINOMA**

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**Aims**

Undifferentiated nasopharyngeal carcinoma is endemic in our locality with primary treatment involving radiotherapy +/- chemotherapy. Surgical salvage is typically through fairly invasive approaches including the maxillary swing. Here we review our minimally invasive experience, utilizing endoscopic nasopharyngectomy in treating locally recurrent nasopharyngeal carcinoma.

**Method**

A retrospective case series review of endoscopic nasopharyngectomy for undifferentiated nasopharyngeal carcinoma at The Chinese University of Hong Kong.

**Results**

Eighteen patients underwent an endoscopic nasopharyngectomy. Demographically, the majority were male (n=11, 61.1%), recurrent disease (n=14, 77.8%), recurrent/persistent T1 (n=15, 83.3%), had initial primary radiotherapy alone (n=7, 38.9%). The mean age at recurrence was 51.8 years old (median 49.5, range 26.0 – 79.0). Intraoperatively, the majority had no need of an antrostomy (n=8, 44.4%), had resection of the prevertebral muscle (n=11, 61.1%) and a nasoseptal flap coverage (n=13, 72.2%). The mean length of surgery was 542 minutes (range 231 – 800), mean estimated blood loss of 508ml (range 100 – 1600). Postoperatively the mean length of stay was 12.7 days (2 – 46 days). Fifteen patients had negative margins. Osteoradionecrosis was the most common complication occurring in eight patients (44.4%). Local recurrence occurred in one patient. Mean followup was 22.0 months (median 21.3 months) with 2 year disease free survival and overall survival of 90% and 100% respectively.

**Conclusion**

Endoscopic resection of recurrent undifferentiated nasopharyngeal carcinoma occurs with low surgical morbidity. However, further long term evaluation with longer follow-up data is needed to evaluate if the survival data is comparable or better than open approaches

**PITUITARY SURGERY AND VOLUMETRIC ASSESSMENT OF EXTENT OF RESECTION: A PARADIGM SHIFT IN THE USE OF INTRAOPERATIVE MRI**

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**Aims**

To quantitatively assess the role of intraoperative high field 3 Tesla MRI (3T-ioMRI) in improving gross total resection rate (GTR) and extent of resection (EOR) in endoscopic transsphenoidal (TSS) surgery for pituitary adenomas.

**Method**

Volumetric measurements of adenoma volumes pre-, intra- and 3 months postoperatively were performed in a consecutive series of 50 patients undergoing TSS. The quantitative contribution of 3T-ioMRI was measured as a percentage of the additional rate of GTR and of EOR achieved after 3T-ioMRI.

**Results**

Mean adenoma diameter and volume were 21.1 mm and 5.23 cm<sup>3</sup> respectively. GTR was the surgical goal in 34/51 operations (tGTR) and was achieved initially in 16/34 at the 3T-ioMRI and in 30/34 patients (88%) after further resection. In this subgroup of patients EOR increased from 91% at 3T-ioMRI to 99% at the 3-months MRI (p<0.05). In 17/51 patients with planned subtotal resection (tSTR), EOR increased from 79% to 86% (p<0.05) and GTR could be achieved in one patient. Overall the use of 3T-ioMRI led to further resection in 27/51 patients (53%) and permitted achieving GTR in 15 of these 27 patients (56%) and thus to increase the GTR rate in the entire cohort from 16/51 (31%) to 31/51 (61%) patients and EOR from 87% to 95% (p< 0.05).

**Conclusion**

The use of high definition 3T-ioMRI allows precise visualization and quantification of adenoma rests volume. It helps to increase GTR and EOR rates in both tGTR and tSTR patient groups. Moreover it helped to achieve low rates of intrasellar remnants

**ENDOSCOPIC VERSUS OPEN SURGERY FOR SINONASAL MALIGNANCIES: MAYO CLINIC EXPERIENCE**

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**Aims**

Background: Due to the rare occurrence of sinonasal malignancies, as well as the more recent adoption of endoscopic techniques, differences in outcomes between the external and endoscopic resection for these cancers are not yet definitively established.

Objective: To study overall and disease-free survival in patients undergoing endoscopic versus external resection for sinonasal malignancies.

**Method**

A retrospective chart review was conducted. Patients with sinonasal malignancies treated surgically at Mayo Clinic, Arizona from 1996-2015 were studied to compare outcomes between endoscopic and external resection techniques.

**Results**

One hundred fourteen patients with sinonasal malignancies underwent surgical resection at Mayo Clinic, Arizona during the study period. Endoscopic techniques were first employed for resection in 2008. The median age of patients was 66.2 years (range, 20.6-95.0 years). Gender distribution was similar (54 males and 60 females). Twenty-seven patients (23.7%) underwent purely endoscopic resection and 87 patients (76.3%) underwent open resection. The majority of patients had T4 disease (61 patients, 53.5%) and of these, 15 patients underwent endoscopic and 46 patients underwent external resection. Median follow-up for surviving patients was 34.7 months (6.9 months - 60.6 months) for the endoscopic group and 74.3 months (0.2 months - 200.2 months) for the external group. Five-year overall survival was similar: 49.3% in the endoscopic group and 55.3% in the external group ( $p=0.3164$ ). Five-year disease-free survival was also similar: 63.2% in endoscopic group and 51.9% in the external group ( $p=0.5445$ ).

**Conclusion**

Using appropriate selection strategy, overall and disease-free survival was similar for external versus endoscopic resection of sinonasal malignancies.

## THE RADIOANATOMY OF ENDONASAL FLAP COVERAGE OF SKULL BASE DEFECTS: A TOOL FOR PREOPERATIVE PLANNING

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### Aims

To develop a tool for the calculation of surgical skull base defect (SSBD) and endonasal flap dimensions on pre-operative CTs in order to aid surgical planning.

### Method

A literature search was conducted to identify all endonasal flaps. There were five basic models identified. There are the nasoseptal flap (NSF), anterior lateral nasal wall flap (ALNW), bipediced anterior septal flap (BAS), posterior pedicled inferior turbinate flap (PPITF) and middle turbinate flap (MTF). Publications on the radioanatomy of endonasal flaps and SSBDs were also identified. Using these descriptions as a reference, 46 radioanatomic variables were measured on CT scans obtained from 60 pre-operative endonasal skull base surgery patients. These were then used to model endonasal flap coverage of six SSBDs: transfrontal, transcribriform, transplanar, transsellar, transsphenoidal and transclival.

### Results

		BAS				ALNW				NSF				PPITF				MTF			
		Adequate flaps	Cases	%	SE	Adequate flaps	Cases	%	SE	Adequate flaps	Cases	%	SE	Adequate flaps	Cases	%	SE	Adequate flaps	Cases	%	SE
Transfrontal	Height	2	57	49.30	3.06	109	110	159.80	2.81	0	56	71.37	1.04	2	110	75.22	0.94	64	108	117.44	4.08
	Width	1	59	60.56	2.01	82	118	111.44	1.95	60	60	188.15	3.88	82	118	111.44	1.95	42	113	96.90	2.53
Transcribriform	Length	1	59	76.16	1.14	116	116	136.87	1.28	44	59	108.25	1.28	104	116	113.87	1.13	33	114	89.92	1.78
	Width	1	59	60.56	2.01	116	118	189.10	3.36	56	60	128.94	2.39	116	118	189.10	3.36	46	113	94.54	2.11
Transplanar	Length					78	114	107.02	1.15									2	112	63.79	1.44
	Width					115	116	188.35	3.14									45	113	94.39	1.93
Transsellar	Length					7	114	83.39	0.77									0	112	46.13	0.97
	Width					115	116	188.35	3.14									45	117	92.79	2.20
Transsphenoidal	Length (vertical placement)									14	58	91.24	3.03	39	115	96.66	2.45				
	Width (vertical placement)									58	59	212.66	4.65	116	116	192.95	2.10				
	Length (horizontal placement)									116	116	173.74	4.32	114	116	162.03	3.95				
	Width (horizontal placement)									49	58	109.05	1.03	104	115	115.18	1.20				
Transclival (Pinheiro-Neto)	Height									116	116	327.87	5.48	115	115	181.19	2.55				
	Width (upper)									53	58	117.18	1.72	116	116	207.48	2.75				
	Width (mid)									47	58	107.39	1.39	116	116	190.22	2.26				
	Width (lower)									19	58	97.05	1.43	116	116	185.93	2.61				
Transclival (Peris-Celda)	Width (plane 1 position A)									38	57	111.72	3.03	112	112	213.68	5.03				
	Width (plane 1 position B)									0	56	56.12	1.28	88	110	118.37	2.34				
	Width (plane 1 position C)									0	88	55.90	0.92	82	88	127.20	2.14				
	Width (plane 2 position A)									30	57	104.02	3.21	112	112	196.86	4.12				
	Width (plane 2 position B)									0	57	54.36	1.26	83	112	114.63	2.25				
	Width (plane 2 position C)									0	110	48.19	1.01	68	110	109.67	2.24				

Adequate flaps: number of cases in which the modelled flap adequately covered the skull base defect. %: percentage coverage of skull base defect by flap. SE: standard error.

### Conclusion

The NSF provides adequate coverage for most SSBDs. The PPITF is an excellent alternative, and provides better coverage of posterior skull base defects. The ALNW is the best choice for transfrontal defects. The MTF and BAS flaps provide secondary options when the larger flaps are not available. We have developed a simple tool for the calculation of endonasal flap coverage of SSBDs.

**SAFETY AND EFFICACY OF ENDOSCOPIC ENDONASAL APPROACH FOR ESTHESIONEUROBLASTOMA: JAPAN MULTICENTER STUDY**

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**Aims**

To illustrate the utility of multilayer resection of olfactory neuroblastomas via endoscopic approach in Japan

**Method**

A retrospective case series of 31 patients with olfactory neuroblastomas treated between 2008 and 2015 using endoscopic endonasal techniques was investigated. Patients' baseline characteristics, stage, post-operative complications, pathological margin, occurrence of metastasis and survival were examined.

**Results**

Mean age of patients at presentation was 51.7 years. Sixteen patients were females and 15 patients were male. Kadish staging at presentation was: A – 4 patient, B – 5 patients and C – 22 patients. The period of follow-up ranged from 3 months to 92 months. No post-operative complications were identified in all cases. Pathological margin studies revealed margin-free in 30 patients and margin-positive in 1 patient (Kadish C, T2, Hymas II). In this margin-positive case, tumor invasion was found in the margin of the dura matter. No recurrence or metastasis was found. As for Hymas Grade, 3 patient showed Grade I, 24 patients showed Grade II and 4 patients were Grade III. During the observation period, metastasis was found one patient, but all patients were survival.

**Conclusion**

Endoscopic endonasal surgery for olfactory neuroblastomas is a safe and efficacious technique. However, intraoperative margin study should be done carefully. Future studies are required to determine prognostic factors for recurrence and to develop adjuvant therapy.

**SINONASAL AND PERIOPERATIVE MORBIDITY FROM A MODIFIED NASOSEPTAL FLAP IN PITUITARY SURGERY****G. Oakley<sup>1</sup>, J. Christensen<sup>1</sup>, M. Winder<sup>2</sup>, A. Davidson<sup>3</sup>, B. Jonker<sup>2</sup>, T. Steel<sup>2</sup>, R. Harvey<sup>1,3</sup>**

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**Aims**

Although sella reconstruction can be achieved with several techniques, the potential for CSF leak during pituitary surgery often affects surgeon aggressiveness and tumor removal. A modified nasoseptal flap(NSF) is employed routinely to assist sella reconstruction and alleviate reconstruction concerns. The impact of NSF on both perioperative morbidity and sinonasal function is assessed.

**Method**

A retrospective cohort study of consecutive patients undergoing endoscopic pituitary surgery with or without NSF for reconstruction, with at least 6 months follow-up, was performed. Perioperative complications (CSF leak, meningitis, other intracranial infection, intracranial bleed, epistaxis, and need for extra debridement) and long-term complications (atrophic rhinitis, persistent crusting, sinus dysfunction, delayed CSF leak, and ascending meningitis) were recorded. Sinonasal outcome test 22 (SNOT22) and nasal symptoms score (NSS) were used. Olfactory discrimination scores (SIT40) were assessed pre and post-surgery.

**Results**

151 patients (49.7% female, 53.1 ± 16.5yrs) were assessed consisting of smokers(18.5%), asthmatics(6.0%), adjuvant radiation(2.6%), and revision(21.9%). Sella reconstruction included NSF(n=118) and none/free grafts(n=33). NSF groups were similar in age, gender, and adjuvant radiation. Perioperative events were similar including CSF leak(5.3%), meningitis(0.7%), other intracranial infection(0.7%), intracranial bleed(1.3%), epistaxis(6.0%), and need for debridement(0.0%). The only long-term complication was persistent crusting (0.7%). Sinonasal function was similar after surgery in the NSF group, NSS(0.55± 0.68 v 0.62± 0.73, p=0.49) and SNOT22(1.0± 0.80 v 0.87± 0.77, p=0.14). Olfactory discrimination differed by only 0.97points(32.1± 4.3 v 31.1± 5.4, p=0.04).

**Conclusion**

The use of a modified NSF provides a robust reconstruction option without significant impact on sinonasal function.



**PATHOLOGICAL ASSESSMENT OF ENDOSCOPIC COMPARTMENT SURGERY FOR INTESTINAL ADENOCARCINOMA OF THE OLFACTORY CLEFT**

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**Aims**

Aims of the present study were to report the pathological features of each compartment and to assess the impact of tumoral extension in these compartments on oncological outcomes.

**Method**

Retrospective study between 2004 and 2014 including all patients treated by endoscopic surgery for an intestinal adenocarcinoma (ITAC) of the olfactory cleft. Two types of endoscopic surgeries were performed: ethmoidal resection with olfactory cleft exenteration (ERwOC) or ethmoidal resection with intracranial resection (ERwICR). Two independent pathologists examined the specimens of each compartment: olfactory cleft, ethmoidal labyrinth and anterior cranial fossa, and classified them into 3 categories: without, or with focal or massive invasion.

**Results**

Sixty-seven patients with nasal ITAC (mean age 69.4±9.6 years, age range: 44-84 years) were included. The mean follow-up was 35.2 ± 28.8 months (range: 3.6-117.4 months). Prognostic factors for recurrence and specific death were advanced tumor staging and perineural and vascular invasion. No patient with a focal invasion of the olfactory cleft, even those who were not treated with adjuvant radiotherapy, presented a recurrence or a disease-related death. Patients with massive invasion of any one of the compartment (OC, ethmoidal labyrinth, anterior cranial base) had a high risk of recurrence and specific death.

**Conclusion**

Pathological assessment of compartment endoscopic endonasal surgery of nasal ITACs confirms the usefulness of the olfactory cleft exenteration approach.

**PROGNOSTIC VALUE OF PRETREATMENT PERIPHERAL BLOOD MARKERS IN PATIENTS WITH PARANASAL SINUS CANCERS: NEUTROPHIL-LYMPHOCYTE RATIO AND PLATELET-LYMPHOCYTE RATIO.**

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**Aims**

Pretreatment hematological markers have emerged as prognostic factors for patients with cancers. The aim of the study is to investigate the value of neutrophil-lymphocyte (NLR) and platelet-lymphocyte ratio (PLR) in predicting mortality and recurrence in patients with primary sinonasal and skull base cancers (SBC).

**Method**

A retrospective review of patients with SBC treated through endoscopic approaches from 2002 to 2014 at the University of Insubria, Varese, Italy, was performed. The cut-off points of NLR and PLR for overall survival (OS) and disease-free survival (DFS) were determined by receiver-operating characteristic (ROC) curves. The Kaplan–Meier method and log-rank test were adopted to calculate DFS and OS. The Cox regression was used for multivariate analysis.

**Results**

Among the 365 patients treated, 215 (41%) fulfilled the inclusion criteria. The ROC curves shown that the optimal cut-off levels on OS were 5.56 and 162 for NLR and PLR, respectively, while on DFS they were 2.6 and 156.9, respectively. On univariate analyses, there was a statistically significant tendency toward shorter OS and DFS for patients with higher NLR and PLR when analyzing epithelial tumors (adenocarcinoma group and carcinoma) and in advanced-stage tumors (pT3-T4). Finally, in multivariate analysis, the NLR and PLR resulted to be as independent prognostic factors for DFS but not for OS with reduced risk of recurrences for patients with NLR<2.6 (HR=0.39, p=0.02) and PLR<156.9 (HR=0.34, p=0.001).

**Conclusion**

High pretreatment NLR and PLR were associated with poor prognosis in patients affected by epithelial SBC, especially for advanced stages.

**ENDOSCOPIC NASOPHARYNGECTOMY FOR RECURRENT NASOPHARYNGEAL CARCINOMA: A REVIEW OF 71 PATIENTS AND PROGNOSTIC FACTORS.**

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**Aims**

The purpose of this study was to evaluate the efficacy of endoscopic nasopharyngectomy in the management of recurrent nasopharyngeal cancers (NPC) and to identify prognostic factors.

**Method**

Between January 2006 and March 2014, 71 patients who received endoscopic nasopharyngectomy for recurrent NPC were retrospectively reviewed.

**Results**

The median age of 71 cases of recurrent nasopharyngeal carcinoma patients was 51.0 years. Male to female ratio was 2.9: 1. The lesions were staged as follows: rT1, 27; rT2, 10; rT3, 19 and rT4, 15. All patients underwent successful endoscopic nasopharyngectomy. No one was transferred to open approach. The mean operative time was 155 minutes. Three patients need intraoperative blood transfusion. No serious postoperative complications occurred. Postoperative follow-up time was 5-96 months. During follow-up, 48 cases survived, including that 7 patients survived with disease, 1 patient had pulmonary metastases, and 1 case had cervical lymph node metastasis. Two-year overall survival and disease-free survival rates were 74.0% and 60.5%, respectively. Five-year overall survival and disease-free survival rates were 39.0% and 31.9%, respectively. Multivariate analysis showed that tumor necrosis was an independent prognostic factor for survival in recurrent nasopharyngeal carcinoma patients.

**Conclusion**

Endoscopic nasopharyngectomy is a safe and effective procedure for treatment of recurrent nasopharyngeal carcinoma. It has a better result for rT1 cases and lesions involved with the superficial part of the parapharyngeal space (rT2) or the base of the sphenoid sinus (rT3). But a large number of cases with a longer follow-up are needed to evaluate the effect of endoscopic nasopharyngectomy.

**ENDOSCOPIC TRANSMAXILLARY TRANSPTERIGOID CORRIDOR ACCESS TO THE SKULL BASE. PRACTICAL SURGICAL LANDMARKS AND RADIOLOGICAL CORRELATIONS**

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**Aims**

With technological developments, the extended endoscopic approach to the deep regions and midline structures of the skull base is becoming a proved method. But the complexity of anatomical elements and their relations need sustained training, knowledge of critical landmarks and specific equipment.

Our aim is to illustrate the usefulness of transmaxillary transpterygoid corridor in reaching these regions, by presenting the important anatomical landmarks with radiological correlations and their clinical utility.

**Method**

The endoscopic corridor anatomy is illustrated in fresh cadaver head dissections with navigation system correlation. Vicinity relations of the structures and their landmarks are described for the posterolateral part of the sphenoid sinus, cavernous sinus, clivus, upper parapharyngeal area and pterygopalatine fossa.

**Results**

Our dissections confirmed the vidian nerve canal as a stable landmark for Internal Carotid Artery and cavernous sinus identification, the infraorbital bundle utility for reaching foramen rotundum, the lateral pterygoid muscle relation with middle meningeal artery and foramen ovale and the Eustachian tube, longus capitis muscle, tensor and levator veli palatine muscles relations with upper parapharyngeal Internal Carotid Artery and jugular foramen.

**Conclusion**

Repeated training sessions are mandatory to understand the complex anatomy of these regions and to identify crucial landmarks in order to facilitate complete surgical resection and to prevent complications. The four hands technique improves the approach but needs a learning curve for both surgeon's movement correlations. Specific equipment is necessary for a better local control. Nevertheless, this approach needs an important clinical experience, cadaveric specimens falling short of real pathological conditions.

**VARIANTS OF TRI-ALLELIC SEROTONIN TRANSPORTER GENE-LINKED POLYMORPHIC REGION (5-HTTLPR) IN PATIENTS WITH CHRONIC TENSION-TYPE MID-FACIAL PAIN**

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**Aims**

Patients with chronic mid-facial pain in the absence of other rhinological symptoms commonly have normal nasal endoscopic findings and a normal sinus computed tomogram.

Recent evidence suggests that chronic mid-facial tension-type pain may be due to reduced discharge of central serotonergic pain-modulating neurons that project to the lower centres in the brainstem and spinal cord. One possible cause of reduced discharge is malfunction of the serotonin transport protein that takes up serotonin from the extracellular fluid in the central nervous system into the serotonergic neuron. The tri-allelic serotonin transporter gene-linked polymorphic region (5-HTTLPR) is associated with two main allelic variants. The long variant (LL) exhibits normal uptake activity while individuals homozygous for the short allele (SS) show significant reduction in serotonin uptake into the neuron. The heterozygote (LS) exhibits intermediate activity.

Aim: This study aimed to determine the frequency of these allelic variants in patients with chronic tension-type facial pain.

**Method**

Method: Fifty patients with chronic persistent tension-type facial pain according to previously established criteria who were unresponsive to amitriptyline were genotyped for the 5-HTTLPR by blood analysis using the Polymerase Chain Reaction (rs25531) for the allelic variants. Similar typing was carried out on fifty age- and gender-matched pain-free controls.

**Results**

Results: Sixty per cent of patients with chronic pain exhibited the intermediate-activity LS heterozygote while 40% had the LL allele. None of patients were homozygous for the SS allele.

**Conclusion**

Conclusion:

This study provides evidence that descending serotonergic malfunction may play a role in the aetiology of chronic mid-facial tension-type pain.

**IS FACIAL PAIN A PRESENTING FEATURE OF CHRONIC RHINOSINUSITIS AFFECTING THE FRONTAL SINUS**

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**Aims**

There is a poor evidence base to inform surgeons as to specific symptoms associated with frontal sinus disease. We aimed to assess the correlation between facial pain and radiological evidence of chronic rhinosinusitis affecting the frontal sinus.

**Method**

An analysis of patients attending the rhinology clinic was conducted. Inclusion criteria were adult patients with a clinical diagnosis of chronic rhinosinusitis according to EPOS criteria who had SNOT-22 scores and CT scans available. Each CT scan was scored according to the Lund-Mackay staging system for disease severity. Total Lund-Mackay scores and the scores for each individual sinus and osteomeatal complex were recorded. SNOT-22 questionnaires obtained for each patient. In particular the facial pain symptom score for each patient was recorded.

**Results**

58 patients had an abnormal SNOT-22 score and were included in the study. Their average SNOT-22 score was 54.33. 13 patients scored themselves as 0 out of 5 in the facial pain domain. The average SNOT-22 for this group was 36.85 whilst those scoring 1 or more out of five had an average SNOT-22 of 61.77.

	Lund-Mackay score of 0 in right and left frontal sinuses	Lund Mackay score of greater than 0 in left or right frontal sinus
Total number of patients	27	31
Mean SNOT-22	57.30	51.74

**Conclusion**

Our study shows that there is a poor correlation between radiological evidence of CRS and levels of facial pain. It is therefore important that decision making regarding the surgical management of frontal sinus disease is made carefully and on an individual patient basis

## RHINITIS SYMPTOMS PREVALENCE AND RISK FACTORS IN CHILDREN AND ADOLESCENTS IN HONG KONG

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### Aims

The aim of this study was to investigate the prevalence and risk factors of rhinitis in children and adolescents in Hong Kong.

### Method

A cross-sectional survey utilizing a modified Chinese version of The International Study of Asthma and Allergies in Childhood (ISAAC). Statistical analyses and graphical representations were performed with SPSS 20.0 software (SPSS, Chicago, IL).

### Results

6,421 subjects completed the survey. Rhinitis symptoms were present in 3,597 (56.3%) and rhinoconjunctivitis in 2,049 (31.2%) of the population, in those with rhinitis symptoms 62.0% had conjunctivitis symptoms. Univariate analysis showed that having pets odds ratio (OR) 1.19 (95% CI 1.05 – 1.35), ceiling or wall mold OR 1.44 (95% CI 1.29 – 1.61), asthma OR 2.64 (95% CI 2.08 – 3.35), bronchitis OR 3.44 (95% CI 2.89 – 4.09), eczema OR 1.91 (95% CI 1.59 -2.28), food allergy OR 1.97 (95% CI 1.61 – 2.42), familial allergic history OR 2.33 (95% CI 2.11 – 2.58) were significant risk factors. Multivariate analysis showed that bronchitis OR 2.61 (95% CI 2.17 – 3.15), eczema OR 1.25 (95% CI 1.03 – 1.52), food allergy OR 1.37 (95% CI 1.10 – 1.70), history of familial allergy OR 2.04 (95% CI 1.83 – 2.27), having pets OR 1.16 (95% CI 1.01 – 1.33) and ceiling or wall mold OR 1.34 (95% CI 1.19 – 1.51) were significant risk factors.

### Conclusion

Rhinitis symptoms are common in children and adolescents. A diagnosis of and family history of allergic diseases are significant risk factors for rhinitis symptoms in this population.

**A SYSTEMATIC REVIEW OF RHINITIS IN THE ELITE ATHLETES AND EXERCISE-INDUCED CHANGES IN THE NASAL AIRWAY**

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**Aims**

Rhinitis has clear potential to limit athletic ability with its proven detrimental effects in sleep, mood, and association with asthma. Many exercise environments for athletes are irritant to the nasal mucosa – e.g. cold air, chlorinated water, or outdoors with exposure to aeroallergens, nitrous oxide, and pollution. There is little published evidence specific to rhinitis in the athletic population, with widely varying estimates of frequency. The aim of this systematic review was to examine the changes in nasal airway and prevalence of rhinitis in athletes; to compare land based and aquatic athletes; and to compare rhinitis phenotypes by subgroup.

**Method**

MEDLINE and EMBASE databases were systematically searched, including all studies of athletes (performing more than six hours exercise per week) which examined the effects on the nasal mucosa or the prevalence of rhinitis.

**Results**

total of 19 studies were identified. 7 studies included objective measurements: mucociliary transport time, peak nasal inspiratory flowmetry, acoustic rhinometry, nasal cytology, and cilia beat frequency. Variability in methodology precluded meta-analysis. Overall, prevalence of rhinitis in elite athletes ranged from 6.2 – 42%. When analysed by subgroup, land-based athletes did not have an increased prevalence of rhinitis, whether allergic or non-allergic. However, up to 74% of swimmers demonstrated rhinitis, predominantly of the non-allergic variant. Equally, a large proportion (48.6%) of cold-air exercisers demonstrated non-allergic rhinitis

**Conclusion**

In summary, systematic review confirms that specific athletes are predisposed to rhinitis, but study of rhinitis in the athlete must be precise in definition of both the exercise modality and disease subtype.



**CHRONIC HYPERGRAVITY INDUCES ANTIOXIDATIVE AND PROAPOPTOTIC GENE EXPRESSION IN MICE WITH ALLERGIC ASTHMA AND RHINITIS**

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**Aims**

We aimed to evaluate the effect of chronic hypergravity in a mouse model of allergic asthma and rhinitis.

**Method**

Forty BALB/c mice were divided as follows: group A (n=10, control) sensitized and challenged with saline, group B (n=10, asthma) challenged by intraperitoneal and intranasal ovalbumin (OVA) to induce allergic asthma and rhinitis, and groups C (n=10, asthma/rotatory control) and D (n=10, asthma/hypergravity) exposed to 4 weeks of rotation with normogravity (1G) or hypergravity (5G) during induction of asthma/rhinitis, respectively. We compared 1) serum total and OVA-specific IgE; 2) number of inflammatory cells in bronchoalveolar lavage (BAL) fluid; 3) expression of genes for *IL-1 $\beta$* , *IL-4*, *IL-5*, *IL-6*, *IL-10*, and *IFN- $\gamma$*  in lung homogenate; and 4) histopathologic findings of lung and nasal cavity. We performed real-time polymerase chain reaction for *Bcl-2*, *Bax*, *caspase-3*, *heme oxygenase (HO)-1*, and *extracellular superoxide dismutase (EC-SOD)*.

**Results**

Group D showed significantly decreased eosinophils, neutrophils, and lymphocytes in their BAL fluid compared with groups B and C ( $p < 0.05$ ). In lung homogenate, the expression of *IL-1 $\beta$*  was significantly upregulated ( $p < 0.001$ ) and *IL-4* and *IL-10* were significantly downregulated ( $p < 0.05$ ) in group D. Infiltration of eosinophils into lung parenchyma and turbinate and less thickening of respiratory epithelium was less in group D ( $p < 0.05$ ). *Bcl-2* and *HO-1* were significantly downregulated, and *Bax* and *EC-SOD* were significantly upregulated.

**Conclusion**

Chronic hypergravity could have a beneficial effect in a mouse model of allergic asthma and rhinitis via regulation of genes involved in antioxidative and proapoptotic pathways.

**ANTI-ALLERGIC EFFECTS OF ANTI-IL-33 IS ASSOCIATED WITH SUPPRESSION OF IMMUNOGLOBULIN LIGHT CHAIN AND INDUCIBLE NITRIC OXIDE SYNTHASE**

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**Aims**

We aimed to find genes significantly induced in allergic mice and that significantly are down-regulated with anti-IL-33 treatment.

**Method**

Thirty-six mice were allocated into each of Group A (intraperitoneally sensitized and intranasally challenged to saline), Group B (sensitized and challenged to ovalbumin), Group C (sensitized and challenged with ovalbumin, and null treatment with intraperitoneal saline), and Group D (sensitized and challenged with ovalbumin, and treatment with anti-IL-33 intraperitoneal injection). We checked the number of nose-scratching in 10 minutes, serum ovalbumin-specific Immunoglobulin E, and titers of cytokines in bronchoalveolar lavage fluid. Using one whole lung from each mouse, we performed microarray and real-time Polymerase Chain Reaction.

**Results**

Group D showed significantly reduced nose-scratching events and lower serum ovalbumin-specific IgE compared to Groups B and C. All cytokines in bronchoalveolar lavage fluid were significantly decreased after anti-IL-33 treatment. Microarray analysis revealed that Group B (Immunoglobulin free light chain (*IgFLC*): 89.1 times, Nitric Oxide Synthase 2 (*NOS2*): 11.5 times) and Group C (*IgFLC*: 141.6 times, *NOS2*: 11.7 times) had significantly increased expression of *IgFLC* and *NOS2* gene compared to Group A. Group D showed significantly decreased expression of *IgFLC* (49.3 times) and *NOS2* (6.5 times). In real-time PCR, Group B and C had significantly increased expression of these genes (*IgFLC*: 10.4 times and 29 times, respectively; *NOS2*: 3.8 times and 4.5 times). Group D showed significantly decreased expression of *IgFLC* (5.0 times) and *NOS2* (2.5 times).

**Conclusion**

The anti-allergic effect of anti-IL-33 can be explained by suppression of *IgFLC* and *NOS2* in mice with allergic rhinitis.

**FUNCTIONAL AND AESTHETIC CORRECTION OF SECONDARY UNILATERAL CLEFT LIP NASAL DEFORMITIES**

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**Aims**

Many procedures/modifications are reported for correction of residual cleft nasal deformities. Surprisingly the vast majority of surgeons focus on nasal appearance and little/no attention is given to management of coexisting airway obstruction. Yet such conditions might potentially have significant impacts on patients' quality of life and wellbeing. Our protocols, experience and long-term outcomes for functional and aesthetic correction of secondary CL nasal deformities will be presented.

**Method**

217 patients treated at our Craniofacial Center with follow-up from 1-9 years (minimum one year) complete pre/postoperative clinical and photographic records were included. Procedures were individualized and performed after extensive clinical, endoscopic, imaging and functional evaluations (rhinomanometry). A variety of nasal techniques were applied to achieve symmetry, aesthetic balance, and correct the airway obstruction.

**Results**

Analysis of our data revealed that 166 patients (76.4%) had significant functional and aesthetic improvement; this number increased to 85.9% when only subjective and not objective functional data were used; 29 (13.07%) had aesthetic but modest functional improvement; 21 (9.8%) required additional surgery to improve appearance.

**Conclusion**

We want to stress the need of equal attention to manage functional and aesthetic aspects of the deformity. Procedures are tailored to specific requirements based on extensive anatomic and physiologic evaluations . Endoscopy assists in better evaluation of structures contributing to airway obstruction and their direct management. Subjective and objective evaluations should be used to confirm results. Rhinomanometry offers an objective tool for postoperative evaluation and substantiation of functional results. Our multidisciplinary protocols will be discussed, representative cases presented and our long-term results analyzed.

**ENDOSCOPIC TREATMENT OF BILATERAL CONGENITAL CHOANAL ATRESIA**

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**Aims**

This report outlines the effectiveness of the transnasal endoscopic approach for the treatment of bilateral congenital choanal atresia.

**Method**

14 patients (7 female and 7 male) with age between 2 days and 25.5 years (mean age 2 years) were treated using this approach by means of 0° and 30° 4 or 2.7 mm telescopes. Five cases were associated with CHARGE syndrome, 2 with trisomy 21 and 3 with non syndromic craniofacial malformations.

**Results**

Only one restenosis was observed in this series 4 months after the first surgical operation. This patient was affected by a trisomy 21 syndrome and had already been operated on at another institution before our surgery. A good choanal patency was achieved after two more endoscopic surgical procedures.

**Conclusion**

This technique permits a direct approach to the atretic area, with the advantage of an angled vision, good illumination and magnification of the CCA. Furthermore, the endoscopic approach can be used at any age and in cases of recurrent CCA. The authors believe that a correct repositioning of mucosal flaps after the resection of the atretic plate is of paramount importance in avoiding restenosis of the neochoana and in reducing the time and/or the use of stenting.

**ACUTE RHINOSINUSITIS IN IMMUNOSUPPRESSED CHILDREN: DIAGNOSTIC AND THERAPEUTIC MANAGEMENT**

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**Aims**

Immunosuppressive therapy places pediatric patients at risk of developing life-threatening sinonasal infections. Diagnosis and treatment is challenging owing to nonspecific signs and symptoms. The aim of the study was to present our department's experience with the surgical management of acute rhinosinusitis in immunosuppressed children.

**Method**

The records of all children with a hematologic or oncologic disease who underwent endoscopic sinus surgery (ESS) for acute rhinosinusitis from January 2005 to May 2014 were reviewed. Data were retrospectively collected on demographics, clinical and imaging characteristics, microbiology, pathology, treatment and outcome.

**Results**

Thirty-four immunosuppressed children underwent ESS for acute rhinosinusitis. Most patients had a fungal infection. Nineteen patients died at the end of follow-up; ten deaths were infection-related. Facial swelling was the only symptom that correlated with death of infection. Relapse of the underlying disease, bone marrow transplantation, and long duration of neutropenia correlated with infection-related mortality. Fungal infection, and specifically *Aspergillus*, correlated with death from infection.

**Conclusion**

ESS is a safe and efficient procedure for diagnosing and treating immunosuppressed pediatric patients with acute rhinosinusitis. Early detection and aggressive medical and surgical treatment, with control of underlying risk factors, are crucial to improve outcome.

**ACUTE RHINOSINUSITIS AND ORBITAL COMPLICATIONS – A POPULATION BASED STUDY ON INCIDENCE, RISK FACTORS AND CLINICAL OUTCOMES IN CHILDREN YOUNGER THAN FIVE YEARS OF AGE**

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**Aims**

To survey the incidence and clinical outcomes of complicated acute rhinosinusitis (ARS) with or without orbital complications in children 0-<5 years of age in tertiary care in Stockholm County.

**Method**

Population based, retrospective, observational study of all records from hospital admissions of children 0-<5 years July 1st 2003 - June 30th 2007 with a diagnosis of ARS and/or related complications.

**Results**

A total of 213 admissions were included. The incidence of hospitalization due to ARS was 53/100000 for males, 37/100000 for females, 69/100000 for children <2 years old and 25/100000 for children 2-<5 years old. Clinical signs of preseptal cellulitis was present in 171/213 admissions, which translates to an incidence of orbital complications due to ARS of 35/100000. Postseptal complications occurred in 7/213 admissions. One patient required surgery due to a postseptal complication. The most common bacterial finding was *Streptococcus Pneumoniae*. Antibiotic treatment was administered intravenously in 97% of the admissions.

**Conclusion**

This population-based study shows that the majority of children hospitalized for ARS had an orbital complication. Most were previously healthy and recovered quickly. Postseptal complications developed in three percent of the admissions with one child needing surgery.

**A PRACTICAL APPROACH TO SAFE AND EFFECTIVE COBLATION REDUCTION OF THE INFERIOR TURBINATES IN THE PAEDIATRIC POPULATION**

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**Aims**

Turbinate reduction is a well established procedure in the management of allergic rhinitis which is refractory to medical management. The use of coblation is a relatively modern technique for turbinoplasty, and has been described as a safe and effective mucosal-preserving approach in the adult population. However, there is a relative paucity of evidence regarding the use of coblation turbinate reduction in the paediatric population. Literature review reveals only two articles which specifically examine coblation turbinoplasty in this patient group, totalling 32 patients. Although these studies demonstrate an improvement in symptom scores with use of coblation, there is no published practical description of the practical technique or the peri-procedural care specific to these patients.

**Method**

In this single centre study, we describe a series of 23 consecutive paediatric patients (11 female, 12 male) who underwent coblation turbinoplasty in the preceding twelve months at our institution.

**Results**

Mean age of the population was 11 years (range 3-15). 3 patients underwent coblation turbinoplasty alone, while 21 underwent a simultaneous secondary procedure (19 adenoidectomy, 1 septoplasty). No patients required an overnight stay. There were no re-admissions for surgical complications. 5 patients were followed up, with mean follow up period of 8 weeks, with no complications noted in these patients. A further 15 patients were contacted by telephone, with none of these patients reporting significant post-operative problems.

**Conclusion**

We describe our experience of coblation turbinate reduction in children, with particular attention to the pre- and post-operative care of the patient.

**ENDOSCOPIC TRANSNASAL DACRYOCYSTORHINOSTOMY**

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**Aims**

The treatment of nasolacrimal duct stenosis can be performed with external and endonasal approaches. We evaluate the long-term results in patients who underwent an endonasal approach for primary or revision surgery.

**Method**

We report our experience of endoscopic transnasal dacryocystorhinostomy (DCR) from February 2000 to May 2015. We use to collaborate with the ophthalmologist during the operation. The ENT surgeon usually performs the intranasal access, removal of lacrimal bone and opening of the nasolacrimal sac. The ophthalmologist localizes the lacrimal punctum helping in the localization of the lacrimal sac and positioning the bicanalicular silicone stent when necessary. The stent is usually removed one month after the surgical operation. During the selected period we performed 607 endoscopic dacryocystorhinostomy on 454 patients (564 eyes primarily treated).

**Results**

We analysed data from 515 eyes treated excluding 49 of them, which have gone lost to follow up.

433 (84%) have been cured at first operation and 463 (90%) after revision surgery. Cases of restenosis have been treated with an endoscopic approach. There was no significant prevalence of side and a female predominance of 65%.

**Conclusion**

Endoscopic dacryocystorhinostomy is a safe, easy to perform surgical operation with a good percentage of success compared to other kind of approaches both for primary and revision surgery.



**ORBITAL VOLUME AND SURFACE AREA BASED ON HIGH-RESOLUTION COMPUTED TOMOGRAPHY OF HUMAN CADAVERS**

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**Aims**

Blow-out fractures affect the volume and surface area of the orbital cavity. Estimation of these values after the trauma may help in deciding whether or not a patient is a candidate for surgery. Recent studies have provided estimates of orbital volume and area of bone defect, and correlated them with the degree of enophthalmos. However, a large degree of biological variation between individuals may preclude such absolute values from being successful indicators for surgery.

Stereological methods have been used to estimate orbital cavity volume in a few studies, but to date these have not been used for surface area. To our knowledge, this study is the first to have measured the entire surface area of the orbital cavity.

**Method**

The volume and surface area of the orbital cavity were estimated in computed tomography scans of 11 human cadavers using unbiased stereological sampling techniques.

**Results**

The mean ( $\pm$  SD) total volume and total surface area of the orbital cavities was  $24.27 \pm 3.88$  cm<sup>3</sup> and  $32.47 \pm 2.96$  cm<sup>2</sup>, respectively. There was no significant difference in volume ( $P = 0.315$ ) or surface area ( $P = 0.566$ ) between the two orbital cavities.

**Conclusion**

The stereological technique proved to be a robust and unbiased method that may be used as a gold standard for comparison with automated computer software. Future imaging studies in blow-out fracture patients may be based on individual and relative calculation involving both herniated volume and fractured surface area in relation to the total volume and surface area of the uninjured orbital cavity.

**EXPANDING THE LIMITS OF ENDOSCOPIC INTRAORBITAL TUMOR RESECTION USING 3-DIMENSIONAL RECONSTRUCTION**

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**Aims**

**Objective:** To utilize 3-dimensional(3D) radiographic reconstruction to define the theoretical lateral limit of endoscopic resectability of primary orbital tumors and to apply these boundary conditions to surgical cases.

**Method**

**Methods:** A 3D orbital model was rendered in 4 representative patients presenting with primary orbital tumors using OsiriX open source imaging software. A two dimensional plane was propagated between the contralateral nare and a line tangential to the long axis of the optic nerve(ON) reflecting the trajectory of a trans-septal approach. Any tumor volume falling medial to the ON and/or within the space inferior to this plane of resectability(POR) was considered theoretically resectable regardless of how far it extended lateral to the ON as nerve retraction would be unnecessary. Actual tumor volumes were then superimposed over this plan and correlated with surgical outcomes.

**Results**

**Results:** Among the 4 lesions analyzed, two were fully medial to the ON, one extended lateral to the optic nerve but remained inferior to the POR, and one extended both lateral to the ON and superior to the POR. As predicted by the 3D modeling, a complete resection was achieved in all lesions except one that transgressed the POR. No new diplopia or vision loss was observed in any patient.

**Conclusion**

**Conclusion:** 3D reconstruction enhances preoperative planning for endoscopic orbital surgery. Tumors that extend lateral to the ON may still be candidates for a purely endoscopic resection as long as they do not extend above the plane of resectability described herein.

**BALANCED (MEDIAL ENDOSCOPIC AND LATERAL TRANSCUTANEOUS) ORBITAL DECOMPRESSION IN GRAVE'S ORBITOPATHY**

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**Aims**

To determine the clinical outcomes and morbidity of combined endoscopic endonasal in conjunction with transcutaneous lateral orbital decompression.

**Method**

A retrospective noncomparative case series of patients who underwent a combined endonasal endoscopic medial wall with transcutaneous lateral orbital decompression in the last 12 years was performed. We analyzed main outcomes measurements included visual acuity (Snellen chart), optic nerve compression (fundoscopy and optic coherence tomography), exophthalmometry (Hertel measurement, millimeters,) ocular motility, diplopía (new o worsening) strabism, eyelid surgery after decompression and complications.

**Results**

A total of 20 subjects (36 orbits) were performed. Mean follow-up averaged 42 months (range 6-84). Vision improved dramatically in all compressive optic neuropathy cases (5 cases). Hertel measurements improved, on average, 2.5 mm (range 0.5-3.5) in all the subjects. The diplopia disappeared in 8 patients (40%) and 9 patients with severe preoperative diplopia required strabismus surgery after decompression. Eyelid surgery was needed in 13 patients. The treatment of eyelid retraction with hyaluronic acid was the most used technique in 6 patients.

**Conclusion**

These results suggest that endoscopic medial orbital decompression with transcutaneous lateral wall is an effective and safe treatment for symptomatic dysthyroid eye disease with important proptosis or compressive optic neuropathy.

**BLOWOUT FRACTURES – DEVELOPMENT OF SEQUELAE IN PATIENTS RECEIVING NON-SURGICAL TREATMENT**

**B. Alinasab**<sup>1</sup>

<sup>1</sup>Karolinska Institute, Stockholm, Sweden

**Aims**

Lack of evidence concerning treatment for blowout fractures, requires studies evaluating the current indications for surgery as well as non-surgical intervention in the management of blowout fractures. We consider to study the sequelae in patients with Blowout fracture who have received non-surgical intervention.

**Method**

103 patients with blowout fracture who received non-surgical intervention according to the current indications in management of blowout fracture. These patients were followed up with up to 6 visits during a year in a prospective controlled clinical study at the ENT department at Karolinska University Hospital in Stockholm, Sweden.

**Results**

The results are been analysed and will be presented at the ERS meeting.

**Conclusion**

A conclusion will be presented att the ERS meeting.

**ENDOSCOPIC ENDONASAL LANDMARKS TO THE DESCENDING PALATINE CANAL: A RADIOGRAPHIC STUDY**

***R. CAMPBELL<sup>1</sup>, R. Carrau<sup>2</sup>, D. Prevedello<sup>3</sup>, A. Solares<sup>4</sup>, E. Mason<sup>4</sup>***

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<sup>4</sup>Georgia Regents Medical Center, Otolaryngology - head and neck surgery, Augusta, USA

**Aims**

The palatine neurovascular bundle is at risk during endoscopic surgery. Injury may result in significant blood loss and anesthesia of the ipsilateral hard palate. Nonetheless, its endoscopic anatomy has not been described previously. This paper strives to establish landmarks to identify the greater palatine canal; thus, avoiding injury to its contents.

**Method**

This study comprised 25 de-identified computed tomographic angiograms (CTA) using landmarks that are immediately visible during endoscopic medial maxillectomy to calculate: the angle of the greater palatine canal to the vertical, the distance from the anteroinferior aspect of the greater palatine canal to the orifice of the nasolacrimal duct, the distance from the anteroinferior aspect of the greater palatine canal to the posterolateral free edge of the hard palate, and the distance from the anterior aspect of the greater palatine canal as it enters the hard palate to the posterior wall of the maxillary sinus.

**Results**

The mean angle of the greater palatine canal to the vertical was 22.5°. The mean distance from the anteroinferior aspect of the greater palatine canal to the nasolacrimal duct was 31.5mm. The mean distance from the anterior aspect of the greater palatine canal to the posterolateral free edge of the hard palate was 7.64mm and the mean distance from the anterior aspect of the greater palatine canal to the posterior wall of the maxillary sinus was 7.59mm.

**Conclusion**

Accessible anatomical landmarks may be used to ascertain the location of the descending palatine canal; thus, avoiding injury to its contents.

**TYPE III FRONTAL SINUSOTOMY: SURGICAL TECHNIQUE, INDICATIONS, OUTCOMES, A MULTIUNIVERSITY RETROSPECTIVE STUDY OF 120 CASES**

**P. Eloy**<sup>1</sup>

<sup>1</sup>, Louvain, Belgium

**Aims**

To present a retrospective study including a cohort patients who underwent surgery in six Belgian university ENT departments.

**Method**

120 patients were included in this study. 77 me, 43 women. Mean age: 55.4 y.o. (range: 40-60).

Mean follow-up was 24.6 months (range: 5-36 months).

The main indications were frontal sinusitis persistent after several endonasal surgeries (74%) - frontal mucocele (14%) - Inverted papilloma (2.5%), osteoma (5% and other (5%).

**Results**

Concerning the facial pain, 67 out of 98 patients were significantly improved. 31 remained symptomatic. Out of them 18 had still significant pain and 13 had simple pressure.

Concerning all the symptomatology, 88 patients out of 120 were asymptomatic or significantly improved (73.5%)

Concerning the healing process there were 4 different endoscopic pattern:

the first consists with a wide neoostium and normal mucosa: N= 68 (57%)

the second consists with a stenosis of the neoostium: N=21 (17.5%)

The third one consists with a polypoid change of the sinus mucosa: N)16 (13%)

The fourth one consists with a closure of the ostium: N=15 (12.5%)

**Conclusion**

Draf III is a demanding procedure requiring expertise in endoscopic sinus surgery.

The procedure aims to create the largest anteroposterior and lateral to lateral diameters .

Even if the size of the neoostium is wide at the end of the procedure the healing process can lead to a significant reduction of the ostium, a polypoid change of the mucosa or even a closure of the opening;

12.5% of patients have a closed neo-ostium.

The procedure is effective with significant improvement of the symptomatology in about 80% of the cases.

**POSTOPERATIVE SINONASAL CRUSTING IN SELLAR RECONSTRUCTION WITH AVASCULAR FREE GRAFTS: MUCOSAL AUTOGRAFT VERSUS ACELLULAR DERMAL ALLOGRAFT*****C.R. Roxbury<sup>1</sup>, M. Ramanathan<sup>1</sup>, M. Lim<sup>2</sup>, M. Ishii<sup>1</sup>, G.L. Gallia<sup>2</sup>, D.D. Reh<sup>1</sup>***<sup>1</sup>Johns Hopkins University School of Medicine, Otolaryngology-Head and Neck Surgery, Baltimore, USA<sup>2</sup>Johns Hopkins University School of Medicine, Neurosurgery, Baltimore, USA**Aims**

Advances in expanded endonasal approaches (EEA) have led to resection of increasingly complex sellar pathology. However, skull base reconstruction remains challenging. While avascular reconstruction is an acceptable means to prevent cerebrospinal fluid fistula, there is little data regarding sinonasal outcomes in these patients. The aim of this study is to compare rates of persistent postoperative crusting (PPC) in patients undergoing sellar reconstruction with mucosal and acellular dermal allografts.

**Method**

Patients who underwent reconstruction of sellar defects with avascular grafts between 2008-2014 were categorized into 2 subgroups: reconstruction with free mucosal autograft or native sellar mucosa, and reconstruction with acellular dermal allograft. Smoking was hypothesized to be an independent predictor of PPC. PPC was defined as significant sphenoidal crusting present 3 months postoperatively. Crusting rates were determined in both the mucosal and acellular allograft groups. Chi squared analyses were performed to compare differences in proportion of PPC in these groups and in smokers versus nonsmokers.

**Results**

There were 79 patients identified. PPC was seen in 12 (15.2%). Reconstruction with mucosa was performed in 52 patients (65.8%), while reconstruction with acellular dermal allograft was performed in 27 (34.2%). There were 10 smokers (12.7%). There was no significant difference in PPC in the allograft group compared to the mucosal group (5/27, 18.5% vs 7/52, 13.5%  $p=0.55$ ). There was a significant association between smoking and increased PPC (4/10, 40% vs 8/69, 11.6%  $p=0.019$ ).

**Conclusion**

There are no significant differences in PPC with the use of acellular allograft compared to mucosa. Smoking should be considered a risk factor for worse sinonasal outcomes regardless of graft material used for reconstruction.

## THE ROLE OF IMAGING IN THE PRE-OPERATIVE ASSESSMENT OF PATIENTS WITH NASAL OBSTRUCTION AND SEPTAL DEVIATION

***N. Carmel Neiderman<sup>1</sup>, D.M. Fliss<sup>1</sup>, A. Safadi<sup>1</sup>, B. Ringel<sup>1</sup>, A. Abergel<sup>1</sup>***

*<sup>1</sup>Tel Aviv Medical Center, Department of Otolaryngology, Tel- Aviv, Israel*

### **Aims**

Introduction: Nasal obstruction is a common complain of multiple etiology. The pre-operative course of patients presenting with nasal obstruction and deviated septum does not include imaging, therefore decision regarding obtaining computed tomography (CT) pre-operation is mainly due to clinical judgement. The benefits of performing pre-operative CT are not entirely established, and the literature regarding this topic is scarce.

Objective: to assess the role and contribution of CT in the pre-operative assessment of patients presenting with nasal obstruction and septal deviation.

### **Method**

a retrospective cohort study in patients undergoing evaluation in a tertiary care academic medical center (TASMC) between the years 2006 and 2014. Data on demographics, presenting symptoms, imaging performed and operative course was gathered.

### **Results**

452 patients underwent endoscopic sinus procedures in TASMC between the years 2006-2014. 99 (22%) presented with isolated nasal obstruction complaints and without imaging performed earlier to the initial intake. Of those, 27 (27.2%) patients underwent CT scan as part of their peri-operative assessment. 89% of patients who underwent CT scan required a modification of their initial pre-operative planning, due to the radiological findings: In 55% of these patients concha bullosa was detected, and in 33% of the patients radiological findings of chronic sinusitis were detected. Both findings were addressed during surgery.

### **Conclusion**

In this series, 89% of patients who underwent pre-operative imaging for nasal obstruction, there was a change in the initial pre-operative planning, based on physical examination alone. The advantages and disadvantages of pre-operative imaging in patients with nasal obstruction will be discussed.



**INCREASING PRESSURES WITHIN THE ENT DEPARTMENT?**

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<sup>1</sup>University Hospital of Wales- Cardiff, Ear- Nose and Throat, Cardiff, United Kingdom

<sup>2</sup>UHW, ENT, Cardiff, United Kingdom

**Aims**

To look at current trends within ENT Departments in England from the past nine years, and attempt to predict future demand.

**Method**

The Health and Social Care Information Centre website was accessed and Hospital Episode Statistics for Admitted Patient Care for nine years, starting 2006-07 were accessed. This data was interrogated looking specifically at the number of consultations, elective admissions, emergency admissions, mean age and male to female ratio of the patients for patients admitted under the care of an ENT team, at national level.

**Results**

During the nine years of data collection we have an average of 349,246 finished consultations per year. We have an average admission number of 341,793 per year with a maximal range of 22,094. Our average number of emergency admissions per year is 62,422 with a maximal range of 8,842. The average age of our patients is 36 years old.

**Conclusion**

Our data has demonstrated that on a national level the number of finished consultations, elective admissions and emergency admissions has remained relatively constant, whilst this may reflect a constant demand for the service it may also represent that the infrastructure is limited and currently reaching saturation point. This information is important for future departmental planning.

**AN END-USER SURVEY TO DETERMINE PATIENT EXPECTATIONS WITH REGARD TO THE ASSESSMENT OF NASAL PATENCY**

***R. Gupta<sup>1</sup>, P. Andrews<sup>2</sup>, J. Joseph<sup>2</sup>, C.H. Li<sup>3</sup>, T. Leung<sup>3</sup>***

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<sup>2</sup>University College London Hospitals, ENT, London, United Kingdom

<sup>3</sup>University College London, Medical Physics and Biomedical Engineering, London, United Kingdom

**Aims**

The purpose of this new questionnaire, designed by a UCL medical student, is to evaluate what patients want from a clinical assessment of their nasal patency. The aim is to establish what should be included in a nasal patency assessment to enhance a patient's understanding of their condition.

**Method**

We want to impart a distinction between what patients find informative and what they find confounding. Educating a patient on their own condition can improve their experience in a clinical setting by enabling them to increase their involvement with decisions regarding their management. The survey will also provide insight into patient satisfaction with current methods of assessment and whether they find these methods beneficial. For example, do patients better interpret the results of an objective assessment when the data was presented back to them numerically, as in NIPF, or visually, as in spatula misting? There are numerous subjective questionnaires used by clinicians to evaluate patient symptoms. An additional component of our new questionnaire is that it consolidates the most common of these, such as the NOSE and SNOT-22, into its own, quantitative evaluation of patient symptoms.

**Results**

The new questionnaire is currently being trialled on patients who are participating in a related, ongoing clinical study.

**Conclusion**

The premise of this survey follows a previous questionnaire that was designed for clinicians to determine what clinicians find most advantageous from a nasal patency assessment. It can thus be deduced whether there is any correlation between what is considered useful from a clinician's and a patient's perspectives.

**PATIENT INJURIES IN OPERATIVE RHINOLOGY DURING A TEN-YEAR PERIOD: REVIEW OF NATIONAL PATIENT INSURANCE CHARTS**

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<sup>2</sup>Helsinki University Central Hospital, Department of Otorhinolaryngology, Helsinki, Finland

**Aims**

To assess patient injury-contributing factors in operative rhinology.

**Method**

Study design: A retrospective claim record study of national patient insurance charts in Finland. Setting and participants: Data of the accepted patient injury claims involving operative rhinology, closed between the years 2001 and 2011, were obtained from a search of the Finnish Patient Insurance Centre registry. Two senior otolaryngologists analysed and evaluated the injury mechanisms in detail. Factors contributing to injury were identified and classified.

**Results**

During the 10-year study period, there were 67 patient injuries in operative rhinology, which was 35,6% of all patient injuries in otorhinolaryngologic surgery. The majority (77.6%) of patients were treated in university or central hospitals and 60 (89.6%) by the fully trained otolaryngology specialists. The factors contributing the injuries were errors in surgical technique, like lesions to the orbit (10 cases, 14.9%), skull base and meninges (7 cases, 10.4%), and adjacent nerves (14 cases, 20.9%), as well as mistakes with removable packings left in situ (7 cases, 10.4%). Altogether 32 (47.8%) patients had undergone endoscopic sinus surgery. Mortality was 1.5%, one patient died because of bleeding from intracranial artery. Fourteen (20.9%) patients needed reoperation due to injury.

**Conclusion**

Patient injuries in rhinology were caused by typical complications of common operations. The increased volume of endoscopic sinus surgery was evident also in injuries.

**HIGH-DEFINITION VIDEO TELESCOPIC RHINOPLASTY**

***T. Losano<sup>1</sup>, C. La Melia<sup>1</sup>, G. Ceroni Compadretti<sup>1</sup>, I. Tasca<sup>1</sup>***

<sup>1</sup>ENT DEPARTMENT, ENT, IMOLA, Italy

**Aims**

Optical magnification has become an essential tool in rhinologic practice . In this preliminary study, we describe the use of VITOM® technology in rhinoplasty, an emerging technology aimed at providing enhanced visualization of open procedures requiring magnification to all members of the operating team, useful for documenting uncommon cases, for training and educational purposes.

**Method**

VITOM® (Karl Storz Endoscopy, Tuttlingen, Germany) is VITOM® is a 0° telescope with a diameter of 10 mm and a length of 10 cm, called exoscope since it is positioned outside the body. The camera head is mounted on the proximal end of the telescope, illumination is provided by a cold light fountain Xenon 300, and images are displayed on a HD monitor.

**Results**

When the exoscope is positioned, details of lesions are anatomically relevant on the monitor as fine vascularisation, cartilage and bone irregularities, scars, are perfectly visible. In order to follow the flow of the operation, the supporting device can be rotated in the 3 planes of the space allowing for fine movements of the scope.

**Conclusion**

VITOM® technology markedly improves the visualization of the operations, thereby improving the understanding of the procedures and enhancing the teaching environment. The system is associated with a computer that is capable of capturing images and video sequences, and storing data. The VITOM® permitted a natural head and neck position, allowing the surgeon to operate from a comfortable position without increased operative time or complications. The improved comfort levels may translate into safer, more accurate surgeries.

**NEGLECTED DIABETES MELLITUS AND RHINOCEREBRAL MUCORMYCOSIS**

***A. Milioni<sup>1</sup>, A. Karatzanis<sup>1</sup>, E. Prokopakis<sup>1</sup>, E. Fountakis<sup>1</sup>, A. Kaprana<sup>1</sup>, G. Velegrakis<sup>1</sup>***

<sup>1</sup>University Hospital of Heraklion Crete, Otorhinolaryngology, HERAKLION, Greece

**Aims**

Non-treated diabetes mellitus is a trigger factor for Mucormycosis that is often underestimated. The most common clinical presentation of this rare fungal infection is the rhino-orbital-cerebral form. A case of a rhinocerebral mucormycosis with intracranial complication in the setting of neglected diabetes mellitus is addressed.

**Method**

A 53 year-old male was presented to the Emergency Department complaining of a diffuse pain and numbness of the left midface for 5 days, followed by diplopia, instability and difficulty in swallowing. The patient had a history of untreated diabetes mellitus for years. The physical examination revealed 5<sup>th</sup> 6<sup>th</sup> and 9<sup>th</sup> cranial nerve palsy together with a mild periorbital edema on the left. Ulcerations in the mucosa of the left half of the palate and left inferior turbinate were observed. Immediately, the clinical suspicion of Mucormycosis has risen and biopsies were obtained from the mentioned areas, confirming the diagnosis. A head CT scan followed by an MRI the next day depicted the location and extend of the lesions.

**Results**

The patient underwent a partial left maxillectomy and ethmoidectomy and he was transferred to ICU. Despite of the radical surgical debridement and the intravenous antifungal and antimicrobial agents, patient's general condition, after a 24hours of improvement, was deteriorating and on the 33th day of admission he succumbed.

**Conclusion**

Mucormycosis is a medical emergency and the treatment consists of aggressive surgical debridement in combination with antifungal therapy. However mortality rates are high. A high degree of suspicion must be maintained in the immunocompromised patient with sinus complaints.

**SINONASAL INVERTED PAPILLOMA: COMPARING GROUPS WITH REOCCURRENCE VS. NO REOCCURRENCE - FAILURE ANALYSIS FOR ENDOSCOPIC ENDONASAL APPROACH**

***J. Urbancic<sup>1</sup>, T. Soklic Kosak<sup>1</sup>, K. Jenko<sup>1</sup>, D. Gluvajic<sup>1</sup>, K. Rainer<sup>1</sup>, I. Borsos<sup>1</sup>***

*<sup>1</sup>University Medical Centre Ljubljana, Department fo otorhinolaryngology and cervicofacial surgery, Ljubljana, Slovenia*

**Aims**

Sinonasal inverted papilloma (IP) is a rare benign tumour of the nose and paranasal sinuses. Historically is IP connected with reoccurrences and malignant transformation. Connection with multiple factors (HPV, EBV, smoking, CRS) has been proposed. Diagnostic procedure for IP is known and straightforward. Treatment of choice is radical endonasal endoscopic surgery with complete removal of the tumour and underlying mucoperiostium.

**Method**

We have compared two groups of patients who underwent rather heterogeneous endoscopic treatment by various surgeons in different institutions. First group had an uneventful follow up, second one had a reoccurrence of IP. We compared the groups for staging, anatomic location of the IP within nasal cavity or sinuses, different extent of endoscopic surgical treatment and evaluated the possible reasons for failure.

**Results**

Our main focus was evaluating possibility of residual disease after first surgical attempt due to restricted access to all diseased areas. All patients had IP within nasal cavity or paranasal sinuses. Our results emphasized the importance of surgical control of medial wall of maxillary sinus, especially its most anterior part, supraorbital recess, rarely well pneumatized lateral recess of sphenoid.

**Conclusion**

We propose meticulous preoperative planning, use of appropriate instruments and strong inclination towards oncologic principles even when dealing with IP.

## ANALYSIS OF "LOOPS" IN 4-PHASE-RHINOMANOMETRY BY SIMULATION WITH AN "ARTIFICIAL NOSE"

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<sup>1</sup>University of Latvia, Center of Experimental Surgery, Krakow am See, Germany

<sup>2</sup>University of Latvia, Center of Experimental Surgery, Riga, Latvia

### **Aims**

Loops in rhinomanometry have been considered as a sign of technical errors in rhinomanometry. These errors are excluded by the general progress in sensor techniques and computing methods. An analysis of the persisting loops was necessary by simulation

### **Method**

An "artificial nose" was constructed by the combination of a linear actuator with a pump. The digital actuator was controlled by different programs producing as well a sinus or rectangular "wave" as different types of human breaths with different length and acceleration.

The generated air stream was lead through different resistors as equivalents of tubes, diaphragms with and without elastic compartments.

### **Results**

It could be shown, that loops around the intersection between the x-axis and y-axis can be caused by the inertia of the air if the airway is corresponding to a tube more than a diaphragm of "hole". Other types of loops can also be produced, if the airway is consisting of an irregular space with small holes at both ends. Asymmetric loops can be produced by special resistors with elastic compartments comparable to the nasal valve.

Typical examples and breathing types will be demonstrated by videospots.

### **Conclusion**

Loops in rhinomanometry are representing special conditions of the nasal airway and are of diagnostical meaning if they are asymmetric.

ERS16-0029

FREE PAPER SESSION 30: RHINOLOGY MISCELLANEOUS

**SINO-NASAL LESIONS: CHOOSING THE APPROPRIATE SURGICAL APPROACH - PRESENTATION  
CANCELLED**

**A. Yakirevitch<sup>1,2</sup>, G. Nakache<sup>1</sup>, L. Bedrin<sup>1</sup>**

<sup>1</sup>Sheba Medical Center, Otorhinolaryngology – Head and Neck Surgery, Tel Aviv, Israel

<sup>2</sup>Tel Aviv University, Sackler School of Medicine, Tel Aviv, Israel

**Aims**

Generations of otolaryngologists practiced an open approach as the only option of surgical treatment for sino-nasal lesions. During the last decade endoscopic techniques have gained an increasing popularity. While accumulating experience, we encounter and realize the limitations and drawbacks of endoscopic surgery.

The aim of this course is to discuss the optimal approach to the different types of lesions. We will present decision making algorithms based on the current literature and on the analysis of sino-nasal and skull base pathology treated by an endoscopic and combined cranio-endoscopic approach in our institution.

Together with the audience, we will virtually treat the representative cases to demonstrate planning and performing the surgery.**Method**

Instructional course

**Results**

Instructional course

**Conclusion**

Instructional course



**ERS16-0798**

**WHAT RESULTS CAN WE PREDICT FOR OUR PATIENTS?**

**WHAT OUTCOMES PATIENTS CAN EXPECT FROM SURGERY VS. MEDICAL THERAPY**

**T. Smith<sup>1</sup>**

<sup>1</sup>, Oregon, USA

Outcomes patients can expect: Surgery versus medical therapy, and choice of surgeon

Tim L Smith, MD, MPH, FACS

Clinicians have long searched for factors that might prognosticate outcomes of sinus surgery. Clinical phenotypes such as chronic rhinosinusitis with nasal polyposis or chronic rhinosinusitis with aspirin exacerbated respiratory disease have often been implicated as having worse outcomes. However, a closer examination demonstrates that the various subtypes of chronic rhinosinusitis generally experience clinically important improvements in quality of life following sinus surgery but they do so from differing baseline quality of life.

When patients have failed appropriate medical management, they are more likely to achieve clinically significant improvement in quality of life with endoscopic sinus surgery as compared to continuing medical therapy. In addition, health utility has been shown to improve substantially following endoscopic sinus surgery and to return to a value equivalent to health utility in a normative population.

Surgeons performing endoscopic sinus surgery appear to have differing outcomes as measured by patient based quality of life instruments. It will be important to develop an appropriate risk adjustment model so that robust comparisons of surgeons' outcomes can be made to improve quality of care.

**INVERTED PAPILOMA**

**A. Herrera**<sup>1</sup>

<sup>1</sup>, *Spain*

Inverted Papillomas are benign Tumors of the Sino nasal region that can be quite challenging even for experienced Endoscopic Sinus Surgeons. When dealing with these Tumors, one must always bare in mind that these tumors have a high rate of recurrence and a well documented association with malignancy, which is why it is paramount to achieve a complete resection. Good surgical results are directly proportional to our ability to completely resect tumor insertions in “difficult anatomical areas” such as the anterior and lateral wall of the Maxillary Sinus; the Sphenoid Lateral Recess; Frontal Recess -Anterior Ethmoid Artery; anterior and extreme lateral wall of the the Frontal Sinus. Surgical technique must include a subperiosteal dissection and drilling of the underlying bone at the attachment sites.

During this lecture, I will present my rationale on how to choose the best surgical approach according to the patient’s anatomy and suspected site of insertion of the tumor. The different approaches that will be discussed are the: Medial Maxillectomy and the Extended Denker’s approach to the Maxillary Sinus; the Trans Pterygopalatine Fossa approach to the Sphenoid Lateral Recess; Draf II B and Draf III procedures to the Frontal Sinus. Various Clinical Cases with surgical videos will be presented to emphasise key surgical aspects of these approaches.

**DIAGNOSIS OF FACIAL PAIN**

**M. Setzen<sup>1</sup>**

<sup>1</sup>, New York, USA

Diagnosis of Facial Pain – Michael Setzen MD,FACS, FAAP

In the United States, 70-80% of the population experience headache at some time. 30 million Americans suffer from migraine. 37 million Americans suffer from rhinosinusitis.

This lecture will assist attendees in making the diagnosis of headache due to the nose.

Common misconceptions include:

1. Sinus headaches are common.
2. All pain in the face and forehead is sinus.
3. If the nose is stuffy, headache is due to sinus.
4. Headache due to weather change is sinus.
5. If over-the-counter sinus medications relieve the headache, then it is sinus.

Facial pain and pressure over the forehead, eyes, and cheek occur both in acute and chronic sinusitis. The majority of all headaches are due to migraine and not sinusitis.

The diagnosis of rhinogenic headache is made up based on a detailed history, nasal endoscopy, and a CT scan of the sinuses.

On nasal endoscopy, one needs to look for septal deviation, and in particular a spur with contact points, purulent drainage from the sinus ostia, and concha bullosa. If the patient comes in with a complaint of headache and one sees any contact point, this area should be anesthetized both topically and via injection to see whether or not this alleviates the headache. If indeed it does, then it is powerful information that the headache may be rhinogenic.

CT sinus is helpful if it shows concha bullosa, contact points especially a septal spur abutting the inferior or middle turbinate. Treatment is both medical or surgical, and this will be discussed in detail.

**ERS16-0810**

**SYMPOSIUM 30: FACIAL PAIN AND HEADACHE**

**TREATMENT ALGORITHMS FOR FACIAL PAIN**

***A.M. Agius<sup>1</sup>, N.S. Jones<sup>2</sup>, R. Muscat<sup>3</sup>***

<sup>1</sup>, Ibragg, Malta

<sup>2</sup>University of Nottingham- UK, Department of Otolaryngology, Nottingham, United Kingdom

<sup>3</sup>University of Malta, Physiology and Biochemistry, Msida, Malta

Frequent or persistent facial pain is a common complaint in the rhinology clinic and is may be of rhinogenic or non-rhinogenic origin. Bilateral, symmetrical pressing pain that lasts several hours is now generally understood to be a tension-type pain of the mid-face, that is, of neurological origin rather than pain associated with sinusitis.

This presentation concentrates on the medical management of patients with non-rhinogenic facial pain and explains the stepwise role of investigations and medical treatment in the clinical decision-making process. It also explores the background evidence for such treatment and briefly discusses the pathways and origin of such facial pain since this affects the choice of therapy.

OVERVIEW OF PRESENT GUIDELINES

J. Mullol<sup>1</sup>

<sup>1</sup>IDIBAPS, IRCE, BARCELONA, Spain

According to the Allergic Rhinitis and Its Impact in Asthma (ARIA) guidelines, allergic rhinitis (AR) can be classified as intermittent or persistent, and mild, moderate, or severe. Asthma is a frequent comorbidity of AR. Some patients may present local AR (LAR) in the absence of systemic atopy, local production of specific IgE, and a positive nasal allergen provocation test. It is important to discriminate between AR and chronic rhinosinusitis by symptoms, natural history, nasal endoscopy, and CT scan. The most frequent symptoms of AR, are sneezing, itchy/watery nose and eyes, nasal congestion, and runny nose. Loss of smell is less frequent but linked to AR severity. Severe chronic upper airway disease (SCUAD) defines those patients whose symptoms are inadequately controlled despite adequate pharmacologic treatment according to guidelines. ARIA clinical recommendations for AR, in both adults and children, were updated in 2010 following the approach suggested by the GRADE working group: 1) oral, not causing sedation and without P450 interaction, and intranasal H<sub>1</sub>-antihistamines, and leukotriene receptor antagonists; 2) second- rather first-generation oral H<sub>1</sub>-antihistamines; 3) oral rather intranasal H<sub>1</sub>-antihistamines; oral H<sub>1</sub>-antihistamines rather leukotriene receptor antagonists; 4) intranasal corticosteroids rather oral H<sub>1</sub>-antihistamines or leukotriene receptor antagonists. Intranasal corticosteroids have been considered the first-line therapy for moderate-severe AR until recently. However, a fixed intranasal formulation of fluticasone and azelastine (MP-AzeFlu) has shown a higher effect than corticosteroid alone on both nasal and ocular symptoms, in seasonal and chronic AR. Oral (drops or tablets) or subcutaneous allergen immunotherapy may also be used in severe patients not well controlled by medical treatment.

Bousquet et al. *Allergy* 2008; Brozec et al. *J Allergy Clin Immunol* 2010; Bousquet et al. *J Allergy Clin Immunol* 2016 (In press)

**MEDICAL TREATMENT**

**U. Geisthoff<sup>1</sup>**

<sup>1</sup>, Germany

Hereditary hemorrhagic telangiectasia (HHT, Rendu-Osler-Weber disorder) is a rare disorder, therefore the level of evidence for the management of epistaxis is low. The first step in treating nosebleeds in HHT is trying to prevent it using nasal irrigations, ointments, gels or oils. This is also part of the self-management. Active ingredients like tranexamic acid or estriol have been described. A randomized study on the endonasal injection of bevacizumab did not reveal a statistically significant result. Oral drugs include tranexamic acid, tamoxifen, N-acetylcysteine and thalidomide. Placebo-controlled randomized drugs have shown a statistically positive effect of the former two drugs. Bevacizumab given systemically has also been reported to reduce epistaxis – however, it is not clear yet, if it's use is justified for epistaxis only. Patients can benefit from being taught how to pack their noses themselves as this gives them more self-control of the situation. This increases quality of life for them.

**TREATMENT OUTCOMES**

**G. Bachmann-Harildstad<sup>1</sup>**

<sup>1</sup>Akershus University Hospital, Lørenskog, Norway

Treatment outcomes

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The treatment outcomes in HHT are measured by several different tools. For the outcome of epistaxis, several questionnaires and diary approaches exist, for the measure of QoL, a Likert scale, the SF-36 and symptom specific QoL measures are mainly used and for the grading of HHT, a severity score has been introduced.

The level of evidence for medical and surgical treatment of HHT is generally low whereas systemic treatment with tranexamic acid is effective with level 1c. On expert opinion level, nasal humidification and relative low-risk medical therapy with tranexamic acid is considered treatment of first choice, followed by minimal invasive topical laser surgery for the reduction of epistaxis.

Patients with HHT showed a clear reduction in almost all aspects of health related QoL and in addition in several symptom specific QoL measures. The impaired QoL is bounded to the burden of epistaxis and to a lesser extend to pulmonary function. Live expectancy as a final outcome in HHT is reduced with an average of 3 – 15 years.

The way of measuring treatment outcomes in HHT is of utmost importance as the discrepancy between subjective and objective results and the "placebo" effect of topical nasal saline spray could recently be documented.

**ERS16-0840**

**SYMPOSIUM 33: JUNIOR MEMBER SYMPOSIUM: “FACIAL PLASTICS”**

**INSTRUCTIONAL LECTURE**

**H. Saleh<sup>1</sup>**

<sup>1</sup>, London, United Kingdom

Rhinoplasty is the heart of the facial plastic specialty. It is a difficult operation due to the wide variations of nasal anatomy and the patients' desires. The budding facial plastic surgeon spends his/her time learning this procedure with the ultimate aim of obtaining optimal and predictable results. There is no substitute to years of experience but following some rules may shorten the learning curve. I will introduce some tips and tricks and discuss how to improve training in rhinoplasty.



**NOVEL OUTCOME MEASUREMENT TOOL OF THE NASAL VALVE SURGERY: IMAGE ANALYSIS USING ENDOSCOPIC SYSTEM FOR SMARTPHONES**

***P. Surda<sup>1,1</sup>, A. Walker<sup>1</sup>, S. Little<sup>1</sup>, A. Toma<sup>1</sup>***

*<sup>1</sup>St Georges University Hospital, ENT, London, United Kingdom*

**Aims**

The aim of this study is to introduce the image analysis using endoscopic system for smartphones which seems to be a useful outcome measurement tool of the nasal valve surgery.

**Method**

This was a prospective study of 16 consecutive patients undergoing septorhinoplasty for unilateral or bilateral nasal blockage due to internal nasal valve collapse. Study measurements were obtained of internal nasal valve areas and angles from each side immediately prior to surgery and at 1 month follow up. SNOT-22 scores were also obtained from the initial clinic evaluation and from the post-operative follow up visit. The internal nasal valve angle and area measurements were taken from endoscopic photographs using the ImageJ software. The photographs themselves were captured using an endoscope attached to a mobile phone adapter (EIAS).

**Results**

Post-operatively, all 14 completing patients reported a subjective improvement in nasal blockage and demonstrated an increase in nasal valve area and nasal valve angle as evaluated with endoscopic image analysis using smartphones. A moderate positive correlation was seen between increases in cross-sectional nasal valve areas and SNOT-22 scores.

**Conclusion**

We conclude that EIAS of the internal nasal valve area could be a useful method to objectively evaluate surgical effectiveness. This has the advantage over other objective methods of measuring nasal airway of being rapid, low cost and easily performed in a clinic setting.

**FUNCTIONAL RESPIRATORY IMAGING-AIDED VIRTUAL PREOPERATIVE PLANNING IN NASAL SURGERY: TOWARDS A PERSONALIZED APPROACH**

***E. Ansari<sup>1</sup>, W. Vos<sup>2</sup>, C. Van Holsbeke<sup>2</sup>, P. Lefebvre<sup>1</sup>, A.L. Poirrier<sup>1</sup>***

<sup>1</sup>CHU SART TILMAN, ENT, LIEGE, Belgium

<sup>2</sup>Fluidda NV, Fluidda NV, Kontich, Belgium

**Aims**

Objective outcomes of functional nasal surgery are difficult to assess. The use of functional respiratory imaging (FRI) in rhinology is a novel concept. FRI is a combination of advanced 3D model reconstruction from medical imaging that is updated with computational fluid dynamics (CFD) in order to obtain objective measures of nasal airway dimensions combined with the subsequent physiology of the patient specific nasal airflow. It enables surgeons to preoperatively perform virtual surgery. In this study we evaluate the feasibility of FRI-based pre-operative planning of functional nasal airway surgery.

**Method**

Pre- and postoperative 3D nasal airway models were created based on cone beam computed tomographic images in a 55 year old man that underwent functional rhinoplasty including, septoplasty and internal nasal valve repair. Virtual surgery of the preoperative 3D model was performed. CFD calculations of nasal airflow, airflow distribution, and nasal airway resistance were performed in the pre-operative model, the model with virtual surgery and the post-operative model.

**Results**

When analyzing the effects of the virtual surgery we found a reduction of nasal resistance in both the nasal vestibule and the respiratory region. Also, a more homogenous distribution of airflow between the left and right side was observed. The post-operative nasal model demonstrated similar results.

**Conclusion**

FRI-aided virtual surgery may be useful in preoperative computation of functional outcomes of nasal surgery. It has the potential to allow surgeons to perform personalized nasal surgery using preoperative virtually simulated models. Automated and less labor-intensive models should facilitate surgeons to implement this tool in an outpatient setting.

**ASSESSMENT OF NASAL PATENCY USING BILATERAL AND UNILATERAL PEAK NASAL INSPIRATORY FLOW PRE AND POST SEPTORHINOPLASTY SURGERY**

***A. Kaura<sup>1</sup>, J. Joseph<sup>1</sup>, P. Andrews<sup>1</sup>***

*<sup>1</sup>Royal National Throat Nose and Ear Hospital- University College London Hospitals, Department of Rhinology, London, United Kingdom*

**Aims**

Measurement of Peak Nasal Inspiratory Flow (PNIF) is an easy and cheap method to assess nasal patency. PNIF correlates well with subjective measures in septorhinoplasty patients and is as accurate as anterior acoustic rhinomanometry in identifying nasal obstruction. This study assesses the suitability of PNIF as an objective measure of nasal patency before and after septorhinoplasty.

**Method**

Bilateral and Unilateral PNIF measurements (L/min) were obtained before and after septorhinoplasty. Data was collected between May 2015 and January 2016 from 20 patients undergoing septorhinoplasty. Three recordings were taken for each PNIF measurement and the best value was used in our analysis.

**Results**

The average follow-up time for this cohort was 12 weeks, at which point the post-op measurements were taken. The average improvement in bilateral PNIF was 67% from the pre-op value (range 25-138%), with 4 patients showing no improvement. Analysing the data for unilateral PNIF, specifically looked at the side of obstruction (lowest unilateral PNIF right or left), the average increase was 83% (range 17-300%), and 2 patients showed no improvement.

**Conclusion**

Our study demonstrates that patients have significant improvement in both unilateral and bilateral PNIF scores. PNIF should be a standard part of assessment in considering patients for septorhinoplasty, both useful in measuring initial nasal patency and the effect of surgical intervention. Objective clinical tools like PNIF are important in providing evidence that septorhinoplasty significantly benefits patients, and should therefore continue to receive funding and be offered as part of an ENT service.

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**ERS16-0847**

**SYMPOSIUM 34: THE MULTI-DISCIPLINARY TEAM IN COMPLEX RHINOLOGY**

**HHT**

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<sup>1</sup>*Monash Health, Otolaryngology Head & Neck Surgery, Melbourne, Australia*

Hereditary haemorrhagic telangiectasia (HHT) is a multisystem inherited disease. Whilst epistaxis is the predominant symptom for most patients, and can significantly affect their quality of life, they need more than just an ENT surgeon to manage their condition. The multidisciplinary team in HHT includes geneticists, haematologists, radiologists, gastroenterologists and neurosurgeons, amongst others. Screening for and managing the non-rhinological aspects of HHT is important, and having the relevant expertise available is vital for best patient care.

**UNITED AIRWAYS**

**S. Steinsvag**<sup>1</sup>

<sup>1</sup>, Bergen, Norway

**United airways**

The upper and lower airways are united both:

- Anatomically-Physiologically

- o The mucosal lining share several structural, functional and influential characteristics such as the respiratory epithelium and the non-specific and specific defense systems.

- Epidemiologically

Diseases in the two airway compartments frequently coexist.

- o A majority of patients with asthma have rhinitis.

- o Nasal polyps are associated with an increased incidence of asthma, as is chronic rhino sinusitis.

- o A majority of patients suffering from chronic obstructive pulmonary disease has symptoms from the nose.

- Pathophysiologically

Four pathophysiological mechanisms linking the upper and lower airways to each other are discussed.

- o Inflammatory reactions spreading between the airway compartments. Nasal allergen provocation may elicit inflammatory responses in the lungs and vice versa.

- o Direct, trans luminal spread of pathogenic substances between the upper and lower airways.

- o Anatomical differences between those suffering from global airway disease and those that does not.

- o Spread of disease between airway compartments through neurogenic pathways.

- Therapeutically

Medical and surgical therapeutical measures in the nose may positively influence on diseases in the lungs.

**DIFFERENT TYPES OF VASCULITIS - DIFFERENTIAL DIAGNOSIS**

**E. Prokopakis**<sup>1</sup>

<sup>1</sup>, Crete, Greece

Signs and symptoms of the sinonasal tract may be originated in any organ system. Distinguishing these from original sinonasal disease poses a great diagnostic challenge. The ENT specialist usually faces an unresponsive or relapsing case, with an atypical presentation. We address this issue by trying to provide a wider perspective when dealing with sinonasal manifestations.

A great variety of systemic conditions with sinonasal manifestations, including connective tissue, autoimmune, infectious, vascular, hematological, gastrointestinal, and endocrine diseases, are included. We address their distinguishing characteristics and diagnostic work-up.

The keys to dealing with such disorders are understanding the patterns in which systemic diseases can manifest, and using special diagnostic tools specific to each condition to confirm or rule out particular diagnoses.

**SURGICAL MANAGEMENT OF THE NOSE AND SINUSES IN VASCULITIS/GRANULOMATOSIS**

**P. Andrews**<sup>1</sup>

<sup>1</sup>, *United Kingdom*

SURGICAL MANAGEMENT OF THE NOSE AND SINUSES IN VASCULITIS/GRANULOMATOSIS

The surgical management of sino-nasal vasculitis depends on firstly whether the disease is active or not and secondly on their symptomology. In early onset ANCA associated vasculitis (AAV) the major symptoms are secondary to an active septal perforation which include crusting, bleeding and blockage. The late onset symptomology include internal and external nasal valve blockage, naso lacrimal duct blockage, aesthetic/saddle deformity and collumella and medial canthal skin defects.

As part of our MDT process, early onset ANCA associated Vasculitis (AAV) is primarily treated with immunosuppressive treatment, however surgical management of the septal perforation is often called upon and custom made reinforced sialastic splints are trialled. In our 10 year case series of 20 splint insertions we have a tolerance rate of 70%. In the remaining 30% the splints are removed almost immediately owing to the discomfort and lack of benefit. This is explained to all patients pre operatively. The splints are sutured anteriorly using 4/0 prolene and can be replaced annually.

In controlled and stable disease the septal and cartilaginous destruction leads to middle third collapse with resultant external and internal valve insufficiency and aesthetic deformity. Often the skin envelope is tight and non-forgiving. The work horse of our reconstructive process is rib osteocartilaginous (ROC) fixation owing to deficient septal and upper lateral cartilage and the need to plate the bony rib to the frontal bone as this is the only method of true fixation. The success of this procedure is dependent on ossification of the bony fixation and the free cartilaginous section allowing for further suture techniques. We present our 5 year long term results of the ROC technique in both active and inactive disease.



**RICH ALLERGEN CONTENT OF THE BOVINE DANDER EXTRACT IMPROVES DETECTION OF OCCUPATIONAL RHINITIS**

***L. Airaksinen<sup>1</sup>, H. Suojalehto<sup>1</sup>, I. Lindström<sup>1</sup>, J. Sund<sup>2</sup>, P. Pallasaho<sup>1</sup>, A. Puustinen<sup>2</sup>***

<sup>1</sup>*Finnish Institute of Occupational Health, Occupational Medicine, Helsinki, Finland*

<sup>2</sup>*Finnish Institute of Occupational Health, Systems biology, Helsinki, Finland*

**Aims**

The inconsistency of commercial bovine dander extracts hampers the diagnostics of IgE-mediated occupational rhinitis, asthma and contact urticaria. Our study aimed to investigate whether the in-house produced bovine dander extract differs from commercial extracts in allergenic potency and if it improves the prompt diagnostics of occupational rhinitis.

**Method**

Occupationally exposed patients underwent skin prick tests (SPT), and if occupational rhinitis was suspected, nasal provocation tests (NPT) were done, with in-house and concentrated commercial bovine dander extract. Specific IgE- protein reactions from the serums of patients with occupational rhinitis were studied and allergens were identified.

**Results**

Skin prick tests with the in-house extract showed more positive reactions than the tests using two commercial extracts (44 vs 34 vs 11%, respectively). Nasal provocation tests with the in-house extract showed more positive reactions than one commercial concentrated extract (86% vs 24%). SPT and NPT results of healthy controls were negative with the in-house extract. Allergen variety was wider and protein concentration higher in the in-house extract compared to the commercial extracts.

**Conclusion**

Bovine dander contains several potential allergens causing occupational diseases. The insufficient allergen content of the currently available commercial extracts may cause false negative reactions in skin prick and nasal provocation tests. In-house bovine dander extracts are still needed to obtain accurate diagnoses of occupational rhinitis.

## EFFECTIVENESS OF ANTILEUKOTRIENES IN THE TREATMENT OF NON-ALLERGIC EOSINOPHILIC RHINITIS

*E. De Corso*<sup>1</sup>, *R. Anzivino*<sup>1</sup>, *S. Baroni*<sup>2</sup>, *M. Romanello*<sup>1</sup>, *R. Cimorelli*<sup>2</sup>, *C. Autilio*<sup>2</sup>, *G.C. Passali*<sup>1</sup>, *W. Di Nardo*<sup>1</sup>, *C. De Vita*<sup>1</sup>, *M. Rigante*<sup>1</sup>, *G. Paludetti*<sup>2</sup>

<sup>1</sup>Policlinico Agostino Gemelli, Head and Neck Surgery, Rome, Italy

<sup>2</sup>Policlinico Agostino Gemelli, Biochemistry and Clinical Biochemistry, Rome, Italy

### Aims

The aim of our study was to evaluate the effectiveness of the selective antagonists of CysLT-1 receptor such as Montelukast in the treatment of symptomatic non-allergic eosinophilic rhinitis patients.

### Method

We studied 78 subjects (Mean age:41; Male:25; Female:53) suffering from symptomatic non-allergic eosinophilic rhinitis that underwent treatment with 10 mg montelukast in single administration for 2 months. All patients were asked to complete a rhinological questionnaire before and after treatment about different nasal symptoms such as rhinorrhoea, nasal obstruction, facial pain, sneezing, loss of smell, nasal itching, difficulty falling asleep, lacrimation and nocturnal awakening. The symptoms were scored by a visual analogic scale 0-10 points. For each patient we calculated a “composite score”(adding scores of each symptom analyzed). Patients were assumed as responders when a reduction of the composite symptoms score of at least the 50% respect the baseline was observed.

### Results

The mean composite symptoms score was significantly reduced from 39.41 to 20.73 after treatment( $p<0.001$ ). In our series 42 out of 78 patients(53,8%) were considered responders to the therapy. Patients with a familiar history of non allergic eosinophilic rhinitis, with blood hypereosinophilia and ASA intolerance showed a increased risk to be not responders. Asthmatic patients presented an increased probability to be responders.

### Conclusion

Our study suggests that patients affected by non allergic eosinophilic rhinitis may benefit from treatment with montelukast 10 mg per day. Further studies are needed to clarify the effectiveness of the drug and its mechanism of action and to accurately outline the most responsive patients to this therapy.

**INTRANASAL CORTICOSTEROIDS FOR NON-ALLERGIC RHINITIS: COCHRANE SYSTEMATIC REVIEW AND META-ANALYSIS**

***A. Gevorgyan<sup>1</sup>, C. Segboer<sup>2</sup>, S. Chusakul<sup>3</sup>, J. Kanjanaumporn<sup>3</sup>, S. Aeumjaturapat<sup>3</sup>, R. Reeskamp<sup>2</sup>, W. Fokkens<sup>2</sup>, K. Snidvongs<sup>3</sup>***

<sup>1</sup>University of Toronto, Department of Otolaryngology, Toronto, Canada

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<sup>3</sup>Chulalongkorn University, Department of Otolaryngology, Bangkok, Thailand

**Aims**

Non-allergic rhinitis (NAR) is diagnosed after exclusion rhinosinusitis, allergic and anatomic causes. Treatment of NAR includes trigger avoidance, oral and topical nasal antihistamines, intranasal and rarely systemic corticosteroids, and anticholinergics (ipratropium bromide), intranasal injection of botulinum toxin type A, intranasal saline rinse, local and systemic sympathomimetics and cromolyn sodium. A recent Cochrane systematic review showed that capsaicin may be an option in the treatment of idiopathic NAR, as it appears to have beneficial effects on overall nasal symptoms up to 36 weeks after treatment, based on a few, small studies.

The objective of this study was to assess the effectiveness of intranasal corticosteroids (INCS) in the management of NAR compared with no therapy, placebo or other topical or systemic medications, or two or more of the above therapies in combination, or different intranasal corticosteroids regimens.

**Method**

We performed a Cochrane systematic review and meta-analysis.

- Types of studies: randomised controlled trials, irrespective of publication status, date or language
- Types of participants: patients with non-allergic rhinitis
- Types of interventions: INCS
- Types of outcomes: overall symptom scores, individual symptom scores, adverse events, and objective measures.

**Results**

A meta-analysis was possible only with one outcome - total nasal symptom score for the comparison of INCS vs. placebo. Preliminary analysis of 7 included studies suggests no significant difference between INCS and placebo groups (standardized mean difference, -1.84, 0.07; 95% CI). Further results will be presented.

**Conclusion**

INCS are an option in treatment of non-allergic rhinitis, however preliminary results suggest no significant effect compare to placebo.

## LOCAL ALLERGIC RHINITIS (LAR) IN JAPAN

S. Matsune<sup>1</sup>, M. Ishida<sup>1</sup>, N. Wakayama<sup>1</sup>, Y. Yuma<sup>1</sup>, Y. Satoshi<sup>1</sup>, S. Kuwon<sup>1</sup>, K. Okubo<sup>2</sup>

<sup>1</sup>Nippon Medical School Musashikosugi Hospital, Department of Otolaryngology, Kawasaki, Japan

<sup>2</sup>Nippon Medical School Hospital, Otolaryngology- Head and Neck Surgery, Tokyo, Japan

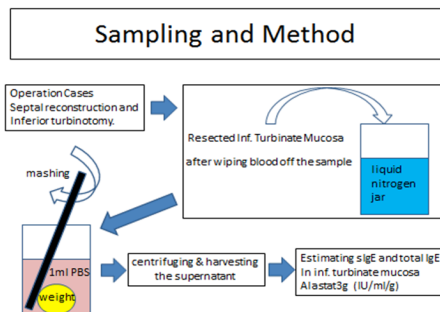
### Aims

Local allergic rhinitis (LAR) is a localized nasal allergic response in the absence of systemic atopy characterized by local production of specific Ig E (sIgE) antibodies in nasal mucosa, which was for the first time reported in 1975 as an allergic rhinitis case sensitized by house-dust mite. In 2000's, many reports have been published about the concept, pathophysiology and management of LAR mainly in Europe. In Japan, however, few clinical reports have been found yet about the exact entity of LAR. We estimated, as a pilot study, sIgE level in inferior turbinate mucosa and blood serum in operation cases.

### Method

During operation, resected inferior turbinate mucosa was immediately stored in the liquid nitrogen jar after wiping blood off the sample. (Figure 1) Obtained inferior turbinate mucosa was weighed and mashed for 5 minutes in 1ml PBS followed by centrifuging and harvesting the supernatant, which was stocked at -40°C in the deep freezer. Antigen specific and total IgE levels in the inferior turbinate mucosa were quantified by Alastat3g (SIEMENS) (IU/ml/mg) and compared with ones in blood serum (range; 0.1 ~ 500 IU/ml).

Figure 1



### Results

In 13 cases with negative systemic atopic data, positive mucosal sIgE data anti-mite and/or Japanese cedar pollen were shown in 3 cases (23%). These 3 cases showed eosinophil positive in the nasal smear after the antigen provocation test.

### Conclusion

LAR was confirmed as allergic rhinitis both by mite and Japanese cedar pollen allergen. LAR in Japan update is to be reported and reviewed.

## THE EFFECT OF ALLERGIC RHINITIS ON CHOROIDAL THICKNESS

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<sup>2</sup>Bezmialem Vakif University School of Medicine, Department of Ophthalmology, Istanbul, Turkey

### Aims

Allergic rhinitis is an inflammatory disease that develops through immunoglobulin E (IgE) in the rhino-ocular mucosa due to allergy. The main symptoms are runny nose, nasal congestion, sneezing and itchy nose. This study was designed to investigate the effect of allergic rhinitis on choroidal thickness.

### Method

The study included 61 patients with allergic rhinitis and 35 healthy subjects. Patients in both groups underwent skin prick test. In allergic rhinitis patients and healthy persons; subfoveal, temporal and nasal choroidal thickness measurement was performed. The choroidal thicknesses were measured without pupil dilation using the Spectralis Optical Coherence Tomography (OCT).

### Results

In the subfoveal and temporal region, choroidal tissue was followed up significantly thicker in allergic rhinitis patients statistically compared to healthy persons ( $p=0.031$ ,  $p=0.049$ ). However, no significant difference was followed up between the nasal choroidal thickness measurements statistically ( $p=0.54$ ). Runny nose (67.2%), sneeze (65.5%), stuffiness (62.2%), itching of the nose (40.9%), and nasal discharge (21.3%) complaints were observed significantly higher in the group having allergic rhinitis.

### Conclusion

The effect of allergic rhinitis on choroidal thickness were assessed and compared with the control group. Our study revealed that there was significant association between increased choroidal thickness and allergic rhinitis. Allergic sensitivity may play an important role in increased choroidal thickness.

**NASAL SENSITIVITY TO MUSTARD OIL AND SELF-REPORTED NASAL HYPERREACTIVITY PREDICT THE THERAPEUTIC RESPONSE OF CAPSAICIN IN IDIOPATHIC RHINITIS PATIENTS**

***L. Van Gerven<sup>1</sup>, Y. Alpizar<sup>2</sup>, B. Steelant<sup>3</sup>, E. Dekimpe<sup>1</sup>, I. Kortekaas<sup>3</sup>, K. Talavera<sup>2</sup>, P. Hellings<sup>1</sup>***

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<sup>3</sup>KULeuven, Clinical Immunology, Leuven, Belgium

**Aims**

**Background:** The therapeutic action of capsaicin in idiopathic rhinitis (IR) is based on the ablation of the TRPV1-Substance P nociceptive signaling pathway (1).

**Aims:** To study the effects of capsaicin treatment on the afferent innervation of the nasal mucosa by monitoring trigeminal nerve activity and to identify prognostic factors on therapeutic outcome.

**Method**

A double-blinded placebo-controlled trial with capsaicin spray was performed involving 33 IR patients and 12 healthy controls (HC.) Before and at 4, 12 and 26 weeks after treatment, nasal mucosal potentials (NMP) were evoked by exposing nasal mucosa to an aerosol with increasing doses of the TRP-agonist allyl isothiocyanate (=mustard oil, MO). The threshold was determined for each individual. The results of the NMP measurements were evaluated in parallel with therapeutic response, VAS for nasal symptoms and nasal hyperreactivity (NHR).

**Results**

At baseline, the MO-threshold was significantly lower for IR patients compared to HC ( $P= 0.043$ ). Capsaicin treatment of IR patients induced a shift towards higher MO thresholds at 4 and 12 weeks ( $P= 0.047$  and  $P= 0.012$  resp.). The shift in MO threshold correlated with changes in VAS major symptom and total symptom score ( $P= 0.024$ ). IR patients with lower baseline MO-threshold and self-reported NHR were significantly better responders to capsaicin compared to IR patients with higher thresholds to MO and no NHR ( $P= 0.0150$  and  $P= 0.0002$  respectively).

**Conclusion**

The lower threshold for MO in IR as well as the reduced threshold after capsaicin treatment confirms the role of TRPV1 and TRPA1 in the pathophysiology of IR.

**EVALUATION OF NON-SELECTIVE CHEMOKINE LEVELS IN NASAL SECRETIONS OF PATIENTS WITH NON-ALLERGIC RHINITIS WITH EOSINOPHILIA SYNDROME AND PERENNIAL ALLERGIC RHINITIS**

***A. Peric<sup>1</sup>, J. Sotirovic<sup>1</sup>, C. Spadijer Mirkovic<sup>1</sup>, D. Vojvodic<sup>2</sup>***

<sup>1</sup>Military Medical Academy, Department of Otorhinolaryngology, Belgrade, Serbia

<sup>2</sup>Military Medical Academy, Institute for Medical Research- Division of Clinical and Experimental Immunology, Belgrade, Serbia

**Aims**

An increased production of several chemoattractants, responsible for guiding the eosinophilic inflammatory process, has been reported in chronic rhinitis. The aim of this study was to evaluate nasal secretion levels of monocyte chemoattractant protein-1 (MCP-1), MCP-3 and regulated on activation normal T cell expressed and secreted (RANTES) and to correlate those levels with nasal symptoms and degree of eosinophilia in patients with non-allergic rhinitis with eosinophilia syndrome (NARES) and perennial allergic rhinitis (PAR).

**Method**

Fourteen patients with PAR and 14 NARES patients were recruited for this cross-sectional study. Fourteen healthy subjects were included as controls. The concentrations of MCP-1, MCP-3 and RANTES in nasal secretions were measured using enzyme-linked immunosorbent assay (ELISA). Eosinophil counts were performed by percentage of differential granulocyte counts during cytological examination of scraped nasal mucosa obtained from the inferior turbinate. Therefore, we scored rhinitis patients according to nasal symptom score.

**Results**

We found significantly higher concentrations of MCP-1 ( $p < 0.0001$ ), MCP-3 ( $p = 0.018$ ) and RANTES ( $p < 0.0001$ ) in nasal fluid of NARES patients compared to patients with PAR. In PAR patients, we found positive correlation between RANTES levels and nasal symptom score and eosinophil counts. In patients with NARES, the concentrations of MCP-1 and RANTES were associated with nasal symptom score and percentage of eosinophils.

**Conclusion**

NARES is characterized by higher degree of eosinophilic inflammation than PAR. RANTES correlate well with the level of eosinophilic inflammation in both diseases. The measurement of chemokine levels in nasal secretions could be useful in evaluating the degree of chronic nasal inflammation.

**ENDOSCOPIC TRANSNASAL SPHENOIDOTOMY: THE BULLA DOWN TECHNIQUE FOR SINUS AND SKULL BASE PATHOLOGY**

**M. Al-Qudah**<sup>1</sup>

<sup>1</sup>Jordan University of Science and technology, Irbid, Jordan

**Aims**

Endoscopic transnasal sphenoidotomy is a well-described approach to access sphenoid sinus for different sinus and skull base pathologies management. Although this approach is the least invasive physiological approach to sphenoid sinus, it usually required trimming the superior or the middle turbinate which might lead to intra or postoperative complications.

**Method**

A retrospective charts and medical records review for 550 consecutive sinonasal surgeries performed by a single surgeon at tertiary, academic center from August 2010 to December 2015.

**Results**

In the bulla down technique, the uncinat process and ethmoid bulla removed. This allowed easily lateralized the middle turbinate to fully expose the sphenoethmoid recess and the superior turbinate. It also creates an enough posterior space for handling the instruments. Over the studied period we have been used this technique without reported any major surgical complications.

**Conclusion**

Bulla down technique is safe, easy to follow and effective method to approach sphenoid sinus to treat different medical conditions in the sinus and surrounding structures.



**ANATOMIC VARIATIONS OF THE PARANASAL SINUSES**

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**Aims**

Due to close proximity of the sinuses to the orbits, brain and other structures, surgeons should be aware of sinonasal anatomy and associated variations.

**Method**

Retrospective review of 150 consecutive adult paranasal sinus CT scans performed in a district hospital in 2015. The demographic variables and anatomic variations were analyzed.

**Results**

A total of 75 scans fulfilled the research criteria. Each CT was thoroughly evaluated in the left and right side, resulting in a total of 150 evaluations.

The mean age was 48 years, with 52% males. The uncinat process was attached to lamina papyracea (LP) in 56%, to middle turbinate in 11% and to skull base in 33%. We found absent frontal sinus (FS) in 6% and hypoplastic FS in 15%, LP defect in 11%, anterior ethmoidal artery dehiscence in 29%, Onodi cell in 16%, optic nerve exposure in 28% and internal carotid artery exposure in 19%, amongst other anatomic variations and defects described in the full presentation. The mean lateral lamella height was significantly higher in males (3.28 vs. 2.75 mm, T test  $p=0.009$ ). The female gender correlated significantly with the presence of hypoplastic maxillary sinus ( $p<0.001$ ) and a medial LP ( $p=0.01$ ). Male gender correlated significantly with an absent frontal sinus ( $p=0.02$ ). Additionally, there was a correlation between pneumatized anterior clinoid process and exposure of optic nerve ( $p=0.048$ ).

**Conclusion**

A careful CT evaluation preoperatively is essential to achieve better surgical outcomes and lower complication rates.

**DECONGESTANT USE IN SINONASAL SURGERY**

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**Aims**

The nasal mucosa is very vascular, receiving more blood flow per cubic centimeter of tissue than does muscle, brain or liver. This vascularity can present a major problem during sinus surgery. Surgeons routinely use topical vasoconstrictors in endoscopic sinus surgery however, the optimal regimen is not clear. Imidazoline nasal sprays are often used up to 1 hour before sinonasal surgery to aid in intra-operative vasoconstriction. After the induction of anesthesia, epinephrine-based topical and submucosal preparations are subsequently administered to further enhance vasoconstriction.

**Method**

A literature search and analysis was undertaken to investigate the potential antagonistic role of imidazolines when used with epinephrine in sinus surgery.

**Results**

Imidazolines are non-selective, partial alpha adrenoceptor agonists with a higher affinity, yet lower potency, for alpha adrenoceptors when compared to epinephrine. It is hypothesized that imidazolines block the action of epinephrine on the alpha adrenoceptors of the nasal mucosa resulting in less vasoconstriction, and a poorer intra-operative field, when compared to the use of epinephrine alone.

**Conclusion**

This paper hypothesizes that preoperative imidazoline administration may adversely affect optimal intra-operative vasoconstriction.

**FAT GRAFT TRANSFER FOR THE MANAGEMENT OF CHRONIC REFRACTORY MAXILLARY SINUSITIS ( CRMS): INTRODUCING STEMM CELLS IN THE MANAGEMENT OF CRMS ?**

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**Aims**

Chronic refractory maxillary sinusitis (CRMS) is challenging for rhinologists and incapacitating for patients. Treatment options are limited. We postulate that an attempt to regenerate new epithelium using mesenchymal stem cells in abdominal adipose tissue may successfully treat CRMS.

**Method**

A 58 year old male with a four year history of left sided CRMS and refractory to standard treatment (patient 1) and a 39 year old male with a 3 year history of recalcitrant right sided CRMS resistant to maximal medical and repeat surgical therapy (patient 2) were offered a unique therapeutic option : revision maxillary sinus surgery with complete stripping of the sinus mucosa, an adipose tissue autograft to re-line the sinus and a pedicled naso-septal flap overtop. Patient 1 was placed on intravenous antibiotics for 6 weeks post-operatively while patient 2 received enteral antibiotics in the immediate post-operative period.

**Results**

Patient 1 reported constant improvement in the post-operative period with complete resolution of all symptoms at 5 and 12 months. Patient 2 improved symptomatically, however, a mild surgical site infection at 6 weeks post op improved with additional antibiotic treatment. Healthy looking sinus mucosa replacing the fat graft at 3 months post-op was noted in both cases.

**Conclusion**

We suggest a potential novel solution for CRMS. The introduction of adipose tissue in a single stage surgery potentially allows healthy adipose derived mesenchymal stem cells to help develop new epithelium correcting the underlying abnormality in CRMS. Adequate antibacterial coverage with intravenous antibiotics appears to be an important adjunct in the early post-operative period.

**THE INCREASING INCIDENCE OF PARANASAL ORGANIZING HEMATOMA: A 20-YEAR EXPERIENCE OF 23 CASES AT A SINGLE CENTER**

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**Aims**

Sinonasal organized hematoma is a rare, benign disease that can be locally aggressive and may be mistaken for malignancy. Because of its rarity, the clinical characteristics are not well known. The aim of this study is to investigate the distinguishing features of organized hematoma with an emphasis on incidence change.

**Method**

In this retrospective study, we reviewed the records of 23 patients with organized hematoma confirmed histopathologically among 5,378 patients who underwent endoscopic sinus surgery performed by a single surgeon from January 1995 to December 2014 at a tertiary care center. Clinical symptoms, endoscopic photography, computed tomography, and operative findings were reviewed. Age, site, origin subsite and histopathology were investigated. A statistical review was performed using R 3.1.2 to examine incidence change.

**Results**

The most common complaint was frequent epistaxis and nasal obstruction (52.1%). Of the 23 patients, eight were women and 15 were men with an age range of 18 to 75 years. (mean 38.9 years). Nine of these hematomas occurred on the right side and 14 on the left side. The predominant occurrence site was the antrum (65%), followed by the septum (17.3%), inferior turbinate (8%), and ethmoid sinus (8%). The incidence steadily increased over 20 years.

**Conclusion**

Investigation of the clinical characteristics and incidence change of organized hematoma can provide useful information. Through analysis of the 23 cases in our study, the age distribution was bimodal and the incidence of organizing hematoma was observed to steadily increase. Clinicians should be aware of these characteristics to avoid misdiagnoses of malignant tumors.

**CLINICAL MANIFESTATIONS OF SINONASAL HEMANGIOMA**

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**Aims**

Hemangioma of the skin tissue is a common benign vascular lesion. It rarely involves the mucous membrane, the nasal cavity and paranasal sinus is an uncommon lesion. It has to be added to differential diagnosis of a nasal cavity mass presenting as epistaxis.

**Method**

We performed a retrospective analysis of 23 patients diagnosed with hemangioma in Chonbuk National University Hospital between January 1995 and December 2014. Clinical symptoms, endoscopic photography, computed tomography, operative findings were reviewed. We also systematically reviewed all literature that contained previously diagnosed cases as sinonasal hemangioma. Age, sex, site, origin subsite and histopathology were investigated.

**Results**

The most common complaint was nasal obstruction (13/23, 56.5%), followed by epistaxis (12/23, 52.1%). Of these 23 patients, twelve were women and 11 were men with an age range of 4 to 80 years.(mean 40.1 years). Nine of these patients were left side and 14 were right side. Predominant subsite were inferior turbinate(39.1%), followed by septum(34.8%), uncinated process(13.0%), middle turbinate(8.6%). Statistical review was surveyed with SPSS 20.0, looking at age, site, subsite and clinical manifestation.

**Conclusion**

To our knowledge, there are several case reports and paucity of review about sinonasal hemangioma. It is worth to investigate clinical characteristics and statistical review of this disease. Clinicians should be aware of these characteristics that may be misdiagnosed as malignant tumor or angiofibroma or other benign mass.

**MUPIROCIN SALINE IRRIGATION AS AN ALTERNATIVE TREATMENT OPTION FOR RECURRENT CHRONIC RHINOSINUSITIS: A RANDOMIZED CONTROLLED STUDY**

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**Aims**

Recurrent Chronic rhinosinusitis (CRS) is a challenge to many otorhinolaryngologists. Mupirocin have an antimicrobial effect to Staphylococcus aureus infection. Mupirocin saline irrigation may be an alternative option for recalcitrant sinusitis.

**Method**

This study is a prospective, double-blinded, placebo-controlled study. Sixty CRS patients with persistent sinonasal infection despite antibiotics therapy was divided into two groups. They received either a 1-month, eight times daily treatment course of pure saline or mupirocin saline irrigation. The primary outcome was checked by radiological change and symptom score.

**Results**

Mupirocin group had an excellent outcome, which include 24/30 (80.0%) improved radiologically at 1 month, compared to 15/30 (50.0%) of control group (P < 0.01). Improvement in subjective outcomes was more evident in mupirocin group than in control group.

**Conclusion**

Mupirocin saline irrigation is an effective treatment in recalcitrant CRS . We expect further study of mupirocin irrigation will be investigated using molecular biology.

**NASAL NEBULISATION OF TOBRAMYCIN: PRECLINICAL AND CLINICAL STUDY ON POST-OPERATIVE SUPPURATIONS IN NASAL POLYPOSIS PATIENT**

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**Aims**

The choice of nasal treatment for patients is mainly conducted by EPOS guidelines. Treatments concern saline irrigation, spray of corticosteroid, oral antibiotherapy. Nasal nebulisation or topical antibiotherapy are not recommended due to the lack of clinical evidence.

This study presents the preclinical and clinical results of the evaluation of tobramycin administered by nasal nebulisation in nasal polyposis (NP) patients.

**Method**

Patients with NP often present recurring suppurations even after ethmoidal surgery.

The 4 preclinical steps of the study were: (1)Bacteriological study of ethmoid specimens from NP patients obtained after ethmoidal surgery, (2)Selection of the antibiotic molecule, (3)Development of a new nasal nebulizer (Easynose®) for the drug and patients, (4)In vitro and in vivo drug deposition measurements with Easynose®.**Results**

The type of bacteria involved in these post-operative exacerbations was predominantly identified as S. aureus. Tobramycin (150mg, Erempharma) was selected for nasal nebulisation treatment. Aerosol delivered with Easynose allows 99% of deposition in nasal cavities including ethmoid and sinuses.

Tobramycin was nebulized in 72 post-operative NP patients who presented nasal suppurations. After 7-days of treatment, significant bacteria eradication was reported, vs. serum physiology treatment (respectively 46.9% and 17.4% of eradication; p=0.02).**Conclusion**

As conclusion, tobramycin administered by nasal nebulisation is efficient for nasal bacteria eradication.

**THE EFFICACY OF BALLOON DILATION IN THE FRONTAL RECESS**

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**Aims**

Balloon dilation of the sinus ostium is a relatively new tool in the management of chronic rhino-sinusitis. Although studies of its safety and application have been reported, its efficacy in specific indications has not yet to be clearly defined. The purpose of this study was to evaluate the effectiveness of balloon dilation of the frontal recess in the management of chronic rhino-sinusitis of the frontal sinus.

**Method**

This was a retrospective study of 150 patients who presented with chronic frontal sinusitis that had failed medical therapy and required operative intervention. The patients were between 6 and 78 years old. Balloon dilation of the frontal recess was performed in 112 patients. The Stammberger frontal surgery “uncapping the egg” was performed in 36 patients. Another two patients received the Draf procedure. The clinical success rate and surgical success rate were calculated by survival analysis.

**Results**

After a follow-up of 3-24 months, balloon dilation is feasible when the frontal sinus is involved. There were 11 (9.82%) edema of ostium, no stenosis and no complete closure in the group of balloon dilation. No major complications were observed. There were four patients in the group of Stammberger frontal surgery needed revision surgery because of severe stenosis. The two patients who received the Draf procedure were no stenosis and the ostium of frontal sinus was open well.

**Conclusion**

Balloon dilation of the frontal recess is a relatively safe and effective tool in the management of chronic frontal rhinosinusitis after intensive medical treatment has failed.



**CYCLAMEN EUROPAEUM EXTRACT IMPROVES THE EFFECT OF ORAL ANTIBIOTICS ON CHRONIC RHINOSINUSITIS EXACERBATIONS AND RECURRENCES: A REAL-LIFE OBSERVATIONAL STUDY**

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**Aims**

Chronic rhinosinusitis (CRS) is an inflammatory disease of the nose and paranasal sinuses affecting 11% of European population. *Cyclamen europaeum* (CE) extract has demonstrated efficacy in treating acute rhinosinusitis but its role in CRS exacerbations remains unknown. The objective of this study was to evaluate the efficacy of CE, in monotherapy or in combination with oral antibiotics, in acute exacerbations of CRS without nasal polyps.

**Method**

In this prospective observational real-life study, 317 patients with exacerbations of CRS of moderate severity were treated using three different options: oral antibiotics (3-6 days), CE nasal spray (8 days), or combination of oral antibiotics with CE. The main outcomes were: effect of treatment on sinonasal symptoms and endoscopic appearance after 6 weeks, and the number of CRS exacerbations after 6 months of follow-up.

**Results**

After 6 weeks, CE in monotherapy ( $0.76 \pm 0.12$ ;  $p < 0.001$ ) or added to oral antibiotics ( $0.78 \pm 0.16$ ;  $p < 0.001$ ) reduced Total Nasal Symptom Score compared to baseline ( $7.93 \pm 0.25$  and  $8.80 \pm 0.29$ ; respectively) and significantly higher ( $p < 0.001$ ) than antibiotics alone (from  $8.23 \pm 0.34$  to  $1.70 \pm 0.22$ ). On the top of oral antibiotics, CE significantly improved sinonasal endoscopic findings ( $p < 0.001$ ) and caused a 4-fold reduction ( $p < 0.01$ ) of CRS exacerbations in the next 6 months compared to oral antibiotics alone.

**Conclusion**

In patients with moderate CRS exacerbations, CE nasal spray, alone or in combination with oral antibiotics, reduces sinonasal symptoms and inflammation, and prevents CRS exacerbations to a higher extent than standard oral antibiotic therapy.

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**REOPERATION POST MODIFIED ENDOSCOPIC LOTHROP PROCEDURE**

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**Aims**

Modified endoscopic Lothrop procedure (MELP) is an effective surgical method of treating different pathologies of frontal sinus resistant to conservative therapy or to treating by less invasive surgical procedures. This technique involves removal of the floor of the frontal sinus extending from orbit to orbit through a superior septum nasal defect.

**Method**

From 2010 to 2015 60 patients were operated using this procedure. Indications were chronic sinusitis with or without polyps, mucocele, osteoma, Sjögren's syndrome, inverted papilloma and iatrogenic complications. Efficacy of the treatment understood as lack of restenosis of frontal sinus ostium was 83,34%. Until February 2016 ten patients had reoperation, which included excision of adhesions, scars, polyps; dilating sinus ostia and removing mucopurulent discharge.

**Results**

In 4 patients reoperation was performed twice. In 8 patients reoperation was combined with use of Hydrodebrider. In 2 patients, due to dense effusion in middle ear cavity, ventilation tubes insertion was performed simultaneously with sinus reoperation. 4 patients had a history of Samter's triad.

**Conclusion**

In majority of patients post MELP, patency of frontal sinus ostium was preserved for years, but in every six patient resurgery was needed to be done. Further follow-up will show whether this tendency will remain on the same level.

## AERODYNAMIC CRITERIA OF OSTIUM OF MAXILLARY SINUS THAT FUNCTIONS NORMALLY

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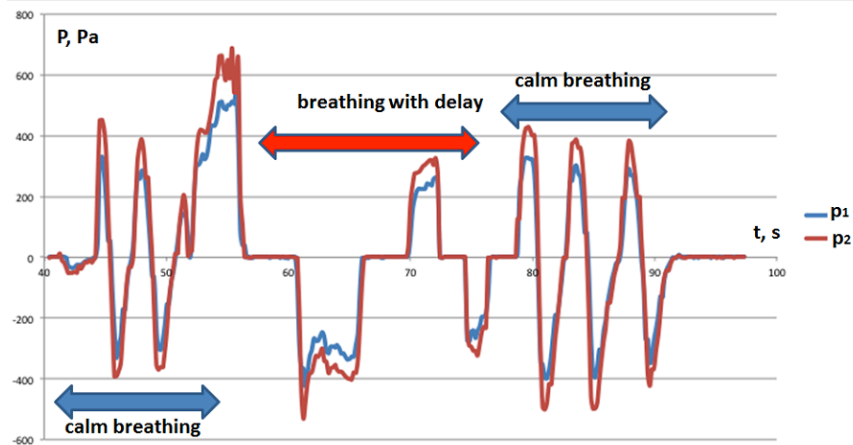
The aim of the current study is to investigate the behavior of air pressure during nasal breathing in maxillary sinus when ostium and nasal cavity function normally.

**Method**

We selected 32 patients with foreign bodies in maxillary sinus (fitting material). All of patients didn't have a nasal breathing problems and chronic inflammatory pathologies. We performed the endoscopic surgical approach through the anterior wall of the maxillary sinus. We used a double-channel digital computer system for measurement of pressure. A method of measurement is the following: pressure in maxillary sinus is measured through perforated anterior wall during intervention. At the same time, the pressure is measured in a nasopharynx, opposite obturated nostril according to active anterior rhinomanometry method.

**Results**

The result of measurement is shown in figure, where  $p_1$  – pressure in maxillary sinus,  $p_2$  – pressure in the nasopharynx.

**Conclusion**

We conclude that change of pressure in the maxillary sinus occurs synchronously with the change of pressure in the nasopharynx. The changes of pressure in the maxillary sinus have less amplitude than pressure in the nasopharynx (from 10 to 200 Pa at the peak). Both inspiratory and expiratory pressure in the nasopharynx and maxillary sinus simultaneously aligned with atmospheric when a patient starts to hold the breath.

**PRIOR TURBINATE REDUCTION SURGERY AS A FACTOR INFLUENCING SLIT COMPLIANCE**

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**Aims**

Allergic rhinitis affects approximately 20% of people in Australia and can significantly impact quality of life. A congested nose is often one of the main presenting complaints. Specific immunotherapy is beneficial in switching off the allergic drive and thus improving patient's symptoms but does little to reverse changes that have already occurred, such as turbinate hypertrophy. The influence of turbinate reduction on compliance with immunotherapy, is assessed.

**Method**

A case-control study of SLIT patients at a tertiary rhinologic clinic was performed. Patients were selected for based on epicutaneous testing to confirm a clinically relevant antigen to their symptoms. Patients were considered to have had turbinate surgery if performed during the 3 years prior to commencing SLIT. Non-compliance with SLIT was defined as patients who had actively given up therapy or had not ordered within the last 12 months. Comparison was performed with Chi-squared analysis.

**Results**

One hundred and five patients (42.2% female, age 27.87±13.74yrs) were assessed, with 41.3% of patients failing to complete the course. Prior turbinate surgery was noted in 35% of SLIT patients. SLIT patient who had undergone turbinate surgery were more likely to be males (71.4% v 48.1%, p=0.045) but were of a similar age (29.59±11.05yrs v 27.73±14.45, p=0.56). The difference in dropouts favoured the prior turbinate surgery group (50% v 28.8%, p=0.07) but was not statistically significant.

**Conclusion**

In this population men were more likely to have had prior surgery, but women women were more likely to drop out (p=0.24). The factors contributing to dropouts will be further assessed.

**COMPARISON OF MEDICAL THERAPY AND BALLON DILATION SINUS SURGERY IN CHILDREN WITH CHRONIC SINUSITIS**

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**Aims**

Our study is to compare the outcomes of the medical therapy and the balloon dilation sinus surgery in children with chronic sinusitis.

**Method**

This is a prospective review of children who had surgery for CRS between January 2010 and February 2015. Forty-six pediatric patients with chronic sinusitis alone, aged between 6 to 12 years with average age of 8 years (SD, 2.5), are divided into 2 groups. In group I, twenty-two cases were kept on treating by medicine, whereas twenty-four cases in group II were treated by balloon dilation sinus surgery (balloon catheter dilation in maxillary ostium). The main outcome measures were the SN-5 score and visual analog scale (VAS). Outcomes are evaluated at 3 months after treatments (the medical therapy and the balloon dilation sinus surgery).

**Results**

The different treatment approaches had the different results in group I and II. The group I had improvement that mean the SN-5 and VAS scores were significantly lower ( $p < 0.01$ ) in only 20% of its subjects under medical treatment but not significantly changed in 80%, and in group II the sinus balloon catheter dilation (SBCD) had been used for improvement in 92.2% ( $p < 0.01$ ). The outcomes (rates of improvement) of the medical therapy and the balloon dilation sinus surgery in children with chronic sinusitis were significantly different ( $P < 0.001$ ) at 3 months after treatments.

**Conclusion**

Our study demonstrates that balloon dilation was effective in children with chronic sinusitis who were compared with medical therapy. Balloon catheter dilation could be recommended prior to proceeding to functional endoscopic sinus surgery in children with chronic sinusitis.

**RETROMAXILLARY POSTERIOR ETHMOIDS: HERZALLAH VS. HALLER CELLS NOVEL DESCRIPTION & IMPACT IN REVISION CASES**

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**Aims**

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**Objectives:** Retromaxillary pneumatization of posterior ethmoid (PE) air cells is an area that is yet to have appropriate description in rhinologic literature.

**Method**

First, 524 sides in 262 paranasal sinus CT scans were analyzed: 350 normal sides were examined for PE pneumatization lateral to the sagittal plane of the medial wall of maxillary sinus posteriorly, and 174 diseased sides were similarly reviewed to check how pathology may affect identification and measurements. Following that, 153 operated sides in 84 cases prepared for revision endoscopic sinus surgery (ESS) were studied for the rate of residual diseased cells at different anatomical locations.

**Results**

Overall, retromaxillary PE pneumatization was identifiable in 416 of the 524 sides (79.4%). Lateral retromaxillary extension was bounded anteroinferiorly by the junction between the posterior and superior walls of the maxillary sinus. Three cell types were described depending on the degree of lateral extension (Type I: < 3 mm; Type II: 3-6 mm; Type III > 6 mm). This cell (that we also refer to as *Herzallah cell*) was distinguishable from the anterior ethmoid Haller cell, and was found to have residual disease in 50.3% of cases prepared for revision ESS.

**Conclusion**

Retromaxillary PE cells vary considerably in depth and require attention during ESS. Residual undissected retromaxillary cell is a common finding in revision ESS and can contribute to inadequate disease clearance.

**CLINICAL ANALYSIS OF EOSINOPHILIC CHRONIC RHINOSINUSITIS**  
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**Aims**

ECRS was summarized as an entity of intractable chronic sinus inflammation accompanied by numerous infiltrations of activated eosinophil in the paranasal sinus mucosa and/or nasal polyps. A clear definition of ECRS has not established. The aim of the study is to compare the clinical findings of ECRS and non-ECRS in Korean population.

**Method**

Four hundred eighty six patients undergoing endoscopic sinus surgery in Kyung Hee university medical center from March 2013 to January 2014. We investigated allergic sensitization, asthma, atopic dermatitis, subjective symptom, olfactory function test, blood test including eosinophil and Ig E and CT scoring.

**Results**

Prevalence rate of ECRS reaches approximately 11 percentages of CRS patients in Korea. ECRS group had higher percentage of asthma history( $p=0.036$ ) Lower scores at discrimination( $p=0.031$ ) and threshold( $p=0.050$ ) in olfactory function test and higher peripheral eosinophil count( $p<0.001$ ) were seen in ECRS group. In CT scan imaging by Lund Mackay system and olfactory cleft scoring, ECRS group showed higher scores at anterior-Es( $p<0.001$ ), posterior-Es( $p<0.001$ ), Fs( $p<0.001$ ), Oc( $p<0.001$ ) and total score.( $p<0.001$ ) In endoscopic examination, which was done after operation, polypoid mucosa( $p<0.001$ ), granulation tissue( $p=0.002$ ), MP discharge( $p=0.010$ ) were higher in ECRS group.

**Conclusion**

If Eosinophilic Polyp has observed, more careful observation is required. In case of ECRS group, possibility of recurrence after the surgery must be observed through more detailed follow-up.

**LOWER AIRWAY INFLAMMATION IN PRIMARY CARE PATIENTS WITH CHRONIC RHINOSINUSITIS WITH NASAL POLYPS NEVER REFERRED FOR SINUS SURGERY: A PROSPECTIVE, CROSS-SECTIONAL STUDY**

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**Aims**

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a common inflammatory disorder of the upper airways and concomitant lower airway disease is frequently found in these patients—inside as well as outside tertiary hospitals. In a recent study we showed that 44% of primary sector patients with CRSwNP who have never undergone sinus surgery had asthma. Therefore, we hypothesize that inflammation of the lower airways could be present in all CRSwNP patients independently of asthma status. Here, we aim to investigate the degree of lower airway inflammation using exhaled nitric oxide and lung function in CRSwNP patients from the primary sector who have never undergone sinus surgery and compare these with healthy controls.

**Method**

Fifty-seven patients who met the EPOS criteria for CRSwNP were prospectively recruited from nine private ear, nose and throat clinics in the Copenhagen area. Additionally, thirty healthy controls were enrolled. Expiratory nitric oxide measurement and thorough pulmonary function evaluation was performed. Pulmonary disease was diagnosed by a respiratory specialist.

**Results**

Data collection is currently being finalized.

**Conclusion**

We expect to find that subclinical lower airway inflammation is present even in pulmonarily healthy patients with CRSwNP.



**FRONTO-SEPTAL ROSTRUM - PREVALENCE, CLASSIFICATION AND CLINICAL IMPLICATION**

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**Aims**

The anatomic correlation between the frontal sinuses and the upper part of the nasal septum might be crucial for the endoscopic surgeon. The aim of this study is to describe a newly observed frontal sinus anatomic variant, the fronto-septal rostrum (FSR).

**Method**

**Materials and methods:** Consecutive sinus CT scans performed between January and December 2013 were reviewed. The FSR was defined as a mucosa-lined air space formed in the attachment of the most upper bony nasal septum and the central floor of the frontal sinuses. Its presence and dimensions were evaluated.

**Results**

Included were 400 CT scans, 189 women (47.3%) and 211 men (52.8%) with a mean age of 46.8 years. An FSR was observed in 122 patients (30.5%) with a mean antero-posterior length of 10.63mm, width of 4.52mm and height of 2.18mm. The mean FSR volume was 63.52mm<sup>3</sup>. No statistically significant difference related to gender in all analyzed diameters was found (P=0.343). A right-sided FSR was found in 55 (45%) cases and 58 (47.5%) on the left (P=0.346) and bilateral FSR in 9 (7.37%) cases. No correlation was found between the side of the FSR, patient gender, patient age (P=0.811) and volume of the FSR (P=0.203).

**Conclusion**

The newly described FSR is a common unnoticed anatomic variation with possible clinical and surgical implications that need further attentive evaluation. We suggest using this aerated space in specific surgical indications and evaluating its presence in cases with peculiar septal infections

**CHRONIC INVASIVE FUNGAL RHINOSINUSITIS IN IMMUNOCOMPETENT PATIENTS: THE OXFORD 5 YEAR EXPERIENCE*****R. HETTIGE<sup>1</sup>, T. Jani<sup>1</sup>, A. Qureishi<sup>1</sup>, P. Martinez-Devesa<sup>1</sup>, R. Almeyda<sup>1</sup>***<sup>1</sup>John Radcliffe Hospital, ENT Surgery, Oxford, United Kingdom**Aims**

Little consensus exists regarding management of chronic invasive fungal rhinosinusitis (CIFRS) in immunocompetent patients.

This case-series examines the presentation, type of surgery, duration of anti-fungals and follow-up requirements regarding this cohort to produce recommendations for best-practice. **Method**

5 individuals (N=5) over 5 years were identified in a tertiary rhinology practice. Data was collected prospectively and mean follow-up duration was 24 months.

**Results**

	Age & Sex	Symptoms & Signs	Radiological Findings	Type of Surgery	Microbiology & Granulomatous	Anti-fungal type & duration	Follow-up Period ?Residual
1	45, F	headaches, diplopia	pan-sinusitis, optic canal & pterygoid process	incomplete endoscopic clearance	Aspergillus Flavus non-granulomatous	none	12 months residual disease stable
2	59, M	nasal obstruction, epiphora facial pain	multiple sinuses, pterygopalatine & lateral pterygoid	endoscopic clearance - successful	Candida Glabrata non-granulomatous	none	15 months no residual
3	80, F	epiphora, facial pain	Max sinus, infratemporal & pterygopalatine fissure	incomplete endoscopic clearance	Aspergillus fumigatus granulomatous	oral Voriconazole 12 weeks	48 months residual disease stable
4	35, M	diplopia	pan-sinus & periorbital	endoscopic clearance - successful	Bipolaris Hawaiiensis non-granulomatous	oral Voriconazole 3 months	36 months no residual
5	35, F	headaches	sinus & intracranial involvement	endoscopic biopsy	Aspergillus flavus granulomatous	longterm oral voriconazole 8 months	8 months headaches but residual disease improving

**Conclusion**

The interplay between host and pathological factors in CIFRS in immunocompetent patients remain poorly understood. Diagnosis requires a high index of suspicion due to the heterogeneity of cases. Endoscopically accessible disease can be successfully cleared, but antifungals and surveillance imaging are recommended for intracranial/extensive skull-base spread.

**CLUSTERING OF SYMPTOMS VS. HEALTH RELATED QUALITY OF LIFE IMPAIRMENT IN MAJOR PHENOTYPES OF CHRONIC RHINOSINUSITIS**

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<sup>3</sup>University Hospital Centre "Sestre milosrdnice", Dept of ORL, Zagreb, Croatia

**Aims**

The aim of the study was to compare the patterns of symptoms and health-related quality of life (HRQL) disease-specific domains affected in patients with chronic rhinosinusitis with and without nasal polyps (CRSwNP and CRSsNP, respectively), adjusted for demographics, risk factors, comorbidities, and previous treatment.

**Method**

A cohort of 251 consecutive patients with CRS completed the visual analogue scale (VAS) symptom severity score and the Sino-Nasal Outcome Test 22 (SNOT-22) questionnaire. Data sets were analyzed using principal component analysis (PCA) to identify a set of symptom components, together with the items excluded from PCA, which were then analyzed for differences between chronic rhinosinusitis patients with (CRSwNP) and without nasal polyps (CRSsNP).

**Results**

PCA of SNOT-22 items identified six components, three referring to CRS-specific symptoms, and three referring to HRQL impairment: sleep, functional and emotional disturbance. With adjustment for age, gender, asthma, current smoking, use of corticosteroids and antihistamines, and previous surgical treatment, there was an overall significant difference between the two subsets of patients. Patients with CRSwNP had significantly worse nasal symptoms, olfactory/cough symptoms and nasal obstruction. Patients with CRSsNP scored significantly worse with regard to fatigue, sleep and functional disturbance. Total SNOT-22 score between groups was not significantly different ( $p = 0.075$ ).

**Conclusion**

After the adjustment for confounders that may have impact on the severity of the disease, the analysis showed significant differences in symptom patterns and different aspects of HRQL impairment between patients with CRSwNP and CRSsNP. However, no difference in total disease severity score, measured by SNOT-22, was found.

**RHINOSINUSITIS: HOW UNCINECTOMY AND BALLOON SINUPLASTY AFFECT CHRONIC INFLAMMATION OF NASAL AIRWAY. A CONTROLLED RANDOMIZED CLINICAL STUDY**

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<sup>1</sup>University of Tampere, Otolaryngology, Tampere, Finland

**Aims**

To conduct a prospective randomized controlled trial in patients with chronic rhinosinusitis of maxillary sinuses without severe pathology of other sinuses. To study the histopathology of upper airway mucosa in chronic rhinosinusitis (CRS) patients and compare its changes after treatment of patients with balloon sinuplasty or uncinectomy.

**Method**

Adult patients with chronic rhinosinusitis were randomized in two groups: uncinectomy and balloon sinuplasty. Histopathology of nasal mucosa was reviewed preoperatively and at three, six and twelve months, postoperatively.

**Results**

Thickened epithelium, absence of cilia, metaplasia of epithelium, hyperplasia of mucosal glands, hyperplasia of blood vessels and increased inflammatory cells were observed in the majority of preoperative samples. Smoking history and nasal steroids had no association with histopathological findings. History of allergy was associated with higher number of goblet cells and shedding of epithelium was associated with worse SNOT22 scores. Higher number of inflammatory cells associated with increased number of goblet cells before and after treatment. Both treatments resulted to a decrease of inflammation in mucosa and epithelium. Hypertrophy of mucosal glands, hyperplasia of blood vessels and mucosal edema decreased after treatment ( $p < 0,05$ ). Those changes were more noticeable in conventional endoscopic sinus surgery group (uncinectomy).

**Conclusion**

Decreased number of inflammatory cells, alleviation of mucosal hypervascularity and decline of mucous glands' hypertrophy after treatment indicates a positive effect of treatment in inflammatory process.

**DO EOSINOPHILIC POLYPS PREDICT OLFACTORY DYSFUNCTION AND ITS POSTOPERATIVE RECOVERY IN CHRONIC RHINOSINUSITIS ?**

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**Aims**

The purpose of this study was;1) to evaluate the difference in olfactory dysfunction according to the pathological classification of CRS with nasal polyp(NP) patients; 2) to identify the degree of olfaction recovery after ESS; and 3) to identify the factors that predict the changes in olfactory status

**Method**

The sample of the study consisted of patients with CRSwNP who underwent ESS with biopsy from January 2012 to September 2014. Seventy five patients were classified into eosinophilic CRS(ECRS) and non-ECRS groups. During approximately an average 5 months of follow-up, the Korean Version of the Sniffin' Stick test (KVSS)II was conducted on each patient to examine the difference between the preoperative and postoperative state of olfactory function

**Results**

The ECRS group showed an increase in the postoperative KVSSII scores when compared to the preoperative scores with statistical significance, while the non-ECRS group did not show any statistically significant change. For the anosmia category by KVSSII, the ECRS group showed significantly improved olfactory function test scores for the threshold, discrimination, and identification tests

**Conclusion**

ECRS and preoperative olfactory function status(anosmia) could be predictable factors of postoperative olfactory function

## FACTORS AFFECTING REVISION-RATE OF CHRONIC RHINOSINUSITIS

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### Aims

Chronic rhinosinusitis (CRS) is divided into forms with nasal polyps (CRSwNP) and without (CRSsNP). Sinus and/or nasal polypectomy surgery are considered if maximal conservative treatment is insufficient. The predictive factors of the need of revision surgery comprise mostly CRSwNP phenotype and are not fully understood. The aim of this study was to evaluate the factors that associate with the revision surgery rate in CRS patients with variable extent of disease.

### Method

Cohort data of CRS patients (N=178) undergoing sinus surgery and/or nasal polypectomy in 2001-10 were used. Patient characteristics and follow-up data were collected from patient records and questionnaires. Unadjusted Cox proportional hazard models for 12 variables were analysed and were fitted for the need for revision sinus surgery and/or nasal polypectomy during the follow up of in average 8 years. Associations were also analysed by Fisher's exact, Mann Whitney U, and the Kaplan-Meier method with logrank test.

### Results

The proportion of CRS patients that had undergone revision in five years was 9.6 %. After adjustment with confounders, the following factors associated significantly with the need for revision sinus surgery and/or nasal polypectomy: allergic rhinitis (AR), corticosteroid treatment, previous surgery of CRS, and recurrent NP.

### Conclusion

Progressive chronic inflammatory phenotype would putatively be recognized by relatively simple questions concerning atopy, recurrent NP, previous sinonasal surgeries, and high need for corticosteroid therapy. Further studies with increased sample size are needed to evaluate whether these predictive factors would be relevant for developing better detection and management of progressive CRS.

**THE VALIDITY OF NASAL ENDOSCOPY IN PATIENTS WITH CHRONIC RHINOSINUSITIS - A CLINICAL INTEROBSERVER SURVEY**

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*<sup>1</sup>Odense University Hospital, Department of ear- nose and throat, Odense, Denmark*

**Aims**

**Background:** Results of Nasal endoscopy are a corner stone in diagnosing Chronic rhinosinusitis (CRS). However the procedure may be subject to a certain degree of subjectivity in the assessment of different objective clinical parameters specified in different endoscopy scores. The interrater reliability has been evaluated by scoring video recordings of nasal cavities in several different studies. However, the management of the rigid endoscope is probably depending on the individual endoscopist as well.

**AIM:** To evaluate interrater reliability and use of video recording of nasal endoscopy as diagnostic tool in patients with CRS and/or septal deviation.

**Method**

The study includes 30 patients diagnosed with CRS by a referring ENT doctor. The patients were evaluated according to EPOS '12. Three raters consisting of academic rhinologists were blinded for any information regarding the patient's history and scored each patient according to a modified Lund-Kennedy endoscopy score with added assessment of septal deviations. The purely objective and categorical scorings are compared between the raters using Fleiss' kappa statistics. Furthermore, each nasal cavity was recorded for the raters to reassess using the same scoring system after 3 months. A Fleiss' kappa value is calculated between the clinical assessment and the video assessment for each rater individually. The objective assessment was after end of clinical examination correlated to the patient's symptoms and result of CT-scanning.

**Results**

Data collection is expected to end February 2016, presently 24 patients have been included.

**Conclusion**

Pending until results are available.

**THE CHRONIC SINUSITIS ACTION PLAN - THE PATIENT PERSPECTIVE**

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<sup>3</sup>University of Ottawa, Otolaryngology-Head and Neck Surgery, Ottawa, Canada

**Aims**

Patient centered care is an increasing focus in today's evolving healthcare environment. Patient self-management education can allow patients to better understand their disease and be more engaged in their care. The chronic sinusitis action plan (CSAP) is a patient resource for patients with chronic rhinosinusitis (CRS). The objective of the study was to determine a patient perspective about the utility of CSAP.

**Method**

A survey of patients with CRS attending a tertiary rhinology clinic at 2 different academic centers was undertaken between March 2015-January 2016. Patients had the opportunity to independently review the CSAP and then complete the survey, which included a total of six questions.

**Results**

A total of 29 patients with CRS completed the survey. Twenty-eight (97%) patients felt that the description for baseline CRS accurately represented their symptoms of CRS on a day-to-day basis. Twenty-seven (93%) patients felt that the description for an exacerbation of CRS represented worsening of their CRS. Nine patients (31%) described having a complication of their CRS. Twenty-seven (93%) patients felt their doctor should use the CSAP for the management of their CRS.

**Conclusion**

The CSAP appears to represent baseline, exacerbation and emergency symptoms for patients with CRS. Patients with CRS find the CSAP to be a very helpful instrument and recommend their physicians use it. Patients appear to be motivated to be involved in the care of the CRS. Interventions such as the CSAP can result in better collaboration, increased compliance to physician instructions and patient satisfaction through better communication.



**INCREASED SERUM IGA LEVELS IN CHRONIC RHINOSINUSITIS**

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**Aims**

An increased serum level of immunoglobulin A (IgA) is frequently observed in immunoglobulin profiling of patients with chronic rhinosinusitis (CRS), however the implications of this increase are unknown. Elevated IgA levels are present in several autoimmune diseases, such immune-mediated intra-epidermal bullous disorders with specific IgA autoantibodies present in serum. We wished to determine whether elevated serum IgA in CRS patients was associated with other markers of CRS disease in order to suggest potential mechanisms.

**Method**

Retrospective chart review of consecutive adult CRS patients (>18 y.o) at a single tertiary care center between January 2012 & December 2014. Patients were segregated into 'high-IgA' (serum IgA>4.0g/L) and 'normal-IgA' (IgA<4.0g/L) groups. Biochemical parameters were compared.

**Results**

1148 patients had IgA levels available for assessment. Eighty-two patients (53=M, 29=F, age range 18-87y) were deemed 'high-IgA' (Mean 4.85; range: 4.04-8.15). Compared to the normal-IgA group, high-sensitivity C-reactive protein (hsCRP) level was increased in the 'high-IgA' group (3.79 mg/L (n=24) vs 1.78 mg/L (n=194), p=0.042). There was no difference in serum parameters of WBC, eosinophilia, or total serum IgE level.

**Conclusion**

Increased serum IgA levels may correlate with a high-inflammation form of CRS as suggested by increased hsCRP levels. The basis of this relationship is unknown, but suggests potential links with autoimmunity, which merit further exploration. Investigative CRS biopsy studies assessing presence of IgA autoantibodies in the sinus mucosa should be performed to seek novel pathogenic mechanisms in CRS.

**SINONASAL SYMPTOM-RELATED SLEEP DISORDERS BEFORE AND AFTER SURGERY FOR NASAL POLYPOSIS**

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**Aims**

Patients with nasal polyposis (NP) complain of several sinonasal symptoms that impact their sleep and quality of life. However, data on sleep disorders related to NP symptoms, before and after surgery, is poor. The aim of the present study was to analyze sleep complaints related to each NP symptom, before and after surgery, using the Dynachron questionnaire.

**Method**

63 patients operated for NP were included in this prospective study. They filled the DyNaChron questionnaire one day before surgery (V0), 6 weeks (V1) and 7 months (V2) after surgery. The self-ratings (0-10 point visual analog scale) of nasal obstruction, anterior rhinorrhea, postnasal discharge, cough and 5 items related to sleep disturbances, due to each symptom of chronic nasal dysfunction, were extracted from the questionnaire and analyzed.

**Results**

There was significant improvement of symptoms and symptom-related sleep disturbance scores at V1 and V2 compared to baseline scores ( $p < 0.0001$ ). Before surgery, moderate/severe sleep disorders were reported by two thirds of patients for nasal obstruction and anterior rhinorrhea, by half for postnasal discharge, and by one third for cough. Less than 10% of patients reported moderate/severe sleep disorders at V1. There was a mild increase of patients that rated moderate/severe sleep disorders at V2 in comparison to V1. The correlation between scores of nasal obstruction and its impacts on sleep quality was weak before surgery and strong afterwards.

**Conclusion**

The knowledge of symptom-related sleep disturbances may contribute to a better understanding of the mechanisms of sleep disorders in NP.

**COMPLEX FRONTAL PNEUMOSINUS DILATANS ASSOCIATED WITH MENINGIOMA: A REPORT OF TWO CASES AND ASSOCIATED LITERATURE REVIEW**

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<sup>1</sup>Guy's & St Thomas' Hospital, Rhinology department, London, United Kingdom

**Aims**

Pneumosinus dilatans (PSD) is a rare phenomenon involving the expansion of one or more paranasal sinuses, without bony destruction or a mass. Previously documented cases have demonstrated simple expansion of a solitary sinus air cell. We present two unique cases of PSD in the presence of meningioma, in which complex new cells developed within the frontal sinus. One of the two patients developed associated sinus disease.

**Method**

Case 1: A 28-year-old man presented with facial pain. His history included fibrous dysplasia and multiple meningiomas. A CT scan showed an abnormally enlarged right frontal sinus, divided into multiple air cells by bony septations. These changes were not present on childhood scans. He underwent a modified endoscopic Lothrop approach to divide the septations and his symptoms resolved.

**Results**

Case 2: A 65-year-old woman presented with a three-month history of headaches. Scans revealed a left frontal meningioma and multiple enlarged, dilated air cells within the left frontal sinus. She had no symptoms of sinus disease and so was managed conservatively.

**Conclusion**

PSD has been widely documented in association with fibrous dysplasia and meningioma, but the existing literature presents only examples of single enlarged air cells. The most prevalent theory of the mechanism of PSD is of obstruction of the sinus ostium causing sinus expansion through a 'ball-valve' effect. Our cases suggest a more complex process, involving local mediators that stimulate bone turnover and remodelling. The cases also highlight the importance of considering underlying meningioma in patients presenting with sinus disease in the presence of pneumosinus dilatans.

**A PRECLINICAL MODEL OF CHRONIC RHINOSINUSITIS**  
**D.Y. CHO<sup>1</sup>, D. Skinner<sup>1</sup>, C. MacKey<sup>1</sup>, B. Woodworth<sup>1</sup>**

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**Aims**

In order to understand the pathophysiology of acute and chronic rhinosinusitis, multiple approaches have been reported to create rhinosinusitis in animal models. As rabbits show more anatomical and physiological similarities with human, we would like to produce a consistent and reproducible experimental model of CRS using rabbits, by endoscopically blocking mucociliary clearance (MCC) of sinus.

**Method**

New Zealand white rabbits (n = 10) were assigned for occlusion of the left middle meatus by placing Merocel® (9mm, Pope Ear Wick) using rigid nasal endoscope (Karl-Storz, 1.9mm). The contralateral sinus served as a control. After 2 weeks, packing was removed then five rabbits were sacrificed for histology analysis and five were observed for next 10 more weeks. CT scans and endoscopic exams were performed on Week 0, 2, and 12 as well as swab cultures. After 12 weeks, rabbits (n = 5) were sacrificed for histology analysis.

**Results**

By endoscopically blocking MCC for two weeks, all rabbits developed sinus opacification (CT) and purulent drainage from middle meatus on Week 2, which were also observed persistently on Week 12. Five rabbits (sacrificed on Week 2) demonstrated ulceration and infiltration of acute inflammatory cells in the sinus epithelium. On Week 12, chronic inflammation (dense infiltrate of chronic inflammatory cells) with fibroblast proliferation was observed in the sinus epithelium of all five rabbits.

**Conclusion**

We were able to induce a preclinical model of CRS by endoscopically blocking MCC of rabbits without bacterial inoculation. This model can be used for the future study of CRS.

**SQUAMOUS CELL CARCINOMA**

**N. Otori**<sup>1</sup>

<sup>1</sup>, Tokyo, Japan

The incidence of sinonasal malignant tumor is 3% of head and neck cancer. A one-third of the sinonasal malignant tumor is SCC. Most one is maxillary cancer in sinonasal SCC.

Combination of complete removal by the external approach and radiotherapy is standard therapy. Recently, for the advanced case, it is reported that results of superselective intra-arterial cisplatin infusion and concomitant radiotherapy for maxillary sinus cancer are reported good. An effect at the same level as complete removal of maxillary sinus cancer is reported.

On the other hand, for the case of T1 and T2, we consider the indication of endoscopic endonasal surgery tends extended recently. The advantages of endoscopic endonasal surgery are, 1) tumor can be removed under the clear and magnified field of endoscopic vision, 2) less invasion for the patients, 3) post-op endoscopic observation is easy, and 4) radiation therapy can be available when the tumor recurred.

Indications of endoscopic endonasal surgery are, 1) short tumor diameter, 2) endoscopic observation and manipulation is possible, 3) no skull base invasion, no orbital invasion, 4) if there is a recurrence, it can be easily observed endoscopically.

A tricks of the surgery are to find out an appropriate excision range in reference to endoscope views and intraoperative frozen section diagnosis. In addition, it is important to make a surgical field wide as it possible.

In this lecture, movies of actual endoscopic surgery is shown.

**MALIGNANT MELANOMA**

**M. Jangard**<sup>1</sup>

<sup>1</sup>, Sweden

Abstract

Malignancies emerging in the nasal cavity and the paranasal sinuses are rare and accounts for 5% of all head and neck malignancies and 0.1% of all malignancies in Sweden. The incidence of sinonasal malignancy (SNM), except sinonasal malignant melanoma (SNMM), has been reported to decrease since 1960 in Sweden.

About 1–2% of all malignant melanomas originate from mucosal membranes in the genitourinary, digestive and the respiratory regions, whereas mucosal melanomas are most frequently located in the nasal cavity, followed by sites in paranasal sinuses in the head and neck region. The incidence of cutaneous malignant melanoma (CMM) continues to increase in many parts of the world, possibly due mainly to the effects of sun-related behaviour. We have found that the incidence of SNMM is increasing in Sweden, as we have documented one of the largest consecutively studied SNMM groups in the world. Nevertheless, the underlying mechanism remains unclear.

The treatment options for these patients have remained the same over the years; mainly radical surgery followed by radiotherapy. Alternatively, recent molecular-targeted therapy has become available for sub-groups of patients with malignant melanomas. Such therapeutic advances stress the importance of investigating the aetiology and molecular characteristics of SNMM, which are not yet well.

**ERS16-0839**

**SYMPOSIUM 37: EAFPS SESSION: THE NASAL VALVE**

**PRIMARY VALVE SURGERY**

**A.J. Tasman<sup>1</sup>**

<sup>1</sup>, *Switzerland*

The spectrum of surgical procedures for the correction of the incompetent nasal valve currently in use is wide. Broadly accepted clear indications for the use of any of these in a given patient are lacking. This presentation will critically review the procedures and illustrate the speaker's approach in a case-based manner.

ERS16-0805

**SYMPOSIUM 38: IMMUNOTHERAPY IN ALLERGIC RHINITIS – THINGS TO LEARN FOR A RHINOLOGIST?**

**WHAT'S AROUND THE CORNER?**

**L.O. Cardell**<sup>1</sup>

<sup>1</sup>, Sweden

Allergic rhinitis (AR) affects over 20% of the population of Europe and the United States. Allergen immunotherapy (AIT) is currently the only form of treatment that affects symptoms and modifies the progression of disease. Established forms of AIT include subcutaneous (SCIT) and sublingual (SLIT) immunotherapy and are widely effective, yet only 2-9% of eligible patients undergo therapy, likely due to the long duration of treatment. As a result, novel, faster forms of AIT are currently under development.

This overview will summarise the efficacy and mechanisms of established forms of AIT, highlighting the current drawbacks. We discuss novel strategies of AIT that have been developed in an attempt to tackle these limitations, including epicutaneous, intradermal and intralymphatic immunotherapy (ILIT), focusing on ILIT, the treatment that has been most comprehensively assessed.



**OCCUPATIONAL RHINITIS: ALLERGEN EXPOSURE IN THE WORKPLACE**

**P. Campo Mozo**<sup>1</sup>

<sup>1</sup>, Spain

Occupational rhinitis (OR) is an inflammatory disease of the nose, characterized by persistent or intermittent symptoms (nasal obstruction, sneezing, rhinorrhea, pruritus) and/or variable limitation to nasal airflow and/or nasal hypersecretion due to causes and conditions associated to an specific work environment and not to stimuli encountered outside the workplace (*Vandenplas O, EAACI Position Paper 2008*).

The current clasification differenciates 2 types of occupational rhinitis:

a) Rhinitis *caused* by the workplace = **OCCUPATIONAL RHINITIS (OR)**

**a.1. Allergic rhinitis (with latency period):**

IgE mediated

Non-IgE mediated

**a.2. Non allergic rhinitis (w/o latency period):**

Single exposure (RUDS)

Multiple exposure: Irritant-induced OR

Corrosive rhinitis

b) Rhinitis *exacerbated* in the workplace= **WORK-EXACERBATED RHINITIS (WER)**

**OCCUPATIONAL RHINITIS (OR)**

Caused by an immunological mechanism mediated by IgE or cellular mechanism

Sensitization to substances of the workplace after latency period

*IgE mediated OR:*

- High molecular weight substances (HMW, > 1,000 Da)

- Low molecular weight substances (LMW, < 1,000 Da): behaves as haptens

*Non- IgE mediated OR:*

- Mostly LMW substances

- Cellular?

- Danger signals?

OR 2-4 times more prevalent than occupational asthma

In the talk several novel aspects about OR will be discussed:

-Causative agents

-Natural history

-Relationship with asthma

-Diagnosis

-Treatment

-Management and prevention

ERS16-0833

**SYMPOSIUM 40: ARS SESSION: POLYPS FROM HELL! WHAT TO DO FOR RECALCITRANT DISEASE?**

**EXTENT OF SURGERY FOR RECURRENT NASAL POLYPS; ROLE FOR EXTENDED PROCEDURES?**

**R. Casiano**<sup>1</sup>

<sup>1</sup>, USA

Nasal polyps are a phenotypic manifestation of multiple possible immunologic processes, that are frequently associated with asthma and is independent of atopy. They are associated with established genetic syndromes, and exhibit an aggressiveness that may be influenced by a variety of environmental, socioeconomic, as well as geographic factors. In some studies, recurrent nasal polyps have been reported to recur in up to 50% of patients, significantly impacting quality of life. Some nasal polyps can be quite aggressive and symptomatic, despite maximum medical management. In these patients, aggressive surgical management, including the creation of wide-open cavities, free of condemned mucosa and polyps, is the first step in the long-term management of this subgroup of patients. This facilitates long-term topical therapies, and in-office management of disease, and may provide better long-term outcomes, free of significant symptomatology.

**ACUTE RHINOSINUSITIS IN CHILDREN**

**L. Kalogjera**<sup>1</sup>

<sup>1</sup>University of Zagreb - School of Medicine, ORL, Zagreb, Croatia

Acute rhinosinusitis in children is defined, according to the EPOS guidelines, as the sudden onset of two or more of the symptoms (discoloured nasal discharge, nasal blockage/obstruction/ congestion, cough at daytime and night-time) for less than 12 weeks, with validation by telephone or interview. The incidence of acute rhinosinusitis (ARS) in children is estimated to be from 4 to 7% based on the definition based on the prolonged symptoms of upper respiratory tract infection (URTI), lasting for more than 10 days. The incidence is highest in the first year of life and in children attending daycare. There is an overlap between the diagnosis of URTI and ARS in children due to the similar symptoms even if paranasal sinuses are not affected. URTI is complicated with ARS in 7 to 10 percent of the children, and occurrence of ARS is depending on the age and some other predisposing factors. Bacterial infection is likely to occur if URTI is lasting longer than 10 days. Clinically, ARS in children presents with several patterns of symptoms combinations, either rhinorrhea with prolonged cough, or purulent rhinorrhea, which may be accompanied with facial pain. Headache and facial pain is less common in children than in adults. Adenoiditis is the major differential diagnosis, while nasal foreign body and unilateral choanal stenosis present rare disorders with similar clinical findings. Most commonly cultured bacteria in pediatric ARS are *Streptococcus pneumoniae* and *Haemophilus influenzae*. Bacterial ARS in children is usually treated with empirically chosen antibiotics which are effective in the common causative bacteria. Saline washings and topical nasal steroids may present an important ancillary treatment in pediatric ARS.

**IS THERE STILL AN INDICATION FOR SURGERY IN ORBITAL COMPLICATIONS TO ACUTE RHINOSINUSITIS**

**A. Swift**<sup>1</sup>

<sup>1</sup>, Liverpool, United Kingdom

**Is there still an indication for surgery in orbital complications in acute rhinosinusitis?**

Acute RS is normally caused by upper respiratory tract viral infections, often with bacterial superinfection. Most cases resolve over a 3-week period without further complications. However, there are occasions when acute infective complications occur within the orbit, intracranial cavity or both. These complications can occur at all ages but are particularly prone to occur in children.

Such complications carry serious risks and are potentially catastrophic, particularly in children. To minimize the risks, clinical algorithms have been developed to provide clinical guidance as to how best to manage these children.

With recent years, controversy has arisen with regard to the surgical management of the orbital complications, in particular, a subperiosteal abscess. The principle of treating pus within an abscess or body cavity has always been drainage and removal of pus. However, there is now a move to treat such abscesses medically, thus avoiding surgical drainage.

This presentation will include a review of the evidence-base for this conservative non-surgical approach and explore the indications, limitations and risks for such regimes.

**HEALTH ECONOMICS**  
**M. Setzen<sup>1</sup>**

<sup>1</sup>, New York, USA

The Impact of Nasal Inflammation On ..... Health Economics, Michael Setzen, FACS, FAAP

The economic impact of chronic rhinosinusitis (CRS) is determined by cost and risk.

Objectives of this presentation include discussion of both the direct and indirect costs of CRS and how it impacts society.

1 in 10 to 12 Americans suffer with CRS. There are 12.6 million office visits related to this problem with an estimated cost of anywhere from \$12 to 22 billion for direct expenses due to CRS.

Chronic medical conditions account for 84% of all healthcare expenses in the US per year. Compared to other chronic illnesses, chronic rhinosinusitis is the greatest cost to society.

Direct costs are due to office visits, hospital visits, medications and surgery. Indirect costs are related to absenteeism, presenteeism and disability.

Indirect costs are 3-4 times more costly than direct costs. A high SNOT-22 is responsible for more lost productivity than anything else and drives the patients to seriously consider surgery. Indirect costs are \$10,077.00 per patient per year for CRS. Absenteeism was on the average 24.6 days per year, presenteeism 38.8 days per year per patient, and this correlated closely with poor quality of life and a high SNOT-22.

CRS management is expensive. Direct and indirect costs of CRS are high

Productivity costs were responsible for more lost time with CRS and expensive than diabetes, migraine, or asthma. Productivity costs decrease after endoscopic sinus surgery from \$9190.00 to \$3373.00 per patient, per year.

Absenteeism decreased from 22 days to 3.5 days. Presenteeism decreased from 41 to 19.

Surgery decreases the cost of direct and indirect expenses of CRS. Quality of life and severity of disease dictate costs and act as drivers for surgery.

What is the world economic impact of CRS. This is unknown but it is more than likely very high.

**ERS16-0794**

**SYMPOSIUM 42: IMPACT OF NASAL INFLAMMATION ON ...**

**OSA**

**D. Friberg<sup>1</sup>**

<sup>1</sup>, Sweden

Nasal inflammation and Rhinitis has several etiologies. There is a link between Extra-Esophageal Reflux (EER), Obstructive Sleep Apnea (OSA), Asthma, and Rhinitis. EER could explain the inflammation of the upper airways seen in OSA, Asthma and Rhinitis, both in children and in adults. But what is the process behind this link, and how to deal with the information? For example: could treatment of suspected EER before planned surgery prevent patients with Chronic Rhinosinusitis from FESS, or small children from adenoidectomy? The session will focus on this link and discuss the results from several studies.

**ERS16-0858**

**SYMPOSIUM 42: IMPACT OF NASAL INFLAMMATION ON ...**

**OLFACTION**

**E. Holbrook<sup>1</sup>**

<sup>1</sup>*Massachusetts Eye & Ear/Harvard Medical School, Otolaryngology, Boston, USA*

Symposium Session: Impact of nasal inflammation on...

Presentation Title: Olfaction

Abstract:

Our ability to interact with the chemical environment, which results in perception of smell, depends upon the exposure of millions of olfactory receptor neurons lining the superior aspect of the nasal cavity to surrounding air. These receptor neurons are unique in that they are true bipolar neurons with direct axonal connections to the brain (the olfactory bulbs) on one end and dendritic processes ending in knobs with cilia sampling odorants entering the nasal cavity at the apical end. Direct exposure to the outside environment puts these neurons at risk for damage and death, however recovery from damage is possible by the remarkable ability of the olfactory epithelium to regenerate all cell components including the olfactory receptor neurons.

Unfortunately, this capacity is limited and various causes of damage and inflammation often results in diminished or absent ability to smell--sometimes permanently. This review will outline common forms of nasal inflammation that can result in disruption in olfactory ability. Prognosis for recovery often depends on the underlying cause, duration of the inflammation, and availability of treatment.



**NASAL POLYP MUCOCILIAR DIFFERENTIATION HAS A DIFFERENTIAL GENE EXPRESSION PROFILE COMPARED TO HEALTHY NASAL MUCOSA*****B. Callejas<sup>1</sup>, G. Fernández<sup>2</sup>, L. Michel<sup>2</sup>, A. Martínez<sup>3</sup>, M. Fuentes<sup>1</sup>, I. Alobid<sup>1</sup>, F. Jaume<sup>1</sup>, L. Pujols<sup>1</sup>, J. Roca-Ferrer<sup>1</sup>, C. Picado<sup>1</sup>, S.G. Kalko<sup>2</sup>, J. Mullo<sup>1</sup>***<sup>1</sup>IDIBAPS, Clinical and Experimental Respiratory Immunology, Barcelona, Spain<sup>2</sup>IDIBAPS, Bioinformatics Platform- IDIBAPS, Barcelona, Spain<sup>3</sup>National Institutes of Health NIH, Critical Care Medicine Department-, Bethesda- MD, USA**Aims**

The study of molecular mechanisms controlling mucociliary differentiation under healthy and diseased conditions may help to understand the development of chronic rhinosinusitis with nasal polyps (CRSwNP). The aim of this study was to perform a genome-wide transcriptional analysis during mucociliary differentiation of primary human nasal epithelial cells (HNECs) cultured in the air-liquid interface (ALI) system.

**Method**

HNECs were obtained from CRSwNP patients (n=7) and healthy subjects (NM, n=7), and differentiated in the ALI system for 28 days. At different days (0, 14, 28), global gene expression microarray analysis were performed on both ALI cultures. Bioinformatic analysis of differential gene expression was completed in order to identify key genes, biological processes and pathways involved in differentiation.

**Results**

In CRSwNP cells we identified 1,337 and 2,321 genes at days 14 and 28, respectively, which displayed statistically significant changes (FDR<0.01) compared to day 0. In control NM cells, we identified 1,542 genes and 1,986 genes at days 14 and 28, respectively. Among these genes, 831 and 1,399 genes were common in both cultures at days 14 and 28, respectively; whereas 506 and 922 genes were exclusively expressed in CRSwNP. Functional enrichment analysis revealed that several biological processes (cell cycle, oxidation reduction, fatty acid metabolic process) and pathways (cell cycle, drug metabolism), were enriched in gene-expression datasets from both cultures; whereas others were only enriched in NM (cilium morphogenesis) or NP (gland development).

**Conclusion**

HNECs from CRSwNP showed a different global gene expression profile during mucociliary differentiation when compared to control NM.

(\*)\_This\_study\_was\_sponsored\_by\_a\_ISCIII\_grant\_(PI12-01129). FEDER ("Fondo\_Europeo\_de\_Desarrollo\_Regional")

**INTEGRATED ANALYSIS OF MICRORNA AND MRNA EXPRESSION PROFILES IN THE DIFFERENTIATION OF HUMAN NASAL POLYP EPITHELIAL CELLS COMPARED TO CONTROL NASAL MUCOSA.**

***B. Callejas<sup>1</sup>, F. Guerau<sup>2</sup>, L. Michel<sup>2</sup>, A. Martínez<sup>3</sup>, M. Fuentes<sup>1</sup>, I. Alobid<sup>1</sup>, F. Jaume<sup>1</sup>, L. Pujols<sup>1</sup>, J. Roca-Ferrer<sup>1</sup>, C. Picado<sup>1</sup>, S.G. Kalko<sup>2</sup>, J. Mullol<sup>1</sup>***

<sup>1</sup>IDIBAPS, Clinical and Experimental Respiratory Immunology, Barcelona, Spain

<sup>2</sup>IDIBAPS, Bioinformatics Platform, Barcelona, Spain

<sup>3</sup>National Institutes of Health NIH, Critical Care Medicine Department, Bethesda- MD-, USA

**Aims**

MicroRNAs (miRNAs) regulate cell differentiation through modulation of target gene expression in many systems and may contribute to epithelial abnormalities in airway respiratory diseases. The aim of this study was to perform a global transcriptome analysis of miRNAs and paired mRNAs data during the differentiation of primary human nasal epithelial cells (HNECs) cultured in the air-liquide interface (ALI) system.

**Method**

HNECs were obtained from CRSwNP patients (n=7) and healthy subjects (NM, n=7), and differentiated in the ALI system for 28 days. At different days (0, 14, 28), global miRNA/mRNA expression microarray analysis were performed on both ALI cultures. Bioinformatic analysis of differential miRNA/mRNA expression datasets, was completed. miRNA/mRNA pairs involved in mucociliary differentiation were identified using validated interaction databases.

**Results**

Microarray analysis revealed that 831 genes and 54 miRNAs at day 14, and 1,399 genes and 98 miRNAs at day 28, were commonly expressed in both CRSwNP and NM cultures compared to day 0 (FDR<0.05). We also detected, however, that 506 genes and 134 miRNAs at day 14, and 922 genes and 180 miRNAs at day 28, were exclusively expressed in CRSwNP. Furthermore, bioinformatic analysis allowed us to identify a variety of miRs, with their target genes, which were differently expressed during HNEC differentiation in CRSwNP compared to NM.

**Conclusion**

Integrated analysis of global transcriptomic profiles (miRNAs/mRNAs) may lead to the identification of miRNAs involved in the control of genes potentially important for HNEC differentiation in CRSwNP.

(\* This study was sponsored by a FIS grant (PI12-01129). FEDER "Fondo Europeo de Desarrollo Regional".

**DETECTING THE BIOMARKERS OF NEURODEGENERATIVE DISEASE IN THE NOSE.**

**S. Gane<sup>1</sup>, G.A. Gurria<sup>2</sup>, D. Logan<sup>3</sup>**

<sup>1</sup>Royal National Throat Nose and Ear Hospital, Rhinology, London, United Kingdom

<sup>2</sup>Sanger Institute, Logan Lab, Cambridge, United Kingdom

<sup>3</sup>Sanger Institute, Logan Lab, Cambridge, United Kingdom

**Aims**

Anosmia is the earliest (although seldom reported) symptom of several neurodegenerative diseases such as Parkinson's, Alzheimer's and Frontotemporal dementia (FTD). Since the olfactory sensory neurons responsible are exposed in the olfactory mucosa, sampling and analysing these might form the basis of a diagnostic or screening test for these diseases.

**Method**

Work from others in our team generated a mouse model for familial FTD with Parkinsonism (FPTD-17) which expresses the human mutant isoform P301S of the \*Tau\* gene in all neurons. These mice are hyposmic from an early age, prior to the onset of cognitive or motor deficits. RNA sequencing of the olfactory epithelium showed a wide variance in the transcribed RNA between mutant and wild-type mice. Narrowing the transcriptome to just those genes likely to produce pathognomonic protein plaques, established the "Cambridge set". We show that the "Cambridge set" reliably distinguished the neurons of FTDP-17 mice from healthy controls.

**Results**

To demonstrate the feasibility of this in humans we developed a technique for the atraumatic, reproducible sampling of human olfactory sensory neurons via a self-administered nasal wash. Although the yield was variable both within and between individuals, olfactory marker protein staining and RNAseq analysis demonstrated olfactory sensory neurons in sufficient quantities to perform a "Cambridge set" analysis as a first attempt at a prodromal marker.

**Conclusion**

We present a method for the harvesting and analysis of neurodegenerative disease biomarkers in olfactory sensory neurons, which may allow the diagnosis of these diseases in the prodromal phase.

## SPLEEN TYROSINE KINASE INDUCES MUC5AC EXPRESSION IN HUMAN AIRWAY EPITHELIAL CELL

*Y.D. Kim<sup>1,2</sup>, H.G. Na<sup>1</sup>, B. Chang Hoon<sup>1</sup>, Y.S. Choi<sup>1</sup>, S.Y. Song<sup>1</sup>*

<sup>1</sup>Department of Otorhinolaryngology-Head and Neck surgery, College of Medicine- Yeungnam University, Daegu, Republic of Korea

<sup>2</sup>Regional Center for Respiratory Diseases, Yeungnam University Medical Center, Daegu, Republic of Korea

### Aims

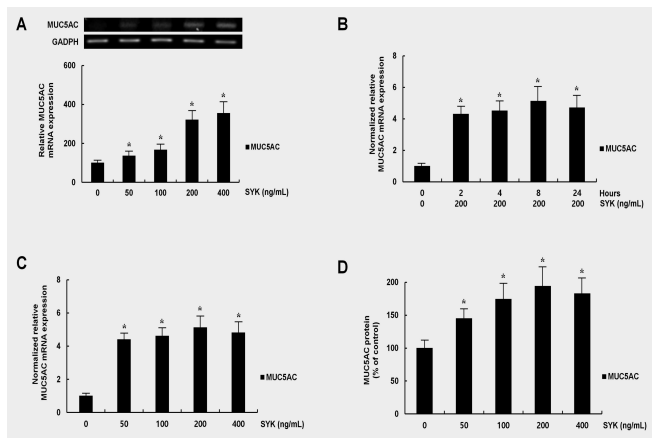
MUC5AC, a major secreted mucin, is increased in chronic inflammatory airway disease. Spleen tyrosine kinase (SYK) is a mediator, which acts as an important regulator of intracellular signal transduction in the inflammatory response. SYK was originally identified in hematopoietic cells, and its expression in some non-hematopoietic cells, including respiratory epithelial cells, was recently demonstrated. However the effects of SYK on mucin-secretion in human airway epithelial cells have not been studied. The objective of this study is to investigate the effect and brief signaling pathways of SYK on MUC5AC expression in human airway epithelial cells.

### Method

In mucin-producing human NCI-H292 cells and primary cultures of human nasal epithelial cells, the effects and signaling pathways of SYK on MUC5AC expression were investigated by reverse transcriptase-polymerase chain reaction (RT-PCR), real-time PCR, enzyme immunoassay, and immunoblot analysis with several specific inhibitors and small interfering RNA (siRNA).

### Results

SYK induced MUC5AC expression. SYK activated significant phosphorylation of ERK1/2 and p38 MAPK signaling pathways. SYK-induced MUC5AC expression was significantly attenuated by pretreatment with U0126 (ERK1/2 MAPK inhibitor) and SB203580 (p38 MAPK inhibitor). In addition, the knockdown of ERK2 and p38 MAPK by ERK2 and p38 MAPK siRNA significantly blocked SYK-induced MUC5AC expression.



### Conclusion

These results suggest that SYK increases MUC5AC expression via ERK2 and p38 MAPK signaling pathways in human airway epithelial cells.

**ALTERATIONS IN NASAL EPITHELIAL TRANSCRIPTOME AFTER SUBCUTANEOUS BIRCH POLLEN IMMUNOTHERAPY*****S. Toppila-Salmi<sup>1</sup>, E. Terna<sup>2</sup>, P. Mattila<sup>3</sup>, S. Joenväärä<sup>2</sup>, J. Renkonen<sup>2</sup>, R. Renkonen<sup>4</sup>***<sup>1</sup>University of Helsinki, Haartman Institute and Dep. of Allergy- Helsinki University Hospital, Helsinki, Finland<sup>2</sup>University of Helsinki, Haartman Institute, Helsinki, Finland<sup>3</sup>University of Helsinki, Finnish Institute of Molecular Medicine, Helsinki, Finland<sup>4</sup>University of Helsinki, Haartman Institute and HUSLAB, Helsinki, Finland**Aims**

Birch pollen allergic rhinitis (AR) is a common disease in Northern Europe. Subcutaneous allergen immunotherapy (SCIT) has shown to associate with a variety of immunological changes, such as a decrease in allergen-specific IgE, increase in IgG4 and IgA blocking antibodies, and modulations of T-cell and B-cell responses. The aim was to detect effects of birch pollen SCIT on gene expression profile of nasal epithelium by using Next Generation Sequencing.

**Method**

Nonsmoking other vice healthy subjects with/without birch pollen allergic rhinitis (N=24) were recruited. Nasal cell brushings were collected from all subjects in two consecutive years during and outside the birch pollen season; before and during birch pollen SCIT. Total RNA was extracted, enriched RNA-seq library prepared and Nextera Primers were used. mRNA was PCR enriched and RNA libraries sequenced (N=11).

**Results**

When comparing the gene expression levels between the spring<sub>duringSCIT</sub> and spring<sub>preSCIT</sub>, a total of 564 transcripts were differentially expressed in the group with AR with SCIT. The top GO categories for the differentially expressed mRNAs were: enzymes, transporters, transcription regulators, transmembrane receptors and peptidases. The numbers of differentially expressed transcripts were smaller in the group with AR without IT; and in the control group.

**Conclusion**

By this controlled study, we were able to demonstrate alterations of nasal epithelial transcriptome that associated with the group of birch pollen AR subjects that underwent birch pollen SCIT. Further studies are still needed to discover putative candidate proteins or pathways and to test them as predictive markers or potential therapeutics for pollen AR.

**SURGICAL TREATMENT FOR EPISTAXIS**  
***R. Costello<sup>1</sup>, H. Elhassan<sup>2</sup>, S. Quine<sup>3</sup>***

<sup>1</sup>University Hospital of Wales, Cardiff, United Kingdom

<sup>2</sup>Morrison Hospital, Swansea, United Kingdom

<sup>3</sup>University Hospital of Wales, Ear- Nose & Throat, Cardiff, United Kingdom

**Aims**

We believed that either due to increasing numbers of patients presenting with epistaxis, or due to increasingly difficult to control episodes of epistaxis more patients were being taken to theatre to control bleeding, or perform a definitive procedure.

**Method**

The Health and Social Care Information Centre website was accessed and Hospital Episode Statistics for Admitted Patient Care for nine years, starting 2006-07 were accessed. This data was interrogated looking specifically at the number of procedures performed for control of epistaxis. The procedures reviewed included cauterisation, ligation, embolisation, laser therapy and nasal packing. This data was then interrogated using Numbers.

**Results**

Our results demonstrate a clear pattern of increasing number of surgical procedures performed to control epistaxis in English Hospitals.

Date	Surgical Procedures for Epistaxis
2006-07	12741
2007-08	14085
2008-09	15376
2009-10	15962
2010-11	16451
2011-12	16858
2012-13	17038
2013-14	17496
2014-15	17048

**Conclusion**

The increasing number of operations to control epistaxis could be reflecting a number of causes. In terms of patient factors we have a number of ageing patients presenting on multiple medications which can make controlling epistaxis with packing and medical treatment alone difficult. As surgeons we have a number of procedures available to us which we can employ with limited morbidity to the patient. Also as anaesthetics have become safer its no longer such a risk taking a bleeding patient to theatre, particularly compared with the alternative of leaving them with inadequate packing on the ward.

**ESTABLISHMENT OF OLFACTORY DIAGNOSIS FOR TRADITIONAL CHINESE VERSION OF UNIVERSITY OF PENNSYLVANIA SMELL IDENTIFICATION TEST**

***R.S. Jiang<sup>1</sup>, K.L. Liang<sup>1</sup>***

*<sup>1</sup>Taichung Veterans General Hospital, Department of Otolaryngology, Taichung, Taiwan*

**Aims**

A traditional Chinese version of University of Pennsylvania Smell Identification Test (UPSIT-TC) has been developed for use in a Chinese population. This study attempts to establish an olfactory diagnosis for UPSIT-TC.

**Method**

1440 volunteers were enrolled from November of 2009 to June of 2015. The phenyl ethyl alcohol (PEA) threshold test was performed to examine their threshold function, and the threshold function was divided into normosmia (PEA threshold < -6), mild hyposmia (-6 < PEA threshold < -4), moderate hyposmia (-4 < PEA threshold < -2), and anosmia (PEA threshold > -2). All males and females were grouped by age: 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, and 70-79 years. There were 30 subjects in each group of different olfactory function, age, and sex. They then received the UPSIT-TC to examine their identification function. The cut-off scores of UPSIT-TC among the different groups were determined by receiver operation characteristic curve.

**Results**

The score of UPSIT-TC significantly decreased in both men and women after the age of 60. The cut-off scores were 29.5 between the normosmic and mildly hyposmic groups, 26.5 between the mildly hyposmic and moderately hyposmic groups, and 16.5 between the moderately hyposmic and anosmic groups for the 20 to 59 years male group, were 23.5, 20.5, and 13.5 for the 60 to 79 years male group, were 30.5, 27.5, and 17.5 for the 20 to 59 years female group, and were 20.5, 24.5, and 15.5 for the 60 to 79 years female group.

**Conclusion**

Further investigation is needed for elderly females.

**IMPORTANCE OF CORRECTIVE NASAL SURGERY IN OBSTRUCTIVE SLEEP APNOEA SYNDROME PATIENTS WITH CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) INTOLERANCE**

***C. Merma Linares<sup>1</sup>, M. Gonzalez Pena<sup>1</sup>, S. Perello Aragones<sup>2</sup>, F.X. Aviles Jurado<sup>1</sup>, M.D. Martinez Novoa<sup>1</sup>***

<sup>1</sup>Joan XXIII University Hospital, ENT, Tarragona, Spain

<sup>2</sup>Joan XXIII University Hospital, Pneumology, Tarragona, Spain

**Aims**

To examine the role of nasal surgery in obstructive sleep apnoea syndrome (OSAS) patients with nasal obstruction and do not tolerate non-invasive ventilation therapy (CPAP).

**Method**

This was a prospective observational study. Patients enrolled had moderate to severe OSAS and did not tolerate CPAP because of clinical nasal obstruction and subsequently underwent surgical correction. Pre- and post-operative OSAS measurements were noted; apnoea hypopnea index (AHI) and mean cumulative time percentage of SpO<sub>2</sub><90%(CT90%). Post-operative health related quality-of-life scores were obtained utilising a visual analog rating scale.

**Results**

A total of 25 patients were enrolled (24 male & 1 female) with an average of 49.2 years old (+/-15.9yrs). Significant decrease of the postoperative AHI was observed (pre-operative 46.6+/-14.3/hr versus 29.3+/-16.1/hr; p=0.03). A significant reduction was also noted in severe OSAS patients (p=0.05). According to Sher criteria, 28% of patients improved AHI>50% (56% improves <50%). The CT90% decreased following surgery from 6.9%(+/-6.9%) to 2.1%(+/-2.8%)(p=0.14) with significant drop in severe OSAS (14.3% versus moderate OSAS 2.4%;p=0.004). According to the acoustic rhinometry, the increase of the Total Volume was important (p=0.054) especially in the severe OSAS patients (p=0.006) and Total Minimal Cross Sectional Area (MCA) (p=0.035). This could justify the decrease of the CT90% because of the improvement of nasal resistance. Finally, the percentage of postoperative satisfaction was 70% (+/-17.5 %).

**Conclusion**

Although nasal surgery is not a definitive treatment for OSAS, the reduction in nasal airway resistance, especially in severe cases, is beneficial and improves quality of life despite no significant change in CT90%.



## INTRAORAL "AROUND-THE-MAXILLA" ENDOSCOPIC LIGATION OF MAXILLARY ARTERY IN THE INFRATEMPORAL FOSSA: ANATOMICAL STUDY AND TECHNIQUE REVISITED. CAN WE AVOID EMBOLIZATION IN CERTAIN CASES?

**G. Polev<sup>1</sup>, D. Golbin<sup>2</sup>, K. Avdeeva<sup>1</sup>**

<sup>1</sup>Russian Federal State Clinical Research ENT Center, Rhinology, Moscow, Russia

<sup>2</sup>Burdenko Scientific Neurosurgery Institution, Cranio-orbito-facial oncology, Moscow, Russia

### Aims

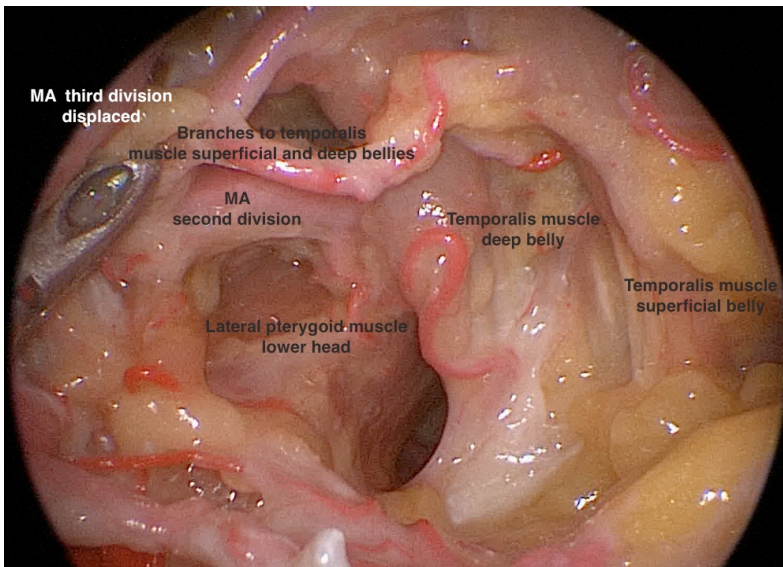
To describe the endoscopic anatomy variability of the maxillary artery (MA) in relation to other structures in the infratemporal fossa during cadaveric dissections, and to establish critical anatomical landmarks for the transoral "around-the-maxilla" endoscopic approach for the MA ligation.

### Method

5 injected fresh cadaveric specimens were dissected bilaterally via combined endonasal and transoral endoscopic approach. 10 infratemporal fossa regions are studied. The route of the MA and its relations to the deep belly of temporalis muscle, lateral pterygoid muscle lower head (LPMlh) and buccal nerve are investigated to establish the transoral endoscopic approach for MA ligation.

### Results

Second division of maxillary artery was found in all dissections in the area of crossing of LPMlh and temporalis muscle deep belly thus staying superficial to the LPMlh in all specimens (figure 1). Buccal nerve was identified in all specimens running above and perpendicular to the LPMlh, medially and inferiorly to MA and after crossing the artery coming down to stay parallel to the deep belly of temporalis muscle in a close proximity to it. Anterior and posterior deep temporal arteries, posterior superior alveolar artery, infraorbital artery and distal branches of MA were identified. No significant variations were found except the variability of MA third division looping characteristics.



### Conclusion

Based upon previously described technique and our anatomical study the technique of transoral "around-the-maxilla" endoscopic approach for MA ligation was modified. One patient has undergone the urgent transoral endoscopic MA ligation as an alternative procedure to embolization with successful bleeding control and no approach-related complications.

**FEASIBILITY OF ELECTRICAL IMPEDANCE TOMOGRAPHY AS A REAL-TIME MONITORING DEVICE FOR DETECTION OF THE UPPER AIRWAY OCCLUSION**

***S.W. Kim<sup>1</sup>, E.J. Woo<sup>2</sup>, T.I. Oh<sup>2</sup>, D. Lee<sup>3</sup>, S.Y. Jeon<sup>4</sup>, H.J. Cho<sup>1</sup>, Y.H. Joo<sup>1</sup>***

<sup>1</sup>Gyeongsang National University Hospital, Department of Otorhinolaryngology, Jinju, Republic of Korea

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<sup>3</sup>Kyung Hee University, Humanitas College, Kyungki, Republic of Korea

<sup>4</sup>Gyeongsang National University School of Medicine, Department of Otorhinolaryngology, Jinju, Republic of Korea

**Aims**

The electrical impedance tomography (EIT) is a non-invasive imaging technique useful for long-term monitoring such as evaluation of lung ventilation in the critical care unit. We hypothesized that EIT might be instrumental to detect the upper airway occlusion which occurs in obstructive sleep apnea (OSA) patients during sleep. Our first goal was to ascertain whether EIT can differentiate the upper airway changes in patency in healthy subjects.

**Method**

Ten healthy with no history of witnessed apnea underwent an MRI and EIT on the upper airway area. An elastic mask which contained sixteen small electrodes was applied along the lower face, which reflected the retrolingual space of the upper airway. Impedance images were obtained while normal respiration (open airway) and swallowing maneuver which simulated upper airway occlusion using the EIT system.

**Results**

In all subjects, the closure of the upper airway was successfully visualized in EIT images with reference to MR images. For some subjects, furthermore, the shape of the upper airway in EIT images was well correlated with that in MR images. For other subjects, however, the shape of the airway in EIT was deformed by artifacts. The shape of the airway in MRI and EIT was matched in seven (70%) of ten subjects.

**Conclusion**

We could estimate the upper airway patency using EIT in healthy subjects. To establish the EIT as a real-time monitoring device for the upper airway occlusion in OSA patients, further case-control human studies with larger number of subjects may be needed.

**CORRELATION OF CENTRAL COMPONENT/ TOTAL DURATION OF MIXED APNEAS WITH DEMOGRAPHIC AND POLYSOMNOGRAPHIC DATA IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA**  
**V. Gungor<sup>1</sup>, K.M. Ozcan<sup>1,2</sup>, N. Yurtsever Kum<sup>1</sup>, D. Atan<sup>1</sup>, M. Ozcan<sup>1,3</sup>**

<sup>1</sup>Ankara Numune Education and Research Hospital, Otorhinolaryngology, Ankara, Turkey

<sup>2</sup>Giresun University Faculty of Medicine, Otorhinolaryngology, Giresun, Turkey

<sup>3</sup>Hitit University Faculty of Medicine, Otorhinolaryngology, Corum, Turkey

**Aims**

Mixed apnea (MA) is defined as absence of inspiratory effort in the initial portion of the respiratory event, followed by resumption of it in the second portion of the event. MAs are considered as obstructive respiratory events, however the clinical significance of the ratio of central component duration (CCD)/ total apnea durations (TAD) is not clear. In this study, we aimed to investigate correlation of CCD/TAD ratio of MAs with demographic and polysomnographic data in patients with obstructive sleep apnea (OSA).

**Method**

Sixty-seven patients diagnosed with OSAS based on history and standard full-night polysomnography, and had a MA index >5/h were included in the study. The CCD of MAs were divided by TAD to determine CCD/TAD ratio. The correlation of CCD/TAD ratio with age, gender, BMI, and other polysomnographic parameters was investigated.

**Results**

The mean age of the patients was 49.7 (26-75) years. Their mean apnea hypopnea index (AHI) was 70.7/h (21.4-124/h), and mean MA index was 16.8/h (5-102/h). The mean CCD/TAD ratio was 0.42 (0.15-0.73). Correlation analysis showed that CCD/TAD ratio showed positive correlations only with age ( $p=0.011$ ). There was no correlation with other demographic or polysomnographic parameters studied ( $p>0.05$ ).

**Conclusion**

The results of this preliminary study indicated that duration of central component of MA increased as age increased. Further studies are needed to clarify clinical significance of the central components of MAs in patients with OSA.

**THE EFFECT OF MIXED APNEA INDEX ON POSITIVE AIRWAY PRESSURE THERAPY COMPLIANCE**

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<sup>3</sup>Hitit University Faculty of Medicine, Otorhinolaryngology, Corum, Turkey

**Aims**

Positive airway pressure (PAP) therapy is the most efficient and golden standard treatment method in obstructive sleep apnea (OSA). The most important issue in PAP therapy is compliance. Degree of daytime sleepiness, and severity of OSA may affect PAP compliance. There is scarce data on effect of mixed apneas (MAs) on compliance. In this study, we aimed to investigate the effect of MA index on PAP compliance.

**Method**

One-hundred patients with moderate-severe OSA suggested to use PAP were included in the study. Compliance was regarded as PAP use  $\geq 5$  days/week, and  $\geq 4$  hours/night. PAP-compliant and non-PAP-compliant patients were compared for MA index and demographic and polysomnographic data.

**Results**

The mean age was 51 (29-86) years. Fifty-one (51%) patients were PAP-compliant. MA indexes were 3.97/h (0-40.8/h) and 6.62 (0-68.3/h) in compliant and non-compliant groups, and mean ages were 55.45 and 48.16 years, respectively. Two groups were similar for mixed apnea indexes ( $p=0.871$ ). PAP compliant and non-compliant groups did not show any differences for age, gender, body mass index, apnea hypopnea index, or indexes of central and obstructive apneas during PAP titration.

**Conclusion**

The results of this preliminary study indicated that MA index in diagnostic polysomnography is not a significant factor for PAP compliance. Further studies taking the duration of the central components of MA into consideration are needed.

**THE SENSATION OF PAIN/PRESSURE IN THE FACE IN PATIENTS WITH CHRONIC RHINOSINUSITIS AND NASAL SEPTUM DEFORMITY**

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<sup>1</sup>Clinical Centre Vojvodina, ENT, Veternik, Serbia

<sup>2</sup>Clinical Centre Vojvodina, ENT, Novi Sad, Serbia

**Aims**

The objective of this paper is to determine if the degree of nasal septum deformity with chronic rhinosinusitis influences the sensation of facial pain/pressure.

**Method**

90 patients were diagnosed with chronic rhinosinusitis. The patients were divided into three equal groups of 30 according to the degree of nasal septum deformity. The nasal septum degree in the first group was less than 10. The patients in the second group had the deformity between 10 and 15, whereas the third group was more than 15 degrees. The sensation of pain/pressure was estimated on the VAS scale from 0 to 10 cm.

**Results**

The average values of facial pain/pressure sensation in the first group were 0.97, in the second group 1.90 while in the third group they were 3.30. The degree of nasal septum deformity significantly influences the intensity of facial pain/pressure sensation in the observed groups of patients ( $H= 13.692$ ,  $p= 0.001$ ). Further analysis (Mann-Whitney test) has shown that the facial pain/pressure sensation was significantly more intense in the third group in comparison to the first one ( $p= 0.001$ ), and if we compare the third group with the second one ( $p= 0.024$ ). Also, a much more intense sensation of facial pain/pressure was in the second group in relation to the first one ( $p= 0.028$ ).

**Conclusion**

To conclude, the higher the nasal septum deformity in patients with chronic rhinosinusitis, the more intense the facial pain/pressure sensation.

**CLINICAL VARIABLES AND SEVERITY PREDICTORS IN SEVERE IDIOPATHIC EPISTAXIS: A RETROSPECTIVE REVIEW OF HOSPITALIZED PATIENTS**

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**Aims**

The lack of knowledge about idiopathic epistaxis physiopathology as well as the inconclusive and conflicting results of studies about the risk factors of severe disease makes the treatment of this condition a challenge. The aim of this study was to analyse the clinical variables of adult patients hospitalized with primary diagnosis of idiopathic epistaxis, and identify risk factors of severity.

**Method**

Data of 134 patients admitted between 2005 and 2014 in the Otorhinolaryngology Department for idiopathic epistaxis were collected. Chi-square test and a multivariate regression analysis were performed to study the association between the severity of disease and potential severity predictors. The designated disease severity indicators were: hospital stay of more than 4 days, invasive treatment, blood transfusion requirement, presence of other complications, and readmission in 72 hours.

**Results**

Severe disease, defined as the presence of at least one of the disease severity indicators occurred in 88 cases (65.7%). The presence of heart disease was predictive of an increased risk of severe disease while diabetes was predictive of a decreased risk of severe disease. A trend for antiplatelet medication to be predictive of less severe disease was also observed, though not significant. No other factors were independently associated with disease severity.

**Conclusion**

In our study we found that heart disease was predictive of an increased risk of severe disease in patients hospitalized for idiopathic epistaxis. To improve patient care and avoid those complications related to disease severity, an evaluation by a Cardiologist should be done in this group of patients.

## THE EFFECT OF SEPTORHINOPLASTY ON OLFACTION: A SYSTEMATIC REVIEW

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### Aims

The nose as a sensory organ is often underrepresented in the surgical literature. The exception to this is where inadvertent olfactory dysfunction is caused by surgical intervention. With regards to septorhinoplasty, it is our experience that improved olfactory function is in fact more common than deterioration. We therefore conducted this systematic review of the current literature on olfaction and septorhinoplasty surgery.

### Method

A literature search covering 'Pubmed', 'Web of Science', and the 'Cochrane Library' was performed using search terms 'olfaction', 'smell', 'odour', 'septorhinoplasty', 'rhinoplasty' and 'surgery'. Individual paper reference lists were additionally searched. Authors from two studies were contacted for details of surgery.

### Results

Excluding non-English language papers, 7 studies were identified. A combination of aesthetic and functional septorhinoplasties were performed in all but 2 studies in which aesthetic only were performed. Most studies included both open and closed approaches. Five studies utilised odour identification as a test of suprathreshold olfactory function. The remaining utilised subjective patient reported outcomes. Results varied from statistically significant olfactory improvement, to no change or deterioration.

### Conclusion

Comparison between studies was difficult due to heterogeneity in olfactory outcome measurements, patient populations and surgical technique. Whilst it would follow that improving odorant flow to the olfactory cleft may improve function, further work utilising standardised threshold and suprathreshold olfactory tests is required to determine the effect of septorhinoplasty on olfaction.

**AUDIT OF RE-ADMISSION RATES OF OVERNIGHT STAY SEPTOPLASTY**

***H. Elhassan<sup>1</sup>, N. Leung<sup>1</sup>, T. Hywel<sup>1</sup>, K. Saw<sup>1</sup>, H. Whittet<sup>1</sup>***

*<sup>1</sup>Morrison Hospital, ENT Department, Swansea, United Kingdom*

**Aims**

To determine the baseline characteristics of patients undergoing septoplasty in our department

To review how septoplasty is performed in our department

To identify the complications of septoplasties performed in our department

To audit the re-admission rate following septoplasty, prior to the implementation of the day case septoplasty pathway, against the standard unexpected day case surgery re-admission rate of 2-3% recommended by the Royal College of Surgeons of England.

**Method**

Patients undergoing septoplasty between 1/1/2015 and 1/9/2015 were identified on the ENT theatre lists. The operation notes, discharge summaries and computerized admissions summaries of these patients were reviewed. Data analysis was performed on excel.

**Results**

62 patients were identified. Indications for surgery included nasal obstruction, obstructive sleep apnoea, snoring and sinus disease. 54% of patients underwent a type of turbinate surgery as well as their septoplasty. Inferior turbinate reduction (13%) and out fracture (11%) were the most common. 42% of septoplasty patients had quilting sutures. 73% had nasal packing. 50 patients went home the next day after the surgery. 7 patients went home the same day. Complications include 2 patients who returned with epistaxis that settled spontaneously.

**Conclusion**

The majority of patients were discharged the day after the procedure or later. Only 11% were discharged the same day. The re-admission rate following septoplasty over an 8-month period involving 62 patients was 1.6%, which is less than the accepted standard of 2-3%.



## ENDOSCOPIC FRONTAL SURGERY

S. Haruna<sup>1</sup>

<sup>1</sup>, Japan

### Aims

Frontal sinus is surgically difficult area because not only 30 or 70 ° endoscopy and several kinds of curved forceps are needed to treat the frontal diseases and surgical space is limited, but also there are close to the dangerous sites which are skull base, orbit and anterior ethmoidal artery.

I will show the surgical technique of the several kinds of frontal diseases.

### Method

The range of diseases must be evaluated by CT or MRI before surgery. When mucocele and inverted papilloma exist the lateral site of frontal sinus, only endonasal approach has the limit to treat the lateral site of frontal sinus. Additional approaches of Draf III or external procedure should be selected.

The important points to open the ostium of frontal sinus widely are that complete ethmoidectomy is performed and the triangle surrounded by middle turbinate, agar nasi, papyracella and anterior skull base is confirmed under the view of 30° or 70° endoscopy. Using strong curved forceps and microdebrider, frontal sinus is widely communicated to the ethmoid sinus and the mucosa near the ostium of the frontal sinus is preserved as possible. However, complete removal of mucosa is needed in case of inverted papilloma. **Results**

In case of medial location and primary surgery, simple drainage should be selected.

In case of the severe cases and revision, Draf II or III should be performed.

In case of lateral location, external approach should be considered.

### Conclusion

Endoscopic frontal approaches should be selected by the locations of frontal diseases and pathological conditions.

**ANTIBIOTIC IN SEPTOPLASTY**

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**Aims**

The ENT department at Lovisenberg diakonale hospital in Oslo performs continuous quality control of nasal septoplasty. Part of this is to supervise the antibiotic treatment of the surgery.

**Method**

For this study we have selected patients operated with septoplasty with or without conchoplasty from December 2013 to January 2016. Exclusion criteria were local manifestations of systemic disease, infection and supplementary nasal surgery.

**Results**

Of 425 patients treated with septoplasty alone, 81 (19.1%) were given peroperative antibiotics (cefalotin or cloxacillin intravenously) and 37 (15.7%) of 235 patients undergoing both septoplasty and conchoplasty received the same. Thus 118 (17.2%) of the total operative cohort were treated with antibiotics. From August 2014, we also registered the time span of the antibiotic treatment. Of 81 patients given antibiotics, 27 (33.3%) were treated for one week or more with dicloxacillin perorally. The reasons for the prolonged treatment were: incipient common cold (n=2), purulent secretion observed during surgery (n=2), prophylaxis due to diabetes (n=1), immunosuppressive treatment (n=2), and difficult/time-consuming surgery or multiple reintroductions of septal cartilage or bone into the septum (n=20).

**Conclusion**

There are no national guidelines for antibiotic prophylaxis of nasal surgery in Norway. We have found that the percentage of patients given antibiotics peroperatively is high, and we want to discuss the potential risks and benefits of using antibiotic prophylaxis in nasal surgery.

**FAILURE TO FOLLOW-UP APPOINTMENTS AFTER SEPTOPLASTY AND TURBINATE SURGERY**

***R. Hijano<sup>1</sup>, M. Cantón<sup>1</sup>, J. Fusté<sup>1</sup>, M. Costey<sup>1</sup>, J. Comas<sup>1</sup>, J. Fontané<sup>1</sup>***

<sup>1</sup>Hospital del Mar, Otorhinolaryngology, Barcelona, Spain

**Aims**

To evaluate the incidence and contributing variables to failure to follow-up postoperative appointments in patients after septoplasty and/or turbinate surgery. Being septoplasty one of the most frequently performed operations by otolaryngologist and having a high satisfaction rate (about 70%), the causes why patients miss some recommended appointment after surgery remains unclear.

**Method**

567 (384 septoplasties and 183 turbinates procedures) patients underwent an observation period after the date of the surgery from 2010 to 2015. A chart review was performed. Demographics, surgery and follow-up dates and complications were recorded. The investigators attempted to contact all patients who missed some follow-up visit prescribed.

**Results**

Less than 0.5% (13/567) of patients fail to the first follow-up visit within the first week after the surgery -mainly in patients who underwent a turbinate surgery-. The rate of failure to follow-up to the next appointment within the first month increased till 20%, not showing differences between septoplasty and turbinate procedures. This failure rate was almost 40% within the first year alone. 46% of the patients who couldn't keep adequate follow-up could not be contacted.

**Conclusion**

Failure to follow-up is a serious problem with septoplasty and turbinate surgery. It is difficult to detect which patients are at risk for noncompliance with follow-up recommendations. Proper patient tracking protocols and patient education may decrease risk of failure to follow-up. However, a significant number of patients will still choose not to follow-up because septoplasty and turbinate surgery usually have very favorable outcomes and a rate of complications acceptably low.

**LATERAL ALOTOMY APPROACH FOR NASAL AND MIDFACIAL LESIONS**

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<sup>1</sup>*Papageorgiou Hospital/Aristotle University Thessaloniki, 2nd Academic ORL Department, Thessaloniki, Greece*

**Aims**

This article aims to present the efficacy of lateral alotomy approach in the management of midfacial tumours and masses of the nasal valve area.

**Method**

In a period of 5 years, 11 patients (3 males /8 females), eight with benign midfacial tumors and three with nasal valve tumors, were operated with lateral alotomy. There were two children and nine adults with a mean age of 40,1 y.o (range 7-68 y.o). Histopathology of the midfacial lesions included vascular anomalies, posttraumatic myxoma, cystic formation, dental cyst, leiomyoma, hamartoma. The nasal valve lesions were melanoma, solitary fibrous tumor and hemangiopericytoma.

**Results**

All patients underwent surgical excision of the lesions by lateral alotomy approach. One patient underwent tumor resection by lateral alotomy with an extension of incision to the nasolabial crease. In four patients reconstruction of the lateral nasal wall was performed with conchal graft. Postoperatively 9 out of 11 patients had satisfactory aesthetic and functional results. Two patients developed mild vestibular stenosis and alar collapse due to conchal graft absorption.

**Conclusion**

Nasal valve lesions and midfacial lesions can be excised by lateral alotomy approach combined with a variety of extensions which follow facial lines. Besides the minimal incision, this approach provides wide surgical field and enables complete excision of varying pathology, preserving in most cases normal nasal valve function with satisfactory aesthetic results.

**FACTORS ASSOCIATED WITH RECURRENCE AND METASTASIS IN PRIMARY CUTANEOUS SQUAMOUS CELL CARCINOMA OF THE PINNA – A 3 YEAR RETROSPECTIVE STUDY AND META-ANALYSIS**

***M. Khan<sup>1</sup>, J. Stansfield<sup>2</sup>, S. Khwaja<sup>1</sup>***

<sup>1</sup>Stepping Hill Hospital, Otolaryngology, Manchester, United Kingdom

<sup>2</sup>Stepping Hill Hospital, Foundation Doctor, Manchester, United Kingdom

**Aims**

Primary cutaneous squamous cell carcinoma (cSCC) is a locally invasive malignancy with metastatic potential. Variables which influence recurrence and metastasis are site (pinna is considered high-risk), diameter over 20mm, depth over 4mm, invasion beyond dermis, histological subtype (poorly or moderately differentiated, acantholytic, spindle cell, desmoplastic) and immune status. This study aims to identify patterns associated with recurrence of cSCC of the pinna which has been surgically treated. We present our findings together with a meta-analysis of available data.

**Method**

49 sequential cSCC lesions of the pinna in 46 patients from our centre over a three-year period were studied retrospectively.

**Results**

22 lesions have undergone a two-year follow-up. 8 patients developed metastatic (4 patients) or recurrent disease (3 patients), or both (1 patient). 7 patients developed this within one year of diagnosis. Variables previously identified as low-risk for cSCC in general were demonstrated in a number of the primary lesions associated with recurrent or metastatic disease: 4 lesions had a diameter of less than 20mm and 3 lesions had a depth of less than 4mm, 3 lesions were confined to the dermis and 3 demonstrated a degree of well-differentiated histological subtype.

**Conclusion**

These results suggest that variables other than high-risk factors are associated with recurrence. Literature concerning prognostic factors for exclusively pinna cSCC consists of ten small studies, a systematic review of older literature, and case reports. We present our data in the context of a meta-analysis to identify patterns associated with recurrence or metastasis of cSCC of the pinna in surgically managed disease.

**NASAL VALVE STABILIZATION IN EXTRACORPOREAL SEPTOPLASTY**

***C. LA MELIA<sup>1</sup>, T. LOSANO<sup>1</sup>, G. CERONI COMPADRETTI<sup>1</sup>, I. TASCA<sup>1</sup>***

<sup>1</sup>IMOLA HOSPITAL, ENT Department, IMOLA, Italy

**Aims**

Among the different operations for septoplasty, the extracorporeal septoplasty technique basically consists in the removal of all the nasal septum, the correction of bone and cartilage deformities, and their replacement with a particular suture technique to correct the markedly deviated nasal septum especially in the internal nasal valve area. The drawbacks of this surgery technique are as follows: swelling of the mucosa in the valve area and restenosis, the development of saddle nose and septal hematoma. The aim of this study is to describe our results with a modified suture technique of the extracorporeal septoplasty (ECS), taking into account the operative time and functional results

**Method**

A retrospective chart review of 133 adult patients treated with extracorporeal septoplasty from January 2011 to December 2013 was performed in a primary care centre in Imola city, Italy. Preoperative and postoperative evaluations were done using rhinomanometry and acoustic rhinometry. Statistical Analysis was performed with commercially available software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.)

**Results**

We followed up a total of 133 cases in our centre. Three patients (2.25%) had to be reoperated on due to impaired nasal patency. A statistically significant improvement was evident after surgery based on the rhinomanometric and acoustic rhinometric outcomes

**Conclusion**

Nasal valve stabilization in extracorporeal septoplasty is a successful surgical technique for anterior deviations of the septum, with an optimal surgery time and a reproducible surgical technique

**COMPARISON OF ABSORBABLE AND NON-ABSORBABLE NASAL PACKING AFTER SEPTAL SURGERY.**

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*<sup>1</sup>kangbuk samsung, Otorhinolaryngology-Head and Neck Surgery, Seoul, Republic of Korea*

**Aims**

After septal surgery, nasal packing is considered essential for preventing bleeding, hematoma, dead space and dislocation of cartilage. However, most of them have been used previously were non-absorbable materials. Goal of this study is to evaluate and compare new absorbable nasal packing (guardcel, carboxymethyl cellulose, hyaluronic acid and collagen) with non-absorbable nasal packing (merocel) after septal surgery.

**Method**

A retrospective study, we reviewed and compared 20 patients of guardcel nasal packing with 20 patients of merocel nasal packing. We checked the score of symptoms including rhinorrhea, nasal obstruction, sneezing and hyposmia at pre- and post-operative days. And also, we confirmed the complications that include adhesion, septal hematoma and septal perforation.

**Results**

The scores of symptoms between two groups in pre- and post-operative period had no significant difference. During packing removal, 1 patients (5%) felt severe pain in guardcel group, whereas, 7 patients (35%) in merocel group and 2 patients (10%) got severe bleeding in merocel group, but no one in guardcel group. Hematoma occurred in 4 patients (20%) in guardcel group and 3 patients (15%) in merocel group. And synechia occurred in 2 patients (10%) in merocel group but no one in guardcel group. But, in two groups, there were no statistically significant difference in prevalence of complications.

**Conclusion**

Nasal packing with guardcel is a good alternative for non-absorbable nasal packing used previously. It does cause less pain and bleeding for patients, but, no statistically significant differences in complications and symptoms.

**NASAL VALVE STABILIZATION IN EXTRACORPOREAL SEPTOPLASTY**

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<sup>2</sup>Italian Hospital of Buenos Aires, ENT, Buenos Aires, Argentina

**Aims**

Among the different operations for septoplasty, the extracorporeal septoplasty technique basically consists in the removal of all the nasal septum, the correction of bone and cartilage deformities, and their replacement with a particular suture technique to correct the markedly deviated nasal septum especially in the internal nasal valve area. The drawbacks of this surgery technique are as follows: swelling of the mucosa in the valve area and restenosis, the development of saddle nose and septal hematoma. The aim of this study is to describe our results with a modified suture technique of the extracorporeal septoplasty (ECS), taking into account the operative time and functional results.

**Method**

A retrospective chart review of 133 adult patients treated with extracorporeal septoplasty from January 2011 to December 2013 was performed in a primary care centre in Imola city, Italy. Preoperative and postoperative evaluations were done using rhinomanometry and acoustic rhinometry. Statistical Analysis was performed with commercially available software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.)

**Results**

We followed up a total of 133 cases in our centre. . A statistically significant improvement was evident after surgery based on the rhinomanometric and acoustic rhinometric outcomes. Three patients (2.25%) had to be reoperated on due to impaired nasal patency.

**Conclusion**

Nasal valve stabilization in extracorporeal septoplasty is a successful surgical technique for anterior deviations of the septum, with an optimal surgery time and a reproducible surgical technique.



**TRANSSEPTAL APPROACH TO THE MODIFIED ENDOSCOPIC LOTHROP PROCEDURE**

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**Aims**

Chronic frontal sinusitis is one of the most challenging problems faced by sinus surgeons. The modified endoscopic Lothrop procedure (MELP) is technically demanding, but still involves a difficulty of intraoperative identification of the frontal sinus. This paper describes an endoscopic transseptal approach to access the frontal sinus during MELP<sup>1</sup>.

**Method**

The first step of this procedure was to open a window in the bilateral anterior portion of the middle turbinates and nasal septum. The nasal septum, which could be observed through the window, should be the landmark of the midline during the surgery. A drill bur was raised up just behind the nasal bone along the midline of the nose. After the bilateral frontal sinuses and their posterior walls were confirmed, the interfrontal septum was removed superiorly.

**Results**

The transseptal approach can be recommended for difficult cases with the risk frontal sinus. We, however, routinely perform this procedure, because the approach may be simple in comparison with other classical MELP. The fact that prominent complications were not observed during or after surgery was the ground to perform this procedure.

**Conclusion**

Endoscopic transseptal frontal sinus surgery is simple to perform, and does not cause severe complications.

**Reference:**

1. Nishiike S, Yoda S, Shikina T, Murata J. Endoscopic Transseptal Approach to Frontal Sinus Disease. *Indian J Otolaryngol Head Neck Surg* 67: 287–291, 2015.

**DEFINITION AND VALIDATION OF AN ANALYTICAL SCALE OF THE NASAL DEFORMATIONS IN RHINOPLASTY**

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<sup>1</sup>APHM, ENT, MARSEILLE, France

**Aims**

The purpose of this study was to assess the reproducibility intra and inter-observer of an analytical scale of the nasal deformations before and/or after rhinoplasty. This scale could lead to an objective scoring of the deformations.

**Method**

Two scales were evaluated. The first was published by Anderson et al. in the eighties. It has 56 items defined on 3 photographic records : anteroposterior (front-to-back) perspective; the lateral view (profiles), the worm's-eye view (from below). The second one was established by our team. It has 29 items defined on the same 3 photographic records.

Three reviewers (1 expert, 1 senior and 1 junior) evaluated, twice at one month apart, 25 files randomized among patients operated in the last 2 years, using each analytical scale. Intra and inter-observer reproducibility were established using the intraclass correlation coefficient.

**Results**

The first scale did not provide good reproducibility. The second scale provided very good intra and inter-observer reproducibility. The intraclass correlation coefficient was 97%

**Conclusion**

We propose a reliable analytical scale of the nasal deformations that can be used before and/or after rhinoplasty to evaluate the aesthetic results. It could be useful to compare those aesthetic score with the functional scores or the scores of quality of life of our patients.

**ROLE OF ALPHA-TOCOPHEROL ACETATE IN MUCOSAL RESTORATION AFTER SINONASAL SURGERY**

***D. Testa<sup>1</sup>, G. Panin<sup>2</sup>, A. Guariglia<sup>1</sup>, M. Nunziata<sup>1</sup>, F.T. Zappoli<sup>1</sup>, G. Marcuccio<sup>1</sup>***

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<sup>2</sup>Medical Doctor, Pediatric, Rovigo, Italy

**Aims**

Healing process of the sinonasal mucosa requires, after surgery, the use of various medical treatment to promote a proper functional recovery. It is necessary, during this period, a constant cleaning of the nasal cavities. Therefore the importance of postoperative treatment is essential for the surgical success as the procedure itself.

**Method**

We evaluated the effectiveness of alpha-tocopherol acetate therapy in 44 patients waiting to be subjected to sinonasal surgery (septoturbinoplasty and functional endoscopic sinonasal surgery). Two groups were created, group A including 21 patients treated with hypertonic saline solution associated with alpha-tocopherol acetate (Filme nasale spray). Group B, including 23 patients treated with hypertonic saline solution and Gomenol essential oil.

**Results**

Follow-up was performed at 7, 15, 30 days, and 1, 3 months after surgery. In just two weeks of therapy was possible demonstrate less formation of crusts in the nasal cavities of group A, compared to B. In one month group A showed a complete healing of nasal mucosa, while group B showed same results only at the third month. Nasal Symptom Score also demonstrated, after one month of therapy, a better recovery in group A than in group B.

**Conclusion**

Postoperative treatment, in sinonasal surgery, has the objective of the most complete functional repair. The present research has showed the effectiveness of alpha-tocopherol acetate therapy in the improvement and acceleration of the healing process of sinonasal mucosa after surgery.

**SEPTOPLASTY - ARE POPULATION DEMANDS INCREASING?*****R. Costello<sup>1</sup>, Q. Stuart<sup>2</sup>***<sup>1</sup>University Hospital of Wales, Ear- nose & Throat, Cardiff, United Kingdom<sup>2</sup>ENT, UHW, Cardiff, United Kingdom**Aims**

Septoplasty is a common procedure performed in any rhinology centre. We want to identify if the national number of septoplasty operations is increasing or decreasing per year in England. This gives us some indication as to whether routine ENT operations are increasing or decreasing.

**Method**

The Health and Social Care Information Centre website was accessed and Hospital Episode Statistics for Admitted Patient Care for nine years, starting 2006-07 were accessed. This data was interrogated looking specifically at the number of septoplasty procedures performed per year. This data was then interrogated using Numbers.

**Results**

	Septoplasty
2006-07	18,448
2007-08	19,119
2008-09	18,813
2009-10	18,537
2010-11	18,960
2011-12	18,546
2012-13	19,900
2013-14	20,900
2014-15	17,909

Our results have not demonstrated a large increase in the number of septoplasty operations performed per year in England

**Conclusion**

Our results have shown that on a national basis the number of septoplasty operations performed per year does not seem to be changing significantly on a year to year basis. This information is important as it enables us to plan our ongoing service provision to meet the needs of our patients.

**SUBMUCOSAL MICRODEBRIDER-ASSISTED TURBINATE REDUCTION IN RHINITIS MEDICAMENTOSA: OUR EXPERIENCE AND TECHNIQUE MODIFICATION**

**G. Polev<sup>1</sup>, . Avdeeva<sup>1</sup>**

<sup>1</sup>Russian Federal State Clinical Research ENT Center, Rhinology, Moscow, Russia

**Aims**

To assess the effectiveness of microdebrider-assisted submucosal turbinate reduction (MASTR) in surgical treatment of 146 patients with rhinitis medicamentosa (RM) and to improve the results by modifying the technique.

**Method**

58 patients have been operated for RM where MASTR was done as the last stage of complex endonasal procedure (group A). In 36 patients MASTR was done for isolated RM without concurrent nasal pathology (group B). In 52 patients MASTR was done as a first stage of complex surgery with FESS and/or septoplasty being done afterwards (group C). Nasal airway patency and degree of crusting were assessed with a questionnaire on 5th, 10th, 20th, 40th days and 3 months after surgery along with the endoscopic appearance of nasal cavity. All procedures were done by the same surgeon and the same post-op medication protocol been used.

**Results**

The amount of crusts and nasal airway patency recovery were the worst in group A (average of 16 days) and the best results were achieved in group B (average of 8 days). In group C where MASTR was done as a first step of complex surgery the speed of mucosal healing was intermediate but closer to the group B (average of 11 days).

**Conclusion**

MASTR is better to be done before the inferior turbinate lateralization or outfracture and under the conditions of slight (not maximum) mucosal decongestion. Indeed the technique itself and it's performance is a matter of subjectivity to a certain degree, but the better results in groups B and C supports this hypothesis.

**THE ROLE OF ENDONASAL ENDOSCOPIC APPROACHES IN MANAGEMENT OF SINONASAL AND INFRATEMPORAL FOSSA SCHWANNOMAS**

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**Aims**

The aim of the study is to discuss effectiveness of endonasal endoscopic approaches (EEA) for managing extra-axial sinonasal and infratemporal fossa (ITF) schwannomas and evaluate potential intraoperative complications.

**Method**

Retrospective chart review of clinical records of all patients operated for a sinonasal or ITF schwannoma from 2007 to 2015. Lesions which were removed with open or combined surgery were excluded. Clinical examination results, radiological studies, surgical techniques, operative finding and treatment outcomes were evaluated.

**Results**

There were 5 schwannoma patients operated through EEA. According to imaging findings which were well matched to our operative findings, three patients had infratemporal fossa, one nasal and one sphenoid sinus located schwannoma. They required transnasal transsphenoidal or transmaxillary transpterygoid approaches. The most common presenting symptom was facial numbness in 3(60%) patients followed by 2(40%) and 1(20%) patients with headache and nasal obstruction, respectively. During removal of schwannoma from ITF, 2(40%) patients had CSF leak from foramen ovale after resection, which were detected and immediately repaired. There was no major bleeding or injury of adjacent neurovascular structures. Total tumor resection achieved in all patients. No recurrences were observed in a mean follow-up time of 49 months.

**Conclusion**

In our caseload, patients who were diagnosed for an extra-axial sinonasal and ITF schwannoma, endonasal endoscopic approaches helped us to reach and effectively remove all tumors, even in the ITF adequately without causing major complications. In order to avoid unexpected situations and complications which may put surgeons in tricky situations during surgery, precautionous preoperative planning is imperative.

**A COST EFFECTIVE DELIVERY SYSTEM FOR FLOSEAL® DURING TRANSNASAL ENDOSCOPIC BRAIN SURGERY**

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**Aims**

We share our experience with a new delivery system for the flowable haemostatic matrix, FloSeal® (Baxter, Deerfield, IL, USA) in endoscopic skull base surgery.

**Method**

We prospectively analyzed the use of FloSeal® with a hemostatic delivery system in transnasal endoscopic skull base procedures performed at the authors' institution from 1.1.2015 to 30.6.15. In all cases the number of aliquots were noted for the entire operation and also the total number of FloSeal® ampules of 5 ml was recorded.

**Results**

Our device allowed controlled application of small amount (0.5 - 1 ml) of FloSeal® to the site of bleeding. This controlled application resulted not only in increased visibility during its application, but also reduced the amount of FloSeal® required during the procedure. We were able to use 5-10 application per 5 ml ampule of FloSeal® within an individual procedure. No procedure required more than one 5 ml ampule of FloSeal®. Therefore, the use of our device results in a reduction of costs. Prior to the use of our device, we were often only able to use the material of one vial of 5 ml for one or two applications – especially in transnasal endoscopic procedures when working along a deep corridor.

**Conclusion**

Our results indicate that our delivery device of FlowSeal® can effectively control hemostasis by applying small amounts of FlowSeal® to the site of bleeding. This results in increased visibility during hemostasis and reduction of cost.

**INVERTED PAPILLOMA: RETROSPECTIVE STUDY IN A TERTIARY CENTER**

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<sup>1</sup>, Louvain, Belgium

<sup>2</sup>UCL saint Luc, ENT department, Brussels, Belgium

**Aims**

Aim of the presentation: To report a retrospective study performed in the ENT department of the CHU Dinant, Godinne.

**Method**

The study includes 40 patients operated for an inverted papilloma from January 2000 to December 2012.

There were 30 men and 10 women. Mean age: 61 +/- 12.5 yo

The symptomatology was, in a decreasing order of frequency, : unilateral nasal obstruction(62.5 %), epistaxis (15%), rhinorhea (12.5%) and impairment of smell (10%).

In the medical history we noticed a polypectomy in 32.5% and a previous surgery in 20%of the cases.

With regards to the imaging, the papilloma extruded from the maxillary sinus in 50% , from the ethmoid sinus in 32.5%, The ethmoid and maxillary sinus in 10% and other origins in 17.5%

The surgery consisted in an endonasal approach (ethmoidectomy and middle antrostomy) in 37.5%, a medial maxillectomy in 20%, A Caldwell Luc procedure in 17.5%, a combined approach (endonasal and Caldwell luc ) in 7.5%, a lateral rhinotomy in 12.5%, and a Rouge Dencker in 5%.

**Results**

We observed 5 cases with persistence of the inverted papilloma requiring a revision surgery in our department

**Conclusion**

Inverted papilloma is a "benign " tumour which can be very aggressive: tendency of local recurrence and potential risk of cancerization.

With the advances of the endoscopic techniques the endonasal approaches are as valid as the open approach with better outcomes and less morbidity.

Long follow-up is required in order to detect persistence or recurrence of the Inverted papilloma.



**CAVERNOUS HAEMANGIOMAS OF THE MAXILLARY SINUS OPERATED SUCCESSFULLY WITH AN ENDONASAL APPROACH; CASE SERIES**

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**Aims**

Introduction: Haemangiomas have been defined as benign vascular tumors . Batsakis classified them as capillar, cavernous, mixed or proliferative. Haemangiomas originating in the sinus mucosa are extremely rare.

Aim of the presentation: to report 3 cases of haemangiomas of the maxillary sinus operated successfully with an endonasal approach.

**Method**

3 adult patients (2 men and one woman) presented to the outpatient clinic with progressive unilateral nasal obstruction. In one case there is a story of epistaxis.

Ct scan depicted an opacification of the maxillary sinus. MRI (performed in 2 cases) showed an heterogenous opacification of the maxillary sinus. The vascularisation seemed high in one case.

A biopsy performed in one case was complicated with severe bleeding. A selective arterial embolisation was then performed before surgery.

For all the patients, an endonasal approach was done. It consisted with a middle maxillary antrostomy in one case whereas in the 2 other cases a transnasal medial maxillectomy associated with an ethmoidectomy was carried out.

**Results**

All the patients are disease free. No complication occurred. No blood transfusion was necessary.

**Conclusion**

Even if they are rare cavernous haemangiomas should be included in the differential diagnosis of unilateral opacity of the maxillary sinus. Nasal obstruction associated with epistaxis are the common complaints.

Imaging (CT and MRI) is mandatory to make the cartography of the tumor and to exclude important vascular afferences that should require a preoperative selective arterial embolisation.

Endonasal surgery is a viable alternative to the traditional open approach.

The surgeon must do the dissection in a non vascular plane, surrounding the tumour.

**OUTCOME AND PERIOPERATIVE COMPLICATIONS OF ENDOSCOPIC VS. OPEN CRANIOFACIAL SURGERY APPROACHES FOR RESECTION OF SINUNASAL MALIGNANCIES**

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**Aims**

Endoscopic approaches for resection of malignancies in the paranasal sinuses have been emerging recently, replacing open-craniofacial techniques for certain indications. Many data suggest that this transition to minimal-invasive, endoscopic surgery comes along with a reduced risk of skull base defects with cerebrospinal fluid leaks and other perioperative complications. We want to investigate if this hypothesis is accurate in a large collective of cases.

**Method**

Retrospective study of a total of 366 cases between 1993 and 2013 who underwent surgery for malignant tumors of the paranasal sinuses, skull base and nasal cavity at our hospital.

**Results**

A total of 366 surgeries were performed either endoscopically (n=195), via open-craniofacial approach (n=124) or by a combination of both approaches (n=47). The mean T stage (AJCC TNM classification) was 2.9 and therefore significantly lower for patients operated purely endoscopically vs. 3.39 for patients with an open-surgery approach (p<0.006). Marked intraoperative or postoperative bleeding occurred significantly less frequently in patients undergoing endoscopic procedures (26%) compared to 52% for patients undergoing open-craniofacial surgery. There was no significant difference regarding postoperative CSF leaks (5.6% for endoscopic vs 5.2% for open-craniofacial procedures) or postoperative meningitis.

**Conclusion**

Endoscopic approaches for resection of malignant tumors of the skull base and paranasal sinuses lead to a significant reduction of marked perioperative bleeding in our collective. However, there was no significant reduction of postoperative CSF leaks and other complications for endoscopic compared to open surgery. Careful preoperative assessment regarding the surgical approach has to be made to meet proper indications for both techniques.

**PROGNOSTIC VALUE OF TUMOR CLASSIFICATION IN PATIENTS WITH SINONASAL MUCOSAL MELANOMA**

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<sup>1</sup>Université d'Auvergne, 63000, Clermont Ferrand, France

**Aims**

Introduction. Sinonasal mucosal melanoma is a rare disease associated with a very poor prognosis. The purpose of this study was to assess the prognostic value of the 2 staging systems found in the literature for this tumors: the American Joint Committee on Cancer (AJCC) TNM classification for mucosal melanomas in 2009 (7<sup>th</sup> edition), and the 2002 (AJCC) TNM classification for carcinomas of the nasal cavity and sinuses (6<sup>th</sup> edition) and the value of tumors localization.

**Method**

Methods. A retrospective study of 18 patients treated between August 1998 and June 2014 was conducted for this study. . There were 11 women (60 %) and 7 men (40 %) with a median age of 72 years. Global median survival was 80 month. Each patient was retrospectively staged using 6 and 7<sup>th</sup> edition. Demographic, clinical and localization parameters were identified and correlated with outcomes. Survival rates (overall and disease-free) were calculated using the Kaplan–Meier method. The log-rank test was used to compare survival curves.

**Results**

Results. The overall survival at 1 years was 82.6 % and at 5 years was 54.5 %. Only 6<sup>th</sup> edition was significantly correlated with overall survival (p=0.0476) and not correlated with 7<sup>th</sup> edition (p=0.108). Sinusal localization was significantly correlated with a poor overall survival p=0.0039.

**Conclusion**

Conclusion. We believe TNM 2002 classification of AJCC should be the primary staging system for patients with mucosal melanomas of the sinonasal tract. Tumor localization is a good prognostic value in terms of overall and disease-free survival.

**COMPARISON OF ANTERIOR ENDOSCOPIC TRANSNASAL APPROACH AND LATERAL MICROSURGICAL APPROACH TO THE JUGULAR FORAMEN: AN ANATOMICAL STUDY**

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**Aims**

The jugular foramen is one of the most challenging surgical regions in skull base surgery. With the development of endoscopic techniques, the endoscopic endonasal approach has been undertaken to treat some lesions in this area independently or combined with open approaches. The purpose of the current study is to explore the endoscopic transnasal approach to the jugular foramen and compare it with the lateral microsurgical approach.

**Method**

Fifteen bony structures related to the jugular foramen were measured in 33 cases of adult dry skulls. Six silicon-injected adult cadaveric heads (12 sides) were dissected performing an endoscopic endonasal approach and lateral infratemporal fossa approach (type A). The jugular foramen was exposed; related landmarks were demonstrated. High-quality pictures were obtained. The distances and angles of the bone structures related to the jugular foramen were obtained.

**Results**

The jugular foramen can be accessed using either approach. With the endoscopic approach, dissection and transposition of facial nerve can be avoided, but to adequately expose the jugular foramen the internal carotid artery may be need to be dissected and displaced. Important anatomic landmarks for the endoscopic approach include: internal carotid artery, inferior petrosal sinus, petroclival fissure, styloid process, sphenoid spine, foramen spinosum as well as ascending pharyngeal artery.

**Conclusion**

A deep understanding of the complex anatomy of the jugular foramen is paramount for safe and effective surgery of the jugular foramen. The endoscopic transnasal approach and microsurgical approach to the jugular foramen each have distinct advantages and limitations.

**SINONASAL ADENOCARCINOMAS: EXPERIENCE OF LISBON ONCOLOGY INSTITUTE BETWEEN 2000 AND 2014**

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**Aims**

To analyze treatment outcomes, including overall and disease-free survival rates, of patients with sinonasal adenocarcinomas.

**Method**

Retrospective study of patients with sinonasal adenocarcinoma treated in IPOFGL between 2000 and 2014. The authors used Kaplan-Meier method for the survival analysis and the Log-rank test to compare prognostic factors.

**Results**

We identified 33 patients; 17 were women and 16 men. Average age at diagnosis was 65.6 years and median follow-up was 39 months. Ethmoid sinus was the most frequent location; 51% presented at AJCC stage IV. Surgery with adjuvant radiotherapy was used in 70%. Overall survival at 36 months was 57.6%, with 40.5% disease-free survival. Recurrence was caused by local failure in majority of cases. Survival was decreased significantly in patients with sphenoid sinus involvement ( $p=0.038$ ), skull base invasion ( $p=0.003$ ) and recurrence metastatic disease ( $p=0.01$ ).

**Conclusion**

Complete surgical removal with postoperative radiotherapy remains the standard treatment modality. Sphenoid sinus and skull base invasion, and development of distant metastasis portend for poor prognosis.

**PERIORBITAL SUSPENSION FOR MANAGEMENT OF FAR LATERAL FRONTAL SINUS LESIONS**

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**Aims**

Although Draf procedures improve endoscopic ease of access to the frontal sinuses, in well pneumatized sinuses, lesions located at the far lateral regions still pose a challenge to the rhinoendoscopists. In this study, we investigated the role of our unique technique that we use since 2010, enabling periorbital suspension to address pathologies at the far lateral portion of the frontal sinuses and supraorbital recess, otherwise remaining inaccessible through an endoscopic approach.

**Method**

Retrospective analysis of all patients operated with periorbital suspension technique between 2010 and 2016 at our tertiary care unit were included. Open or combined surgeries were excluded. Clinical examination results, radiological studies, operative findings and treatment outcomes were evaluated.

**Results**

Fourteen patients were identified that periorbital suspension technique was utilized in diverse grades for different pathologies. Among the patients, 4 had frontal CSF leaks, 3 fibrous lesions, 3 inverted papillomas, 2 mucoceles, one frontal cholesteatoma and one malignant mesenchymal tumor. All lesions were completely removed. According to the level of lateral extension of the pathology, diverse grades of periorbital suspension method was used. We were most laterally able to reach even middle cranial fossa dura and inner temporal muscle periosteum through a transfrontal approach. As the only medial attachment of periorbita, anterior ethmoidal artery ligation provided the most important key-role in periorbital suspension.

**Conclusion**

Periorbital suspension technique yields a whole new option in the endoscopic management of far lateral frontal sinus and supraorbital region pathologies. It expands our limits enabling us to adequately address areas earlier unreachable through the endonasal approach.

**ENDOSCOPIC NASOPHARYNGECTOMY: HONG KONG EXPERIENCE**

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**Aims**

Nasopharyngeal carcinoma is a common disease in South East Asia. About 12% of local failure rate of chemoradiation for primary treatment had been documented in Hong Kong. Salvage treatment can be performed by re-irradiation and surgery. Surgery as nasopharyngectomy can decrease the complications induced by re-radiation with slightly better survival rate. However, nasopharyngectomy is not an easy procedure because of the deep sited anatomy of the nasopharynx. We start off to perform endoscopic nasopharyngectomy with binostrials 4-hands technique,

**Method**

The extends of dissection depends on the location and extend of the disease. For disease with superficial involvement of fossa of Rossemuller, we cut the Eustachian medial to medial pterygoid muscle. For disease with deeply involved fossa of Rossemuller, we cut the Eustachian lateral to medial pterygoid muscle by transpterygoid approach. For centrally located disease. We perform endoscopy nasopharyngectomy between the bilateral Eustachian tube with drill down the sphenoid floor.

**Results**

We performed endoscopic nasopharyngectomy on 19 cases of recurrent undifferentiated cell carcinoma since 2010.. 14 rT1 diseases. 4 rT2a diseases. One recurrent had been detected on follow up..

**Conclusion**

Endoscopic nasopharyngectomy is feasible in well selected cases with good prognosis

**ROBOTICS**

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<sup>1</sup>, Bern, Switzerland

**Aims**

Microscopic or endoscopic skull base surgery is technically demanding and its outcome has a great impact on a patient's life. In the last 10 years, patient-specific stereotactic templates, skull-mounted or more conventional image-guided robotics approaches have been presented by different groups. The most famous used clinically in the area of the skull base was the DaVinci® robot, but the tools and the handling is not made for routinely operations for chronic rhinosinusitis +/- polyps. There are other groups worldwide which are trying to implement a prototype robot system (Leipzig, Seattle, Montpellier, Pennsylvania [Flexrobot®]) for chronic rhinosinusitis surgery. Because of the angled anatomy of the sinuses through a key-hole procedure only a robot with smart flexible instruments integrated with the movements of the endoscopes can be the goal for the future to perform a whole FESS operation. Since 2008 also our group in Bern is developing our own robot with our Biomedical Engineering center (ARTORG). We used the robot at the moment as an endoscopic holder or as a high accurate percutaneous cochlea implant system.

During the lecture the different prototypes of robot systems will be presented.

Acknowledgments: supported by the Swiss National Science Foundation ([www.nano-tera.ch](http://www.nano-tera.ch)), Commission of Technology and Innovation, Bern, Switzerland.

**Method**

Review

**Results**

During the lecture the different prototypes of robot systems will be presented.

**Conclusion**

Robot systems are not ready for clinical use at the moment for FESS.



**PEDIATRIC NASOPHARYNGEAL MALIGNANT TUMORS: CLINICAL PRESENTATION AND SURVIVALS ANALYSIS IN 28 PATIENTS**

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**Aims**

To analyse the clinical presentation, histological pattern, treatment and survivals of children and adolescents with nasopharyngeal malignant tumors.

**Method**

Retrospective study based on the review of clinical reports of 28 patients under 18 years of age with nasopharyngeal malignant tumors treated between 1998 and 2014. For survival analyses only patients treated before 2013 were included. Survivals were estimated using Kaplan-Meier method with SPSS-software. The log-rank test was used to test differences between subgroups.

**Results**

28 patients with nasopharyngeal malignant tumors were included. Carcinoma was the most common histologic type (71,4%), followed by Sarcoma and Lymphoma. Cervical masses were the most common presentation symptom (57%). The majority of patients presented with advanced locoregional disease. All patients were treated with chemotherapy with or without concurrent/adjuvant radiotherapy, depending on histology. In 3 patients with Sarcomas there was a persistence of the local disease after treatment and in 1 patient there was local relapse. In 3 cases of carcinoma there was a local/regional or distant relapse of the disease and in 1 patient there was a distant disease progression during treatments. The 3 and 5 years overall survival in patients with nasopharyngeal malignant tumors were both 74,8%. There was no significant difference in overall survivals between patients with carcinoma and other tumors histology ( $p=0,169$ ).

**Conclusion**

Pediatric nasopharyngeal malignant tumors are rare. The first manifestation of these tumors is usually a symptom that the otorhinolaryngologists often observe in their daily practice. A high index of suspicion is needed if the patient is to benefit timely and appropriate diagnosis.

**EPISTAXIS: HOW HELPFUL ARE ONLINE MEDICAL RESOURCES FOR PATIENTS?**

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**Aims**

To evaluate the quality and readability of medical resources which are readily accessible to the general public via the internet.

**Method**

Using the World Wide Web, the terms 'epistaxis' and 'nosebleed' were entered separately into the 3 most widely used internet search engines (Google, Yahoo and Bing). The top 40 webpage links for each search engine were confirmed, having excluded any duplicates, leaving a total of 40 webpages to be analysed.

For each webpage, a Flesch-Kincaid readability score, using the first 400 words of each article, and a DISCERN score (for article quality) was obtained. Both scores were combined to give an overall score.

**Results**

The 3 websites receiving the highest overall scores were royalberkshire.nhs.uk, nhsdirect.wales.nhs.uk and nhsinform.co.uk. The mean Flesch-Kincaid score was 50.2 (range 1.8-84.6), indicating a 'fairly difficult' to 'difficult' readability of articles, and the mean DISCERN score was 50.0 (range 29-73), demonstrating that online material is of variable quality.

**Conclusion**

More and more patients are turning to the internet to research their medical conditions. Our study has shown that the large amount of online resources available to the general public can be of variable quality and potentially written at a level too difficult for the average adult to read easily. If patients wish to use the internet as a medical resource, then clinicians should be able to direct them towards the most appropriate literature.

**GENOMIC ANALYSIS OF OLFACTORY NEUROBLASTOMA AND ESTABLISHMENT OF NOVEL OLFACTORY NEUROBLASTOMA CELL LINE MODELS**

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**Aims**

To identify molecular markers, putative targets for therapy, and to elucidate genetic alterations specifically associated with olfactory neuroblastoma, a rare nasal neoplasm originating from the olfactory neuroepithelium in the upper portion of the nasal cavity (1,2,3).

**Method**

Twelve FFPE olfactory neuroblastomas (and 12 control samples) were laser-capture micro/macro-dissected, enriching tumour DNA for sample exome capture, flow cell preparation and whole-exome sequencing (WES) (4,5,6). In addition, fresh tumour tissue from three patients was dissected following endoscopic resection and cells were then grown using a modified Schlegel method on a monolayer of irradiated mouse fibroblast (3T3-J2) feeder cells and a Rho-associated kinase (ROCK) inhibitor (10uM Y27632) (7).

**Results**

WES data reveal mutations and copy number changes in multiple genomic regions, such as in 1p36, 1q21, 1q44, and 14q32. These regions include genes involved in DNA repair, and most interestingly all of the amplified regions contain genes of the olfactory receptor family (up to 56 olfactory receptor genes per region). So far, three primary olfactory neuroblastoma cell cultures, i.e. ONB-MLVL-007, UCL-C-ONB-006 and UCL-C-ONB-001 have been successfully established from olfactory neuroblastoma specimens.

**Conclusion**

This work elucidates genetic alterations specifically associated with this malignancy and identifies novel genomic alterations and molecular markers. Moreover, this work demonstrates the successful establishment of primary cancer cell cultures from olfactory neuroblastoma samples. These *in vitro* models will be used to test putative targets for therapy. This may help to establish novel targets for future evaluation and could eventually improve the outcome of this rare and potentially life-threatening disease.

**SNOT-22 REVEALS LATENT PATHOLOGY IN YOUNG ADULTS**

***E. Prokopakis<sup>1</sup>, A. Milioni<sup>1</sup>, I. Lympferidis<sup>1</sup>, A. Kaprana<sup>1</sup>, S. Velegrakis<sup>1</sup>, G. Velegrakis<sup>1</sup>***

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**Aims**

The 22 point Sino-Nasal Outcome Test (SNOT-22) is a validated patient-reported measure of symptoms' severity and health-related Quality of Life in sinonasal conditions. It has also recently been used to assess response to treatment. We determine whether the SNOT-22 can be used in revealing latent pathological conditions from the upper respiratory system in healthy groups of general population.

**Method**

500 healthy volunteers were randomly recruited Greek Army Forcies School and asked to fill in the SNOT 22 questionnaire. All participants had no history of upper or lower respiratory disorder and aged from 18 to 24 years old. Ten per cent of the subjects (n=50) with the highest SNOT score, as well as 20 with the lowest score (control group) underwent a complete rhinologic (nasal endoscopy, rhinomanometry, sniffin' sticks and skin prick test) and pulmonologic (chest radiograph and spirometry) examination. Respondents with symptoms of respiratory infection or fever were excluded from the analysis.

**Results**

We compared the results of the experimental and the control group using SPSS 18.0 statistical software. Parameters that approached significance ( $p < 0,005$ ) were septal deviation and hypertrophy of inferior nasal turbinate, while no statistically significant difference were observed in rhinomanometry, sniffin' sticks, skin prick test and spirometry results.

**Conclusion**

The SNOT-22 is a reliable, valid and handy tool that physicians can use to predict likelihood of latent pathology in general population as a routine clinical practice.

**CORRELATION STUDY ON THE SYMPTOM SCALES BETWEEN CHRONIC RHINOSINUSITIS AND LARYNGOPHARYNGEAL REFLUX**

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**Aims**

To assess the laryngopharyngeal reflux (LPR) symptoms in chronic rhinosinusitis (CRS) patients and investigate the correlation between sino-nasal outcome test 20 (SNOT-20) and reflux symptom index (RSI).

**Method**

96 patients with CRS (44 in CRSwNP group, 52 in CRSsNP group) and 53 cases of control group were included. All subjects were assessed with visual analog scale (VAS), SNOT-20, Lund–Mackay CT scoring, RSI, and RFS. Difference and correlation were analyzed in the three groups.

**Results**

The RSI scores in two CRS groups were evidently higher than the control group. No significant difference was found between the two CRS groups. The correlation of total score of the first 10 items in the SNOT-20 scale and the total score in RSI between the CRSwNP and CRSsNP groups suggested positive correlation, but no correlation was observed in the control group.

Furthermore, several indexes in SNOT-20 also correlated with symptoms in RSI.

**Table 1. RSI score in three groups**

RSI score	A:CRS <sub>w</sub> NP group (n=44)	B:CRS <sub>s</sub> NP group (n=52)	C:Control group (n=53)	statistical significance
RSI $\geq$ 10	8 (18.18%)	18 (34.62%)	2 (3.77%)	There's no significant difference between A and B. A is significantly larger than C.(Z=2.26>Z <sub>0.975</sub> ) B is significantly larger than C. (Z=4.35> Z <sub>0.975</sub> )
RSI $\geq$ 13	7 (15.91%)	12 (23.08%)	2 (3.77%)	There's no significant difference between A and B. A is significantly larger than C.( Z=1.99>Z <sub>0.975</sub> ) B is significantly larger than C. (Z=3.02> Z <sub>0.975</sub> )

**Table 2. Correlation of some symptoms between SNOT-20 and RSI scales in CRS<sub>w</sub>NP group. (r value)**

SNOT-20 index	RSI index					
	hoarseness / vocal fatigue	pharyngeal paraesthesia	throat clearing	cough	dry pharynx/ over secretion	acid regurgitation/ heartburn/ stomach discomfort
Thick nasal Discharge	-	-	-	-	-	-0.370
Blow the nose	-	-	-	-	-	-
Postnasal discharge	0.300	0.420	-	-	-	-
Sneezing	-	-	-	-	-	-
Runny nose	-	-	-	-	-	-

P value<0.05

**Table 3. Correlation of some symptoms between SNOT-20 and RSI scales in CRS<sub>s</sub>NP group. (r value)**

SNOT-20 index	RSI index					
	hoarseness / vocal fatigue	pharyngeal paraesthesia	throat clearing	cough	dry pharynx/ over secretion	acid regurgitation/ heartburn/ stomach discomfort
Thick nasal Discharge	-	-	0.418	0.502	-	-
Blow the nose	-	-	-	-	-	-
Postnasal discharge	-	0.362	0.470	0.455	0.559	0.470
Sneezing	0.306	0.392	-	-	-	-
Runny nose	-	-	-	-	-	-

P value<0.05

## Conclusion

CRS patients accompanied with high LPR symptoms scores. The total scores and several symptoms of SNOT-20 and RSI showed positive correlation. An underlying causal relationship may exist between the two scales, which implied the application of RSI to LPR investigation for CRS patients may be inaccurate.

**PROGNOSTIC BIOMARKERS AND MOLECULAR FEATURES OF P16/HPV POSITIVE NEOPLASIA OF THE NOSE AND PARANASAL SINUSES: A SYSTEMATIC REVIEW**

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**Aims**

Background: Human papilloma virus (HPV) infection is becoming an increasingly common predisposing factor for head and neck neoplasia. HPV is thought to promote malignant transformation by surpassing cell cycle checkpoints and causing genomic instability. HPV positive neoplasia represents a distinct biological entity in terms of its underlying genetics and clinical behaviour. Next generation sequencing has enabled researchers to begin identifying biomarkers associated with neoplasia which can aid in predicting tumour behaviour as well as offering potential targets for treatment.

Objectives: To evaluate the current known prognostic biomarkers of HPV positive sinonasal neoplasia.

**Method**

Embase (1947-2015) and Medline (1946-2015) were searched on 19th December 2015 using a comprehensive strategy for studies evaluating clinical outcomes of prognostic biomarkers of HPV-positive upper aero-digestive tract neoplasia. Articles were limited to English language and Human subjects. All studies that provided original data on the clinical implications of biomarkers in HPV positive neoplasia were included. Outcomes relating to malignant conversion, recurrence, regional and metastatic spread as well as response to treatment were evaluated.

**Results**

The search returned 3324 publications. Title review resulted in 1008 relevant abstracts. Of these 778 were excluded. 230 articles were considered for full text assessment. These studies included data involving 5 thematic groups: prognostic implication (n=138), malignant conversion (n=27), recurrence (n=51), metastatic or nodal disease (n=46) and response to treatment (n=61) with some studies evaluating more than one outcome.

**Conclusion**

The clinician should be aware of the clinical implications of a variety of biomarkers present in HPV positive neoplasia, both in benign and malignant disease.

**POSTOPERATIVE CARE OF PATIENTS AFTER FESS WITH THE USE OF MASTIC OIL AND OLIVE OIL.  
A MEDITERRANEAN APPROACH**

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**Aims**

Aim: Significant percentage of nasal polyposis patients undergoing Functional Endoscopic Sinus Surgery (FESS) experience impaired wound healing, leading to recurrent polyps. The initial purpose of this study is to define the efficacy of olive oil on symptoms relief, quality of natural sinus drainage improvement and postoperative process.

**Method**

Material-methods: In a period of 3 years 48 patients after FESS were assigned to instill randomly for 4 weeks, into one nostril, 5 drops of mastic oil solution 1% diluted in olive oil, after saline washes, and normal saline drops into the other. An endoscopic score was obtained at 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> postoperative week for crusting, purulent secretions and edema, in order to assess response after the given treatment. In addition, subjective scores for nasal obstruction, irritation and dryness were also recorded by patients for the same period of time.

**Results**

Results: The sides treated with the oily solution presented significantly better endoscopic scores in all the objective, endoscopic findings, especially for crusting ( $p=0.003$ ). Similarly, subjective scores showed that postoperative symptoms were lower in the oily solution group, to levels considered statistically significant and clinically relevant, for obstruction ( $p=0,05$ ) and dryness ( $p=0,00$ ). Most of the patients achieved better symptomatic response from the use of olive oil, but not statistically significant for irritation ( $p=0,088$ ).

**Conclusion**

Conclusion: The anti-inflammatory properties of mastic and olive oil can be helpful in wound healing process after FESS, decreasing the persistent crusting and promoting re-epithelization.



## RISING INCIDENCE OF HEAD AND NECK MUCOSAL MELANOMA IN AUSTRALIA

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### Aims

Mucosal melanomas are rare and aggressive malignant tumours arising from melanocytes of mucosal surfaces. The nose and sinuses are the most commonly affected region within the respiratory tract.

Incidence of sinonasal mucosal melanoma is controversial but appears to be on the rise.

### Method

We sought to analyse the trends in incidence of Head and Neck Melanoma in Australia over a 25 year period from 1985-2009. The 2011 Australian Cancer Database was used for data collection.

We identified 353 cases of **head and neck** mucosal melanoma (HNMM) in the Australian Cancer Database between 1985 and 2009. This included 288 cases of sinonasal melanoma and 65 cases of non-sinonasal disease.

### Results

The incidence of **HNMM** in Australia has steadily **increased** over the 25-year calendar period. The age-standardised incidence rate increased from 0.59 to 0.80 cases per million for men and 0.74 to 0.92 cases per million for women. This represents a TPC of 35.8% and 24.5% respectively. The **rate of increase was most pronounced in men** with sinonasal melanomas.

### Conclusion

Our results show a clear and dramatic increase in rates of head and neck mucosal melanoma and in particular in sino-nasal malignant melanoma.

This increased incidence may be attributed to improvement in diagnostic methods such as immunohistochemical markers. however this would fail to explain why rates are increasing faster amongst males than females.

**A META-ANALYSIS OF SURVIVAL FACTORS IN RHINO-ORBITAL-CEREBRAL MUCORMYCOSIS**

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**Aims**

Rhino-orbital-cerebral Mucormycosis (ROCM) is an uncommon but potentially lethal fungal infection. Although most cases originate from developing countries, the duality of an aging population and increased prevalence of chronic illness may mean some rhinologists practicing in Western countries will encounter ROCM in their careers. Yohai et al published a review of 145 case reports from 1970 to 1993 assessing prognostic factors for patients presenting with this disease. We present an updated review of the literature.

**Method**

An extensive Medline literature search was performed for case reports published from 1994 – 2015.

**Results**

In total, 210 published cases were identified, of which 175 were included in this review. 55 were female, with a mean age of 43. Overall survival rate was 59.5%, which was not significantly better than the previous series (60%). Survival rates in patients with renal disease had improved, from 19% to 52%, and in patients with leukaemia (13% to 50%). Facial necrosis and hemiplegia remained poor prognostic indicators (33% and 39% survival rates respectively).

Early commencement of medical treatment related to better survival outcomes (61% if commenced within first 12 days of presentation, 33% if after 13 days). Timing of surgery had less of an effect, however, in 28 cases that did not receive any surgical treatment, only 21% survived.

**Conclusion**

Although overall survival rates have not improved, survival rates in patients with renal disease were better, potentially due to the introduction of liposomal amphotericin B which is less nephrotoxic. Prompt diagnosis and treatment remain of utmost importance in this disease.

**CLINICAL FINDINGS OF SINONASAL FIBRO-OSSEOUS LESIONS EXCEPT OSTEOMA**

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**Aims**

Fibro-osseous lesions in sinonasal area are not common disease. The diagnosis and treatment depend on the symptoms, age, diagnostic imaging and the pathology. However, the report on the large series is not found. We analyzed the clinical findings of 36 patients with fibro-osseous lesions except osteoma.

**Method**

Patients who received sinus surgery with diagnostic imaging show fibro-osseous lesions in sinonasal area were selected from 2005 to 2015. Patients with definite osteoma was excluded. Clinical findings were analyzed.

**Results**

The age distribution was 2 to 60. Twenty patients (52.8 %) were younger than 20 and their main symptoms were facial asymmetry (75 %) and visual impairment (20 %) and male to female ratio was 13:7. Fibrous dysplasia occupied 70% and revision surgeries were done in 40%. In remaining 16 patients, main symptoms were sinonasal symptom or headache and male to female ratio was 6:10. Fibrous dysplasia occupied 37.5 % and revision surgeries were done in 6.3 %.The CT imaging show too diverse patterns and the cystic change and mucocele appeared later.

**Conclusion**

The fibro-osseous lesion grows fast causing facial asymmetry or visual symptom in younger male patients. From thirties slow growing lesions cause sinonasal symptoms mainly in female patients.

## A DECADE OF RHINOLOGY IN SAINT LUCIA

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### Aims

St Lucia is a developing country with evolving healthcare needs. A single otolaryngologist has provided the island's rhinology services for the last 23 years. The primary aim of this study is to establish the surgical caseload for Saint Lucia's rhinology surgeon. The secondary aim is to establish trends in operation type over the last decade.

### Method

The electronic operative records were retrospectively obtained from Saint Lucia's largest hospital for all ENT operations performed January 2005- December 2014. These were classified by ENT-subspecialty. The Pearson Product Moment Correlation Co-efficients (r) was calculated to establish trends.

### Results

A total of 1558 operations were performed over the decade at Victoria Hospital. The most commonly performed rhinology operation was manipulation of nasal bone (1% of cases), followed by nasal cautery (1%). We found that 11% of total cases were Rhinology (compared with 23% in a comparable UK centre); 7% Otolaryngology, 32% Head and Neck and a further 41% were Paediatric cases. Over the ten-year period there was a shift towards increase in number of Head and Neck cases ( $r=0.66$ ) but downward trend in the number of Otolaryngology ( $r=-0.59$ ) and Paediatric ( $r=-0.22$ ) cases with no change in Rhinology. There was an upward trend in the number of elective ENT operations ( $r=0.32$ ) and respective downward trend in emergency cases ( $r=0.22$ ).

### Conclusion

Through defining the ENT operative caseload, it is possible to inform future training of West Indian rhinologists. With increased number of ENT surgeons, Saint Lucia will be able to incorporate sub-specialisation of ENT services, including rhinology.

**NASAL MUCOSA MELANOMAS IN IPOLFG (1995-2010)**

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**Aims**

Nasal mucosa cancer is a rare condition and mucosal melanomas comprise less than 1% of all melanomas. Although it is less common in the paranasal sinuses than the other tumor types, the sinonasal cavities are the most frequent sites for mucosal melanomas in the head and neck. The long-term prognosis is often poor.

The main objective of the study is to determine clinical features of the nasal mucosa melanoma (NMM) cases managed at our institution.

**Method**

The study was performed in a high-case volume oncologic institution. Patients diagnosed NMM, managed between 1995 and 2010, were assessed retrospectively.

The staging system used was from the American Committee on Cancer (AJCC).

SPSS® computer program was used for statistical analysis. Kaplan-Meier and log rank tests were used for survival analysis.

**Results**

23 patients were studied. The mean age at diagnosis was 70.7 years.

11 patients were classified stage III, 4 stage IVa, 3 stage IVb and 5 stage IVc, in the first appointment.

15 patients undergone surgery and received radiotherapy. 7 patients received radiotherapy and one patient died before the treatment started.

Overall survival at 36 months were 26%.

Disease-free survival at 36 months was 5%. Mean disease-free survival was 9.9 months, with a confidence interval of 95% (3.970-15.830).

Survival was significantly decreased in patients classified stage IV comparing to stage III ( $p < 0.05$ )

**Conclusion**

Nasal mucosa melanoma is an aggressive disease. Surgery remains the treatment of choice in most stage III melanomas, whilst advanced disease only benefits from palliative treatment. Stage IV melanomas have poor survival.

**EXOPHYTIC SINONASAL PAPILLOMAS AND NASAL FLORID PAPILOMATOSIS: A RETROSPECTIVE STUDY**

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**Aims**

Exophytic papillomas (EP) represent 30 to 50% of the nasal cavities papillomas. The florida EP has not been yet described in the literature. The aim of this study was to describe the management of EP, including florida EP and to highlight potential risk factors.

**Method**

this retrospective study included, over 10 years, all patients presenting an EP. We recorded: medical history; extension of the lesion at diagnosis; treatments performed; pathology results including features of HPV infection and dysplasia; recurrences. All patients included were invited to have a control nasal endoscopy.

**Results**

We included 13 patients (8 men, 5 women, mean age 36 years) with a mean follow-up of 5 years. The most common symptom at diagnosis was nasal obstruction (6 cases, 40%). Eight patients had a history of nasal trauma, ipsilateral septal deviation, occupational exposure to dust. The initial location of EP was mainly on the anterior part of the septum (6 cases, 40%) followed by the nasal vestibule (5 cases, 33%). In 3 patients multiple and diffuse EP lesions were detected (florida EP). The initial treatment was surgery for 12 patients. Pathological analysis found presence of dysplasia in 4 cases (31%) and features of HPV infection in all cases. A nasal recurrence occurred within 3 months in 4 patients (31%) (2 patients with florida EP).

**Conclusion**

EP in their uni/bifocal presentation have poor recurrence rates after surgery. On the contrary, florida EP treatment remains a challenge and the understanding of its pathophysiology is a key point.

**THREE-DIMENSIONAL COMPUTED TOMOGRAPHIC STUDY OF THE SUPREME NASAL TURBINATE**

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**Aims**

The superior nasal turbinate (SorNT) is a landmark for the identification of the sphenoid ostium (SO) during endonasal surgery. There is little data in the literature on anatomy of the supreme nasal turbinate (SmeNT) and its relation to SO. The aim of this study was to evaluate the prevalence and anatomy of SmeNT.

**Method**

Multiplanar (MPR) and 3D rendering reconstructions were used to analyze 100 paranasal sinus CT of slice thickness less than 0,75 mm.

**Results**

SmeNT was identified in 80 subjects: in 62 subjects on both sides, and in 18 unilaterally (13 on the right). SO was always located medial to the posteroinferior attachment of SorNT and SmeNT (if present). Three main types of SmeNT were defined basing on coronal plane images: 1 - forming the ostium to the posterior ethmoidal cell adjacent to the skull base, 2 - forming the entrance to the shallow cavity or ostium to the posterior ethmoidal cell not adjacent to the skull base, 3 - appearing as a fold of the medial wall of the nasal cavity, forming a shallow groove beneath.

**Conclusion**

SmeNT is more common than thought, but due to its location posterior and superior to SorNT, in the narrow cleft, it is rarely seen intraoperatively. However, if SmeNT is identified, the sphenoid ostium should be looked for medial to the posteroinferior attachment of this structure.

**THE ONODI CELL AND OPTIC CANAL ASSESSED IN PARANASAL SINUS CT IN ASIAN NOSE**  
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**Aims**

In 2014, the Onodi cell was defined as the most posterior ethmoid cell which is situated laterally and/or superiorly to the sphenoid cell. It is closely connected to the optic nerve. If there is a large Onodi cell and a surgeon does not recognize it during endoscopic sinus surgery, he may injure the optic nerve in the cell or not able to open the sphenoid sinus situated beneath it. Thus it is important to know whether the optic canal is exposed in the posterior ethmoid cell or the sphenoid sinus. The objective of the present study was to determine the prevalence of the Onodi cell and variations of the optic canal exposure in Asian nose.

**Method**

Paranasal CT scans obtained from 152 patients in Osaka National Hospital were analyzed. The study was approved by the Institutional Review Board of Osaka National Hospital.

**Results**

The prevalence of the Onodi cell was 29.9% (91 sides) in the patients. We classified the type of optic canal exposure into 4 groups according to its exposed site: A: posterior ethmoid only; B: Sphenoid sinus only; C:posterior ethmoid and sphenoid sinus; and D:no exposure. Group A comprised 69 sides, group B 148 sides, group C 71 sides, and group D 16 sides.

**Conclusion**

Our data of the Onodi cell and the optic canal may be useful for surgeons performing endoscopic sinus surgery in Asian nose. We must take care to avoid the optic nerve injury in patients in case of Onodi cell and a pneumatized anterior clinoid process.



**THE BURDEN OF RHINOLOGIC DISEASE**

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**Aims**

The purpose of this study was to measure the health-related quality of life in a rhinologic patient sample and to compare it with the general population and some other diseases.

**Method**

Adult patients with nasal complaints referred to Helsinki University Hospital were asked complete the generic 15D quality of life questionnaire that includes the following dimensions: moving, seeing, hearing, breathing, sleeping, eating, speech, eliminating, usual activities, mental functioning, discomfort and symptoms, depression, distress, vitality and sexual activity. The diagnosis was recorded after outpatient visits in the ENT clinic.

**Results**

The most common main diagnoses of the 345 rhinologic patients were chronic rhinosinusitis (n=124), rhinitis (n=103) and septal deviation (n=35). The mean total 15D score was lower in patients with nasal complaints than in the age- and gender-standardized sample of the general population (0.867 vs. 0.922, p<0.001). The difference is statistically significant and clinically important. The patients were worse off in all dimensions but moving. Accordingly, the rhinologic patients scored worse than patients waiting for hysterectomy, patients with asthma and patients with head and neck cancer. The scores of nasal patients were further decreased in the subpopulation with sleep apnea.

**Conclusion**

Rhinologic diseases seem to affect almost all dimensions in the generic health-related quality of life. The effect of nasal obstruction on sleep quality and the many comorbidities associated with nasal diseases, such as asthma, sleep apnea and depression may explain the broad range of this burden.

**ANALYSIS OF ADULT ENDOSCOPIC SINUS SURGERY OPERATIVE FLOW: OPPORTUNITIES FOR IMPROVED SAFETY & EFFICIENCY**

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**Aims**

The goal of this study was to develop and evaluate the impact of an aviation-style challenge and response sinus surgery specific checklist on potential safety and equipment issues at key stages of the patient surgical journey, during sinus surgery at a tertiary academic health center. This initiative is designed to be utilized in conjunction with the 'standard' WHO surgical checklist. Although endoscopic sinus surgery is generally considered a safe procedure, avoidable complications and potential safety concerns continue to occur. The WHO surgical checklist does not address certain issues, which may be of particular relevance for endoscopic sinus surgery.

**Method**

This prospective observational study compared the occurrence of any safety or equipment issues before and after implementation of the checklist. 47 consecutive functional endoscopic surgeries were audited, the first eight without the checklist and the following 39 with the checklist. The checklist was compiled by evaluating the patient journey, utilizing the available literature, expert consensus and finally re-evaluation with audit type cases.

**Results**

Implementing this specific surgical checklist in 39 cases at our institution, allowed us to identify and rectify 35 separate instances of potentially unsafe, improper or inefficient pre-operative setup. These incidents included issues with labeling of topical vasoconstrictor or injectable anesthetics (3, 7.7%) and availability, function and/or position of video monitors (2, 5.1%), endoscope (6, 15.4%), microdebridor (6, 15.4%), bipolar cautery (6, 15.4%) and suctions (12, 30.8%).

**Conclusion**

The design and integration of this checklist for endoscopic sinus surgery, has helped improve efficiency and patient safety in the operating room setting.

**RHINOLOGIST-BEWARE-NOT ALL NASAL RESISTANCE VALUES ARE THE SAME! COMPARISON OF THE CLASSIC AND BROMS METHOD IN RHINOMANOMETRY USING NOSE MODELS**

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**Aims**

**Background:** Calculation of nasal airway resistance (NAR) using rhinomanometry can be obtained using different methods of analysis of the pressure-flow curve. The two commonest methods are the classic method using fixed pressure of 75 Pa or 150 Pa and the Broms method at radius 200.

**Aim:** To compare the NAR values measured using both methods over a range of resistances.

**Method**

In-vitro measurement and comparison of unilateral NAR values of four artificial nose models.

**Results**

The unilateral NAR measurements from the classic (at 75 Pa or 150 Pa) and Broms method gave either similar or different results depending on the level of nasal resistances. The different measurements can be explained by reference to the pressure-flow curves and the sample points calculated by the two methods. The magnitude of any change in resistance due to surgery or medical intervention is therefore also dependent on the method used to analyse the pressure-flow curves.

**Conclusion**

NAR is not a standardised measurement like blood pressure. Clinicians need to be careful when comparing unilateral measurements of resistance from the classic and Broms methods as the two methods can give the same or different measurements depending on the level of nasal resistance.

**CHRONIC MAXILLARY ATELECTASIS AND SILENT SINUS SYNDROME: 2 SHADES OF THE SAME ENTITY. CASES SERIES**

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**Aims**

**Aim of the presentation:** To report a cohort of 18 patients operated for a "maxillary sinus collapse" in 4 teaching hospitals between 2000 and 2015.

**Method**

The cohort includes 18 patients (7 women, 11 men) aged from 12 to 70 y.o (mean age: 44 y.o.).

9 patients had a history of sinus disease.

The CT scan showed in all the cases a downward displacement of the orbital floor with a maxillary sinus contraction, a sinus volume reduction and an increased orbital volume.

14 patients had an ipsilateral septal deviation and 5 had an ipsilateral middle turbinate lateralization. In all the cases the uncinate was fused to the lamina papyracea.

The patients underwent a wide endoscopic middle maxillary antrostomy performed from backwards to forwards.

**Results**

There was no orbital complication.

All the patients experienced a resolution or a dramatic reduction of their symptomatology, mainly their cheek pain .

1 patient out of 18 is seeking for an orbital implant to correct the hypoglobus, persistent 6 months after the sinus surgery.

**Conclusion**

Implosion of the maxillary sinus is a rare evolving process leading to an enopthalmos. The nasal endoscopy, the CT scan and the clinical evaluation are mandatory to detect this entity. A middle maxillary antrostomy is the treatment of choice leading to the resolution of the symptomatology in most cases. An orbital implant may be necessary 6 months after the initial surgery to correct a persistent enopthalmos but this issue is extremely rare.

**THE FUNGI ON SINONASAL MUCOSA: NORMAL CONTENT OF MICROBIOME OR SILENT TREAT?**

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**Aims**

The pathogenesis of fungal rhinosinusitis/FRS was widely investigated but the relationship of the fungal presence in environment and development of FRS is not yet revealed. We evaluated the relationship of the presence of fungi on sinonasal mucosa with fungal presence in home air of patients with their clinical characteristics.

**Method**

The prospective study with 136 patients with chronic rhinosinustis/CRS was conducted in the National Reference Medical Mycology Laboratory, Faculty of Medicine, University of Belgrade. Study design included: 1) anamnesis data; 2) measurements of molds specific IgE/sIgE and total IgE Ab, absolute eosinophile/Eo count and skin prick test; 3) rhinologic and CT observation; 4) mycological finding of sinonasal nasal aspirate and 5) air sampling from the patient's bedroom.

**Results**

(i) 30.4% patients with positive molds sIgE Ab had severe forms of CRS with more often presence of NP ( $p=0.025$ ); (ii) 46.4% of patients with positive sIgE Ab had positive fungal finding on nasal mucosa; (iii) in Serbia the prevalence is 1.3% for allergic FRS/AFRS and 2.8% for FRS; (iv) patients with AFRS had more frequent asthma ( $p=0.024$ ) and CRS lasting more than 10 years ( $p=0.000$ ); (v) 225 fungus was found in air samples, the most common were *A. niger* (57%) and *Penicillium sp.*(26%).

**Conclusion**

Huge amount of fungal spores in the air of patient's living area could be threat for development of FRS in predisposing patients. Continuation of this study would clarify the mechanism by which airborne fungi turn from 'normal flora' into triggers of immunological reactions, resulting in FRS.

**PARANASAL SINUSES ROLE A NEW MICROBIOME BASED THEORY**

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**Aims**

Paranasal sinuses role is controversial.

Describe sinuses role according to recent microbiome discoveries.

**Method**

Literature review of sinus abnormalities and microbiome field.

**Results**

Recent theory describe the appendix role as a "safe house" for commensal bacteria, providing support for bacterial growth and potentially facilitating re-inoculation of the colon in the event that the contents of the intestinal tract are purged following exposure to a pathogen. We suggest that the sinuses might have similar role in the respiratory tract.

This theory might better explain some abnormalities: Maxillary sinus location and frontal sinus ciliary recycling patterns might be explain by the need to retain most of the bacterial mass within the sinuses, rather than simple drainage. Ostial mucosa thickening during nasal contamination might be explain by the need to isolate the beneficial bacteria from the nasal contamination. Sinus pain might be explained by need to keep protective bacterial flow out of the sealed sinus into the infected nasal cavity, which create pain because of sinus vacuum.

**Conclusion**

Surgical interventions might be implied. Sinuplasty and FESS eliminate the one-way valve mechanism that keep the sinuses isolated niche from the nasal cavity. It eliminate vacuum pain and enable protective bacteria penetrate into infected sinuses. However, it weakens the body natural defense. Future interventions might restore sinus bacterial balance without harming its functionality.

**HISTOLOGICAL ANALYSIS OF NASAL POLYPOSIS IN DIFFERENT CLINICAL MANIFESTATIONS**

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**Aims**

Nasal polyposis (PN) is a chronic inflammatory process of the nasal mucosa, characterized by the presence of multiple polyps and usually bilateral. The study of the inflammatory infiltrate of the polyp is essential to establish the differential diagnosis of various systemic diseases and nasosinusal disorders that can be expressed as PN.

**Method**

Were assessed patients over 18 years assisted between 2010-2014 with a diagnosis of PN and analyzed comorbidities such as asthma and intolerance to salicylates. Patients included were divided into three groups: Isolated PN (ISOLATED); PN and asthma (ASTHMA); PN, asthma and intolerance to salicylates (DREA). Histologically were assessed: edema of the submucosa, cellular intensity (eosinophils, plasmocytes lymphocytes, neutrophils), basement membrane thickness, lymphoid follicle and gland cysts.

**Results**

Were evaluated 36 patients with a mean age of 53.9 years, 17 men and 19 women. 19 belonged to the ISOLATED group, 9 to ASTHMA group and 8 to DREA group. The predominant cell intensity was moderate in all groups. The eosinophilic predominance was more intense in DREA group (100%), followed by the ASMA (77%) and least evident in the ISOLATED (52%). The lymphocytic predominance was most evident in the ISOLATED (21% intense). The incidence of neutrophils was mild in all groups. The edema of submucosa was more intense on ISOLATED (63%), followed by DREA (50%), ASTHMA (44%). The lymphoid follicles occur only on ISOLATED (15%). None of these findings showed statistical significance.

**Conclusion**

histological analysis of nasal polyps showed no statistically significant differences related to clinical manifestations investigated.

**MICROBIOME AND CULTURE BASED ANALYSIS OF DIFFERENT TYPES OF CHRONIC RHINOSINUSITIS VERSUS HEALTHY SINUS MUCOSA**

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**Aims**

*The role of bacteria in chronic rhinosinusitis (CRS) is still not well understood. Microbiome analysis might add new diagnostic and treatment aspects to our current, mainly culture-based understanding. It is still largely unclear how the results of microbiome analysis and culture correlate.*

**Method**

*Middle meatus swabs and tissue samples were gained during sinus surgery in 15 patients with CRS (5 nasal polyps, 5 diffuse CRS without polyps and 5 unilateral maxillary CRS) and 3 patients with healthy sinus mucosa. Swabs were cultured. Parts of each tissue sample underwent culture after homogenization and were analyzed for the bacterial community composition using 16S rRNA gene amplicon sequencing (Illumina, MiSeq).*

**Results**

*Bacterial yield in terms of both the number of different species and the number of colonies was greater when swabs were cultured compared to tissue samples. These culture results reflect higher species richness in the surface mucosa-associated microbiome, compared to the intra-tissue-specific microbiome. The 16S rRNA gene-based microbiome analysis revealed that the healthy sinus mucosa differs from that of all three types of CRS. Samples from patients with CRS without nasal polyps displayed a characteristic microbial community, which differed from the other types of CRS. The species identified with culture techniques did not generally correspond with the most abundant genera in the microbiome analysis.*

**Conclusion**

*This observation might put the clinical value of bacterial culture results in CRS into question. Further analysis will show if the bacteria available in culture can be used as possible indicator organisms independent from their abundance in the tissues.*



**IMMUNOPATHOLOGIC CHARACTERISTICS OF VARIOUS TYPE OF KOREAN NASAL POLYPS**

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**Aims**

The aim of this study was to investigate the immunopathologic characteristics of Korean patient with eosinophilic NPs (ENP) Vs non-eosinophilic NPs (NENP) and atopic NP (ANP) Vs non-atopic NP (NANP)

**Method**

Tissue samples were collected from 81 NP patients (37 ENP Vs 44 NENP and 38 ANP Vs 43 NANP) and 24 controls. Clinical characteristics of NP patients were analyzed. Tissues were investigated for the expression of chemical mediators (interleukin (IL)-5, IL-10, IL-17, interferon (INF)- $\gamma$ , and tumor growth factor (TGF)- $\beta$ 1), transcription factors (GATA-3, Foxp3, RORC, and T-bet) and extracellular matrix (collagen type I, fibronectin, TIMP-1, and MMP-9) expressions were evaluated.

**Results**

Although the clinical characteristics were different between ENP and NENP, atopic status did not influence the clinical finding of CRSwNP. Both Th1 and Th2 cytokines were significantly increased in ENP and atopic status did not influence the expression of chemical mediators. Expression of mRNA for GATA-3 was significantly upregulated in ENP and mRNA for RORC was significantly overexpressed in NENP. T-bet, RORC, and Foxp3 mRNA expressions were significantly increased in NANP. Expression of mRNA for  $\alpha$ -smooth muscle actin, collagen type I, fibronectin, and MMP-9 were significantly upregulated in NENP and TIMP-1 expression was not significantly different among the three groups.

**Conclusion**

T cell cytokine and transcription factor expression patterns of Korean NPs were different from other countries and the immunopathologic characteristic were different between ENP and NENP and between ANP and NANP. The different underlying pathogenic processes may influence the development of NPs.

**THE INDUCTION OF IL-33 IN THE SINUS EPITHELIUM AND ITS INFLUENCE ON T-HELPER CELL RESPONSES**

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**Aims**

The aim of the study was to evaluate the role of IL-33 in chronic rhinosinusitis and its regulation as well as effects on T-helper cells.

**Method**

Biopsies from chronic rhinosinusitis patients with and without polyps as well as mucosa from healthy controls was harvested. IL-33 and its receptor ST-2 mRNA expression was determined by qPCR and protein expression was investigated by confocal microscopy. The induction of IL-33 in sinonasal-epithelial cells was assessed in multiple cytokine and T-cell stimulated cultures. Effects of IL-33 on different T-cell subsets were assessed by PCR, Elisa and flow cytometry.

**Results**

IL-33 and its receptor were up-regulated in CRS tissues. The induction of IL-33 in epithelial cells mainly resulted from IFN- $\gamma$  stimulation. IL-33 leads to a typical Th2 favoring profile upon co-culture with T-cell subsets.

**Conclusion**

This study presents the regulation of IL-33 in sino-nasal tissue and its effects on T-cell profiles. The observed effects could contribute to the pathogenesis of CRS and the Th2 predominant environment in CRSwNP.

**ROLE OF GROUP 2 INNATE LYMPHOID CELLS IN THE PATHOGENESIS OF EOSINOPHILIC CHRONIC RHINOSINUSITIS**

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**Aims**

Group 2 innate lymphoid cells (ILC2s) represent a critical innate cellular source of type 2 cytokines. However, functional importance of ILC2s in the pathogenesis of eosinophilic CRS (ECRS) is unclear. To examine the role of ILC2s in ECRS, we measured the prevalence of ILC2s in sinonasal mucosa and nasal polyp and in peripheral blood from patients with CRSwNP (ECRS and non-ECRS), CRSsNP and control subjects

**Method**

Fluorescence activated cell sorting (FACS) was used to determine ILC2s. ILC2s were identified as lineage<sup>-</sup> CD45<sup>+</sup> CD127<sup>+</sup> CD294<sup>+</sup> cells. The prevalence of ILC2s was calculated as ILC2s divided by lineage<sup>-</sup> CD45<sup>+</sup> cells.

**Results**

Nasal polyp-derived ILC2s produce IL-5 and IL-13, and proliferate significantly in response to IL-33 and IL-2. *Alternaria* significantly stimulated IL-33 secretion from cultured human nasal epithelial cells of ECRS patients compared with those of CRSsNP patients. The prevalence of ILC2s in nasal polyps was significantly high in ECRS patients compared with non-ECRS patients, and the prevalence of ILC2s was positively correlated with number of eosinophils in nasal polyps. Percentage of blood eosinophils was significantly high in ECRS patients; however, the prevalence of blood ILC2s was not increased. The prevalence of ILC2s in blood was high in patients with allergic rhinitis and high serum IgE level, and that was low in patients with bronchial asthma and high blood eosinophilia.

**Conclusion**

High prevalence of ILC2s in nasal polyps may be involved in the pathogenesis of eosinophilic CRS. However, role of blood ILC2s in allergic airway inflammation is still unclear.

**THROMBOXANE A2 REGULATES CXCL1 AND CXCL8 CHEMOKINE EXPRESSION IN THE NASAL MUCOSA-DERIVED FIBROBLASTS OF CHRONIC RHINOSINUSITIS PATIENTS - PRESENTATION CANCELLED**

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**Aims**

To investigate the CXCL1/8 chemokine and TXA<sub>2</sub>-TP receptor expression in the CRSsNP mucosa

**Method**

1. Primary culture of nasal mucosa derived fibroblasts from CRS patients
2. Immunohistochemistry
3. Western Blotting
4. RT-PCR
5. siRNA analysis

**Results**

The immunohistochemistry results indicated that CXCL1 and CXCL8 were highly expressed in the CRSsNP mucosa compared with the controls; however, the TP receptors were expressed in both mucosa. Therefore, U46619 and IBOP, a TXA<sub>2</sub> analog and TP agonist, were used to explore the role of TP activation in CXCL1/8 expression; both of these induced CXCL1/8 mRNA and protein expression in CRSsNP mucosa-derived fibroblasts. U46619 phosphorylated p38 MAPK, PI-3K-JNK, cyclic AMP (cAMP)/PKA, PKC, and cAMP response element (CREB). Activation of cAMP/PKA, PKC, and CREB was the major cxcl1/8 gene transcription pathway and the p38 MAPK pathway regulated CXCL1/8 secretion. Pharmacological and siRNA knockdown analyses revealed that activation of cAMP/PKA and PKC $\mu$ /PKD pathways were required for CREB phosphorylation and PKA/C crosstalk with the PI-3K-JNK pathway.

**Conclusion**

Abundant TP receptor and CXCL1/8 expression in CRSsNP mucosa and for TXA<sub>2</sub> stimulation inducing CXCL1/8 expression in nasal fibroblasts primarily through PKA, PKC $\mu$ /PKD, and CREB-related pathways.

**POSITIVITY RATES FOR COMMON ANTIGENS USING IN-VITRO TESTING**

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**Aims**

Introduction: In-vitro allergy testing is a common standardized approach to allergy screening and broad panels of allergens are commonly performed. The purpose of this study was to assess the rate of positivity of allergens used in in-vitro screening allergy testing in the United States.

**Method**

Methods: All allergens tested in 6 screening respiratory and 2 screening food allergy panels by ImmunoCAP® from September 2014 until September 2015 at one of the reference laboratories in the Great Lakes region were evaluated for percentage positive.

**Results**

Results: Six respiratory panels yielded 125,190 independent potential respiratory antigens. Most of the results were in Class 1-3 but there were a notable number of samples that were extremely elevated at Class 6. There was a wide range of percent positivity depending on the antigen. The most common positive antigens were dog (24%), cat (23%), dust mites (23% for both D pteronyssinus and D farina), June grass (21%), ragweed (17%) and timothy grass (17%). Thirty of the 45 measured respiratory antigens had positive rates greater than 10%. Two food panels yielded 23,438 independent results. Milk (18%), peanut (17%), wheat (16%) and egg whites (15%) were the most commonly positive food allergens. Shellfish ranged from 4-9% and fish were uncommonly positive (3-5%).

**Conclusion**

Conclusions: There is a wide range of rates of positivity in common respiratory and food in-vitro allergy screening tests. Evaluating such rates will help to further identify the most and least common allergens and will help to cost-effectively refine allergy screening panels.

**EFFECTS OF ORAL BRONCHODILATOR ON TRACHEAL SMOOTH MUSCLE IN PATIENTS WITH ALLERGIC RHINITIS AND ASTHMA**

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**Aims**

Allergic rhinitis and asthma often coexist. Inhaled or oral bronchodilators, Terbutaline (Bricanyl) and Bambuterol (Bambec), are  $\beta_2$ -adrenoceptor agonists often used in patients during symptoms occur. Terbutaline in the form of inhaled short-acting bronchodilator, relieves shortness of breathe quickly and increase peak expiratory flow in vivo. However, in children, elderlies and people with disability, bambuterol are taken in powder or liquid form and may be at risk of silent aspiration. Currently the effects of bambuterol administrated intratracheally have rarely been explored. This study was aimed at verifying the effect of bambuterol and terbutaline on the tracheal smooth muscle directly *in vitro*.

**Method**

The effects of bambuterol on isolated rat's tracheal smooth muscle in comparison with terbutaline were investigated. The following assessments of bambuterol and terbutaline were performed: (1) effect on tracheal smooth muscle resting tension; (2) effect on contraction caused by  $10^{-6}$  M methacholine as a parasympathetic mimetic; (3) effect of the drugs on electrically induced tracheal smooth muscle contractions.

**Results**

The results showed that in comparison to the contraction induced by  $10^{-6}$  M methacholine, there was significantly more contraction induced when given bambuterol of  $10^{-4}$ M or more in concentration. But terbutaline elicited a relaxation response at dose of  $10^{-6}$ M or more. Both bambuterol and terbutaline could inhibit electrical field stimulation induced spike contraction.

**Conclusion**

Terbutaline had anti-cholinergic effect that could relieve asthmatic symptoms. However, the effect of bambuterol is controversial and further study is warranted. Clinicians should be aware of the effect of bambuterol when managing patients with allergic rhinitis and asthma.

**CAN MOMETASONE FUROATE NASAL SPRAY CANCEL SURGERY IN CHILDREN WITH INDICATION FOR ADENOIDECTOMY?**

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**Aims**

The aim is to study the effect of mometasone furoate in children with indication for adenoidectomy.

**Method**

In a period of 3 years, 98 children (aged 4-7,3 y.o.) listed for adenoidectomy in a tertiary hospital randomly received a 16 weeks treatment with mometasone furoate 200µg /day. In all children adenoids were assessed endoscopically pre-, post- treatment and at a 32 weeks follow up. Nasal obstruction and purulent discharge were scored subjectively by the parents with the use of a visual analog scale (0-100) for the same period of time. Ears were evaluated with otoscopy and tympanogram for the presence of fluid. A control group of 98 children received for the same period of time normal saline spray.

**Results**

Endoscopic obstruction of nasopharynx decreased from a mean of 82% to a mean of 64,1% after treatment and increased again to a mean of 73,4 % at 32 weeks . Nasal obstruction mean score improved for 75% and discharge for 55% at 16 weeks and then dropped to 55% and 35% at 32 weeks respectively. Otitis media with effusion had a resolution percentage of 60% at 16 weeks however this was decreased to 24% at 32 weeks. Surgery could be cancelled in 21% of the total study group (24% in otitis media children and 16% in sleep apnea children).

**Conclusion**

Mometasone furoate nasal spray for 16 weeks offers a significant symptom free period of time which helps to avoid unnecessary surgery in approximately 20% of children indicated for adenoidectomy.

**SILENT SINUS SYNDROME IN CHILDREN (CASE REPORT)**

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**Aims**

Silent sinus syndrome or chronic maxillary sinus atelectasis characterized by asymptomatic hypoplasia of maxillary sinus, progressive enophthalmos, facial asymmetry. The diagnosis based on clinical features and data of computed tomography. The majority of documented patients with silent sinus syndrome aged from 30 to 60 years old.

**Method**

2 case reports of the children with silent sinus syndrome admitted to our clinic are presented.

**Results**

1 case. 13 years old girl complained with nasal discharge from the right side during 3 months. Before admitting underwent 2 maxillary sinus punctures, one complicated with orbital oedema. CT scan of paranasal sinuses showed retraction of right maxillary sinus walls, sinus hypoplasia and opacification. Patient underwent endoscopic right maxillary sinus surgery under general anaesthesia. During 3 month follow up girl had normal nasal breathing and no nasal discharge.

2 case. 8 years old girl complained with facial asymmetry, facial pain, recurrent sinusitis during last 2 years. CT scan revealed: a completely opacified right maxillary sinus, hypoplasia of the sinus, retraction and thinning of the orbit floor of the right maxillary sinus comparing with left side. Endoscopic right maxillary sinus surgery was performed: after resection of the lateralized uncinated processes the blocked ostium of the maxillary sinus was enlarged. During 6-months follow up period facial asymmetry was stable and there were no symptoms of sinusitis.

**Conclusion**

Silent sinus syndrome is a rare entity in children. Endoscopic sinus surgery is effective treatment for this pathology in children, that restore normal development of the paranasal sinuses and facial skeleton.



## SWINGING DOOR FLAP TECHNIQUE FOR ENDOSCOPIC TRANSEPTAL REPAIR OF BILATERAL CHOANAL ATRESIA

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### Aims

To describe and evaluate the outcome of an endoscopic transeptal approach for the repair of bilateral choanal atresia in neonates.

### Method

The study was a prospective case series of neonates with a confirmed diagnosis of bilateral choanal atresia. The endoscopic approach was performed using 4 mm 0° telescope. A laterally based trapezoid shaped septal mucosal flap was created on each side using a radio-frequency needle. Flaps were elevated in a swinging door fashion to expose the atretic plate and the vomer. After removal of the posterior bony septum and widening of the choana, the flaps were trimmed and applied to the exposed lateral bony rim of the choana. All patients were stented bilaterally for 3–4 weeks postoperatively.

### Results

Fourteen neonates (10 females and 4 males) were recruited. Their age at the time of surgery ranged from 2 to 25 days. Recovery was uneventful in all cases except for one case that developed bleeding in the immediate postoperative period and was controlled under endoscopic guidance. One case died 3 months following stent removal from uncompensated heart failure due to concomitant ventricular septal defect. Follow-up ranged from 4 to 36 months with a mean of  $17.3 \pm 9.3$  months. An adequate functional nasal breathing and appropriate feeding with sufficient weight gain were maintained during the entire follow-up period.

### Conclusion

The described endoscopic technique offered excellent visualization of the choana and allowed maximal widening of the choana while preserving the mucosa along the entire circumference of the newly created choana and hence less risk of postoperative stenosis.

**CONGENITAL PYRIFORM APERTURE STENOSIS: A RARE CAUSE OF NASAL OBSTRUCTION IN NEONATES**

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**Aims**

To report a case of congenital nasal pyriform aperture stenosis, a rare cause of nasal obstruction in neonates.

**Method**

Case report: A case of congenital nasal pyriform aperture stenosis, single maxillary central incisor and holoprosencephaly.

**Results**

A male term neonate with prenatal suspicion of brain malformation, family history of holoprosencephaly (unborn sibling), presenting at birth with a peculiar facies (facial dysmorphism, hypotelorism, low radix and short nasal pyramid), recurrent episodes of respiratory distress while feeding and pyriform aperture stenosis on physical exam.

Cranial MRI confirmed holoprosencephaly, while pyriform aperture stenosis was confirmed by craniofacial CT-scanning/3D-CT-scan reconstruction also showing a single maxillary central incisor.

Despite conservative treatment, respiratory distress episodes persisted, feeding was only tolerated through orogastric tube, and weight gain was inadequate. Surgical widening of the pyriform aperture stenosis was performed at 14<sup>th</sup> day of life – sublabial approach to the pyriform aperture using drill and stenting each nostril with an orotraqueal tube.

At seven months follow-up the child showed no signs of respiratory or feeding distress.

**Conclusion**

Congenital nasal pyriform aperture is a rare cause of neonatal nasal obstruction, causing respiratory distress and feeding problems in neonates since they are obligatory nasal breathers. It can occur isolated or in association with other anomalies. Diagnosis is confirmed by CT scan and treatment can be either conservative or surgical, depending on child's clinical tolerance to the nasal obstruction.

**ORBIT DECOMPRESSION IN THE TREATMENT OF GRAVES' ORBITOPATHY: THE ADDED VALUE OF THE THIRD WALL ORBITOTOMY IN PROPTOSIS REDUCTION**

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**Aims**

It is often stated that, in the surgical management of exophthalmia in Graves' orbitopathy, the greatest amount of decompression is provided by the three-wall decompression, combining the endoscopic endonasal two-wall procedure (medial and inferior orbitotomies) with a lateral orbitotomy through an external approach. However, unless in extreme proptosis, which decompression cases require a third wall orbitotomy is still a matter of debate. Published literature is not enlightening, with often conflicting and non-comparable data from ENT and Ophthalmology series. The objective of this study is to assess the added value of the third orbital wall decompression to the two-wall orbitotomies.

**Method**

Nineteen eyes submitted to either two-wall or three-wall orbit decompression, with the third wall taken down whenever pre-operative Hertel exophthalmometry results did not anticipate a post-operative eye projection within normal values i.e.  $\leq 20$  millimeters (mm) with the expected maximum result of just a two-wall decompression (4 mm proptosis reduction), had their pre- to post-operative proptosis reduction results compared.

**Results**

The three-wall decompression surgery was able to bring a pre-operative 27.4 mm mean eye projection value to a post-operative 20.3 mm, with 7.3 mm as the mean reduction values obtained.

**Conclusion**

Not only the procedure was shown to be highly effective in bringing post-operative eye projection results to within normal range, but the decompression of the third wall, undertaken in the more severe cases, was deemed critical for the overall surgical success.

## ENDOSCOPIC DACRYOCYSTORHINOSTOMY WITH AND WITHOUT SILICONE INTUBATION: 4 YEARS RETROSPECTIVE STUDY

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### Aims

To assess different outcomes between endoscopic dacryocystorhinostomy (En-DCR) with and without silicone intubation.

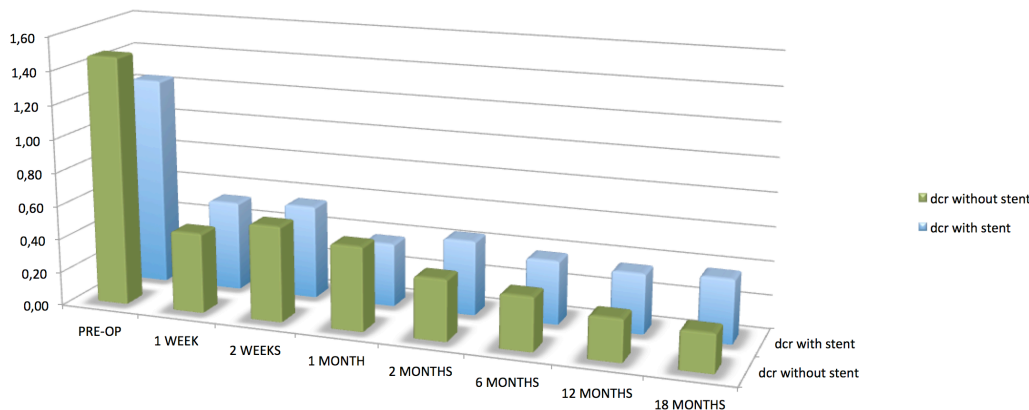
### Method

We retrospectively analysed 84 patients (89 procedures), suffering from chronic epiphora for primary acquired nasolacrimal duct obstruction, treated with En-DCR and divided into two groups depending on silicone stent intubation.

Preoperative findings that led to the decision for not stenting were: presence of a distended sac and/or regurgitation of mucopurulent or mucoid discharge from the lacrimal canaliculi, especially the lower one, when pressing the area of the sac; a visible, not stenosed, lacrimal puncti, especially the lower one. The decision for not stenting was finally made during surgery. Functional success was defined as absence of epiphora, no further episodes of dacryocystitis and a patent ostium after fluorescein irrigation.

### Results

45 En-DCR with stent and 44 En-DCR without stent were performed. The surgical outcomes were evaluated at 7 post-operative controls using Munk's score criteria (Fig1). Success rate after 18 months follow-up were respectively 82,2% in the stent group and 88,6% in the non-stent group (OR 0.59) with no statistical differences. Ostial size reduction has been reported in higher percentage in the stent group, mainly due to peristomal granuloma (OR 3.64), scar tissue formation (OR 2.25) and turbinoseptal synechia (OR 1.76).



### Conclusion

The benefits of non-intubation are less patient discomfort, reduced surgical time and costs, simpler follow-up regimen and less intubation-associated complications. En-DCR without silicone stent intubation should be the first choice of procedure, stent intubation should be reserved in selected cases with poor local conditions pre and intra-operatively assessed.

**ORBITAL COMPLICATIONS OF RHINOSINUSITIS IN THE ADULT POPULATION**

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**Aims**

Orbital complications of rhinosinusitis range from mild preseptal infection to life-threatening cavernous sinus thrombosis. The vast majority of data in the literature regarding these complications pertains to the pediatric population. Little is reported on the adult population. We aim to present our experience in this patient group

**Method**

Retrospective review of medical records of all patients with rhinosinusitis and orbital complications, who were admitted to a tertiary referral center between 2000 and 2015

**Results**

To date, sixty patients were identified. Mean age at diagnosis was 44, with a M:F ratio of 1.6:1. 66.6% presented with acute rhinosinusitis while the remaining (33.3%) suffered from chronic disease. 32% of patients had previous sinus surgery. 31% received antibiotics prior to admission. All patients had pansinusitis on imaging on the involved side. Preseptal cellulitis was the most common complication (60%) encountered, followed by orbital cellulitis (20%), subperiosteal abscess (6.6%), orbital abscess (5%), cavernous sinus thrombosis (3.3%) and isolated extra ocular muscle nerve paralysis (5%). Staphylococcus aureus was the most common causative pathogen. Complete recovery was noted in all patients, of whom 87% were managed conservatively. Eight of 9 patients with an abscess or cavernous sinus thrombosis required surgical drainage

**Conclusion**

Orbital complications of rhinosinusitis in the adult population are not uncommon. Contrary to the pediatric population, many of these patients have a history of previous sinus surgery or chronic rhinosinusitis. Conservative treatment suffices in patients with preseptal and orbital cellulitis. When an abscess and cavernous sinus thrombosis is present surgical drainage is required

**360 DEGREES SURGICAL APPROACH TO THE ORBIT: PERSONAL CONSIDERATIONS**

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**Aims**

Orbital approaches have always represented a challenge and are still demanding. No ideal approach exists and the choice depends on many features: site and size of the lesion, anatomic relationships, and suspected nature of the lesion. The present study would like to emphasize our philosophy in the management of orbital and periorbital lesions and describe our considerations on the actual role of the orbit in skull base procedures.

**Method**

Anatomic dissection was performed on 10 specimens (20 sides) at the Dissection Laboratory of “Fer à Moulin”, Paris. Patients included in the clinical part of the study presented pure intraorbital lesions (IOLs) or skull base lesions invading the orbit or the orbital walls, that were managed through superior or inferior-eyelid approach, or a combined approach in two Italian tertiary care centres.

**Results**

We presented our personal scheme and discussed the feasibility of different surgical routes based on tumor location. The case series included 25 patients presenting a single-side IOL. The aim of surgery was curative in 18 (72%) cases, diagnostic in 7 (28%): 11 were meningiomas and 14 pure IOLs, including 4 lacrimal gland and 3 vascular tumors, 1 lymphoma, 1 schwannoma, 1 orbital-maxillary aspergillus, 1 Langerhans cell histiocytosis, 1 fibrous dysplasia. In 2 cases we only obtained dense fibrous adipose tissue. No major intraoperative complications were observed, 9 patients developed postoperative transient diplopia or V1-V2 nerves impairment.

**Conclusion**

Our proposal seems applicable and preliminary results are promising, showing successful functional and cosmetic outcomes with reduced morbidity.

**ENDOSCOPIC DACRYOCYSTORHINOSTOMY IN PROXIMAL OBSTRUCTIONS OF THE NASOLACRIMAL SYSTEM**

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**Aims**

Dacryocystorhinostomy (DCR) is usually used in correction of symptomatic nasolacrimal duct obstruction. Typically, DCR is not indicated for proximal obstructions. In patients with some proximal obstruction combined with distal blockage, probing and dilatation in conjunction with DCR and insertion of stents is frequently performed, despite the not so favourable outcome when compared to the results obtained in pure distal blockage. This study aims to determine the success of endoscopic DCR in cases of proximal obstruction of the nasolacrimal system.

**Method**

Retrospective analysis of cases of endoscopic DCR in proximal obstructions of the nasolacrimal system carried out in a period of 5 years in a tertiary referral center. Charts were reviewed for history, clinical assessment, procedure and outcome.

**Results**

Endoscopic DCR was performed in eighteen cases of proximal obstruction confirmed by dacriocistography (puncti – 1; canaliculi – 2; common duct – 1; Rosenmüller valve – 9; lacrimal sac – 5). Three cases were associated with distal blockage at Krause valve. An endoscopic DCR using a mucoperiosteal flap technique with large rhinostomy and silicone stents insertion was performed in all cases. The stents were removed on average 2 months after the surgery. The mean follow-up was 9.2 months and it was observed complete symptoms resolution in 76.5% (n=13), mild symptoms in 5.9% (n=1) and recurrence in 17.6% (n=3).

**Conclusion**

Endoscopic DCR with stents insertion is a valid and safe procedure for correction of proximal nasolacrimal system obstruction and is an alternative to other techniques associated with more adverse effects.

**TRANSCANALICULAR DIODE LASER-ASSISTED ENDOSCOPIC DACRYOCYSTORHINOSTOMY – OUR EXPERIENCE**

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**Aims**

The diode laser-assisted transcanalicular approach of the lacrimal system, described for the first time by Eloy et al (2000) and reviewed by the Alañon Fernandez brothers (2004), simplified the dacryocystorhinostomy (DCR) technique. The diode laser vaporizes the lacrimal sac, performs the lacrimal bone osteotomy and simultaneously vaporizes and coagulates the nasal mucosa.

**Method**

From February 2009 to December 2014, all consecutive patients with the diagnosis of chronic epiphora, documented obstruction with a dacryocystogram, treated with transcanalicular diode laser-assisted endoscopic DCR (**Surgery Video**) performed by single surgical team, were retrospectively analysed. The Munk scale for epiphora grading was adopted. Demographic and clinical characteristics were collected from medical records. Statistical significance was defined by  $p < 0.05$ .

**Results**

From 40 patients submitted to transcanalicular diode laser-assisted DCR (72% female, mean age  $62,9 \pm 17$  years-old, 12,5% were revision cases and 30% were bilateral DCR. The distribution of the results assessed with the Munk scale were: Grade 0=62,5%, Grade 1=12,5%, Grade 2=5,0%, Grade 3=10,0% e Grade 4=10,0%), with a success rate of 80%. Mean follow-up time was  $14 \pm 20$  months. Patients with silicone stenting showed a statistically significant higher surgical success rate during follow-up ( $p < 0,001$ ).

**Conclusion**

From our experience, we defend that this technique, when correctly performed by an experienced team, has good results combined with the advantages of being a safe, fast and relatively easy procedure, without significant associated morbidity or the need of general anaesthesia and allowing a short hospital admission. In our cohort, surgical success was highly associated with silicone stenting, a safe and simple procedure.



**IMPACT OF ENDOSCOPIC DACRYOCYSTORHINOSTOMY ON SINONASAL QUALITY OF LIFE**

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**Aims**

The purpose of this study was to determine whether patients undergoing endoscopic dacryocystorhinostomy (eDCR) suffered any long term decrement in sinonasal quality of life.

**Method**

Retrospective chart review of 44 patients who underwent eDCR between June 2012 and May 2015. The primary outcome was the total and nasal specific domain 1 scores of the disease specific validated Sino-Nasal Outcomes Test (SNOT)-22. Pre-operative scores were compared with the post-operative scores on days 0-30, 30-90, and 90-180 visits.

**Results**

A statistically significant increase in both total (7.5 (0-44) to 24 (0-51), median (interquartile range)) and domain 1 (2.5 (0-11) to 9 (0-18)) scores was observed between the pre-operative score and the first post-operative score (days 0-30) (p=0.0066 and p=0.0001; respectively). In contrast, there was no statistically significant difference between the pre and post-operative scores on days 30-90 or 90-180.

**Conclusion**

Our findings indicate that, in general, eDCR is well tolerated by patients and nasal symptom scores return to baseline values within 30-90 days of surgery. The concomitant performance of septoplasty in the setting of asymptomatic septal deviation does not confer any long term improvement in symptoms of nasal obstruction.

**RECONSTRUCTION OF BLOWOUT FRACTURES OF INFEROMEDIAL WALLS**

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**Aims**

Blow-out fracture of the orbit refers to conditions in which combined orbital floor and medial wall fracture occur due to trauma, causing orbital contents to prolapse, which thereby leads to the manifestation of various symptom. There is as yet no consensus on the therapeutic strategy and timing of surgery. To repair orbital wall fractures, many surgical techniques have been proposed.

In our department, we have undergone surgery to 98 patients from April 2000 to December 2015. Especially, we have employed the endoscopic transnasal approach to inferomedial wall fractures until April 2014.

Among the cases of medial wall fracture in which surgery was performed, none of the patients felt their own enophthalmos. On the other hand, among cases with inferomeidal wall fracture, 25% felt their own enophthalmos.

We report our new procedure and postoperative results.

**Method**

We have been employing the combination method of transorbital and transnasal approach since May 2014. We used silicon plates and the balloon as needed.

**Results**

Our new surgical results are more effective than results of the endoscopic transnasal method. No patients felt their own enophthalmos. In addition, all patients increased their own postoperative eyemovement.

**Conclusion**

Our study demonstrated that the combination method of transorbital and transnasal approach is adapted to inferomedial wall fractures.

## THE PRELACRIMAL APPROACH FOR THE REPAIR OF ORBITAL FLOOR FRACTURES

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### Aims

Lower eye lid incisions are commonly used for the exposure and treatment of orbital floor. These incisions techniques are associated with low morbidity and favorable cosmetic results. Nevertheless, complications as malposition of the lower lid do occur and pose a disturbing functional outcome. In consideration of the common approaches, we present the endonasal technique to treat these fractures without affecting the lid system.

### Method

At the clinic of otorhinolaryngology at the university of Regensburg 15 patients suffering from an isolated fracture of the orbital floor were treated. They underwent surgical repair by using the endonasal prelacrimal transmaxillary approach. We demonstrate the surgical technique step by step and discuss the clinical outcome of our patients.

### Results

A retrospective database of 15 patients suffering from isolated orbital floor fractures requiring operative repair at Regensburg ENT /ORL University Department between 2015 and 2016 was reviewed. All patients underwent the endonasal endoscopic technique. Overview was excellent and the various transplants could be positioned exactly. We used titanmesh, medpore, tachosil or PDS-sheets. Cosmetic and functional results were excellent. We did not observe any disturbances of the rim of the lid or any rhinologic problems.

### Conclusion

By using the endonasal prelacrimal approach isolated orbital floor fractures could be treated safely. Thus, undesirable complications at the eye lid could be avoided. Mean operation time seems to be longer than in traditional techniques though. A prospective, randomized trial is planned to provide further information.

**ERS16-0815**

**HOW TO ADDRESS PATIENTS WITH UNCONTROLLED DISEASE**

**MEDICAL THERAPY**

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**How to address patients with uncontrolled disease: Medical therapy**

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Within the group of CRS patients, those with nasal polyps tend to suffer more often from uncontrolled disease. About 50% of CRSwNP patients also develop asthma, and more than one third will need revision surgery or even several surgeries after a first sinus surgery. Patients with CRSwNP may be aspirin-sensitive or may suffer from allergic fungal disease; both diagnoses may again predict difficult to treat patients. Nowadays, based on the inflammatory mediators, we are able to differentiate “endotypes” within the “phenotype” CRSwNP, clearly different in the mediators involved in the inflammation. Those endotypes are helpful in determining the prognosis after surgery and the likelihood for asthma comorbidity; they also form the basis for surgical treatment approaches or innovative treatment with monoclonal antibodies. These therapies need to be personalized.

Recently, proof-of-concept studies have been performed with monoclonal antibodies targeting one or more cytokines of the Th2 inflammatory reaction, including IgE, interleukin (IL)-5, IL-4 and IL-13. All of those studies have shown benefit in patients with former surgeries and/or co-morbid asthma. Within 3 years, we will have new innovative drugs registered for the indication of uncontrolled CRSwNP.

**TOO LATE OR TOO EARLY?**

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The management of chronic rhinosinusitis begins with “maximum medical therapy”, with surgery reserved for those patients who fail this treatment. There are no definitive guidelines for what constitutes maximum medical therapy, or what defines treatment failure, but it is generally accepted that surgery should be offered if symptoms persist after 3 months of medical treatment. But at what point after this 3 month period should surgery be undertaken? Are we operating too early or too late in these patients?

There is little in the literature to answer this question, but recent studies suggest that delaying surgery once medical treatment has failed leads to worse long-term outcomes. Why this might be is unclear, but it is likely that persistent inflammation causes irreversible changes within the mucosa and bone of the sinuses, which earlier surgery might prevent. Surgery also allows better penetration of topical medication, particularly steroids, which may improve the response to treatment. Could we be operating too early? A diagnosis of chronic rhinosinusitis requires symptoms to have been present for at least 12 weeks - is the diagnosis right? Medical treatment also needs to be given time to work before declaring it a failure.

Knowing when to operate might improve the success rates of surgical treatment. Being able to predict which patients will respond best to surgery, and when, would allow for better patient choice and therefore better overall care.

**MEDICAL AND SURGICAL TREATMENT OF CRSwNP: OPPOSING VIEWS OR CLOSE FRIENDS?**

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*Introduction:* CRSwNP is a complex immunological disease affecting the sinonasal mucosa. Despite thorough endoscopic sinus surgery a potential for recurrence remains impairing the patients' quality of life as regards nasal breathing, nasal discharge, olfaction and congestion. Targeted treatment is still pending thus a balanced combination of symptomatic therapy and surgery needs to be aimed at for optimal outcomes and avoidance of revision surgery.

*Material and Methods:* Case series of severe CRSwNP including preoperative treatment, surgery and follow-up controls. Surgical approaches as well as medical therapeutic regimen will be eluded to. Long term outcomes (>1 year) will be presented.

*Results:* Patients improve after surgery as regards olfaction and nasal breathing. To maintain this condition regular follow-up controls are mandatory where the individual patient's conservative therapy is optimized. Diagnostic endoscopy should be performed at all times providing cleansing of the sinonasal cavity, resection of tiny recurring polyps as well as irrigation and suctioning of thickened mucus.

*Conclusion:* As of today optimal outcomes can be achieved with surgery and thorough follow-up. Patient's symptoms as well as endoscopic findings can be correlated to adapt medication. Thus, medical and surgical treatment are "close friends".

**ASPIRIN SENSITIVITY IN CRSwNP; DESENSITISATION: INDICATIONS, METHOD, TECHNIQUE**

**L. Klimek**<sup>1</sup>

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Disturbances in the arachidonic acid metabolism implicate both the lipoxygenase and the cyclooxygenase-pathways. This results in imbalances of eicosanoid, leukotriene and prostaglandin synthesis and may clinically result in Aspirine-exacerbated respiratory disease (AERD) or Aspirin-Intolerance-syndrome (AIS).

Important biochemical findings in many AERD patients are increased basal leukotriene levels (at least in cell cultures) that excessively increase after intake of COX-1 inhibitors. In these patients, intolerance reactions to nonsteroidal antiinflammatory drugs (NSAIDs) can lead to different clinical manifestations. According to the ENDA classification listing 5 different phenotypes. Aspirin Exacerbated Respiratory Disease (AERD) is the most common phenotype characterized by an eosinophilic dominated inflammatory disease of the airways, that clinically impose with nasal polyps, chronic sinusitis and bronchial asthma including about 34% of patients.

Aspirin desensitization uses the repetitive application of aspirin to induce a tolerance towards NSAIDs, especially COX-1 inhibitors. After a dose-increase phase with reaching a threshold dose, a dose-continuation phase is performed. For application the nasal, bronchial, oral and intravenous route have been described. Aspirin desensitization was proven to be efficacious and safe and was able to reduce the need for other medications in AERD patients.

**ERS16-0851**

**SYMPOSIUM 45: EAFPS SESSION: MALFORMATIONS AFFECTING THE UPPER AIRWAY**

**VASCULAR MALFORMATION PAPAIZAMOS /CAE**

**M. Tovi**<sup>1</sup>

<sup>1</sup>, Sweden

General presentation of vascular anomalies. Terminology, classification and diagnosis.

Radiological examinations. Presentation of different vascular malformation causing obstruction of the upper airway.

Interventional radiology and medical treatment in the management of vascular anomalies of the upper airway.



EUROPE

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**Global rhinological challenges – regional analysis: Europe**

Private and public health care systems in Europe differ a lot but the common goal for all otolaryngologists is to help patients with ENT-diseases.

The UK has the lowest number of ENT surgeons (1/100.000) and Greece the highest number (1/10.000) and Sweden about 1/12000. All together there are at least 27000 ENT specialists in EU and about 3700 specialists in associated countries like Norway, Switzerland, Serbia and Croatia.

The death in infectious diseases of the head & neck, that once made the ENT- speciality necessary, has decreased but other diseases and symptoms have increased. For instance, chronic nasal symptoms.

We know from recent data that there is still an increase in allergic rhinitis in adults today due to the increase in sensitization to grass pollen while the increase of other inhalant allergens and also asthma has more or less stopped. It is a rhinological challenge to improve and individualize the medical treatment of allergic and non-allergic rhinitis.

The prevalence of chronic rhinosinusitis including both nasal polyposis and without, is more than 10%.

It is a rhinological challenge to further improve education of nose and sinus surgeons by doing more training in wet labs and always perform 4-hand endoscopic surgery, when possible.

To summarize, we have to improve the treatment of patients with chronic inflammation in the upper airways because they have a very poor quality of life. Increased research in the field of rhinology is crucial to improve symptom control and reduce health economic costs.

ERS16-0849

**SYMPOSIUM 46: IRS SESSION: GLOBAL RHINOLOGIC CHALLENGES – A REGIONAL ANALYSIS**

**NORTH AMERICA**

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Wider understanding of the nature and pathogenesis of chronic rhinosinusitis has brought significant changes in management, both medical and surgical, to this disease process. In some cases, patients are reaping the benefits of these changes with improved outcomes and decreased risk of side effect. In contrast, however, in many cases these changes are occurring in the setting of a paucity of evidence leading to inappropriate treatments of questionable efficacy along with the potential for significant side effect. While in others, evidence is slowly mounting, but economic incentives have led to significant inappropriate application of specific therapies. In this discussion, the author will describe some of these controversial areas occurring in the field from the perspective of healthcare in North America, specifically, the United States, with a focus on the technology of balloon sinus dilation

**AUSTRALIA**

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Australia has an excellent reputation for rhinology. This has been achieved due to several high-level academic appointments, some funded by the Garnett-Passe and Rodney Williams Memorial Foundation, and excellent research output. There can be no doubt the Australian environment provides some form of disease-modification with a huge amount of CRSwNP being seen in most rhinological practices. More aggressive surgery has evolved as the norm to deal with this disease burden and this has been criticised in many quarters.

Current challenges in Australian rhinology include the lack of reimbursement for most office procedures apart from nasendoscopy, nasal cautery and turbinate cautery. There is also a relative over-supply of fellowship-trained rhinologists in several cities, yet a lack in others. This results in patients with severe disease or rare tumours often needing to travel inter-state to receive gold-standard care.

As with many western economies, the global financial crisis has resulted in a cut in healthcare spending in real terms. All these factors will be discussed.

**OLFACTORY DISORDERS, PSYCHOLOGICAL CONSEQUENCES**

**S. Nordin**<sup>1</sup>

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The fact that the olfactory epithelium is exposed directly to ambient air without protection contributes to this sensory system being particularly vulnerable to pathology. About 200 possible causes of olfactory disorder have been identified, ranging from viral/bacterial infections to airway blockage and neurological disorder. These causes may result in loss in odor sensitivity, but occasionally also in parosmia (qualitative odor distortion) and phantosmia (odor sensation in the absence of an external odorant). The human sense of smell plays an important role in basic life-maintaining functions, such as regulation of food intake and avoidance of potentially harmful chemical substances. As a consequence, olfactory disorders may result in poor quality of life and risky situations. Examples are change in food appreciation and thus nutritional deficiency, failure to detect fire and harmful chemical exposure, and adverse impact on work and social interactions. Elderly may constitute a major risk group, not only due to aging being strongly associated with olfactory loss, but also due to the loss developing gradually over time. This results in elderly typically being unaware of their olfactory loss, and not prone to take necessary precautions. Chemical intolerance, with, for example, upper and lower airway symptoms and severe fatigue from exposure to odorous, daily substances (e.g., perfumed products) is another condition for which patients may seek medical care from the ENT physician. Severe such cases may experience considerable impact on quality of life, such as not having access to society and poor financial security and social relationships.

**ERS16-0861**

**SYMPOSIUM 47: OLFACTION – IT IS NOT ONLY ABOUT THE NOSE!**

**CENTRAL OLFACTORY DISORDERS**

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Odor identification entails matching household odors to their typical sources, and is a common assessment of olfactory function. As odor identification impairments are often assumed to be caused by loss of sensory abilities, cognitive influences have received less attention. I will present results from odor identification and naming experiments in healthy participants and individuals with dementia, using behavioral and neuroimaging techniques. These results indicate that performance is mediated by cognitive brain networks responsible for language and memory. The cognitive influences on odor tasks makes it possible to use odor identification and naming as methods for understanding neurological conditions such as Primary Progressive Aphasia, where olfactory sensations are often preserved.

**THE ROLE OF ENDONASAL ENDOSCOPIC SURGERY IN SINONASAL AND INFRATEMPORAL FOSSA HEMANGIOMA AND HEMANGIOPERICYTOMAS**

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**Aims**

Hemangioma and hemangiopericytoma of the sinonasal cavity and infratemporal fossa(ITF) yield challenges in endonasal endoscopic surgery(EES) due to vascular morphology. This study aims to evaluate effectiveness of EES in their management.

**Method**

Retrospective analysis of all patients operated with sinonasal and ITF hemangiomas and hemangiopericytomas between 2005 and 2015 at our tertiary care unit were included. Open or combined surgeries were excluded. Clinical examination, radiological and operative findings as well as treatment outcomes were evaluated

**Results**

A total of 16 patients were included in this study. There were 14 hemangioma and 2 hemangiopericytoma patients. Most common presenting symptom was epistaxis in 13 patients followed by nasal obstruction in 9 patients. One patient presented with conductive hearing loss and serous otitis media due to eustachian tube compression by ITF located tumor. One patient had a large hemangioma destructing midline septal cartilage to extend the contralateral nasal cavity. All were removed through EES either in a piece-meal fashion for large lesions or in one piece if the tumor was small. There were no major bleeding and no injury of important neurovascular structures. One patient with hemangiopericytoma needed two revision surgeries for recurrent tumor in three years, although there was no tumor residual left histologically at former surgeries. None of the hemangioma group recurred. Mean follow up was 49.7 months

**Conclusion**

In the management of sinonasal and ITF hemangiomas and hemangiopericytomas in which surgery is being accepted as the current treatment modality, endonasal endoscopic surgery demonstrates an effective and safe approach in the benefit of patients.

**THE IMPACT OF CIGARETTE SMOKING ON NASAL OBSTRUCTION: AN ANALYSIS BASED ON THE NOSE-P SCALE**

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**Aims**

Nasal obstruction is one of the most frequent symptoms in the otorhinolaryngology practice, with significant impact on quality of life. Few studies tried to establish a relationship between smoking and nasal resistance and the sensation of nasal obstruction, with conflicting results. As smoking is still a worldwide habit, further investigation of its possible effects on subjective sensation of nasal obstruction is warranted. The aim of this study was to evaluate the impact of cigarette smoking on nasal obstruction based on the analysis of the NOSE-p score.

**Method**

The NOSE-p questionnaire was applied to patients from a primary health care centre to evaluate subjective nasal obstruction symptoms. Subjects with previous nasal surgery and smokers of other forms of tobacco were excluded. The age, sex, and other factors that can be associated with subjective nasal obstruction (occupation, active medical conditions and current medication) were also collected and included in the regression model as potential confounders.

**Results**

We observed a significant association between the current smoking and the NOSE-p score, while no association was detected in the ex-smokers comparing to the non-smokers. The amount of tobacco smoked, expressed in pack-years, was not significantly associated with the score, which suggest that there is no dose-effect.

**Conclusion**

Our results suggest that smoking is a contributing factor to nasal obstruction symptoms, regardless the cumulative cigarette consumption and exposure time, which seem to solve in those who quit smoking. Therefore, smoking cessation should be considered in the treatment of patients with nasal obstruction.

**A RANDOMISED CONTROL TRIAL TO EVALUATE DIAGNOSTIC AND MANAGEMENT CONFIDENCE OF ENDOSHEATH NASENOSCOPY: EARLY RESULTS**

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**Aims**

The Endosheath is a protective barrier for nasendoscopes. Most local ENT surgeons do not use an endosheath as some feel the endosheath distorts the quality of view. We aimed to investigate this.

**Method**

Ten open-source images of various laryngeal conditions and two nasendoscopes were utilised (one with Endosheath on and the other without). Seven ENT-clinicians of varying experience participated. Blinding to the participant was carried out by concealing the fiberoptic component of the nasendoscope in tubing. The order at which participants used the sheathed and non-sheathed scopes was counterbalanced to minimise practice effects. Participants were asked to document a diagnosis and management of each condition, along with their confidence of each on a Visual Analogue Scale (VAS).

**Results**

The average VAS score demonstrated a higher diagnostic confidence for the non-sheathed nasendoscope for all participants barring one. The average score for diagnostic confidence was higher for the non-sheathed nasendoscope (81.22 vs 74.32;  $P=0.002$ ). The difference in management confidence was non-significant (80.32 vs 79.52;  $P=0.68$ ).

**Conclusion**

Preliminary findings suggest that clinicians have lower diagnostic confidence with an Endosheath. There was no significant difference in management confidence. Limitations include low numbers of participants and the inability to simulate condensation on the sheath. Clinicians using an Endosheath have lower diagnostic confidence; this did not affect management confidence, implying no change in management. Greater numbers of clinicians need to be evaluated to ensure that Endosheath use is not affecting patient management.



**NORMAL PEAK NASAL INSPIRATORY FLOW (PNIF) RATE VALUES IN HEALTHY 15-20 YEAR OLD ADOLESCENTS IN UKRAINE**

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**Aims**

PNIF measurement appears to be a simple, cheap, affordable and easily performed method to assess nasal patency. The purpose of this study is to establish normative PNIF data for a healthy adolescent population and provide charts relating PNIF normal values with age, gender, height, weight and body mass index.

**Method**

Repeated PNIF measurements were obtained from 332 medical college students aged 15-20 years old during January 2016. Of these 332 adolescents, 183 fulfilled the inclusion criteria and were included in the study. All of them were non-smokers, non-asthmatic, without nose and paranasal sinuses problems. Data were statistically analysed and tables were produced relating PNIF to age, gender, height, weight and body mass index.

**Results**

PNIF values were higher in males compared to females and this difference was statistically significant. There was no correlation between gender and age or height. There was considerable residual variability of PNIF between individuals not explained by any of the variables investigated.

**Conclusion**

This study confirms that PNIF measurement is a reliable and simple technique. The normal range of PNIF in a healthy Ukrainian adolescent population has been determined. The study provides normative data for a Caucasian population. Therefore, it remains a useful method for the follow-up and survey of patients complaining of nasal obstruction.

**SINONASAL INVERTED PAPILLOMA. AN UPDATE OF MANAGEMENT AND RECURRENCE RATES**

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**Aims**

The aim of this audit was to assess the outcome of treating patients with sinonasal inverted papilloma (NIP) in our institution and recurrence rates.

**Method**

A list of patients whose clinical coding suggested resection of NIP between 2003 and 2013 were identified. The clinical records and histology reports of these patients were reviewed. Data collated in an Excel spread sheet included demographics, date of first clinic review, presenting symptoms, initial diagnostic procedure with date, definitive operative procedure with date, evidence of recurrence, subsequent management and number of follow-up appointments.

**Results**

20 patients with sino-nasal inverted papilloma were treated over a 10 year period. The male to female ratio was 5.6 to 1. The mean age at presentation was 58 years (range 34-78). Presenting symptoms included nasal obstruction (80%), nasal discharge(55%), epistaxis(20%), headache(10%), postnasal discharge (10%) and other symptoms (35%).

The primary site of the NIP was the lateral nasal wall in 30% of patients, ethmoidal (30%), septal(10%), nasal vestibule(10%) and combined sites(20%). Surgical treatment included a lateral rhinotomy for the first 2 patients in the series, endoscopic resections depending on site. These varied from endoscopic medial maxillectomy, endoscopic sinus surgery and simple nasal polypectomy with a safety margin in septal and vestibular lesions. One patient (5%) had a malignant transformation and succumbed to the disease. The recurrence rate for endoscopic resections was 11% and both patients who underwent a lateral rhinotomy had a recurrence.

**Conclusion**

Variable degrees of endoscopic resections of NIP depending on site, remain an effective way to this condition.

**GOBLET CELL DENSITY IN THE AIRWAY EPITHELIUM OF THE UPPER- AND LOWER RESPIRATORY TRACT (SEPTUM AND TRACHEA) IN NORMAL AND NUDE (ATHYMIC) RATS**

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Purpose of the study; Try to elucidate a supposed correlation between upper and lower airways Try to elucidate if there could be a correlation between the specific and non- specific immune system Material and methods; 10 congenitally athymic (NU/NU), 3 months old, Lewis male rats All of the rats were bred in a pathogen free environment The septal- and tracheal mucosa was fine dissected, stained by the Pas-Alcian blue whole-mount method and the goblet cell density was determined in 10 high power fields Results; A correlation between upper- and lower airways in the normal and in the nude rat was found Goblet cell density in both upper- and lower airways was found to be low in nude rats compared to normal rats (p

**CLOSURE OF LARGER DURAL DEFECTS IN TRANSNASAL SKULL BASE SURGERY - A CASE SERIES**  
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**Aims**

Transnasal skull base surgery commonly goes along with iatrogenic dural defects of considerable size, placing new demands on the closure techniques with regards to both surgical methods and materials used.

**Method**

A systematic analysis of transnasal skull base cases at the Munich University Hospital over a two year period with dural defects greater than 2 cm in maximum extension was performed regarding technique of closure, the materials deployed as well as the postoperative course.

**Results**

A total of 8 patients with the following pathologies were identified: olfactory neuroblastoma with intracranial extension (n=3), large meningocele (n=2), pituitary adenoma with suprasellar extension (n=1), adenocarcinoma of the paranasal sinuses with infiltration of the frontal dura (n=1), and one case of an intracranial-intradural nasal polyposis. The defects (2-5 cm in maximum extension) were primarily closed with a combination of Tachosil<sup>®</sup>, a pedicled flap and fibrin glue. In 4 cases, additional materials were used. A prophylactic lumbar drainage was not placed in any case. In 3/8 cases, a postoperative CSF rhinorrhea occurred. This was successfully handled in 2 cases via lumbar drainage over 3 days, and in the third case by a surgical revision. There was no case of a secondary CSF rhinorrhea.

**Conclusion**

Using a combination of different materials including vascularized, local flaps, even larger defects of the anterior skull base can be effectively closed during transnasal skull base surgery. This statement is also supported by the current literature on this topic, which will be discussed in relation to the presented results.

**DOUBLE NASOSEPTAL FLAP TECHNIQUE IN TRANSSEPTAL TRANSSPHENOID APPROACH FOR ENDOSCOPIC ENDONASAL HYPOHYSECTOMY**

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**Aims**

Endoscopic endonasal approach has been successfully used for pituitary tumors. Transseptal transsphenoidal technique has been warranted for four hand surgery. However the loss of septal mucosa especially around sphenoethmoidal recess might be a disadvantage.

The aim of this study is to describe a novel “double nasoseptal flap” technique in endoscopic transsphenoidal pituitary surgery and to evaluate its functional and morphological outcomes.

**Method**

The technique based on fully harvested bigger nasoseptal flap on one side and smaller on the other side. By placing the anterior and superior margins of incisions to different regions on the mucoperichondrium of right side, septum and mucoperichondrium of the left side, the margins didn't overlap during reconstruction. Bigger flap sutured to caudal septal cartilage and the smaller flap sutured to the bigger one.

Thirty patients who underwent endoscopic endonasal pituitary surgery were included. Double nasoseptal flap technique was used. Nasal obstruction was assessed by preoperative and postoperative first month visual analogue scale (VAS), and morphology was evaluated by achieving intact septum from the sphenoid ostium to the columella. Sphenoid sinusitis and crusting in sphenoethmoidal recess were also assessed.

**Results**

Mean VAS was 71 and 67 mm preoperatively and postoperatively, respectively ( $p>0.01$ ). There was no septal perforations postoperatively. Three patients had (10%) crusts on incision margins around sphenoethmoidal recess on first month postoperatively.

**Conclusion**

Double nasoseptal flap technique had advantages such as wider exposure during surgery and better morphological and functional outcomes postoperatively, additionally prepared flaps could be used if needed. The technique was safe without any perforations and minimal crusting.

**A DIAGNOSTIC CONUNDRUM IN A PATIENT PRESENTING WITH RECURRENT EPISTAXIS**

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**Aims**

Introduction

A patient with a history of pituitary macroadenoma presented with epistaxis originating from a mass of the septal lining. Histology suggested an olfactory neuroblastoma but specialist neuropathology review was unable to exclude a recurrence/extension of the pituitary lesion.

**Method**

Case Report

A 66-year-old female presented with a six-month history of recurrent left-sided epistaxis nine years after incomplete emergency resection of a pituitary macroadenoma without post-operative radiotherapy. Clinical examination revealed a lesion of the high nasal septum confirmed on CT as adjacent to the middle turbinate. Endoscopic resection was undertaken and a pale granulomatous lesion was resected just inferior to, but not in communication with, the olfactory cleft.

**Results**

Discussion

Review of pre-operative CT correlated with intra-operative findings showing an air gap between the tumour and cribriform plate with tumour arising from the septal lining. DOTATATE PET-CT demonstrated avidity in the left nasal cavity with no evidence of extra-lesional disease. Histological examination demonstrated fragments of respiratory mucosa infiltrated by solid nests of tumour morphologically in keeping with an olfactory neuroblastoma. In view of the previous pituitary lesion neuropathologist review was sought however immunohistochemistry was unable to definitively exclude a recurrence/extension of the pituitary lesion. Endoscopic transnasal resection was undertaken with clear margins and ectopic olfactory neuroblastoma decided as the most likely diagnosis. Post-operative radiotherapy was decided against in view of complete excision.

**Conclusion**

We present the first reported case of an ectopic olfactory neuroblastoma presenting as a second primary malignancy in a patient with a history of incompletely excised pituitary macroadenoma but no post-operative radiotherapy.

**EFFICACY OF MULTILAYER RECONSTRUCTION AFTER ENDONASAL ENDOSCOPIC TRANSCRIBRIFORM APPROACHES**

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**Aims**

Endonasal endoscopic transcribriform approaches aiming to manage various pathologies like olfactory groove meningiomas could reveal large craniotomies opening to the sinonasal cavity at the end of the procedure. Large defects created by this approach between two lamina papyracea could involve resection of crista galli and reveal challenges during reconstruction. The aim of this report is to emphasize the value of multilayer reconstruction techniques for watertight closure after endoscopic transcribriform approaches.

**Method**

Retrospective analysis of all patients operated between 2009 and 2015 at our tertiary care unit through an endoscopic transcribriform approach. Postoperative outcomes of reconstruction were evaluated by endoscopy and objective CSF testing in nasal secretion.

**Results**

Fourteen patients were included to the study, 11 requiring surgery for tumor removal (olfactory groove meningioma 6, esthesioneuroblastoma 2, fibrous dysplasia 2 and meningoencephalocele 1) and 3 for CSF fistula closure. Multilayer reconstruction was done in all patients using fascia lata in intradural underlay, extradural underlay and overlay fashion. After 2013 nasoseptal flap was utilized as the last layer in 8 patients. Twelve patients had Draf III and 2 required Draf IIB drainage procedure for frontal sinus aeration during reconstruction. No postoperative clinical CSF leak was encountered, verified by Beta-2-Transferrin test in nasal secretion at 1<sup>st</sup> month and endoscopic mean follow-up of 21 months.

**Conclusion**

Multilayer reconstruction of the large anterior skull base defects with fascia lata promises a stable and effective closure method after transcribriform approaches. Use of nasoseptal flaps as the last layer improves stability and results in rapid healing.

**ENDONASAL ENDOSCOPIC MANAGEMENT OF PETROUS APEX LESIONS**

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**Aims**

Petrous apex of the temporal bone is an anatomically challenging area to access. Traditional neurotologic lateral approaches to this area may cause high morbidity. The aim of this report is to discuss role of anterior transphenoidal endoscopic approach for petrous apex lesions and to evaluate its outcomes.

**Method**

All patients who were operated for a petrous apex lesion through an endonasal endoscopic approach since 2010 with minimum one year follow-up were retrospectively analyzed.

**Results**

During the time period 5 patients were operated through an endoscopic transnasal transsphenoidal approach to manage petrous apex lesions. The aimed pathology at petrous apex was cholesterol granuloma in three, mucocele in one and chondrosarcoma in one patient. By the help of angled instruments and endoscopes it was possible to visualize, drain, irrigate and check every corner of the cholesterol granuloma and mucocele cavities behind the internal carotid artery. In three patients a nasoseptal flap was introduced to the cavity to avoid stenosis of the drilled isthmus created for drainage to the sinonasal cavity. Chondrosarcoma was totally removed with no residual. There was no major bleeding or injury of adjacent neurovascular structures. No recurrences were observed in a mean follow-up time of 28,8 months.

**Conclusion**

Endonasal endoscopic approach to the petrous apex uses a straightforward and natural corridor with minimal morbidity, enabling direct visualization also for controls in selected cases. Use of pedicled nasoseptal flap ensures patency of the new isthmus created between the lesion cavity and sphenoid sinus, which facilitates permanent drainage in the follow-ups.



**OUR EXPERIENCE OF ENDOSCOPIC MANAGEMENT OF RECURRENT JUVENILE NASAL ANGIOFIBROMAS**

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**Aims**

This is a report of 47 patients with recurrent juvenile nasal angiofibroma (JNA), previously operated at other hospitals and had revision surgery at our Institute.

**Method**

Over the past 10 years 114 patients represent the population of our study. All were males, aged 7 - 36 y.o. (mean 16 y.o.).

61 patients with JNA I-IIIa were treated endoscopically; 54 patients with JNA IIIa-IV by Andrew's classification were treated neurosurgically with endoscopic assistance. Their presenting symptoms were: nasal obstruction, bleeding, facial deformation, visual loss, and growing residual JNA.

Of 61 patients 47 had previous treatment: 12 - had embolization and 2-3 open surgeries; 5 - had sutured ECA and 1-3 open surgeries, radiation and chemotherapy; 28 - had a biopsy; 2 - radiation therapy.

**Results**

Endoscopic resection of JNA can be considering as a method of choice even in patients with recurrent JNA as it is less traumatic method of its treatment with a good surgical outcomes. Bleeding during the surgery (because of revascularization) and scarring were significantly higher, the surgery much more difficult and requiring a longer surgical time. We had two severe complications in this group: pseudoaneurism of maxillary artery and ICA injury.

However, preoperative tumor embolization, intraoperative blood saving methods, such as isovolemic hemodilution, autobody reinfusion need to be used as these type of surgeries have a higher risk of dramatic bleeding

**Conclusion**

JNA is successfully treated with endoscopic guidance, a "stand by" team including experienced rhinologists, neurosurgeons; anesthesiologists, transfusiologists and endovascular neurosurgeons should be available at "times of need".

**ENDOSCOPIC TREATMENT OF FRONTAL CSF-LEAKS AND MENINGOCELES: WHAT THE SURGEON NEEDS TO KNOW**

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**Aims**

Frontal sinus cerebrospinal fluid leaks and meningoceles are rare and their surgical management difficult. Up until recently, they could only be treated by open surgery. With the development of endoscopic endonasal surgery, less invasive techniques such as an exclusive endoscopic approach can now be used.

**Method**

Review of the literature was performed to identify relevant articles and cases were selected from our database to illustrate this topic.

**Results**

High resolution CT and MRI of the sinuses are essential for the diagnosis and localization of the CSF leak/meningocele. Schlosser and Shi radiologic classifications can help the surgeon to decide for open or endoscopic surgery (Fig 1 and 2). Most difficult locations are lateral and superior, but current register of endoscopic techniques such as Draf or modified Lothrop allows pushing boundaries of endoscopic repair. Thorough knowledge of CSF-leak repair techniques is mandatory to achieve high closure rate.

Figure 1: A: Anatomy of frontal recess, B: Classification according to Schlosser.

Figure 2: Preoperative diagram according to Sieskiewicz

**Conclusion**

Endoscopic frontal sinus CSF leak repair requires a good knowledge of both the surgical techniques specific to the frontal sinus, as well as the techniques of endoscopic CSF-leak repair. Maintenance of frontal sinus patency must be a priority during the operation. When these conditions are observed, endoscopic repair is associated with a very high success rate and a low complication rate. The current limitations of this surgery will very probably continue to decline as surgeons' experience, instruments and surgical techniques continue to improve.

**RADIOLOGICAL STUDY OF THE ANTERIOR CRIBRIFORM PLATE AND ITS CLINICAL CONSEQUENCES**  
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**Aims**

ethmoidal foramen (EF) and cribroethmoidal foramen (CF) are foramina located at the anterior part of the cribriform plate and described at the beginning of the XX<sup>th</sup> century by Gray and Rouvière. EF contains a process of the dura mater and CF the anterior ethmoidal nerve and a branch of the anterior ethmoidal artery. Our objective was to describe their characteristics in CT scan.

**Method**

anatomical radiological study with conventional CT scan of 13 dried skulls.

**Results**

24 sides allowed analysis of the foramina. The ethmoidal foramen had a "classic" configuration according to Gray's description: uniqueness in each side, oval shape, without partition, in 83% of cases (20/24 sides). In 2 sides, a partition separated the EF into two parts. For 2 other sides, the foramina were not identified. When present, they were all clearly distinguishable on CT slides. They measured an average of 3.9+/-1.7mm long, 0.9+/-0.3mm in width. The cribroethmoidal foramina were present in all cases and always visible on CT. They measured an average of 1.6+/-1mm long, 0.9+/-0.3mm width. Small subdivisions of CF were visible on CT in 58% of cases.

**Conclusion**

Ethmoidal and cribroethmoidal foramina are frequently present, and often visible on dried skulls CT scans. Their average dimensions were close from the values found by our previous anatomic study. Those findings are encouraging and could explain spontaneous CSF leaks and routes of tumor extensions as they represent an area of least resistance at the anterior part of the cribriform plate.

**ENDOSCOPIC ASSISTED APPROACH TO PETROUS APEX LESIONS: WHAT RHINOLOGIST CAN BRING TO OTOLOGIST**

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**Aims**

Petrous apex lesions are usually removed by microscopic lateral approaches. Total removal of those lesions can be difficult when they involve the most anterior part of the petrous apex. In that condition, endoscopic access from the sphenoid has been advocated and recently developed. However, it doesn't allow reaching the posterior part of the petrous apex and necessitate operating in a narrow corridor. The combination of a lateral microscopic approach, completed by the use of the endoscope allows exploring and removing extensive lesions of the petrous apex such as cholesteatomas. The aim of this communication is to establish the rationale and indications of this combined surgery

**Method**

2 cases of extensive petrous apex lesions will be discussed, and the microscopic/endoscopic assisted technique will be illustrated by 2 videos of the surgery.

**Results**

Microscopic/endoscopic assisted technique allowed total removal of the cholesteatoma in our 2 patients without recurrence at 2 years. The use of the endoscope with combination of FESS instruments allowed the removal of the cholesteatoma and to reach the sphenoid sinus by the lateral otologic approach. Correct instrumentation and perfect knowledge of the anatomy is mandatory to achieve safely the removal.

**Conclusion**

Microscopic/endoscopically assisted removal of petrous apex cholesteatomas is feasible and avoids the use of a double simultaneous approach by the nose and by the ear. Endoscopic anatomy of this area has now to be described and taught.

**ACUTE OPHTHALMIC SYMPTOMS IN TWO PATIENTS AND THE CHALLENGE TO ARRIVE AT THE DIAGNOSIS OF ROSAI-DORFMAN DISEASE.**

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**Aims**

Rosai-Dorfman disease is a rare benign histolytic proliferative disorder also known by sinus histiocytosis with massive lymphadenopathy. Massive, bilateral, painless cervical lymphadenopathy in clinically well patients, elevated ESR and a hypergammaglobulinemia with reversal of the albumin-globulin ratio is associated with 90% of presentations. Extra-nodal manifestations are common, but orbital presentations are very rare. Aetiology is unknown, but there is speculation of a viral origin and immunological dysfunction. Treatment is controversial, as 20% of patients show spontaneous recovery without intervention.

**Method**

First patient: 47 year old male with left proptosis and compressive optic neuropathy arising from a maxillary sinus tumour with orbital and cavernous sinus invasion and nasal obstructive symptoms. Imaging showed enhancing soft tissue mass expanding and partially destroying the left maxillary sinus with perineural spread into the orbit, pterygopalatine, infratemporal fossa and intracranially.

Second patient: 59 year old male with a 3 month history of left proptosis, optic neuropathy, ophthalmoplegia. A MRI showed abnormal thickening and enhancement of cavernous sinus with anterior extension, FDG-PET demonstrated left osseous destruction.

Both patients underwent endoscopic biopsy and debulking surgery.

**Results**

Biopsies from both patients demonstrated characteristic histology of Xanthogranulomatous inflammation with numerous foamy histiocytes that were positive for S100 and CD68 immunostains, but negative for CD1a. Phagocytosed lymphocytes and red blood cells (emperipolesis) were identified in the foamy histiocytes.

**Conclusion**

These cases demonstrate that similar symptoms may be evoked by mass lesions in different anatomical locations. Rosai-Dorfman disease is rare and can mimic malignancy. The diagnosis and management of this condition is challenging.

**SINGLE LAYER REPAIR OF LARGE ANTERIOR SKULL BASE DEFECTS WITHOUT VASCULARIZED MUCOSAL FLAP.**

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**Aims**

Bilateral anterior skull base (ASB) defects are commonly repaired using a multi-layered reconstruction followed by a nasoseptal flap. Use of a single-layer closure of these defects with an acellular dermal allograft has been described in literature with a high success rate, but this technique has yet to gain widespread use. We report our experience in a series of five patients with esthesioneuroblastomas who underwent reconstruction of large ASB defects using a single-layer intradural graft, without nasoseptal flaps. We also compared the results of Alloderm or collagen matrix xenograft (Duramatrix) use as the graft biomaterial.

**Method**

Retrospective Study. Medical records were reviewed from five consecutive patients with single-layer closure of large, bilateral ASB defects treated at a tertiary academic medical center.

**Results**

5 patients had successful endoscopic reconstruction of the skull base with single-layer closure, without postoperative CSF leaks. All patients had adjuvant external beam radiation therapy for the diagnosis of olfactory neuroblastoma which had crossed the midline. Two patients that were reconstructed with AlloDerm, and these patients showed increased post-surgical crusting, more symptomatic post-operative infections, delayed improvements in SNOT-22 scores, and increased time to remucosalization compared to the 3 patients reconstructed with Duramatrix.

**Conclusion**

Single-layer repair without vascularized mucosal flap is a viable method of skull base repair for large ASB defects. In this series, repair with Duramatrix was superior with less graft crusting and infection, requiring substantially fewer debridements than patients reconstructed with AlloDerm.

**ENDOSCOPIC REPAIR OF CEREBROSPINAL FLUID LEAKS IN PAEDIATRIC PATIENTS**

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**Aims**

In literature there are fewer case series regarding endoscopic treatment of paediatric cerebrospinal fluid fistulas. Compared to craniotomy, endoscopic repair doesn't reach wider consent even if craniotomy carries higher complications rate. Endoscopic technique can imply lifelong consequences as permanent panhypopituitarism, impairment of growth centres in splanchnocranium, especially before the age of 3.

The aim of the study is to report our institutional experience on paediatric cerebrospinal fluid leak to demonstrate the safety and efficacy of the endoscopic approach in a variety of cases.

**Method**

Clinical records of all paediatric patients who underwent endoscopic repair of anterior and middle fossa skull base defects were reviewed for several parameters (symptoms, signs, aetiology, endoscopic features, surgical technique, comorbidities). Ten patients were enrolled (6 males, 4 females) with a mean age of 10 years (from 2 months to 17 years). The aetiology of the leak was congenital (2 cases), trauma-induced (6 cases) and iatrogenic (2 cases). Bone defect was localized by CTscan.

**Results**

Remedial was obtained using multiple grafts technique with autologous materials during a single procedure in all but one case, this one case requiring a second operation for delayed recurrence. The mean follow-up duration is 36 months. Any major complication relating to the procedure was observed.

**Conclusion**

CSF fistulas can be approached in paediatrics of any age with high success and low complications rate using the endoscopic approach. Risks connected to this technique seem less dangerous than craniotomy ones. To avoid serious consequences as ascending meningitis, we recommend endoscopic performance as soon as possible.

**THE ROLE OF POSTOPERATIVE NASAL CARE IN ENDOSCOPIC ENDONASAL SKULL BASE SURGERY; REVIEW OF RELATED ARTICLES AND PRESENTING OUR PRACTICE**

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**Aims**

The aim of this study is to evaluate the role of postoperative care in improving the sinonasal symptoms induced by the manipulation of nasal mucosa after endoscopic endonasal approach (EEA) which may last until the healing process is completed and the nasal function is restored.

**Method**

After 10 years of practicing endoscopic endonasal skull base surgery, a prospective study was conducted from February 2011 to December 2014 on 47 patients with pituitary adenoma living in dry climate areas that were candidate for EEA and received reconstruction with nasoseptal flap. The patients were asked to irrigate their nose with saline solution and use a paper mask during the first postoperative month. Self-reported Sinonasal Outcome Test 22 (SNOT-22) Questionnaire was completed preoperatively and 1, 3, 6, and 12 months postoperatively.

**Results**

The average use of paper mask in these patients was  $10.09 \pm 6.06$  hours per day and  $36.38 \pm 25.13$  days in total. Patients who used nasal paper mask for more than 100 “hour-days” showed a better SNOT-22 scores at 1<sup>st</sup> ( $p=0.04$ ) and 3<sup>rd</sup> ( $p < 0.001$ ) postoperative months. The data related to postoperative care in endoscopic surgeries were reviewed in Medline and presented along with our routine practice.

**Conclusion**

Saline sprays and irrigation are used in postoperative period. The use of nasal paper mask in dry environments can also help in maintaining the humidity inside the nasal cavity, thus leading to decrease in sinonasal symptoms in the patients undergoing EEA. The effect needs to be evaluated in other nasal surgeries.



**ENDOSCOPIC MANAGEMENT OF A FRONTAL SINUS POSTERIOR TABLE FRACTURE WITH A DOUBLE MINI TREPHINATION APPROACH: A CASE REPORT**

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**Aims**

The description of a modification of the mini trephination approach and its application in the management of a frontal sinus posterior table fracture.

**Method**

A 38 year old male sustained posterior table frontal sinus fracture secondary to motor vehicle accident. The fracture line was 14mm long and its dislocation was 8mm according to the preoperative HRCT scan. Under general anesthesia, the fracture line and the walls of the frontal sinus were marked on the frontal skin with the use of navigation system. Two horizontal incisions about 1-2cm long were performed, one directly under the left eyebrow and one in the midline 3cm above the nasal root. The frontal sinus anterior table was exposed and drilled, creating two openings large enough for endoscope and instruments insertion. A 30° rigid endoscope allowed complete visualization of the fracture line. Fracture correction was achieved via endoscopic removal of the covering mucosa, drilling and re-approximation of the overlapped fragments. The underlying dura was intact. A piece of Tachosil was placed upon the fracture line, fixed with fiber glue. The recovery was uneventful.

**Results**

Postoperative CT scan 6 months later showed complete healing without evidence of a bony defect or frontal sinusitis. The patient is in good condition and symptom free.

**Conclusion**

Double mini trephination approach may be an alternative option in the management of frontal sinus posterior table fractures. It is minimally invasive, preserves the sinus function and ensures a good aesthetic result, reducing the need for sinus cranialization or obliteration. A careful patients' selection is a prerequisite.

**INCIDENCE AND RISK OF MALIGNANT TRANSFORMATION IN THE SWEDISH POPULATION 1960-2010**

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*Introduction:* The true incidence of Inverted Papilloma (IP) is not yet known. From hospital based studies its incidence has been estimated to approximately 0,5/100000 personyears . Earlier hospital case studies have shown that IP can undergo a malignant transformation in 1-53%. The frequency of its malignant transformation on a population basis is unknown. To our knowledge, no SIR (standardized incidence ratio) has been reported for malignancies among IPs. This study aims to investigate these incidences on a population basis.

*Methods:* Using the data from the Swedish Cancer Registry (SCR) we have identified patients with IP and patients with Squamous Cell Carcinoma (SCC) diagnosed between 1960 and 2010 in Sweden. Incidence of IP, incidence of SCC among patients with IP and SIR were analyzed.

*Results:* 814 patients with IP were identified. The incidence of IPs reported to the SCR increased from 1960-2010 from 0,01-0,33/100000 py. In this cohort, SCC was overrepresented, as compared to the general population, SIR = 142,76 (p<0,05).

*Conclusion:* The incidence of IP in the Swedish population seems to have increased from 1960-2010. Possibly, SCC is more common among patients with SCC than in the general population.

**ENDOSCOPIC VIDIAN NEURECTOMY: A RETROSPECTIVE CASE SERIES OF 20 PATIENTS**

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**Aims**

Chronic refractory vasomotor rhinitis (VMR) is a debilitating condition that causes significant impairment of quality of life. The purpose of this study is to evaluate the efficacy of endoscopic vidian neurectomy as treatment for patients with VMR in a large case series.

**Method**

A total of twenty patients with symptoms of vasomotor rhinitis underwent 40 endoscopic vidian neurectomies. All patients had negative screening for common aeroallergens on skin-prick tests. All patients underwent preoperative CT scanning. The surgical technique for endoscopic vidian neurectomy is presented and anatomical variations considered. All patients underwent preoperative CT scanning. The surgical technique for endoscopic vidian neurectomy is presented and anatomical variations considered. The outcomes for the patients were retrospectively assessed with patients asked to score their pre- and postoperative symptoms using the SNOT-22 and VAS scoring 0-10 for rhinorrhoea and nasal obstruction, preoperatively, 12 weeks, 6 months, 1 year, following surgery.

**Results**

All patients had pathologic confirmation of nerve section. Statistically significant improvement was measured for both the postoperative VAS scores and SNOT-22 and compared with the preoperative scores ( $p < 0.01$ ).

**Conclusion**

Endoscopic vidian neurectomy improves the symptoms of nasal obstruction and rhinorrhea in patients with vasomotor rhinitis refractory to medical treatment.

**ENDOSCOPIC ENDONASAL SURGERY SIMULATOR: A VALIDATION STUDY**

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**Aims**

Functional endoscopic sinus surgery (FESS) is currently the gold standard of treating a great deal of nose diseases. Initially, the best thing to FESS training is to acquire technical skills by the use of simulator devices. Our aim was to develop endoscopic endonasal surgery simulator (EESS) as well as to carry out efficiency monitoring of all usage.

**Method**

To succeed in this study EESS was developed in our department (patent number 158398 RU). Cylindriform cartridges are used to simulate the nasal model. Learners perform different tasks depending on the nasal model structure. EESS allows to use Freer elevator, ball-shaped ends probe, Blacksley straight forceps, through-cutting straight Blacksley shape forceps, Stammberger backward cutting punch, nasal straight scissors. 11 otolaryngology residents with no experience in FESS were recruited into the study. After a brief tutorial participants exercised 1 hour a day over 5 days. Every step of the study was recorded by video camera. Task-performance time and the number of technical accuracy mistakes were assessed at the beginning and at the end of this training course.

**Results**

On the basis of received data it was revealed that task-performance time and also the number of technical accuracy mistakes were statistically significant reduced after five-hour practice ( $p < 0,05$ ). Thus, it demonstrates the validity of EESS.

**Conclusion**

EESS was developed in our department to master skills of using surgical instruments through endoscopic view inside the nasal model. The user can get technical skills of FESS due to introduced tasks. There is a significant tendency towards acquiring proficiency at FESS.

**SIGNIFICANCE OF NASAL MANIFESTATIONS IN DISEASE STRATIFICATION OF ANCA ASSOCIATED VASCULITIS**

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**Aims**

Patients with anti-neutrophil cytoplasm antibody (ANCA) associated vasculitis (AAV) commonly have otorhinolaryngological (ENT) involvement, with nasal features being the most common. Rituximab is a B-cell depleting monoclonal-antibody often used for treating resistant autoimmune conditions. A retrospective review was carried out of patients receiving rituximab for AAV at a London tertiary referral centre over a ten year period with assessment of responsiveness and clinical outcomes.

**Method**

A retrospective review of the notes of 110 AAV patients who received a total of 153 courses of rituximab between December 2004 and January 2013 was carried out. The demography and characteristics of all AAV patients, including those with ENT manifestations was assessed alongside their severity of disease activity. Evaluations were then made of the responses of all patients to treatment and comparisons made.

**Results**

55% of all the AAV patients had ENT features. This was the second most commonly affected system after the kidneys (61%). Nasal features accounted for 80% of all AAV patients with ENT activity.

Within six months of starting Rituximab, 76% of those with ENT features had complete remission of their ENT disease activity, whilst 85% of patients with non-ENT involvement had complete remission.

**Conclusion**

ENT manifestations in AAV are common, with the nose being the most common site. Patients with ENT involvement responded to rituximab, although with a lower response rate than non-ENT involvement. This study highlights the potential role of ENT disease in predicting the severity and treatment responsiveness of systemic AAV disease.

**SINONASAL NEOPLASMS: A CASE SERIES FROM A DISTRICT GENERAL HOSPITAL AND REVIEW OF LITERATURE**

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**Aims**

To review our experience of the management of benign and malignant sinonasal neoplasms, and compare this to what is described in the literature.

**Method**

A retrospective case series of all patients who presented to our unit with sinonasal neoplasms between 2005 and 2015 was carried out. Data collected included patient demographics, site of lesion, histology, local management and recurrence. Following this a review of literature was carried out.

**Results**

One hundred and twenty two sinonasal neoplasms were identified. Male to female ratio was 1:1.67. The mean age at presentation was 37.5 years (range: 10 to 97 years). From the benign lesions, the most common diagnoses were inverted papilloma (17.2%, n=21) and squamous papilloma (15.6%, n=19). Malignant neoplasms were found in 25% (n=31) of cases, which included squamous cell carcinoma (n=12), adenocarcinoma (n=7) and malignant melanoma (n=5). Lymphoma and chondrosarcoma were additional rare diagnosis.

From the inverted papilloma cases, 4 were removed by wide excision and 17 removed endoscopically. Eight cases recurred (at a mean time of 38.1 months). Two patients with inverted papillomata had signs of dysplasia or oncocytic changes histologically.

**Conclusion**

This review highlights the diversity of sinonasal neoplasms that can present to the District General Hospital. Our data confirms the difficulties associated with treating inverted papilloma, and due to the well documented risk of malignant transformation, a complete resection is crucial. Here we present our own experiences and a review of literature

## THE ROLE OF ENDOSCOPIC ENDONASAL NASOPHARYNGECTOMY IN ADVANCED RECURRENT rT3 AND rT4 NASOPHARYNGEAL CARCINOMA

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### Aims

Background: Endoscopic endonasal nasopharyngectomy (EEN) has become increasingly used for recurrent nasopharyngeal carcinoma (rNPC) due to reduced functional and cosmetic morbidities compared to conventional external approach. Majority of the existing studies on EEN focused on patients with lower recurrent staging of rT1 and rT2.

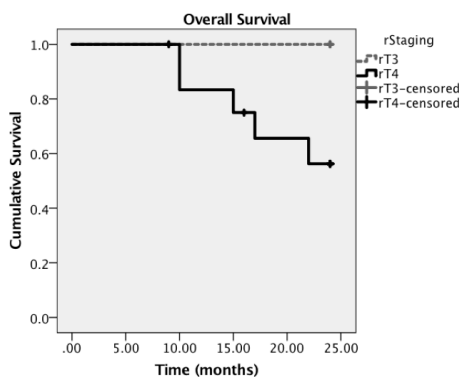
The aims of this study were to report the outcome of EEN performed in patients with advanced (rT3 and rT4) rNPC, and to determine the prognostic factors for patients' survival.

### Method

All patients who underwent EEN for rNPC between January 2003 and December 2015 inclusive were analyzed. All surgeries were performed in University Malaya Medical Centre in Kuala Lumpur and Queen Elizabeth Hospital in Sabah, by a single surgeon. We reported the 2-year overall survival (OS), disease-free survival (DFS) and disease-specific survival (DSS) and any related complications and significant prognostic factors.

### Results

Fifteen patients with recurrent NPC (two rT3 and thirteen rT4 tumours) underwent EEN over the thirteen years period. The mean age was 50.4 years (range 30-65) and the mean follow-up period was 28.7 months (range: 9-81 weeks). The 2-year OS, DFS and DSS were 66.7% (mean: 19.4 months), 40% (mean: 15.7 months) and 73.3% (mean: 20.2 months) respectively. No severe operative complications were encountered. No independent prognostic factors for survival outcome were identified.



### Conclusion

This study demonstrated favourable early results for usage of EEN as a feasible and safe option for treatment of advanced rT3 and rT4 NPCs. However, further long-term follow-up of patients is required.

**CLINICAL RESEARCH OF THE QUALITY OF LIFE IN PATIENTS WITH DISEASES OF OPERATED NOSE**

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**Aims**

A widespread introduction of nasal and sinus surgery is accompanied by a number of patients in whom the operation didn't lead to the eradication of the disease and even significantly worsened their quality of life. Our aim was to evaluate the quality of life in patients with the diseases of operated nose (DON).

**Method**

A total of 76 patients with DON and 87 reference participants were included. Quality of life was measured by the SF-36 short form questionnaire. Statistical processing was performed using IBM SPSS Statistics 22.0.

**Results**

Analysis of the quality of life in patients of the main group revealed that the PF (physical functioning) was 83.56 + 7.7; RP (role limitations due to physical health) 89.37 + 26; BP (bodily pain) 80.1 + 13; GH (general health) 57.93 + 13.1; VT (energy) 70.11 + 10.9; SF (social functioning) 89.08 + 13.6; RE (role limitations due to emotional problems) 91.95 + 23.8; MH (mental health) 74.34 + 12.1 (p < 0.05). In the control group, quality of life indicators were: PF 58,36 + 17,7; RP 42,11 + 39,6; BP 61.55 + 28.2; GH 27,67 + 20,5; VT 38,36 + 20,4; SF 51,55 + 25,6; RE 32,44 + 35,3; MN 45.09 + 21.5 (p < 0.05).

**Conclusion**

The study revealed that problems of nasal breathing, constant feeling of illness, instability to stressful situations forced patients to limit their physical and mental activity, give up sport and communication, thereby leading to depressive states.



## THE CLINICAL OUTCOMES OF USING A NEW CROSS-LINKED HYALURONAN GEL IN ENDOSCOPIC FRONTAL SINUS SURGERY

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### **Aims**

Aim of this study is to evaluate the efficacy of new cross-linked hyaluronan (HA) gel, PureRegen® Gel Sinus on wound healing and synechiae prevention in endoscopic frontal sinus surgery

### **Method**

The study consists of two groups of patients who underwent endoscopic sinus surgery including frontal sinus surgery. In the study group, there were 37 patients and in all these patients PureRegen® Gel Sinus was applied to frontal recess and ostium at the end of the operation. For patients with polyps PureRegen® Gel Sinus was mixed with Triamcinolone Acetonide. In the control group there were 28 patients and no nasal dressing material was applied to frontal recess and ostium at the end of the surgery.

### **Results**

In the postoperative follow-up data epithelization was found to be significantly better in study group in 2<sup>nd</sup> and 4<sup>th</sup> weeks. In postoperative 8<sup>th</sup> weeks, there were no significant difference found between two groups in terms of epithelization, but synechiae formation was found to be significantly low in study group in all 2<sup>nd</sup>, 4<sup>th</sup> and 8<sup>th</sup> weeks evaluations

### **Conclusion**

PureRegen® Gen Sinus promotes reepithelization and wound healing in sinus cavities and reduces the postoperative synechiae formation in frontal recess and ostium after endoscopic sinus surgery

**ODONTOGENIC SINUSITIS: THE EVOLUTION OF DENTAL IMPLANTOLOGY AND ITS ADVERSE SEQUELAE**

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**Aims**

Dental implants are diverse devices, which have many advantages, for the approximate 150,000 UK patients who acquire them each year. Unfortunately, when incorrectly placed, or in certain clinical circumstances, they lead to the development of odontogenic sinusitis. It has been suggested that this diagnosis is under-reported. We aim to present this case series from our tertiary referral Rhinology Department.

**Method**

All data was prospectively collated. Pre-existing radiologic examinations were retrospectively reviewed.

**Results**

Twelve patients were identified with implant-related sinusitis. Dental pathology at presentation, symptoms at presentation, sinus affected, history of previous dental treatment, radiologic investigations and ultimate management are recorded. Endosteal implants, zygomatic craniofacial implants and sinus lift surgery were all implicated as primary aetiologies for sinusitis.

**Conclusion**

Odontogenic sinusitis, secondary to dental implants is an increasingly common presentation. We believe consideration should be given to sinus anatomy and adequate pre-implant imaging completed, prior to implantation. Serious consideration should be given as to whether people with a diagnosis of chronic rhinosinusitis are suitable candidates for dental implant surgery.

## CLINICAL CHARACTERISTICS AND TREATMENT OF OROANTRAL FISTULA

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### Aims

Oroantral fistula is an epithelialized communication between the oral cavity and the maxillary sinus. The aim of this study is to investigate clinical characteristics and treatment of oroantral fistula.

### Method

The patients undergone the treatment of oroantral fistula between 1995 and 2015 were enrolled in this study. Demographic data of patients and characteristics of oroantral fistula were analyzed. The patients with oroantral fistula were initially administered oral antibiotics for 3 weeks. If fistula persists in spite of the medication, surgery (soft tissue flap with or without bone graft) was performed. The surgical results according to the presence of bone graft were compared.

### Results

Twenty-two patients were in accordance with the inclusion criteria. The male to female ratio of the patients was 12/10 and mean age was  $47.9 \pm 13.4$  years. Main complaint of the patients was pus discharge from the fistula. Two patients were successfully treated with antibiotics and 20 patients underwent surgery. Recurrence occurred in the 3 patients treated with soft tissue flap, but no recurrence developed in the patients treated with soft tissue flap and bone graft. Although dehiscence of soft tissue flap occurred in a patient treated with bone graft, it was successfully treated by secondary intention without an additional surgery.

### Conclusion

Bone graft bears negative pressure of the oral cavity and the weight of secretions including blood. In addition, it induces secondary intention for the dehiscence of the flap. Therefore, bone graft seems to contribute to surgical success of oroantral fistula.

**IMPROVEMENTS TO ESS FOR EOSINOPHILIC RHINOSINUSITIS BASED ON POSTOPERATIVE ENDOSCOPIC EVALUATION**

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**Aims**

Eosinophilic rhinosinusitis (ERS) is known as an intractable disease involving eosinophilic nasal polyps. Recurrent polyps frequently occur even if endoscopic endonasal sinus surgery (ESS) is performed. We evaluated our outcomes of ESS for ERS using postoperative endoscopic (E-score) and computed tomography (CT) scoring, and improved our techniques based on these postoperative evaluations. Details of improvements and surgical outcomes are shown in this study.

**Method**

Fifty-seven patients with ERS who underwent ESS within the last 5 years were evaluated using both endoscopic and CT examinations. The patients were followed for 12 months or more after surgery. Endoscopic and CT evaluations were performed at 8-12 months after surgery. Postoperative E-score (0, no obstruction; 1, partial obstruction; 2, total obstruction of the sinus ostium operated on) was assessed and calculated in a similar manner to Lund-Mackay CT scoring. An improved ESS was applied to the most recent 20 of the 57 patients.

**Results**

In the 37 patients who underwent conventional ESS, postoperative E and CT scores were 27.1 and 28.6%, respectively. Frontal and sphenoid sinus ostia showed particularly high E-scores. The 20 patients who underwent improved ESS including Draf type IIa for the frontal sinus and a transseptal sphenoid sinus approach showed significantly better outcomes (E, 12.5; CT, 15.4%) than patients who underwent conventional ESS.

**Conclusion**

Our improvements to ESS for ERS based on postoperative endoscopic evaluation are considered acceptable, although a longer follow-up study is required.

**SOLITARY FIBROUS TUMOR OF THE NASAL CAVITY: A RARE CAUSE OF UNILATERAL NASAL OBSTRUCTION**

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**Aims**

To describe an extremely rare cause for unilateral nasal obstruction, the solitary fibrous tumor (SFT) of the nasal cavity.

SFT is a tumor from mesenchymal origin, affecting primarily organs with mesenchymal origin, although several extrapleural locations have been described in literature; when extrapleural, they behave typically as benign lesions. SFT occurrence in nasal cavity and paranasal sinuses is extremely rare, with about 30 cases described in literature between 1991 and 2013.

**Method**

Case report: An adult male presenting with a rare nasal tumor, a solitary fibrous tumor of the nasal cavity.

**Results**

A 45 years old male with isolated slowly progressive unilateral nasal obstruction caused by a mass in the left nostril. The lesion was surgically resected and histopathological exam revealed a solitary fibrous tumor, with negative specimen margins. Six years later the patient seeks a new ENT appointment complaining of left nasal obstruction presenting with a mass obliterating the left nostril. A second surgical resection was made; histopathologic exam diagnosed a solitary fibrous tumor, once again with negative margins. At three years follow-up patient shows no signs of recurrence of disease.

**Conclusion**

Solitary fibrous tumor of the nasal cavity is a rare tumor, typically benign, presenting with variable symptoms, depending on its volume and location . The treatment of choice is surgery, and like other fibrous tumors of extrapleural origin, recurrence is not expected.

This case reports one of the rare cases of recurrence after surgical removal with specimen negative margins.

**MUCOSAL ROUTE OF IMMUNOTHERAPY WITH TRANSGENIC RICE SEEDS EXPRESSING HYPOALLERGENIC WHOLE T CELL EPITOPES OF Cryj1 AND Cryj2 -INVESTIGATION IN MURINE MODEL OF CEDAR POLLINOSIS-**

***H. Kawauchi<sup>1</sup>, Q. Infei<sup>2</sup>, T. Yamada<sup>2</sup>, N. Aoi<sup>2</sup>, I. Morikura<sup>2</sup>, T. Fuchiwaki<sup>2</sup>***

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**Aims**

For the last decade, we have been investigating the therapeutic effect of mucosal route of administration of transgenic rice (Tg-rice) seeds, which contain T-cell epitopes of Cryj1 and Cryj2, on murine allergic rhinitis models and reported its clinical efficacy to actually attenuate nasal symptoms. However, its mechanism remains to be further investigated and adverse events of this therapeutic approach should be very least with more sophisticated manners.

**Method**

Therefore, we have examined the effect of natural feeding with protein bodies (PB) of Tg-rice seeds expressing hypoallergenic whole T cell epitopes of Cryj1 and Cryj2, in comparison with whole Tg-rice, in a murine model of cedar pollinosis.

**Results**

The numbers of sneezing after final intranasal challenge in mice naturally fed with PB Tg-rice powder were significantly decreased in a dose dependent manner, with less doses, in comparison with those of whole Tg-rice powder. Histopathological findings correspondingly demonstrated that the number of eosinophils infiltrating into the nasal mucosa decreased and the damage of epithelial cells was less found in each group of mice. Sublingual route of administration is also effective to attenuate nasal symptoms.

**Conclusion**

Protein body fraction of Tg-rice more efficiently downregulated nasal symptom in murine models of cedar pollinosis with natural feeding or sublingual administration. These results indicate that intake of protein body form of Tg-rice can be more promising strategy and material to be utilized for mucosal route of immunotherapy to attenuate nasal symptoms of patients with Japanese cedar pollinosis.

**ENDOSCOPIC ENDONASAL APPROACH TO THE PTERYGOPALATINE FOSSA, INFRATEMPORAL FOSSA AND PARAPHARYNGEAL SPACE: ANATOMY AND CLINICAL APPLICATIONS**

**L.Y.D. Lee**<sup>1</sup>

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**Aims**

Pterygopalatine fossa, infratemporal fossa and parapharyngeal space are characterized by their complex 3-D anatomy. Standard textbooks usually explain the anatomy with external view pictures. And traditional surgery on these areas are performed by lateral skull base approaches. This project is to examine the endoscopic anatomy of these areas on cadaver dissection and apply the anatomy on endoscopic skull base surgery.

**Method**

We dissected on two latex injected heads. Endoscopic medial maxillectomy was performed and posterior wall of maxilla was removed to expose the pterygopalatine fossa and infratemporal fossa. Important contents were identified. Then, we entered parapharyngeal space and the great vessels were identified. We applied these anatomies on different surgical cases.

**Results**

in cadaver dissection, we could identify the internal maxillary artery and its branches, pterygopalatine ganglion, vidian nerve, infraorbital nerve and greater palatine nerve in the pterygopalatine fossa. We could appreciate the temporal muscles, two heads of lateral pterygoid muscles, buccal nerve and even the mandibular nerve (V<sub>3</sub>) and the middle meningeal artery in the infratemporal fossa. Further backwards, we found the pre-styloid parapharyngeal space contents as fat, tensa veli palatine muscle, levator veli palatine muscle and the Eustachian tube. Once the stylopharyngeal fascia was opened, internal carotid artery and the internal jugular vein were found. We applied these anatomies on different surgical cases including angiofibroma, infratemporal fossa neurofibroma and transpterygoid approach in endoscopic nasopharyngectomy.

**Conclusion**

Endoscopic approach to pterygopalatine fossa, infratemporal fossa and parapharyngeal space is possible in well selected cases and the anatomical views are different from external approaches.

**INVERTED PAPILLOMA-20 YEARS EXPERIENCE IN TREATMENT**

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<sup>1</sup>University Hospital Center Osijek, ENT, Osijek, Croatia

**Aims**

To show that the modern technique of endoscopic sinus surgery and early detection become questionable characteristics of inverted papilloma

**Method**

The article includes cases of inverted papilloma treated from 1996 to 2016 year, with the technique of endoscopic sinus surgery at the ENT department of the University Hospital of Osijek, Croatia.

**Results**

We get quite a different result compared to the references, particularly in terms of malignancy and

**Conclusion**

According to our results questionable is: significant aggressiveness, propensity to recur and malignant transformation. The outcome interprets: better prevention, timely surgical treatment and above all endoscopic sinus surgery that allows the removal of the tumor, usually in its entirety.



**POSTOPERATIVE CARE IN SEPTOPLASTY: OVERNIGHT OR DAY-CASE SURGERY- THAT IS THE QUESTION?**

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<sup>2</sup>Hospital de Braga, Otolaryngology, Braga, Portugal

**Aims**

The performance of elective septoplasty in outpatient setting is an increasingly established practice and has proven to be cost-effective. Recent literature has shown suitability and safety of day-case septoplasty. The aim of this study was to identify risk factors associated with complications after septoplasty and to evaluate its safety in an outpatient basis.

**Method**

Retrospective analysis of 203 patients who underwent septoplasty with or without inferior turbinectomy, between January and December 2015. Demographic, clinical, surgical, and anesthetic data, as well as perioperative complications were collected and statistical analysis was performed.

**Results**

Approximately 17.7% of patients were admitted as inpatient and 82.3% as outpatient with overnight admission. In total, unexpected admissions (UA) to the emergency room occurred in 16 patients (7.9%) in the first 28 postoperative days, of these 11 (5.4%) occurred in the first 48h. The main reasons were nasal obstruction (n=5), self-limited epistaxis (n=4) and gastrointestinal intolerance to the prescribed antibiotic (n=3). Four patients required prolongation of hospital stay due to nausea or vomiting (n=3) and asthenia (n=1). There were no intraoperative complications nor was there the need for readmission in the operating room. There was no association of the occurrence of complications with the duration of surgery and anesthesia, surgeon experience, nasal packing, ASA, revision surgery or presence of comorbidities.

**Conclusion**

The overall UA rate of septoplasty performed at our unit is above that recommended for ambulatory procedures, but is within the range previously published and no major complications were seen. Septoplasty has a great potential to be undertaken as a day-case procedure being patient selection the cornerstone of safe and efficient perioperative care.

**PROPOSAL FOR AN UPDATED INTERNATIONAL STANDARD IN RHINOMANOMETRY**

***K. Peksis<sup>1</sup>, K.D. Wernecke<sup>2</sup>, H. Behrbohm<sup>3</sup>, O. Kaschke<sup>4</sup>, R. Enache<sup>5</sup>, C. Sarafoleanu<sup>6</sup>, A. Krzeski<sup>7</sup>, K. Vogt<sup>8</sup>, M. Argale<sup>8</sup>***

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<sup>7</sup>University Hospital Warszawa, ENT-Department, Warszawa, Poland

<sup>8</sup>University of Latvia, Center of Experimental Medicine, Riga, Latvia

**Aims**

The present standard of rhinomanometry was created by the “ISOANA” in 1984. The “consensus report” of 2005 was not giving new recommendations. This standard is based on the sensor technique and data processing of the 80ths and is simply a transfer of graphical methods. The superannuated recommendations cannot be accepted anymore due to severe failures. Rhinomanometry as a measurement method is being replaced in the practical diagnostic by estimations, which is not acceptable for the evaluation of drugs, surgical procedures or in sleep medicine. Recent publications (2015) about 36,500 unilateral and 10,300 measurements of total resistance by 4-phase rhinomanometry deliver clinical material for a renewed standard in agreement with the European Directive of Medical Devices. Contradictory publications including an EPOS paper have to be discussed.

**Method**

Recommendations:

1. To re-define the precision of rhinomanometric measurements by replacing all one-point measurements by the evaluation of the complete nasal breath with a resolution given by the properties of contemporary flow and pressure transducers and following computing.
2. To use the Effective Resistance and Vertex Resistance as basic parameters instead of resistances erroneously calculated at 150 Pa
3. To use in the clinical practice the logarithmic transformation of these values including the clinical classification for Caucasian noses as above because of their correlation to the sensing of obstruction.

Practical recommendations have to be renewed.

Normal o false false EN-US X-NONE X-NONE

**Results**

A proposal of the ERS and IRS should be reviewed by experts and presented to the European authorities.

**Conclusion**

These proposals have been discussed with numerous experts and clinicians world-wide.

**DISRUPTION OF THE TRANSCRIPTION FACTOR NRF2 ENHANCES SUSCEPTIBILITY TO SEVERE ALLERGIC EOSINOPHILIC SINONASAL INFLAMMATION IN MICE**

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<sup>2</sup>Johns Hopkins Bloomberg School of Public Health, Environmental Health Sciences, Baltimore, USA

**Aims**

Oxidative stress has been postulated to play an important role in allergic rhinitis. Although a defect in antioxidant responses has been speculated to exacerbate allergic rhinitis, this has not been previously demonstrated. Nrf2 is a transcription factor that is involved in the regulation of multiple antioxidant genes. The primary aim of this study is to understand the antioxidant role of Nrf2 in a mouse model of ovalbumin (OVA) induced allergic rhinitis.

**Method**

Both wild type and Nrf2 deficient mice were injected intraperitoneally with OVA plus alum and challenged daily with intranasal OVA. Cell counts were determined from nasal lavage fluid. Mouse heads were sectioned to perform immunohistochemistry and confocal microscopy for eosinophilic major basic protein and sinonasal epithelial barrier tight junction proteins. Lastly, IL25, IL33, and TSLP were quantified by ELISA from nasal lavage fluid.

**Results**

OVA sensitized mice lacking Nrf2 demonstrate significant tissue and nasal lavage eosinophilia and statistically significant increase in IL25, IL33, and TSLP when compared to wild type mice. In addition Ova sensitized Nrf2 deficient mice demonstrate increased sinonasal epithelial barrier defects compared to wild type.

**Conclusion**

We demonstrate for the first time that the enhanced severity of eosinophilic sinonasal inflammation from disruption of the Nrf2 pathway is a result of a lowered antioxidant status of the nose caused by lower basal expression and attenuation of multiple antioxidant genes. The responsiveness of Nrf2-directed antioxidant pathways may act as a major determinant of susceptibility to allergen-mediated eosinophilic sinonasal inflammation and may have potential as a therapeutic target for allergic rhinitis.

**Z-PLASTY FOR INTERNAL NASAL VALVE COLLAPSE: AN EVALUATION USING THE NOSE SCALE**

***S. Toma<sup>1</sup>, I. Beegun<sup>1</sup>, H. Saleh<sup>1</sup>***

<sup>1</sup>IMPERIAL COLLEGE NHS TRUST, ENT, LONDON, United Kingdom

**Aims**

To determine the efficacy of Z-plasty for nasal obstruction due to internal nasal valve collapse in a large case series.

**Method**

51 patients attending a tertiary rhinology clinic with symptoms of nasal obstruction undergoing intranasal Z-plasty for nasal valve collapse. Nasal obstruction pre and post operatively was measured using the validated Nasal Obstruction Symptom Evaluation (NOSE) scale score.

**Results**

All patients reported an improvement in nasal obstruction symptoms. There was a statistically significant correlation between preoperative NOSE scale scores and patient reported improvement ( $p < 0.1$ ).

**Conclusion**

Z-plasty is a highly effective surgical technique to repair internal nasal valve collapse. Patients with severe nasal obstruction symptoms receive the most benefit.

ERS16-0783

**FREE PAPER SESSION 46: RHINOLOGY MISCELLANEOUS**

**GRAFTS IN ENDONASAL RHINOPLASTY: WHEN AND HOW**

**S. Toma<sup>1</sup>, H. Saleh<sup>1</sup>**

<sup>1</sup>IMPERIAL COLLEGE NHS TRUST, ENT, LONDON, *United Kingdom*

**Aims**

The aim of this paper is to discuss the use of grafts in endonasal rhinoplasty derived our experience.

**Method**

We will describe the main principles of grafts use in endonasal rhinoplasty with particular reference to the analytics and technical considerations. The techniques covered include tongue-in-groove , a columellar strut, or extended columellar strut, spreader grafts, dorsal grafts and alar batten grafts. Illustrative cases are discussed.

**Results**

N/A

**Conclusion**

It is technically possible to use a variety of grafts in endonasal rhinoplasty to achieve good aesthetic and functional results.

**ERS16-0859**

**SYMPOSIUM 49: IRS SESSION: WHAT ABOUT FUNGUS IN THE SINUSES?**

**CHRONIC INVASIVE FUNGAL RHINOSINUSITIS**

**I.R. Herzallah**<sup>1,2</sup>

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<sup>2</sup>King Abdullah Medical City, Rhinology and Endoscopic Skull Base, Makkah, Kingdom of Saudi Arabia

Fungal rhinosinusitis often occurs in a non-invasive form, and less commonly as an invasive one. Invasive fungal rhinosinusitis refers to fungal sinusitis with mucosal infiltration of mycotic organisms, and can be classified into three categories: acute fulminant, chronic, and chronic granulomatous, depending on the disease course and the histological features. Acute fulminant invasive fungal sinusitis usually occurs in immune-compromised hosts, while any individual can suffer the chronic forms of invasive fungal rhinosinusitis. Invasive fungal sinusitis requires surgical intervention plus systemic administration of antifungal agents, although the management approach may vary in different forms.

Our talk will update audience about the disease characteristics of chronic invasive rhinosinusitis in our practice as well as in different reported cases. We will also cover the recent advances in management strategies including the role of surgical intervention and newer antifungal agents such as voriconazole. Backed with the latest evidence, our presentation would guide surgeons to improve the prognosis in chronic invasive fungal rhinosinusitis, including cases with significant intracranial and orbital extensions.

**ACUTE INVASIVE FUNGAL RHINOSINUSITIS**

**R. Vedantam**<sup>1</sup>

<sup>1</sup>Christian Medical College, ENT, Vellore- Tamilnadu, India

Acute invasive fungal sinusitis is a highly aggressive angioinvasive infection, commonly affecting immunocompromised individuals. In India, the high prevalence of diabetes mellitus has led to an increase in invasive fungal sinusitis in uncontrolled diabetics. Prompt diagnosis and therapy is required for a successful outcome. Typically, these patients present with rapidly progressive nasal, sinus, ocular and neurological symptoms and signs. Fungal smear invariably reveals organisms of the Class *Zygomycetes* (*Mucor* or *Rhizopus* species) or *Aspergillus* species. Radiological features include paucity of signs of contrast CT of the paranasal sinuses and brain, presence of cavernous sinus thrombosis and loss of fat plane in the retromaxillary space.

We present a series of patients with this diagnosis treated at our institution, highlighting the role of customized surgery and endoscopic followup in the management of these patients. Uncontrolled diabetes mellitus was the commonest comorbidity. Roughly 1/3 of patients had intracranial involvement. Fungal isolates were recovered in 75% of specimens of which *Rhizopus* species was the most common. Roughly ¼ of patients had mixed fungal sinusitis. Most patients (64%) underwent endoscopic debridement with about 1/3 requiring partial or total maxillectomy. Most patients (75%) received plain amphotericin B. The overall disease specific survival rate in these patients was 59.1%. Acute invasive fungal sinusitis continues to have a high mortality and poor prognosis as the majority of Indian patients present in an advanced stage and the costs of therapy are high.

**DRUG RELATED RHINITIS**

**S. Steinsvaag**<sup>1</sup>

<sup>1</sup>, Norway

**Drug-induced rhinitis.**

Definition: Inflammation of the mucous membrane lining the nose induced by topical or systemic medication.

The phenotypes are:

1. Caused by topical medication:

o Rhinitis medicamentosa

§ Oxymetazoline

§ Xylometazoline

§ Amphetamine

2. Caused by systemic medication:

o Local inflammatory type:

§ Aspirin

§ Non-steroidal anti-inflammatory drugs (NSAIDS)

o Neurogenic type:

§ Sympatolytics

§ Metyldopa

§ ACE-inhibitors

§ Sildenafil

o Idiopathic type:

§ Antihypertensives

§ Oral contraceptives.

Treatment :

1. Avoidance. If impossible:

o Intra nasal steroids

o Intranasal antihistamines

o Short course of systemic steroids



**ERS16-0841**

**SYMPOSIUM 50: ENVIRONMENTAL, HORMONAL AND DRUG RELATED PROBLEMS WITH THE NOSE**

**WOOD WORKERS AND RHINITIS**

*M. Holmstrom*<sup>1</sup>

<sup>1</sup>*Karolinska Institute, Otorhinolaryngology, Stockholm, Sweden*

Wood workers rhinitis

The greatest concern regarding health effects of wood dust used to be naso-ethmoidal cancer. Due to awareness of this correlation and efforts to reduce exposure levels cancer incidence is now lower. On the other hand rhinitis correlated to occupational exposure to wood dust is a health problem. Wood dust exposure is known to cause an inflammatory reaction in the nasal mucosa, decreased mucociliar clearance, impaired nasal breathing as measured with nasal peak flow or increased resistance to breathing with rhinomanometry. Nasal symptoms like obstruction, secretion and impaired sense of smell is more frequent among wood dust exposed compared to controls. To reduce exposure related health effects further steps to lower exposure must be taken by increased ventilation and protection. Nasal irrigation with saline is probably the best action to take when exposure is impossible to prevent. Saline to wood dust exposed workers is shown to improve nasal complaints, muciliar clearance and nasal breathing.

**ERS16-0807**

**SYMPOSIUM 51: BASIC MECHANISMS IN AIRWAY INFLAMMATION**

**REVISITING NEUTROPHIL INFLAMMATION**

**L.O. Cardell<sup>1</sup>**

<sup>1</sup>, Sweden

For many years, eosinophils were considered the main players in the allergic airway response. We introduce here, a new concept regarding the role of neutrophils in acute airway allergy. This talk aims to establish the neutrophil as a significant contributor to the development of allergic rhinitis as well as in asthmatic airway hyper-reactivity.

**SIXTH NERVE PALSY AND ISOLATED SPHENOID SINUSITIS: A CASE REPORT WITH SURGICAL TREATMENT**

***M. Donato<sup>1</sup>, J. Pimentel<sup>1</sup>, A.R. Lameiras<sup>1</sup>, P. Vale Fernandes<sup>1</sup>, P. Henriques<sup>1</sup>, F. Cruz<sup>1</sup>, P. Escada<sup>1</sup>***

<sup>1</sup>*Centro Hospitalar de Lisboa Ocidental, ENT department, LISBOA, Portugal*

**Aims**

Isolated sphenoid sinusitis is an uncommon entity that can present as cranial nerve deficits. The lack of ENT symptoms makes it important to have high index of suspicion for diagnosis. The aim of this paper is to report a case of a patient with sphenoid sinusitis and VI nerve palsy which was successfully treated with surgery.

**Method**

An 89-year-old male admitted to our emergency department with 7 days' history of frontal headache and new onset of horizontal diplopia for 24 hours.

**Results**

Neurological examination showed right VI nerve palsy. ENT evaluation was unremarkable. Investigation with head CT scan showed complete filling of sphenoid sinus with erosions of the right posterolateral sinus wall and of the right petrous apex. Further investigation with MRI revealed T1 iso-hyperintense and T2 hypointense mass, suggestive of fungal sphenoid sinusitis. We assumed the sphenoid sinusitis as the cause for the right VI nerve palsy and after informed consent, the patient was taken to surgery. An endonasal endoscopic wide sphenoidotomy (complete removal of the anterior sphenoid wall and posterior septectomy) was performed. The mass was compatible with a fungus ball which was completely removed and the fungal etiology confirmed by histological and microbiological exam. The symptoms were completely resolved within 24 hours after surgery and the patient was discharged after 7 days.

**Conclusion**

This case highlights the diagnostic challenge of an unusual course for sphenoid sinusitis, stresses this disease as a possible cause for unilateral abducens nerve palsy and the need for early and aggressive surgical treatment for complete recovery.

**ERS16-0154**  
**ACUTE RHINOSINUSITIS**

**ABUSE OF DIAGNOSTIC TOOLS AND THERAPEUTIC MEDICATIONS IN MILD AND MODERATE ACUTE RHINOSINUSITIS IN SPAIN (THE PROSINUS STUDY) \***

***F. Jaume Monroig<sup>1</sup>, L. Quintó<sup>2</sup>, C. Langdon<sup>1</sup>, M. López-Chacón<sup>1</sup>, I. Alobid<sup>1</sup>, J. Mollo<sup>1</sup>***

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**Aims**

Mild (common cold) and moderate acute rhinosinusitis (ARS) have a high incidence. Although the diagnosis is clinical and evolution is mostly self-limited, physicians seem to use excessive diagnostic tools and medications for their management. The aim of the PROSINUS study was to describe the socio-demographic characteristics, use of diagnostic tools, and prescribed medications in ARS patients.

**Method**

This prospective observational study included 1,362 patients with ARS from ENT clinics in Spain. According the duration of symptoms (EPOS criteria) patients were classified as having viral (<10days) or postviral (> 10days, ≤12weeks) ARS, or chronic disease (>12weeks). Socio-demographic characteristics, symptoms, severity, quality of life (SNOT-16), diagnostic tools, and medications were assessed.

**Results**

Among ARS patients, 36% had viral, 63% postviral, and 1% chronic disease. Higher diagnostic tools were done in postviral than in viral ARS (rhinoscopy/nasal endoscopy 80%vs70%, plain X-ray 70%vs55%, CT scan 22%vs12%, microbiology 9%vs3%; p<0.005 for all). Medications were prescribed in more patients with postviral than viral ARS (oral antibiotics 76%vs62%; intranasal corticosteroids 54%vs38%; antihistamines 46%vs31%; nasal decongestants 48%vs38%; nasal saline 54%vs40%; p<0,05 for all except *Cyclamen europaeum* 46%vs41%, p=0,14). Independently of prescribed medication, QoL at visit 1 was more affected in postviral than viral ARS (38.7±14.2vs36.0±15.3, p=0.0031), while more postviral than viral ARS patients reported symptoms of potential complications (0.4% vs 1.5%; p=0.06).

**Conclusion**

This study demonstrates, independently of disease severity, a significant abuse of therapeutic tools and prescribed medications in managing ARS.

(\* ) The PROSINUS study was sponsored by an unrestricted research grant from Hartington Pharmaceuticals.

**ASSOCIATION OF DIFFERENT MEDICATIONS USED IN REAL-LIFE CLINICAL PRACTICE WITH DURATION, QUALITY OF LIFE, AND COMPLICATIONS OF ACUTE RHINOSINUSITIS (THE PROSINUS STUDY)\***

***F. Jaume Monroig<sup>1</sup>, L. Quintó<sup>2</sup>, C. Langdon<sup>1</sup>, M. López-Chacón<sup>1</sup>, J. Mulloí<sup>1</sup>***

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**Aims**

Acute rhinosinusitis (ARS) has a high incidence in the general population and a significant impact on patient's quality of life (QoL). Although self-limited in most patients, physicians prescribe more medications than needed. The study aim was to describe the association of different treatments with ARS evolution

**Method**

This prospective observational study included 1,362 patients with ARS from ENT clinics in Spain. According to episode duration (EPOS criteria), ARS patients were classified in viral (<10days) or postviral (>10days, ≤12weeks). Logistic regression models were estimated to assess the relationship between different medications and disease duration, QoL (SNOT-16), and risk of complications.

**Results**

Overall, more patients with postviral than viral ARS received medications, including politherapy. No matter the used medication, symptoms and QoL improved at visit 2, while disease duration was 16.6±9.3 days and 6.0±1.9 days in viral and postviral patients, respectively, only 1% becoming chronic. Whatever type of ARS and its severity at first visit, the only two treatments showing an independent association with disease duration were phytotherapy (*Cyclamen europaeum*), with shorter episodes [relative difference 0.95, 95%CI:(0.91, 1.00), p<0.05], and intranasal steroids, with longer episodes [relative difference 1.07, 95%CI:(1.02, 1.12), p<0.01]. No evidence was found for a significant association between used medication and SNOT-16 or the risk of complications.

**Conclusion**

Although viral and postviral ARS were self-limited no matter of the used medication, the use of *Cyclamen europaeum* and intranasal steroids were associated with shorter and longer disease duration, respectively.

(\* ) The PROSINUS study was sponsored by an unrestricted research grant from Hartington Pharmaceuticals.

**EMPLOYMENT OF HYDRODEBRIDER IN TREATMENT OF CHRONIC RHINOSINUSITIS AND BACTERIAL COLONISATION IN NOSE**

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*<sup>1</sup>Institute of Physiology and Pathology of Hearing, World Hearing Center, Warsaw, Poland*

**Aims**

Majority of patients treated in Rhinology Clinic have chronic rhinosinusitis. According to epidemiological data this problem affects 15% of Polish population. Our aim was to identify bacterial cultures and antibiotic resistance among patients with CRS and estimate of efficiency Hydrodebrider in surgical treatment of patients of the World Hearing Center, Poland.

**Method**

Prospective study includes 90 patients with CRS and bacterial colonization in the nose. All patients have stayed with procedure full consistent treatment conservative 2007 EPOS. Nasal swabs were taken between January 2013 and June 2014. Demographic and clinical information was gathered from patients medical history. Microbiological results of nasal swabs, including bacterial and fungal culture were analyzed. Hydrodebrider was used during the surgery. In follow up each patient had complete clinical examination and endoscopic cleaning of surgery site every 2 weeks. After 6 weeks nasal swabs were removed.

**Results**

Colonisation was found in all nasal swabs. 45 patients had Methicillin-Sensitive Staphylococcus Aureus, 12 had Haemophilus Influenzae and 9 other had Streptococcus Pneumoniae. In remaining 19 nasal swabs: Proteus Mirabilis, Staphylococcus Aureus MSSA macrolides-lincosamidesstreptogramins B resistant (MLSB), Enterococcus Cloace, Pseudomonas Aeruginosa and Staphylococcus Epidermidis Methicillin-Susceptible Coagu lase-Negative (MSCNS) were detected separately. Five patients had a Methicillin-Resistant Staphylococcus Aureus (MRSA). Patients underwent operations; opening of maxillary sinus, with/or ethmoidectomy, frontoethmoidectomy, sphenectomy, frontosphenoidectomy, modificate Lothrop operations. After 12 weeks control nasal swabs had been taken. They were negative in 94% patients. Non satisfactory results were observed in patients with MRSA colonisation.

**Conclusion**

Hydrodebrider is helpful in treatment of patients with CRS and nasal bacterial colonisation.

**ERS16-0761**  
**ACUTE RHINOSINUSITIS**

**PHYTOTHERAPY IN TREATMENT OF POST-VIRAL RHINOSINUSITIS IN CHILDREN**  
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*<sup>1</sup>Ivano-Frankivsk national medical university, Otorhinolaryngology Department with surgery of head and neck, Ivano-Frankivsk, Ukraine*

**Aims**

To study the rate of regression of symptoms, dynamics of improvement of quality's life and frequency of transformation of post-virus into bacterial rhinosinusitis at Sinupret's application.

**Method**

120 children of 6-11 years of age diagnosed with acute post-viral rhinosinusitis

**Control group** (N=55): irrigation therapy + pharmacotherapy according to the national guidelines

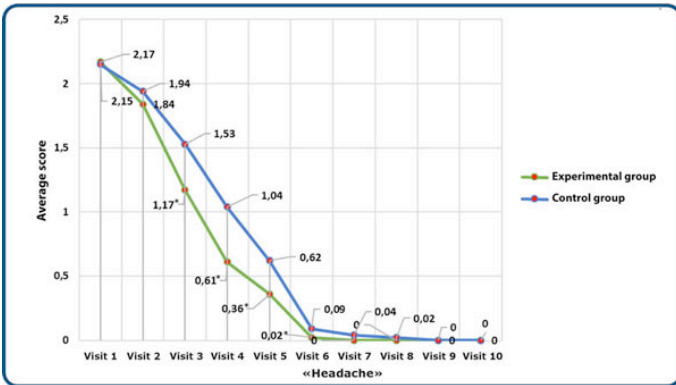
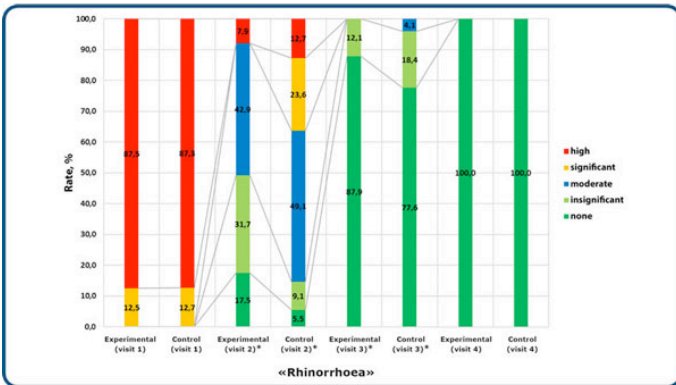
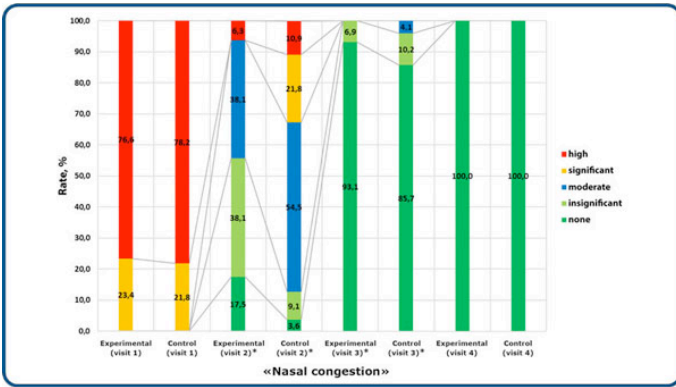
**Experimental group** (N=65): irrigation therapy + Sinupret® syrup

**Severity assessment:**

- Nasal congestion, rhinorrhoea – by physician according to the MSS scale after visit 1 (day 0), visit 2 (day 5), visit 3 (day 10), visit 4 (day 14)
- Headache – on a daily basis with self-assessment according to the VAS

**Results**

\* statistically significant ( $p < 0,05$ )



## Conclusion

The usage of Sinupret® for the treatment of acute post-viral rhinosinusitis ensures a clinical cure after 10 days and significantly faster dynamics as compared to the control group:

- regression of the main clinical manifestations
- improving the quality of life for patients
- reduction in the frequency of post-virus transformation into bacterial rhinosinusitis and the need for the antibiotics prescriptions by 28.5%



**ERS16-0484**  
**ACUTE RHINOSINUSITIS**

**ORBITAL COMPLICATIONS OF ACUTE RHINOSINUSITIS: REVISED CLASSIFICATION ON AN ANATOMICAL BASIS**

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**Aims**

The Chandler's classification is most commonly used for delineating orbital complications of acute rhinosinusitis. Dating from the pre-CT era this classification lacks specificity in describing the anatomical localisation.

**Method**

We suggest a new classification for orbital complications of acute rhinosinusitis, based on radiological anatomy and illustrate this with a case series.

**Results**

Eye lid infections (pre-septal inflammation) and intracranial complications, both included in the original Chandler's classification, are excluded. Orbital abscesses are subdivided into 'extraconal' abscesses, located exteriorly to the muscle cone formed by the ocular muscles and 'intraconal' abscesses, located interiorly to this muscle cone. Extraconal abscesses are further subdivided into subperiosteal abscesses and not-subperiosteal abscesses.

**Conclusion**

We propose a new classification for orbital complications of acute rhinosinusitis based on anatomy. It helps physicians in determining the probable etiology and determines the preferred treatment strategy.

**INFLAMMATORY POLYP MIMICKING AN INVERTED PAPILLOMA ON CT AND MRI: CASE REPORT**

**G. Almeida<sup>1,2</sup>, P. Vale<sup>1,2</sup>, V. Oliveira<sup>1,2</sup>, J. Pimentel<sup>1,2</sup>, P. Escada<sup>1,2</sup>**

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**Aims**

The investigation of sinonasal tumors usually requires computed tomography (CT) and magnetic resonance imaging (MRI). Some imaging findings may suggest specific diagnosis. Particularly in the case of inverted papilloma (IP) which can present with a focal hyperostosis at the site of tumor origin on CT and a lobulated soft tissue mass with a “cerebriform” appearance on MRI. The authors present a case of a maxillary sinus lesion with imaging investigation compatible with IP but definitive histopathological diagnosis of inflammatory polyp.

**Method**

A 22-year-old male was referred to our ENT department for investigation and treatment of a left maxillary sinus lesion on CT scan. The lesion was further investigated with MRI. Both studies were very suggestive of IP. It was decided to approach the lesion through endonasal endoscopic surgery. The intraoperative endoscopic view, complemented with narrow band imaging, was more compatible with a polyp. The lesion was fully removed along with the hyperostosis at its implantation through a wide maxilar sinusotomy and sent to histopathology analysis.

**Results**

There were no complications in the perioperative period and the patient was discharged the day after surgery. The histopathology result revealed a polypoid mass with 2,5x1x0,3 cm with a bone component of 0,6 cm of size compatible with an allergic inflammatory polyp.

**Conclusion**

Differentiating sinonasal lesions can be difficult and imaging can often help differentiate them. However most sinonasal tumors do not have a pathognomonic imaging feature requiring a histopathology diagnosis.

**ERS16-0417**  
**DIAGNOSIS OF CHRONIC RHINOSINUSITIS**

**ASPIRIN EXACERBATED RESPIRATORY DISEASE AND CHRONIC RHINOSINUSITIS WITH NASAL POLYPS**

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**Aims**

To determine the prevalence of patients with AERD, and examine whether there is a statistically significant difference between patients with AERD and patients with CRSwNP.

**Method**

From protocol rhinological-allergy treatment of the patient, the following data were analyzed:

**Results**

In the 150 patient with a history of CRSwNP we found 25.3% with AERD, bronchial asthma in 39.33% patient and bronchial hyperreactivity in 57.3%. The average age of the all patients was  $52,83 \pm 12,28$ , while of patient with AERD was  $47,24 \pm 13,35$ . In the AERD female gender was more present for 1.7:1. In AERD patient 47.37% had allergy to inhaled allergens, 73.68% patient have eosinophils in nasal secretions and 63.16% patient have positiv *Stapylococcus aureus* in nasal swab. At the first endoscopic examination of AERD patient, we diagnosed second degree of nasal polyps at 63.16%, and third degree of nasal polyps in 36.84% of the patients. After a year of therapy in 2.63% of patients we diagnosed first degree of nasal polyps, in 60.53% patient second degree of nasal polyps and third degree in 36.84%. During the follow-up year, 26.32% of patients require two tours systemic corticosteroid therapy, while 73.68% of the patients received three tours. None of the patients remained on a one systemic corticosteroid therapy.

**Conclusion**

Comparing the value of endoscopic findings before the initiation of therapy among patients with AERD and the all patients with nasal polyps, we found statistically significant differences in the presence of I, II and III degree of polyposis, for  $p=0,0217$  tj.  $p<0,0$

ERS16-0188

## DIAGNOSIS OF CHRONIC RHINOSINUSITIS

### CHARACTERISTIC OF GERIATRIC ALLERGIC RHINITIS; RELATIONSHIP BETWEEN COGNITIVE DYSFUNCTION AND OLFACTORY PROBLEM

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#### Aims

We figured out of the association of the clinical characteristics and senile dementia through the past medical history, medications, allergies or not, sense of smell, nasal changes and various surveys.

#### Method

Conducted a retrospective study to address rhinitis symptoms presented by the patient over the age of 65, or other symptoms for people who complain of rhinitis in patients 65 years of age or older who visited the address in Kyung Hee Medical Center was a patient, such as history was a paperweight.

#### Results

Out of 50 patients, AR group is 15 people, none AR patients were identified as 35 people, respectively, past medical History 10 people, 7 people, TNSS score 6.24, 5.51, RQLQ score 57.81, 54.34, mild cognitive impairment were 73%, 51%. Geriatric rhinitis patients shows a high incidence of anosmia and hyposmia and was investigated 73% mild cognitive impairment in allergic rhinitis patients compared with 51% in none allergic rhinitis patients, which was confirmed statistically significant value. ( $P < 0.05$ ).

#### Conclusion

This important figure shows the high risk of dementia compared with normal elderly in geriatric rhinitis patients and it means that aggressive treatment is needed to and it will improve the quality and lower the probability of life of elderly patients with cognitive impairment.

**SIMULATION AND VALIDATION OF NASAL AND PARANASAL SINUSES AIRFLOW AND VOLYMETRY WITH 3-D NASAL PRINTS IN NASAL BREATHING DIFFICULTIES**

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**Aims**

The aim of the study is to assess the nasal airflow in a 3-D nasal model printed by the commercial 3-D printer and to evaluate the accuracy of 3-D printed plastic models.

**Method**

Six patients with nasal breathing problems were included to the study. Both acoustic rhinometry and rhinomanometry measurements were performed and paranasal sinuses and nasal volumes were assessed with the cone beam computed tomography (CBCT). 3-D models were printed from patients' CBCT images with a commercial 3-D printer. Acoustic rhinometry and rhinomanometry measurements were repeated with 3-D models. All 3-D models were imaged with CBCT and paranasal sinuses and nasal volumes of 3-D models were evaluated. The volumes of paranasal sinuses were measured by using volumetric software (OnDemand3D™).

**Results**

The correlations of *in vivo* (patient) and *in vitro* (3-D model) rhinomanometry results were good, as well as correlations of *in vivo* and *in vitro* paranasal and nasal volumes from CBCT images. The correlations of *in vivo* and *in vitro* acoustic rhinometry results were moderate.

**Conclusion**

3-D printed models can be used as a novel research tool for nasal breathing difficulties. The accuracy of 3-D models were high and 3-D models may be used also as a model to predict surgical outcome.

**IS OUTPATIENT AMBULATORY BIOPSY OF UNILATERAL NASAL MASSES A FEASIBLE DIAGNOSTIC TOOL? A YEAR IN REVIEW**

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**Aims**

Pathological findings in the nasal cavity vary greatly, from benign or malignant tumors to chronic rhinitis or rhino-sinusitis (CRS). In this paper we try to evaluate whether biopsies of unilateral nasal masses in outpatient services represent an effective diagnostic tool for distinguishing nasal pathologies needing earlier or more extensive surgical intervention from those which can be primarily managed pharmacologically.

**Method**

Biopsies of unilateral nasal masses, performed from January 1<sup>st</sup> to December 31<sup>st</sup> 2015, in all outpatient services of the Ljubljana Clinical Center, Clinic for otorhinolaryngology and cervicofacial surgery, were included. All biopsies were processed and evaluated by pathologists at University of Ljubljana, Medical faculty, Institute for pathology. Data on patient gender, lesion location (left or right nasal cavity) and histological findings were analyzed.

**Results**

A total of 85 unilateral nasal biopsies were performed in the designated time period; 52 (61.2%) originated from male and 33 (38.8%) from female patients. 41 (48.2%) of them were obtained from the left and 44 (51.8%) from the right nasal cavity. Histologically 55 (64.7%) of pathologies could be primarily managed pharmacologically (CRS). Of the remaining 30 biopsies (35.3%) inverted papilloma was diagnosed in 10 specimens (11.8%), 13 (15.3%) specimens were malignant tumors and 7 of the biopsies (8.2%) arose from benign tumors.

**Conclusion**

Unilateral nasal masses should always raise suspicion over underlying pathologies requiring surgical treatment. Biopsies performed in outpatient services are usually simple enough to perform with nearly no danger for the patient and with high diagnostic yield.

**ISOLATED SPHENOID SINUS FUNGUS BALLS: A RETROSPECTIVE STUDY IN A TERTIARY CARE REFERRAL CENTER IN KOREA.**

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**Aims**

Fungus ball is the most common form of extramural fungal rhinosinusitis. Sphenoid sinus is an uncommon localization of this disease. We present our 20-year experience (1996-2015) of managing isolated sphenoid sinus fungus ball (SSFB).

**Method**

We retrospectively reviewed our series of 47 cases of isolated SSFB seen between 1996 and 2015 with reference to the demography, clinical features, radiologic findings, treatment modalities and outcome.

**Results**

Recently, the number of SSFB patients is rapidly increasing; 2 cases from 1996 to 2000, 4 cases from 2001 to 2005, 14 cases from 2006 to 2010, and 27 cases from 2011 to 2025. The mean age was 63.1 years, ranging from 26 to 84 years and there was a significant female predominance (33:14). The most common symptom was headache (72.3%), which was localized in various regions, followed by postnasal drip (36.2%), rhinorrhea (36.2%) and nasal obstruction (25.5%). The disease was unilateral in 45 patients (25 right; 20 left) and in 2 (4.3%), it was bilateral. On CT scan, 69.6% of affected sphenoid sinuses showed intralesional calcified densities. Bony sclerosis or bony erosion of sinus wall was observed in 69.6% and 34.8% of affected sinuses, respectively. All but one patient underwent transnasal endoscopic sphenoidotomy to remove the FB and facilitate aeration of the sinus. There were no recurrences or any serious complications.

**Conclusion**

Isolated SSFB was extremely rare disease, but is now increasing. Although the clinical presentation is usually vague and unspecific, SSFB should be kept in mind in patients with persistent headache, especially in elderly females.

CLINICAL, IMAGIOLOGICAL AND ETIOLOGICAL SPECTRUM OF SPHENOIDAL SINUSITIS

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**Aims**

Sphenoid sinus opacifications may have different etiologies, clinical signs and symptoms, and due to its close relation to vital anatomic structures it is considered a clinically relevant pathology. We aim to identify the most common etiologies of opacification of the sphenoid sinus and highlight the most relevant aspects of the differential diagnosis, both from a clinical and imagiological point of view.

**Method**

Review of the literature and illustration of different etiologies through practical clinical cases occurred in our ENT Department.

**Results**

Opacification of the sphenoid sinus can be the result of multiple etiologies, including infectious, inflammatory, congenital, neurological, vascular or neoplastic disease. Headache is the most frequent symptom but nasal obstruction and eye symptoms are also very frequent. The involvement of adjacent structures can occur causing involvement of the cavernous sinus, associated cranial nerves (III, IV, V, VI), and the optic nerve with the onset of diplopia, ptosis, decreased visual acuity and photo motor reflexes. CT Scan allows, in most situations, for a fast and correct diagnosis but RMI can also have an important role.

**Conclusion**

The pathology of the sphenoid sinus is diverse and there are no pathognomonic signs or symptoms. The presenting symptoms are usually the result of the extension into adjacent structures, including vascular and nerve structures. CT is the preferred method to achieve differential diagnosis. Sometimes the final diagnosis can only be obtained intraoperatively or after biopsies results. FESS approach allows satisfactory results in controlling most cases associated with low morbidity.



**CHRONIC RHINOSINUSITIS WITH NASAL POLYPS (CRSWNP): MYCOPHENOLATE MOFETIL (MMF) IS AN EFFECTIVE STEROID SPARING TREATMENT STRATEGY**

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**Aims**

**Background:** CRSwNP is mostly an eosinophil dominant disease. Th2 and B cell inflammatory pathways drive the disease. MMF is a potent immunosuppressant. Its principal mechanism of action is inhibition of inosine monophosphate dehydrogenase (IMPDH), the key rate limiting enzyme in the *de-novo* synthesis of guanosine nucleotides. Activated T and B lymphocytes are particularly dependent on this IMPDH pathway than any other cell types. Thus MMF should attenuate inflammation in CRSwNP.

**Objectives:** we report our experience of two severe cases of high eosinophil driven steroid dependent CRSwNP treated with MMF.

**Method**

Patient A and B with severe CRSwNP could only be controlled with high dose long term prednisolone (up to 30mg daily) and thus MMF was introduced as a steroid sparing agent. Eosinophilic granulomatous polyangiitis (Churg-Strauss) was excluded in both patients.

**Results**

SNOT-22 score pre and post MMF was 71\* vs 52 for Patient A whilst Patient B was 82\* and 53 respectively. In addition, associated asthma in both patients improved significantly. The median eosinophil count pre vs post MMF was 0.47 and 0.28 (p=0.026 unpaired t-test) (range 0.13 -1.46) and 0.49 vs 0.26 (p=0.25) (range 0.32-2.92). The mean prednisolone dose before MMF introduction was 18.75mg and post 9.1mg (p=0.0052 unpaired t-test) Patient A and 18.13mg vs 7.2mg (p=0.0132) Patient B. The target MMF dose was 2g daily. There were no adverse events and MMF was tolerated.

\*on prednisolone

**Conclusion**

MMF is a potential steroid sparing agent in severe CRSwNP. A powered double blind placebo controlled study is warranted.

**A PROSPECTIVE, RANDOMIZED CLINICAL STUDY COMPARING DRUG ELUTING STENT THERAPY AND INTRANASAL CORTICOID STEROID THERAPY IN THE TREATMENT OF PATIENTS WITH CHRONIC RHINOSINUSITIS**

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**Aims**

To conduct the first prospective, randomized controlled clinical trial comparing the efficacy of a drug-eluting stent (the Relieva Stratus™ MicroFlow Spacer) and topical intranasal corticosteroid therapy in patients with chronic rhinosinusitis.

**Method**

Sixty-three adult patients with CRS with ethmoid disease were randomized into either the DES group (n=34) or nasal spray group (n=29). The main outcome variable was the Sinonasal Outcome Test-22 (SNOT22). Visual Analogue Scale (VAS) grading, direct nasal endoscopy, anterior rhinomanometry (RMM), and acoustic rhinometry (AR) were performed at the beginning of the study, after three months and finally after six months of follow-up. Cone Beam Computed Tomography (CBCT) of the paranasal sinuses was performed before the therapeutic interventions and at the end of the follow-up.

**Results**

Both treatments significantly improved quality of the life (SNOT22), with no significant difference being found between the two groups. The VAS score decreased in both groups: improvements were significant at three and six months in the nasal spray group, but in the DES group a significant difference was noted only at three months. There was a statistically significant increase in total nasal cavity volumes as measured with AR in the corticosteroid spray group, but not in the DES group.

**Conclusion**

We found that patients benefitted from DES and the corticosteroid nasal spray. Because of the very good results for the nasal spray and the much higher material and operating room costs associated with DES, we cannot recommend the use of DES over nasal spray as a monotherapeutic treatment for CRS.

**ERS16-0500**  
**MANAGEMENT OF CRS MEDICALLY**

**DOES AMOXICILLIN-CLAVULANIC ACID IMPROVE SYMPTOMS IN CHRONIC RHINOSINUSITIS PATIENTS WITH ACUTE EXACERBATION? A PROSPECTIVE, DOUBLE-BLINDED, RANDOMIZED, PLACEBO-CONTROLLED TRIAL**

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**Aims**

Patients with Chronic Rhinosinusitis (CRS) commonly present acute exacerbations of symptoms; however, few studies have evaluated whether the use of oral antibiotics change the course of symptoms in patients with acute exacerbation of CRS. The objective of this study was to evaluate whether amoxicillin-clavulanate alters the course of CRS patients with acute exacerbation.

**Method**

This was a prospective, randomized (2:1), double-blinded, placebo-controlled trial. Patients with acute exacerbation of CRS received either amoxicillin-clavulanate (875/125mg) or placebo orally, twice a day, for 14 days. A visual analog scale (Total Score of Symptoms) and endoscopic score (Lund-Kennedy score) were taken at days 0 (baseline) and 14 days following treatment. Scores were compared between groups using a linear regression model (Total Score of Symptoms - TSS) or Fisher's exact test (Endoscopic score). Statistical difference was considered significant when  $P < 0.05$ .

**Results**

Twenty-two patients were allocated in the amoxicillin-clavulanate and 11 in the placebo group. One patient in the antibiotic group was excluded after resignation. On both amoxicillin-clavulanate and placebo-treated groups, a significant improvement of TSS (day 14 vs day 0,  $P < 0.01$ ) was observed. Similarly, more specific sinonasal items of the TSS, such as "nasal secretion" and "nasal obstruction", also presented significant improvement on both groups ( $P < 0.05$ ). On nasal endoscopy evaluation, there was no difference of nasal endoscopy status on day 14 compared with baseline ( $P > 0.05$ ).

**Conclusion**

Despite symptomatic improvement after 14 days in CRS patients with acute exacerbation, the use of amoxicillin-clavulanate did not change the course of symptoms compared with placebo.

**SUPPRESSION OF INFLAMMATORY CYTOKINES FROM CULTURED HUMAN NASAL EPITHELIAL CELLS BY CAM AND EM900.**

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**Aims**

**Background:** Low-dose long-term 14-membered macrolide therapy (LDMT) by erythromycin (EM), clarithromycin (CAM) or roxithromycin (RXM) is now prevalent conservative therapy for chronic rhinosinusitis with/without nasal polyp in Japan. This LDMT is considered to be based not on antibiotic but on anti-inflammatory effect of macrolides. However, the possibility of inducing macrolide-resistant bacteria by LDMT has ever been pointed out. EM 900 is a novel derivative of EM and is one of the most eligible macrolides which has only anti-inflammatory without antibiotic effect.

**Objective:** Anti-inflammatory effect by EM900 on the suppression of inflammatory cytokines was experimentally elucidated in comparison with CAM.

**Method**

Human Nasal Epithelial Cells were cultured. On the 2nd day after the culturing, CAM or EM900 was administered into the culture medium. These cultured epithelial cells were stimulated by TNF-alpha on the 4th day. Then, IL-8 and vascular endothelial growth factor (VEGF) in the culture were estimated at mRNA level by RT-PCR after 16-hour later, and at the protein level by ELISA after 24-hour later.

**Results**

EM900 and CAM did not suppress VEGF, but significantly suppressed IL-8 production from cultured epithelial cells of Human nasal. It has been well known that IL-8 is a key cytokine for increasing neutrophil infiltration. EM900 is thought to be one of promising anti-inflammatory drug.

**Conclusion**

A novel EM derivative EM900, as well as CAM, suppresses inflammatory cytokine production from cultured Human nasal epithelial cells.

**EFFECTS OF CHINESE HERBAL MEDICINE (ZHU-YUAN DECOCTION) ON POSTOPERATIVE CARE AFTER FUNCTIONAL ENDOSCOPIC SINUS SURGERY: A COMPARATIVE STUDY**

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**Aims**

This study is to evaluate the effectiveness and safety of a Chinese herbal formula (CHM), Zhu-Yuan decoction (ZYD), performed after functional endoscopic sinus surgery (FESS).

**Method**

Patients with chronic rhinosinusitis (CRS) who underwent FESS were prospectively enrolled in the study. Before surgery, they were evaluated by visual analogue scale (VAS) score, Lund-Kennedy endoscopy score, and Lund-Mackay computed tomography (CT) score, and routine blood test. After surgery, they were randomized to taking ZYD or intranasal corticosteroids (INC) for 12 weeks. They were reevaluated by VAS, endoscopic score at 4,8,12 weeks, and by Lund-Mackay CT score and routine blood test at 12 weeks after surgery.

**Results**

Eighty-five patients (44 in the INC group, 41 in the CHM group) completed the study. In the both CHM and INC group, VAS and endoscopic scores significantly decreased at 4,8,12 weeks, and the CT score after treatment was decreased at 12 weeks compared with baseline scores. No significant differences were observed with regard to the postoperative VAS, endoscopic or CT scores between the two groups of patients. FESS followed by oral ZYD could reduce VAS, nasal endoscopic and CT scores of the CRS patients and had the same efficacy and safety as FESS followed by INC. No fatalities or major adverse events were observed in both groups during the study.

**Conclusion**

Our study suggests that endoscopic sinus surgery followed by oral ZYD has similar efficacy and safety compared to FESS followed by intranasal corticosteroids, and ZYD could be an alternative treatment to corticosteroids after FESS.

**ERS16-0218**  
**MANAGEMENT OF CRS SURGICALLY**

**WEDGE SHAPE MIDDLE MEATUS PACK AFTER FESS**  
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**Aims**

Nasal pack is usually used after sinus surgery to achieve hemostasis, promote healing, prevent adhesion formation and lateralization of the middle turbinate, however its use can be associated with pain and discomfort.

**Method**

We describe a simple technique to modify the shape of Merocel nasal pack by cutting its edge vertically and then obliquely which allows its superior end easy insertion in the middle meatus while the inferior end closed the choana.

**Results**

This new-shaped nasal pack has been used by the author for the last five year on 450 patients. No significant postoperative bleeding encountered. Nine patients had adhesion that required surgical management, but none developed lateralized middle turbinate.

**Conclusion**

Wedge-shape middle meatus nasal pack is a simple, safe and effective method that can achieve ideal packing requirements after endoscopic sinus surgery.

**FRONTOETHMOIDAL MUCOPYOCELE: WHEN THE ENDOSCOPIC APPROACH IS NOT ENOUGH**  
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**Aims**

**Introduction:** Frontoethmoidal mucocele is a relatively rare and benign disease, though it can invade adjacent structures such as the orbit. Surgical treatment is mandatory, however the approach is controversial: endoscopic vs external, marsupialization vs complete excision.

**Method**

**Objective:** To report a case of frontoethmoidal mucopyocele with orbital involvement treated by a combined approach, supported by video report. To highlight the advantages and disadvantages of each surgical approach.

**Results**

**Case report:** A 62-year-old man presented with right eye proptosis and diplopia caused by the evolution of a frontoethmoidal mucocele that extended towards the orbit after destroying its upper and inner wall. The treatment consisted of a successful complete excision of the mucopyocele by a combined approach including nasofrontal endoscopic and external approach with restoration of the orbital roof, using a titanium mesh, and obliteration of the frontal sinus.

**Conclusion**

**Conclusion:** The surgical approach depends on the surgeon's experience, extension and location of the lesion. A combined approach may be considered in this pathology.

**THE MODIFIED LOTHROP PROCEDURE IN THE TREATMENT OF COMPLICATED FRONTAL CHRONIC SINUSITIS AFTER HEAD TRAUMA**

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**Aims**

Chronic sinusitis is a known complication of frontal bone fracture. The authors report three cases of frontal chronic sinusitis, resolved with modified Lothrop procedure.

**Method**

Three patients had their frontal bone reconstructed after head trauma with fracture of the frontal bone. Years later, multiple episodes of recurrent acute frontal sinusitis emerged. As there was severe stenosis or bony obliterations of the frontal recess, they were treated with modified Lothrop procedure.

**Results**

The implants in the frontal bone due to reconstruction, with biofilms adhesion, perpetuate the chronic disease of the frontal sinus. The therapeutic goal does not resolve completely the sinusitis, but allows, whenever there is an acute infection, the frontal sinus drain directly into the nasal cavity without symptoms and without meningeal irritation.

**Conclusion**

The Lothrop procedure is a valid and successful choice. Literature review confirms that this is an effective procedure to treat complicated chronic sinusitis, with few complications when compared to alternative surgical techniques.



**SHORT-TERM FRONTAL SINUS STENTING AFTER ENDOSCOPIC FRONTAL SINUSOTOMY**

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**Aims**

Endoscopic sinus surgery is a gold standard procedure for inflammatory disease of the frontal sinus. This study reported our preliminary experience about short-term stent use to maintain the patency of the frontal outflow tract after endoscopic frontal sinusotomy.

**Method**

A retrospective chart review was performed in patients who had undergone endoscopic sinus surgery with frontal sinusotomy from April 2015 to December 2015. When the created frontal ostium size was  $\leq 5$ mm, the frontal stent was routinely placed. When the ostium size was  $> 5$ mm and  $\leq 8$ mm, the stent was placed only when multiple raw surfaces were present at the frontal ostium/recess area. When the ostium size was  $> 8$ mm, the stent was not used.

**Results**

Twenty five patients were enrolled in this study, including 37 sides of frontal sinusotomy. Frontal stents were placed in 18 sides (48.6%). The stent was removed 2–4 weeks later after surgery (depend on the recovery condition of the mucosa at the frontal ostium/recess). During the follow up period, the frontal outflow tract was patent with normal mucosa in 10, patent with edematous mucosa in 3, obliterated by polypoid mucosa/polyp in 2, and total synechiae with fibrotic tissue in 3 in the stenting group. In the non-stenting group, the frontal outflow tract was patent with normal mucosa in 14 and patent with edematous mucosa in 5.

**Conclusion**

Frontal sinus stenting can prevent fibrosis/synechiae formation and facilitate postoperative endoscopic local treatment after frontal sinusotomy. It can be applied in properly selected cases.

**ERS16-0711**  
**MANAGEMENT OF CRS SURGICALLY**

**UTILITY OF INTRAOPERATIVE FLEXIBLE ENDOSCOPY IN FRONTAL SINUS SURGERY**  
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**Aims**

Surgical management of the frontal sinus can be challenging. Extensive frontal sinus pneumatization may form a far lateral or supraorbital recess that can be difficult to reach by conventional endoscopic surgical techniques, requiring extended approaches such as the Draf III (or endoscopic modified Lothrop) procedure. Rigid endoscopes may not allow visualization of these lateral limits to ensure full evacuation of the disease process.

**Method**

Here we describe the utility of intraoperative flexible endoscopy in two patients with far lateral frontal sinus disease.

**Results**

In both cases, flexible endoscopy allowed confirmation of complete evacuation of pathologic material, thereby obviating more extensive surgical dissection.

**Conclusion**

In cases where visualization of the far lateral frontal sinus is inadequate with rigid endoscopes, flexible endoscopy can be used to determine the need for more extensive dissection.

**EVALUATION OF NEW OPERATIVE CRITERION FOR ENDOSCOPIC SINUS SURGERY**

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**Aims**

To date, no universal operative criterion for endoscopic sinus surgery (ESS) has been established. In 2013, the Japanese Rhinologic Society proposed the new and simple criterion for ESS. This criterion consists of 5 procedures (Type I: fenestration of ostio-meatal complex, Type II: single-sinus procedure, Type III: poly-sinus procedure, Type IV: pan-sinus procedure, Type V: extended procedure beyond sinus wall: e.g. Modified Lothrop procedure). We sought to evaluate this new criterion in Okayama University Hospital.

**Method**

A retrospective study was performed in 122 patients (195 sinuses) with chronic rhinosinusitis (CRS) or paranasal cysts who received ESS in 2012. Relationship between the degree of ESS based on the criterion and clinical courses including operation time, bleeding amount, and improvement of olfaction, CT score and nasal airway resistance was analyzed.

**Results**

A total of 195 ESS was classified into Type I (n=3), Type II (n=17), Type III (n=91), Type IV (n=82) and Type V (n=2). Type II, III and IV ESS were predominant in paranasal cyst (68%), CRS without nasal polyps (77%) and CRS with nasal polyps (55%), respectively, with a statistical significance ( $P < 0.001$ ). Degree of ESS based on this criterion positively and significantly correlated with operation time ( $r = 0.669$ ,  $P < 0.001$ ) and bleeding amount ( $r = 0.383$ ,  $P = 0.008$ ). CT score, olfaction and nasal airway resistance were significantly improved after surgery in both Type III and IV ESS.

**Conclusion**

This new criterion for ESS is simple and reflects perioperative course. Proper selection of ESS type can archive a significant improvement after surgery.

**ERS16-0226**  
**MANAGEMENT OF CRS SURGICALLY**

**ORBITAL COMPLICATIONS CAUSED BY ENDOSCOPIC SINUS SURGERY - TWO CASE REPORTS-**  
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**Aims**

The more endoscopic sinus surgery (ESS) increases, the more accidents caused by ESS become increasing. Especially medial wall of orbit and medial rectus muscle were often involved and these kind of cases tend to be dealt as matter of suits.

The pathophysiology of such kind of orbital complications and the treatments for these conditions were discussed

**Method**

In this presentation, 2 cases suffered from orbital complication were reported.

**Results**

The first case was that the medial rectus muscle was damaged because of high pressure by tight gauze packing. The visual acuity was deteriorated as low as blind, but immediate decompression leads to recover up to 0.4 as visual acuity.

In the second case, medial rectus muscle was torn off by forceps during ESS. The eye ball was deviated to lateral side, and severe diplopia on medial gaze was occurred. Like first case, salvage surgery was performed immediately, and the rest of torn medial rectus muscle was sutured each other, as a result, eye ball's position was recovered to normal position, and diplopia at frontal gaze disappeared after surgery

**Conclusion**

Very careful attention must be paid in operating at neighboring orbital medial wall

**ERS16-0465**

**MANAGEMENT OF CRS SURGICALLY**

**ENDOSCOPIC REMOVAL OF HUGE DENTIGEROUS CYST IN THE MAXILLARY SINUS**

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**Aims**

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**Method**

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**Results**

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**Conclusion**

Dentigerous cysts are the most common type of developmental odontogenic cysts. They are associated with the crown of an unerupted or impacted tooth. Treatments for dentigerous cysts are different depending on its' size and location, age of patients and so on. But, the basic principle of treatment is a complete removal of the entire cyst with associated tooth. Up to date, Caldwell-luc operation is treatment of choice for dentigerous cyst in maxillary sinus, but the operation may increase the risk of complication and morbidity. Due to this fact, recently, treatments with endoscopic endonasal approach are increasing. A 21-year old man was referred to our outpatient department, due to left toothache and purulent posterior nasal drip. All routine laboratory test results were within normal limits. Computed tomography showed a huge soft tissue density with an egg shell like calcific wall in Lt. maxillary sinus and a tooth in the posterior superior wall. We removed the cyst completely with the impacted ectopic tooth by endoscopic endonasal approach. The patient recovered without complications, and exhibited no signs of recurrence at the 4-months follow-up.

**ROLE OF PERIPHERAL BLOOD EOSINOPHILIA IN THE EFFECT OF ENDOSCOPIC SINUS SURGERY ON LUNG FUNCTION IN PATIENTS WITH EOSINOPHILIC CHRONIC RHINOSINUSITIS**

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**Aims**

Patients with chronic rhinosinusitis (CRS), especially eosinophilic CRS (ECRS) show impaired lung functions regardless of the presence of asthma. However, effect of endoscopic sinus surgery (ESS) on the lung functions in ECRS patients remains unclear. We sought to determine the effect of ESS on lung functions in ECRS patients. Factors affecting the improvement of lung function after ESS were also investigated.

**Method**

111 patients with CRS with nasal polyps (CRSwNP) who received ESS were recruited. Patients were divided into ECRS (n=97) and non-ECRS (n=14) based on JESREC (the Japanese Survey of Refractory Eosinophilic Chronic Rhinosinusitis) criterion. Lung functions including percent predicted vital capacity (%VC), forced expiratory volume in 1 second (FEV<sub>1</sub>), FEV<sub>1</sub>/forced vital capacity (FEV<sub>1</sub>/FVC) ratio, peak expiratory flow rate (PEFR), maximal expiratory flow rate at 50% and 25% of vital capacity (V<sub>50</sub> and V<sub>25</sub>), and maximum mid-expiratory flow rate (MMF) were measured before and 9 months after ESS.

**Results**

Overall, no significant improvements in lung functions 9 months after ESS were seen in either ECRS or non-ECRS patients. On the other hand, ECRS patients with low peripheral blood eosinophilia (2-5% of whole white blood cells) showed significant improvement in V<sub>50</sub>, V<sub>25</sub> and MMF after surgery. Patients who showed FEV<sub>1</sub>/FVC ratio less than 70% before surgery significantly improved FEV<sub>1</sub>/FVC ratio, V<sub>50</sub> and MMF after surgery.

**Conclusion**

Effect of ESS on peripheral lung functions may depend on the degree of peripheral blood eosinophilia and the existence of obstructive lung dysfunction before surgery in ECRS patients.

**USE OF SINUS SURGERY NAVIGATION SYSTEMS IN TREATMENT OF RECURRENT CRS WITH OR WITHOUT NASAL POLYPS**

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**Aims**

Second surgery of sinuses caused by distorted, neossification, scars after previous surgery and local disease advancement, surgical anatomy are a big challenge for ENT surgeons. Despite excellent knowledge of anatomy it is often hard to remove a disease in total. The biggest problem is bleeding. Use of the navigation system is helpful in surgery. Careful examination of CT scans is necessary.

**Method**

Poster presents retrospective study of 188 patients with recurrent sinus disease treated surgically in the World Hearing Center, Kajetany between 2009-2012. Main reason of recurrences is Samter's triad, incomplete previous surgery, genetic disorders, inappropriate pharmacological treatment. Incomplete surgery in frontal recess and posterior ethmoid cells were most common reasons for reoperation

**Results**

70% of patients are free from disease after follow up ranging from 4 to 20 months after surgery. 15% of patients have recurrent sinus disease treated medically with good results and good access to sinuses in endoscopic view. 15% needed reoperation - mainly patients with Samter's triad and mucopolysaccharidosis. The main reason for another procedure was nasal polyps formation. It is important to have proper CT scans of patients and to use appropriate protocol for patient registration to navigation system. After fulfillment of this condition one can get good correlation of anatomy with navigation view but have to keep in mind 1 mm shift that sometime is very important.

**Conclusion**

Sinus surgery navigation system is a valuable tool but the knowledge of the anatomy is crucial as well as careful CT scan examination and good planning of procedure.

**THE RELATIONSHIP OF THE WIDTH OF THE FRONTAL RECESS AND THE FRONTAL RECESS CELLS  
IN THE PREOPERATIVE CT**

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**Aims**

Endoscopic Sinus Surgery (ESS) is now a well-established modality all over the world for common inflammatory diseases of the paranasal sinuses. However, the surgery of the frontal recess can become difficult, frustrating, confusing, and potentially dangerous, if the surgeon is not aware of or familiar with the anatomic variations. The frontal sinuses can have variable drainages depending on the anatomy of the frontal sinus drainage pathway. Preoperative evaluation by CT, especially the width of the frontal recess and the frontal sinus drainage pathway, is mandatory for all patients undergoing ESS. We analyzed the relationship between the width of the frontal recess and the frontal recess cells in patients with chronic rhinosinusitis.

**Method**

Multiplanar paranasal sinus computed tomography (CT) images from 129 sides of 95 patients who underwent endoscopic sinus surgery were reviewed. The types of frontal recess cells, the volume of the agger nasi cell, the thickness of the frontal beak and the anterior-posterior (A-P) length of the frontal recess and frontal isthmus were evaluated.

**Results**

The volume of the agger nasi cell significantly and positively correlated with the A-P length of the frontal recess, frontal isthmus, and A-P thickness of the frontal beak.

**Conclusion**

Increasing pneumatization of the agger nasi cell is associated with a significant increment in the A-P length of the frontal recess and isthmus in Japanese, suggesting that making a wide drainage pathway to frontal sinus is easy in patients having the enlarged pneumatization of the agger nasi cell.



**RISK FACTORS PREDICTING POSTOPERATIVE FEVER AND BACTERIAL COLONIZATION ON PACKING FOLLOWING ENDOSCOPIC SINUS SURGERY**

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**Aims**

Postoperative fever following endoscopic sinus surgery (ESS) is one of the surgeons concerns. To elucidate the cause of postoperative fever, we analyzed patients' characteristics and perioperative background in association with fever.

**Method**

We analyzed 372 patients who had endoscopic endonasal surgery. Influence of intake of antibiotics, steroids, history of asthma, smoking, preoperative nasal bacterial culture, duration of operation, and intraoperative intravenous antibiotics on postoperative fever and bacterial colonization on packing material were analyzed.

**Results**

Fever ( $\geq 38^{\circ}\text{C}$ ) occurred in 64 (17%) patients. Most of the fever occurred on one postoperative day. Most of the fever diminished after removal of packing without further antibiotic use. Two patients who developed meningitis and cerebral hemorrhage had postoperative fever. History of asthma, prolonged operation time ( $\geq 108$  minutes) and intravenous Cefazolin use instead of Cefmetazole were associated with postoperative fever. Odds ratios (OR) for each were 2.8, 4.1 and 2.1, respectively. Positive preoperative bacterial colonization was associated with postoperative bacterial colonization on packing material (OR = 2.2).

**Conclusion**

Postoperative fever after ESS is not rare event. Most of the fever was diminished after removal of packing. When fever persists, focus of infection should be scrutinized.

**SILENT SINUS SYNDROM: A MISDIAGNOST PTERYGOMAXILLAR FOSA TUMOR - CLINICAL CASE**  
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**Aims**

This entity is relatively new in sino-nasal pathology, characterized by a chronic unilateral maxillary sinusitis, without specific symptoms. Like atelectatic otitis caused by Eustachian tube dysfunction with negative pressure in middle ear, in silent sinus syndrome appears slight thickening of the walls of the sinus caused by chronic inflammation and negative intrasinusal pressure due to osteo-meatal dysfunction, with appearance of indolent enophthalmia.

**Method**

We present a 38-year-old man misdiagnose with right pterygomaxillar fosa tumor, who accused fluctuant migraine, partial nasal obstruction from 3 years earlier, associated in the last 3 months with unilateral indolent enophthalmia, unilateral vision problem, facial asymmetry. Clinic and para-clinic examinations showed silent sinus syndrome aspect like.

**Results**

In this case was performed sino-nasal surgical treatment but no ophthalmologic surgery.

**Conclusion**

Conclusion - Silent sinus syndrome is a rare pathology, characterized by in-dolor and progressive enoftalmia, being necessary a multidisciplinary outcome.

**REVISION ENDOSCOPIC SINUS SURGERY FOR RECURRENT CHRONIC RHINOSINUSITIS**

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**Aims**

Revision functional endoscopic sinus surgery (FESS) is recommended for patients with chronic rhinosinusitis (CRS) whose symptoms persist after failing both maximum medical therapy and prior sinus surgery. The aim of this study was to investigate the surgical revision rate in patients with CRS and describe their endoscopic and preoperative image findings.

**Method**

Clinical data of patients undergoing revision FESS between 2006 and 2014 in a tertiary center were retrospectively analyzed. All patients had a postoperative follow-up of at least 12 months. Of the 1794 patients analyzed, 86 underwent two or more surgeries. Patients with benign or malignant tumors (n=25) were excluded.

**Results**

A total of 61 patients (60.7% female and 39.3% male) with a mean age of 47.8 years (range 23-75) were included. CRS with nasal polyps was present in 34 patients and CRS without nasal polyps in 27 patients. A high prevalence of eosinophilia (n = 20) and asthma (n = 12) in the group of CRS with nasal polyposis was observed. The average time between the previous surgery and the revision surgery was 3.51 years (range 0.2-8). The most common image findings were recurrence of polyps (n=19), remaining ethmoid cells (n=16), residual uncinated process (n=10), nasal septum deviation (n=7) and nasal cavity adhesions (n=5).

**Conclusion**

Despite the high success rate of FESS in the management of CRS refractory to medical treatment, some patients have recurrent disease with indication for revision surgery. Preoperative CT scan and correct analysis of anatomic marks are the key to a successful surgery.

**DENTAL IMPLANTATION AS A LIMITING FACTOR TO MAXILLA SINUS ACCESS**  
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**Aims**

Dental implantation is effective and safe method of teeth row defect replacing. Preservation the conditions for dental implantation and sinuslifting should be considered in sinus surgery if it does not reduce their effectiveness. An important factor in ensuring the effectiveness sinuslifting is intakt periosteum, which mobilized in the area of intervention during surgery.

**Method**

The analysis of cone beam CT 36 patients (53 cases) through 3-12 months after sinuslifting were done. Location of neointegrated bone to maxillary structures were estimated. To predict areas of potential periosteum detachment is 1 cm out from the border of location sinuslifting material.

**Results**

The distance from the medial edge of osteoplastic weight to the bottom of the nose is  $6,5 \pm 3,5$  mm, the distance between the front edge of osteoplastic root mass to the apex of the first premolar is  $4,4 \pm 2,9$ , and the lower edge foramen infraorbitalis -  $6,6 \pm 2,7$ , infraorbitalis - premolar distance is  $16,6 \pm 2,9$  mm.

**Conclusion**

To provide miniinvasive interventions on maxillary sinus with preserving periosteum in the region of a possible sinuslifting- 1 cm out from the border of location sinuslifting material.

**SAMTER'S TRIAD IN PATIENT WITH CORTICOSTEROIDS ALLERGY**

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**Aims**

Samter triad is characterized by bronchial asthma, nasal polyposis and intolerance to aspirin and most NSAIDs. The treatment consists in the avoidance of non-selective COX inhibitors, desensibilization to aspirin, and use of inhaled and systemic corticosteroids associated with surgical treatment for the nasal polyps. We aim to present a clinical case and make a short review of the literature.

**Method**

We present the case of a 36 years old patient with Samter's Triad associated with allergy to hydrocortisone and other corticosteroids which was sent to our department complaining of nasal obstruction and hyposmia.

**Results**

Anterior rhinoscopy revealed the presence of nasal polyposis grade 3 bilaterally. CT-Scan identified nasal polyposis with complete obliteration of the nasal cavity and inflammatory changes involving the anterior ethmoid and maxillary sinus bilaterally. Because of corticosteroids allergy the patient was sent to the Immunoallergology department for a more detailed corticosteroids allergy screening, having initiated deflazacort 30mg which was later reduced to 6mg because of late allergy symptoms and later began aspirin desensibilization. Surgically the patient was submitted to FESS. After treatment there was an improvement in the clinical presentation. The patient has had no recurrence of nasal polyps 1 year after surgery.

**Conclusion**

In this case of Samter's Triad associated with many corticosteroids allergy we obtained the complete control of the disease due to a multidisciplinary approach which combined both our ENT (FESS) and the Immunoallergology departments.

**FESS IS A SAFE AND EFFECTIVE DAY CASE PROCEDURE IN OLDER ADULTS**

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**Aims**

At present, there is a paucity of data regarding the safety and efficacy of endoscopic sinus surgery (FESS) in the aging population. This study aimed to examine the practise of FESS in older adults.

**Method**

This was a prospective study of FESS performed at a single centre adults aged 60 years and older (67 patients, mean age 68 years). Data was collected preoperatively regarding comorbidities, previous procedures, and SNOT-22 scores. Median follow up was 4 months. Post operative data was collected including immediate and late complications, admission rate, and post operative SNOT-22 scores. A comparison group of adults under 60 years old was used as a control (185 patients, mean age 42 years).

**Results**

Older adults had significantly lower pre-operative SNOT-22 scores compared to adults under 60 (43 vs 51,  $p < 0.05$ ). Medical comorbidities were encountered significantly more frequently in the over 60s (e.g. COPD, DM). 47 patients underwent first FESS aged over 60 whilst 20 cases were revision; this was a similar casemix compared to the under 60s. 3 older adult patients encountered immediate perioperative complications (all 3 cases of bleeding); this was not a significant elevation in risk compared to the under 60s. 5 patients required one overnight stay (admission rate of 7.5%; comparable to the under 60s). Post operative SNOT 22 reduction was excellent (mean reduction of 29; no statistical difference compared to under 60s).

**Conclusion**

FESS is a safe and effective procedure in adults over 60 years old and can be reliably performed in the day case setting.

**ERS16-0768**  
**MANAGEMENT OF CRS SURGICALLY**

**THE EFFECT OF LATERAL WALL ENDOSCOPIC SINUS SURGERY ON NASAL OBSTRUCTION**  
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**Aims**

This study aimed to investigate the efficacy of functional endoscopic sinus surgery in relief of nasal obstruction; and whether this effect was related to operations on the lateral or medial wall.

**Method**

This was a prospective study of 251 patients undergoing FESS at a single centre. Data was recorded preoperatively regarding SNOT-22, Lund-Mackay CT score, and endoscopic appearances, and the details of the precise procedure performed. Median follow up was 4 months and included scoring of endoscopic appearance and SNOT-22.

**Results**

Overall effect size for FESS in reducing nasal obstruction was 1.88. Of 251 patients, 84 required endoscopic septoplasty to facilitate access. Patients undergoing FESS plus septoplasty achieved similar degree of reduction in nasal obstruction scores and overall SNOT-22 compared to patients undergoing FESS only. 41 patients required reduction of concha bullosa. Presence of concha bullosa was associated with significantly higher preoperative nasal obstruction scores, but post operative nasal obstruction scores and degree of change was comparable to those without concha bullosa correction. 138 patients had CRS with nasal polyposis, and 97 CRS without nasal polyposis (16 patients excluded from analysis). Both groups with had similar preoperative nasal obstruction scores; but the group with nasal polyposis achieved significantly higher reduction in post op nasal obstruction.

**Conclusion**

FESS is effective in relieving patient reported nasal obstruction. In this study, the relief of nasal obstruction was not linked to correction of anatomical variants such as septal deviation and concha bullosa. However, patients with nasal polyposis achieved superior results compared to patients without nasal polyposis.

**ALTERED EPITHELIAL CHLORIDE SECRETION IN PRIMARY HUMAN NASAL EPITHELIAL CELLS OF PATIENTS WITH CHRONIC RHINOSINUSITIS**

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**Aims**

Chronic rhinosinusitis (CRS) is considered as common chronic disorder. The underlying pathophysiologic mechanisms are still not entirely known and may be linked to altered ion transport by the nasal epithelium. Purpose of this study was to functionally characterise epithelial chlorid conductance in cultured human nasal epithelial primary cells (hNEpC) of patients with CRS.

**Method**

hNEpC were isolated from patients undergoing FESS. Tissue of the lower turbinate was obtained from healthy controls. HNEpC were cultured under air-interface conditions and the transepithelial short-circuit current ( $I_{sc}$ ) was measured in Ussing chambers with and without pretreatment with IL-13. Transcript levels of the  $Cl^-$  channel TMEM16A were determined using real-time PCR.

**Results**

Ussing chamber measurements demonstrated a significantly reduced basal  $I_{sc}$  in hNEpC cell monolayers of patients with CRS compared to healthy controls ( $18.2 \pm 1.7$  vs.  $40.3 \pm 6.8 \mu A/cm$ ). Amiloride-sensitive  $I_{sc}$  did not differ, whereas the amiloride-insensitive current was significantly diminished in CRS ( $15.5 \pm 1.6$  vs.  $40.7 \pm 8.5 \mu A/cm$ ). CAMP-induced  $Cl^-$  secretion revealed no differences, whereas UTP- induced responses were substantially lower in CRS ( $0.0 \pm 0.2$  vs.  $0.8 \pm 0.3 \mu A/cm$ ). Pretreatment with IL-13 increased TMEM16A transcript levels in hNEpC of CRS and controls. UTP-mediated  $Cl^-$  secretion in IL-13 pretreated cultures were ~20-fold increased in CRS, but only ~4-fold increased in control compared to measurements without pretreatment.

**Conclusion**

We observed significant differences in the  $Cl^-$  secretory capacity of hNEpC from patients with CRS compared to controls. Our results suggest that a dysregulation of TMEM16A may contribute to abnormal epithelial ion transport and support further investigation of this epithelial dysfunction in the pathogenesis of CRS.



**EXPRESSION OF ADAM17 AND ADAM10 IN NASAL POLYPS**

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**Aims**

The ‘a disintegrin and metalloproteases’ (ADAMs) are a multi-functional gene family that contribute to the homeostasis of the extracellular matrix, transduction of specific intracellular signals, organogenesis, inflammation, tissue remodeling, adhesion, and cell migration. ADAM17 is the best-characterized of the ‘shedases,’ and its putative substrates are widespread, including various inflammatory modulators. ADAM10 is the most similar to ADAM17 in terms of protein sequence and the structural properties of their catalytic domains.

**Objectives:** To assess the roles of ADAM17 and ADAM10 in nasal polyps (NPs) by measuring their expression.

**Method**

The expression of ADAM10 and 17 was investigated in NPs at endonasal sinus surgery ( $n = 15$ ) and compared with that in inferior turbinate mucosa samples obtained from non-allergic hypertrophic rhinitis patients ( $n = 15$ ). Tissue samples were analyzed by real-time polymerase chain reaction (PCR), Western blotting, and immunohistochemical staining.

**Results**

The ADAM17 mRNA and protein levels were significantly higher in the inferior turbinate than in NPs ( $P < 0.05$ ). The ADAM10 mRNA and protein levels did not differ significantly between NPs and inferior turbinates ( $P > 0.05$ ). ADAM10 and 17 were expressed primarily in inflammatory cells, submucosal glandular cells, and lining epithelial cells.

**Conclusion**

ADAM17 may contribute to the development of NPs in contrast to ADAM10, based on their expression patterns. It may be important to discover the role of ADAM17 in the development of NP and helpful to examine the specific mechanism of the development of NPs.

**ETHANOL HYPER-RESPONSIVENESS IN CHRONIC UPPER AIRWAY DISEASES: THE QUESTIONNAIRE**  
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**Aims**

A significant percentage of patients diagnosed with chronic airway disease report alcohol-induced worsening of their symptoms. The prevalence and characteristics of respiratory reactions provoked by alcohol-containing drinks has not been fully investigated yet.

We aimed to assess the prevalence and characteristics of alcohol hyper-responsiveness in patients with chronic upper airway diseases

**Method**

We evaluated the prevalence and characteristics of alcohol-induced complaints in 1101 subjects. Nasal polyp patients (CRSwNP) with and without aspirin exacerbated respiratory disease, allergic rhinitis (AR) patients, patients with chronic rhinosinusitis without nasal polyps (CRSsNP) and healthy controls were approached by means of a questionnaire.

**Results**

Preliminary results show that aggravation of respiratory symptoms caused by alcohol-containing drinks was reported by 3,8% of healthy responders, 29,3% of respondents with AR, 30,5% of respondents with CRSsNP, 41,9 % of CRSwNP respondents and as high as 65,1% in the subgroup with asthma and aspirin hypersensitivity.

**Conclusion**

Nasal hyper-responsiveness to ethanol-containing beverages appears to be more prevalent in more severe upper airway disease.

**THE ROLE OF IL-25 AND IL-33 IN CHRONIC RHINOSINUSITIS WITH OR WITHOUT NASAL POLYPS**

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**Aims**

The aim of this study was to detect serum and tissue levels of IL-25 and IL-33 in chronic rhinosinusitis with nasal polyps (CRSwNP) or without polyps (CRSsNP) using ELISA method so as to investigate the roles of these parameters in ethiopathogenesis of CRSwNP and CRSsNP.

**Method**

Study group consisted of 20 CRSwNP and 20 CRSsNP patients. Control group comprised of 20 volunteers .All groups preoperatively sinonasal pathologies were recorded based on Lund-Mackay radiological staging system. IL-25 and IL-33 levels in serum and tissue samples were analyzed using ELISA method.

**Results**

Mean serum IL-25 and IL-33 levels in study and control groups did not differ statistically significantly. (p=0.345 and p=0.338, respectively). Any statistically significant difference was not detected in mean tissue IL-25 levels among study and control groups (p=0.698). A statistically significant difference was detected among groups as for tissue IL-33 levels (p<0.001). Mean tissue IL-33 level in the CRSwNP group was statistically significantly lower when compared with those of CRSsNP and control groups (p<0.001 and p<0.001, respectively). A statistically significant negative correlation was detected between tissue IL-33 levels, and Lund-Mackay CT scores (r=-0.436 and p=0.005).

**Conclusion**

In the present study, we investigated their role, even though we have not detected significantly higher levels of these parameters in our patients, we conceivably contributed to scarce number of studies conducted on this issue. We think that further studies will better clarify the role of IL-25 and IL-33 in the development of nasal polyps.

**CORRELATION BETWEEN CLINICAL DATA AND HISTOPATHOLOGICAL FINDINGS IN CHRONIC RHINOSINUSITIS WITH NASAL POLYPOSIS IN GREEK PATIENTS.**

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**Aims**

The aim of this study is to describe the histopathologic findings from a group of patients with chronic rhinosinusitis with nasal polyposis and correlate them with baseline clinical data.

**Method**

Thirty three adult patients with chronic rhinosinusitis were prospectively recorded. Patients with diseases such as cystic fibrosis and antrochoanic polyps were excluded. Disease severity was measured by computed tomography using the Lund-Mackay CT score, endoscopy (Hadley's endoscopy score) and quality-of-life score (SNOT22 questionnaire). Nasal polyps specimens were collected during surgery and the presence of eosinophils, neutrophils, and lymphocytes (T-cells CD4 and CD8) was detected. The percentage of eosinophils, and neutrophils was also measured in the blood. Statistical analysis and correlation between the data was performed.

**Results**

The presence of inflammatory markers varied, with T-cells (CD4 and CD8) present in 100% of subjects, eosinophils in 45,1%, and neutrophils in 0,6%.WBC (eosinophils and neutrophils) did not significantly correlated with the clinical data. Eosinophilia in nasal polyps tissue was related with worse disease severity on CT and endoscopy. QoL did not correlate with any of the histopathological data.

**Conclusion**

The presence of T-cells (CD4 and CD8) in the nasal polyp samples does not correlate with the severity of the clinical findings. The presence of nasal polyp eosinophilia correlates with the CT and endoscopy findings, but not with the quality-of-life scores

**INVASIVE FUNGAL RHINOSINUSITIS**

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**Aims**

There is a lot of debate around fungal involvement of paranasal sinuses, weather it is a limited disease or an invasive one, the impact of immunodeficiencies and allergy on the evolution of the disease.

**Method**

Authors noticed an increased number of cases among healthy subjects, especially aspergilloma. But also an increased number of invasive fungal sinusitis in imunocompromised patients, and this is why we choose to present different cases with mucormycosis. Among the immunodeficient patients there are some with severe evolution and some with latent evolution.

**Results**

All patients were treated under general anesthesia by endoscopic endonasal surgery with opening of ethmoid and maxillary sinuses, or the sphenoid sinuses, and the pathology exam confirmed the diagnosis of fungal sinusitis – mucor or aspegilus. We also discuss the appropriate treatment, surgical and medical treatment according to EPOS.

**Conclusion**

The increasing number of cases raises the question of causality; in healthy subjects aspergilloma, for instance is very rare and the appropriate treatment is surgical drainage under endoscopic control. Systemic treatment is still controversial, but in patients with immunodeficiency the disease became invasive and this demand an aggressive treatment for a potential deadly condition.

**IMMUNE IMBALANCE IN NASAL POLYPS OF CAUCASIAN CHRONIC RHINOSINUSITIS PATIENTS**

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**Aims**

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a chronic Th2 inflammatory disease in western countries and affects about 1-4% of the population. The pathogenesis remains unclear, especially the ongoing chronic inflammation. The recruitment of leukocytes in CRSwNP patients is poorly understood and defects in the leukocyte adhesion cascade could explain the selective influx of eosinophils and the immun imbalance. The known role of the leukocyte adhesion cascade for the pathophysiology of inflammatory processes led us to investigate mRNA and protein expression profiles of leukocyte adhesion cascade related components in nasal polyps of chronic rhinosinusitis patients.

**Method**

We performed biochemical, immunohistological and molecular methods to determine the gene and protein expression of leukocyte adhesion cascade related components in nasal polyps.

**Results**

In nasal polyps, an increased P-selectin expression comes along with a significant down-regulation of E-selectin, CXCL4 and CXCL5. Additionally, eosinophil and neutrophil counts differed significantly in nasal polyps, while inferior turbinates exhibited a balanced count of eosinophils and neutrophils.

**Conclusion**

Different therapies could reestablish the immun balance in nasal polyps. Beside an up-regulation of E-selectin, a down-regulation of P-selectin (to reduce the influx of eosinophils) is also possible. However, further studies are necessary to validate the best therapy in the pathogenesis of nasal polyps in CRS, and if so, whether its therapeutic effectiveness could represent a promising strategy in the future.

**ASSESSMENT OF STEROL-O-ACYL TRANSFERASE 1, A KEY ENZYME FOR CHOLESTERYL ESTER BIOSYNTHESIS, AND LIPID ACCUMULATION IN SINUS TISSUE OF PATIENTS WITH AND WITHOUT CHRONIC RHINOSINUSITIS**

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**Aims**

Airway secretions contain endogenous antimicrobial factors which contribute to the innate host defense of the respiratory tract. Antibacterial host-derived lipids including cholesteryl esters have been detected in maxillary lavage fluid. Increased gene expression of sterol O-acyltransferase-1 (SOAT1), a key enzyme for cholesteryl ester production, has been observed in the sinus mucosa of patients with chronic rhinosinusitis(CRS) versus controls. The purpose of this study is to determine if SOAT1 is present within sinus epithelial cells and to localize lipid accumulation in patients with and without CRS.

**Method**

Sinus mucosa was obtained from subjects with(8) and without(5) a history of CRS. Formalin fixed specimens were processed for immunohistochemistry for SOAT1 or, for lipid assessment;pretreated with linoleic acid(to amplify the signal of native lipids) and chromic acid(to fix the lipids prior to staining with the lipophilic dyes Oil-Red-O and Nile-Red.

**Results**

Immunohistochemistry revealed the presence of SOAT1 in all epithelial cells with a stronger staining at the cell base. In contrast, lipid staining appeared to be more prominent at the apical surface. Furthermore, in 4/5 controls, the pseudostratified respiratory epithelium was more prominently stained with the lipophilic dyes than the submucosal tissue. In contrast, in 7/8 CRS samples, submucosal tissue was more prominently stained than respiratory epithelium and numerous cells with a granular lipid accumulation were present.

**Conclusion**

Lipids as well as SOAT1 are present in sinonasal epithelial cells;and additional sources for lipids may be recruited in CRS specimens. This further supports the novel concept of lipid-mediated innate mucosal defense and its potential role in CRS.

## DO HELICOBACTER PYLORI AND LARYNGOPHARYNGEAL REFLUX HAVE A ROLE IN CHRONIC RHINOSINUSITIS ETIOPATHOGENESIS?

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### Aims

Although still controversial and poorly understood, laryngopharyngeal reflux has been linked, as an etiopathogenic factor, to chronic inflammatory disease of the nose and sinuses. The DNA of the gastric pathogen *Helicobacter pylori* has also been shown to be present in a number of upper respiratory tract sites, in both health and disease states. To investigate the role of reflux and *H. pylori* in chronic rhinosinusitis etiopathogenesis the following study was developed.

### Method

Fifteen patients with chronic rhinosinusitis had their diseased mucosa sampled during functional endoscopic sinus surgery and analyzed for pepsin and pepsinogen I concentrations, as well as for *H. pylori* DNA presence by polymerase chain reaction analysis. Simultaneously, nasal mucosa samples obtained during endoscopic surgery of five other patients with non-inflammatory conditions, serving as a control group, were analyzed in the same manner.

### Results

Although not statistically significant, the prevalence of *H. pylori* was found to be higher in mucosal samples obtained from the chronic rhinosinusitis group than in the control group. Both pepsin and pepsinogen I tissue concentrations were always lower than their respective serum concentrations, both in the disease and control group.

### Conclusion

Evidence of a recent episode of gastric reflux in the upper airway mucosa was not found in either group of patients. Also we did not seemingly find a pathological role for *H. pylori* in chronic rhinosinusitis.



**TOWARDS THE IN-VIVO AUTOMATED ASSESSMENT OF NASAL CILIA MOTILITY**

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**Aims**

Cilia motility is an important diagnostic feature for various nasal diseases, both of acquired and genetic origin.

So far this assessment has been performed ex-vivo in nasal samples. Sampling is invasive and may damage cilia, and ex-vivo measurements may not always reflect the in-vivo cilia function.

In this work we investigated the possibility of assessing cilia motility in vivo in humans with a preliminary study using confocal micro-endoscopy.

**Method**

We used the pre-clinical high-power laser confocal endoscope developed by Mauna Kea Technology (MKT). This device has a 1µm spatial resolution and a temporal resolution varying between 8 and 90 Hz.

Ex-vivo pig trachea samples and human nasal biopsy samples were labelled with fluorescent marker Octadecyl Rhodamine B Chloride (R18). Beating cilia were easily identified allowing the acquisition of 40 videos ready for analysis. Using in-house software that estimates frequencies based on luminance variation in a small window and FFT analysis, we evaluated cilia and compared the beat frequency with ground truth.

**Results**

We validated our estimations on all sequences acquired between 30 and 90Hz. Videos acquired at less than 30Hz did not offer sufficient temporal resolution. We only observed occasional errors when the software identified a harmonic oscillation instead of the fundamental frequency.

**Conclusion**

The MKT confocal endoscope allowed us to visualize ex-vivo beating cilia and to measure beat frequencies. Fluorescent dye approved for human use will be required for future in-vivo experiments. This constitutes a first feasibility step in-vivo cilia motility evaluation.

**REDUCTION OF BLOOD EOSINOPHIL COUNTS IN EOSINOPHILIC CHRONIC RHINOSINUSITIS AFTER SURGERY**

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**Aims**

This study aimed to predict the prognosis of eosinophilic chronic rhinosinusitis (ECRS), by investigating postoperative changes of blood eosinophil count and other biomarkers in the disease.

**Method**

Twenty-two patients with ECRS who were treated with ESS were examined for blood eosinophil count, and serum IL-5 before and after surgery. Data were compared with those for non-ECRS patients and patients with chronic rhinosinusitis without polyps. We also analyzed the differences between good-controlled ECRS patients and patients who experienced recurrence (RG).

**Results**

The blood eosinophil count and serum IL-5 were decreased after surgery in the ECRS group. Among ECRS patients, the preoperative blood eosinophil count was significantly higher in RG patients ( $825.7 \pm 26.1$  vs  $443.9 \pm 76.6$ ,  $p < 0.05$ ), and the blood eosinophil count was significantly decreased after surgery ( $825.7 \pm 26.1$  vs  $76.7 \pm 25.8$ ,  $p < 0.05$ ).

**Conclusion**

The blood eosinophil count in ECRS may reflect condition of patients and prognosis after surgery.

**IDENTIFICATION OF NASAL RESIDENT BACTERIA AS CAUSATIVE ALLERGENS IN CHRONIC RHINOSINUSITIS WITH NASAL POLYPS**

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**Aims**

Chronic rhinosinusitis with nasal polyps (CRSwNP) is a refractory allergic disease and is associated with eosinophil-infiltrated nasal polyps (NPs). High levels of IgE are detected in NPs of CRSwNP patients. Despite cumulative clinical studies on CRSwNP, the causation of this disease remains unclear. By using NP tissues and lymphocytes from patients, we have attempted to identify the causation.

**Method**

We performed immunostaining of NPs, the single cell-based gene cloning of NP-derived plasmablasts and in vitro T cell stimulation with several antigens.

**Results**

In the immunohistochemical analysis, clusters of AID<sup>+</sup> IgE<sup>+</sup> cells were observed in NPs, indicating that these IgE plasmablasts were differentiated within NP tissues. Immunoglobulin cloning from sorted plasmablasts of NPs revealed that in most cases, the variable region of IgE contained a large number of mutations, implying multiple rounds of germinal center reaction. We next generated monoclonal antibodies from IgE<sup>+</sup> plasmablasts of NPs. In the reactivity tests, we found that ~20% of expressed antibodies reacted with nasal resident bacteria including *S. pyogenes*, *S. aureus* and *M. catarrhalis*, while no clone was reactive to known inhalants such as pollen and mites. As Th2 cells supposed to trigger local eosinophilic infiltration as well as IgE production in CRSwNP, we examined T cell responses of patients against residential bacteria. Among the bacteria we tested, *S. pyogenes* induced activation of patient-derived blood CD4<sup>+</sup> T cells with Th2 cytokine production, which was not observed in T cells from healthy donors.

**Conclusion**

We propose that nasal resident bacteria is one of the causative allergens of CRSwNP.

## THE RELATIONSHIP BETWEEN OLFACTORY DYSFUNCTION AND THE NUMBER OF EOSINOPHILS IN NASAL POLYPS

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### Aims

Olfactory dysfunction is one of the common symptoms in patients with chronic rhinosinusitis (CRS). We have ever investigated for the clinical characteristics and prognosis of olfactory dysfunction in the patients with eosinophilic chronic rhinosinusitis (ECRS) and non-eosinophilic chronic rhinosinusitis (NECRS).

In the present study, we examined the relationship between olfactory dysfunction and the number of eosinophils in nasal polyps with ERS and NERS.

### Method

This study included the 100 CRS patients with olfactory dysfunction treated by ESS in our hospital from June 2009 to September 2014. The CRS patients were divided ECRS and NECRS by criteria of JESREC study and evaluated their olfactory function in pre and post ESS. We counted three places the number of eosinophils in the nasal polyp removed in ESS and calculated the average value.

### Results

The number of eosinophil in nasal polyp from NECRS patients (N=20) were less than 70 in all patients. There was significant correlation between blood eosinophil count and eosinophil count in nasal polyp. Blood eosinophils were correlated with the severity of disease by JESREC study, but the number of eosinophil in nasal polyp were not correlated with the severity in ECRS. Number of eosinophils in the nasal polyps was not correlated with the severity of the preoperative olfactory dysfunction, and post operative olfactory function was better in the patients with severe eosinophil infiltration in nasal polyp.

### Conclusion

In this research, it was not observed significant correlation between eosinophil in nasal polyp and olfactory function.

**CHANGES OF NASALANCE SCORE AFTER SINONASAL SURGERY**

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**Aims**

In prior studies, the initially elevated nasalance scores after sinonasal surgery have been reported to gradually recover the preoperative level. It has been hypothesized that changes in nasal cavity volume and resistance may influence nasality, but there is no conducted study about such relationship. The objective of this study was to evaluate the nasalance changes after sinonasal surgery and to determine the effects of nasal cavity volume and nasal resistance on nasalance scores.

**Method**

Included in this study were 82 chronic rhinosinusitis (CRS) patients who underwent sinonasal surgery at Chungnam national university hospital. Using a nasometer, nasalance scores were checked before surgery, a month after, and three months after surgery. At the same time, measurements of nasal cavity volume and nasal resistance using acoustic rhinometry and rhinomanometry have been recorded.

**Results**

1 month after surgery, nasalance scores and nasal cavity volume both increased significantly while nasal resistance significantly decreased; however the correlation only existed between nasalance scores and nasal cavity resistance to a moderate degree. 3 months postoperative nasalance scores and nasal cavity volume were significantly lower than those measured at 1 month post-operation. In addition, a high correlation was found between the nasalance scores and the nasal cavity volume.

**Conclusion**

Changes in nasal cavity volume and nasal resistance after sinonasal surgery have an effect on nasalance scores. Furthermore, the decrease in nasalance scores due to postoperative period is strongly affected by reduction in nasal cavity volume.

**EFFECTS OF ENDOSCOPIC SINUS SURGERY ON NASALITY IN PATIENTS WITH CHRONIC RHINOSINUSITIS**

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**Aims**

The purpose of this study was to examine the effect of endoscopic sinus surgery on voice in terms of nasality in patients with chronic rhinosinusitis

**Method**

81 patients with chronic rhinosinusitis were enrolled. We classified the patients into four groups according to the different surgical interventions employed: unilateral anterior sinusectomy (group I), bilateral anterior sinusectomy (group II), bilateral posterior ethmoidectomy (group III), and bilateral pansinusectomy (group IV). We also classified the patients into 3 groups according to the Lund-MacKay CT scoring system and polyp grading system; mild, moderate, and severe group. The nasalance scores for oral, oro-nasal, and nasal passages were measured by nasometry and nasal volume was measured by acoustic rhinometry before and at 1 and 3 months after endoscopic sinus surgery

**Results**

In group II, III, and IV, the nasalance scores for all passages and nasal cavity volume were significantly increased after ESS and did not return to its preoperative level at 3 months after surgery. However, there are no significant changes in nasalance scores and nasal cavity volume in group I. Similarly, there are no significant changes in nasalance scores for all passages in mild group classified by CT scoring system and polyp grading system, whereas the nasalance scores were significantly increased postoperatively in moderate and severe groups.

**Conclusion**

The nasalance scores and nasal cavity volumes were increased after ESS and remained unchanged until postoperative 3 months. Postoperative changes in nasalance scores were more remarkable in patients who underwent more extensive surgery and who had more severe disease.

**EFFECTS OF TRIAMCINOLONE-IMPREGNATED NASAL DRESSING ON SUBJECTIVE AND OBJECTIVE OUTCOMES FOLLOWING ENDOSCOPIC SINUS SURGERY**

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**Aims**

To compare the effects of triamcinolone (TA)- and saline-soaked biodegradable nasal dressings on subjective symptoms, wound healing and improvement of olfactory dysfunction in patients with chronic rhinosinusitis with nasal polyposis (CRSwNP) after undergoing endoscopic sinus surgery (ESS)

**Method**

A total of 80 patients undergoing bilateral ESS for CRSwNP were enrolled and randomly assigned to two groups. Nasal dressing was impregnated with normal saline in the control group while patients received triamcinolone impregnated dressing in the TA group. Sino-Nasal Outcome Test 20 (SNOT-20) and Korean Version of the Sniffin' Stick (KVSS) II test were used to assess the patients' condition preoperatively and at postoperative 1 and 3 months. Lund-Kennedy (L-K) and Perioperative Sinus Endoscopy (POSE) scores were assessed on postoperative months 1, 2, and 3

**Results**

There were significant differences between the control and TA group in terms of Postoperative L-K scores and POSE scores at 1 and 2 months. The postoperative endoscopic 4 scores were significantly decreased in the TA group compared to the control at 1 month. Olfactory functions were significantly improved at postoperative 3 months ( $p=0.0099$ ) compared to the preoperative score in the TA group. Significant improvement in the olfactory functions among anosmic and hyposmic patients at postoperative 1 month ( $p=0.0475$ ) and 3 months ( $p=0.0019$ ) compared to their preoperative olfactory function score was observed only in the TA group

**Conclusion**

TA-impregnated dressing had a significant advantage over saline-soaked dressing with regards to postoperative wound healing and improvement of olfactory function

**THE EFFECT OF UNCINECTOMY OR BALLOON SINUPLASTY ON MAXILLARY SINUS PNEUMATIZATION. A CONTROLLED RANDOMIZED CLINICAL STUDY**

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**Aims**

To conduct a prospective randomized controlled trial in patients with chronic rhinosinusitis of maxillary sinuses without severe pathology of other sinuses. To examine the cone beam computed tomography (CBCT) of paranasal sinuses in chronic rhinosinusitis patients and compare changes after operative treatment of patients with balloon sinuplasty or uncinectomy.

**Method**

Adult patients (n=60) with chronic rhinosinusitis were randomized into two groups: uncinectomy (n=31) and balloon sinuplasty (n=29). CBCT of paranasal sinuses was examined before the operative treatment and six months postoperatively. The pneumatized volume of maxillary sinuses was measured by using volumetric software (OnDemand3D™). The size of maxillary ostium and Lund-Mackay (LM) scores were analysed from pre- and postoperative CT-scans.

**Results**

There was an objective improvement in the quality of life as a decrease in total SNOT22 in both study groups. The mean postoperative maxillary sinus volume increased in uncinectomy group with 2243mm<sup>3</sup> but decreased with 553 mm<sup>3</sup> in balloon sinuplasty group. However, the difference between the groups was not statistically significant. The LM score remained unchanged after operative treatment. Also the size of maxillary ostium did not show any increase in postoperative CBCT scans.

**Conclusion**

The volumetric measurement of paranasal sinuses was found to be more accurate to measure the changes of paranasal inflammation in CT-scans compared to the LM score. The enlargement of maxillary ostium did not show up in postoperative CBCT scans although the outcome became better.



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## OUTCOME ASSESSMENT IN CRS

### TRANSNASAL ENDOSCOPIC REPAIR OF CONGENITAL BILATERAL CHOANAL ATRESIA WITHOUT STENTING, EVIDENCE BASED ?

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#### Aims

We describe the case of a neonate boy with congenital bilateral choanal atresia who underwent a transnasal endoscopic approach for resection of the vomer and the bony atretic plates.

#### Method

We observed adequate functional nasal breathing immediately postsurgery. Normal breastfeeding was possible after removal of the nasogastric tube 7 days post-op. At 3 months, one year and 3 years post-op normal breathing and feeding continues.

#### Results

Comparison is impossible because of nonstandardized reporting and lack of uniform definitions.

#### Conclusion

Multicenter randomized controlled trials (RCT's) are needed

**PATHOLOGY OF NASAL CAVITY AND PARANASAL SINUSES IN CHILDREN WITH CONGENITAL CLEFT LIP AND PALATE**

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**Aims**

The aim was to evaluate the prevalence and nature of the nasal cavity and paranasal sinuses pathology in congenital cleft lip and palate (CCLP) patients after surgery in the first year of life.

**Method**

We observed 23 children aged 9 to 16 years, after successful surgery in the first year of life and 23 children of the same age without maxillofacial anomalies. All children underwent a comprehensive examination including medical history and complaints, standard ENT examination, endoscopy of nasal cavity and nasopharynx, and computed tomography of the paranasal sinuses.

**Results**

In CCLP children 17 (74%) patients found nasal septum deviation in the quadrangular cartilage and hypertrophic rhinitis, in 2 (8.6%) - a crest in the cartilage and bone department (throughout the nasal septum) and 4 (17.4%) slight S-shaped nasal septum deviation without violation of nasal breathing and vasomotor rhinitis. All children with congenital cleft lip, had a deformation of the external nose (flattening of the nose wing on the side of the cleft, the deformation of the tip of the nose and nasal vestibule). According to CT Scan of paranasal sinuses in 53% of cases an increased pneumatization of the middle turbinate anterior end was detected, while it wasn't in patients without maxillofacial abnormalities.

**Conclusion**

In children with CLP we have 74% pathology of nasal cavity and 53% pathology of paranasal sinuses which require a surgery.

**EOSINOPHILIC ANGIOCENTRIC FIBROSIS OF NASAL SEPTUM**

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**Aims**

Eosinophilic angiocentric fibrosis (EAF) is a rare fibro-inflammatory lesion of uncertain etiology with characteristic predilection to affect the sinonasal cavity. Up to date, less than 60 cases have been described in the literature with a mean age at diagnosis of 47 years. Herein, we describe a case of EAF of nasal septum and give the clinical manifestations, radiological and histopathological findings.

**Method**

Case report

**Results**

a 47-year-old female who presented to ENT clinic with a 7-year history of progressive nasal obstruction and swelling, epistaxis, and epiphora. Physical examination showed midline dorsal nasal mass that is hard and non-tender. Nasendoscopy revealed mucosal thickening involving the nasal septum and both lateral walls. MRI scan of the paranasal sinus demonstrated abnormal thickening and enhancement in the midline involving the nasal dorsum and lacrimal ducts bilaterally with evidence of right dacryocystitis. Surgical biopsy were performed. Histopathological assessment showed fibrosis with whorling angiocentric pattern and mixed inflammation predominantly made up of eosinophil. No necrotizing vasculitis or granuloma formation was seen.

**Conclusion**

Due to the extreme rarity of this condition, Otolaryngologists should be aware of this differential as patients may present with nonspecific symptoms like nasal swelling and epistaxis.

**NK/T NASAL EXTRANODAL LYMPHOMA, A CASE REPORT**

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**Aims**

NK/T nasal extranodal lymphoma is an uncommon form type of lymphoma. It occurs predominantly in men, and is associated with EBV infection. It causes destructive lesions in facial bones, and is characterized by poor prognosis and bad response to the therapy. The diagnosis is based on histopathological and immunohistochemical findings.

**Method**

Case report

**Results**

A 71 years old male came to emergency presenting a month earlier redness and swelling of the right eye. Physical examination showed fever, chills, right eye inner edge with swelling, redness and painful to the pressure. He was diagnosed for acute dacryocystitis by the ophthalmologist and was treated with antibiotics and antiinflammatories. Patient came back to emergency three days later without any improvement and complains also headache in frontal region. Nasal endoscopy showed a mass in right middle meatus. Hospitalization was decided with intravenous antibiotics, biopsy of the lesion and imaging study. The magnetic resonance shows right antranasal ethmoid tumour with intraconal anteromedial orbital extension, septal invasion and possibly eye compromise. Differential diagnosis was carcinoma vs lymphoma. Biopsy confirm NK / T extranodal nasal lymphoma type with positive Epstein Barr virus. Despite started the right treatment by oncology ward, the patient died two months after the final diagnosis.

**Conclusion**

Facial masses with symptoms suggestive of infection that do not recover in spite of antibiotic treatment , require a thorough diagnostic imaging test. Nk linfoma acts highly aggressive and rapidly progressive conferring a poor prognosis. It should be considered in the differential diagnosis of diseases that can cause craniofacial destruction.

**INVERTED PAPILOMA: A 12 YEARS EXPERIENCE**

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**Aims**

Inverted papilloma is a benign but locally aggressive tumour of the sinonasal tract. It appears frequently from the lateral nasal wall in the fontanelle area and maxillary sinus. The most common symptom is the unilateral nasal obstruction with watery rhinorrhea.

**Method**

We performed a retrospective study of patients who had a histological confirmation of inverted papilloma in the last 12 years at a University Hospital. We analyzed the demographics, imaging findings, preoperative biopsy if performed, clinical diagnosis before surgery, final diagnosis, follow up, reoperation, and time between surgeries when recurrence.

**Results**

A total of 19 patients had inverted papilloma. Having found three unexpected cases during septal surgery, 16 patients underwent preoperative CT, but an imaging diagnosis of inverted papilloma was done only in 6 patients. Preoperative biopsy was performed in 10 patients, although a histopathologic diagnosis of inverted papilloma was done in only 8 cases. Final diagnosis was done after intraoperative biopsy in the other 8 cases.

All cases were treated by ESS including endoscopic medial maxillectomy, six of them after previous functional FESS which pathology report included inverted papilloma. Complications after medial maxillectomy were cerebrospinal fluid leak (1 case), epifora with long-term supraorbital pain (1 case) and palpebral hematoma (1 case). Mean follow-up period was in average 18 months, with a median of 5 years.

**Conclusion**

CT imaging and preoperative biopsy help the clinician to suspect inverted papilloma and plan adequate treatment. Medial maxillectomy is an appropriate technique to treat inverted papilloma. Careful technique helps to avoid recurrences.

**PILONIDAL SINUS OF THE NASAL DORSUM**

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**Aims**

Pilonidal sinus, resulting from growth abnormality and often contains hair and pus that may be intermittently discharge from a small pit, most commonly occur in sacrococcygeal region but can occur anywhere in the body. There are reports of pilonidal sinus, in scalp, forehead, interdigital region, axilla, neck and abdomen but it is very rare seen in the nasal region. Due to rarity, we aim to present a case of pilonidal sinus in nasal dorsum.

**Method**

A 16-year-old female patient who was admitted to our hospital with complaints of swelling and intermittent discharge from the nasal dorsum since birth. Physical examination of the nose showed sinus ostium in the midline of supratip and expansion in the bone-cartilage junction of the nasal dorsum. Nasal dermoid cyst was firstly considered. To rule out its intracranial extension, magnetic resonance imaging (MRI) was performed after given contrast agent into the sinus ostia.

**Results**

Any evident fistula tract or cranial extension was not detected by MRI. The Lesion was excised with open rhinoplasty approach under general anesthesia. The histopathological examination of the lesion was revealed pilonidal sinus. The patient recovered uneventfully. There was no complication after surgery and no recurrence was observed in one-year postoperative follow-up.

**Conclusion**

We conclude that, although very rare, pilonidal sinus can underline nasal region chronic fistulas and should be considered for differential diagnosis of swelling and chronic discharges in the midline of nasal dorsum.

## ENDONASAL RESECTION OF SINONASAL MUCOSAL MELANOMAS: CASE SERIES AND LITERATURE REVIEW

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<sup>3</sup>Aintree University Hospital, Department of Otorhinolaryngology- Head and Neck Surgery, Liverpool, United Kingdom

### Aims

The aim of this study was to investigate the outcomes of patients with sinonasal mucosal melanoma (SNMM) treated with endoscopic nasal resection.

### Method

Literature review and retrospective case series of SNMM patients from a five-year period at our Head & Neck Cancer Centre.

### Results

SNMM accounts for 4% of malignant nasal tumours, often presenting at an advanced stage carrying a 5-year survival rate between 5-30%. Studies have shown no differences in survival between patients treated with surgery alone and those receiving additional radiotherapy. Endoscopic resection compared to open transfacial surgery has been shown to have reduced morbidity and no survival differences.

Six patients (4 women, 2 men) were identified with a mean age 73.8 years, SD 13.4. Two patients died during follow-up, one as a result of another independent malignancy and one due to local recurrence in the infratemporal fossa.

All patients were offered post-operative radiotherapy. One declined and developed a recurrence referred to above. To date one patient has required neck dissection, another nasal adhesion division and a third underwent further endoscopic surgery for suspected recurrence. Four patients are currently disease-free.

### Conclusion

This study demonstrates that large melanotic mucosal tumours can be removed endoscopically, minimising morbidity without compromising outcome. Endonasal resection is an effective treatment option and should be considered for first-line treatment, irrespective of size.

These are rare tumours and there is a need for a multicentre collaborative study to collate results and offer meaningful data. Removal of large tumours is possible endoscopically leading to an improved overall quality of life.

**NASAL PSEUDOTUMOR**

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**Aims**

To present a 59-year old female with a nasal pyramid tumor-like deformation, diagnosed in several ENT Departments since 2009.

**Method**

To describe the course of disease and the diagnostic process in a patient with a tumor-like change of the nasal pyramid.

**Results**

The first symptoms were observed in 2008: the dryness of the nasal mucosa, nasal deformation and disordered nasal breathing. The biopsies in 2010 and 2014 revealed unspecific inflammatory changes. The computed tomography in 2014 presented bony pyramid destruction of the nose. Granulomatosis with polyangiitis was excluded. In 2015 the serum level of IgG4 was found slightly elevated. The biopsy was reassessed and sent for IgG4 immunostaining. The results were histologically suggestive of IgG4-related disease.

**Conclusion**

IgG4-related disease is a broad clinical entity of unknown origin. Its features are elevated serum IgG4 antibodies and presence of tumefactive lesions infiltrated with IgG4 positive cells with fibrosis, eosinophilic and lymphocyte infiltration and vessel obliteration. Pathologic changes may affect one or more organs such as: orbit, lacrimal glands, salivary glands, pancreas, lungs, or lymphatic nodes. It rarely may affect nasal pyramid.



**EXTERNAL NASAL DEFORMITY IN GRANULOMATOSIS WITH POLYANGIITIS**

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<sup>1</sup>Warsaw Medical University, Otorhinolaryngology, Warsaw, Poland

**Aims**

Evaluation of the external nose deformities in patients with granulomatosis with polyangiitis.

**Method**

The analysis included 46 patients treated due to granulomatosis with polyangiitis with rhinologic manifestation of the disease. To assess the severity of the external nose destruction a classification presented by W. Abdel - Hamid Hussein was used:

grade 1 - small nasal destruction with nasal dorsum slightly collapsed (almost not noticeable).

grade 2 – nasal collapse < 5mm , the nose is " upturned ." Grade 1 and 2 occur due to the cartilage destruction.

grade 3 - significant deformation of the nose due to bony and cartilaginous septum destruction.

**Results**

Nasal pyramid destruction was found in 10 patients over 46 treated in Otorhinolaryngology Department of Warsaw Medical University. 90% were women aged 29 to 74 years. The youngest one was 18 when nasal deformity occurred and the oldest one was 69 years old. Two patients underwent unsuccessful reconstruction of the external nose, one reconstruction was successful - with graft from the iliac crest. One patient has developed a fistula due to destruction of nasal bone.

**Conclusion**

Granulomatosis with polyangiitis is a rare autoimmunologic disease. External nose deformity, occurs in 25% of patients. In most cases the first stage is the septal perforation, as a result of malnutrition due to vascular necrosis. The second stage is destruction of osseo-cartilaginous junction, resulting in a loss of sufficient nasal dorsum support. This leads to the formation of the saddle nose deformity, which is a kind of stigmatization of patients with this disease.

**EXOPHYTIC PAPILLOMA: AN UNUSUAL LOCALIZATION ON THE MAXILLARY SINUS**

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**Aims**

Exophytic (or fungiform) papillomas are a special type of schneiderian papillomas from the sinonasal tract. They are described as almost exclusively arising from the nasal septum with rare cases involving the vestibule or middle turbinate. Involvement of the paranasal sinus is distinctly unusual, and practically non-reported in literature. In contrast, inverted and oncocytic papillomas generally originate from the lateral nasal wall and maxillary sinus. The differential diagnosis between these two entities and exophytic papilloma is crucial as transformation into malignancy is, by far, more frequent in the first two. We report a case of exophytic papilloma from the maxillary sinus in a 26-years old woman.

**Method**

The patient was admitted with complaints of nasal obstruction, chronic posterior rhinorrhea and frontal headache for 8 months. Nasal endoscopy revealed purulent drainage from the right middle meatus and a lateral bowing of the medial wall of the ipsilateral maxillary sinus and uncinate process. The patient underwent preoperative computed tomography that revealed a unilateral opacification of the right maxillary sinus, confirming the lateral bowing of the medial maxillary wall and uncinate process. Treatment consisted of type 2 maxillary antrostomy and identification and resection of the mass by its stalk, with removal of the affect mucosa and mucoperiosteum. Histopathology revealed exophytic papilloma.

**Results**

The patient recovered without complications; no recurrence was observed 6 months after excision.

**Conclusion**

To our knowledge this is one of the few reported cases of exophytic papilloma involving the maxillary sinus.

**SINONASAL LOCAL INVOLVEMENT OF GRANULOMATOSIS WITH POLYANGIITIS: A DISEASE ACTIVITY SCORE PROPOSAL**

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**Aims**

Granulomatosis with polyangiitis (GPA) is a multisystemic autoimmune disease characterized by necrotizing granulomatous inflammation and small vessels vasculitis, with frequent sinonasal tract involvement. Our aim is to introduce and evaluate the efficacy of a specific sinonasal disease activity score (DAS) for GPA patients with signs and symptoms of sinonasal involvement: the snGPA-DAS.

**Method**

From a retrospectively created database, we selected GPA patients with sinonasal involvement, examined at the Otolaryngology and Rheumatology Departments of Padova University between 2006 and 2015. Based on endoscopic and CT evaluation, the snGPA-DAS was calculated by evaluating the presence of nasal crusting, bloody rhinorrhea, nasal inflammation, septal perforation and bone erosion. snGPA-DAS was correlated with inflammation indexes (ESR; CRP), Birmingham Vasculitis Activity Scores (BVAS, BVAS-WG), Vasculitis Damage Index (VDI), and the need for a change in treatment strategy. Chi-square and Spearman correlation tests were applied.

**Results**

The selected sinonasal-localized GPA patients were 24 (42% of our GPA-patients cohort). Mean age was 53±13.75 years, 83.3% were ANCA positive with 73% positivity of PR3. Forty-two ENT assessments were performed. The median value of the snGPA-DAS was 2 (range 0-5). A linear association was identified between the snGPA-DAS and ESR ( $r_s=0.524$ ;  $p=0.002$ ), BVAS ( $r_s=0.722$ ;  $p<0.001$ ) and BVAS-WG ( $r_s=0.651$ ;  $p=0.001$ ). The score was moreover associated with a need of therapeutic strategy adjustment ( $p=0.02$ ). snGPA-DAS values did not correlate with VDI ( $r_s=-0.111$ ;  $p=0.48$ ).

**Conclusion**

The snGPA-DAS reflects the activity of disease. Furthermore, the score could identify patients with an active disease worthy of immunotherapy adjustments. Further evidences on larger patient's cohort are needed.

## VOLUMETRIC ANALYSIS OF THE MAXILLARY, SPHENOID AND FRONTAL SINUSES: A COMPARATIVE COMPUTERIZED TOMOGRAPHY BASED STUDY

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### Aims

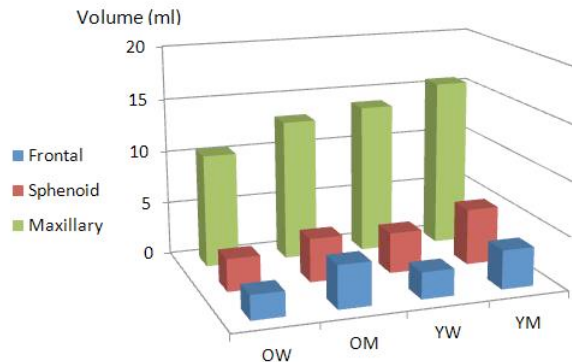
To study volume characteristics of the maxillary, sphenoid and frontal sinuses among healthy adults, using computed tomography (CT) scans.

### Method

Single academic center, retrospective, case series study. 201 CT scans were reviewed in order to estimate the volume of the paranasal sinuses bilaterally. The study population was subdivided by gender and age (50 men aged 25-64; 51 men aged  $\geq 65$ ; 50 women aged 25-64, and 50 women aged  $\geq 65$ ). Exclusion criteria included documented sinus pathology and lack of pneumatization.

### Results

The mean volume ranges of maxillary, sphenoid and frontal sinuses in the four groups were 10.5-15.7; 2.6-4.7; 2.3-3.6 cm<sup>3</sup>, respectively. In both genders, older patients demonstrated a significantly lower volume of the maxillary and sphenoid sinuses (14.81 vs. 11.82 cm<sup>3</sup> and 4.84 vs. 3.84 cm<sup>3</sup> respectively;  $p < 0.001$ ). Men had significantly larger sinus volumes: maxillary 14.38 vs. 12.23 cm<sup>3</sup> ( $p < 0.0001$ ), sphenoid 4.91 vs. 3.76 cm<sup>3</sup> ( $p < 0.001$ ), frontal 4.47 vs. 2.97 cm<sup>3</sup> ( $p < 0.001$ ). No correlation or synergistic effect was found between age and gender.



### Conclusion

Age related volume degeneration is expected in the maxillary and sphenoid sinuses. This reduction may influence future therapeutic approaches in the geriatric population.

## IF WE ARE OPERATING TO CONTROL EPISTAXIS DO WE STILL HAVE TIME FOR SEPTOPLASTY SURGERY?

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### Aims

We hypothesised that our emergency work is increasing on a year to year basis, and recognised that this may be having a potential impact upon our elective work. To test this theory we compared the number of septoplasty operations performed annually with the number of operations performed for control of epistaxis in England, over the past nine years.

### Method

The Health and Social Care Information Centre website was accessed and Hospital Episode Statistics for Admitted Patient Care for nine years, starting 2006-07 were accessed. This data was interrogated looking specifically at the number of septoplasty procedures and epistaxis procedures per year. This data was then interrogated using Numbers.

### Results

Date	Surgical Procedures for Epistaxis	Septoplasty
2006-07	12741	18,448
2007-08	14085	19,119
2008-09	15376	18,813
2009-10	15962	18,537
2010-11	16451	18,960
2011-12	16858	18,546
2012-13	17038	19,900
2013-14	17496	20,900
2014-15	17048	17,909

Our results demonstrate that whilst the number of septoplasty operations performed annually has remained relatively constant, the number of epistaxis operations is increasing on an almost year on year basis.

### Conclusion

It is important to recognise demands which are placed on any service. If, as predicted the demand for emergency epistaxis surgery continues we can expect it to start having an impact upon the provision of routine surgery. Knowing this information enables us to make contingency plans to provide patients with the safest levels of care.

**NASAL OBSTRUCTION AS THE FIRST SYMPTOM OF MULTICOMPARTIMENTAL LYMPHOMA**

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**Aims**

Lymphomas represent the second most common malignancy of head and neck region. They are generally classified as Hodgkin and Non-Hodgkin Lymphomas (NHL). In the last two decades there was an increase in the number of NHL in general and especially in the number of extranodal lymphomas. Head and Neck lymphomas represent one of the most common sites of extranodal sites of lymphomas, second after the gastrointestinal tract. We highlight the importance of Otorhinolaryngologist in diagnosing these tumors.

**Method**

We describe a clinical case of a multicompartimental lymphoma of head and neck in a female patient whose first symptom was nasal obstruction.

**Results**

81 years old female patient who attended emergency department complaining of nasal obstruction with 2 months evolution and more recent parotid area swelling. She presented with left parotid area hard, painless tumefaction, swelling of the the left side of soft palate and an ipsilateral regular vegetant lesion in nasopharynx. Transoral lesion biopsy revealed diffuse large B cell lymphoma. Patient was then treated with chemotherapy.

**Conclusion**

Non Hodgkin Lymphoma is a frequent tumor in head and neck area and the most common type is the Diffuse large B-cell lymphoma. Thus, Otorhinolaryngologist can be the first physician to deal with lymphoma. Good knowledge of the clinical characteristics of these lymphomas and the methods to establish diagnosis is essential for a correct therapy.

**PATIENT PREPARATION FOR SURGERY: A PROSPECTIVE AUDIT IN ENT**

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**Aims**

To evaluate whether operative patients feel well informed about their procedure, and how good clinicians are at providing patients with information before their operation.

**Method**

We designed a questionnaire of 5 questions regarding the provision of information to patients about their procedure when they were listed for theatre. 30 patients were identified at random for contact over a one month period from pre-operative assessment records. They were contact by telephone and asked the questions previously designed.

**Results**

Of the 30 patients contacted, 20 (67%) felt that they were satisfied with the information given about their procedure. 26 (87%) felt that all of their questions were addressed by a clinician at their clinic appointment. Only 2 (7%) received a written patient information leaflet about their procedure. All of the 28 who did not receive a patient information leaflet stated that they would have liked to receive one. 4(14%) stated that receiving more information might have affected their decision to undergo their operative procedure.

**Conclusion**

The provision of pre-operative information is imperative for patients to feel comfortable and have confidence in their surgeon prior to, during, and after their procedure. It is apparent from the study that too few patients receive written information at their appointment, and as a result, feel under prepared for their procedure. We will request that all surgeons provide their patients with leaflets when they are listed for surgery, and re-audit after a suitable period to assess whether patients feel better informed about their procedure.

**A RETROSPECTIVE ANALYSIS OF EPITHELIAL CARCINOMA OF THE NOSE UNDERGOING RESECTION AND SUBSEQUENT HISTOLOGY: ARE OUR EXCISION MARGINS TOO CONSERVATIVE?**

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**Aims**

Epithelial malignancies frequently manifest nasally, requiring resection and nasal reconstruction. Basal cell carcinoma incidence is particularly high, with around 80% of BCC's found on the head and neck and 30% estimated to occur on the nose, most frequently on the ala and nasal tip. They generally do not metastasise, invading only directly to the surrounding tissues. Management concerns resection with excision margin and nasal reconstructive before follow-up in clinic with completed histology.

**Method**

In this retrospective study we assessed outcomes in our nasal skin tumour patient cohort over recent years. A number of these cases necessitated further operations due to histology identifying the presence of a squamous cell carcinoma, which requires greater excision margins. We looked at the margin taken initially and the number of cases where histology alters management. We also looked at the reconstructive techniques used.

**Results**

Results in progress

**Conclusion**

Small excision margins maximise available tissue for reconstruction improving aesthetic and functional outcomes. They also result in second procedures for many patients. Here we investigate if our current approach is optimal for this compromise.



## MALIGNANT MELANOMA OF THE SINONASAL MUCOSA: A CASE REPORT AND LITERATURE REVIEW

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### Aims

To report a case of primitive malignant melanoma of nasal mucosa and present a literature review. We discuss its possible etiology, site of origin, incidence, clinical presentations, principles of management and outcome.

### Method

Description of clinical case of mucosal melanoma of the nasal cavity diagnosed and followed-up in the Department of Otorhinolaryngology of Hospital Garcia de Orta, in Almada, Portugal.

Literature review in PubMed database with the combination keyword "mucosal melanoma" associated with various terms of the ENT universe (particularly focusing on rhinology sphere), including "intranasal cavity", "paranasal sinuses", "treatment", "endoscopic sinonasal surgery", "radiotherapy", "metastasis", "prognosis". Research conducted without deadlines.

### Results

A 77-year-old man presented with unilateral nasal block, sporadic epistaxis and nasal discharge for the last 3 months, caused by the evolution of a greyish irregular mass in the left nasal cavity. The biopsy and the computed tomography showed malignant melanoma with invasion of the nasal cavity structures. The patient was submitted to endoscopic sinonasal surgery supported by video report.



### Conclusion

Malignant melanoma of the nose is a rare tumor, with aggressive behavior and poor prognosis. The early diagnosis is the best option for this tumor nowadays. Rarity of this lesion warrants its mention and emphasizes the importance of considering malignant melanoma among the differential diagnosis of nasal obstruction, especially at old age patients and in unilateral obstructions.

**MONOSTOTIC FIBROUS DYSPLASIA OF MAXILLARY SINUS: A CASE REPORT**

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**Aims**

The Fibrous Dysplasia (FD) is a fibro-osseous lesion characterized by the replacement of normal elements of the bone for a disorganized fibrous tissue. There are two primary categories of the disease: monostotic fibrous dysplasia, that involves only one bone and represents 70% of the cases; and polyostotic fibrous dysplasia, that presents the involvement of several bones. Polyostotic form may form part of the McCune-Albright syndrome or of the Jaffe-Lichtenstein syndrome. It is generally developed at the end of the childhood and the craniofacial skeleton is a frequent region of the disease.

The aim of this presentation is to report clinical and radiological findings of a case diagnosed as FD of the maxillary sinus.

**Method**

Review of clinical file.

**Results**

CASE REPORT: A 10-year-old Portuguese child was referred to our hospital with a clinical of a painless swelling in the right hemiface, noticed two months before. At Otorhinolaryngology physical examination no other significant manifestations were observed. Paranasal Sinus CT scan revealed a mass with hyperdense standard intermixed by imprecise limits hypodense areas, occupying the right maxillary sinus and partially involving the right maxilla. This picture suggested a diagnosis of Fibrous Dysplasia. The systemic search of other osseous lesions and endocrinologic study were negative.

**Conclusion**

We describe a case of monostotic FD of maxillary sinus in a female child. Just the presence of the lesion does not justify surgical intervention, considering the symptoms and patient's age, so we chose an expectant procedure. The patient is under periodical follow-up.

**AGGRESSIVE NASOSINUSAL LYMPHOMA OF NATURAL KILLER (NK) CELLS: A CASE REPORT AND LITERATURE REVIEW**

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**Aims**

Natural killer (NK)/T-cell lymphomas represent a rare type of lymphoma derived from either activated NK cells or, rarely, cytotoxic T cells. These lesions are most commonly extranodal and tend to present as destructive lesions within the midline facial structures, initially localized to the nasal region. The T/NK cells lymphoma may manifest in any age group, with prevalence of the male sex and older groups.

**Method**

Case report and literature review.

**Results**

A 70-year-old Portuguese female presented with nasal obstruction, foul smell and burn feeling sensation in the left hemiface for three months, without recovery with antibiotics. Otorhinolaryngology examination revealed extensive crusting of the nasal mucosa of the septum and lateral wall and floor of the nose. Nasal biopsies were performed twice under local anaesthesia, but did not show any evidence of malignancy. A wide number of infectious, autoimmune, or inflammatory diseases were excluded. Paranasal Sinus CT scan revealed a total opacification of the left maxillary sinus, ethmoid sinus, frontal sinus, right nasal cavity and nasopharynx. Under general anaesthesia an endoscopic sinus surgery was scheduled with left meatal antrostomy, ethmoidectomy, sphenoidotomy and frontal sinusotomy. The histopathological exam using immunohistochemical analysis diagnosed an extranodal NK/T-cell lymphoma, nasal variant. Patient was referred to the Oncology department; chemotherapy treatment was started but after the first cycle she died.

**Conclusion**

This lethal case in an immune competent woman represents the aggressive clinical course and poor prognosis of the nasosinusal lymphoma of T/NK cells. It has a rapid evolution; the diagnosis is often difficult and requires expert clinical examination.

**SALVAGE SURGERY IN RHINOSINUSAL TUMORS**

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<sup>1</sup>Coltea Clinical Hospital, ENT- Head&Neck Surgery Department, Bucharest, Romania

**Aims**

The development of technical facilities, together with better understanding of anatomy and rhinosinusal tumors, are the base for treatment guidelines regarding tumors of the paranasal sinuses; step by step surgery addressed to the management of paranasal sinuses tumors is changing from the classic to endoscopic surgery, but we still have situations in which we choose open surgery.

**Method**

Tumors affecting the nose and paranasal sinuses are rare, but they can be difficult to manage because of their late presentation and extension to important anatomical structures like the eye and brain, and surgical complications should be treated as well; we still have a lot of cases in which salvage surgery is the option.

**Results**

Although new technical achievements make more and more addressed the endoscopic procedures, the surgeon should know to perform the open approaches and to manage all the possible complications. Unfortunately we still have a lot of cases to be managed by salvage surgery.

**Conclusion**

The multidisciplinary approach, oncologic principles are the gold standard for the curative intent in sinonasal malignancies. We should have the most appropriate approach tailored to the patient tumor and we should be prepared for long term follow up.

**PREDICTIVE VALUE OF ONCOGENES EXPRESSION IN SINUSES MALIGNANCIES**

***R. Grigore<sup>1</sup>, B. Popescu<sup>1</sup>, A. Nicolaescu<sup>2</sup>, R.C. Popescu<sup>1</sup>, S.V.G. Bertesteanu<sup>1</sup>***

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**Aims**

Nasal sinuses malignancies are rare and in this field lymphomas are even more rare. Diagnostic is sometimes tricky and always an excisional biopsy is necessary. A lot of scientists are looking for more information about evolution of these tumors and markers for bad or good evolution, like oncogenes expression.

**Method**

Among all the patients diagnosed with lymphoma of the head and neck in our clinic (237), we focused on these with paranasal sinuses involvement (27patients). All patients were questioned about symptoms and were investigated with nasal endoscopy and CT-scan.. We examined the subtype of paransal tumor and also the presence of molecular markers such oncogenes proteins, bcl 2 and bcl 6. We tried to correlate these markers with the evolution of patients, relapse rate, treatment response, survival rate.

**Results**

Oncogenes expression like bcl 2 and bcl 6 were positive especially in follicular lymphoma (bcl 2) but in a certain degree there is a combination of bcl 2 and bcl 6 expression in every tumor. We also determined Ki 67 expression, positive in the majority of severe cases.

**Conclusion**

We tried to correlate if the primary lesion, head and neck, sinuses or lymph node can be linked with severity of disease or evolution. We also tried to see if bcl 2, bcl 6 expression can be a factor for prognosis. In the same time we correlate the time from diagnosis with the second malignancy. The future might be a treatment addressed to these proteins expression.

**SINONASAL ADENOCARCINOMA: REVISION OF A SERIE OF CASES**

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**Aims**

We present a serie of sinonasal cancer cases treated in our department during a 13 years period. We aim to perform a survival analysis and to compare our results with the literature available.

**Method**

Retrospective analysis of medical reports of patients diagnosed with sinonasal cancer in our department between January 2002 and March 2014. SPSS® 22 was used for statistic analysis. Survival analysis was performed using Kaplan-Meier methodology.

**Results**

14 patients (13 male and 1 female), mean age at diagnosis of 60 years, 11 wood workers. Half of the patients presented with a TNM stage IV at the diagnosis. 11 patients were treated initially with surgery: endoscopic sinus surgery (4 cases), external surgery (5 cases) and combination of both techniques (2 cases). All of these were treated with adjuvant radiotherapy. The 2 years and 5 years overall survival rates were respectively 60% and 40%.

**Conclusion**

This study showed that our results are within the range previously published. Our population is almost represented by wood workers. The late diagnosis associated with poor outcomes of this disease seriously compromises the prognosis and possible curative treatment. This review highlights the greater use of endoscopic sinus surgery as surgical modality. The most important Oncology Centres agree that surgery is the mainstay of treatment, regardless of modality. Our study showed that surgical modality is not related with different survival rates. It is important to create screening policies directed to the wood workers, in order to recognize early adenocarcinoma patients and get better outcomes.

**DOES PRE-OPERATIVE ADMINISTRATION OF GABAPENTIN/PREGABALIN IMPROVE POST-OPERATIVE NASALSURGERY PAIN?**

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**Aims**

**Objectives**

Gabapentin and pregabalin are useful for treating neuropathic pain and managing acute post-operative pain. The goal of this meta-analysis was to perform a systematic review of the literature on the effect of gabapentinoids on post-operative pain, following nasal surgery, and its adverse effects in patients.

**Method**

Two authors independently searched the databases such as MEDLINE, SCOPUS, and Cochrane from the beginning of each database's article collection to December 2015. They identified studies that compared pre-operative gabapentinoid administration (gabapentinoids groups) with a placebo or pain control agent (control group) with the outcomes of interest, which included post-operative pain intensity, rescue analgesic consumption, or adverse effects—such as sedation, nausea and vomiting, blurred vision, operative bleeding, dizziness, and headache—during a 24-hour post-operative period.

**Results**

The pain score reported by the physician and need for analgesics during the first 24 hours, post-operatively, significantly decreased in the gabapentinoids group versus the control. Additionally, there was no significant difference between the gabapentinoids and control groups for adverse effects, with the exception of blurred vision during 24 hours post-operatively. In the subgroup analyses of these results according to operation type, these subgroups showed similar effects on reducing post-operative pain and adverse effects.

**Conclusion**

Pre-operative administration of gabapentinoids could provide pain relief without significant side-effects in patients that undergo nasal surgery. However, blurred vision may be a handicap that requires attention for use and education for patients. Further clinical trials will confirm the results of this study.

## HEMANGIOPERICYTOMA OF THE MAXILLA-A REPORT OF A RARE CASE AND REVIEW OF LITERATURE

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### Aims

Introduction:- Haemangiopericytoma (HMP) is a very rare slow-growing malignant vascular tumor arising from the mesenchymal cells with pericytic myoid differentiation. We present a very rare case of hemangiopericytoma of the right maxilla in a 62 year old lady who presented with recurrent profuse epistaxis and review the literature.

### Method

Retrospective case report.

### Results

A 62 year Indian female presented to us with episodes of recurrent epistaxis from the left nostril over the past two months. With a diagnosis of fibrocytoma with malignant transformation elsewhere, she was advised radiation. She presented to us after two fractions of radiation with profuse nasal bleeding. Examination revealed large vascular polypoidal mass occupying entire right nasal cavity with considerable bleeding when probed. A MRI revealed a diffuse enhancing mass in the right maxilla eroding the posterior and lateral walls with suspicious area of involvement of the periorbita. A repeat biopsy at our institution showed closely packed spindle cells separated by thin walled branching dilated blood vessels. Immuno histochemistry reveals CD 34, Myogenin, S100, Desmin, SMA negativity and positivity to Ki 67 (20%), CD 68, and Vimentin. Based on the histological features and IHC, the diagnosis of hemangiopericytoma was established.

### Conclusion

Discussion:-Haemangiopericytoma of the sino nasal cavities is extremely rare and the diagnosis is always histological. Sinonasal HMP unlike soft tissue HMP have myoid differentiation. Treatment is often radical excision and role adjuvant therapy remains unknown. HMP when it occurs in the sino-nasal cavities has relatively better prognosis with five year survival of around 88%.



**THE EFFICACY OF LAVENDER AROMATHERAPY IN REDUCING PREOPERATIVE ANXIETY IN AMBULATORY SURGERY PATIENTS UNDERGOING PROCEDURES IN GENERAL OTOLARYNGOLOGY**

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**Aims**

Preoperative anxiety is a common problem in hospitals and other health care centers. This emotional state has been shown to negatively impact patient satisfaction and outcomes. Aromatherapy, the therapeutic use of essential oils extracted from aromatic plants, may offer a low-risk and cost-effective method of managing preoperative anxiety. The purpose of this study was to evaluate the efficacy of lavender aromatherapy in reducing preoperative anxiety in ambulatory surgery patients undergoing procedures in general otolaryngology.

**Method**

A prospective and controlled pilot study was conducted with 100 patients who were admitted to New York-Presbyterian/Weill Cornell Medical Center for ambulatory surgery. The subjects were allocated to two groups; the experimental group received inhalation lavender aromatherapy in the preoperative waiting area while the control group received standard nursing care. Both groups reported their anxiety with a visual analog scale upon arriving to the preoperative waiting area and upon departure to the operating room.

**Results**

Using a paired t-test, anxiety in the experimental group was shown to significantly decrease following aromatherapy intervention ( $p < 0.05$ ). The change in anxiety was not significant in the control group ( $p > 0.05$ ). Moreover, the results of an independent t-test showed a statistically significant difference in the mean change in anxiety between the experimental and control groups ( $p < 0.05$ ).

**Conclusion**

Lavender aromatherapy was shown to reduce preoperative anxiety in ambulatory surgery patients. Future research is needed to confirm the clinical efficacy of lavender aromatherapy and elucidate the underlying mechanism of its anxiolytic effects.

**EFFECT OF BOTULINUM TOXIN TYPE A THERAPY IN PATIENTS WITH JAPANESE CEDAR POLLINOSIS (4TH TRIAL): E-BOAT 4-PILOT STUDY**

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**Aims**

Botulinum toxin type A (BTX-A) is a neurotoxin that inhibits the release of acetylcholine from presynaptic neurons at the neuromuscular junctions. Since 2009, we have been evaluating the efficacy and safety of BTX-A-injection therapy in patients with Japanese cedar pollinosis in a placebo-controlled double-blinded fashion (E-BOAT 1-3). Those studies have demonstrated that pollen levels in a season and the timing of BTX-A injection (before or after pollen release) could affect the efficacy of therapy. Here, we modify the application of BTX-A to be more minimally invasive and evaluated the efficacy of therapy in patients with Japanese cedar pollinosis.

**Method**

Twenty patients with Japanese cedar pollinosis were randomly divided into 2 groups: Group A, receiving 40 units (0.8 ml) of BTX-A; and Group B, receiving 0.8 ml of isotonic saline (placebo). Drops of the agent were added to cotton inserted into each nostril in the 2014 pollen season. Symptom scores, medication scores, and adverse events were evaluated during 2 months from March 3, 2014.

**Results**

Symptom and medication scores did not differ significantly between groups, but aggravation of nasal symptoms during the season appeared significantly reduced in Group A. No major adverse events were encountered in either group

**Conclusion**

Future studies with a larger number of patients could clarify the efficacy of BTX-A cotton-soaked therapy for Japanese cedar pollinosis.

**A CASE OF NASAL EXTRANODAL NK/T CELL LYMPHOMA MISDIAGNOSED AS RECCURENT PERIORBITAL CELLULITIS OR ACUTE DACRYOCYSTITIS**

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**Aims**

Nasal extranodal natural killer/T cell (NK/T cell) lymphoma is more common in East Asia than in the United States, comprising up to 7-10% of all non-Hodgkin's lymphoma. Early nasal symptoms are nonspecific and similar to chronic rhinosinusitis, such as nasal obstruction and nasal bleeding. With disease progression, inflammation and necrosis of the mucosa increase, hindering pathologic diagnosis. We experienced a case of nasal extranodal NK/T cell lymphoma in a 58-year-old woman who presented with recurrent periorbital swelling.

**Method**

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**Results**

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**Conclusion**

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**PIGMENTED NASOPHARYNGEAL INFLAMMATION MIMICKING PRIMARY NASOPHARYNGEAL MELANOMA**

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**Aims**

we report a rare case of pigmented nasopharyngeal inflammation mimicking primary nasopharyngeal melanoma that presented as right otalgia and sore throat.

**Method**

clinical experience

**Results**

Pigmented nasopharyngeal inflammation

**Conclusion**

Pigmented lesions represent a variety of clinical entities, ranging from physiological changes to manifestation of systemic illness and malignant neoplasm. Although pigmented nasopharyngeal inflammation is an exceedingly rare pathology with obscure clinical presentation, it should be distinguished from primary nasopharyngeal melanoma, which is malignant mucosal tumors and have more serious consequences. Herein, we report a rare case of pigmented nasopharyngeal inflammation mimicking primary nasopharyngeal melanoma that presented as right otalgia and sore throat.

**SEPTOCHOANAL POLYP WITH METAPLASTIC OSSIFICATION MIMICKING SINONASAL TUMOR: A CASE REPORT**

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**Aims**

To describe a rare clinical presentation of a huge septochoanal polyp with metaplastic ossification.

**Method**

A 77-year-old man presented with progressive nasal obstruction of the both sides for 20 years. There was no history of nasal discharge and allergy. The endoscopic examination revealed obstruction of posterior choanae by a huge both nasal cavity mass filling the entire nasopharynx and extending into the oropharynx. A computed tomography scan of the paranasal sinuses showed soft tissue lesion with adjacent bony remodeling and irregular ossification in the both nasal cavity, nasopharynx, oropharynx. On magnetic resonance imaging, metaplastic ossification had heterogenous high signal intensity on T1-weighted images and low signal intensity on T2-weighted images. The haziness in both frontal, ethmoidal, and maxillary sinuses was also noted. Endoscopic sinus surgery was performed under general anesthesia. The pedicle of mass was identified on the right posterior nasal septum. The base of the lesion including the healthy mucosa around it was removed and cauterized using suction cautery for prevention of recurrence. The mass was removed via the oropharynx. Histopathologic examination showed a benign nasal polyp with extensive metaplastic bone formation in the stroma.

**Results**

According to the operative and histopathologic findings, this case was diagnosed as a septochoanal polyp with metaplastic ossification. Endoscopic examinations performed 6 months postoperatively demonstrated no evidence of recurrence.

**Conclusion**

Although septochoanal polyp is known to be very rare, it must be included in the differential diagnosis of nasal cavity mass. Furthermore, metaplastic ossification within septochoanal polyp should be considered in the benign-looking nasal cavity mass.

**OCCURRENCE OF INCIDENTAL FINDINGS IN PARANASAL SINUSES IDENTIFIED ON COMPUTER TOMOGRAPHY SCANS MADE IN LATVIA**

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**Aims**

The aim was to retrospectively analyze the occurrence and the types of incidental abnormalities of paranasal sinuses detected by radiographic examinations in the Latvian population.

**Method**

The research work includes retrospective data of three hundred patients. They underwent spiral computer tomography (CT) scan of the head referred for non-sinus pathologies in Pauls Stradins Clinical University Hospital in Latvia between February 2015 and October 2015.

**Results**

Analysing descriptions of CT scans made by radiologists for primary pathology and evaluating CT scans it was found that the most frequent incidental finding is pathology of sinus mucosa. Mucosal thickening was the most frequent. The most frequently affected were *sinus maxillaris dextra et sinistra*. The degree of mucosal pathology in maxillary sinuses was measured. Mild mucosal pathology predominates. *Sinus maxillaris dextra* is the location where noted total opacity during staging CT scans with Lund-Mackay score. There was statistically significant association ( $P_x = 2.55 \times 10^{-2}$ ) between the type of incidental finding and the mean age of patients. Patients with nasal polyp or pathological substrate were the oldest. Pathological substrate and retention cyst was more common among females than males ( $P_x = 7.00 \times 10^{-4}$ ). Radiological signs of acute sinusitis were more common during winter, but antrolith was not noted during winter period at all ( $P_x = 4.10 \times 10^{-3}$ ).

**Conclusion**

Radiological incidental findings in paranasal sinuses are common in Latvian population. Incidental findings may be considered in the individual clinical context of signs and symptoms, reducing the risk of overestimation of the real impact of radiographic findings.

**EXTRA NODAL NATURAL KILLER/ T CELL LYMPHOMA, NASAL TYPE IN THE NOSE AND PARANASAL SINUS**

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**Aims**

**Method**

**Results**

**Conclusion**

We describe three patients with extra nodal NK/ T cell lymphoma nasal type in the nose and paranasal sinus. It is a rare disease and locally very aggressive. Although this disease is much more in common in Asia it can also be seen in patients from European background. The Epstein-Barr virus may have a pathogenic role. Distant spread of the disease is rare in contrast to extranasal NK/T cell lymphoma. The treatment of this often diagnosed stage 1E disease consists of high dose local radiotherapy followed by chemotherapy.

**TOLERABILITY OF FLEXIBLE FIBREOPTIC NASOENDOSCOPY AND NASAL SAMPLING WITHOUT LOCAL ANAESTHETIC**

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**Aims**

The nose provides a number of local, measurable mediators which can have implications for ill-health, both locally and in the context of wider disease. In clinical practice and research the nose may need to be assessed with differing instruments, including nasendoscopy, sometimes without local anaesthesia. In a study assessing nasal activity, fibreoptic examination was carried out alongside obtaining samples for analysis of soluble nasal proteins (proteomics) and nasal messenger ribonucleic acid (mRNA) expression (transcriptomics). This unique study provides insight in the tolerability of nasal instrumentation with routine appliances, when done without local anaesthesia.

**Method**

As part of an ethically-approved study assessing nasal mediators, participants underwent nasal mucosal lining fluid sampling and superficial nasal epithelia curettage before fibreoptic nasal assessment. This was done by the same otolaryngologist using an absorptive synthetic absorptive matrix (SAM), a rhinoprobe nasal curette and subsequent flexible nasendoscope respectively, followed by a blood test by phlebotomists. Patients were then invited to assess the painfulness of each procedure on a 0-10 Likert chart, with zero being no pain and 10 being unbearable.

**Results**

Twenty-six patients consented to a variety of sampling without local anaesthesia. The median pain score for venepuncture, nasal curettage with a rhinoprobe and mucosal lining fluid sampling with a SAM was one out of ten, each. Nasendoscopy scored three out of ten for pain, when carried out afterwards.

**Conclusion**

This limited study gives some insight into the potential tolerability of nasal sampling without local anaesthesia, highlighting that it need not be any more painful than routine venepuncture.



## THE POTENTIAL ROLE OF PODOPLANIN IN NASOPHARYNGEAL CARCINOMA

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### Aims

Podoplanin (PDPN) has been known to be expressed in a variety of tumors, but its expression in Nasopharyngeal carcinoma (NPC) is still unknown. The aims of this study were to investigate the podoplanin expression and possible role in NPC cells.

### Method

The expression of PDPN was investigated by immunofluorescence staining of cultured NPC TW01 cells. The effects of PDPN knockdown by siRNA in NPC TW01 were determined for cellular functions in terms of cell proliferation, migration, and invasion. Microarray was further conducted to see genes that PDPN might regulate.

### Results

Our results showed PDPN was expressed in most NPC TW01 cells. The expression was decreased after cells transfected with PDPN siRNA. PDPN siRNA decreased NPC cell proliferation, migration, and invasion. The microarray data showed 62 up-regulated genes and 7 down-regulated genes.

### Conclusion

PDPN is expressed in NPC cells, and it could affect cell proliferation, migration, and invasion. It may serve as a potential chemotherapeutic target for NPC in the future.

**THE ACCURACY OF FOCAL HYPEROSTOSIS ON COMPUTED TOMOGRAPHY SCAN AS A MEANS TO IDENTIFY THE TUMOUR ORIGIN OF SINONASAL INVERTED PAPILOMA**

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**Aims**

The objective of this study is to evaluate the accuracy of focal hyperostosis on CT scan in identifying the tumour origin of inverted papilloma.

**Method**

We retrospectively reviewed 23 consecutive cases of sinonasal inverted papilloma treated in our unit between 2007 and 2014. The CT scans were interpreted by a rhinologist through a blinded process. The correlation between the suspected site of origin and the intraoperative findings was made.

**Results**

Sites of tumour origin were the lateral nasal wall 56.5% (n=13), maxillary sinus 21.7% (n=5) and ethmoid cells 8.7% (n=2). In three cases (13.0%), the site of origin extended across multiple areas. The incidence of hyperostosis in inverted papilloma was 86.9% (n=20). The accuracy of focal hyperostosis in predicting the gross location of tumour origin was 90.0% (n=18) (eg: lateral nasal wall, maxillary sinus, ethmoid cells). However, its accuracy in predicting the precise location of the tumour origin was 70.0% (n=14) (eg. Specific turbinate, sphenoethmoidal recess, uncinata process, bulla ethmoidalis). There was particular difficulty (60.0%, n=6) in identifying the precise origin of the tumour arising from the lateral nasal wall.

**Conclusion**

Focal hyperostosis in preoperative CT scan can accurately identify the gross location of tumour origin but harder to pinpoint the exact tumour origin when anatomical structures are small and in close proximity to one another such as at the lateral nasal wall. Therefore, CT scan is helpful in surgical planning for sinonasal inverted papilloma, but intraoperative endoscopic visualization remain the gold standard to identify the actual tumour origin and enable adequate resection.

**RESULT OF ENDOSCOPICALLY RESECTION SCHNEIDARIAN PAPILLOMA IN A MULTIRACIAL SOCIETY**

**K. LIM<sup>1</sup>**

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**Aims**

Determine the epidemiological characteristic of schneiderian papilloma among the various ethnic groups.

Review the 10 year results of endoscopic resected schneiderian papilloma

**Method**

The case records were studied retrospectively to establish the demographic, clinical characteristics and outcome of patient with histologically proven schneiderian papilloma that were managed endoscopically between 2003 and 2013.

**Results**

Thirty eight patients with histologically schneiderian papilloma was treated endoscopically. Patient's mean age was 55 years old (ranged 22 to 86 years old), with 65.8% of male. Majority (84.2%) of the patients were of Chinese followed by Indian 7.9%. There were no Malay patients. The most common presenting symptom was nasal obstruction followed by rhinorrhea and epistaxis. Majority of the tumour were Krouse 2 and 3. The recurrence rate was 13.2%. There were no major complications. The most common minor complication was bleeding, followed by infection, septal perforation and paraesthesia. One had severe dysplasia and another has carcinoma in situ. Average follow up was 3.09 years (range 39 weeks to 10 years)

**Conclusion**

Schneiderian tumour is most commonly found among middle age Chinese male. Presenting symptom was non specific. Endoscopic resection is the standard modality of treatment in Singapore with acceptable recurrence rate and complications.

## THE ARTERIAL SUPPLY TO THE NASAL CAVITY

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### Aims

To create an accurate description of the arterial supply to the nasal cavity using cadaveric dissection and a literature review.

### Method

Six fresh frozen heads were dissected. Four heads had their arterial systems injected with red resin. One of the injected heads was hemisected in the sagittal plane to allow gross dissection. All other heads underwent bilateral endoscopic dissections, for a total of nine dissected sides. A literature search was carried out to determine the current available information on the arterial supply of the nasal cavity.

### Results

The sphenopalatine artery (SPA) divides into two main branches: the posterior septal artery (PSA) and the posterior lateral nasal artery (PLNA). In general anatomical textbooks, the SPA is described as exiting the sphenopalatine foramen (SPF) as one branch. In recent literature, the SPA has been found to split into two or more branches before exiting the SPF, which we confirmed in our dissections. In five sides the SPA and PLNA exited the SPF separately, with a third branch noted in one side. In five sides the PSA bifurcated on the sphenoid rostrum lateral to the natural sphenoid ostium. In the hemisected head, an anastomosis between the anterior ethmoidal and anterior lateral nasal arteries was found near the axilla of the inferior turbinate.

### Conclusion

Our research delineates this anatomy in detail, and should be of use to surgeons, anatomists and students with an interest in the nasal cavity and related structures.

**SINONASAL - TYPE HAEMAGIOPERICYTOMA TREATED WITH PREOPERATIVE EMBOLISATION AND ENDOSCOPIC RESECTION: A CASE PRESENTATION**

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**Aims**

Sinonasal – type haemagiopericytoma is a rather rare, benign tumor of pericytes that accounts for less than 0.5% of all sinonasal tumors. It carries a low malignancy potential and differs from conventional soft-tissue hemangiopericytoma in its location, pathologic and clinical features.

**Method**

We report the case of a 55-year-old male who presented with right nasal obstruction. Clinical examination followed by nasendoscopy, CT and MRI examinations demonstrated a soft-tissue mass that obstructed the right nasal cavity and extended into the left maxillary sinus and nasopharynx. Biopsy of the mass revealed a sinonasal hemangiopericytoma. It was decided to treat the tumor by preoperative embolization followed by complete endoscopic resection. The angiographic control demonstrated arterial supply to the mass by both internal maxillary arteries, and they were embolized with microparticles. The patient underwent endoscopic right middle meatal antrostomy followed by “powered” reduction of middle turbinate, anterior and posterior ethmoidectomy and sphenoidotomy. Complete resection of the tumor was achieved.

**Results**

Pathology and immunohistochemistry confirmed features of a sinonasal – type haemagiopericytoma. The postoperative period was uneventful and no recurrence was noted during the 6-month follow-up period.

**Conclusion**

We conclude that diagnosis with biopsy and preoperative planning with CT and MRI imaging modalities is important. When it comes to treatment, endoscopic resection is preferable, with angiography and superselective embolisation reserved for cases of large or highly vascular tumor, reducing perioperative blood loss and operation time and adding to the safety of the procedure.

**INVOLVEMENT OF GASTRIN-RELEASING PEPTIDE IN ALLERGIC RHINITIS**

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<sup>1</sup>Kyorin University School of Medicine, Otolaryngology, Tokyo, Japan

**Aims**

The present study utilized the nasal mucosa of AR model mice to examine GRP and GRP receptor expression levels, localization, and other factors, and examine their role in AR pathology (e.g. nasal mucosal hypersensitivity).

**Method**

The AR model was created using BALB/c mice, and GRP and GRP receptor localization and chronological changes in allergic sensitization in a control group and an AR group were examined using western blot (WB) and fluorescent immunostaining. Pathology and therapeutic effectiveness were also examined using GRP inhibitors.

**Results**

GRP and GRP receptor were heavily expressed in the AR group, where they were found present in the nasal mucosal epithelium and surrounding the nasal glands, and in the submucosal gland and nasal mucosal epithelium, respectively. Moreover, mice that were administered GRP receptor antagonist (RC-3095) nose drops demonstrated a decreasing trend in nose scratch and sneeze counts compared to non-administered mice.

**Conclusion**

The increase of GRP and GRP receptor in the AR group indicated by WB and fluorescent immunostaining, and the mitigation of symptoms by the GRP receptor antagonist, suggest that GRP and GRP receptors act as aggravating factors in symptoms of allergic inflammation.

## ENDOSCOPIC RESECTION OF EXOPHYTIC PAPILLOMA IN SITU OCCUPYING THE POSTERIOR NASAL CAVITY

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### **Aims**

Sinonasal papilloma (SP) is a benign epithelial neoplasm arising from the schneiderian mucosa and accounts for 0.5-4% of all nasal tumors. Malignant transformation occurs in about 10% of SP. Most of SP with malignant transformation is either inverted or oncocytic type. Here we report a rare case of exophytic papilloma with malignant transformation.

### **Method**

This is a case report of an exophytic papilloma with carcinoma in situ, which occupied the posterior nasal cavity.

### **Results**

A 50-year-old woman consulted our hospital for the treatment of left nasal tumor. Nasal endoscope revealed a reddish mass filling the posterior left nasal cavity. Enhanced computed tomography (CT) showed a slightly enhanced mass without bone destruction in left of nasal cavity. Images of magnetic resonance imaging (MRI) indicated that the tumor origin was inferior turbinate or nasoseptal mucosa. We performed endoscopic endonasal resection for the tumor. It was certain the continuity of tumor with mucosa around the palatovaginal artery, not with the inferior turbinate or nasoseptal mucosa. The tumor was totally resected together with mucosa around the palatovaginal artery, posterior half of inferior turbinate and posterior half of septum mucosa. Histopathological examination demonstrated the presence of carcinoma in situ in the tumor.

### **Conclusion**

The present case indicated that even in case of exophytic papilloma, complete resection and detailed histopathological examinations is crucial.

**RHINOLITHIASIS- AN UNSUAL CAUSE FOR A COMMON SYMPTOM**

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**Aims**

A rhinolith is a calcified mass formed within the nasal cavity due to solidifications of mucus, debris or foreign bodies by gradual accretion of mineral salts. They are uncommon and rarely encountered in clinical practice. A case report of a female patient presenting with a longstanding rhinolith in her right nasal cavity is described and a review of the literature is provided.

**Method**

Case Report and review of the literature.

**Results**

We present the case of a 44-year-old female that was referred by her general dental practitioner with a incidental radio-opaque lesion in the right nasal cavity on routine dental panoramic radiograph. She presented a longstanding undetected rhinolith with mild symptoms. Radiographic examination revealed anatomical alteration of the inferior turbinate that was attributed to the long presence of the rhinolith in the nasal cavity. The patient underwent removal of the rhinolith under general anesthesia, uneventfully. The anatomopathological analysis revealed the inorganic properties of the foreign body.

**Conclusion**

In conclusion, rhinolithiasis is a rare condition but must always be suspected in patients with long standing nasal obstruction, nasal and oral malodor, purulent rhinorrhea and chronic headache. The treatment of choice is surgical removal under local or general anesthesia.



## COMPLEX THERAPEUTIC PROCEDURE IN A PATIENT WITH MICROTIA AND EXTERNAL AUDITORY CANAL ATRESIA

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### **Aims**

Case presentation of a complex therapeutic procedure, including surgical, plastic and audioprosthesis treatments in a patient with microtia and external auditory canal atresia.

### **Method**

Patient with a left sided microtia, external auditory canal atresia and ipsilateral conductive hearing loss was appointed in the World Hearing Center. Two-stage procedure with use of autogenic cartilage graft was performed according to Brent-Nagata method modified by prof. Skarzynski. The patient was also interested in hearing restoration. Audiometric results and computed tomography images has been considered and the patient was qualified for a Vibrant Soundbridge implantation in left ear. The implantation was performed after plastic therapy. For esthetic and functional assessment a 10-degree scale proposed by Skarzynski has been used. The hearing benefit after middle ear implantation was assessed applying free field speech audiometry.

### **Results**

The effects of the plastic procedure reached 8 points in the Skarzynski's 10-degree scale, which means that functional and esthetic results were obtained. Analysis of audiometric results indicates effectiveness of the applied methods.

### **Conclusion**

Microtia with external auditory canal atresia is a congenital malformation that needs complex treatment, including plastic surgery, otosurgery and audioprosthesis approaches. In the World Hearing Center for ear reconstruction a Brent-Nagata method, modified by Skarzynski is used. After the operation and healing process hearing restoration is usually considered. Such a complex approach allows us to obtain good esthetic and functional results. Objective assessment based on the Skarzynski's 10-degree scale and free field speech audiometry are considered to be essential factors in assessment of the applied therapeutic procedure.

**BROWN TUMOR OF THE MAXILLA DUE TO ATYPICAL PARATHYROID ADENOMAS**

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**Aims**

Brown tumors are rare benign giant-cell lesions associated with abnormal bone metabolism in an underlying hyperparathyroidism. Even though they can affect any skeletal bone, maxillary involvement is extremely uncommon. The manifestation usually concerns middle-aged patients, while there is a female predominance. This is a case of a 19-year-old male with a maxillary brown tumor as the initial presentation of primary hyperparathyroidism.

**Method**

The patient presented with a 2-week duration facial pain and a mild edema in the right infraorbital region, mimicking acute rhinosinusitis. Rigid nasal endoscopy revealed dislocation of the right lateral nasal wall, while computed tomography of the paranasal sinuses showed an osteolytic, bone-expanding lesion in the right maxillary sinus with invasion of the adjacent anatomical structures. Complete resection of the tumor was performed followed by parathyroidectomy 20 days after, based on the paraclinical findings.

**Results**

Histological findings of the maxillary tumor were consistent with a giant-cell lesion. A thorough diagnostic work-up was carried out revealing increased calcium and PTH levels in plasma, and subsequently the existence of two parathyroid adenomas. Parathyroidectomy was performed after the initial operating procedure due to unsatisfactory response of the hypercalcaemia to medication. The histopathological diagnosis showed atypical parathyroid adenomas. Postoperatively, the patient manifested hungry bone syndrome that was managed with supplements for a month.

**Conclusion**

Brown tumor is a rare entity whose knowledge is essential for differentiating lesions in craniofacial area. Clinical examination, laboratory investigation, radiological and histological findings have to be done to confirm the diagnosis.

**SINONASAL SARCOIDOSIS: A CASE REPORT**

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<sup>3</sup>*Clinical Hospital Center "Dragisa Misovic", ENT, Belgrade, Serbia*

**Aims**

Sarcoidosis is a chronic granulomatous inflammatory disease of unknown etiology which usually affects one or more organs with a predilection for lungs. Localization of sarcoidosis in the nasal-sinus region is rare. To present a case of thirty-three-years man who complained about nasal obstruction and the deformity of nose.

**Method**

The external appearance of the nose has changed significantly in the past year. Allergy to pollens and dust mites was present for ten years. Rhinoscopy and nasal endoscopy indicated mucosal hypertrophy of the septum and nasal concha with granulomatous changes. Computed tomography and magnetic resonance imaging of the paranasal sinuses have indicated a change in the right ethmoid sinus and septum.

**Results**

The diagnosis of nasal-sinus sarcoidosis was confirmed by histopathological examination of samples from the ethmoidal sinus and septum.

**Conclusion**

Although the sino-nasal area is rarely affected by sarcoidosis, in the routine diagnostic procedure of nasal symptoms we have to think of this chronic inflammatory disease.

## FILAGGRIN EXPRESSION IN THE HUMAN NASAL MUCOSA

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<sup>1</sup>*Juntendo University Faculty of Medicine, Otorhinolaryngology, Bunkyo-Ku, Japan*

### Aims

Mutations in the human filaggrin (FLG) gene have been shown to be the significant risk factor for atopic dermatitis. FLG variants are also considered to be associated with asthma and rhinitis. Mechanisms that underlie the association of FLG variants with asthma and rhinitis are not well understood since FLG is not expressed in the upper or lower airway epithelium.

We first examined the presence of FLG mRNA and re-examined the localization and distribution of FLG immunoreactivity in the upper airway mucosa using a newly available antibody.

### Method

Nasal biopsies of inferior turbinates were analyzed in this study. Sections were freshly cut from the frozen biopsies. So the result of immunofluorescence showed that moderate immunoreactivity of FLG was mainly observed in the apical region of the epithelium of the nasal mucosa.

On the other hand, we performed experiments to demonstrate the expression of FLG using mRNA analysis. Normal human epidermal keratinocytes, nasal epithelial and bronchial epithelia cells were purchased from Kurabo, PromoCell and Lonza, respectively.

### Results

The FLG mRNA levels in both nasal epithelial cells and keratinocytes were significantly increased as compared with those of bronchial epithelial cells, whereas no statistically significant difference was observed between FLG mRNA levels of nasal epithelial cells and keratinocytes. Thus, the FLG expression in the nasal mucosa may explain a strong link between FLG variants and allergic rhinitis despite the unknown function of FLG in the upper airway.

### Conclusion

We suggested expression and location of FLG in the human nasal mucosa.

**MYXOINFLAMMATORY FIBROBLASTIC SARCOMA OF THE NOSE**

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<sup>2</sup>Tampere University Hospital- and University of Tampere, Department of Pathology- Fimlab Laboratories, Tampere, Finland

**Aims**

Case report of a 51-year-old man which was referred to our department for evaluation of a nasal mass that had been gradually increasing in size. Approximately 1 year earlier, the patient began experiencing nasal skin symptoms. The primary symptoms were a small painless papule and swelling on the dorsum of the nose.

**Method**

Computed tomography was performed to look for extension of the tumour. CT revealed that the tumour had not extended inside the nasal cavity or into the surrounding bony or cartilaginous structures. The tumor was excised surgically in its entirety, with macroscopic free margins of 3 to 5 mm. A free skin graft from the supraclavicular area was used for reconstruction of the nasal defect.

**Results**

Microscopically, a poorly circumscribed tumor with a maximum diameter of 3.0 cm was identified in the dermis and subcutis. The tumor was heterogeneous in composition, with myxoid, relatively acellular areas alternating with cellular areas. The cellular areas contained spindle cells along with a prominent inflammatory infiltrate that was rich in mononuclear lymphocytes, plasma cells, and, in particular, eosinophils. Germinal centers were seen, especially in the periphery of the tumor. In the myxoid areas, there were pleomorphic lipoblast-like cells. Additionally, polygonal ganglion-like cells with prominent inclusion-like nucleoli were observed in the cellular areas. Mitotic activity of the neoplastic cells was negligible.

**Conclusion**

We believe our case is the first MIFS to be reported in the nasal area.

**A CASE OF COEXISTENCE OF SEROMUCINOUS HAMARTOMA AND OZENA**

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**Aims**

Seromucinous hamartoma, a type of epithelial hamartoma, is a rare benign glandular proliferation of the sinonasal tract. The aim of this work is to present a case of seromucinous hamartoma arising from the middle turbinate associated with primary atrophic rhinitis.

**Method**

Case report and review of the literature.

**Results**

A 53-year-old man presented with 1-year history of left side nasal obstruction and purulent rhinorrhea. He had a history of 30 years treatment for ozena and 20 year anosmia. Nasal endoscopy revealed a pedunculated polypoid lesion with glandular mucosal surface arising from left side middle turbinate. CT scan demonstrated a 2 cm mass attached to the left middle turbinate. The patient underwent endoscopic excision of lesion under general anesthesia. Histopathological analysis confirmed the diagnosis of seromucinous hamartoma.

**Conclusion**

Seromucinous hamartoma associated with ozena is an exceedingly rare manifestation of glandular proliferation of the sinonasal tract.

**AEROALLERGENS IN WEST CRETE IN RELATION TO CLIMATIC CONDITIONS. A FIVE YEAR (2010-2014) AEROBIOLOGICAL STUDY.**

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**Aims**

To present air-pollen counting program results for the period 2010-2014 and correlate them with climatic conditions (temperature, rainfall, humidity, wind).

**Method**

Airborne pollens collection, from both urban and sub-urban areas, is achieved by using a special Burkard pollen trap installed on the roof of Chania General Hospital. Pollen concentration measuring is made in a standardized way with fixation of the material collected, and then counting using the optical microscope.

**Results**

Annual and total circulating pollen counts for the study period are presented. In the year 2014 the highest total annual count was recorded while 2013 was the year with the lowest annual circulating pollen counts. Months with the highest average pollen concentrations were June for the years 2010 and 2011 (1291g/m<sup>3</sup> and 1114.6 g/m<sup>3</sup> respectively) and May for the consecutive three years 2012-2014 (1120 g/m<sup>3</sup>, 890 g/m<sup>3</sup> and 1353.1 g/m<sup>3</sup> respectively). In addition, concentrations on a monthly basis were compared to each other for the study period and were associated with temperature, rain, humidity and winds of the corresponding period.

**Conclusion**

Peak periods for circulating aeroallergens were April to June. Trees pollen accounted for the majority of circulating aeroallergens (615.9 g/m<sup>3</sup> and 677.1 g/m<sup>3</sup> during peak periods in years 2012 and 2014), while fungi accounted for the majority of circulating aeroallergens (818.5 spores/m<sup>3</sup>, 729.4 spores/m<sup>3</sup>, 890.7 spores/m<sup>3</sup>), during peak periods in years 2010, 2011 and 2013. Variability in peak pollen periods could be partly explained by the differences in climatic conditions (rainfall levels and humidity) during the study period.

**IMPATIENCE IN OUTPATIENTS CLINICS! - IMPROVING THE EFFICIENCY OF RHINOLOGY CLINICS**

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**Aims**

To improve the efficiency of rhinology ENT outpatient clinics in a tertiary centre, and thus minimise waiting times and delays.

**Method**

This project observed adult rhinology outpatient clinics at the Royal Sussex County Hospital, Brighton, over a two month study period. The study consisted of two phases with data collection from both phases including the time patients registered at the clinic, the time they entered the ENT registrar or consultant room, and the time they left the clinic room. The first phase observed the timings in the pre-existing clinic set up whereby all new patients are seen first, followed by all follow up patients. However for the second phase, clinics were adjusted such that new patients were seen in between follow up patients. Data were input and analysed using Microsoft Excel to enable direct comparison of the two study phases.

**Results**

This study demonstrated notable waiting times for some patients using the pre-existing clinic timetable. Phase two of the study highlighted that simple adjustments in the scheduling of appointments can significantly reduce waiting times for patients.

**Conclusion**

The efficiency of ENT rhinology outpatient clinics is dependent upon designing the clinic timetable to meet clinical needs. This study demonstrated that, as expected, the duration of appointments was considerably dictated by whether the appointment was a new or follow up rhinology patient. This study highlights one method by which the efficiency of rhinology clinics can be improved to benefit patients and make better use of seniors' time.



**ASSESSMENT OF THE EFFECT OF LOCAL APPLICATION OF NIGELLA SATIVA OIL ON ACUTE RADIATION-INDUCED NASAL MUCOSITIS IN RATS-A PRELIMINARY STUDY**

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<sup>2</sup>Umraniye Training and Research Hospital, Pathology, Istanbul, Turkey

**Aims**

The aim of this study was to demonstrate the effect of radiotherapy (RT) on nasal mucosa in rats and to assess the possible radioprotective effects of the local application of nigella sativa (NS) (black seed oil) to treat acute radiation induced nasal mucositis in rats.

**Method**

18 rats were randomized into three groups: Rats in Group1 had sham RT plus topically administered saline; Group 2 had RT plus saline and rats in Group 3 had RT plus NS. Rats in group 2 and 3 were irradiated with a single dose of 40 Gy to the nasal and paranasal sinus area. Saline was applied to nasal cavity in the first, second and third days after radiotherapy in Group 1 and Group 2 and NS was applied to nasal Group 3 . 10 days after irradiation, the rats were sacrificed and the nasal mucosal tissues were processed for histopathological exam

**Results**

13 rats were available for the histopathological examination. Vascular dilatation, inflammatory cell infiltration, superficial erosion and formation of exudates were classified according to the severity by histopathological examination. No evidence of mucositis was observed in group 1. Histologically, vascular dilatation, inflammatory cell infiltration, superficial erosion and formation of exudates were all observed in the RT groups; only the severity and extent were different. The microscopic observations in the NS treated group were better than in Group 2.

**Conclusion**

These preliminary results demonstrated that topical administration of NS to the nasal mucosa may be an effective treatment of acute nasal mucositis due to RT.

**INTRAOSSEOUS CAVERNOUS HEMANGIOMA OCCURRED FROM A MIDDLE TURBINATE**

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**Aims**

Hemangiomas mostly arise from the soft tissues. Intraosseous hemangiomas are rare and usually occur in the vertebra and skull bones. Intraosseous hemangioma of the nasal cavity is extremely rare and there are few reported cases in the literature. We describe the case of a 56-year-old woman who was referred to our hospital with a tumor in her right nasal cavity, without subjective symptoms such as pain. The tumor was located at the front end of the right middle turbinate. Enhanced computed tomography demonstrated a 3 cm \_ 2 cm expansive bony tumor replacing the bottom of the right middle turbinate with some partial enhancement effects. The characteristic honeycomb appearance was observed.

**Method**

The tumor and right middle turbinate were excised en bloc by the endoscopic endonasal approach without complications or severe bleeding occurred during the peri-operative period.

**Results**

Histological examination showed endothelium-lined blood-filled vascular spaces within the bony trabeculae, which suggested the typical pattern of intraosseous cavernous hemangioma.

**Conclusion**

As Far as we know, this is the first case report of intraosseous cavernous hemangioma of the middle turbinate in the English literature.

**HEMORRHAGIC HEREDITARY TELANGIECTASIA: A CASE REPORT**

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**Aims**

Introduction: Hereditary Hemorrhagic Telangiectasia (HHT) or Rendu-Osler-Weber Syndrome is a rare autosomal dominant disorder that causes a systemic fibrovascular dysplasia and a tendency to bleeding in skin and mucous membranes. Epistaxis is the first and most common clinical manifestation. The definitive diagnosis is given by the Curaçao criteria: three or more of the following: telangiectasia on the face, hands and oral cavity; recurrent epistaxis; arteriovenous malformations with visceral involvement, and family history. Treatment of the syndrome is only palliative and there is no consensus on the best treatment option.

**Method**

Case presentation: This is about the patient seen at the ENT clinic of the Federal Hospital of Andaraí in Rio de Janeiro: N.C.C., male, 55 years old, white and retired. Hereditary Hemorrhagic Telangiectasia has diagnosed about 10 years ago. He presents recurrent epistaxis since early youth and worsens with age. His father died of the same disease. Denies gastrointestinal bleeding. Made use of cocaine via inhaled for about 20 years, which caused worsening of epistaxis. The ENT examination revealed telangiectasias in oral mucosa adhered clots in nasal mucosa and septal destruction.

**Results**

Discussion: The HHT is a disease that requires multidisciplinary clinical follow-up, as it can affect multiple organs, but is still underdiagnosed.

**Conclusion**

As HHT has the first clinical manifestation of the spontaneous epistaxis and recurrent, it is essential that the ENT specialist to be acquainted with the disease and treatment options available. With early diagnosis and proper treatment, it's possible to prevent the complications of the disorder.

**KAPOSI 'S SARCOMA WITH NASAL INJURY AS AN INITIAL MANIFESTATION: A CASE REPORT**

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**Aims**

Introduction: Kaposi's sarcoma (KS) is a malignant vascular neoplasm in skin and lymph tissue, as a complication of AIDS with CD4 counts below 50 cells / mm<sup>3</sup>. Lesions are typically red macules. Skin lesions may affect the trunk and extremities including head and neck, as well as respiratory and gastrointestinal tract. KS has been strongly associated with human herpesvirus type 8 (HHV-8), probable oral transmission.

**Method**

Case presentation: R.F.G., male, 37, bricklayer, brown, divorced, complaining of nasal obstruction due to injury in the nasopharynx, obstructive, which began 15 days ago. Reported rhinorrhea and dyspnea. The patient had no chronic illnesses or general symptoms. On examination, granulomatous lesions affecting nasopharynx and soft palate. Patient also had injuries in lower limbs that look like vasculitis. Genitalia, had purplish papules on the glans penis also displaying the video laryngoscopy, involving the right vocal fold, and vegetative lesions on the tongue base and epiglottis. CT scan of paranasal sinuses with pansinusal opacification.

**Results**

Admitted for diagnosis and treatment , patient underwent positive rapid HIV test later confirmed by ELISA 1 and 2 and Western blot. Too negative serology. A biopsy of the lesion performed with removal of rino fragments and oropharynx with piecemeal clamp had suspected KS confirmed by immunohistochemistry performed at INCA, positive for HHV8.

**Conclusion**

Discussion: Patients referred for evaluation of nasal obstruction, which just reported on the progress of the disease and its comorbidities. additional tests allowed hypotheses and conduct are, with dramatic clinical outcome, requiring hospital support its complications during evolution

**CASE SERIES OF 23 PATIENTS WITH SINONASAL INVERTED PAPILLOMA**

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**Aims**

Inverted papilloma (IP) is a benign sinonasal tumor which tends to recur and is associated with squamous cell carcinoma. The aim of this study is to analyze the clinical characteristics and treatment outcomes of IP.

**Method**

We retrospectively reviewed 23 patients (18 men and 5 women) with IP treated at our hospital between 2002-2014.

**Results**

The average age of patients in this study was 59 (range 38-75 yo). The most common presenting symptom, unilateral nasal obstruction, was seen in 83% of cases. Imaging studies were performed in all patients: computed tomography (CT) in 23 and magnetic resonance imaging (MRI) in 8 patients. Tumors were classified with the Krouse staging system as follows: 3 as T1, 16 as T2, 3 as T3, and 1 as T4. Preoperative biopsy was performed in 48% of cases and the initial result of the biopsy was consistent with the final pathology in 91%. All patients underwent surgery. Endoscopic sinus surgery (ESS) was performed in 22 cases. Two cases were treated with a combination of ESS and the Caldwell-Luc procedure. Anterior skull base surgery and a median drainage (Draf III) procedure were performed in 1 case which was classified as T4 (intraorbital extension). Postoperative recurrence occurred in 8 cases (recurrence rate 35%).

**Conclusion**

To avoid recurrence, it is important to identify the origin of the tumor before surgery using preoperative MRI and CT, and select the best surgical approach for adequate tumor removal.

**YOLK SAC TUMOR IN THE NASAL CAVITY OF AN ADULT MALE**

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**Aims**

Yolk sac tumor (YST), also known as endodermal sinus tumor due to its similarity with endodermic sinuses of the placenta, is a malignant neoplasm of germ cell origin. Germ cell tumors are extremely rare in the head and neck region and predominantly occur in children. The aim of this study is to present the case of a YST in an adult patient.

**Method**

We present the case of a 56 year-old man with a complete obstruction of the right nasal cavity. Magnetic resonance imaging revealed a mass with 6cm of diameter with orbital invasion and extending into the nasopharynx, ethmoid and pterygopalatine fissure.

**Results**

The patient underwent a lateral rhinotomy, total maxillectomy and orbit exenteration. The histological examination revealed an undifferentiated squamous cell carcinoma. The patient was submitted to postoperative radiotherapy. After 2 months, due to disease progression, the patient underwent another tumoral excision and the histopathological examination revealed typical YST elements admixed with undifferentiated cell carcinoma. The patient was indicated for chemotherapy, but due to intracranial, left nasal cavity and orbita invasion, he was only referred to palliative care, and died within a few months.

**Conclusion**

The etiology of YST is unknown and they are extremely rare in the sinonasal cavities. YST is extremely malignant and tends to recur locally and may present with early metastases, so it is associated with a very poor prognosis. We also provide a review of the six other cases of sinonasal YST in adults presented in the literature.

**NASAL PIERCING COMPLICATIONS: BEYOND THE OBVIOUS**

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**Aims**

Many studies reporting atypical complications of nose piercing were published recently. The objective was to critically analyze the impact of atypical complications, causes and treatment options available.

**Method**

Review of the literature study; a search of related literature listed in the Medline/Pubmed, SciELO, and LILACS databases was performed.

**Results**

Many atypical complications associated to the nasal piercing were published as case reports, and they include: infective endocarditis; cutaneous tuberculosis; basal cell carcinoma; neurothekeoma; aortic pseudoaneurysm; dyschromia; granuloma; collapse of lateral nasal wall; and persistent telangiectatic erythema. Possible association and the pathophysiologic process relating them to the piercing are critically discussed.

**Conclusion**

Although rare, these complications can be objectively traced back to the nasal piercing. These complications affect young patients, with possibility of severe sequels, causing physical and psychological trauma. The health professionals should actively orient the young patients about the risks, rather than waiting for the patients to explicit the desire to have a nasal piercing.

**PARANASAL SINUS ACCESSIBILITY OF LARGE VOLUME SALINE BY INTRANASAL INSTILLATION IN VARIOUS HEAD POSITIONS OF FRESH FROZEN CADAVERS**

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**Aims**

To determine the distribution of saline to paranasal sinus by intranasal instillation of saline in various head positions

**Method**

This was an experimental study conducted in 4 fresh frozen head cadavers, 8 sides. PNS CT scans were performed in various head positions (Mygind's, vertex-to-floor and Ragan positions) before and after intranasal instillation of large volume saline and before and after FESS. A large volume saline mixed with contrast media and fluorescein was instilled slowly into each nasal cavity and stopped the instillation when the saline began to flow into the oropharynx for Mygind's and Ragan positions or dripped from the nose in vertex-to-floor position. The distribution of saline in various paranasal sinuses and lateral nasal walls as shown by CT scans were interpreted.

**Results**

Comparing before and after FESS for the distribution of saline to the paranasal sinuses more than 50% of the sinus volume, vertex-to-floor position could deliver saline into frontal sinus (FS) 2/8 vs 7/8, anterior ethmoid sinus (AES) 2/8 vs 8/8, posterior ethmoid sinus (PES) 1/8 vs 4/8, sphenoid sinus (SS) 0/8 vs 1/8 and maxillary sinus (MS) 0/8 vs 0/8 respectively while Mygind's position distributed to SS 1/8 vs 7/8, PES 1/8 vs 7/8, AES 0/8 vs 6/8, FS 1/8 vs 4/8 and MS 0/8 vs 0/8 respectively. Ragan position distributed to SS 0/8 vs 7/8, PES 2/8 vs 6/8, MS 1/8 vs 6/8, AES 0/8 vs 3/8 and FS 0/8 vs 2/8 respectively

**Conclusion**

FESS and head positions have the effect on the distribution of instilled saline to PNS.



**SUPRANUMERARY ECTOPIC TOOTH IN THE NASAL CAVITY: A CASE REPORT**

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**Aims**

Supranumerary teeth are those which exceed the normal dental formula and are not uncommon. In the other hand, the ectopic eruption of teeth in nondental sites is a rare phenomenon, and has already been reported in palate, maxillary sinus, nasal cavity, orbit, mandibular condyle, coronoid process and ethmoid sinus.

**Method**

The finding of an intranasal ectopic tooth is still considered a rare clinical entity and may remain silent for a long time, before manifesting with nasal symptoms, or is incidentally found.

**Results**

We report a rare case of a supranumerary intranasal tooth connected the nasal floor, in the posterior part of the left nasal cavity in a middle-aged man who presented with nasal obstruction and nasal discharge.

**Conclusion**

Transnasal endoscopic surgical approach was used to remove it, with no evidence of complications and resolution of the symptoms.

**PLEOMORPHIC ADENOMA IN THE NASAL CAVITY. A NATIONWIDE SERIES FROM FINLAND**

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**Aims**

To evaluate the occurrence and clinical characteristics of sinonasal pleomorphic adenoma in a nationwide series.

**Method**

Study design: A retrospective study.

Data from the Departments of Otorhinolaryngology – Head and Neck Surgery, and Pathology at the five university hospitals in Finland for the past two to four decades were obtained. Clinical and histopathological characteristics were investigated.

**Results**

Ten patients were identified (eight females and two males; mean age 44 years; range, 19 to 75). Nasal septum was the most frequent site for tumour origin. All tumours were surgically resected and there have been no recurrences or malignant transformations during the various follow-up periods.

**Conclusion**

Pleomorphic adenomas of the nasal cavity were found to be extremely rare in this nationwide investigation.

**CAVERNOUS HEMANGIOMA OF NASOPHARYNX – CASE REPORT**

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**Aims**

Diseases of the head and neck hemangiomas is common, but there is a relative scarcity of cases in nasal cavity and nasopharynx. Vascular tumor histology can be divided into capillary , cavernous, and mixed type. Cavernous hemangioma usually presents as an unilateral bleeding mass manifestating of slowly growing and covered with necrotic tissue on the surface. The average occurring age is 40 years old without gender differences.

**Method**

We experience a 35 years old male presenting with bloody sputum for several days. Nasopharyngeal endoscopy shows a bluish appearance lesion in the nasopharynx without invading the Rosenmuller's fossa. Computed tomography with contrast revealed mild enhancement of the mass, and no obvious supplying vessels are identified.

**Results**

We perform endoscopic excision of the tumor with minimal bleeding. Pathologic reports cavernous hemangioma. Postoperative recover well, no recurrence and bleeding occur.

**Conclusion**

Cavernous hemangioma of the nasopharynx is rare, surgical resection is the main choice of treatment. Preoperative embolization is considered in case of large lesions. Other alternatives include injection of sclerosing agent, cryotherapy, and laser therapy. The tumor can be excised via endoscopy conservatively without major sequelae when limited in the nasal cavity and nasopharynx.

**THE INVOLVEMENT OF CROSS-REACTIVE CARBOHYDRATE DETERMINANTS (CCD)-SPECIFIC IGE ANTIBODIES IN POLLEN ALLERGY TESTING**

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**Aims**

To assess the impact of CCD interference on the results for pollen allergen specific IgE antibodies in general population of adults, and to perform CCD inhibition testing for the samples positive to pollen allergens in order to evaluate the involvement of CCD.

**Method**

406 employees were tested for sIgE antibodies to pollens and CCD, and were given questionnaires about pollen allergic symptoms to determine the presence of subjective symptoms. sIgE antibodies for cedar, Japanese cypress, orchard grass and ragweed were analyzed as the pollen allergens. sIgE antibodies for MUXF, Bromelain, Horseradish Peroxidase (HRP) and Ascorbate Oxidase (ASOD) were tested as CCD.

**Results**

It was observed that the positive ratio of CCD-specific IgE antibody was highest in HRP (13.5-50.0%) among those who tested positive to any of the pollen allergens. The ratios of antibody titers tended to be higher in the samples without subjective symptoms but there was no significant differences observed. The results from the inhibition tests revealed that CCD was obviously present. Although sIgE antibodies for cedar pollen were not involved with CCD, sIgE antibodies for Japanese cypress, orchard grass and ragweed were possibly involved with CCD, among which ragweed accounted for the highest proportion as determined by inhibition.

**Conclusion**

It was revealed that CCD was obviously present by the results from the inhibition tests and was suggested that there was involvement of CCD. sIgE antibodies for Japanese cypress, orchard grass and ragweed were possibly involved with CCD, among which ragweed accounted for the highest proportion as determined by inhibition.

**THE SAFETY AND OUTCOME OF BALLOON SINUPLASTY**  
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**Aims**

Balloon sinuplasty (BS) is a rather new method and data about its benefits are still lacking. Aim of this study was to evaluate all BS procedures at a single academic tertiary care institution.

**Method**

All patients who underwent BS procedure at the Department of Otorhinolaryngology - Head and Neck Surgery, Helsinki University Hospital, Finland between 2009-2014 were retrospectively reviewed. Basic data on patient characteristics and previous operations, preoperative symptoms and findings, operations and number of re-operations were evaluated.

**Results**

Altogether, 64 patients were evaluated. Ninety-nine sinuses were operated in 71 BS procedures for 60 patients. In four of the patients the dilation did not succeed because of difficult anatomy. 53% of the operated patients were male and 47% were female with an age distribution of 14-71 years and, a mean age of 45.5 years. Most common symptoms preoperatively were pain in 53 (70%) patients, obstruction in 19 (25%) patients and nasal discharge in 9 (12%) of the patients. Most common sinus operated was frontal sinus (64), followed by 32 maxillary sinuses and three sphenoidal sinuses. 36 (60%) patients underwent BS only and 24 (40%) patients underwent a hybrid operation i.e. both BS and conventional endoscopic sinus surgery. All procedures were done in the operating room, 76% were done under general anesthesia and 24% under local anesthesia. Only three minor complications were reported. The mean follow up was 2.2 years. Eight (13%) of the patients were re-operated.

**Conclusion**

This retrospective study shows that BS is a safe and an alternative surgical sinus procedure.

**ONE-YEAR RESULTS OF NUVENT, NAVIGATED BALLOON SINUPLASTY: A REPORT OF 7 CASES**  
**A. Mickielewicz<sup>1</sup>, I. Gwizdalska<sup>1</sup>, K. Lazecka<sup>1</sup>, E. Witkowska<sup>1</sup>, R. Osmolski<sup>1</sup>, J. Dabrowska-Bien<sup>1</sup>,  
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**Aims**

To assess the functional results after surgery with application of the NuVent balloon sinus dilation system.

**Method**

7 patients were operated in 2014 in the World Hearing Center with NuVent sinus dilation system. This method was used to dilate natural ostia of maxillary, sphenoid and frontal sinuses. Sphenoid and frontal sinus ostia were dilated by this method in 1 patient, maxillary and frontal sinus ostia - in 2 patients and frontal sinus ostium only - in 4 patients. This procedure was performed simultaneously with ESS in 3 cases, conchoplasty of middle turbinate in 2 cases, sphenoidectomy in 1 case, maxillary sinusostomy in 1 case.

**Results**

During control visit after approx. 2-4 weeks postsurgery all patients felt well, sinus ostia were widely opened, with no signs of scarring nor occluding. On 7-month follow-up visit examination showed swelling of mucosa, polyps in middle meatus uni- or bilateral in 3 patients. In 4 patients sinus ostia were widely opened, with no signs of occlusion. Analysis of the outcomes showed, that patients with good results were nonallergic, and patients with non satisfactory results had a history of allergy. On 14-month follow-up examination showed nasal obstruction and polyps in endoscopy in 3 patients with allergic rhinitis. 3 patients with negative history of allergy had good nasal patency with no polyps and 1 patient without allergy had nasal obstruction and polyps visible in endoscopy.

**Conclusion**

So far this method looks very encouraging, giving surgeons opportunity to confirm anatomy, avoid critical areas and optimize balloon placement to open blocked pathways.

**BALLOON SINUPLASTY: A TREATMENT OPTION FOR CHRONIC SINUSITIS**  
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**Aims**

The purpose of this paper is to discuss the efficiency, as well as the advantage, of balloon sinuplasty compare to traditional endoscopic sinus surgery base on our experience with a systemic review of English literature.

**Method**

The medical records of 60 patients who were treated for chronic sinusitis with balloon sinuplasty between January 2013 and January 2014 were reviewed retrospectively.

**Results**

Balloon sinuplasty represents an exciting, minimally invasive technology that serve as an alternative to endoscopic sinus surgery for patients suffering from chronic sinusitis. Approximately 30 million individuals in the U.S. suffer from chronic sinusitis and the majority require surgical drainage such as functional endoscopic sinus surgery (FESS). FESS is the most frequent treatment for the management of chronic sinusitis. Here we'll be discussing how balloon sinuplasty is rapidly becoming a useful adjunct to FESS.

**Conclusion**

Balloon sinuplasty is an innovative technology one step forward from the conventional sinus surgery in our journey of seeking advancement in the field of minimally invasive procedures. Our results, as well as several published literatures, demonstrate that this procedure is an alternative and adjuvant to the conventional sinus surgery with the same safety profile and effectiveness. Most importantly, patient satisfaction after the procedure is very high because of the comfort of in-office procedure as well as the shortened recovery periods.

**ANTROCHOANAL POLYP : ANALYSIS OF 58 CASES**

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**Aims**

Antrochoanal polyps (ACPs) are benign lesions originating from the mucosa of the maxillary sinus, growing through the sinus ostium into the middle meatus and protruding posteriorly into the choana and nasopharynx. Macroscopically, ACPs consist of cystic and solid polypoid portions. The purpose of this study was to evaluate the clinical features of ACPs and results of surgical treatments.

**Method**

Retrospectively, the medical records of 58 patients who had surgery for ACPs between January 2004 and June 2014 were reviewed. For all patients, clinical presentation, origin of the polyp, and surgical outcome were evaluated.

**Results**

The medical records from 35 male and 23 female patients with a mean age of 23.2 years (range: 4-68 years) were reviewed. Among all patients, the most common symptom reported was nasal obstruction. In total, 50 cases had associated sinusitis, 27 had inferior turbinate hypertrophy, 21 had deviated nasal septum, and 8 had adenoid enlargement. Origins of the ACP stalks were noted in the following order of occurrence: posterior wall > lateral wall > medial wall > inferior wall. There were nine cases that were treated with transnasal endoscopic (TE) approach in combination with the mini-Caldwell procedure. For 49 cases, in which TE was used alone, five patients experienced recurrent ACPs.

**Conclusion**

Complete removal of the base of the polyp is critical for the management of ACPs. Although endoscopic sinus surgery is efficacious technique in the management of ACPs, TE approach in combination with the mini-Caldwell procedure is a useful option for a complete removal of the ACP stalks.



**CHRONIC RHINOSINUSITIS AFFECTS SLEEP QUALITY NEGATIVELY**

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**Aims**

The aim of this epidemiological study was to analyse the prevalence of sleep problems in subjects with chronic rhinosinusitis (CRS). We also aimed to analyse if disease severity of CRS affects sleep quality.

**Method**

A random sample of 45 000 adults in four different Swedish cities were sent a postal questionnaire in 2008. The questionnaire included questions on CRS, asthma, allergic rhinitis, comorbidities, tobacco use, education level and physical activity. The European Position Paper on Rhinosinusitis and nasal Polyps (EPOS) epidemiological criteria were used to define CRS. The number of reported CRS symptoms were used to define disease severity. Sleep quality was assessed by the Basic Nordic Sleep Questionnaire (BNSQ).

**Results**

The questionnaire was answered by 26 647 subjects. The estimated prevalence of CRS was 8.4%. Analysed sleep problems were 50-90% more common among subjects with CRS, compared to subjects without CRS and the total population. The prevalence and risk of sleep problems increased with severity of CRS. For subjects with four CRS symptoms the adjusted OR for 'snoring' was 3.13, 'difficulties inducing sleep' OR 3.98, 'difficulties maintaining sleep' OR 3.44, 'early morning awakening' OR 4.71, 'excessive daytime sleepiness' OR 4.56, compared to subjects without CRS symptoms. By adding persistent allergic rhinitis to CRS in the analysis the risk for all sleep problems increased significantly.

**Conclusion**

Sleep problems are very common among CRS patients. Sleep quality is negatively affected by disease severity of CRS.

**ASTHMA AND NASAL POLYPOSIS, WHAT ELSE?**

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**Aims**

The association between asthma and nasal polyposis is common. Certain clinical features, however, should prompt the ENT doctor to suspect of a more rare and severe condition.

**Method**

We present a case of a 66 year old woman who looked for ENT consultation complaining of chronic nasal obstruction. She had a history of severe asthma requiring multiple hospital admissions, salicylate intolerance and asthenia.

**Results**

Physical examination revealed nasal polyposis. Suspecting of a multisystemic disorder, we asked for a paranasal sinus CT, chest CT, laboratory tests and performed a biopsy on one of the nasal polyps. We found: CRS with nasal polyps and pulmonary infiltrates on CT, peripheral eosinophilia (17%), negative *Toxocara*, *Strongyloides stercoralis* and HIV serology, normal tryptase and vitamin B<sub>12</sub> dosages, negative auto-immune antibodies, low IgE levels, negative *Aspergillus* precipitins (the last two results exclude allergic bronchopulmonary aspergillosis). The biopsy examination revealed an intense lympho-eosinophilic perivascular infiltrate, without necrotizing vasculitis, and non-necrotizing eosinophil-rich granulomas. According to the American College of Rheumatology, this patient has 99.7% specificity to Churg-Strauss syndrome (CSS) diagnosis.

**Conclusion**

CSS, recently renamed eosinophilic granulomatosis with polyangiitis, is a rare systemic necrotizing vasculitis that affects small-to-medium-sized vessels. It is often misdiagnosed and misunderstood. CSS must be suspected in patients whose asthma is poorly controlled with inhaled glucocorticoids.

**THE CONSERVATIVE MEDICAL TREATMENT FOR SINUSITIS - OUR EXPERIENCE OF NEW SINUSITIS THERAPEUTIC CATHETER -**

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**Aims**

For conservative washing therapy, the puncture method using the Schmidt catheter for maxillary sinusitis has been enforced since early 1900. This washing method is highly effective in acute maxillary sinusitis. However, at the time of the enforcement, there are some complications such as sharp pain and the bleeding. The YAMIK catheter washing therapy introduced in ISIAN in 1991 was the method that was epoch-making as a paranasal sinus washing therapy to assume Proetz substituted principle. Unfortunately, in Japan, the availability of the YAMIK catheter became difficult in 2005. However, the ENT-DIB sinusitis treatment catheter released in Japan in 2014. This method is expected to show a similar treatment effect to YAMIK catheter that is considered to be useful as a choice of conservative medical treatment for chronic sinusitis.

**Method**

Briefly, we would like to present the washing method with the ENT-DIB. First, insert the catheter into the nasal cavity after intranasal gauze anesthesia. Secondly, fix by inflating the balloons around both the nostril and choana. This procedure may change nasal cavity and sinuses into a closed cavity. Finally, wash rhinosinuses with a supine position down to affected side by adding pressurization and depressurization from another channel to rhinosinuses.

**Results**

This time, we report several cases, including the sinus fungal disease, acute sinusitis, chronic sinusitis, that were performed the washing therapy using the ENT-DIB catheter.

**Conclusion**

This therapy, as an intermediate treatment between surgical therapy and conservative therapy, is considered to be capable of becoming a proactive choice for selected cases.

**ABO AND RhD BLOOD GROUPS IN NASAL POLYPOSIS**

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**Aims**

Nasal polyposis is a complex multifactorial disease with an arguable genetic component. Several members of a family may be affected with nasal polyps but there is weak evidence for a genetic basis for this. ABO and RhD blood groups are genetically transmitted. The oligosaccharide composition of the cell membrane and mucosal secretions is controlled in part by the ABO system. Such composition influences the adhesion of environmental factors to epithelial cells. Compared with controls, a significantly higher incidence of the O phenotype in male patients with allergic rhinitis was reported. The aim of this study was to determine whether there is an association between ABO and RhD blood groups and development of nasal polyps (NP).

**Method**

Frequencies of ABO and RhD phenotypes in patients with NP (study group, n=116) and blood donors (control group, n=116) were determined. ABO and RhD blood group phenotypes were determined by a standard hemagglutination test. All participants were from the same geographical region. Sample size calculations were done for a significance level=0.05 and power=80%.

**Results**

There were no significant differences between patients and controls in the distribution of the A ( $p=0.592$ ), the B ( $p=0.142$ ), the AB ( $p=0.518$ ), the O ( $p=1.00$ ) and the RhD ( $p=0.867$ ) phenotype.

**Conclusion**

According to the present results, the ABO and RhD blood group systems are not linked with development of NP.

### CONTAMINATION OF NASAL STEROID SPRAY BOTTLE IN CHRONIC RHINOSINUSITIS

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#### Aims

Recently, contamination of medical devices such as saline irrigation bottles, venturi-style atomiser bottle has been issued because of the cross-infection of nasal mucosa. Because intranasal steroids are the first line of treatment for CRS, this study aimed to evaluate the cross-infection of the nasal steroid spray and nasal cavity and assess the clinical relevance of cross-infection between them

#### Method

40 patients with persistent CRS symptoms recruited from the out-patient clinic and they underwent microbiological analysis of their nasal vestibule. The patients were visited 2,3 or 4 weeks after using the nasal steroid spray, and we swabbed the nasal tip area for nasal spray culture

#### Results

Bacterial growth was present in 31 patient on their nasal vestibule(77%) and 9 patient on their nasal spray(22%). The predominate isolates included *Staphylococcus aureus*, *Staphylococcus epidermis*, *Klebsiella pneumoniae*, *Coagulase negative staphylococcus*. *Staphylococcus aureus* was culture from 10 of the 31(32%) patients and 2 of these 10 had concomitant bacterial growth from nasal spray tip. Thus, the cross-contamination rate was 20% for *Staphylococcus aureus* infected patient. Also rates of positive nasal spray culture was increased as period of spray use was prolonged(2weeks: 10%, 3weeks: 25%, 4weeks, 35%)

#### Conclusion

Nasal steroid spray tips can become contaminated with CRS patients but the rate of the contamination was minimal. And period of nasal spray use is important factor for contamination of the device. Although contamination rate was not high, it is emphasized patient education on this matter

**OTITIS MEDIA WITH EFFUSION IN THE COURSE OF CHRONIC RHINOSINUSITIS**

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**Aims**

Chronic rhinosinusitis is often considered as a single disease, with not enough carefully insight for issue of functioning of middle ear. And vice versa- doctor stating otitis media with effusion (OME), if earlier excludes recent upper respiratory tract infection, acute otitis or mass in nasopharynx, usually does not broaden medical interview nor diagnostics towards paranasal sinuses diseases.

**Method**

Curious about coexistence of those illnesses, we analyzed 300 medical histories of patients post sinus surgeries, finding that among them, 20 had a history of chronic otitis media with effusion, that needed ventilation tubes insertion. Intraoperatively, effusion was described as very dense and hard to evacuate. Out of them, 15 patients were also diagnosed with Samter's triad.

**Results**

This issue was not very often described in literature before. It seems, that simultaneous diagnostics for diseases of paranasal sinuses and middle ear should be more emphasized, because in many cases middle ear can be and should be treated like an additional sinus.

**Conclusion**

According to authors, in comparison to other forms of chronic rhinosinusitis, in patients with Samter's triad otitis media with effusion co-occurs more often and insertion of ventilation tubes is needed.

**EXPRESSION OF INTERLEUKIN-13 IN RESPIRATORY EPITHELIAL ADENOMATOID HAMARTOMA**

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<sup>1</sup>Okayama University, Otolaryngology - Head and Neck Surgery, Okayama, Japan

**Aims**

Background: Respiratory epithelial adenomatoid hamartoma (REAH) was first reported as a rare benign lesion in sinonasal cavities, but nowadays REAH is not so rare and might be overlooked. Pathophysiology of REAH remains unclear. Some studies showed that the inflammatory process such as IL-9 and Th9 cells is important for REAH formation and associated with asthma and/or eosinophilic chronic rhinosinusitis. In asthma, periostin is recognized as a biomarker of Type 2 inflammation. In addition, POSTN, a gene encoding periostin, is up-regulated in bronchial epithelial cells by interleukin-13 (IL-13) and IL-4. Objective: We sought to determine the expression of IL-13 and periostin in REAH.

**Method**

We evaluated the presence of IL-13 and periostin in REAH by immunohistochemistry. These expressions in REAH were compared with control tissues such as uncinatae mucosae and nasal polyps (non-eosinophilic and eosinophilic).

**Results**

Every REAH lesion showed positive staining of IL-13 and periostin. On the other hand, control tissues such as non-eosinophilic polyps showed little expression of IL-13. Periostin was stained in all of the samples.

**Conclusion**

IL-13 may have a role in the formation of REAH.

**POTT'S PUFFY TUMOR IN A YOUNG MALE ADULT PATIENT DUE STREPTOCOCCUS CONSTELLATUS**  
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**Aims**

Pott's puffy tumor is osteomyelitis of the skull due to frontal sinusitis characterized by subperiosteal abscess and purulent collection under the periosteum. It is commonly described in children, but it is a rare condition in adult patients since the wide usage of antibiotics. The purulent collection under the periosteum causes swelling and edema over the forehead.

**Method**

We present a twenty four year old male patient who was admitted to our ENT department with a painful swelling of forehead. The patient had a 3 week history of headache and purulent nasal drainage treated with antibiotics. A 5x4 cm fluctuant area was palpated over the right eyebrow and frontal sinus. Endoscopic examination revealed purulent discharge from the nasal cavity and generalized edema in the nasal mucosa. The computed tomographic scan showed bilateral frontal, ethmoid and maxillary sinusitis and bony defect of the anterior wall of frontal sinus. Magnetic resonance imaging scan showed no intracranial involvement of the infection.

**Results**

Forty-eight hours after the initiation of parenteral ampicillin sulbactam and metronidazole treatment the patient was operated under general anesthesia. The abscess was drained, the samples were collected for culture, the frontal sinus trephination and functional endoscopic sinus surgery was performed. The cultures were found to be positive for streptococcus constellatus . The patient was treated with antibiotics for six weeks and healed without any complications.

**Conclusion**

As far as we know, our report is the first to show Streptococcus constellatus as the infectious agent for Potts puffy tumor.



**A CASE REPORT OF ECTOPIC PITUITARY ADENOMA IN THE SPHENOID SINUS**

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**Aims**

In outpatient clinic, we have a lot of patients who have nasal cavity and paranasal sinus diseases. We had a patient who had an affected part only in a sphenoid sinus, and its pathological diagnosis was pituitary adenoma.

**Method**

The case was 82 years old woman. She had dementia and went to another hospital for a close inspection. She was performed brain MRI, and found there was a tumor in a sphenoid sinus. She visited our hospital for the close inspection and treatment. For the purpose of differential diagnosis, we decided to perform an endoscopic sinus surgery under general anesthesia.

**Results**

We approached the right sphenoid sinus via common nasal meatus, and opened the natural ostium. When we extended the natural ostium using microdebrider, there was a white mass in the sphenoid sinus. We carefully detached the tumor from the mucous and were able to remove the tumor without damage. The tumor itself was soft and looked like a cyst. We verified a bone defect on the posterior wall of the sphenoid sinus, but the outflow of the cerebrospinal fluid was not found.

**Conclusion**

According to the pathological diagnosis, the tumor was pituitary adenoma producing ACTH. The case report of the pituitary adenoma (ectopic pituitary adenoma) in the sphenoid sinus is not so many, but we think that the pituitary adenoma is important as one of the differential diagnosis in the sphenoid sinus disorder.

**THE ROLE OF FROZEN SECTION BIOPSY AND FUNGAL CULTURE IN THE DIAGNOSIS OF ACUTE INVASIVE FUNGAL RHINOSINUSITIS**

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**Aims**

Among the types of fungal rhinosinusitis, major attention should be given to acute invasive fungal rhinosinusitis (AIFRS) since it is diagnosed mainly in immunosuppressed patients, and because of its rapid evolution. In these patients, the condition presents with few symptoms and, in suspected cases, nasal endoscopy associated with mucosal biopsies is mandatory. The objective of this study was to evaluate the use of fungal culture and frozen section biopsy for the early diagnosis of AIFRS.

**Method**

Medical records of 21 patients with suspected AIFRS between January 1<sup>st</sup>, 2010 and July 31, 2012 were reviewed. Fungal cultures and histopathological biopsies of frozen and permanent sections were performed for all patients with suspected AIFRS.

**Results**

The evaluation of 21 patients showed a significant association between biopsies of permanent and frozen sections ( $P < 0.0001$ ), with high sensitivity (92.8%), specificity (100%), and accuracy (92.5%). There was also a significant association between histopathological biopsies and fungal cultures ( $P < 0.04$ ), with 75% of sensitivity.

**Conclusion**

Prompt diagnosis and early treatment are essential for better outcomes in AIFRS. Frozen section biopsy proved as effective as permanent histology, with the advantage of providing faster results. Similarly, there was a significant association between the results of permanent biopsy and fungal cultures in respect to the identification of microorganisms, although the sensitivity of the latter method was lower. Thus, frozen section biopsy should be advocated in all cases where suspicious of AIFRS occurs.

**MANAGEMENTS AND SURVIVAL OUTCOMES IN INVASIVE FUNGAL SINUSITIS**

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<sup>1</sup>Fudan University, Department of Otolaryngology- Eye and ENT Hospital, Shanghai, China

**Aims**

To analyze clinical features and survival outcomes of invasive fungal sinusitis(IFS).

**Method**

Cases of IFS proved by histological analysis between March 2006 and November 2015 were retrospectively reviewed. Interval from the onset of symptoms to initiation of diagnosis, clinical characteristics, treatment and prognosis were collected.

**Results**

18 patients (10 males; 8 females) were identified. The median age was 54 years old. Three cases were acute IFS. Five cases were subacute IFS and ten cases were chronic IFS. The mean duration of symptoms before diagnosis was 5 months. The most common presenting symptom was headache (10/18), followed by visual disturbance (7/18), nasal obstruction (4/18), facial pain (2/18) and diplopia (2/18). Two patients had diabetes mellitus; one patient had received immunosuppressive drugs for one year. Four patients had the disease confined in the sinus. Complications of this infection include orbital apex in 6 patients, intraorbital and optic nerve in 3 patients, cavernous sinus in 5 patients, pterygopalatine fossa and infratemporal fossa in 5 patients, intracranial extension in 3 patients. All patients underwent endoscopic debridement. Fungal species included aspergillus (n=3), Mucor (n=15). 17 patients received intravenous antifungal therapy. The duration of follow-up ranged from 1 to 60 months. Two patients occurred and one patient died of the disease. Endoscopic debridement combined with antifungal therapy had prominent effect on pain release (P<0.05).

**Conclusion**

The key to improvement of outcomes is early recognition and treatment. Endoscopic debridement combined with intravenous antifungals is efficacious in management of invasive fungal sinusitis.

**CONSIDERATIONS REGARDING THE NASOPHARYNGEAL BACTERIAL BIOFILM IN PEDIATRIC PATIENTS**

***R.A. Bugari<sup>1</sup>, S. Baschir<sup>1</sup>***

*<sup>1</sup>Vasile Goldis Western University of Arad, ENT, Arad, Romania*

**Aims**

The main target of our study is to correlate the ratio of adenoid mucosa contaminated with bacterial biofilm in pediatric patients suffering of chronic rhinosinusitis (RSC) in comparison to pediatric patients diagnosed with obstructive sleep apnea syndrome (OSAS).

**Method**

We have collected the adenoids from all 20 patients included in the study, and sent them for SEM preparation to our microscopy lab.

We have estimated using s image analysis program the bacterial biofilm from the entire surface of the extracted adenoids, from 5 girls and 15 boys aged between 4 and 10 years;**Results**

Adenoids extracted from pediatric patients diagnosed with CRS presented bacterial biofilms coating almost the entire mucosa (77.23%), compared to 2.20% of bacterial biofilm coverage, at the pediatric patients with OSAS. The obtained difference is statistically significant.

**Conclusion**

Polyps removed from patients with CSR have most of their mucosal covered with bacterial biofilm in comparison to the group with OSAS. In the nasopharynx of pediatric patients with CSR, bacterial biofilm can play the role of a chronic fountain of pathogens, adenoidectomy explains the symptomatic improvement observed in this group.

## THE INFLUENCE OF CONDENSATE IN THE PIEZOMETRIC TUBE ON PATIENT VENTILATOR INTERACTION DURING NONINVASIVE POSITIVE PRESSURE VENTILATION

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### Aims

To study the effects of condensate in the piezometric tube on Patient ventilator interaction during Noninvasive positive pressure ventilation

### Method

Six healthy adults received non-invasive positive pressure ventilation. Different capacity of physiological saline was injected gradually into the piezometric tube until the experimenter can not trigger the ventilator or the total volume of the water reached 1.5ml. The dynamic changes of the pressure of mask ( $P_{mask}$ ), piezometric tube near mask ( $P_{pro}$ ), piezometric tube near breathing machine ( $P_{dis}$ ), and the flow were observed.

### Results

With increasing saline: 1. The trigger time:  $T_{Itri}(P_{mask})$  increased from  $(0.093 \pm 0.053)$  to  $(0.278 \pm 0.120)$  s, The trigger pressure:  $T_{Ptri}(P_{mask})$  increased from  $(0.269 \pm 0.216)$  to  $(2.730 \pm 1.548)$  cmH<sub>2</sub>O, The pressure-time product: PTP ( $P_{mask}$ ) increased from  $(0.031 \pm 0.038)$  to  $(0.717 \pm 0.842)$  cmH<sub>2</sub>O\*S; Ineffective triggering rate increased from 0 to 8 times/min; Spurious triggering rate from 0 to 33 times/min. 2. The plateau pressure of  $P_{mask}$  and  $P_{pro}$  is exceed preset parameter, increased significantly compare with 0ml, from  $(9.90 \pm 0.36)$  to  $(18.28 \pm 1.91)$  cmH<sub>2</sub>O and from  $(9.98 \pm 0.42)$  to  $(18.29 \pm 1.94)$  cmH<sub>2</sub>O. The change of plateau pressure of  $P_{dis}$  is not significantly. 3. The baseline pressure of  $P_{mask}$ ,  $P_{pro}$  and  $P_{dis}$  changed from  $(3.94 \pm 0.11)$  to  $(10.45 \pm 1.89)$  cmH<sub>2</sub>O, from  $(3.94 \pm 0.09)$  to  $(10.47 \pm 1.87)$  cmH<sub>2</sub>O and from  $(3.93 \pm 0.10)$  to  $(4.66 \pm 1.16)$  cmH<sub>2</sub>O respectively. 4. The pressure fluctuation of platform of  $P_{mask}$ ,  $P_{pro}$  and  $P_{dis}$  increased significantly compare with 0ml. 5. The time when the pressure of the  $P_{dis}$  began to change was delayed to  $P_{mask}$  and  $P_{pro}$ .

### Conclusion

It will influence patient-ventilator synchrony when there are condensate in the piezometric tube during Noninvasive positive pressure ventilation. To improve the Patient ventilator interaction of noninvasive positive pressure ventilation, should be avoided condensate in the piezometric tube.

**SIGNIFICANCE OF NASAL PACKING DURATION IN THE MANAGEMENT OF EPISTAXIS**

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**Aims**

Ascertain the importance of nasal packing duration in patient groups with epistaxis

**Method**

A retrospective study on patients admitted with epistaxis over a 2-year period was conducted. Patients managed with nasal packing were included in the study and ineffectively placed packs were excluded. Patients were grouped according to the duration of nasal packing (Up to 12hours, between 12 and 24 hours and greater than 24 hours). The groups were analysed using SPSS to determine statistically significant difference with regards to pack failure rate (bleeding through pack and re-bleed requiring intervention)

**Results**

525 non-dissolvable nasal packs were inserted in the study period. The duration of nasal packing were 12.8%, 55.6% and 31.6% in the 12-hour, 12-24 hour and greater than 24hour groups respectively. When the groups were matched by age, aetiology, co-morbidities and anticoagulant use, there was no significant statistical difference between the re-bleed rate and duration of nasal packing in patients with anterior epistaxis (95% confidence interval). Patients with posterior epistaxis showed statistically significant re-bleed rate in the over 24 hour nasal packing duration group requiring further nasal packing or surgical intervention (re-bleed rate of 45.7%).

**Conclusion**

Despite the common practice of leaving nasal packing in situ for longer with patients on anti-coagulation and anterior epistaxis, this study suggests there is no benefit to re-bleed rates in leaving a pack for more than 12 hours. Earlier decannulation may reduce co-morbidity, length of stay, and cost. Posterior epistaxis management is however, more likely to require a Foleys catheter pack and or surgical intervention

**ERS16-0283**  
**MANAGEMENT OF SEVERE EPISTAXIS**

**RECURRENT EPISTAXIS: FACTORS INFLUENCING READMISSION**

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**Aims**

Analyse the key factors influencing epistaxis recurrence and readmission and suggest ways of reducing high readmission rates.

**Method**

We conducted a retrospective cohort study at a tertiary otorhinolaryngology centre. All patients admitted acutely with epistaxis to the ENT unit between October 2013 and October 2015 was included in the study with up to 2 year follow-up. We collated data on patient demographics, admission information, laboratory results, aetiology and interventions administered. Fisher's exact test was used to assess the strength of any association between the categorical variables and re-admission. Logistic regression was then performed on those factors that were found to be significant. All point estimates were calculated with associated 95% confidence intervals

**Results**

614 patients were identified; of which 18.6% re-admitted once and 7.8% were readmitted more than once. Age, Sex, duration of nasal packing and site of epistaxis showed no statistical significance with regards to 30- day readmission. Recent admission with epistaxis was associated with significant 30-day readmission ( $R=0.073$   $P<0.01$ ). Other factors predicting 30 day readmission were: ongoing anticoagulant use ( $R=0.011$   $P<0.05$ ), Unidentified bleeding point at initial admission ( $R=0.085$   $P<0.01$ ) and Cautey as single treatment ( $R=0.014$   $P < 0.05$ )

**Conclusion**

Understanding the clinical factors which influence recurrent epistaxis and readmission will help improve the management offered to improve readmission rates. We advocate that patients who are at increased risk of readmission should be risk stratified and offered definitive management. Dissolvable packs may improve outcomes and decrease readmissions especially in patients who are on anticoagulants and have cautey as single modality treatment.

ANALYSIS OF THE MANAGEMENT OUTCOMES OF EPISTAXIS

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**Aims**

To investigate the management outcomes of the various epistaxis treatment modalities to facilitate decision-making and the development of novel algorithms in the management of complicated epistaxis patients

**Method**

A retrospective cohort study of all patients admitted to a tertiary otolaryngology centre between October 2013 and October 2015 was performed. Patients were categorised according to site of bleeding and the outcome of the treatment modality used (cautery, nasal packing, artery ligation and embolization) were compared. Multivariate logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CIs), adjusting for coagulopathy, hypertension, and bleeding site

**Results**

834 admissions were included in the study. 19.3% had nasal cautery as a single modality treatment. This group had the highest treatment failure rate with 18% immediate failure rate and 54.4% 30-day readmission rate (OR =6.01, 95% CI). When the cautery group was subdivided, the subgroup who had cautery and dissolvable haemostatic pack performed better (25.4 % readmission rate) than the group who had cautery alone. 67.2% were managed initially with nasal packing; of this group, immediate failure rate requiring subsequent foleys catheter posterior pack insertion or artery ligation was 4.6% and 30-day readmission rates of 15.3%. 5% had artery ligation with a failure rate of 8.7% (OR 0.14 95% CI).

**Conclusion**

Although Initial management of anterior epistaxis with chemical cautery has been advocated, in certain patient groups, there may be an increased failure rate, especially those on anticoagulation therapy. The use of initial nasal pack for a short period or dissolvable haemostatic agents may improve outcome



USE OF DIODE LASER PHOTOCOAGULATION (808 NM) IN TREATMENT OF PRIMARY EPISTAXIS

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**Aims**

Prospective study designed to evaluate the use of diode laser (808nm) to treat patients presented with idiopathic epistaxis.

**Method**

Laser system used is class IV GaAlAs diode laser of (808 nm ) with a power output ranging (0.5 – 15 W) and laser is delivered using fiber-optic fiber connected to contact tip with diameter of (800micrometer). The power setting used is (5 W) applied to nasal mucosa of (2) patients and (10 W) in (10) patients. The laser mode is CW mode and exposure time not more than (15 seconds) . The power density is around (1 KW/cm<sup>2</sup>) when using power setting of (5W) and (2 KW/cm<sup>2</sup>) for power setting of (10W).

**Results**

Two patients had nasal bleeding after laser treatment, while ten patients needed one laser session without complications. Four patients had previous unsuccessful chemical cauterization, three of them had one laser session using power density of (2 KW/cm<sup>2</sup>), while the fourth patient required second laser session with power density (2 KW/cm<sup>2</sup>) because power density of (1 KW/cm<sup>2</sup>) failed to control bleeding. Eleven patients stated that they had no pain or mild tingling sensation during laser procedurs, whereas only one patient had pain during the procedure. Power density of (2 KW/cm<sup>2</sup>) was used in ten patients, only one patient had minor postoperative bleeding, while one patient of (1 KW/cm<sup>2</sup>) density needed laser session using power density of (2 KW/cm<sup>2</sup>).

**Conclusion**

Laser photocoagulation using (2KW/cm<sup>2</sup>) power is more effective than using (1KW/cm<sup>2</sup>), and reserved for recurrence of epistaxis after chemical cautery.

**HEREDITARY HEMORRHAGIC TELANGIECTASIA (HHT)**

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<sup>1</sup>Oslo University Hospital, Otolaryngology, Oslo, Norway

**Aims**

HHT is a rare, autosomal dominant, vascular disorder, characterized by mucocutaneous telangiectases, arteriovenous malformations (AVMs) of internal organs and bleeding. The most common type of bleeding is epistaxis.

Epistaxis is usually the first and most common symptom in HHT. This epistaxis is characterized by being recurrent, spontaneous or easily provoked by minor physical or emotional stress. Although internal organs AVMs are the most life threatening pathologies for patients with HHT, epistaxis is the most annoying symptom. It has the greatest negative impact on the Quality of Life. The HHT associated epistaxis can lead to secondary health problems like iron deficiency anemia, dyspnea and malaise.

Severity of HHT associated epistaxis is highly variable. It varies among patients and has ethnic, geographical and seasonal variations. Different systems have been used to score HHT associated epistaxis. There is still no common internationally accepted grading system for epistaxis in HHT.

Treatment options for HHT associated epistaxis can be categorized as; treatments to stop the ongoing epistaxis, and treatments to decrease the frequency and the intensity of the recurrent the epistaxis. A wide variety of treatment modalities have been developed for control of epistaxis in HHT. Many of these modalities are expensive and almost all of them have side effects, drawbacks and limitations. Therefore, more new treatment modalities are still demanded. Choosing the appropriate modality for each patient depends extensively on the severity of the epistaxis.

This lecture aims to review the latest development in the field of HHT associated epistaxis.

**Method**

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**Results**

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**Conclusion**

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**TREATMENT ALGORITHM OF NASAL HAEMORRHAGE**

**S. Dheyauldeen<sup>1</sup>**

<sup>1</sup>Oslo University Hospital, Otolaryngology, Oslo, Norway

**Aims**

Epistaxis is a quite common health problem. It affects approximately 60% of the population at some stage of their lives. It varies in severity. Most of the epistaxis conditions are self-limited. However, it can be severe and even life threatening.

Epistaxis has a number of local and systemic predisposing factors, but most of the cases are idiopathic.

The treatment of epistaxis can include many treatment modalities like: chemical or electrical cauterization, anterior or posterior nasal pack, and selective arterial ligation or embolization. All these modalities have some adverse effects, drawbacks and limitations. Selecting the appropriate treatment at the appropriate time point is important to avoid unnecessary side effects, ensure the effectiveness of the treatment, and minimize the duration of the therapy.

Choosing the appropriate treatment depends on many factors. Some of these factors related to the etiology, the severity of the epistaxis, and the patient's condition like the age and comorbidities. These factors may also include the availability of the particular treatment modality and experience of the clinician.

The aim of this lecture is to provide an overview of the possible treatment algorithm of epistaxis, taking in consideration all the above-mentioned factors.

**Method**

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**Results**

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**Conclusion**

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**ERS16-0195**  
**MANAGEMENT OF SEVERE EPISTAXIS**

**PECOMA OF THE NASAL CAVITY:A CASE REPORT**

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**Aims**

We present a rare case report of an 80 years old female patient that was admitted to our emergency department due to a severe nasal bleeding from the left nostril.

**Method**

Clinical examination revealed a fleshy polypoid soft tissue mass in the left nasal cavity. Computerized tomographic (CT) scans revealed a homogeneous, avidly enhancing, soft tissue mass located in the anterior left nasal cavity arising from the middle turbinate with no remodeling or destruction, the cribriform plate was not involved and there was no intracranial extension. The patient underwent a complete endonasal endoscopic excision of the tumor. The histological examination revealed a nasal PEComa.

**Results**

Eighteen months after primary surgery the patient is alive and asymptomatic without evidence of disease.

**Conclusion**

PEComa of the nasal cavity are extreme rare and only few cases have been described in the literature. Nasal Tumors should be considered in the differential diagnosis of patients presenting with severe nasal bleeding.

**DOES PROACTIVE TREATMENT WITH KTP LASER REDUCE THE NEED FOR ADMISSIONS IN PATIENTS WITH HEREDITARY HAEMORRHAGIC TELANGIECTASIA?**

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<sup>2</sup>, ENT,, United Kingdom

**Aims**

Hereditary haemorrhagic telangiectasia (HHT) is an inherited autosomal dominant condition, characterised by recurrent spontaneous epistaxis as well as visceral arteriovenous malformations. The most common symptom of HHT is recurrent spontaneous epistaxis, a cause for numerous hospital admissions for these patients. Patients with moderate to severe epistaxis are treated with KTP LASER ablation. The aim of this audit was to assess the outcome of treating Hereditary HHT patients treated with KTP LASER in our institution.

**Method**

A retrospective audit of patients who had KTP Laser for HHT at Derriford hospital between 2010 and 2013 was carried out through a review of clinical records.

The following data was collated:

- Patients' demographics
- Number of KTP LASER procedures
- Frequency of hospital admissions
- Interval between hospital admissions for epistaxis

**Results**

15 patients who had KTP LASER procedures for HHT were identified during the period covered by the audit. The patients had a total of 46 applications of KTP LASER therapy. 67% of those applications were done on an elective basis (n=31) whilst 33% were non-elective/urgent procedures (n=15)

The average length of time between admissions in those patients managed proactively with elective therapy was 240 days (range 6-1318). The average length of time between admissions in those patients managed reactively with non-elective/urgent therapy was 59 days (range 0-428).

**Conclusion**

Our data indicates that proactive management of moderate to severe HHT with elective KTP LASER results in a reduced need for hospital admissions; serving as a proxy measure for increased quality of life of patients.

## PDT TREATMENT FOR THE NOSE VASCULAR TUMOUR

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<sup>1</sup>, Tashkent, Uzbekistan

### Aims

**Background:** Unfortunately vascular tumour are localized in 80% cases in the face region and 18% in nose. These tumours include hemangiomas, limphangiomas, malformations which present at children birth. The rapid growing stage for tumour is most dangerous for its complications. There are breath problems, bleeding, infection and face disfigurements, and scars.

### Method

All patients were discussed at a multidisciplinary meeting involving surgeons, radiation and medical oncologists, interventional clinical radiologists and allied healthcare professionals. It was agreed to offer photodynamic therapy under local or general anesthesia, using 5-ALA as the photosensitising agent (200 mg/kg intravenous for malformation, 500 mg as 20% ointment was administered on skin surface for 6 hours (Min. 6, Max. 24) prior to treatment). Treatment was carried out at a fluence of 10–50 J/cm<sup>2</sup> and a standardised fluence rate of 200 mW/cm<sup>2</sup>. This would allow the agent to accumulate in the pathological area which would increase effectiveness

### Results

Where lesions are large, surgery can have marked adverse effect on form and function and due to difficulty in delineating, these lesions recurrences can be high. The side effects of chemotherapy are well known and radiotherapy carries the risk of inducing new tumour.

### Conclusion

Photodynamic therapy is not superior to other modalities, but it is characterised by being one of the least invasive, being repeatable with no residual toxicity and with a minimal bystander effect on the overall tissue architect and integrity as well as nerves.

**ERS16-0747**

## **MANAGEMENT OF SEVERE EPISTAXIS**

### **ANTERIOR AND POSTERIOR NOSE BLEED TRAINER, THE 3D EPISTAXIS PROJECT.**

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#### **Aims**

Junior emergency doctor and Junior ENT doctors are exposed to nose bleeding at the beginning of their training, dealing with different kind of cases from less to more severe. Therefore, simulation can be a useful method of reinforcing learning about nasal packing.

#### **Method**

DICOM data were imported into the different three-dimensional printing software to develop our training model. The head of our model was printed using polylactic acid, and the nose was printed using polyurethane. A hole was designed through the anterior and posterior aspect of the cribriform plate, on both sides, to simulate the anterior and posterior ethmoidal arteries, behind the cresta ethmoidalis to simulate a posterior epistaxis from the sphenopalatine artery, and another to simulate anterior epistaxis. Several tubes were positioned at the level of every hole; all was connected to a hydraulic system, the hydraulic system works through compression and decompression of a bomb, allowing simulated the arterial pulsations.

#### **Results**

During the training, the resident has the opportunity to practice an anterior rhinoscopy, navigate inside the simulator with a Hopkins telescope to determine the source of bleeding and then packing and stop the bleeding.

#### **Conclusion**

This is a cheap model, the simulator only requires simulated blood. Although a simulator is not able to replace the real life situation, this is a great tool to help the resident practice the exploration and packing technique, learn the tools necessary to perform it, and acquire the skills needed to perform the procedure in the emergency room.

## WHAT IS THE EVIDENCE FOR TREATMENT OF HEREDITARY HAEMORRHAGIC TELANGECTASIA? A SYSTEMATIC REVIEW AND SYNTHESIS OF EVIDENCE BASED TREATMENT LADDER

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### Aims

Hereditary haemorrhagic telangiectasia (HHT, also known as Osler-Weber-Rendu syndrome) is characterised by angiodysplasia of skin, mucous membranes and viscera. Epistaxis is the most common manifestation of bleeding in patients with HHT with 96% patients suffering from recurrent epistaxis at some point in their lifetime. Recurrent persistent epistaxis from HHT is associated with iron deficiency anaemia, admission to hospital for blood transfusion, and chronic nasal crusting. There are currently no guidelines in the UK for the specific management of HHT related epistaxis. We present the current literature surrounding the management of epistaxis in hereditary haemorrhagic telangiectasia (HHT), and assess the quality of the available evidence.

### Method

Systematic review was performed by PubMed and EMBASE search using MeSH keywords. Cross-searching of reference bibliographies was performed to identify any further articles.

### Results

44 publications were identified as suitable for analysis (Systematic review 1, randomized controlled trials 2, case series 25, case report 9, questionnaire study 4, in vitro study 3). Of these 44 studies, there was a lack of high level evidence for the use of many of the available treatments with few high quality RCTs in the field (Figure 1).

Figure 1: Levels of evidence for available treatment options in HHT

Treatment	Route of delivery	Level of evidence
Lubricating ointment / antiseptic cream	Topical	D
Oestriol	Topical (adjunct to laser)	D
Tranexamic acid gel	Topical	D
Silver nitrate	Local cautery	D
Bevacizumab	Topical or local injection	C
Sclerotherapy	Local	D
Nasal obturator	Local	D
Low pressure nasal packing	Local	D
Bipolar diathermy	Local cautery	D
Laser	Operative	C
Coblation	Operative	D
Embolisation	Operative	D
Nasal closure	Operative	C
Tranexamic acid	Systemic	D
Oral contraceptive pill	Systemic	C
Tamoxifen	Systemic	B

### Conclusion

Based on the available evidence, we present a multidisciplinary treatment algorithm for HHT encompassing conservative, medical, and surgical options.



**ANTICOAGULANTS RELATED EPISTAXIS: WHAT IS THE CURRENT TREND IN HOSPITALISED PATIENTS**

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<sup>1</sup>Bradford Royal Infirmary, Department of ENT, Bradford, United Kingdom

**Aims**

Anticoagulants contribute to 14-37.5% of epistaxis admissions to hospitals. Over the last few years, we have seen the increased use of novel oral anticoagulant agents (e.g. rivaroxaban). The anticoagulant effects of these agents cannot be easily reversed which may lead to management dilemmas. The aim of our study is to evaluate any changes in the pattern of admission, duration of stay and management of patients with epistaxis who are taking the novel anticoagulants when compared to patients on conventional agents (e.g. warfarin).

**Method**

We audited the clinical data of epistaxis admissions over two separate 4 month periods between 2011-12 and 2015-16 in a large Teaching hospital. Age, gender, comorbidities, type of anticoagulants and relevant treatment were recorded along with duration of hospital stay. The data were analysed with appropriate statistical tests.

**Results**

There were 126 included admissions (median age 75.5 years; male:female ratio 1.2:1) with no statistical differences in age and gender between the 2011-12 and 2015-16 groups. In 2011-12, there were 27.9% patients who were on warfarin compared to 19.6% in 2015-16. Meanwhile, 23.2% of patients were on new form of anticoagulant in 2015-16. There was no difference in duration of hospital stay, blood transfusion rate or surgical intervention between the warfarin and non-warfarin group in 2015-16.

**Conclusion**

Our current study has shown that the novel anticoagulants potentially contribute to a significant proportion of epistaxis admissions. Our audit suggests, however, that the duration of hospital stay for patients on the “new” and “old” anticoagulants are similar.

**ERS16-0478**  
**NASAL SURGERY, TECHNIQUES**

**MAXILLARY SINUS OSTEOMA**

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*<sup>1</sup>Pavlov First Saint Petersburg State Medical University, ENT Department, Saint Petersburg, Russia*

**Aims**

The aim is to assess a possibility of complete removal of maxillary osteomas using endoscopic endonasal method.

**Method**

4 patients with maxillary sinus osteomas were operated at ENT Clinic of the Pavlov First Saint Petersburg State Medical University from December 2014 till January 2016. All the patients have undergone complete ENT examination, endoscopic examination of nasal cavity and nasopharynx, 3D CT examination of paranasal sinuses. In all the patients the osteoma was removed with endoscopic, endonasal approach, through the inferior nasal meatus by means of Blakesley forceps.

**Results**

Osteoma of maxillary sinus was completely removed from the maxillary cavity in all the patients. Control 3D computer tomography images in 7 days after the surgery showed parietal edema of sinus mucosa at the place of attachment of the lesion. The pain in a projection of maxillary sinus was stopped. Postoperative period was not complicated.

**Conclusion**

The maxillary sinus osteoma in most cases was accompanied by various sinusites with mostly recurrent course. Removal of the neoplasm using endoscopic endonasal approach was a surgical intervention performed with only local anesthesia. Such method of treatment results in considerable decrease in duration of postoperative period (in comparison with radical maxillary surgery) and it helps to avoid cosmetic defects. It stands to mention that the pain syndrome in the postoperative period after endoscopic surgery was minimal.

**OSTEOMAS OF THE NOSE AND SINUSES : OUR EXPERIENCE ON 57 CASES**

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**Aims**

The authors present their experience on a series of 57 cases of rhinosinusal osteomas on a period of 5 years from 01/01/2011 to 01/01/2016. The most difficult cases are presented and there are established the proper surgical techniques depending on the dimensions, position and potential complications of the tumors.

**Method**

In this series of 57 cases we used a retrospective analysis on our admitted cases with rhinosinusal osteomas, focusing on sex ratio, age, dimensions of the tumors, the position of the osteomas and local complications due to tumor invasion.

**Results**

Sex ratio determined no significant differences between men and women. The dimension of the osteomas varied between 5 mm and 10 cm. The tumors were found in the nasal cavity and in every paranasal sinus. We had patients with no symptomatology and also with orbital and endocranial complications. We performed endoscopic surgical techniques in more than two thirds of our cases. The histopathological exam confirmed our diagnostic. There was no recurrence of the tumor in all our patients, followed up for an average period of twelve month.

**Conclusion**

The authors try to establish the indication of surgical approach, the proper surgical technique and the best way to assure a functional surgery with no aesthetic and phisiological modifications after complete tumor removal.

**THERAPEUTIC MANAGEMENT FOR INVERTED PAPILLOMA**

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**Aims**

Inverted papilloma (IP) remains a serious challenge in ENT practice. Inverted papilloma is a benign but locally aggressive nasal tumor originating from the lateral nasal wall with high recurrence rate and potential for malignant transformation. The aim of the study is to analyze the alternative approaches, techniques and results in the management of IP.

**Method**

A group of 16 patients all males with an average age of 42,6 years, range 35 – 66 years were treated with IP. The diagnosis was based on typical signs and symptoms, nasal endoscopy, CT scan, MRI and biopsy with histopathology. The radical surgery was performed in the subperiosteal plane to assure complete removal with free histological margins. Treatment of inverted papilloma is surgical: simple polypectomy (2 cases); endonasal endoscopic surgery (3 cases); combined endoscopic sinus surgery with external approach via canine fossa (6 cases); Caldwell – Luc procedure (3 cases), and medial maxillectomy (2 cases).

**Results**

The postoperative control included nasal endoscopy and imaging study at 3, 6 and 12 months after surgery. Recurrence rate 12,5% (2 cases) was after simple polypectomy with inadequate removal tumor, or unrecognized residual disease. No recurrence was observed after radical surgery. The follow-up period ranged from 6 months to 10 years (mean 4,8 years).

**Conclusion**

The extent and localization of disease dictated the feasibility of different surgical approaches and procedures. The therapeutic management of this aggressive tumor included endoscopic surgery, combined endoscopic procedures or external approaches in order to ensure excellent long – term results.

**TREATMENT FOR MUCOCELE OF THE MAXILLARY SINUS**

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**Aims**

The aim is to evaluate the indications, advantages, limits of applied surgical techniques, endoscopic sinus surgery (ESS) and open surgical procedures. Mucocele is a benign cystic expansion produced if the ostium of paranasal sinuses is blocked in chronic inflammation. It is filled with sterile mucus contents, locally destructive due to gradually compression and erosion of local bone walls.

**Method**

We treated 29 patients, 16 males and 13 female aged 21- 67 years main age 31,2 for mucocele of maxillary sinus. In 21 cases ESS was performed via maxillary sinuscopy through the canine fossa – transcanine sinuscopy (TS) under control with a 0°, 30°, 45°, 70° endoscopes. Generally it is sufficient the technique of endonasal marsupialization to treat uncomplicated mucoceles of maxillary sinus. The original mucocele sac is left on the bony wall incorporating it into the mucosal lining of the sinus. External surgical procedure Caldwell – Luc (CL) was applied in 8 cases.

**Results**

The most important factors affecting the choice of surgical approaches are the exactly localization, extension of disease and the preference of surgeon. The endoscopic sinus surgery can be used for medially situated maxillary sinus mucoceles. The external approach remains the first choice for laterally and complicated mucoceles. CL procedure due to occasional sensory deficits in the anterior incisor area.

**Conclusion**

The endoscopic sinus surgery procedure is the best option in treating uncomplicated mucoceles of maxillary sinus with the best results and significant advantages.

**ENDONASAL LASER SURGERY FOR NASAL AIRWAY OBSTRUCTION**

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*<sup>1</sup>University of Medicine and Pharmacy "Victor Babes", ENT Department, Timisoara, Romania*

**Aims**

Endonasal laser surgery is a new treatment modality for nasal obstruction, the major symptom secondary to chronic hypertrophic rhinitis. We evaluated the safety and effectiveness of endonasal laser surgery for the treatment of nasal obstruction caused by bilateral non – allergic and allergic chronic inferior turbinate hypertrophy unresponsive to current therapy.

**Method**

A group of 76 symptomatic patients, males: 31, females: 45, age range:18-66 years, age average: 28,2 years undergoing CO<sub>2</sub> laser surgery for the chronic hypertrophic rhinitis allergic (54 cases) and non-allergic (22 cases). The CO<sub>2</sub> laser surgery can be used for reducing hyperplastic inferior turbinate, in single spots, inducing shrinkage, scarring with minimal tissue damage, excellent haemostasis. Diagnostic evaluations included nasal endoscopy, symptom questionnaire with a visual analog scale (VAS 0-100) was made preoperatively at 3 and 6 month postoperatively. Surgery was performed in local anesthesia as outpatient treatment.

**Results**

Endonasal CO<sub>2</sub> laser surgery provides significant symptom control (nasal obstruction - 94% cases) and excellent long-term results with the QoL improvement for all patients with the moderate/severe chronic hypertrophic rhinitis. The CO<sub>2</sub> laser surgery offer major advantages: controllable coagulation, rapid epithelialization, no complications, no adverse effects, no pain or edema. After surgery the patients received less medication, only intranasal corticosteroid (INS).

**Conclusion**

Endonasal CO<sub>2</sub> laser surgery in all aspects represent a valuable and efficient alternative to the conventional procedures in treating chronic nasal airway obstruction in adults.

**ENDOSCOPIC RECONSTRUCTION FOR DEFORMITIES OF NASAL SEPTUM**  
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<sup>1</sup>, *Japan*

**Aims**

The septal surgery is not easy operation, because the operator has to operate in the narrow space even using endoscopy and there is much variation of the morphology of septum. I will show the endoscopic septal surgery.

**Method**

Initially, surface and infiltration anesthesia are very important.

Incision is made 1 cm from anterior edge of septal cartilage. The plain tip of the elevator is inserted through the incision and pushed forward along the upper anterior border and then, using the hooked end, the elevator is swept downward to the posterior part and withdrawn along the lower portion.

The incision of cartilage is 2-3 mm posteriorly and 2/3 of its thickness.

The tip of the elevator is slowly glided in between the cartilage and perichondrium on the opposite side. Also the tip of the elevator must be always kept to contact with the surface of the cartilage.

When there are prominent ridges or spurs, elevation below the apex of the ridge or spur requires care.

There are two methods to remove bone and cartilage, with re-insertion and without resection of cartilage.

When deviation is mainly anterior portion of cartilage, after removing septal cartilage, cartilage is trimmed as graft and graft is inserted into the anterior deviated portion and several times sutured with anterior deviated cartilage and the anterior portion become the flat .

Finally, round quilting suture by using Septum Stitch (special instrument) is performed.

**Results**

Endoscopic procedures provide a clear view and allow less-invasive surgery

**Conclusion**

Conservative endoscopic septal surgery (re-insertion or leaving of cartilage) is recommended

**ENDOSCOPIC ENDONASAL RESECTION OF MAXILLARY DENTIGEROUS CYSTS: THREE CASE REPORTS**

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**Aims**

A dentigerous cyst is one of the odontogenic cysts. The feature is the crown of an unerupted tooth enclosed by expansion of its follicle. The treatment is removal of the entire cyst and the associated unerupted tooth. In the case of the dentigerous cysts located in the maxillary sinus, Caldwell-Luc procedure was usually undergone. Recently several authors reported novel endoscopic surgery techniques for the maxillary sinus disease, including endoscopic modified medial maxillectomy (EMMM). In contrast to endoscopic medial maxillectomy (EMM), EMMM allows the preservation of the inferior turbinate and nasolacrimal duct.

**Method**

We report three cases of the maxillary dentigerous cysts operated with EMMM procedure.

**Results**

In all cases, the unerupted teeth were successfully removed and the inferior turbinates and nasolacrimal ducts were preserved by the EMMM procedure. In the case 2 and 3, the cyst was completely removed. In the case 1, marsupialization of the cyst was employed because of the huge cyst expanding over the maxillary sinus. Mucous rhinorrhea from the residual lesion continued for a year after the operation. In the case 3, we used the preoperative fine needle aspiration to reduce the volume of the cyst, and we successfully removed the entire cyst.

**Conclusion**

EMMM was considered as the effective procedure for the removal of the maxillary dentigerous cysts. The complete removal of the cyst is necessary for avoiding the postoperative mucous rhinorrhea from the residual lesion.



**PRACTICAL USE OF AN INTEGRATED BIPOLAR AND ULTRASONIC ENERGY DEVICE IN SINONASAL ENDOSCOPIC RESECTION OF NEOPLASMS**

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**Aims**

A retrospective study to evaluate a new vessel sealing device in two patients undergoing endoscopic resection of sinonasal neoplasms to test the safety and effectiveness in controlling bleeding.

**Method**

An integrated bipolar and ultrasonic device was used in 2 cases (one sinonasal adenocarcinoma and one inverted papilloma). Operative performance involving hemostasis, sealing/coagulation, cutting, dissection, limitation of space and operating time was evaluated. Postoperative follow-up was also evaluated (crusting, alteration of smell,...) and compared to other cases without using this device.

**Results**

No complications were encountered intraoperatively and postoperatively. Intraoperative experience involving hemostasis, sealing/coagulation, and cutting was optimal. It had a lack of malleability due to its shape and size -not quite optimal for a narrow area such as the sinonasal space-. No differences regarding operating time and postoperative recovery were found.

**Conclusion**

The integrated bipolar and ultrasonic device is an efficient and safe alternative to standard bipolar aspiration in sinonasal surgery. Having integrated ultrasound energy allows to dissect and coagulate at the same time with one single device. Larger studies are required to evaluate the cost-effectiveness and significant reduction in operating times as compared to conventional bipolar and microdebrider instruments.

**POSTOPERATIVE BENEFIT EVALUATION USING NASAL OBSTRUCTION SYMPTOM EVALUATION (NOSE) SCALE IN PATIENTS WITH A'WENGEN BREATHE IMPLANT**

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<sup>1</sup>*Riga Stradins University, Medical department, Riga, Latvia*

**Aims**

To evaluate symptoms and life quality changes of patients undergoing a'Wengen implant operation in preoperative and postoperative period using the Nasal Obstruction Symptom Evaluation (NOSE) scale.

**Method**

In a case series descriptive study 14 patients, aged between 22 and 59 years old, were evaluated. All the patients have undergone an a'Wengen Breathe implant insertion due to breathing problems as a result of internal nasal valve collapse. Clinics' archives were used to record and preserve patients' data. NOSE scale was used for symptom evaluation. All the patients had to complete NOSE questionnaire before and after operation. Results of the questionnaire were analyzed using SPSS Statistics software (descriptive statistics; Wilcoxon signed-rank test).

**Results**

14 patients were included, of whom 9 were male and 5 - female. The average age was  $M = 41.71$  years,  $SD = \pm 12.72$  years. All the patients have undergone functional rhinoplasty with a'Wengen Breathe implant. Minimal time after operation was 1.5 months. Maximum time - 34 months. Wilcoxon signed-rank test showed that all 14 patients have experienced significant symptoms improvement,  $p = 0.001$ . Before operation maximum score in NOSE questionnaire was 20 points,  $M = 14.86$ ,  $SD = \pm 3.25$ ; after operation maximum score - 13 points,  $M = 3.57$ ,  $SD = \pm 5.06$ .

**Conclusion**

NOSE scale results showed significant differences before and after operation. Improvement of symptoms after a'Wengen Breathe implant operation were detected in all patients' cases. Consequently, it can be concluded that NOSE scale is a proper tool for evaluation of patients with a'Wengen Breathe implant.

**A CHRONIC CANINE STUDY OF TREATMENT WITH RADIOFREQUENCY ENERGY USING A NASAL TISSUE SHAPING SYSTEM**

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**Aims**

Increasing nasal valve area has been shown to increase nasal airflow. Radiofrequency heating has been shown to induce shape changes in soft tissues. The intranasal remodeling (Vivaer®) stylus is designed to deliver RF energy to shape nasal tissue around a curved tip, resulting in increased nasal valve area and improved nasal airflow. We hypothesized the stylus could deliver RF energy sufficient to shape nasal tissue without causing adverse events or clinically significant tissue damage.

**Method**

The superior lateral wall of the canine rostral nasal cavity was treated bilaterally using the intranasal remodeling (Vivaer®) stylus. Target temperature and treatment duration were varied to evaluate long-term healing effects. Follow-up with endoscopic video was completed for each treatment site. Canines were euthanized following 8-week evaluation; snouts were removed, preserved, sectioned, stained and analyzed.

**Results**

There were no adverse events. Staff veterinarians deemed all dogs asymptomatic. On average, 24 histologic sections per animal were evaluated for overall lesion appearance, squamous change, mucosal hyperplasia, epithelial hyperplasia, cartilage change, inflammation severity, mucosal fibrosis and neovascularization. Histologic findings included mild subepithelial fibrosis with loss of preexisting mucosal glands and mild nonsuppurative inflammation. Underlying cartilage demonstrated minimal or mild reduction in eosinophilic staining, interpreted as stable, mild degenerative change.

**Conclusion**

This study verified the intranasal remodeling (Vivaer®) stylus could deliver temperature-controlled radiofrequency energy to target tissue. The stylus was shown to deliver RF energy sufficient to shape tissue without clinically significant adverse effects, demonstrating a potential novel, non-invasive therapy for increasing nasal airflow through RF shaping of the nasal valve area.

**A CADAVER MODEL OF THE SAFETY AND EFFICACY OF A RADIOFREQUENCY STYLUS FOR RESHAPING SUBMUCOSAL NASAL VALVE TISSUE AND INCREASING NASAL VALVE ANGLE**

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**Aims**

Enlarging the nasal valve angle by expanding the sidewalls of the nose at the level of the nasal valve, using an external nasal dilator strip or Cottle maneuver, increases the cross-sectional area of the nasal passage and increases nasal airflow. Patients, however, lack a longer-term solution that does not require nasal valve dilators or open surgery. Radiofrequency heating has been shown to induce shape changes in soft tissues. We hypothesized that a novel intranasal remodeling stylus (Vivaer®) could heat nasal valve tissue and cause the tissue to assume the stylus tip's shape, increasing nasal valve size without significantly increasing temperature in surrounding tissues.

**Method**

A full simulation of the intended clinical procedure was conducted using cadaver heads. A shaped stylus was placed within the nares against the lateral nasal wall to widen the nasal valve angle. Radiofrequency energy was then applied through electrodes located near the tip of the stylus to create heat within the submucosal tissue. Measurements of maximum internal/external temperatures during treatment and nasal valve size changes were recorded.

**Results**

The procedure was performed five times, resulting in an average increase in nasal valve area opening of 1.75mm (min 1.5mm, max 2.0mm).

Average skin temperature increased by 1 deg C (min 0 deg C, max 2 deg C), while mucosal temperature variance remained below 5 deg C.

**Conclusion**

Measurements of nasal valve area pre- and post-treatment show potential efficacy for the intranasal remodeling stylus (Vivaer®) to improve nasal airflow. Internal/external temperatures during treatment are acceptable for patient safety.

**ADULTHOOD DIAGNOSIS AND MANAGEMENT OF BILATERAL COMPLETE CONGENITAL CHOANAL ATRESIA: PEARLS AND PITFALLS**

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<sup>1</sup>Hospital Prof. Doutor Fernando Fonseca, Otolaryngology, Amadora, Portugal

**Aims**

Congenital choanal atresia (CCA) is a unilateral or bilateral, complete or incomplete obliteration of the posterior nasal aperture. This rare entity has an incidence of 1:7000 live births with a female preponderance of 2:1. 75% of CCA are unilateral. Bilateral complete CCA is a rare and life-threatening abnormality, presenting with respiratory distress at birth and treated with early urgent surgery, being the newborn an obligatory nose breather. Therefore, bilateral complete CCA in adults is extremely rare, and to our knowledge, this report describes the oldest patient stated in the literature and defines the role of endoscopic surgery in the management of this entity.

**Method**

Case report and review of literature of CCA, describing the embryo-pathogenesis, diagnosis and endoscopic surgical management. **(Diagnosis, surgery and follow-up Videos)**

**Results**

A 60-year-old female presented with a history of life-long nasal obstruction and rhinorrhea, associated with 3 to 5 episodes of headache per year. She also reported childhood episodes of respiratory distress with cyanosis during feeding, relieved by crying. Nasal Endoscopy and Computer tomography (CT) scan of the paranasal sinuses revealed a bilateral complete CCA. The patient underwent transnasal endoscopic surgical correction of the obstruction. A twelve-month follow-up showed clinical improvement and an excellent functional outcome with adequate neochoanal openings.

**Conclusion**

The presented case is the oldest patient with complete CCA reported in literature. Transnasal endoscopic surgery is a safe, adequate and effective technique with low morbidity for the correction of adulthood CCA. This rare condition should be part of the differential diagnosis of persistent nasal obstruction.

**PREOPERATIVE PREDICTION OF TUMOR ATTACHMENT FOR SINONASAL INVERTED PAPILLOMA**  
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<sup>1</sup>*Hokkaido University School Of Medicine, Otolaryngology, Sapporo, Japan*

**Aims**

Sinonasal inverted papillomas (IP) originally have a benign entity but they can be locally aggressive. The precise assessments of the attachment site of IP before surgery are mandatory for complete surgical resection. The aim of this study is to compare MRI and CT in terms of sensitivity and specificity in predicting the attachment site of IPs on the sinus walls before surgery.

**Method**

Ten consecutive patients with pathologically proven IPs who were treated at the Department of Otolaryngology, Head and Neck Surgery, Hokkaido University Hospital were enrolled in the study. Two radiologists predicted the IP attachment site from 3.0T MRI and 1.5T MRI and CT.

**Results**

The sensitivity, specificity, PPV, NPV and accuracy of the 3.0T MRI images were all slightly better than those obtained by 1.5T MRI. However, there were no significant differences in sensitivity or specificity between the two groups. CT showed the highest sensitivity ( $P < .0001$ ), although both MRI formats showed greater specificity ( $P < .0001$ ).

**Conclusion**

CT and MRI had different features for prediction of sinonasal IP attachment sites. Preoperative CT plus MRI provided more useful information than CT or MRI alone.

ERS16-0641

## NASAL SURGERY, TECHNIQUES

### THE LEARNING CURVE IN ENDOSCOPIC SINUS SURGERY

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#### **Aims**

In the modern, more and more technology-aided, high-stakes field of endoscopic sinus and skull base surgery (E.S.S.), the learning curve is very steep for young physicians who want to begin tackling this difficult field. Determining the optimal level of preparation for performing successful E.S.S. is key for the well-being of the patient as well as for avoiding complications, which may lead to legal consequences for the physician performing surgery and also for the institution (hospital, clinic, etc.).

#### **Method**

Our experience in training resident physicians in the field of E.N.T. head and neck surgery as well as E.S.S., completed by a review of existing literature on the subject.

#### **Results**

The foundation of E.S.S. is laid in the training of future E.N.T. surgeons (during their resident-physician stage) but, in our view, is insufficient for the latter hurdles they will face in practice. Supplementing this training with courses, dissection workshops and assisting more experienced surgeons is needed for obtaining a training level which permits safe practice of E.S.S. techniques - but isn't supported by the university which oversees their training.

#### **Conclusion**

Mastery of surgical techniques, indifferent of the surgical field, is a life-long process. But every surgeon has to start practicing sometime, and the aim of medicine universities across the E.U. should be to harmonize the training of future surgeons in the field of E.S.S. thus assuring a high standard-of-care for patients.

**ENDOSCOPIC NASO-SINUSAL SURGERY: IS IT POSSIBLE TO REDUCE SURGICAL FIELD BLEEDING?**

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**Aims**

**Objectives:** Intense bleeding during functional endoscopic sinusal surgery (FESS) may difficult the visualization of the surgical field leading to unexpected complications. The use of adjuvant hypotensive drugs during anaesthesia might reduce bleeding and thus reduce risks during surgery. Although used in clinical practice, there is no objective evidence on the efficacy and safety of such approach. A study to generate such evidence has been developed.

**Method**

A first observational study was designed to compare intraoperative bleeding in routine clinical practice, comparing patients receiving a clonidine-based anaesthetic regimen with those receiving fentanyl or remifentanyl based regimes. Based on these results, a prospective clinical trial randomising patients undergoing FESS receiving either a clonidine based or a remifentanyl based anaesthetic regime was designed and conducted.

**Results**

The observational study described 37 subjects undergoing FESS and receiving clonidine or opioid derivatives. Intraoperative bleeding, measured by an ordinal 1-5 scale (Boezaart score) by the operating surgeon, was lower for subjects receiving clonidine. A multivariate analysis including bleeding risk factors showed that the adjuvant hypotensive drug was the best predictor of intense bleeding (Boezaart > 2). The subsequent clinical trial randomised 47 subjects to clonidine or remifentanyl at induction of anaesthesia. Better visualization of anatomical structures was achieved with clonidine. There were no differences in adverse events.

**Conclusion**

The use of clonidine reduces intense bleeding and improves visualization of anatomical structures during FESS.



**ENDOSCOPIC SURGERY FOR PTERYGOPALATINE FOSSA TUMORS: 7 CASE REPORTS**

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**Aims**

To elucidate the safety and the usefulness of the endoscopic endonasal approach for pterygopalatine fossa tumors.

**Method**

We retrospectively reviewed the clinical records of surgery patients at our department from 2012 to 2015.

**Results**

Seven cases include 4 cases of trigeminal (V<sub>2</sub>) schwannoma, a case of giant cell tumor, a case of recurrent maxillary cancer and a case of juvenile nasopharyngeal angiofibroma (JNA). Three total resections and a biopsy were undergone for the trigeminal schwannomas. The all three total resections needed combined endoscopic nasal and canine fossa approach to manage intraoperative bleeding. A case of JNA expanding into the pterygoplatine fossa (stage IIa, Sessions's classification) was totally resected by nasal endoscopic approach with preoperative selective embolization. The specimens were safely taken from a giant cell tumor and a recurrent maxillary cancer behind reconstructed tissue by endoscopic nasal approach. The preoperative planning and intraoperative surgical navigation are utilized in all cases, and were useful for reducing intraoperative bleeding from the maxillary artery and its branch in the pterygopalatine fossa.

**Conclusion**

The computer-guided endoscopic approach was useful for the pterygopalatine fossa tumors. The combined endoscopic and canine fossa approach was sometime needed for managing intraoperative bleeding.

**USE OF THE ULTRASONIC BONE CURETTE FOR THE POSTOPERATIVE MAXILLARY CYST.**

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**Aims**

A postoperative maxillary mucocele (POMC) presents as a delayed complication of radical operation involving the maxillary antrum (i.e. Caldwell-Luc procedures). Conventionally, POMC were treated by excision with sublabial approach. Because of its frequent sequelae (i.e. facial paresthesia, soft-tissue swelling, hematoma, wound infection, tooth root injury and oroantral fistula), transnasal endoscopic marsupialization (TNEM) is more widely used in POMC management in recent years.

During the TNEM, most of bone work is performed with high-speed drill and that can cause damage 4-mm optics and surrounding nasal mucosa in narrow corridors. In this presentation, we wish to demonstrate the application of an ultrasonic bone curette (UBC) during transnasal endoscopic marsupialization(TNEM) for POMC.

**Method**

A 40-year-old woman with POMC underwent TNEM in Soonchunhyang university Seoul hospital. The UBC was used to remove the lateral wall of the inferior meatus.

**Results**

The patient showed a good surgical outcome with no mechanical device or tissue damages resulted from UBC. The surrounding nasal mucosa was also well preserved.

**Conclusion**

UBC remove bone by using high-frequency vibrations to break down hydrogen bonds in tissue proteins, resulting in their denaturation with minimal heat production. It is known that the UBC has many advantages compared with high-speed drill, including prevention of heat-related injury to the surrounding soft tissue and maintaining a clear operative field. Thereby, UBC is widely used in nasal surgeries recently, such as turbinoplasty, osteoma removal, rhinoplasty and dacryocystorhinostomy. In this report, we describe the first application of this technology to TNEM for POMC.

**THE PROPOSITION ALGORITHM OF MODERN COMPLEX DIAGNOSIS AND TREATMENT IN CHRONIC RHINITIS**

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**Aims**

The aim of this study to estimate efficiency of new methods of surgical treatment in patients with various types of chronic rhinitis.

**Method**

156 patients diagnosed with various types of rhinitis participated in research. The patients under the research were divided into 3 groups: patients with hypertrophic rhinitis (HR), allergic rhinitis (AR), neurovegetative rhinitis (NVR). Each patient's method of surgical treatment was randomly selected. 69 patients have undergone high frequency radio wave ablation (HFRA), from which 29 patients had HR, 15 patients – AR and 25 patients – NVR. 43 patients were undergone ultrasound disintegration (USD), from which 18 patients had HR, 9 patients – AR and 16 patients – NVR. 44 patients were undergone electrocautery (EC), from which 14 patients had HR, 13 patients had AR and 17 with NVR. All the patients were performed rhinomanometria, nasal mucosa laser dopplerography, time fixation of mucociliary transport before the surgery and after the surgery in 6-7 months later.

**Results**

The impact of the modern technologies on the inferior nasal turbinates in all studied group was considered the selected method in comparison with traditional methods which is due to the efficiency, well adaptation of the patient, the intervention in ambulatory conditions, the low percentage of early recovery of complex issues in post-surgery period.

**Conclusion**

Combining the data, we came to the conclusion that before giving the pre-surgery accurate diagnosis of the patients with the chronic rhinitis we should apply the functional research methods that will foster the right selection of the treatment method and efficiency.

**HOW WE DO IT? A NOVEL, CHEAP AND EASY TO BUILD FESS TRAINER**

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**Aims**

Simulation models have slowly been gaining a place in training and surgical skills, before attending the operating room. Here we present a model that allows the trainee to practise the functional endoscopic sinus surgery training in a safe, non-patient facing environment.

**Method**

The method can be practised away from the operating theatre and the skills developed can then be transferred to the operating theatre. To create our FESS simulator, we use a cardboard tube and sheet, scissors, markers, cutter, foam, needles, catheters, plasticine, an inflatable balloon, a 10g lumbar puncture needle, one 5 cc syringe, two Blakesley forceps (straight and angled) and a 0° and 30° Hopkins rigid optics. In this simulator you can practise a puncture of the inferior turbinate, the endoscopic depth, remove a polyp, balloon dilation, a partial ethmoidectomy.

**Results**

We describe a cheap and easy to build FESS training model, which allows the resident to practise this technique in a risk-free environment, while guaranteeing the reproducibility of the technique under similar conditions.

**Conclusion**

The high cost of digital simulators does not allow possible spreading this technology in every department. For that reason, the purpose of this paper is the acquisition of a set of skills that allow the resident to go to the operating room with clear concepts about the basic techniques

**FEATURES OF LOCAL ANESTHESIA DURING ENDOSCOPIC INTRANASAL APPROACHES TO SPHENOID SINUS AND SELLAR REGION**

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**Aims**

Presence of optical equipment in the surgical field needs more requirements as to the anesthesiologist and the surgeon. Since the presence of even a small bleeding significantly hampers visualization, consequently limits the action and tightens the surgeon and the surgery. Implementation of intranasal endoscopic operation requires minimal bleeding in the area of operational field.

Optimal development of the local infiltration anesthesia techniques that would allow to reduce intraoperative bleeding by approaches to sphenoid sinus.

**Method**

We studied three groups of patients with lesion of sphenoidal sinus and sellar region. The first group included 23 patients who used only the lidocaine –adrenalin application of nasal cavities. The second group included 21 patients who underwent local anesthesia proposed by Stammberger when performing FESS. In the third experimental group - 19 patients. In this group applied anesthesia was performed by Stammberger and infiltration frontal wall of the sphenoid sinus.

**Results**

Evaluation of intraoperative blood loss was performed on a scale Andre.P.Boezaard and by measuring the amount of blood in the suction capacity. Intraoperative bleeding in the third group of patients where regional anesthesia was performed by the proposed method and was 0-1 degrees on the above mentioned scale.

**Conclusion**

Local infiltration anesthesia region agger nasi and frontal wall of the sphenoid sinus with controlled hypotension can reduce intraoperative bleeding.

**POST-TRAUMATIC DYSOSMIA: HOW TO DEAL WITH**

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**Aims**

The olfactory disorders, as a result of head trauma, have an incidence of 2-38% and are often related to the severity site of the trauma. The literature shows that occipital injuries are associated with anosmia in 21% of cases, while frontal or temporal ones produce this disorder in 4% and in 10% of cases

**Method**

147 patients (mean age of 43years) with a history of head trauma and reported olfactory disorders were enrolled from May 2008 to December 2015. Patients underwent physical examination with anterior and posterior rhinoscopy, rhinomanometry and subjective olfactometry by Sniffin 'Sticks® (olfactometric threshold, discrimination and identification test) before and after nasal decongestion test

**Results**

Relating to the site of trauma, we detected no fractures in 20.5% of patients, while occipital fractures in 17.9%, frontal fractures in 11.5%, complex fractures in 10.2%, temporal fractures or cranio-facials disjunctions in 6.4%, fractures of nasal bones in 5.1%, parietal fracture in 1.2%. Regarding the severity of dysosmia, the highest incidence of anosmia was found in no fracture injuries or in the occipital fractures. We found that 111 of 147 tested subjects were anosmic, 27 normosmic and 9 hiposmic before decongestion, while 103 subjects were anosmic, 31 normosmic and 13 hiposmic after decongestion, with a discrepancy of 9.6% before and after TDN

**Conclusion**

Because of the importance of providing a correct diagnosis for legal and insurance purposes, our work suggests that there must be an accurate method to make a more objective diagnosis of dysosmia and relate it to the head injury suffered

**AN ALGORITHM FOR THE DIAGNOSIS OF POSTTRAUMATIC OLFACTORY LOSS BASED ON THE MORPHOLOGICAL PATTERN OF CENTRAL-NERVOUS DAMAGE**

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**Aims**

Brain areas processing olfactory information exhibit functionally relevant morphological dynamics. This suggests the exploitation of anatomical information in the diagnosis of an olfactory dysfunction. Following previous identifications of olfactory eloquent areas such as the olfactory bulbs and tracts, we focused at a brain-morphology based algorithm for establishing the diagnosis of olfactory loss following brain injury.

**Method**

Forty-one patients with a history of head trauma dated back  $40 \pm 39$  months, and additional 23 patients without head trauma, were assessed for damages in 11 olfaction-relevant brain areas using magnetic resonance imaging (MRI). Olfactory function was derived from the use of a standardized, reliable and validated olfactory test. An olfactory diagnostic algorithm was derived following classification and regression tree analysis of the brain lesion pattern.

**Results**

Subjects were assigned to olfactory diagnoses of anosmia, hyposmia or normosmia. These diagnoses were predictable at an accuracy of 62.3 % from the degree of damage in the olfactory bulb and in the left temporal lobe pole. The main diagnosis algorithm addressed the presence of anosmia, which could be predicted from the degree of damage in these brain areas at an accuracy of 81.3 %.

**Conclusion**

We independently reproduced previously identified brain regions in which morphological damage is associated with olfactory loss. Based on this reproduction, an algorithm was developed for the diagnosis of anosmia from central-nervous damage. Thus, we introduce a morphological component to the olfactory diagnosis that specifically addresses clinical cases of olfactory loss following head trauma.

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## SMELL, TASTE AND TRIGEMINAL FUNCTION

### OBSERVATION OF ODOR BEHAVIOR BY THE NEW SIMPLE DEVICE IN MICE

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#### **Aims**

Behavioral olfactory function tests in animals have been widely studied, however those tests take long time to watch the animal behavior. We assessed whether our new simple device could show the odor aversion behavior *in vivo*.

#### **Method**

We have created a simple device that enables the mice to move freely between the two circular cylinders where the particular odor is separately supplied to each cylinder. There is the corridor where the mouse moves between the cylinders. We also video-recorded the behavior of the mice and carried out time measurement using the software that plots their movements. It has been shown that mice take aversive behavior against a odor of 2,4,5-trimethylthiazoline(TMT). We determined how long time the normal unconditioned mice stay in each cylinder (the one has been supplied with an odor of TMT and the other has been supplied with an odor of distilled water).

#### **Results**

There were not significant differences between the staying time in the TMT side and in the control side.

#### **Conclusion**

It warrants further investigation whether our new device is useful for the study of animal odor behavior in the conditioned mice.



**LACK OF CORRELATION BETWEEN OLFACTORY BULB VOLUME AND OLFACTORY DYSFUNCTION IN A MODEL OF SECONDARY NEURONAL DEGENERATION IN TRAUMATIC BRAIN INJURY\***

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**Aims**

Traumatic Brain Injury (TBI) constitutes one of the main causes of olfactory dysfunction. Excitotoxicity is a key factor in the secondary neuronal degeneration (SND) occurring in TBI. However, the role of excitotoxicity on olfactory dysfunction is unknown. On the other hand, recent reports have suggested that olfactory bulb (OB) volume is related to the olfactory function. We investigated the possible correlation between the olfactory dysfunction and the changes in OB volume, assessed with magnetic resonance imaging (MRI), in a rat SND model induced by bilateral OB administration of the glutamate agonist N-Methyl-D-aspartate (NMDA).

**Method**

Rats were maintained in a food-deprivation schedule. Olfactory discriminatory tests were performed before, 1 and 2 weeks after bilateral NMDA or vehicle OB administrations. After each discriminatory test, animals underwent a 7-Tesla MRI and OBs volumes were measured. NMDA-induced lesion was histologically confirmed by Nissl staining.

**Results**

One week after NMDA lesions, animals showed a 70% decrease in correct olfactory trials ( $p < 0.01$ ). The time spent to achieve the correct odour increased (from 14 to 45 seconds,  $p < 0.01$ ). A recovery of olfactory function was observed 2 weeks after lesion ( $p < 0.01$ ). On week 1, animals exhibited a 74% decrease in OB volumes ( $p < 0.05$ ), however, on week 2 no correlation between recovery of the olfactory function and OB volumes changes was found ( $r = 0.415$ ).

**Conclusion**

The present study suggests that olfactory bulb volume is not correlated with the olfactory loss and recovery occurring after excitotoxicity-induced secondary neuronal degeneration.

(\* ) This study was sponsored by a research grant from Fundació La Marató de TV3.

**OLFACTORY DYSFUNCTION IN AN EXCITOTOXIC MODEL OF SECONDARY NEURONAL DEGENERATION IN TRAUMATIC BRAIN INJURY: EFFECTS OF TRAINING AND NEUROPROTECTIVE THERAPIES\***

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**Aims**

Olfactory dysfunction is an early indicator of brain damage associated with Traumatic Brain Injury (TBI). Excitotoxicity is a key factor in the secondary neuronal degeneration (SND) occurring in TBI, however, its role on olfactory dysfunction is unknown. No therapy has yet been proven to be effective in TBI-related smell loss. We investigated the effects of olfactory training and neuroprotective therapies on the olfactory dysfunction in a rat SND model induced by bilateral administration of the glutamate agonist N-Methyl-D-Aspartate (NMDA) in the olfactory bulbs (OB).

**Method**

After bilateral NMDA OB lesions, animals were randomly distributed in the following groups receiving for 1 week: a) olfactory training, b) glutamate antagonist MK801 (0.1 mg/kg), c) MK801 (0.5 mg/kg), d) dopamine agonist Pramipexole (1 mg/kg), or e) Pramipexole (2 mg/kg). Control groups were non-trained or saline-treated. Olfactory discriminatory tests were performed before, and 1 week after lesions. NMDA-lesions were histologically confirmed.

**Results**

One week after NMDA-lesions, non-training animals showed a 82% decrease in olfactory correct trials ( $p < 0.01$ ), and the time spent to achieve the correct odour increased (from 8 to 46 seconds,  $p < 0.01$ ). Trained animals showed a recovery of olfactory function ( $p < 0.01$ ). MK801 (0.1 mg/kg), but not Pramipexole, showed an improvement in olfactory discrimination increasing in 35% the correct trials ( $p < 0.05$ ) and decreasing the time spent (from 46 to 9 seconds,  $p < 0.05$ ).

**Conclusion**

The results indicate that olfactory training and MK801 treatment improve olfactory dysfunction occurring after excitotoxicity-induced secondary neuronal degeneration.

(\* This study was sponsored by a research grant from Fundació La Marató de TV3.

**INTRANASAL TRIGEMINAL SENSITIVITY IN SEASONAL ALLERGIC RHINITIS**

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**Aims**

The intranasal trigeminal system is intimately related to airflow perception. Purpose of the study was to investigate the intranasal trigeminal sensitivity in patients with seasonal allergic rhinitis before and during allergy season and to correlate it to symptoms and endoscopic scores.

**Method**

Sixteen subjects with birch or grass allergy planned to undergo a specific autoimmun therapy (30.1±6.8 years) and 20 healthy subjects (31.1±9.1years) were included. Intranasal trigeminal sensitivity was tested by means of CO<sub>2</sub>-thresholds with a standardized device. Sinonasal symptoms were assessed with SNOT-20 questionnaire while endoscopic findings were quantified using Lund-Kennedy-Score. Measurements were performed before (November/December) and during allergy season (March/April). Data was analysed cross-sectionally between groups and longitudinal within groups using nonparametric tests.

**Results**

The preliminary analysis of data before the onset of allergy season show no significant difference in trigeminal sensitivity, symptom or endoscopic scores between groups, although patients with allergies showed a trend towards reduced trigeminal responsiveness (Kruskal-Wallis test, p=0.94).

**Conclusion**

Patients with seasonal allergic rhinitis show a trend towards reduced intranasal trigeminal sensitivity outside of allergy season, possibly as a sign of chronic irritation.

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## SMELL, TASTE AND TRIGEMINAL FUNCTION

### ANALYSIS OF OLFACTORY DYSFUNCTION IN IGG4-RELATED DISEASE

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#### Aims

IgG4-related disease (IgG4-RD) is a newly recognized systemic disease characterized by extensive infiltration of lymphocytes and IgG4-positive plasma cells with fibrosis in affected various organs, and elevated serum IgG4 concentrations. Little is known about sino-nasal manifestations yet. The previous study has suggested that olfactory dysfunction is prevalent in IgG4-RD patients. In this study, we examined the olfactory function of IgG4-RD model mice (LAT<sup>Y136F</sup> mice) to reveal the mechanism of olfactory dysfunction.

#### Method

We examined the behavioral tests to evaluate olfactory function. As a result, most of LAT<sup>Y136F</sup> mice had olfactory dysfunction. Furthermore, we analyzed the histology of olfactory epithelium in LAT<sup>Y136F</sup> mice.

#### Results

The thickness of the olfactory epithelium in LAT<sup>Y136F</sup> mice was thinner than age-matched wild type mice. The result of immunohistochemical analysis was consistent with behavioral tests. The expressions of Olfactory Marker Protein (OMP) and Growth Associated Protein (GAP-43) in olfactory epithelium of the LAT<sup>Y136F</sup> mice were markedly less than wild type mice. In the olfactory epithelium of LAT<sup>Y136F</sup>, the newly differential cells and mature olfactory nerve cells are both impaired.

#### Conclusion

These data suggest that the olfactory epithelium impairment caused olfactory dysfunction in LAT<sup>Y136F</sup> mice. We propose that olfactory dysfunction is a remarkable manifestation in IgG4-RD patients.

**THE EFFECT OF OBSTRUCTIVE SLEEP APNEA TREATMENT ON  
INFLAMMATORY/ANTIINFLAMMATORY BALANCE**

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**Aims**

The aim of this study is to investigate the inflammatory/anti-inflammatory cytokine balance in patients with obstructive sleep apnea (OSA) before and after treatment.

**Method**

Sixty patients with OSA are enrolled in this prospective study. Of those, 30 patients have used continuous positive airway pressure (CPAP) treatment and 30 patients who can't tolerate CPAP treatment were planned for surgery. Serum levels of interleukin (IL)-2, IL-4, IL-10, tumor necrosis factor-alpha (TNF- $\alpha$ ), and interferon gamma (IFN- $\gamma$ ) were analysed by enzyme-linked immunosorbent assay (ELISA) before and 3 months after treatment. The change in inflammatory/anti-inflammatory cytokines balance -T helper 1 (Th1) / T helper 2 (Th2) ratio- was evaluated.

**Results**

The surgery group and the CPAP group completed the study with 29 and 28 subjects, respectively. The success rate of surgical treatment was 65.5% and mean compliance for CPAP group was 40.9%. The apnea hypopnea index (AHI), Epworth Sleepiness Scale (ESS), and visual analog scale (VAS) scores significantly decreased in both groups after treatment ( $p < 0.001$ ). IFN- $\gamma$  serum levels in surgery group significantly decreased after treatment ( $p = 0.043$ ). Higher PAP compliance significantly increased IL-4 levels compared with lower CPAP compliance ( $p = 0.045$ ). IFN- $\gamma$ /IL-4 ratio decreased by surgical treatment ( $p = 0.014$ ) and IL-2/IL-4 ratio decreased after treatment for overall 57 patients ( $p = 0.032$ ). All proportions reflecting Th1/Th2 cytokine balance decreased after treatment especially in surgery group.

**Conclusion**

After treatment, Th1/Th2 cytokine balance for all proportional analysis was toward to Th2 direction, suggesting a shift to antiinflammatory state. The intermittent hypoxemia, rather than the severity of AHI, appears to be primarily associated with inflammation.

**SLEEP ENDOSCOPY (DISE) IN THE DIAGNOSIS AND MANAGEMENT OF OBSTRUCTIVE SLEEP APNEA SYNDROME: LITERATURE REVIEW AND OUR PERSONAL EXPERIENCE**

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**Aims**

The aim of this study was to identify patterns of airway collapse and sites of obstruction during drug induced sleep endoscopy (DISE) as predictors of surgical failure following multilevel airway surgery for patients with obstructive sleep apnea-hypopnea syndrome and suggest consequent therapeutic prescriptions

**Method**

Different techniques, interrater reliability, test–retest reliability and currently available data on the relationship with treatment outcome were reviewed. For each patient, we recorded sites and patterns of obstruction and the effects of the mandibular pull-up manoeuvre on both obstruction and snoring. We compared the results of clinical and diagnostic evaluation with those of sleep endoscopy, evaluating the correlation between clinical indexes of routine clinical diagnosis and sites of obstruction in terms of number of sites involved, entity of obstruction and pattern of closure

**Results**

We found that palatal obstruction was the most frequently observed site of obstruction , followed by tongue base obstruction, laryngeal obstruction and hypopharyngeal obstruction. There was a statistically significant difference, as already demonstrated, in the incidence of severe retrolingual collapse identified via DISE compared with Müller's maneuver. A multi-level collapse, a complete collapse, and a tongue base collapse is associated with higher AHI values.

**Conclusion**

DISE is a valid addition when surgery or MRA treatment is considered. DISE is a dynamic, safe, and easy-to-perform technique that visualizes the anatomical sites of snoring or apneas and guides the design of a tailor-made treatment plan in individual cases. Understanding the sites of pharyngeal collapse is mandatory for surgical treatment decision-making in obstructive sleep-apnea-hypopnea syndrome patients.

**SYMPTOMS OF INSOMNIA AMONG PATIENTS WITH OBSTRUCTIVE SLEEP APNEA: A CROSS SECTIONAL STUDY**

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**Aims**

Excess sympathetic nervous system activation is considered to be key factor in the pathophysiology of insomnia. Frequent arousals and fragmented sleep associated with OSA often lead to excessive daytime sleepiness, but may also increase long-term sympathetic activity. The latter may paradoxically exacerbate co-existing insomnia that may further deteriorate patients' general condition and comorbidities. Furthermore, coexisting insomnia might reduce compliance to C-PAP treatment.

Aims: To assess the presence of insomnia among patients presented with obstructive sleep apnea in the O.S.A.S outpatient clinic

**Method**

Cross sectional study. Data regarding sleeping habits and symptoms of insomnia, AHI, BMI, age of OSAS patients followed in the OSAS outpatient clinics in TASMCM was collected from medical charts. Differences between apnea hypopnea index (AHI) scores were compared via T-test.

**Results**

The cohort included 192 patients, with male predominance (79.9%; n=195) with mean age of  $43.52 \pm 14.22$  and mean BMI of  $27.79 \pm 4.31$ . 38.21% (n=73) of patients presented with co-existing medical comorbidities, of which 53.42% (n=39) included essential hypertension. As for OSA assessment, mean AHI was  $24.92 \pm 19.32$ . Onset insomnia was reported in 16.08% of OSA patients (n=32), maintenance insomnia was reported in 24 patients (12.6%), of which a combined disorder of onset insomnia with maintenance insomnia was reported in 33.3% (n=14). There was no correlation between insomnia prevalence and A.H.I was detected.

**Conclusion**

Insomnia of sleep apnea patients should be regarded as a comorbidity. Insomnia-related symptoms should be noted at initial patient intake, and further addressed and followed along with OSA surgical treatment.

**SLEEP ENDOSCOPY IN PATIENTS WITH POSITIONAL OSA**

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**Aims**

The aim of our work was the assessment of drug-induced sleep endoscopy (DISE) possibilities at positional OSA – phenomenon, observed in more than half of the patients, and its impact on the choice of treatment tactics.

**Method**

During 2015 year we performed 48 DISE in OSA patients.

**Results**

In 22 of 48 patients (46%) the positional OSA (p-OSA group) was diagnosed. According to the polysomnography data, nine patients had mild OSA, eight - average, five – severe. Control group (with non-positional OSA) were 26 patients (54%). In the p-OSA group two patients had obstruction at the level of soft palate only, the remaining 20 patients had multilevel obstruction, including velum (n=20, 100%), oropharynx (n=17, 85%), tongue base (n=12, 60%) and epiglottis (n=7, 35%). In control group 6 patients had single level obstruction: five patients - at the velum level, one - at the oropharynx. The remaining 20 patients observed multilevel obstruction including velum (n = 20, 100%), oropharynx (n=14, 70%), tongue base (n=17, 85%) and epiglottis (n=7, 35%). During one of the DISE maneuvers (head rotation) in 17 patients of p-OSA group (77.3%) a decrease of upper airway obstruction was mentioned. There were no such changes in any patient of the control group.

**Conclusion**

In most cases in patients with positional OSA, DISE results completely correlates with PSG data. In case of low compliance about surgery and CPAP in patient with positional OSA there is no need to perform DISE to select position therapy.



**PREDICTING OUTCOMES AFTER UVULOPALATOPHARYNGOPLASTY: A META-ANALYSIS**  
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**Aims**

Uvulopalatopharyngoplasty (UPPP) remains one of the most common surgical treatments for patients with obstructive sleep apnea (OSA). However, the results after UPPP are unpredictable. The purpose of this meta-analysis is to identify the predictors of success after UPPP

**Method**

The variables analyzed were the age, body mass index (BMI), preoperative apnea-hypopnea index (AHI), Friedman anatomical stage, and several cephalometric measurements. 1,257 studies were screened, with 15 studies included in this meta-analysis

**Results**

Our results demonstrate that Friedman Stage I is a strong predictor for success after UPPP, while Friedman Stage III and low hyoid position are negative predictors. Age, BMI, preoperative AHI, and other cephalometric measurements were not significant. Reviews of literature suggest that hypopharyngeal obstruction is a potential predictor for surgical failure

**Conclusion**

Friedman stage and hyoid position are the important predictors for UPPP

**ANALYSIS OF SLEEP BREATHING SOUND BASED ON CYCLOSTATIONARITY**

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**Aims**

Breathing sound during sleep may give us much information on sleep quality and existence of sleep-related disorders. Snoring is one of the breathing sounds occurring during sleep. Snoring is also one of the most common symptoms observed in patients with sleep breathing disorder (SDB) and it is not a significant risk factor in the general cases. Specific irregular respiration patterns which represent long pauses of breathing called obstructive apnea may lead to dangerous conditions such as arrhythmias, hypertension and cardiac ischemia. Therefore, a detection of the abnormal breathings is necessary to classify the SDB severity and sleep quality.

**Method**

Audio data obtained during polysomnophary was collected. The current study analyzed breathing pattern of snoring and obstructive apnea based on the cyclostationary signal analysis approach which had been used to examine hidden periodicities of signals. We hypothesized that an irregular snoring occurring after the obstructive apnea, has different cyclostationary spectral properties compared with simple snoring.

**Results**

A total of 60 SDB patients were included. We calculated spectral correlation coefficients and their statistical measures to get the cyclostationarity of snorings. We could identify effective features among them using some dimensionality reduction and feature selection techniques.

**Conclusion**

We found that cyclostationary information of the breathing sound was effective to distinguish irregular snoring from simple snoring and may be helpful to predict SDB severity.

**ACOUSTIC ANALYSIS OF SNORING SOUND**

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**Aims**

Snoring is a breathing noise evident during the inspiratory phase (and sometimes also the expiratory phase) of the respiratory cycle. The sound is indicative of the presence of an upper airway obstruction and is an important clinical symptom of patients with sleep-disordered breathing (SDB). Acoustic analysis is the process by which sound is “visualized”. Such analysis of “snoring sounds” may aid in diagnosis of SDB, may indicate the site of obstruction, and may assist in treatment planning and prediction of prognosis. Thus, we acoustically analyzed snoring sounds and compared these with the sounds made during endoscopy of patients in drug-induced sleep. We explored whether such analysis facilitated prediction of the site of obstruction, and whether the data assisted treatment planning. We also evaluated the capacity of such analysis to predict treatment outcomes.

**Method**

Each patient underwent polysomnography, and snoring sounds were recorded on a smartphone. All patients also underwent DISE to identify the sites of obstruction. We compared our acoustic data with the DISE findings. We analyzed snoring intensities and spectrographic patterns by obstruction site.

**Results**

The sound intensity varied by obstruction site, as did the spectrographic pattern. A retropalatal obstruction was associated with regular peaks in snoring sound and intensity. However, a retroglossal obstruction was associated with a “crescendo/decrescendo” sound pattern of irregular intensity.

**Conclusion**

Acoustic analysis of snoring sounds may potentially predict obstruction sites and, upon further development, may be able to predict the severity of SDB.

**OSAS IN CHILDREN, SURGICAL TREATMENT IN CHILD DISEASE INSTITUTE, MONTENEGRO**  
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**Aims**

Our aim is to show that tonsillectomy is the method of choice in the treatment of hypertrophic tonsils, especially in children with OSAS problem. Importance of this disorder in children is in disruption of normal breathing during the night and also possible causing of serious cardiovascular, metabolic and other disorders.

**Method**

Study included children suffering from OSAS, in the last three years, for what they were suggested with surgical treatment. One part is treated with adenoidectomy and other part with adenoidectomy with tonsillotomy (earlier we performed Cold steel tonsillectomy). We are performing tonsillotomy with Harmonic Ultracision scalpel (HARMONIC SYNERGY® Blades).

**Results**

Study included 55 patients, we did adenoidectomy as only procedure in 40 cases, and in 15 cases (with tonsillar hypertrophy, grade 3 and 4 (according to L. Brodsky)) we performed tonsillotomy with adenoidectomy. The youngest was 3 years old at the time of the operation and the oldest was 7 years old. Nine patients were female and 6 were male. For now, we have more than tree year follow up of our first patient and we are satisfied with results, normal breathing during sleep, without apnea period, and also no snoring. Operative and postoperative course were easier and shorter then in patients with tonsilloadenoidectomy, almost without bleeding.

**Conclusion**

Carefully chosen patients, with right indication, and appropriated surgery, are the way that we can significantly improve quality of life in a OSAS patients. Fast recovery in children who underwent to tonsillotomy proves that this intervention is far better solution then tonsillectomy.

**DRUG-INDUCED SLEEP ENDOSCOPY IN THE PEDIATRIC POPULATION: PRELIMINARY RESULTS OF A PORTUGUESE HOSPITAL**

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**Aims**

To describe the upper airway endoscopic findings during drug-induced sedation endoscopy (DISE) in children with Obstructive Sleep Apnea (OSA).

**Method**

Prospective study of children with indication for DISE. The indications for doing a DISE were persistent obstructive sleep apnea (OSA) after adenotonsillectomy (AT) and OSA associated to obesity, Down Syndrome (DS) or Sickle Cell Disease (SCD). All DISEs were performed using a uniform intravenous sedation technique. For the endoscopic findings the authors used the same classification system for the obstructive sites in the upperway. Treatment was individually tailored according to UA findings during DISE and polysomnographic data.

**Results**

The authors presented the first ten cases of pediatric DISE in our department. Age ranged 5–18 years at the time of DISE. In five patients (50%) the indication for DISE was OSA and DS, in two (20%) it was OSA and obesity, in one child (10%) it was the diagnosis of OSA and SCD, while the other two (20%) represent children with persistent OSA after TA. DISE revealed the adenoidal region and the tongue base as the most common sites of obstruction. The majority of children had obstruction at multiple sites. Individualized, multilevel, DISE-directed operative therapy was performed in all the patients.

**Conclusion**

Our data suggest that DISE is a useful tool for identifying the sites of obstruction in children with persistent OSA after TA and with OSA associated with other diseases. A larger number of cases would be necessary to confirm the review's results.

**THE ROLE OF NASAL TREATMENTS IN OBSTRUCTIVE SLEEP APNEA**

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**Aims**

In the meantime, a multitude of treatment options for sleep disordered breathing exists. They can be classified into conservative, apparatus, and surgical methods. But the relation between nasal airway and SDB is very complex and, at present, still not completely understood in every detail. From the several review articles, it can be concluded that nasal obstruction may have a negative impact on sleep quality; this study aimed to summarize data and theories on the role of the nose in the pathophysiology of SDB as well as to discuss the benefits of surgical and medical nasal treatments.

**Method**

In this study, we examined the impact on subjective sleep quality on 106 patients undergoing surgery for chronic sinusitis. Also we evaluated with ESS score, which reflects one's subjective assessments of daytime sleepiness.

**Results**

A PSQI score more than 5.5 indicates of poor sleep. And 33 cases had a reduced sleep quality. ESS scores of 10 or more are often considered to be abnormal. We saw abnormal daytime sleepiness, in 11.3% of patients, and in 6.6% they had a severe propensity to fall asleep.

**Conclusion**

In conclusion, the management of nasal obstruction should be regarded as an important consideration in the treatment of sleep quality and OSA. Standardization of methods and higher evidence level studies will further clarify the benefit of nasal interventions in the treatment. Further research should be continued.

**EFFECTIVENESS AND SAFETY OF PILLAR PALATAL IMPLANTATION PROCEDURE PERFORMED IN GENERAL ANESTHESIA**

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**Aims**

To evaluate the safety and effectiveness of Pillar system palatal implantation procedure performed in general anesthesia for patients with snoring and mild or moderate obstructive sleep apnea.

**Method**

Prospective study of 45 patients treated in the same surgical center. The patients were followed for 4 to 12 months after surgery. All demographic data were collected, and complete clinical examination was performed before surgery. Polysomnography, Epworth Sleepiness Scale (ESS), bed-partner assessment of snoring using visual analogue scale (VAS, 0-10), before and after surgery, modified Mallampati index (MMP) grade and tonsil size grade according to Friedman classification were analyzed as factors that may influence the effectiveness of procedure. During the procedure 3 polyethylene terephthalate implants were placed in the palate of each patient.

**Results**

No surgical and anesthesia complications was observed during surgery and in postoperative period. Statistically significant reduction in snoring was observed in 82% of patients. In mild and moderate OSA reduction of AHI index was 71% and 66% respectively. Five patients (11%) experienced total or partial implant extrusions

**Conclusion**

The Pillar palatal implant system is safe and effective option in treating snoring and mild or moderate obstructive sleep apnea. Due to short time of surgery it is also a safe method in general anesthesia implantation. Advantages are virtually no tissue damage and minimal patient discomfort after procedure.

**EFFICACY OF COMBINED ANTERIOR PALATOPLASTY AND MODIFIED EXPANSION SPHINCTER PHARYNGOPLASTY IN OBSTRUCTIVE SLEEP APNEA**

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**Aims**

To investigate the efficacy of combined anterior palatoplasty and modified expansion sphincter pharyngoplasty in obstructive sleep apnea (OSA), and to determine the factors affecting surgical success.

**Method**

A total of 33 patients diagnosed with OSA based on clinical and polysomnography findings, and had simultaneous anterior palatoplasty and modified expansion sphincter pharyngoplasty were included in the study. The efficiency of surgery was analyzed objectively by analyzing preoperative and postoperative polysomnography data, and subjectively by comparing pre- and postoperative Epworth Sleepiness Scale scores. Sher criteria (postoperative AHI <20/h and >50% reduction in preoperative AHI) were used to determine surgical success. The patients with successful and unsuccessful outcomes were compared for age, BMI, Epworth score, and polysomnographic data.

**Results**

The mean pre- and postoperative AHI were 21.73 and 12.05, respectively, with a statistically significant difference in between ( $p=0.002$ ). In addition, there were significant improvements in minimum oxygen saturation, REM AHI, apnea index, hypopnea index, and mean apnea duration ( $p<0.05$  for all). The success rate was found as 54.5% according to Sher criteria. Comparison of the groups with successful and unsuccessful results according to Sher criteria showed a significantly shorter supine sleep position in preoperative polysomnography in the unsuccessful group.

**Conclusion**

Combination of anterior palatoplasty and modified expansion sphincter pharyngoplasty is an effective surgical treatment option in patients with OSA.



**MEASUREMENT OF PHARYNGEAL AND UPPER ESOPHAGEAL SPHINCTER PRESSURE AFTER UVULOPALATOPHARYNGOPLASTY IN OBSTRUCTIVE SLEEP APNEA PATIENTS USING HIGH RESOLUTION MANOMETRY**

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**Aims**

High resolution manometry(HRM), a newly developed device has recently been applied to evaluate the esophageal and upper esophageal sphincter(UES) status. However, its definite role in obstructive sleep apnea(OSA) is not well established. The aim of this study was to evaluate clinical usefulness of HRM by elucidating the change of HRM findings before and after surgical treatment of uvulopalatopharyngoplasty(UPPP) in OSA patients.

**Method**

A total of 10 patients diagnosed with OSA from January 2015 to January 2016 were prospectively enrolled in this study. Preoperative questionnaire and HRM examination was performed on each patient, and 8 weeks following uvulopalatopharyngoplasty, postoperative HRM evaluation was done. An analysis of the pre and postoperative HRM results was performed to evaluate the correlation between the changes in HRM findings and the surgical treatment of OSA.

**Results**

In preoperative evaluation, the patients had an UES residual pressure of  $27.78 \pm 21.92$  mmHg, UES percent relaxation of  $53.99.2 \pm 11.214.3\%$ , wave amplitude of  $3.03 \pm 0.94$  sec, wave duration of  $45.23 \pm 28.79$  cm/s and intrabolus pressure of  $2.2667 \pm 4.35$  mmHg,. Following UPPP, no statistical significance was observed in the changed UES residual pressure( $6.29 \pm 26.36$  mmHg), UES percent relaxation( $-5370.7 \pm 23289.8\%$ ), wave amplitude( $82.88 \pm 54.32$ ), wave duration( $23.74 \pm 50.90$ ) and intrabolus pressure( $-3.38 \pm 7.09$  mmHg). On the preoperative and postoperative questionnaire, no patients had long lasting regurgitation symptoms following operation.

**Conclusion**

According to our study, the pharyngeal and esophageal pressure levels do not show significant change after surgery. Thus, by utilizing HRM, we conclude that UPPP does not cause considerable changes in swallowing difficulty.

**EVALUATION WITH DISE (DRUG INDUCED SLEEP ENDOSCOPY) IN PATIENTS WITH OSAS AND DIFFICULTY TO ADAPTION TO CPAP**

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**Aims**

To evaluate patients with difficulty in compliance to CPAP due to asphyxia with DISE , and to identify possible anatomic factors related with this complaint, as well as the improvement with some maneuvers to CP.

**Method**

Patients with OSAS and low adhesion to CPAP due to asphyxia were compared with those well adapted to CPAP treatment. All patients underwent PSG (both diagnostic and titration) and DISE. The following parameters were analyzed in DISE: obstruction pattern while without treatment, and the effect of CPAP and mandible advancement maneuver (isolated and combined) to this pattern.

**Results**

19 patients (13 with low and 6 with adequate adhesion) enrolled the study. The presence of snoring during DISE with CPAP (pressure used by the patient) was associated with low adhesion to CPAP ( $P < 0,0005$ ), with PPV of 100% and NPV of 83.33%. Pharyngeal obstruction at tongue base and epiglottic level during DISE with CPAP was associated with higher risk of low-compliance to CPAP (odds-ratio: 11.2 and 20, respectively). At the same pressure, nasal mask was better than orofacial one to correct pharyngeal obstruction. Mandible advancement maneuver was not related did not overcome pharyngeal obstruction, neither when isolated neither when CPAP was being employed.

**Conclusion**

DISE can be employed when evaluating patients with difficulty in compliance to CPAP due to asphyxia. The presence of snoring during DISE with CPAP predict well the presence of pharyngeal obstruction. Obstructions at tongue base and epiglottic level are the most commonly associated with compliance problems during CPAP usage.

**EARLY DIAGNOSIS AND MANAGEMENT OF CHILDREN WITH SNORING AND NASAL OBSTRUCTION**  
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**Aims**

Upper airway obstructions often cause snoring in childhood and adolescence. Here belong rhinitis, rhinosinusitis, inferior turbinate and palatine tonsillar hypertrophy of allergic origin, adenoid vegetation in infants, etc.

**Method**

We studied 78 patients aged 8-18 years and presenting with snoring symptoms. Acute respiratory tract diseases were diagnosed in 60 cases (rhinitis in 41, rhinosinusitis in 13 and tonsillopharyngitis in 5) while chronic rhinitis or tonsillitis were proved in 18 children.

**Results**

With the first group, enlarged palatine tonsils were established in 24, nasal septal deviation in 12 and adenoid vegetation in 6 patients. In the second group, 10 children presented with chronic tonsillitis being hyperplastic in 7 of them but 8 children had deviated nasal septum along with chronic allergic rhinitis in 3 of them. Tympanogram and audiogram were altered in 10 patients. A detailed patient's history revealed symptoms of an additional obstructive sleep apnea in 39 cases. Anterior rhinoscopy, nasal endoscopy, rhinomanometry, acoustic rhinometry, tympanometry, audiometry, and polygraphy were applied. The conservative treatment included decongestive drops, antihistamines, corticosteroid nasal drops, mucolytic drugs, homeopathic preparations and antibiotics. Surgery consisted of tonsillectomy, radiofrequency-induced thermotherapy and coblation, or septoplastics.

**Conclusion**

Obstructive sleep apnea should be suspected in any evidence of snoring in children and careful examinations should timely be performed. Sleep analysis is required after failed conservative or operative management of snoring and should be done if child's age allows. The recently rising incidence rate of obstructive sleep apnea syndrome in childhood proves the necessity of the wider application of polygraphy or polysomnography.

**DOES BI-LEVEL COBLATION CHANNELLING IMPROVE PATIENT OUTCOMES?**

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**Aims**

Analyzing the efficacy of bi-level Coblation channelling in treatment of primary snoring and mild obstructive sleep apnoea.

**Method**

A non-randomized retrospective case series of 20 patients, from January 2013 to December 2015, with a diagnosis of primary snoring and mild obstructive sleep apnoea (apnoea-hypopnoea index up to 15), was performed. Each underwent combined Coblation-assisted upper airway procedure (CAUP), and Coblation-channelling of the soft palate and inferior turbinates in a Singapore tertiary centre. Patients and their bed partners were surveyed. Pre- and post-operative snoring scales, nasal obstruction scores, and a general questionnaire on sleep quality were compared, with the results subjected to statistical analysis.

**Results**

Our survey results suggested statistical improvement in 90% of our patients, as responses yielded decreased snoring and significant improvement in sleep quality. This corresponded to a 90% score in bed partner satisfaction post-operatively. Two patients had primary haemorrhage, and two patients developed recurrence from palatal webbing requiring revision surgery. Complications such as nasal regurgitation or altered voice or taste were not encountered in our series. Almost all patients reported improved nasal airway.

**Conclusion**

We refer to studies describing nasal surgery and other palatal stiffening procedures, and describe a modified bi-level Coblation channelling approach. Our finding is that higher volumetric reduction and better palatal stiffening could be achieved with Coblation. We suggest that addressing both sites of turbulent airflow in the same sitting - for selected patients, may maximise treatment outcomes following surgery. More follow up is required to assess long term effects.

**INFLUENCE OF OBSTRUCTIVE SLEEP APNEA ON CHILDREN'S PHYSICAL GROWTH**

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**Aims**

As OSA (Obstructive Sleep Apnea) in children can impact negatively on their growth, it is imperative to diagnose it as soon as possible. Although diagnosis can be achieved by observing symptoms and performing a PSG (polysomnography), this requires hospitalization, and is inconvenient for children and their parents.

The objective of this study is to evaluate other diagnostic methods such as HPSG (home polysomnography) and the OSA-18 quality-of-life questionnaire (OSA-18) as an alternative. Furthermore, this study considers OSA effect on children's growth.

**Method**

The participants were 28 children aged between 5 and 9 years old who were diagnosed with OSA and underwent an adenotonsillectomy between 2013 and 2015. An OSA-18, home video sleep monitoring and a HPSG were given before, and then one year after the operation. Subsequently, two factors were investigated; improvement of physical growth, improvement of the main complaint from the OSA-18.

**Results**

The results support the claim that it is possible to diagnose OSA with a combination of an OSA-18 in addition to home video monitoring and HPSG without using a PSG. Furthermore, the results show an improvement of the main complaint from the OSA-18.

After the adenotonsillectomy, the participants' height increased as compared to the standard height before the operation indicating that the negative influence of OSA on growth can be mitigated by this treatment.

**Conclusion**

It is possible to diagnose OSA, without using a PSG.

Also, OSA affects growth and an adenotonsillectomy is an effective way to alleviate this problem.

**DORSAL GRAFTING WITH CRUSHED CARTILAGE SANDWICH**  
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**Aims**

augmentation of the nasal dorsum and nasofrontal angle by using a modified technique of crushed cartilage grafts to ensure good and long lasting results by simple insertion.

**Method**

by inserting onlay dorsal graft of medium crushed cartilage taken from the nasal septum or chonchal cartilage after removing bone or perichondrium warped by tutoplast with closed edges using monocryl suture to give the shape of the cushion, its size controlled by the amount of cartilage according to the requirement and defect size, a guide suture used to introduce the graft in place by passing the suture transcutaneously and the suture end fixed by using setri strips to the nasal dorsum and covered with nasal splint for one week to keep in place.

**Results**

i did 55 cases using this technique, the mean age is 36 y (18 Y-56 Y)

32 females and 23 males

the result of this technique is very accepted by my patients dorsal contour irregularities specially with the patients with thin skin and fill the nasal saddling happen post hump resection or any other maneuver and correct nasofrontal angle

i follow my patients for one year

first month every week then every 3 months.

**Conclusion**

this modified technique of onlay grafting of nasal dorsum improve the nasal profile and proportions by covering dorsal contour irregularities and fill the defects caused by over correction of the hump which may leads to saddling of the nose and works as permanent camouflage for all dorsal irregularities.

**POST TRAUMATIC CLOSED RHINOPLASTY IN NORTH AFRICAN PATIENTS**  
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**Aims**

The application of rhinoplasty in the treatment of traumatic nasal deformity remains one of the most challenging problems in plastic surgery. This paper presents our experiences in the reconstruction of traumatic nasal deformities using the internal rhinoplasty approach.

**Method**

We conducted a retrospective study from January 2001 to December 2014. We included in this study all patients operated for nasal post-traumatic deformity using closed approach. Each patient chart was reviewed with regard to: age and gender, circumstances and date of nasal trauma, timing of the rhinoplasty as well as for the functional and aesthetic outcomes.

**Results**

One hundred seventy two of these patients, including 115 males and 57 females, underwent the internal approach. The patients were, on average, 26 years old at the time of reconstruction and were followed up for an average period of 16 months. The interval from injury to the rhinoplasty procedure was 4,5 years, on average. The outcome was assessed by (an independent investigator and the patients themselves). The overall aesthetic-improvement rate was 88%, and the patient-satisfaction rate was 95%. There was no complication.

**Conclusion**

Not only is the skeletal structure severely deformed, but the soft tissue may also be disfigured by a previous injury. The closed rhinoplasty technique provides great predictability and minimal postoperative discomfort, with no aesthetic damage

**NASAL FORM AND FUNCTION IN THE RHINOPLASTY: HOW THEY FIT TOGETHER**

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**Aims**

The aim of the article is to discuss how the graduated surgical techniques for the correction of nasal pyramide and septal deviations could affect the nasal form and function and to evaluate the patient satisfaction of the aesthetic and functional outcomes.

**Method**

All 240 cases underwent on rhinoseptoplasty. In 212 of total 240 cases a primary rhinoseptoplasty was performed, whereas in 28 a secondary rhinoseptoplasty. The prospective review of rhinoplasty cases was undertaken to delineate the execution of specific surgical techniques in creating deprojection of nasal dorsum, nasal dorsal augmentation and straightening of deviated nose combined with tip refinement and projection. The patients have been followed for 12 months postoperatively.

**Results**

During the follow-up period of 12 months, the cases were satisfied with the functional and aesthetic outcomes. Aesthetic results were graded excellent in 198, good in 25, satisfactory in 17. Nasal flow was graded excellent in 202, good 24, satisfactory in 14 cases. The mean subjective breathing score was improved significantly ( $p < 0,001$ )

**Conclusion**

The form and function are virtually inseparable in rhinoplasty and must be evaluated jointly. The outcomes of aesthetic and functional nasal surgery are difficult to assess objectively due to the intricate balance between nasal form and function.



## ENDONASAL EXTENDED COLUMELLAR STRUT IN ASIAN RHINOPLASTY

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### Aims

Tip surgery in Asians should be performed in a different way due to anatomic differences. The authors used an endonasal rhinoplasty to correct the position of lower lateral cartilage by adopting a modified columellar strut. This study aimed to evaluate the usefulness of the EECS in Asians.

### Method

A retrospective study was performed with 40 patients who underwent EECS. Photographs taken preoperatively and postoperatively were analyzed. The tip projection, the ratio of the length of the infratip lobule to the total length of the tip, and a columellar labial angle change were measured. Overall, surgical outcomes were rated into three grades (excellent, good, and fair) by two experienced rhinoplasty surgeons. All the patients were asked to rate their cosmetic satisfaction by using a visual analog scale (10 points).

### Results

Postoperative nasal tip projection significantly increased, from 24.2 to 26.7 mm ( $p < 0.01$ ). The ratio of the length of the infratip lobule to the total length of the tip mildly increased, from 0.45 to 0.46 in men, and remained unchanged, at 0.48, in women. The columellar labial angle significantly increased, from 86.9° to 93.7° ( $p < 0.01$ ). Surgical outcomes were rated by two experienced surgeons as excellent (40%), good (42%), and fair (18%). Subjectively, patients graded their satisfaction at ~8.7 on the visual analog scale.

### Conclusion

This novel EECS technique enabled satisfactory tip projection in Asians while maintaining a natural ratio of infratip lobule to total length of tip and leaving no external scar.

**PREOPERATIVE EXPECTATIONS IN RHINOPLASTY**

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**Aims**

A major problem for many rhinoplastic surgeons is the ability to predict, before surgery, the difficulty of the procedure and the success rate of the result. The present poster outlines a systematic approach to nasal analysis, allowing the surgeon to consistently estimate, before surgery, the degree of technical difficulty of each rhinoplasty, as well as predicting its future result in terms of patient satisfaction.

**Method**

This preoperative evaluation is based on the analysis of the skin texture and the osteocartilagenous framework on lateral and frontal views. It allows for the nose to be classified as: type 1 (easy), type 2 (moderate) and type 3 (difficult), depending on two factors: the degree of surgical difficulty and the expected patient's satisfaction with the result.

**Results**

For simplicity, the three most important criteria that determine nose classification are, in order of priority, the profile view (the most crucial evaluating factor), the skin thickness and the frontal view. Analysis of the profile view should be performed first, followed by skin palpation and frontal view analysis. Once this initial assessment is performed, the patient is categorized as having a type 1, type 2 or type 3 nose.

**Conclusion**

The essence of the present poster is to introduce a simple, systematic approach to assist the novice rhinoplastic surgeon to assess the complexity, the risks and the expected outcome of a rhinoplasty in the preoperative period, rather than postoperatively.

**DORSAL AUGMENTATION USING EXPANDED POLYTETRAFLUOROETHYLENE IMPLANTS IN REVISION RHINOPLASTY FOR FAILED AUGMENTATION WITH BIOLOGIC IMPLANTS**

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**Aims**

The biologic dorsal implants, fascia or cartilage, can result in complications such as warping, resorption and irregularity. The use of alloplastic implant material for revision surgery is not generally recommended procedure, however in the revision surgery for failed dorsal augmentation with biologic tissue, dorsal augmentation with different material may be a rational choice. We report our experience of dorsal augmentation using expanded polytetrafluoroethylene (ePTFE) in patients who required revision for the previously inserted biologic dorsal implants.

**Method**

A retrospective review of medical records who underwent revision dorsal augmentation using ePTFE from March 2003 to December 2014 was conducted. All operations were performed by one surgeon. The patient demographics and dorsal augmentation materials were analyzed. Changes in dorsal height and radix height were measured by comparing pre- and postoperative profile views. Postoperative complications were also evaluated.

**Results**

A total 50 patients were reviewed. Mean age was 33.5 years old and mean follow up periods was 12months. Tutoplast-processed fascia lata was used most commonly in previous surgery (N=35). Most common complication of previous surgery was deviation, which was observed in 14 patients. The dorsal height was significantly increased after ePTFE augmentation ( $p = 0.001$ ). However, there was no significant increase in the height of radix ( $p = 0.062$ ). The complications were found in two patients. One patient presented displacement of implant and the other patient showed dissatisfaction.

**Conclusion**

This study indicate that dorsal augmentation using ePTFE is acceptable surgical option in revision rhinoplasty for the complicated dorsal augmentation using biologic tissue implants.

## THE IMPACT OF OPEN RHINOPLASTY ON THE AIRWAY DIMENSIONS

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<sup>2</sup>Tehran University of Medical Sciences, Otorhinolaryngology- Head and Neck Surgery, Tehran, Iran

### Aims

Acoustic rhinometry (AR) has grown popular as a practical and objective clinical modality to assess the severity of chronic nasal obstruction. Herein, we aimed to objectively determine the impact of open rhinoplasty on the alteration in the airway dimensions as assessed by various parameters of AR pre- and post-operatively.

### Method

Sixty patients (39 females; aged [mean  $\pm$  SD]  $25.2 \pm 8.8$ ) with chronic nasal obstruction prospectively underwent objective measurement of the nasal function prior and after open rhinoplasty using three parameters of the AR: minimal cross-sectional area (MCA), volumetric value (VOL) and distance to the nostril on both sides.

### Results

Open rhinoplasty was performed in all cases. Post-operatively, significant improvements were made in the MCA ( $\text{cm}^2$ ) of the nasal airway on both left (from  $0.21 \pm 0.05$  to  $0.71 \pm 0.31$ ,  $P$  value = 0.045) and right (from  $0.25 \pm 0.08$  to  $0.75 \pm 0.12$ ,  $P$  value = 0.014) sides and the VOL ( $\text{cm}^3$ ) on the right side (from  $1.02 \pm 0.14$  to  $1.29 \pm 0.04$ ,  $P$  value = 0.030).

### Conclusion

Our findings support the overall effectiveness of open rhinoplasty on the objective improvement of airway dimensions in patients who underwent septorhinoplasty for improvement of form and function.

## ASSOCIATIONS BETWEEN INTEREST IN RHINOPLASTY, POSITIVE BODY IMAGE, AND PHYSICAL APPEARANCE COMPARISONS AMONG RHINOPLASTIC PATIENTS

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<sup>2</sup>University of Tehran, Psychology, Tehran, Iran

### Aims

research suggests that those who apply for cosmetic surgeries may show body image disturbance. Most of the studies, however, rely on measurement of negative body image among patients. The present study aimed to investigate associations between interest in aesthetic rhinoplasty with two body appreciation as an indicator of positive body image and physical appearance comparison.

### Method

a consecutive sample of 70 patients who applied for aesthetic rhinoplasty filled a set of questionnaires. Patients ranged in age between 16 and 45. Measures included Interest in Aesthetic Rhinoplasty Scale (IARS), Body Appreciation Scale (BAS), and Physical Appearance Comparison Scale-Revised (PACS-R). Instruments included 8, 13, and 11 items respectively. The study was correlational and statistical analysis was performed using SPSS.

### Results

the Pearson correlation coefficient between interest in aesthetic rhinoplasty and body appreciation was -0.272 ( $P < 0.05$ ). Moreover, the correlation coefficient between interest in the surgery and physical appearance comparisons was 0.267 ( $P < 0.05$ ). Cronbach's alpha of the IARS, BAS, and PACS-R were 0.86, 0.90, and 0.96 respectively.

### Conclusion

this study was a preliminary research in order to explore the associations between positive body image and social appearance-related comparison with interest in rhinoplasty among patients. Findings were consistent with the notion that more frequent physical appearance comparison is significantly associated with higher interest in rhinoplasty. Positive body image was also negatively significantly correlated with IARS. Results of the current study may be used in understanding complex social and individual processes which increase interest in rhinoplasty.

## NON-SURGICAL CORRECTION OF NASAL VALVE IN REVISION CASES

M. Naraghi<sup>1</sup>

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### Aims

Correction of the nasal valve region is a challenging issues in revision rhinoplasty, usually requiring many grafts form different donor sites. The availability and ease of the use of natural fillers persuaded us for increasing use of augmenting filling agents in revision cases. Although the preliminary reports mostly addressed the shape of the nose, in this article we present our experience on non-surgical improvement of the nasal valve in revision cases.

### Method

In this study, we present our experience on sixty five patients with nasal obstruction due to the external or internal valve problems. The epicenter of obstruction and severity was determined by physical examination, nasal endoscopy and acoustic rhinometry. All patients underwent augmentation of the weakened areas of the nasal valve with biologic filler injection mimicking different grafts such as alar rim graft, lateral crural strut graft, button graft, columellar strut graft, dorsal graft and spreader graft.

### Results

Comparison of pre and post-procedure symptom groups was performed in all patients and revealed that functional problem improved in all of the patients, with a wide range of changes from minor to major improvement. The immediate result experience was exciting for many patients.

### Conclusion

Non-surgical correction of nasal valve could be an easy, safe and cost effective method for improving external nasal valve function in selected revision cases, mimicking the role of the supporting grafts. However it should be done very cautiously by an expert surgeon with ample experiences on surgical correction of the nasal valve in revision cases.

## THE CAUDAL SHIFT OF MINIMAL CROSS-SECTIONAL AREA BY SPECIFIC TECHNIQUES IN OPEN RHINOPLASTY

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### Aims

to prospectively investigate the impact of specific techniques in open rhinoplasty on the distance of minimal cross-sectional area (MCA) at nasal valve from the nasal sill.

### Method

For a total of sixty patients with chronic nasal obstruction, functional breathing was objectively assessed using the parameters of acoustic rhinometry prior to and after the open rhinoplasty. We performed a subgroup analysis to investigate the impact of various techniques in open rhinoplasty on the objective alteration in the distance of MCA from the nasal sill. For this purpose, the changes of the pre and post-rhinoplasty MCA distance ( $\Delta$ MCA distance: pre-rhinoplasty MCA distance – post-rhinoplasty MCA distance) are calculated and compared in those with or without the use of each specific technique, respectively.

### Results

Open rhinoplasty was performed in all patients. A caudal shift in the MCA distance readings was observed in patients using the turn in flap ( $P$  value for the right MCA distance = 0.017,  $\Delta$ MCA distance: 0.350 vs. -0.068), tongue in groove ( $P$  value for the left MCA distance = 0.022,  $\Delta$ MCA distance: 0.204 vs. -0.427) and cephalic trim ( $P$  value for the right MCA distance = 0.039,  $\Delta$ MCA distance: 0.462 vs. -0.260) techniques.

### Conclusion

The clinical implication of the anterior shift in the MCA distance is currently unclear. The use of turn in flap, tongue in groove or cephalic trim techniques possibly widens the pre-rhinoplasty MCA to the extent of founding a new MCA caudal to the original location.

**FIRST CLINICAL EXPERIENCE WITH RADIOFREQUENCY INTRANASAL REMODELING TREATMENT TO RESHAPE COLLAPSING OR NARROW NASAL VALVE AREAS**

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**Aims**

Weak and/or inward-bent cartilage of the nasal sidewall can produce stenosis and/or collapse of the nasal valve areas, which is a frequent and difficult to treat reason of impaired nasal breathing. Well-dosed heat application with radiofrequency has been shown to persistently alter cartilage shape preserving cartilage cell viability. Reshaping the cartilage of the nasal sidewall might be an interesting option for those patients.

**Method**

The Vivaer intranasal remodeling treatment uses a stylus for intranasal radiofrequency energy application, while the nasal sidewall is bent around the tip of the stylus to stabilize the submucosal tissue of the nasal valve area in the desired shape. It is an outpatient treatment applied under local anesthesia. The success was assessed with the NOSE-Score before treatment and after 30 and 90 days.

**Results**

So far we can report on 11 patients in three different outpatient ENT-services who were treated with Vivaer. The treatment was well-tolerated with some patients reporting a mild burning sensation during treatment. Initial crusting had healed until day 30 and no cosmetic complaints were reported. The NOSE-Score was  $67.3 \pm 13.4$  at baseline. The mean improvement at day 30 was  $-30.5 \pm 21.0$ , a mean change of  $-45.3\%$ . At day 90 a 54% improvement was being observed. The range of improvement was 0 – 65 points.

**Conclusion**

The Vivaer intranasal remodeling treatment is a well-tolerated outpatient procedure without relevant side effects with a lasting positive effect on nasal breathing. It might be an interesting alternative to open surgery in patients with nasal valve problems.



**NASAL MIDDLE VAULT SURGERY: RECONSTRUCTION OF DIFFERENT TYPES OF DEFORMITIES**  
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**Aims**

The nasal middle vault has both aesthetic and functional roles. Reconstructive surgery of the vault is performed to correct congenital, post-traumatic, or iatrogenic defects. The purpose of this paper was to present various types of nasal middle vault deformities, and to describe the surgical reconstruction techniques that we applied for each deformity.

**Method**

In this retrospective descriptive study, the nasal middle vault reconstruction techniques that we applied are described with case presentations for each deformation.

**Results**

Nasal hump excision and osteotomy were performed in cases of a wide nose and dorsal hump. The “reverse spreader graft” technique was applied in cases of a wide nose without a dorsal hump. Spreader grafts were applied in cases of a narrow nose and no supporting infrastructure. Finally, dorsal graft augmentation and cephalic transposition of the graft from the lateral crus of the alar cartilage were performed in cases of saddle nose deformity. All of the applied grafts were autografts.

**Conclusion**

Open rhinoplasty is the first choice approach for nasal middle vault reconstruction. Spreader grafts should be used for reconstruction of narrow middle vault deformities, a crooked nose, or an unsupported middle vault. “Reverse spreader grafts” should be used in reconstruction of a wide middle vault. In addition to known procedures, we introduced the technique of dorsal augmentation with cephalic transposition of the graft from the lateral crus of the alar cartilage.

## TENSOR FASCIA LATAE WRAPPING IS ASSOCIATED WITH WORSE RHINOPLASTY OUTCOMES USING DICED CARTILAGE IN RABBITS

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### Aims

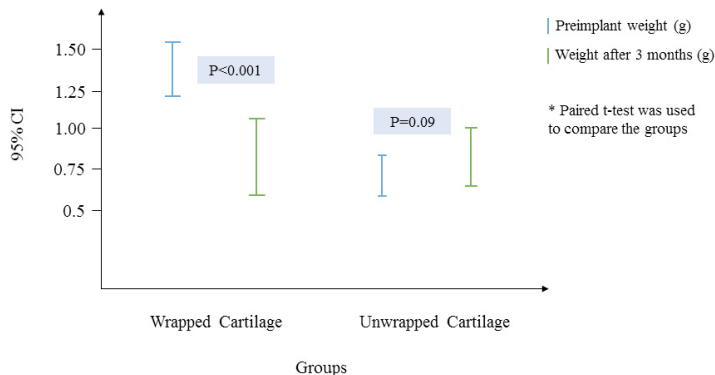
Diced cartilage is widely used in various forms in rhinoplasty because of its several advantages. However, the effect of tensor fascia latae wrapping on the outcomes of using diced cartilage grafts in rhinoplasty surgery is not well understood. In this study, bare and fascia-wrapped diced cartilage in rabbits were considered as a model for human surgical outcomes and changes in weight, size, and histology were compared between two groups.

### Method

Fifteen rabbits were selected and one auricle from each of them was divided into 2 pieces which were both diced. Cartilage specimen from each rabbit was wrapped by the tensor fascia latae (group A specimen); the other specimen received no wrapping (group B specimen). The groups were implanted into separate subcutaneous pockets in each rabbit. Samples were removed from the recipient beds three months later and pre- and postoperative weights were compared. Histologic methods were used to detect evidences of cartilage viability.

### Results

A significant decrease in the weight of cartilage was observed in group A. No significant differences was observed regarding 5 histologic parameters between the two groups, except a higher new cartilage formation in group B.



Comparison by paired t test of the weight of each group of specimens preimplantation (blue bars) and after removal at 3 months post-implantation (green bars). The wrapped group showed a significant decrease in weight ( $P < .001$ ). The unwrapped group showed a non-significant increase in weight ( $P = .09$ ). CI, confidence interval

### Conclusion

Access to surrounding nutrients may be limited by wrapping around diced cartilage. Although dicing increases the absorption surface and results some overgrowth, wrapping negatively changes viability of the diced cartilage.

**AESTHETICS AND FUNCTION. CHANGES IN QUALITY OF LIFE AFTER RHINOPLASTY**  
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**Aims**

Assess the improvement in quality of life of patients undergoing rhinoplasty at the ENT Department of Egas Moniz Hospital, Lisbon, Portugal during three years.

**Method**

Retrospective study of 56 patients who underwent rhinoplasty at Egas Moniz Hospital during a period of three years. Telephone interviews were conducted using the NOSE (Nasal Obstruction Symptoms Evaluation) questionnaire for nasal symptoms evaluation and the questionnaire on the degree of aesthetic satisfaction ROE (Rhinoplasty Outcome Evaluation). The results were analyzed according to age, sex, surgical technique and year of surgery.

**Results**

Of the 56 selected patients, 32 responded to the telephone interview. Regarding the NOSE questionnaire, there was an average improvement of 55 points when comparing the preoperative and the postoperative period. With respect to the ROE, the improvement in the preoperative and postoperative period had an average of 11 points. The results of the NOSE questionnaire were more favorable for the open rhinoplasty. The results of the ROE questionnaire were more favorable for males.

**Conclusion**

The rhinoplasty techniques must take into account the functional and aesthetic part. The degree of functional satisfaction was higher for the open rhinoplasty group. Those facts can be explained by the likely patient selection bias for open rhinoplasty and improving team experience. Regarding the degree of aesthetic satisfaction there is a more favorable outcome in men, which may be explained by the degree of lower expectations preoperatively. Overall, the results were very positive serving this study to encourage the maintenance and improvement of work in this area.

**FIRST EXPERIENCE OF USING AN EXPANDER DERMOTENSION FOR TREATMENT OF POSTTRAUMATIC SADDLE-NOSE DEFORMITY**

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**Aims**

Posttraumatic external nose deformity is characterized by lowering of the osseocartilaginous vault level, not infrequently followed by scar tissue retraction. Nasal dorsum elevation to the precedent level is extremely impeded due to skin deficiency in the nasal dorsum region.

**Objective**

Elimination of skin deficiency in nasal dorsum region will allow elevating its highness to the precedent level.

**Method**

During the first step we performed expander dermotension in order to eliminate skin deficiency. 10 cm<sup>3</sup> silicon expander was inserted under SMAS-fascia of nasal dorsum. Expander's catheter and remote valve were placed under the sculp. Filling the catheter with sterile isotonic NaCl solution has been performing daily 0,8 - 1,3 ml each time until the skin blanching.

On 11-th day was performed the second step – an open-approach rhinoplasty, during which all the expander structures were removed and L-shape implant was placed under SMAS-fascia for nasal dorsum flattening and its elevating to the precedent level.

**Results**

We used expander dermotension for surgical treatment of saddle-nose deformity in 3 patients: males, 32, 40 and 46 years old. No trophic disorders or redundant tissue scarring were observed. On expiry of 6-months period after intervention all the patients were satisfied by esthetic and functional postoperative result.

**Conclusion**

Applying of expander dermotension during surgical correction of posttraumatic saddle-nose deformity significantly increases esthetic postoperative effect. This method comes as an accessible, effective and safe way of treatment.

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## SEPTAL AND TURBINATE SURGERY INCLUDING SEPTAL PERFORATIONS

### HYPERTROPHIC INFERIOR TURBINATE AND TREATMENT WITH ERBIUM YAG LASER ;A PILOT STUDY WITH RCT DESIGN

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#### Aims

All surgical procedures of today for treatment of hypertrophic inferior turbinate are more or less invasive. Erbium YAG laser in non-ablative, thermal mode is considered as non-invasive treatment and could be a new and safe alternative. The aim of this study was to evaluate this laser treatment.

#### Method

20 patients were included in this prospective, parallel group, single (patient) blinded, randomized controlled pilot study. The objectives were to evaluate safety and performance of the laser during and after 3 sessions of treatment in one month. The primary objective was to evaluate the nasal obstruction both subjective and objective (by Visual Analogue Scale, VAS, and Nasal Peak Inspiratory Flow Meter, N-PIF). The secondary objective was to evaluate the nasal burden of quality of life by severity classification system (by modified Nasal Obstruction Symptom Evaluation Scale, NOSE-scale).

#### Results

Active laser showed high improvement during and after the treatment both subjective and objective regarding nasal obstruction and decreased the nasal burden of quality of life. Placebo laser treatment showed no changes or improvements. The safety evaluation did not present any safety concerns.

#### Conclusion

This pilot study showed that Erbium YAG laser could be an effective, rapid, non-invasive, pain free, and very safe alternative method for treatment of nasal obstruction with hypertrophic inferior turbinate. Further and larger studies with longer evaluation time are recommended for stronger evidence.

SEPTOPLASTY AND TYPES OF NASAL SEPTAL DEFORMITIES ACCORDING CLASSIFICATION PROPOSED BY MLADINA

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**Aims**

The purpose is to investigate the characteristics of septal deformities using classification system proposed by Mladina and which were operatively treated in our hospital at period January2013- December2015

**Method**

A prospective study of patients underwent Septoplasty , regarding the type of nasal septal deformities determined with anterior rhinoscopy and endoscopy, correlating the age, sex, side of deformity and trauma.

**Results**

A total of 657 adult patients ( 485 males and 172 females )underwent Septoplasty The classification of septal deformities was based on classification system by Mladina to 7 different types. Type 1 was present at 59 patients (8,06 %) - m 41 ,f 18, type 2 was present at 83 patients (12,6 %)-m54, f 29, type 3 was found at 267 patients ( 40,6 %)-m 191 ,f 76, type 4 ( S shaped septum) at 173 patients (26,3 %) 143 males and 30 females, type 5 at 60 patients(9,1 %) -45 males , 15 females, type 6 at 9 patients (1.37 %), type 7 was found at 6 patients (0,91 %). Left side was present at 389 patients -59,2% and right side deformity at 268patients -40,8 %. Age of patients was 18-72 years divided in age groups.

**Conclusion**

Type 3 was most frequent type of nasal deformity. Left-sided deformities were more prevalent than right-sided- 59.2 % and 40.8 % respectively. The incidence regarding sex was 485 males, females 172, corresponding with previous nasal trauma as cause at males 362 -74,6%, females 53 - 30,8 % ( p <0,001 )

**EFFECTIVENESS OF CUTANPLAST ANAL AS A PACKING MATERIAL AFTER SEPTOPLASTY: A PROSPECTIVE, RANDOMIZED, MULTICENTER STUDY**

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**Aims**

Although Cutanplast may be useful absorbable packing material after endoscopic sinus surgery, there were no studies in regard to its efficacy for packing material after septoplasty. The purpose of this study was to investigate the efficacy of Cutanplast nasal packing on patient's subjective symptoms, hemostasis, and wound healing following septoplasty.

**Method**

Seventy six adult patients with nasal septum deviation requiring septoplasty were included. Following surgery, one nasal cavity was packed with Cutanplast Anal and the other one with Merocel. Patients' subjective symptoms while the packing was in situ, hemostatic properties, patients' pain on removal, degree of bleeding on removal of the packing, time for hemostasis after removal, postoperative wound healing, and the cost of the pack were evaluated.

**Results**

Both packs were equally effective in the control of postoperative bleeding following septoplasty. However, Cutanplast Anal packing was significantly more comfortable while in situ and less painful on removal of the pack. The Merocel packing was associated with significantly more bleeding on removal, therefore much time was needed to control hemorrhage. There was no significant difference in the cost of the pack used and outcome of wound healing.

**Conclusion**

The use of Cutanplast Anal after septoplasty results in significantly less discomfort and greater patient satisfaction with no adverse reactions when compared with Merocel packing. Therefore, Cutanplast Anal may be a useful packing material after septoplasty.

## SEPTAL PERFORATION CLOSURE, AN OPERATION ON THE INCREASE?

R. Costello<sup>1</sup>, H. Elhassan<sup>2</sup>, . Quine<sup>3</sup><sup>1</sup>University Hospital of Wales- Cardiff, Ear- Nose and Throat, Cardiff, United Kingdom<sup>2</sup>Morrison Hospital, ENT, Swansea, United Kingdom<sup>3</sup>University Hospital of Wales, ENT, Cardiff, United Kingdom**Aims**

Septal perforation may result from trauma, post-surgery or as a result of nasal complications of systemic disease. Operations to repair the septum are on the increase in England, we recognise this trend and suggest possible reasons for this rise.

**Method**

The Health and Social Care Information Centre website was accessed and Hospital Episode Statistics for Admitted Patient Care for nine years, starting 2006-07 were accessed. This data was interrogated looking specifically at the number of closure of perforation of septum of nose operations performed per year.

**Results**

Our results have clearly demonstrated an almost year-on-year increase in the number of operations to close septal perforations.

Year	Finished consultant episodes, for septal repair.
2006-07	291
2007-08	305
2008-09	300
2009-10	333
2010-11	410
2011-12	373
2012-13	459
2013-14	502
2014-15	518

**Conclusion**

Operations to perform septal closure are being performed with increasing frequency in England. This may represent greater expectations from patients for the perfect nose, or it may represent increased confidence in operating surgeons to achieve good results.



**RAPID RHINO VERSUS MEROCEL NASAL PACKS IN SEPTAL SURGERY**

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<sup>2</sup>*Tanta University, Anesthesia, Tanta, Egypt*

**Aims**

To compare Rapid Rhino and Merocel packs for nasal packing after septoplasty, in terms of patient tolerance (both with the pack in place and during removal) and post-operative complications.

**Method**

Thirty patients (aged 18–40 years) scheduled for septoplasty were included. Following surgery, one nasal cavity was packed with Rapid Rhino and the other one with Merocel. Patients were asked to record pain levels on a visual analogue score, on both sides, with the packs in situ and during their removal the next day. After pack removal, bleeding was compared on both sides.

**Results**

The mean  $\pm$  standard deviation pain score for the Rapid Rhino pack in situ ( $4.17 \pm 1.78$ ) was less than that for the Merocel pack ( $4.73 \pm 2.05$ ), but not significantly so ( $p = 0.314$ ). The mean pain score for Rapid Rhino pack removal ( $4.13 \pm 1.76$ ) was significantly less than that for Merocel ( $6.90 \pm 1.67$ ;  $p = 0.001$ ). Bleeding after pack removal was significantly less for the Rapid Rhino sides compared with the Merocel sides ( $p < 0.05$ )

**Conclusion**

Rapid Rhino nasal packs are less painful and cause less bleeding, compared with Merocel packs, with no side effects. Thus, their use for nasal packing after septal surgery is recommended

PLACEBO CONTROLLED STUDY OF INFERIOR TURBINATE SURGERY

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**Aims**

To evaluate the effect of radiofrequency ablation (RFA), microdebrider-assisted inferior turbinoplasty (MAIT) and diode laser on nasal obstruction and to estimate the magnitude of possible placebo effect.

**Method**

56 patients with enlarged inferior turbinates due to persistent allergic or nonallergic rhinitis were enrolled in this study. Patients were blinded and randomized into placebo, RFA, diode laser and MAIT groups. The procedures were carried out in local anesthesia patients' eyes covered. During the placebo procedure patients heard the acoustic tone of RFA device and turbinates were gently touched with suction and endoscope. Outcomes were evaluated using the visual analogue scale (VAS) and acoustic rhinometry prior to surgery and three months subsequent the surgery.

**Results**

Placebo (-4.0; CI 95% +/-1.7;  $p < 0.01$ ), diode laser (-4.0; CI 95% +/-1.2;  $p = 0.02$ ), RFA (-4.5; CI 95% +/-1.0;  $p < 0.01$ ) and MAIT (-5.3; CI 95% +/-1.2;  $p < 0.01$ ) procedures all improved the symptom score (VAS) of nasal obstruction significantly at three months. Significant increase of anterior nasal cavity volume (V<sub>2-5cm</sub>) was noted in RFA (0.83; CI 95% = 0.15 - 1.50;  $p = 0.02$ ) and MAIT (0.91; CI 95% 0.14 - 1.68;  $p = 0.02$ ) groups but not in placebo and diode laser groups.

**Conclusion**

All the techniques improved the symptom of nasal obstruction significantly but also a significant placebo effect was indicated. Only RFA and MAIT increased anterior nasal cavity volume significantly at three months follow-up.

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<sup>2</sup>Gyeongsang National University Changwon Hospital, Otorhinolaryngology, Changwon, Republic of Korea

### **Aims**

Endoscopic septoplasty provides several advantages over traditional headlight septoplasty in terms of better visualization. However, surgeons may experience frequent soiling of the endoscope lens by blood from the incision site and awkwardness in finding adequate space for the endoscope and dissectors in narrow septal mucosal tunnels. Here, we propose a simple and safe modification for endoscopic septoplasty.

### **Method**

A total of 21 patients underwent endoscopic septoplasty using a new modification. Briefly, a posterosuperior extension incision was made along the dorsal septum at the superior end of the caudal septal incision, and a posteroinferior-based septal mucosal flap was developed and placed laterally over the inferior turbinate during surgery.

### **Results**

The new modification reported here provided clear endoscopic visualization and a comfortable working space from making the incision to closing the wound. In addition, no significant complications related to this modification, such as increased operation time, intraoperative or postoperative bleeding, delayed wound healing, synechia, nasal septal perforation, and reduced olfaction, were observed.

### **Conclusion**

Adding a posterosuperior extension incision to the caudal septal incision might be a safe and efficient modification for endoscopic septoplasty.

ERS16-0135

## SEPTAL AND TURBINATE SURGERY INCLUDING SEPTAL PERFORATIONS

### OUR EXPERIENCE OF PLASTIC CLOSURE OF NASAL SEPTUM PERFORATION IN CHILDREN

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#### Aims

To find out optimal surgical strategy in closure of nasal septum perforation in children.

#### Method

Ten children with nasal septum perforation aged from 10 to 17 years old were operated.

Patients complained with nasal obstruction, wheezing, dry nose. In 7 cases (70%) nasal septum perforation was incidental finding during ENT examination. 2 (20%) children complained with nasal obstruction for several years, intermittently used nasal decongestion drops and intranasal corticosteroids. Parents of one patient (10%) associated the developing of perforation with trauma.

All children underwent clinical examination, computed tomography and virtual rhinoscopy of nose and paranasal sinuses. Systemic disease markers were negative in all cases.

Examination revealed dry mucosa of nasal cavity and nasal septum deviation in all cases. Perforations had round and slit-like shape, situated in anterior part of nasal septum. Size of the perforation varying from 0,3\*0,5 cm to 1cm.

All patients underwent plastic closure of nasal septum perforation with septoplasty under endoscopic control. In 8 patients surgery was done using mobilization and advancement of nasal mucosal flap and reimplantation of autcartilage. In 2 cases we used pedicle mucosal flap from internal buccal surface with medial base.

#### Results

In 9 patients perforation was successfully closed. One girl had residual perforation 2mm\*2mm without clinical symptoms, so this result we also assessed as positive.

#### Conclusion

The surgical technique for plastic closure of perforation used in adults can be applied to children. First experience of plastic closure of nasal septum perforation was successful, but further assessment and surgical technique optimization, postoperative follow up are needed.

CLINICAL ANALYSIS OF NASAL SEPTUM TUMOR

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**Aims**

Nasal septum tumor is rare disease, and presents various pathologic findings. The aim of this study was to better define the incidence and treatment of nasal septum tumor.

**Method**

Thirty seven patients of nasal septum tumor were treated by surgery in Chonnam National University Hwasun Hospital from January 2004 to December 2015. Patient data, including pathologies, symptoms, complications, postoperative treatment, treatment outcome, and recurrence were collected and analyzed. Patients with inflammatory and rheumatologic disease or lymphoma were excluded in this study.

**Results**

All patients underwent endoscopic surgeries. There were 26 males and 11 females. Age of patients ranged from 10 to 75 years. Pathologies included benign tumor (n=25) and malignant tumor (n=12). The most common benign tumor was inverted papilloma (n=7), and followed by hemangioma (n=6). The most common malignant tumor was plasmacytoma (n=2) and malignant melanoma (n=2). All patients with nasal septum benign tumors were free of recurrent disease at the time of the last follow-up. Two patients among nasal septum malignant tumor were died.

**Conclusion**

Surgical treatment for the nasal septum benign tumor is satisfactory. Follow-up should be done in cases with malignant tendency and malignant tumors.

REVISION SEPTOPLASTY : 45 CASE OF SUBMUCOUS RESECTION AND SEPTAL CARTILAGE REINSERTION

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**Aims**

Septal surgery is common surgery for septal deviation. It is not rare for symptoms to last or re-occur after implanting the septal surgery. This study was intended to research the connectivity among various factors in terms of the re-occurrence of nasal septal deviation and by retrospectively analyzing 45 patients who had re-surgery in this hospital.

**Method**

Among hospitalized outpatients due to nasal obstruction in this hospital from September, 2007, to September, 2014, retrospective cohort analysis was implemented in this study on those with anamnesis on the nasal septum surgery in the past and diagnosed with nasal septum deviation after the treatment.

**Results**

There were the most patients in the age between 30 and 40. Previous anamnesis of nasal trauma before the re-surgery was seen in 6 patients (14%), and 30% of patients (68%) were observed with caudal septal deviation. 30 of them (67%) had septoplasty, and 13 of them (295) had submucous resection without cartilage reinsertion. 2 of them (4%) had submucous resection and cartilage reinsertion. VAS on the symptoms of nasal obstruction was significantly improved from 7.02 in average prior to the surgery to 3 in average on the fourth week after the surgery. This represented a statistically significant result ( $P < 0.001$ ).

**Conclusion**

Re-occurrence of nasal septal deviation was observed to be high on adult males in the age between 30 and 40. Most of the cases occurred in the septoplasty that performed the partial correction. Submucosal resection and cartilage insertion were considered to be effectively in structurally solving nasal valve.

**IATROGENIC SEPTAL PERFORATION: BETTER SAFE THAN SORRY**

**Y. Nour**<sup>1</sup>

<sup>1</sup>Faculty of Medicine, Alexandria, Egypt

**Aims**

To evaluate the different situations during septal surgery that might potentially result in iatrogenic septal perforation and how improved visualization offered by the endoscope prevents such an outcome.

**Method**

Endoscopic assisted septoplasty was performed in all procedures. Controlled elevation of the stretched mucosal flaps overlying septal spurs was possible under endoscopic guidance with minimal mucosal lacerations. Similarly, elevation of the mucosal flap overlying a markedly deviated maxillary crest with clear visualization of the lower edge of the dislocated septal cartilage was performed. The key point was an initial securing of an intact contralateral flap to avoid any bilateral mucosal tears that increase the risk of subsequent perforation.

**Results**

One hundred and thirty two endoscopic septoplasty procedures were reviewed. Septal spur was identified in 73 patients (55%). The role of the sphenoidal process of the quadrangular cartilage in augmenting the angulation of the spur was clearly demonstrated. Marked deviation of the maxillary crest with dislocation of the quadrangular cartilage was reported in 43 patients (32.5%). Endoscopic visualization allowed complete exposure of the deviated portion with no significant loss of the mucosal integrity. Unilateral linear mucosal tears were reported in 37 cases (28%) and were either approximated or repaired under endoscopic guidance.

**Conclusion**

Even when combined with more traditional technique, use of the endoscope allows for improved visualization of the posterior and anterior septum. The improved visualization provided by the endoscope allows for atraumatic elevation of mucosal flaps with a much lower risk of tearing than seen in traditional septoplasty.

## CORRECTION OF CAUDAL SEPTAL DEVIATION: SEPTAL BATTEN GRAFT WITH A BIOABSORBABLE PLATE

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Caudal septal deviation is often difficult to correct due to elasticity of the septal cartilage. Septal batten graft is one of the useful surgical techniques for correction of the caudal septal deviation and the septal cartilage is the mainly used as a graft material. However, in some cases (i.e. revision surgery), the septal cartilage may show insufficient amount or inadequate quality for the surgical procedure.

**Method**

Seven patients have underwent septal batten graft using a bioabsorbable plate for correction of caudal septal deviation.

**Results**

All patients, except one, showed good surgical outcomes without complications (i.e. infection, septal hematoma, septal perforation, or mucosal defect).

Case	Age/Sex	Primary/Revision	Deviation direction	Approach	Additional procedures	Complications	External nose deformities	Follow-Up (Months)
1	29 / F	Primary	Left	Endonasal	Turbinoplasty	None	None	9
2	27 / M	Primary	Right	External	Turbinoplasty	None	None	7
3	58 / M	Revision	Right	Endonasal	Turbinoplasty	Mucosal defect	None	9
4	24 / F	Primary	Left	Endonasal	Turbinoplasty	None	None	4
5	42 / F	Revision	Right	External	Augmentation rhinoplasty, turbinoplasty	None	None	9
6	23 / M	Revision	Right	External	Augmentation rhinoplasty, turbinoplasty	None	None	13
7	23 / M	Revision	Left	External	Humpectomy, augmentation rhinoplasty, turbinoplasty	None	None	13

**Conclusion**

The use of a bioabsorbable plate would facilitate surgical correction of severe caudal septal deviation and may offer mechanical stability until the manipulated cartilage heals. Septal batten graft with a bioabsorbable plate can be a useful alternative method in selected cases.



**EPIDERMOID CYST OF THE FRONTAL BONE RESULTING IN FRONTAL SINUS EROSION**

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**Aims**

Intradiploic epidermoid cysts are benign, slow-growing lesions that account 1% of the general population with male preference.

We present a case of an epidermoid cyst of the frontal bone which invaded the frontal sinus causing erosion of the roof of the orbit.

**Method**

A 15-year old female presented with persistent headaches situated on the right side of the forehead and occasional symptoms of unilateral chronic rhinitis of the right nostril. Further clinical examination of the nose, nasopharynx and eyes was normal.

The CT-scan, showed a cystic lesion which was exactly adjacent to the lateral wall of the ipsilateral frontal sinus causing bony erosion of the anterior wall and the roof of the orbit.

An extended Lynch incision was performed to the eyebrow. A cyst was revealed occupying the eroded cavity, communicating directly with the orbit and displacing inferiorly the superior rectus muscle. The cyst was completely removed. Histopathology report revealed an epithelial cyst with a central mass of keratin.

**Results**

-

**Conclusion**

Epidermoid cysts are very rarely located in the area of the frontal bone, thus the preoperative diagnosis is difficult. CT imaging may suggest an epidermoid cyst, thereby helping to plan the surgical approach. Differential diagnosis should include inflammatory lesions and malignancies such as Pot's tumor, sarcomas and lymphomas. The treatment of choice is surgical removal of the lesion.

**RHINOPLASTY AND CHIN ADVANCEMENT BY HORIZONTAL OSTEOTOMY**

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**Aims**

The chin like the nose is in a prominent position on the face and plays very important role in facial profile. The important relationship between the nose and chin may be underestimated by otorhinolaryngologists and facial plastic surgeons who perform rhinoplasty. In this article, we present our experience on horizontal osteoplastic advancement of chin in patients undergoing rhinoplasty.

**Method**

69 patients underwent genioplasty and rhinoplasty. Age of patients ranged from 17 to 43. The patients were included in three groups in which the genioplasty were done before, after or at single stage with rhinoplasty. All procedures were performed under general anesthesia with intraoral incision. After exposing the mentum, horizontal osteotomy was performed and advanced segment was fixed in place. We utilized five different methods for fixation including three screws, five screws, one per-bent mini-plates, two parallel mini-plates or combination of per-bent mini-plates and screws. There were no significant difference between three groups of patients and between different methods of fixation.

**Results**

Patients were followed 6 months to 8 years after operation. Improvement of facial parameters was observed in all patients. No permanent complication occurred. Three had prolonged hyposthesia up to 3 and 18 months after surgery.

**Conclusion**

Advancement genioplasty by osteotomy could be performed in patients with chin problems during or after rhinoplasty to improve the facial profile. Our experience with horizontal osteotomy showed satisfactory results with no important complication.

REAL-TIME NAVIGATION ASSISTED ORBITAL RECONSTRUCTION

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**Aims**

Limitation in performing restoration of orbital structures is the narrow, deep and dark surgical field, which makes it difficult to view the operative site directly. To avoid perioperative complications from this limitation, we have evaluated the usefulness of computer-aided navigation techniques in surgical treatment of blowout fracture.

**Method**

**Fig.1.** Superficial surface markers attached on the patient's face and light emitting diodes(LEDs) mounted on the patients head  
**Fig.2-1,2-2** Intra-operative CT (Sagittal) image for navigation. The purple lines are the preoperatively planned fracture lines. The blue cross shows the position of the navigation probe tip.

The extent of the orbital fracture was evaluated by navigation probe in real-time. After orbital contents herniated into the adjacent sinuses were repositioned, Macropore<sup>®</sup> was trimmed and inserted at the fracture site as a size of preoperatively measured. Once again, we can identify repositioned orbital contents and inserted Macropore<sup>®</sup> in the right place with no injury to adjacent structures by navigation.**Results**

All 23 patients were treated successfully using computer-assisted navigation surgery. The average fractured area of 23 patients was  $2.02 \pm 1.02 \text{ cm}^2$  and the operations were performed exactly as planned preoperatively without any postoperative complications including diplopia, retrobulbar hematoma, globe injury, implant migration, and blindness.

**Conclusion**

Navigation-assisted technology in orbital surgery seems to have resulted in improvements in functional and aesthetic procedures. Additionally, navigation systems enable surgeons to carry out the preoperative plan accurately, without injuring important anatomical structures, and checking the position of the instruments on the surgical site in real time.

**ERS16-0643**

## **CLOSURE OF SEPTAL PERFORATION**

### **NEW TECHNIQUE FOR SEPTAL PERFORATION REPAIR WITH HIGH SUCCESS RATE WITH OR WITHOUT RHINOPLASTY (MY OWN EXPERIENCE)**

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#### **Aims**

To close nasal septal defects with or without rhinoplasty.

#### **Method**

The procedure starts with harvesting of an auricular chonchal cartilage with bilaterally intact perichondrium according to the size of the perforation through a post auricular incision .

Interposition of the obtained auricular chonchal cartilage by inserting it between the bilaterally elevated septal mucosal flaps that are used for repairing all our series of cases with unilateral or bilateral intranasal mucosal flaps advancement with or without releasing incisions according to the mucosal flaps and septum conditions.

#### **Results**

The most common causes of perforation in this series were iatrogenic 48 cases out of the 59 cases is post septoplasty out of which there were 6 cases that are post cauterization as a part of epistaxis management. 8 cases were post traumatic RTA, and 3 cases were categorized as an induced septal perforation (nose picking).

- 55 cases out of 59 healed completely.
- 6 cases only failed.
- 2 post op cases disappears.
- 4 cases reviewed 3 out of 4 healed completely.
- 1 case failed after revision.
- Total success is 56 out 59 cases.
- The success rate is 94.9% depending on the site, size and patient care.
- Follow up for one year every 3 months.

#### **Conclusion**

By this new technique using chonchal cartilage with bilaterally intact perichondrium we have a very high success rate reaching 94.9% with an acceptable cosmetic results if done a combined approach

**NASAL SEPTAL PERFORATION REPAIR USING PORCINE SMALL INTESTINE SUBMUCOSA: A CASE SERIES**

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**Aims**

Various techniques have been described to repair nasal septal perforations. Most of these involve the use of an interpositional graft between mucosal or mucoperichondrial flaps. We describe a technique using an autologous septal cartilage graft interposed between porcine small intestine submucosa, with no primary mucosal closure.

**Method**

Three consecutive patients (two males, one female, mean age 47 years) with traumatic nasal septal perforations underwent repair of nasal septal perforation via an open rhinoplasty approach. The technique involves use of autologous septal cartilage grafts interposed between two layers of porcine small intestine submucosa and held in place with absorbable sutures, inserted between the septal mucoperichondrial layers. The patients were regularly followed up in clinic to assess symptomatology and endoscopic images taken to monitor healing and perforation size.

**Results**

Patients were followed up for an average of 15 weeks. All reported an improvement in their symptoms. Improvement in nasal obstruction was the first to be noted. Crusting persisted for longer, but eventually decreased. A 76% mean reduction of maximum perforation diameter was observed during the follow-up period.

**Conclusion**

This innovative technique shows promising results in septal perforation repair. There is no donor site morbidity. Porcine small intestine submucosa may act as a scaffold for mucosal regeneration. Longer follow-up might show further reduction in perforation size, possibly even complete closure. In large septal perforations, reduction in perforation size may be sufficient for symptomatic improvement.

**ERS16-0469**  
**FACIAL PAIN**

**CONTACT POINT HEADACHES**

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**Aims**

The middle turbinate and nasal septum are innervated by the anterior ethmoidal nerve, a branch of ophthalmic division of the trigeminal nerve. Periorbital pain due to middle turbinate compression against the septum or the lateral wall of the nose may be due to congestion of the nasal mucosa, to pneumatization of the middle turbinate or to deviated septum.

**Method**

A retrospective study of 35 patient who met the diagnostic criteria of mucosal contact point headaches. Patients were referred to neurologist for migraine exclusion. Patients with clinical and/or radiological evidence of ARS/CRS were excluded from the study. Surgery involved septoplasty, middle/lower turbinoplasty/turbinectomy or both. Treatment efficacy was assessed 6 months after surgery by appointment.

**Results**

12 patients reported complete relief of the symptoms, 17 had some relief and 6 had no relief. Patients who have identifiable sources that test positive with analgesic testing tend to have better outcomes.

**Conclusion**

Careful patient selection is critical.

**CHANGES IN SP LEVELS OF INFERIOR CONCHA OF PATIENTS WITH MUCOSAL CONTACT HEADACHE**

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**Aims**

Vasodilation due to stimulation of unmyelinated C fibers and release of Substance P (SP) causes contact headaches. The aim of this study was to determine possible changes in SP levels in inferior turbinate hypertrophy in relation to contact headache and turbinate volumes.

**Method**

28 patients who had contact headaches (study group) and 16 volunteers with no complaints were included in the study. SP levels in the inferior concha tissue samples were quantified using commercially available SP EIA kit. Inferior turbinate volume was calculated using paranasal sinus CT with three-dimensional volume formula.

**Results**

In the study group average SP levels was  $2.65 \pm 0.28$  pg / mg tissue (range: 0.61 to 5.45) and in the control group it was  $1.78 \pm 0.27$  pg / mg tissue (range: 0.12 to 4.35) and the difference was statistically significant between two groups ( $p = 0.021$ ). Preoperative headache group (VAS) average of  $5.93 \pm 0.38$  (2-9), the volume of the turbinate average was  $6.56 \pm 0.35$  cm<sup>3</sup> (3.50 to 10.30). The control groups concha average volume was  $4.71 \pm 0.40$  cm<sup>3</sup> (2.50 to 7.70). We found a correlation between VAS score and SP levels such that SP levels were higher in VAS score 6 and above ( $p = 0.001$ ).

**Conclusion**

This study demonstrates the relationship between intranasal contact headaches and increased mucosal SP levels. We also found that there is no connection with increased SP levels and volume of the inferior turbinate.

**PSYCHOLOGICAL ASSESSMENT IN RHINOPLASTY - RESPONSIBLE MEDICINE OR RATIONING TREATMENT ?**

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**Aims**

To describe the application of the NHS Scotland Adult Exceptional Aesthetic Referral Protocol in Rhinoplasty assessment.

To share some clinical benefits of a standardised and protocolised approach to assessment.

To describe the outcome of psychological assessment and treatment in potential rhinoplasty patients in West of Scotland.

**Method**

A retrospective review of aesthetic rhinoplasty cases within NHS Greater Glasgow and Clyde, Scotland's largest territorial Health Board and a host for specialist psychological services. We undertook an electronic chart review of ENT patients in whom rhinoplasty was proposed, and for whom the Adult Exceptional Aesthetic Referral Protocol applied.

**Results**

A proportion of patients had surgery supported within tightly described parameters.

The outcome in many cases is rejection on the grounds of underlying body dysmorphism or other psychological condition which would contraindicate a surgical approach.

Some patients underwent successful psychological therapies and had surgery supported ultimately, or elected that surgery was no longer desired.

**Conclusion**

The AEARP provides a structure and consistency in the holistic assessment of rhinoplasty patients in Scotland, and ensures consistent referral to clinical psychology.

Use of a standardised and nationally applied tool has the potential to improve case selection and reduce the inherent health inequality related to inconsistent surgeon assessment and surgical management.

Specialist rhinoplasty surgeons should engage with further revision of the policy to ensure its ongoing application and reflection of the evolving aesthetic landscape.

The AEARP is offered as a paradigm for facilitating the challenging discussion between aesthetic surgeon and rhinoplasty patient.



**THE EFFECT OF MODELLING ACCURACY OF COMPUTATIONAL FLOW ANALYSIS IN THE NOSE AND TRACHEA**

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**Aims**

To determine effects of inter-user variability in defining 3D models of nasal airway (from MR imaging) and tracheal airway (from CT imaging) by image segmentation and the potential impact on airflow prediction.

**Method**

57 participants (medically trained and non-medics) with no prior experience were recruited to segment either 5-slices of a nasal MR or a CT trachea in two different planes. Participants followed a standardised protocol. Data collected included threshold choice, model area/volume, time taken to segment and error rate.

**Results**

Medically trained individuals determined nasal airway volume to be smaller and processed data on average in half the time. Both findings were statistically significant. Airflow pressure loss predictions were found to be sensitive to segmentation choices.

For the CT tracheal airway data, there was no statistical difference in geometric measurements determined by different users. However, the choice of sagittal or axial image significantly changed estimated airway size.

**Conclusion**

Segmentation relies on clinical identification of anatomical boundaries, rendering it susceptible to subjectivity and inter-user variability. Unlike in tracheal segmentation of CT data, segmentation in nasal MR is more anatomically accurate if performed by medically trained individuals; however care needs to be exercised to avoid slice-continuity-errors that may render 3D models unusable for flow predictions.

**PREOPERATIVE ASSESSMENT OF RHINOPLASTY PATIENTS AND SELECTION OF PATIENTS FOR SURGERY**

**COMPARISON OF DIFFERENT DIAGNOSTIC METHODS FOR PATIENTS WITH A STRUCTURAL NASAL OBSTRUCTION BEFORE NASAL SURGERY AND EIGHT WEEKS AFTER IT**

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**Aims**

Nasal obstruction is a commonly known problem in Latvia which decreases quality of life. The research was done to compare which of four diagnostic methods used in this study was the more informative, as well to implement classification of nasal obstruction localization according to CT findings.

**Method**

A prospective study included 15 participants. Before the surgery CT (computer tomography) examination was done. On the day of surgery patients filled in the SNOT20 (Sino-Nasal Outcome Test), evaluated their nasal breathing by VAS (Visual Analogue Scale). PNIF (Peak nasal inspiratory flow) test and 4PR (4Phase-Rhinomanometry) were performed as well. 8 weeks after surgical treatment all the tests were repeated.

**Results**

According to the results of CT we divided patients in 3 groups: a) with/without deviated septum, b) with nasal obstruction/lower turbinate hypertrophy. SNOT20 results showed that all patients described their nasal breathing as mild to moderate. After the surgery SNOT-20 results improved. According to VAS all the patients reported improvement in nasal breathing after the surgery, PNIF test results showed that during postoperative period breathing for 7 patients had improved by 10%, for 5 showed deterioration, but for 3 it had not changed. Preoperative 4PR testing showed very high obstruction in 14 cases, moderate in 1 case. Repeating the test after 8 weeks the level of obstruction decreased.

**Conclusion**

Classification of nasal obstruction allows to make clinical database and to choose best surgical method. SNOT20, VAS and PNIF testing do not give enough information of obstruction and severity. 4PR remains the best method for structural nasal obstruction diagnostics. 4PR together with CT gives full information about both sides of nasal cavity.

**THE USE OF ULTRASOUND AND ELECTRICAL STIMULATION AS ADJUNCTIVE THERAPY IN LIPOSUCTION OF THE NECK**

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**Aims**

Background: Neck rejuvenation remains a popular procedure. Ultrasound therapy and electrical stimulation are well known modalities to decrease edema, bruising and postoperative pain. The role of liposuction is well documented for treatment of neck laxity and submental fat. Persistent edema, bruising and pain are common. Our protocol for neck liposuction complemented with ultrasound therapy and electrical stimulation is presented.

**Method**

Method: A total of 84 patients underwent neck liposuction combined with ultrasound and electrical stimulation from January 2008 to December 2014. Our protocol included infiltration of tumescent solution to the neck followed by preoperative ultrasound therapy. All patients received additional ultrasound treatments as well as electrical stimulation at day 3, 6 and 14. The average follow-up was 6 months.

**Results**

Results: There were no complications. Preoperative ultrasound resulted in increased effectiveness of the tumescent solution providing improved pain relief and increased ease of lipolysis while postoperative treatment resulted in decreased discomfort, edema and bruising. All patients reported high satisfaction with improved contour and overall experience.

**Conclusion**

Conclusion: Based on our experience and comparing with a previous series of patients treated without these modalities, there is a speedier recovery with marked reduction of pain, edema and bruising with the adjunctive treatments. Although additional expenses are initially necessary for the equipment, this is offset by its use in multiple regions of the body. Ultrasound and electrical stimulation are simple and effective adjunctive treatments to improve patient satisfaction and overall aesthetic result.

**THE NON-SURGICAL MANAGEMENT OF IDIOPATHIC FACIAL NERVE PALSY IN A QUATERNARY MULTI-DISCIPLINARY FACIAL NERVE CLINIC**

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**Aims**

Idiopathic facial nerve palsy affects 1 in 5000 people in the UK annually and is the the commonest cause of facial nerve palsy. Quality of life can be severely affected by facial palsy. We present the management of idiopathic facial nerve palsy in a quaternary multidisciplinary (MDT) facial nerve clinic.

**Method**

We reviewed 17 consecutive patients with idiopathic facial nerve palsy managed in the MDT clinic. Clinical records were reviewed for details of onset of facial palsy, previous episodes, initial investigations and management including the role of specialist physiotherapy and botox injections. We reviewed Sunnybrook scores and validated quality of life measures.

**Results**

Of the 17 cases, 10 were female and 7 male. 6 cases were recurrent, 9 were a left sided palsy, 7 right sided and 1 case was bilateral. 11 patients were managed with steroids in the acute phase and a further 4 also had anti-viral therapy. 1 patient had complete resolution by the time of clinic review. In the remaining 16 patients the commonest symptoms were synkinesis and hypertonicity. All patients received an individualised course of physiotherapy with a specialist facial palsy physiotherapist. 10 patients also received botox most commonly to the ipsilateral platysma and mentalis. Sunnybrook scores improved and quality of life measures were influenced by management within the specialist clinic.

**Conclusion**

The MDT management of idiopathic facial palsy including ENT, Plastic surgery, and physiotherapy provides patients with optimum care. Personalised specialist physiotherapy and the use of targeted botox are particularly useful in the care of these patients.

**RE-AFFIRMING THE ROLE OF THE FOREHEAD FLAP IN NASAL RECONSTRUCTION: OUR EXPERIENCE**

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**Aims**

To present our experience in nasal reconstruction using the Paramedian Forehead Flap

**Method**

Case Series of three patients with ages ranging to 55-66 years old, with no smoking history and diagnosed to have Basal Cell Carcinoma for an average of 10 years.

**Results**

Our experience re-affirms the strength and superiority of the Paramedian Forehead Flap in large defects affecting 3 or more Oriental nasal subunits, versatile and cheap for the majority of our indigent patients.

**Conclusion**

A well-executed PFF can result in a natural appearing nasal reconstruction when measures are utilized. PFF represents an ideal choice in nasal reconstruction both for the Caucasian and oriental nose. PFF is easy to harvest flap, cheaper than a rhinoplasty, offers an aesthetic appearance which in end addresses the individualized needs of the patients.

**SERUM LEVELS OF 25(OH)D AND EXPRESSION OF VDR ON NASAL MUCOSA IN PATIENTS WITH ALLERGIC RHINITIS**

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**Aims**

To investigate the relationship between vitamin D and allergic rhinitis (AR) through examining the serum levels of 25-hydroxyvitamin D<sub>3</sub> (25(OH)D) and the expression of vitamin D receptor (VDR) on nasal mucosa in AR patients.

**Method**

32 patients with persistent AR and 25 control subjects without allergic disease were enrolled in this study. Serum 25(OH)D levels were detected by ELISA, while VDR expression by immunohistochemistry. The correlation of serum 25(OH)D levels with the blood eosinophil count was also analyzed.

**Results**

There was no significant difference of serum 25(OH)D levels between AR group and the control group when adjusted by the cofounder factors such as age, sex, body mass index, and the season for blood testing ( $t = -0.903$ ,  $P = 0.371$ ). The percentage of insufficient and deficient 25(OH)D in AR group also had no significant difference compared to the control group ( $\chi^2 = 0.101$ ,  $P = 0.751$ ). Nevertheless, the serum 25(OH)D levels were negatively correlated with the blood eosinophil count even if considering the cofounder factors ( $t = -2.446$ ,  $P = 0.018$ ). On the other hand, no significant difference in the expression of VDR in nasal mucosa was found between AR group and the control group ( $\chi^2 = 1.436$ ,  $P = 0.231$ ). The VDR was mainly moderate-to-vigorous expressed on the epithelial cell membrane of nasal mucosa, but not the cell nucleus.

**Conclusion**

Low serum 25(OH)D levels are not directly associated with AR, but may act on the blood eosinophil count to effect the patients' immune status. The local effect of vitamin D on nasal mucosa still needs to be clarified.

**DEVELOPMENT OF KOREAN VERSION OF ALLERGIC SKIN PRICK TEST PANEL BASED ON THE RETROSPECTIVE STUDY OF THE CHANGING TREND OF CAUSATIVE ALLERGENS IN KOREA**  
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**Aims**

**Objective:** A skin prick test (SPT) is a reliable standard method to diagnose allergic diseases and to identify aeroallergens. However, the diversity of aeroallergens depending on the difference of temporal, regional, environmental characteristics, causes the difficulty to diagnose precisely. This study investigates the annual data of the SPT with 55 aeroallergens performed in a multicentre population-based study to analyze the results of sensitized aeroallergens in terms of temporal, regional, environmental difference.

**Method**

**Materials and Methods:** The overall 20 medical centers analyzed the results on the SPT panel in 2006, 2010 and 2014/2015. The results in 2006 and 2010 were retrospectively analyzed and 2010 results were prospectively analyzed.

**Results**

**Results:** A total of 14,897 SPT test results were analyzed to show the most highly presented aeroallergens in Korea; D. farinae, D. pteronyssinus, Mugwort, Birch, Tyrophagus, Cat, Acarus siro, Oak, Hazel, Beech, Cockroach (G), Alder, Ragweed, Leidoglyphus, Doghair.

Aeroallergens which showed the increasing tendency of SPT positivity are as followed; 1) Pollen: Ash/Beech/Bermuda/Birch/Hazel/Nettle/Rye grass/Timothy grass/Plane/Plantain: 2) Fungi: Aspergillus/Penicillium/Rhizopus: 3) Animal: Cat/Guinea pig/Rabbit: 4) Mite: Tyrophagus/Acarus siro/Leidoglyphus: 5) Insect: Cockroach.

**Conclusion**

**Conclusion:** Based on the Korean population study, we recommend the most significant sensitizing aeroallergens to include on SPT panel. The type and prevalence of allergic sensitization have been changed due to environmental factors; therefore, we should continuously bring up to date the Korean SPT panel test by the regular investigations, based on the results in this study.

**ERS16-0545**  
**RHINITIS MISCELLANEOUS**

**INTRANASAL CAPSAICIN: MYTH OR REALITY?**

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**Aims**

Capsaicin is the active substance extracted from chili. It has been used in the treatment of non-infectious non-allergic rhinitis (NINAR) since the beginning of the 9<sup>th</sup> decade. Its merituos effects have been revealed in neurogenic rhinitis. Its usefulness in nasal polyposis is still a matter of debate.

**Method**

A review of the literature is performed on capsaicin intranasal products. A new line of produscts based on capsaicin is being presented and its effects are being discussed.

**Results**

Intranasal capsaicin releaves the symptomatology (rhinoreea, sneezing & nasal obstruction) in NINAR but has little effect on the dimensions of polyps in nasal polyposis. Its use may be recommended after endoscopic polipectomies to prevent recidive. The compliance has been good among the subjects of the study. Capsaicin decreases nasal hyperreactivity of the nose in all groups of patients and is efficient in gustatory rhinitis.

**Conclusion**

Furher studies are being necessary in order to assess the adequate efficacy and safety of the drug.



**THE EFFECTS OF KOREAN RED GINSENG ON RHINOVIRUS INFECTION IN HUMAN NASAL EPITHELIAL CELLS**

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**Aims**

Korean red ginseng (KRG) has been shown to have multiple biological activities including anti-viral activities. Here, we investigated that the protective effects of KRG on rhinovirus (RV) infection in primary human nasal epithelial cells (HNE).

**Method**

After rhinovirus infection and subsequent treatment with KRG, mRNA expression and protein secretion of inflammatory cytokines interleukin-8 (IL-8) and IL-6 were measured by real-time PCR and Enzyme-linked immunosorbent assays (ELISA), respectively. Viral titer assay and western blot analysis for the expression of rhinovirus 3C protease were used to evaluate viral replication in RV-infected cells. Western blot analysis for the expression of proteins related NF- $\kappa$ B and MAP kinase was used to assess the mechanisms of KRG effects on RV-induced responses.

**Results**

KRG significantly reduced RV-induced up-regulation of inflammatory cytokines IL-8 and IL-6 mRNA levels and protein secretion in primary human nasal epithelial cells. KRG treatment decreased viral replication in RV-infected primary human nasal epithelial cells. KRG treatment inhibited both NF- $\kappa$ B and MAP kinase activation induced by rhinovirus.

**Conclusion**

These results suggested that KRG treatment could attenuate the inflammatory responses by human rhinovirus infection, thus may be a potential therapy for prevention of rhinovirus-induced asthma exacerbation.

**SINONASAL SYMPTOMS IN OPERATING ROOM WORKERS: ANALYSIS BASED ON THE SNOT-22P**

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**Aims**

Health-care professionals, particularly operating room workers, contact with several potential allergens or irritants of sinonasal mucosa. According to EPOS document, symptom-based diagnosis of chronic rhinosinusitis is significantly associated with a positive endoscopy. The median value of 7 was determined to be the normal SNOT-22 score in persons without rhinosinusitis while in the general population the mean SNOT-22 score is reported to be 11±9.4. The purpose of this study was to observe the influence of occupational exposure in sinonasal symptoms based on the SNOT-22 score in the operating room workers.

**Method**

The SNOT-22p was applied through email to operating room workers and to a control group without risk factors for occupational rhinitis. The two groups were compared for exposure/non-exposure. The influence of weekly exposure-time and the cumulative exposure in years in the study group were also analysed.

**Results**

The exposure-time of more than 20 hours/week had a significant effect on the score. There was no influence of cumulative exposure on the score.

**Conclusion**

Working more than 20 hour/week in the operating room is significantly associated with higher SNOT-22p scores. These results suggest a change of sinonasal function associated with the operating room environment that needs to be better investigated. A reduction of the number of hours of exposure may need to be considered in the treatment of operating room workers with the diagnosis of chronic rhinosinusitis.

**EVALUATION OF ALPHA-TOCOPHEROL ACETATE TREATMENT IN PRIMARY ATROPHIC RHINITIS**

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**Aims**

Atrophic rhinitis is a term used to describe a debilitating disease of considerable interest in ENT clinical practice. Many authors have investigated the role of alpha-tocopherol in different anatomical regions, such as skin, oral mucosa and alveolar epithelial cells. At the evidence of the scientific studies, already present in the literature, we wanted to study the effects of alpha-tocopherol acetate in patients with Primary Atrophic Rhinitis (PAR).

**Method**

To study the effect that alpha-tocopherol acetate has in Atrophic Rhinitis we enrolled for this research 13 patients. The group was supplemented with alpha-tocopherol acetate, performing 3 month of therapy with 2 sprays, each nostril, three times daily.

**Results**

Subsequent follow-up demonstrate regression of the disease and decrease of the symptomatology. Endoscopy allowed us to observe an improvement of the rehydration of the nasal mucosa and rinomanometry showed an increased nasal flow and reduction of the nasal resistance. We also observed a decrease of the mean transit time of the mucociliary clearance. The results of our study suggest that alpha-tocopherol acetate has a beneficial effect on the nasal mucosa and can produce a significant reduction of the clinical manifestation of Atrophic Rhinitis.

**Conclusion**

This study is intended as a preliminary work for future trials focused on a poor explored aspect, what is the most effective treatment for atrophic rhinitis? Our results allow us to consider the use of alpha-tocopherol acetate in Atrophic Rhinitis, both Primary and Secondary, and in Empty Nose Syndrome.

**A CASE OF CHRONIC HYPERTROPHIC RHINITIS WITH SENSITISATION TO RAGWEED AND CANNABIS**

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**Aims**

Chronic rhinitis is a very common affection encountered in rhinology. In many cases allergy plays an important role, worsening the symptoms in specific seasons or even the whole year. Allergic reactions to marijuana (*Cannabis sativa*) are rare, but marijuana can be an important allergen in young people.

We present the case of a young patient with chronic rhinitis suffering of nasal obstruction the entire period of the year, with sensitisation to ragweed, but symptomatic only to cannabis exposure (en herbaceous plant related to ragweed).

**Method**

A 30 years-old patient, with history of septoplasty, has from many years permanent nasal obstruction, without other symptoms. In a few minutes after he smoked marijuana he presents anterior rhinorhea, facial redness, sneezing, cough, wheezing. These symptoms disappeared in approximately 2 days after. We performed ENT clinical examination, nasal endoscopy, imaging (CT scan), allergy tests, pulmonary tests, blood tests.

**Results**

After usually testing with standard allergen tests, we find a sensitization to ragweed (*Ambrosia elatior*). CT scan showed chronic rhinitis. Pulmonary tests were normally. Total Ig E was increased.

The treatment options included nasal topical steroids and antihistamines in ragweed season and avoid smoking marijuana.

**Conclusion**

We present a rare case of chronic allergic rhinitis with sensitization to ragweed, but with symptoms only after exposure to a marijuana smoke. There are some reports suggesting the relation between ragweed and cannabis pollens. Allergy to marijuana is rare, but marijuana is an allergen that might be considered frequent for specific age group.

**ADVERSE REACTIONS AND DRUG INTERACTIONS IN THE TREATMENT OF ALLERGIC RHINITIS**

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**Aims**

Nowadays, a substantial part of patients that suffers from allergic rhinitis have coexisting pathologies and are polymedicated. Consequently many of these drugs may interfere with medication for this condition.

The aim of this paper is to detail the main adverse reactions of the medical therapy in allergic rhinitis and the main interactions of these drugs.

**Method**

The authors investigate the interactions between allergic rhinitis medication and the most frequent drugs used in the community, according to their groups.

**Results**

First generation antihistamines are the drugs with more adverse reactions and interactions, namely with some antibiotics. The corticosteroids can lead to high blood pressure and ocular hypertension. The decongestants (especially those of oral use) can lead to tachycardia and loss of appetite and interact with some drugs, like antidepressants. Anticholinergic drugs can lead to xerostomy and bronchitis and interact with antipsychotic and sympathomimetics drugs; leukotriene receptor antagonist can lead to headache, fever and abdominal pain and interact with barbiturates.

The most secure drug studied, despite its low efficacy, was sodium cromoglycate, with almost no adverse reactions and without reported drug interactions.

**Conclusion**

The interactions between different drugs in allergic rhinitis can lead to unwanted effects. Topical therapies are safer, since used at recommended doses. The sodium cromoglycate is the drug with safer profile.

**ERS16-0748**

**TREATMENT OF ALLERGIC RHINITIS**

**NEUTROPHILS CONTRIBUTE TO ALLERGIC RHINITIS**

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**Aims**

Eosinophils are well-known markers of airway allergy and their role in allergic rhinitis has been studied extensively. Neutrophils have evoked less interest since they are found in the nose both when the patient is suffering at the height of the allergic season as well as when patients report no symptoms. Nevertheless the number of neutrophils increase in the nose during season in symptomatic individuals and their large absolute cell number in comparison with corresponding eosinophils deserve attention. The aim of this study was to analyze the neutrophil levels in allergic rhinitis.

**Method**

Peripheral blood, nasal biopsies and nasal lavage fluid (NAL) were obtained from healthy controls and symptomatic allergic rhinitis patients during the pollen season.

**Results**

An increase of the neutrophil levels was demonstrated in peripheral blood, nasal biopsies and NAL from allergic patients with allergic rhinitis during the pollen season compared to healthy controls.

**Conclusion**

Neutrophils might play an immunological role in allergic rhinitis based on the increase seen both systemically in the blood as well as locally in the nose. This role might be explained by different activation levels of the cell.

ERS16-0253

## TREATMENT OF ALLERGIC RHINITIS

### CHANGES IN SKIN SENSITIVITY TO INHALANT ALLERGENS OVER 3 YEARS IN SCHOOL-AGED CHILDREN

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#### Aims

Determining the allergen is important for the diagnosis and management of allergic diseases. The skin prick test (SPT) has been widely used to identify allergens. Skin sensitivity to allergens can change due to changes in lifestyle and outdoor environments. Little is known about the changes of allergen sensitivity in young children.

#### Method

In this Allergic Rhinitis Cohort Study for Kids, consecutive pediatric patients with rhinitis symptoms underwent SPTs. 1689 children were assessed for allergen sensitivity from 2009 to 2011. SPTs were performed with inhalant allergens at initial survey and re-performed at 3-year follow-up survey.

#### Results

280 children fulfilled the follow-up SPT. Initially 72 children were negative for SPT and 25 (34.7%) developed skin sensitivity during the 3-year study. Among 25 children, 20 (80%) were newly sensitized to house dust mites (HDM). 194 (69.3%) were sensitized to HDM at initial survey and 213 (76.1%) were sensitized to HDM at follow-up survey. Skin sensitivity to cat, dog, tree, grass, fungus also increased during the study. 102 children were sensitized only to HDM. After 3-year follow up, 41 (40.2%) were newly sensitized to other antigens such as cat, dog, trees.

#### Conclusion

Our study showed the changes in skin sensitivity to inhalant allergens over 3 years in school-aged children. Skin sensitivity was increased in both non-sensitizer and mono-sensitizer to HDM.

**PREVALENCE OF POLLEN FOOD SYNDROME IN ADULT PATIENTS WITH SEASONAL ALLERGIC RHINITIS**

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**Aims**

Pollen food syndrome (PFS) is a hypersensitivity reaction to specific foods due to prior sensitization to plant inhalant allergens. The IgE originally generated in response to pollen exposure will also bind to food proteins, thereby producing allergic reactions to various foods. There is a high co-occurrence of food allergy with other atopic diseases, including allergic rhinitis. Our aim was to assess the prevalence of PFS in patients with seasonal allergic rhinitis (SAR).

**Method**

A total of 222 patients with diagnosis of SAR were enrolled in our outpatient allergy clinic in Hacettepe University, between September 2014- July 2015. Data about demographic features, accompanying allergic diseases, type of allergic reactions after ingestion of foods, skin prick test (SPT) results, and the specific IgE levels were collected. Family history of atopic diseases were also recorded. Atopy were assessed by standard SPT panel to 16 common aeroallergens.

**Results**

Of 222 patients, 137 were female (61.7%) and the mean age was 32.24±9.99 (min-max:17-68) years. Among 45 patients that declared food allergy, 31 had PFS (31/222, 14%). Remaining 14 patients had other food allergies not related to PFS (egg, cow's milk etc.)

**Conclusion**

With the increasing prevalence of pollen allergy, the prevalence of PFS is expected to rise, however there is limited data about this issue. Compared to previous literature, our PFS prevalence rate was found to be lower. This may be due to mild symptoms, geographic differences, different nutritional habits or patient food avoidance.



**DOUBLE DOSE OF INTRANASAL CORTICOSTEROID FOR TREATING ALLERGIC RHINITIS : A SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Aims**

Increasing steroid dosage potentially enhances glucocorticoid receptor occupancy. When compared to normal dose intranasal corticosteroids (INCS), double dose is more effective for treating rhinosinusitis. Although normal dose of INCS is evident for allergic rhinitis, double dose is recommended by clinical practice guidelines for moderate to severe patients who do not respond to empiric treatment. However, the evidence of the effects of double dose INCS is not clearly shown.

**Method**

The effects of double dose INCS for allergic rhinitis were systematically reviewed. Randomized controlled trials studying the effects of double dose versus normal dose INCS for allergic rhinitis were included. Data were extracted and pooled for meta-analysis. The outcomes were patients report outcomes, and adverse events.

**Results**

17 studies (2,972 patients) met the inclusion criteria. When compared to normal dose, double dose INCS is not different on total nasal symptom score (mean difference (MD) -0.01; 95% confidence interval (CI) -0.11 to 0.09;  $p = 0.84$ ), nasal congestion (MD -0.00; -0.09 to 0.08;  $p = 0.98$ ), rhinorrhea (MD -0.05; -0.14 to 0.05;  $p = 0.32$ ), sneezing (MD -0.01; -0.13 to 0.12;  $p = 0.93$ ) and nasal itching (MD 0.06; -0.07 to 0.19;  $p = 0.39$ ). The adverse events were similar ( $p > 0.05$ ).

**Conclusion**

Double dose brings no additional benefit to normal dose INCS for allergic rhinitis. Doubling dose INCS is not recommended for allergic rhinitis patients who do not respond to normal dose INCS.

**EFFECTIVENESS OF MP-AZEFLU\* FOR THE TREATMENT OF ALLERGIC RHINITIS IN REAL-LIFE ASSESSED BY RESPONDER ANALYSIS: META-ANALYSIS OF DATA FROM 5 EUROPEAN COUNTRIES**  
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## **Aims**

Allergic rhinitis (AR) control has been prioritized at the EU level.<sup>(1)</sup> The visual analogue scale (VAS) has been endorsed as the AR control language, and incorporated into the recent MACVIA-ARIA guideline. This analysis assessed the effectiveness of MP-AzeFlu\* (a novel intranasal formulation of azelastine hydrochloride and fluticasone propionate in a single spray) in routine clinical practice, in several countries across Europe, using a VAS responder analysis.

## **Method**

2795 patients (≥12 yrs old) with moderate-to-severe SAR were enrolled into 5 multi-centre, non-interventional studies in Germany (n=1781), Sweden (n=431), Romania (n=253), Denmark (n=170) and Norway (n=160). Patients assessed symptom severity using a VAS from 0mm (not at all bothersome) to 100mm (very bothersome) on Days 0, 1, 3, 7, and last visit (~Day 14) in the morning before MP-AzeFlu\*-use. VAS score ≤38mm was patient-defined as 'well-controlled'. The proportion of patients who achieved this response were derived as Kaplan-Meier estimates.

## **Results**

MP-AzeFlu\* reduced VAS score from 73.7mm (SD:17.3) at baseline to 23.4mm (SD:20.3) by last visit, a shift of 50.3mm (SD:26.1). 18.2% of patients achieved the 'well-controlled' VAS score cut-off on Day 1, 40.0% on Day 3, 66.6% on Day 7 and 75.9% of patients on last day.

## **Conclusion**

MP-AzeFlu\* provided effective and rapid symptom control in AR patients in a real-life pan-European setting, aligning with EU/MACVIA-ARIA aims for improved disease control and supporting MP-AzeFlu\*'s position as the drug of choice for the treatment of AR.

\*Dymista

(1) Bousquet, et al. J Am Med Dir Assoc 2015;16:1020-6.

**ERS16-0127**  
**TREATMENT OF ALLERGIC RHINITIS**

**EFFECTIVENESS OF MP-AZEFLU\* FOR THE TREATMENT OF ALLERGIC RHINITIS IN REAL-LIFE: META-ANALYSIS OF DATA FROM GERMANY, SWEDEN, NORWAY, DENMARK AND ROMANIA**  
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**Aims**

Allergic rhinitis (AR) control has been prioritized at the EU level.<sup>(1)</sup> The visual analogue scale (VAS) has been endorsed as the AR control language, and incorporated into the recent MACVIA-ARIA guideline. This analysis assessed the effectiveness MP-AzeFlu\* (novel intranasal formulation of azelastine hydrochloride and fluticasone propionate in a single spray) in routine clinical practice in several countries across Europe using a VAS.

**Method**

2795 patients (≥12 years old) with moderate-to-severe SAR were recruited into 5 multi-centre, non-interventional studies in Germany (n=1781), Sweden (n=431), Romania (n=253), Denmark (n=170) and Norway (n=160). Patients assessed symptom severity on a VAS from 0mm (not at all bothersome) to 100mm (very bothersome) on Days 0, 1, 3, 7, and last visit (~Day 14) in the morning before MP-AzeFlu\*-use. Patients' perceived level of disease control was assessed on Day-3. Results are presented as a meta-analysis.

**Results**

MP-AzeFlu\* reduced the mean VAS score from 73.7mm (SD:17.3) at baseline to 23.4mm (SD:20.3) at last visit, a reduction of 50.3mm (SD:26.1). 50.3% of patients considered their symptoms 'well-controlled' on MP-AzeFlu\* after 3 days. The results were consistent across the countries.

**Conclusion**

MP-AzeFlu\* provided effective and rapid AR symptom control in a real-life pan-European setting. One in every 2 patients felt their AR was well-controlled after 3 days treatment. These results align with EU and MACVIA-ARIA aims for improved disease control and support MP-AzeFlu\*'s position as the drug of choice for the treatment of AR.

\*Dymista

(1) Bousquet, et al. J Am Med Dir Assoc 2015;16:1020-6.

**SUBLINGUAL IMMUNIZATION WITH PHOSPHORYLCHOLINE REDUCES ANTIGEN-SPECIFIC IGE LEVELS AND NASAL SYMPTOMS IN MURINE ALLERGIC RHINITIS MODEL**

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**Aims**

Phosphorylcholine (PC) is a structural component of a wide variety of pathogens. Recently, we showed that intranasal or sublingual immunization with PC induced PC-specific mucosal as well as systemic immune responses in upper respiratory tract, suggesting that intranasal or sublingual immunization with PC might be effective to prevent upper airway infections. However, there has been concern that Th2-type immune responses incused by mucosal immunization together with mucosal adjuvant such as cholera toxin might enhance the production of IgE and cause allergic diseases. The purpose of this study is to investigate the influence of sublingual immunization with PC on ovalbumin-induced allergic rhinitis model in mice.

**Method**

Male BALB/c mice were sublingually immunized with PC-keyhole limpet hemocyanin (KLH) (PC-treated group) or phosphate-buffered saline (PBS-treated group) as control. After the final immunization, samples of serum were collected. Following sublingual immunization with PC, each group mice were sensitized with OVA conjugated with alum by intraperitoneal inoculation with OVA and challenged by intranasal administration with OVA. Five minutes after the last challenge, the number of nasal symptoms was counted to evaluate the severity of allergic rhinitis. Antigen-specific antibody titers including IgE were measured by ELISA and the number of eosinophils infiltrating into nasal mucosa was determined.

**Results**

PC-specific IgG in serum were significantly increased in PC-treated Group. Nasal symptoms, the number of eosinophils infiltration and OVA-specific IgE production in PC-treated group was significantly decreased compared with PBS-treated group.

**Conclusion**

Sublingual immunization with PC might reduce the production of antigen-specific IgE and the occurrence of allergic rhinitis.

**SYMPTOMATOLOGY AND NASAL VOLUME IN ALLERGIC RHINITIS AFTER MEDICAL TREATMENT: A RANDOMIZED CONTROLLED STUDY**

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**Aims**

Aim of this prospective randomized study was to evaluate the effect of various medications in nasal signs and symptoms, and nasal volume in adults with symptomatic AR.

**Method**

79 patients with symptomatic AR were recruited from the Rhinology and Allergic Rhinitis Clinic of the 1<sup>st</sup> ENT Department of Aristotle University of Thessaloniki at AHEPA University Hospital in Greece and were randomized in four treatment groups (oral antihistamine; normal saline irrigation and oral antihistamine; intranasal corticosteroids and oral antihistamine; and the combination of all medications). Nasal signs and symptoms, and acoustic rhinometry values were recorded before and after a 4-weeks treatment period.

**Results**

All patients regardless treatment allocation experienced statistical significant improvement in all nasal symptoms between the two visits ( $p < 0.01$  for all nasal symptoms). Furthermore, the nasal signs improved non-significantly in all patients regardless received treatment. No statistical significance was observed when each nasal symptom and sign was compared between the groups except rhinorrhea, which improved significantly in patients receiving intranasal corticosteroids ( $p = 0.02$ ) in comparison with the remaining patients. Moreover, patients who used intranasal corticosteroids experienced a greater but not significant improvement in the other symptoms than the rest of the patients. No significant difference of nasal volume and minimum cross-sectional area was observed after completion of treatment compared with the baseline in all treatment groups. Similarly, no statistical difference of acoustic rhinometry values was observed when pairs of groups were compared.

**Conclusion**

All symptomatic treatment options used in this study had similar beneficiary effects to nasal symptoms and signs of AR.

**QUALITY OF LIFE AND NASAL OBSTRUCTION IN SYMPTOMATIC ALLERGIC RHINITIS**

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**Aims**

Aim of this prospective randomized trial was to compare the effects of different combinations of medical therapy in quality of life (QOL) and nasal obstruction in adult patients with AR.

**Method**

79 patients with symptomatic AR were recruited from the Rhinology and Allergic Rhinitis Clinic of the 1<sup>st</sup> ENT Department of University Hospital AHEPA In Thessaloniki in Greece and were randomized in four treatment groups (oral antihistamine; normal saline irrigation and oral antihistamine; intranasal corticosteroids and oral antihistamine; and the combination of all medications). The patients completed the RQLQ questionnaire and NOSE scale before and four weeks after treatment.

**Results**

The mean RQLQ values in all patients were significant lower after 4 weeks of treatment in comparison with the baseline ( $p < 0.01$ ). The statistical comparison between the treatment groups in pairs didn't show any significant difference between them before and after treatment. Patients with concurrent asthma or allergic conjunctivitis had a significant higher baseline score in comparison with the rest of the patients ( $p < 0.01$ ). This difference was eliminated post treatment. The NOSE score improved in all patients. It is worth to point out that patients who received intranasal corticosteroids experienced a significant reduction in this score after treatment ( $p < 0.01$ ). The correlation analysis between the two questionnaires showed that a strong correlation exists between nasal obstruction and quality of life.

**Conclusion**

This study confirmed that QOL is impaired in AR. Moreover, it showed that the presence of nasal congestion impacts the QOL of AR patients and that QOL and nasal obstruction improve significantly after treatment.

PREVALENCE OF ALLERGIC RHINITIS IN NORTHERN GREECE

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**Aims**

Aim of this study was to measure the prevalence of allergic rhinitis in Northern Greece.

**Method**

221 of the 415 patients who attended the Rhinology and Allergic Rhinitis Clinic of the 1<sup>st</sup> ENT Department of AHEPA University Hospital in Thessaloniki in Greece, between 2013 and 2015, were diagnosed with AR after history taking, complete ENT examination and SPT, and were included in this study. The characteristics of AR, possible trigger factors and allergic comorbidities were analyzed.

**Results**

79.2% of the patients came from urban areas, and 47.6% of them had a positive family history. The prevalence of AR was slightly higher in men (114, 51.6%) than in women (107, 48.4%) and more frequent in patients between 30-64 years of age (121, 44.3%). Patients with concurrent asthma had a higher incidence of positive family history ( $p < 0.01$ ). Concomitant asthma and atopic dermatitis were significant more frequent in women ( $p = 0.02$  and  $p = 0.03$ , respectively). According to ARIA classification 43.4% of the cases were classified as mild and 56.6% as moderate/severe disease. House dust mites were the most frequent allergens in 77.4% of patients followed by pollens in 59.7% of patients. Patients started on immunotherapy were more likely to have sensitization to house dust mites ( $p < 0.01$ ) and to be polysensitized ( $p < 0.01$ ).

**Conclusion**

This study provides data about the prevalence, clinical patterns and sensitization profiles of AR in Northern Greece. We consider that its prevalence in this area is significant and patients with nasal symptomatology should be always evaluated for the presence of AR.

**THE EFFICACY OF MOMETASONE FUROATE NASAL SPRAY AND RESPIRATORY NITRIC OXIDE IN PATIENTS WITH PERENNIAL ALLERGIC RHINITIS**

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**Aims**

Intranasal corticosteroid therapy has demonstrated effectiveness for improving nasal symptoms and quality of life (QOL) scores associated with seasonal allergic rhinitis (SAR). We investigated the efficacy of mometasone furoate nasal spray (MFNS) for improving the total nasal symptom score with perennial allergic rhinitis (PAR) and measured respiratory nitric oxide (NO) as a predicting factor, in order to find whether there could be any relationship between the efficacy of MFNS and respiratory nitric NO.

**Method**

Fifty-seven patients with PAR were randomized to MFNS or placebo for a 14-day, double-blind, cross-over study. The subjects recorded their symptoms on nasal symptom forms. Respiratory NO was measured during a single exhalation using a chemiluminescence analyzer. The patients were divided into two groups according to the levels of respiratory NO.

**Results**

MFNS treatment achieved significant reductions versus placebo for total nasal symptoms ( $p < 0.001$ ). The improvement ratio of nasal symptom scores in the group those respiratory exhaled NO was 100 ppb or more than 100 ppb before treatment were significantly higher than the ratio in the other group ( $p < 0.05$ ) after MFNS treatment, while the nasal symptom scores had no significant difference among groups before treatment.

**Conclusion**

This study demonstrated that MFNS therapy significantly improves nasal symptoms, and respiratory NO is one of the objective predicting factors on the efficacy of MFNS in Japanese subjects with PAR.



**MP-AZEFLU FOR NASAL AND OCULAR SYMPTOM RELIEF IN CHILDREN WITH SEASONAL ALLERGIC RHINITIS: IMPORTANCE OF CHILD SYMPTOM ASSESSMENT**

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**Aims**

MP-AzeFlu (Dymista®; novel formulation of azelastine hydrochloride and fluticasone propionate in a single spray) has been approved for paediatric-use in the U.S. by the FDA who acknowledged challenges of caregiver-reported assessment in paediatric trials. The aim of this study was to assess the efficacy of MP-AzeFlu in children with SAR. The importance of child efficacy assessment is addressed.

**Method**

348 children with moderate/severe SAR (aged 4-11 years) were randomized into a placebo (PLA)-controlled, parallel group, 14-day, double-blind trial to MP-AzeFlu, or PLA (1 spray/nostril bd; daily dose MP-AzeFlu: AZE 548 µg; FP: 200 µg). Children or their caregiver recorded symptom scores in an eDiary twice daily. Efficacy endpoints were overall change from baseline in reflective total nasal symptom score (rTNSS, AM + PM), reflective total ocular symptom score (rTOSS), and in individual nasal and ocular symptom scores in children aged 6-11 yrs (n=304). These were analysed according to degree of child self-rating *post hoc*. Change in quality of life (QoL) was also assessed.

**Results**

By Day-14 MP-AzeFlu-treated children experienced a statistically superior (p=0.027) improvement in QoL compared to PLA-treated children. When children mostly rated their own symptoms (n=82) MP-AzeFlu provided significantly better relief than PLA from overall nasal symptoms (p=0.002), overall ocular symptoms (p=0.009), and each nasal and ocular symptom assessed (p<0.0355; except for rhinorrhoea p=0.064), from the first day of assessment and sustained.

**Conclusion**

MP-AzeFlu is an effective treatment option for childhood AR. A simple and child-specific tool to assess efficacy in paediatric AR trials is urgently needed.

**MP-AZEFLU AND TIME TO CLINICALLY-MEANINGFUL RESPONSE IN CHILDREN WITH SEASONAL ALLERGIC RHINITIS: IMPORTANCE OF CHILD SYMPTOM ASSESSMENT**

**W. Berger<sup>1</sup>, E. Meltzer<sup>2</sup>, N. Amar<sup>3</sup>, U. Munzel<sup>4</sup>, A. Muraro<sup>5</sup>, M. Wickman<sup>6</sup>, J. Just<sup>7</sup>, A. Fox<sup>8</sup>, A. Nieto<sup>9</sup>, E. Valovirta<sup>10</sup>, J. Bousquet<sup>11</sup>**

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**Aims**

MP-AzeFlu (Dymista; novel formulation of azelastine hydrochloride and fluticasone propionate in a single spray) has recently been approved for paediatric-use in the U.S. by the FDA who acknowledged challenges of caregiver reported assessment in paediatric trials. The aim of this analysis was to compare response following treatment with MP-AzeFlu or placebo (PLA). The importance of child efficacy assessment is also addressed.

**Method**

304 children with moderate/severe SAR (aged 6-11 yrs) were randomized into a PLA-controlled, parallel-group, 14-day, double-blind trial to MP-AzeFlu, or PLA (1 spray/nostril bd; daily dose MP-AzeFlu: AZE 548 µg; FP: 200 µg). Children or their caregiver recorded nasal symptom scores in an eDiary twice daily. Time to response was analysed by Kaplan-Meier estimates and log-rank tests post hoc. Change from baseline in AM + PM rTNSS of ≥50% defined response and was assessed according to degree of child self-rating. Change in quality of life (QoL) was also assessed.

**Results**

By Day-14 MP-AzeFlu-treated children experienced a statistically superior (p=0.027) improvement in their QoL compared to PLA-treated children. The influence of rater on treatment effect was seen by the much greater treatment effect observed between MP-AzeFlu and PLA in those children who rated their own nasal symptoms for >90% of the time (n=82). In this group 38.9% of MP-AzeFlu- children achieved response, and did so up to 10 days faster than PLA-patients (10.9%; p=0.0065).

**Conclusion**

MP-AzeFlu provided more complete and faster symptom relief than PLA in children with AR.

**THE OBSERVATION OF SLEEP DISTURBANCE IN PATIENTS WITH ALLERGIC RHINITIS USING ACTIGRAPH**

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**Aims**

It is important to treat the symptom of sleep disturbance or day time activity in patients with allergic rhinitis. In fact, Allergic Rhinitis and its Impact on Asthma (ARIA) reported the severity of allergic rhinitis was decided with sleep disturbance. However, most of the studies about quality of life was reported by questionnaire. Recently, Actigraphy technology was invented and sleep/wake patterns of a variety of patients was able to observe with this device. Then, we collected the data by this device during sleep and in daytime in seasonal allergic patients, and discussed the objective effect of quality of life with allergic rhinitis.

**Method**

The patients with Japanese cedar allergic patients were recruited in this study. The patients were ordered to wear Actiwatch2 (Philips Respironics co.) continuously for two weeks. The study was tried both in and out of pollen season and was compared with each other.

**Results**

The results showed that wake time after sleep onset and percentage of total sleep time was statistically decreased in pollen season. This result suggest that sleep disturbance will be effected with pathophysiological change of allergy and that proper medication will be required in patients with allergic rhinitis.

**Conclusion**

In conclusion, the new device of actigraphy is useful tool to diagnose quality of life in patients with allergic rhinitis.

**THE ADDITIONAL EFFECTS OF ANTIHISTAMINES WHEN COMBINED WITH INTRANASAL CORTICOSTEROIDS FOR ALLERGIC RHINITIS : SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Aims**

Combination therapy is utilized when patients with allergic rhinitis (AR) fail to monotherapy. Although not evident, antihistamines (AH) and intranasal corticosteroids (INCS) are commonly combined. AH may add benefits during the early period while the maximal effects of INCS is not achieved. This study aims to investigate the effects of INCS plus AH for AR.

**Method**

Randomized controlled trials studying the effects of INCS plus AH versus INCS for AR were included. Data were pooled for meta-analysis. The outcomes were patients report outcomes and adverse events.

**Results**

12 studies (1879 patients) met the inclusion criteria. INCS plus AH was not different from INCS on total nasal symptom score (mean difference -0.01; 95% confidence interval (CI) -0.09 to 0.12,  $p = 0.83$ ). They were similar at the time period of both <1 month ( $p=0.85$ ), and  $\geq 1$  month ( $p=0.56$ ). When subgroup analysis was performed, intranasal AH, but not oral AH added benefits to INCS. The number of responders was greater in INCS plus intranasal AH (RR 2.75 (1.26-5.98)) than INCS plus oral AH (RR 1.02 (0.96-1.09)),  $p=0.01$ . Somnolence, dry mouth and other adverse events were similar between groups.

**Conclusion**

Oral AH bring no additional effects to INCS on total nasal symptom score for AR patients at both early and late time periods. Intranasal AH may be beneficial when added to INCS bringing greater number of responders. The additional of AH to INCS has no adverse events.

**SEDATIVE EFFECTS OF LEVOCETIRIZINE: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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**Aims**

Levocetirizine is one of the most potent second-generation antihistamines. As a substrate of P-glycoprotein, it functions as a drug efflux pump and should not bring adverse effects on drowsiness. However while cetirizine, former developed drug, can slightly penetrate the blood brain barrier, the sedative effects of levocetirizine is still controversial. The aim of the study is to investigate the sedative effects of levocetirizine.

**Method**

A systematic review was performed to assess the sedative effects of levocetirizine. All randomized trials comparing sedative effects of levocetirizine with either placebo or other antihistamines for any indications were included. Mean difference and risk ratio (RR) were used for meta-analysis.

**Results**

Forty-nine studies (18,274 patients) met the inclusion criteria. When compared to placebo, levocetirizine brought modest sedative effects (RR 1.64; 95%CI 1.13, 2.38). However, when compared to other second generation antihistamines, its sedative effects were not different (RR 1.26; 95%CI 0.92, 1.73). On subgroup analysis, there was no difference between sedative effects of levocetirizine and fexofenadine (RR 1.54; 95%CI 0.32, 7.50), desloratadine (RR 1.23; 95%CI 0.38, 3.93), loratadine (RR 1.56; 95%CI 0.28, 8.56), bilastine (RR 1.17; 95%CI 0.48, 2.84), olopatadine (RR 1.09; 95%CI 0.81, 1.47) and rupatadine (RR 1.47; 95%CI 0.14, 15.72). When compared to first generation antihistamines, levocetirizine had less sedative effects bringing less change of total reaction time (mean difference -250.76 seconds; 95%CI -338.53, -162.98).

**Conclusion**

Levocetirizine has modest sedative effects with a risk ratio of 1.64. These sedative effects are not different from other second generation antihistamines.

**EFFECTIVENESS OF MP- AzeFlu\* FOR THE TREATMENT OF ALLERGIC RHINITIS IN REAL-LIFE ACCORDING TO PHENOTYPE, SEVERITY AND PATIENT AGE: META-ANALYSIS OF DATA FROM 5 EUROPEAN COUNTRIES**

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**Background:**

Allergic rhinitis (AR) control has been prioritized at the EU level,<sup>(1)</sup> with the visual analogue scale (VAS) endorsed as the AR control language, and incorporated into the recent MACVIA-ARIA guideline. This analysis assessed the effectiveness of MP-AzeFlu\* (a novel intranasal formulation of azelastine hydrochloride and fluticasone propionate in a single spray) in routine clinical practice using a VAS.

**Methods:**

2795 patients (≥12 yrs old) with moderate/severe SAR were enrolled into 5 multi-centre, non-interventional studies in Germany (n=1781), Sweden (n=431), Romania (n=253), Denmark (n=170) and Norway (n=160). Patients assessed symptom severity using a VAS from 0mm (not at all bothersome) to 100mm (very bothersome) on Days 0, 1, 3, 7, and last visit (~Day 14) in the morning before MP-AzeFlu\*-use. VAS score ≤38mm was patient-defined as 'well-controlled'. Data were meta-analysed, by severity (baseline VAS:50-74mm or 75-100mm), phenotype (SAR, PAR or SAR + PAR) and age (12-17, 18-6, >65 yrs).

**Results:**

MP-AzeFlu\* reduced the VAS score from 73.7mm (SD:17.3) at baseline to 23.4mm (SD:20.3) by last visit, a shift of 50.3mm (SD:26.1). On average, patients achieved the 'well-controlled' VAS score cut-off by Day-7, irrespective of severity, phenotype or age. The results were consistent across the countries.

**Conclusion:**

MP-AzeFlu\* provided effective and rapid AR symptom control in days irrespective of severity, phenotype or age in a real-life pan-European setting, aligning with EU/MACVIA-ARIA aims for improved disease control. These data support MP-AzeFlu\*'s position as the drug of choice for AR.

\*Dymista

(1) Bousquet, et al. J Am Med Dir Assoc 2015;16:1020-6.

**MAY HYPERBARIC OXYGEN THERAPY PLAY A ROLE IN TREATMENT OF ALLERGIC RHINITIS?: A DOUBLE- BLIND EXPERIMENTAL STUDY**

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**Aims**

We aimed to evaluate nasal mucosal changes and efficiency of nasal steroids and hyperbaric oxygen (HBO) treatment on nasal mucosa with allergic rhinitis.

**Method**

Thirty adult Albino-Wistar rats were randomized into four groups. Group 1 (control group) (n=6) not model of allergic rhinitis ; group 3 (n=8) received TDI and HBO; group 4 (n=8) exposed to TDI and treated with intranasal mometasone furoate (10µl/d). Specimens of nasal mucosa were collected after sacrifice and dissection of animals. The specimens were exposed to toluene diisocyanate (TDI) and treatment; group 2 (TDI group) (n=8) exposed to TDI for having processed for light microscopic evaluation, and then evaluated histopathologically for eosinophilia, fibroblastic proliferation and inflammation.

**Results**

The level of inflammation in the control group was significantly less severe than group 2 (p<0.05). There were statistically significant differences between groups 2, 3 and 4 (p<0.05). There was no statistical significant difference between groups 3 and 4 (p>0.05). Evaluation of the fibrosis scores showed that the scores of group 4 was significantly increased (p<0.05). There were statistically significant differences between group 1 and the other groups for eosinophilia (p<0.05). There was statistically significant difference between group 2 and 4 for eosinophilia (p<0.05).

**Conclusion**

HBO treatment effects the inflammation and eosinophilia on the nasal mucosa almost as nasal steroid. It can be used for treatment of allergic rhinitis. Additional studies are warranted to investigate the effects of HBO treatment on allergy as well as clinical outcomes in individuals with allergic rhinitis.

**SYNDROME OF LOW TOLERANCE TO HISTAMINE IN PATIENTS WITH SEASONAL ALLERGIC RHINITIS AND CROSS DIETARY ALLERGY**

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**Aims**

The development and progression of allergic diseases, including seasonal allergic rhinitis (SAR) and cross food allergy (CFA), can be aggravated by increases in blood levels of histamine. Histamine concentrations can rise, among other things, as the result of the excess histamine intake with foods and low tolerance to histamine syndrome (LTHS). Many studies have looked at LTHS in patients with CFA, but to our knowledge none have investigated cases of combined SAR and CFA, despite the evidence that LTHS can worsen the progression of both conditions.

The objective of the current study was to examine changes in the level of diamine oxidase in SAR patients with and without CFA.**Method**

A survey was carried out in 217 residents of Kiev city suffering from SAR with sensitization to tree pollen. The diagnosis was done based on the reported symptoms, medical history, allergy tests, and otolaryngological examinations. LTHS was established with patient's specific complaints, analysis of questionnaires and results from laboratory examination of diamine oxidase levels.

**Results**

The prevalence of LTHS in patients with combined SAR and CFA was significantly higher than that in patients with SAR only (10,4% and 1% respectively;  $p < 0,5$  t-criterion Student 3.16).

**Conclusion**

This indicates that LTHS worsens the symptomatology of combined SAR and CFA and suggests that timely detection of LTHS and prescription of low histamine diet can alleviate the symptoms.



**PROGNOSTIC VALUE DETERMINATION OF SENSITIZATION TO LIPID TRANSPORT PROTEINS IN PATIENTS WITH SEASONAL ALLERGIC RHINITIS**

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**Aims**

Background of combination of seasonal allergic rhinitis (SAR) with cross food allergy (CFA) is confirmed by statistics. CFA is characterized by cross-reactions with SAR. Crossed reactions between food allergens and pollen are caused by common antigenic determinants contained in these allergens. Severity of crossed allergic reactions to fruits is caused by availability of sensitization to proteins PR-10, profilins and lipid transport proteins (LTP).

**The aim** of this study is the evaluation of sensitization rate to LTP in patients with food allergy.

**Method**

115 patients with sensitization to tree pollen and CFA were examined by methods of molecular allergodiagnostic.

**Results**

It was found that 11,1% of patients with sensitization to tree pollen with CFA have sensitization to LTP.

**Conclusion**

This suggests that the early detection of sensitization to LTP is very important for prevention of severe systemic reactions and timely appointment of an elimination diet.

**INTRALYMPHATIC IMMUNOTHERAPY WITH A COMBINATION OF BIRCH- AND GRASSPOLLEN ALLERGENS**

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**Aims**

Allergic rhinitis affects over 20% of the population in westernized countries. Allergen immunotherapy is the only treatment that improves symptoms and modifies the disease. However, few patients undergo therapy, likely due to the long duration of treatment. The aim of this study is to further investigate intralymphatic allergen-specific immunotherapy (ILIT) that has been suggested as a less time-consuming alternative to conventional immunotherapy.

**Method**

65 patients aged 18-55 years with allergic rhinitis to birch and grass pollen were recruited. The study was performed at Skåne University Hospital in Malmö and Karolinska University Hospital in Stockholm 2012-2015. Patients were randomized to three double-blind injections of either placebo or 1000 SQ-U Alum adsorbed birch- and grass pollen extract (ALK Alutard®). The ultrasound-guided injections targeted an inguinal lymph node, one in each groin, and were given with 3-4 weeks interval. The outcome was targeted by a nasal grass allergen provocation (1000SQ-U in each nostril) before and after vaccination and by administering a Juniper quality of life form at peak pollen seasons.

**Results**

63 patients received all three injections. 60 patients completed the follow-up. No moderate or severe adverse reactions occurred. Preliminary results indicate that the nasal provocation symptom score improved after vaccination in the actively treated group and that this group had a significantly better quality of life during pollen season ( $p= 0,001-0,05$ ).

**Conclusion**

Our study supports the hypothesis that three low-dose intralymphatic allergen injections improves symptoms at allergen exposure and is the first to show that ILIT with two allergens at the same time is safe.

**ERS16-0721**  
**IMMUNOTHERAPY (ALLERGIC VACCINES)**

**IMMUNOTHERAPY AFTER FUNCTIONAL ENDOSCOPIC SINUS SURGERY FOR POLYPS**  
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**Aims**

With this study we evaluated the degree of inflammation with eosinophils and the association of allergy (tested with skin prick test) with the remission of the nasal polyps after FESS.

**Method**

We had 15 patients (9 men and 6 women) with nasal polyps evaluated before and after FESS. Pre-operative the patients underwent a fiber endoscopy, computer tomography, skin prick test and evaluation of the IgE. Post-operative all the patients were under anti-allergic treatment, specific immunotherapy and a follow-up with endoscopy 3, 6 months and twice yearly afterwards.

**Results**

9 patients out of 15 were found allergic to more than one allergen, whereas 6 were sensible to only one allergen. They all underwent immunotherapy. 3 months after surgery all of the patients were found in the endoscopy free of nasal polyps. 1 year later by 3 patients the nasal polyps re-emerged and they were removed under local anesthesia. On the 3-year follow-up only one patient had nasal polyps, which were also removed under local anesthesia.

**Conclusion**

The specific immunotherapy could help towards the prevention of the remission of nasal polyps.

ERS16-0439

## NASAL HYPERREACTIVITY/NONALLERGIC RHINITIS

### REFRACTORY NEUROGENIC RHINITIS: TREATMENT WITH AMITRIPTYLINE

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#### Aims

**Background:** Despite maximal medical therapy (MMT) a subgroup of rhinitis patients are left with troublesome treatment-resistant neurogenic symptoms. Amitriptyline is a tricyclic antidepressant (TCA). The antidepressant effect is achieved via modulation of serotonergic neuronal activity. TCAs also block histamine-H1 receptors,  $\alpha_1$ -adrenergic receptors and muscarinic receptors. TCAs can therefore potentially influence nose-brain neuromodulatory signaling and rhinitis symptoms.

**Objective:** To report preliminary findings, efficacy and safety of amitriptyline for the treatment of difficult to treat neurogenic non-allergic rhinitis (NNAR)

#### Method

We retrospectively reviewed patients treated with amitriptyline for NNAR. The overall symptom severity was simply scored on a scale of 0-3 (0 = symptoms not present; 1 = mild, symptoms present but not bothersome; 2 = moderate, symptoms bothersome but tolerated, and 3 = severe, symptoms difficult to tolerate).

#### Results

A total of 9 patients (5 males, 4 females) were included with an average age of 33.9 years. Before the introduction of amitriptyline, all patients had an overall symptom score of 3 despite receiving MMT as recommended by current rhinitis treatment guidelines. Following amitriptyline (starting dose 10mg/day, average maintenance dose 30mg/day, median treatment duration 69 days), on paired data analysis the average symptom score significantly reduced from 3.0 to 1.889 ( $p=0.027$ ). Only 1 patient had sedative side effects on a dose higher than 10mg/day. None of the patients reported worsening of the rhinitis.

#### Conclusion

Low dose amitriptyline may be helpful and appears well tolerated. A powered double blind placebo controlled trial is warranted.

ERS16-0042

## NASAL PROVOCATION TESTS

### OPTICAL RHINOMETRY IN NASAL PROVOCATION TESTING

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#### Aims

**Objective** The purpose of this study was to assess the extent to which optical rhinometry (ORM) can be used as an objective measure of nasal mucosal edema following a nasal allergen provocation test in a group of patients with allergic rhinitis versus healthy controls.

#### Method

**Materials:** a total of 60 subjects including 30 patients diagnosed with allergy to common environmental allergens and 30 healthy subjects. **Method:** nasal allergen provocation testing (NAPT) with 5,000 standardized biological units (SBU)/mL.

#### Results

**Results:** The mean delay to the onset of nasal mucosal response as measured by ORM was 3.15 minutes and the level of light extinction returned to baseline after 28.15 minutes (change in optical density [OD] 0.431). These objective changes in optical density strongly correlated with subjective perception measured via a visual analog scale (VAS).

#### Conclusion

Optical rhinometry is a valuable tool for NAPT.

**ERS16-0250**

## **NASAL PROVOCATION TESTS**

### **NASAL METHACHOLINE PATENCY AND NASAL CITOLOGY IN ALLERGIC RHINITIS**

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#### **Aims**

Our aim was to study the effect of inhaled methacholine on nasal function and nasal mucosa cytology in allergic rhinitis patients using acoustic rhinometry.

#### **Method**

The study population consisted of 29 patients with nasal allergy and 24 patients with no nasal complaints. Increasing concentrations of methacholine ranging from 0,125% to 25% were sprayed in both nasal cavities of the subjects. The minimal cross-sectional area and the nasal volume were estimated by means of acoustic rhinometry.

#### **Results**

The methacholine responsiveness was not bilaterally symmetric in both nasal cavities. The allergic group did not show significantly higher incidence of responsiveness for methacholine than the control group. Prominent number of inflammatory cells such as neutrophils, eosinophils and mast cells were detected in the mucosal scrapings of the subjects from the allergic group.

#### **Conclusion**

Both in allergic and control group, topical methacholine stimulation resulted in decreased nasal patency.

**REPEATED LARYNGITIS AND CORRELATION WITH ALLERGIC CONSTITUTION AT ADULT NON - SMOKING POPULATION**

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**Aims**

To evaluate the level of correlation between episodes of repeated laryngitis and conferred allergy on inhalative allergens.

**Method**

Methods-In this study were included 185 patients with episodes of recidivant laryngitis ( two or more episodes in a period of one year).All patients with smoking habit were excluded. All clinical analysis were performed , including skin prick tests and/or in vitro immunoassay test- RIDA for 20 most common inhalative allergens,as well as personal and familial history of allergy respectively

**Results**

Positive tests ( skin prick test / RIDA ) on inhalative allergens were conferred in 102( 55,1% ) patients , males- 35 ( 34,3 % ),females- 67 ( 65,7%).Most common positive allergens were pollens- 39 patients( 38,2% ), Dermatophagoides pter. /farinae – 37 ( 36.4% ), molds- Aspergillus fumigates Alternaria alternata- 21(20,6% ), pets fibers -3 ( 2,9 % ), others -2 ( 1,9% ).Negative allergy test but positive familiar/personal anamnesis for allergy had 38 patients-20,5% ( 15 had positive familial history, Asthma -10 patients, COPD -8 , allergic dermatitis -5 patients. Allergy was not evidenced at only 45 ( 24,3 % )patients.

**Conclusion**

Episodes of repeated laryngitis have high level of significant correlation with allergy on inhalative allergens. Allergy is appeared as very important predictor for repeated laryngitis.

**ERS16-0059**

**LOCAL ALLERGIC RHINITIS**

**PHOTOTHERAPY IN ALLERGIC RHINITIS**

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**Aims**

The main objective is to study phototherapy in the treatment of allergic rhinitis compared with placebo therapy. We want to apply an effective therapeutic method, a safe one, without notable side effects, cheaper, which improve the health of our patients, and quality of their life.

**Method**

It was a multicenter randomized study, investigating the effect of placebo controlled rhinofototherapy, for a total of 187 patients who met the criteria for inclusion / exclusion. Rhinofototherapy effect was investigated: nasal flow (rinomanometry) and individual scores for subjective and objective symptoms.

**Results**

Patients treated with phototherapy = 65, placebo = 32 patients treated. Evolution lot phototherapy: very good - 67% improvement, good improvement - 28%, 5%-unfavorable evolution. Analyzing the placebo treated group: good results-10%, 43% moderate-improvement, evolution-47% unfavorable.

**Conclusion**

Phototherapy is an effective therapeutic method to treat patients with allergic rhinitis, is a well tolerated therapy, with minor side effects, easy to implement and monitor.



**A CASE OF LOCAL ALLERGIC RHINITIS (LAR) TO CANDIDA ALBICANS**  
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**Aims**

Local allergic rhinitis (LAR) is a type of rhinitis which has been attracting attention recently, involving IgE-production and allergic response exclusively at the site of the nasal mucosa without systemic sensitization detected by skin or serum tests. LAR is usually caused by mite and pollen allergens, however, little is known whether LAR is caused by molds. We experienced a patient who had LAR to *Candida albicans*.

**Method**

A 31 old man visited the local otolaryngology clinic due to perennial allergic symptoms including nasal discharge. Serum IgE test showed negative sensitization to mites, pollens, molds and animal dander. Although intranasal corticosteroid was effective for alleviating his symptoms, he was referred to our hospital to definite diagnosis.

**Results**

Additional serum IgE test showed negative systemic sensitization to insects and staphylococcal enterotoxins. Thus we suspected a possibility of LAR, and performed nasal allergen provocation tests (NAPTs). The provocation using paper disc containing house dust mites got no response, but the disc containing mixture of mold extracts (*Aspergillus fumigatus*, *Alternaria alternata* and *Candida albicans*) induced positive response including nasal discharge and swelling of nasal mucosa. One week later, we performed NAPTs again with individual mold allergens. Only NAPT with disc containing the extract of *Candida albicans* got remarkable nasal response.

**Conclusion**

We found for the first time a case of LAR to *Candida albicans*. It is said that NAPT is a useful diagnosis tool in patients with LAR, with high sensitivity. NAPT with multiple aeroallergens may be useful for the screening a possibility of LAR.

**THE INFLUENCE OF THE ALLERGIC REACTION IN NASAL MUCOSA ON LARYNGEAL SYMPTOMS**

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**Aims**

In addition to nasal symptoms, laryngeal symptoms are often reported in patients with allergic rhinitis (AR) during the pollen season. The laryngeal symptoms are thought to be a secondary effect of the chemical mediators released as a result of the allergic reaction in nasal mucosa. Aim of this study was to clarify the influence of the allergic reaction in nasal mucosa on laryngeal symptoms induced by pollen exposure.

**Method**

The participants with cypress AR were exposed to cypress pollen for three hours over two consecutive days with and without artificial nasal blockage in an environmental challenge chamber (ECC) over the course of two experiments. The subjective assessments of the severity of laryngeal symptoms (itching of the larynx, irritation of the larynx, sputum sticking sensation, and tingling of the larynx) were recorded during the period of exposure in the ECC. The severity of the symptoms was evaluated. The total laryngeal symptom score (TLSS) were used to assess the subjective symptoms.

**Results**

During pollen exposure with a nasal blockage, nasal symptoms such as sneezing and rhinorrhea were not reported. There were significant time-dependent increases in the participants' TLSSs in response to pollen exposure, even with nasal blockage. The TLSSs tended to be higher in the participants under nasal obstruction with a nasal plug than in those without a nasal plug on day 1. However, no difference in the TLSSs was found on day 2.

**Conclusion**

Laryngeal symptoms were induced by reason of other than allergic reaction in nasal mucosa.

**HOW CAN INFLUENCE ALLERGIC RHINITIS THE VOICE?**

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**Aims**

The voice is one of the most important human features, enabling communication with others and individual expression. The voice is a complex physiological process that requires interaction among the respiratory, laryngeal, and resonator systems. All parts of the body can affect the voice directly or indirectly.

**Method**

We evaluate the change in the voice quality of patients with allergic rhinitis (AR) after medical treatment. The study enrolled 19 subjects: 9 with high serum-specific IgE levels to inhalant allergens as the study group and 10 healthy individuals as controls. All patients were evaluated using the total nasal symptom score (TNSS) and voice handicap index-10 (VHI-10) and then underwent an acoustic voice analysis. After 1 month of treatment with mometasone furoate nasal spray, and levocetirizine (5-mg tablet once daily), the patients repeated the surveys and acoustic voice analysis. The results before and after treatment were compared.

**Results**

Our results clearly show that patients' nasal symptoms decreased with medical treatment, as we expected. We concluded, patients' AR symptoms decreased with treatment, implying that the swelling and oedema in the upper airways and nasal secretions were decreased. We used the VHI-10 for a subjective voice analysis. The results showed a significant decrease in vocal symptoms after treatment.

**Conclusion**

Allergic rhinitis can cause vocal problems when its symptoms are increased. This can lead to serious problems, especially for vocal professionals (teachers, singers, lowers). We think that combination therapy with a nasal steroid and an oral antihistamine decreases both AR symptoms and vocal problems, improving the quality of the voice.

**IMAGE GUIDANCE IN PEDIATRIC ENDOSCOPIC SINUS AND SKULL BASE SURGERY**

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**Aims**

To study the clinical applications of image guidance for the minimal invasive endoscopic approaches in pediatric sinonasal and skull base surgery .

**Method**

A retrospective study in a tertiary referral hospital from 2009 to 2015 .

**Results**

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20 patients (4-15 years) underwent endoscopic sinus and skull base surgery using the optical and the radio magnetic navigation systems.

The indications included complicated sinusitis 3 (15%),allergic fungal sinusitis abutting the orbit and skull base 9 (45%),chronic invasive fungal sinusitis 1 (5%),mucopyoceles 2 (10%),frontal csf leak 1 (5%),ethmoidal meningocele 1 (5%),pituitary cyst 1 (5%), angiofibroma 1(5%) and 2 (10%) rhabdomyoscoma affecting the infratemporal fossa,sellar and parasellar regions.

**Conclusion**

Image guidance systems are safe and effective tools that facilitate a minimally invasive endoscopic approach in pediatric sinonasal and skull base procedures covering a broad range of pathologies without increasing the intraoperative complications.

**CORRELATION BETWEEN ALLERGIC RHINITIS AND HYPERTROPHY OF ADENOID VEGETATIONS AT CHILDREN**

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**Aims**

**Aim:** To evaluate the correlation between allergic rhinitis and hypertrophy of adenoid vegetations in children, age 3-10 years

**Method**

A prospective randomised trial was conducted between two groups with 50 patients (age 3-10 years old,). First group were patients with negative RIDA allergy test for inhalative allergens, the second group were patients with positive RIDA test . All children had have fiberoptic endonasal evaluation of epipharynx ,graduating the hypertrophy of adenoids on visual analog scale VAS 1-5 . Patients from both groups had informed consent from their parents, respectively.

**Results**

Group I (n=50 ), mean age 5,98 years, mean VAS 2.52 for adenoid hypertrophy. Group II (n=50), mean age 6.26, mean VAS 4,22 Patients from group II had intranasal corticosteroid spray therapy for period of 3 months.After 3 months second fiberoptic endonasal evaluation of epipharynx was preformed,mean VAS 4,06. (  $p < 0.378$  no significant value ). At all patients with VAS score 4 and 5 was conducted Adenoidectomy, also at some patients with VAS 3 considering TLA and tympanometry outcome.

**Conclusion**

Hypertrophy of adenoid vegetations- VAS score 4 and 5 ,was more present at patients with positive RIDA allergy test.(  $p < 0,001$ ).After 3 months therapy with intranasal corticosteroid spray there was no significant difference in VAS endoscopy evaluation of adenoid hypertrophy

**COMPLICATIONS OF ACUTE RHINOSINUSITIS IN THE PAEDIATRIC POPULATION: A DISTRICT'S HOSPITAL EXPERIENCE.**

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**Aims**

Analyse the recent experience of a district's hospital in the diagnosis and treatment of complications of acute rhinosinusitis in children.

**Method**

Retrospective review of records of patients with less than 14 years admitted with a complication of acute rhinosinusitis, between January 2012 and December 2015. There was used the Chandler staging system.

**Results**

Of the 87 patients admitted with acute rhinosinusitis, 42 fulfilled the inclusion criteria (21 male and 21 female patients, with an average age of 5,9 years). Complications occurred more frequently on the left side (62%) and in the month of November. The average time of hospitalization was 9,6 days. There were 42 orbital complications (27 preseptal cellulitis, 22 orbital cellulitis, 3 subperiosteal abscesses and 1 cavernous sinus thrombosis) and 2 purely intracranial complications (2 meningitis and 1 epidural abscess). There were 15 cases with simultaneous preseptal and orbital cellulitis and 6 cases with concurrent ipsilateral dacryocystitis. In all cases medical treatment was based on systemic antibiotics (mainly ceftriaxone for preseptal and orbital cellulitis, ceftriaxone and clindamycin for subperiosteal abscess, and ceftriaxone with clindamycin for simultaneous preseptal and orbital cellulitis). Systemic steroids were used in 23 % of the cases (with poor response to the previous treatment). Endoscopic sinus surgery was necessary in 5 cases. There no deaths.

**Conclusion**

The prognosis in cases of acute rhinosinusitis complications in children is favorable, but it can lead to devastating consequences. The treatment success is based on early diagnosis, aggressive medical management and, in selected cases, surgical drainage procedures.

**IS A SURGICAL APPROACH WITH ELECTROSURGICAL COABULATOR AND ASPIRATOR SAFE AND EFFECTIVE FOR A CHORDOMA ARISING FROM THE CLIVUS?**

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**Aims**

TO INFORM ABOUT A POSSIBLE ALTERNATIVE SURGICAL APPROACH IF THE LOCATION OF THE CHORDOMA CAN BE FOUND IN THE CAVUM

**Method**

AN 11 YEAR OLD FEMALE PRESENTED WITH A 1 MONTH NASAL RESPIRATORY INSUFFICIENCY. NO FAMILY AND PERSONAL HISTORY OF IMPORTANCE WAS REPORTED. ON INSPECTION A MOBILE, SMOOTH AND SEMI SOFT MASS PROTRUDED IN OROPHARYNX. FLEXIBLE FIBEROPTIC SHOWED THE SAME MASS IN THE CAVUM. MRI IMAGING IN T1 AND T2 SEQUENCE REPORTED A BILOBULATED MASS OF 35 X 18 MM IN THE MIDDLE LINE OF THE NASOPHARYNX THAT APPEARS TO ORIGINATE FROM THE CLIVUS.

SURGICAL APPROACH WAS THROUGH NASAL ENDOSCOPY WITH AID OF A COABULATOR AND ASPIRATION ELCTROSURGICAL INSTRUMENT.

**Results**

SURGICAL PATHOLOGY REPORTED THE SPECIMEN AS CHORDOMA.

AT 8 MONTHS FOLLOW UP, PATIENT HAD A SMALL RECURRENCE AT THE CLIVUS AREA AND OTHER AREAS OF THE BRAIN WERE AFFECTED ON MRI.



**Conclusion**

THE TECHNIQUE CAN NOT BE RECOMMENDED AS A DEFINITE TREATMENT, ITS A SYMPTOMATIC RELIEF. IN THIS CASE, RADIATION THERAPY WAS APPLIED DUE TO THE OTHER LESIONS IN THE BRAIN. IF THE TUMOR CAN BE RESECTED ENTIRELY, IT IS PREFERRED OVER THIS TECHNIQUE.

**AVAILABLE METHOD OF ESTIMATION THE CILIARY BEAT FREQUENCY OF NASAL EPITHELIUM CELLS IN PEDIATRIC PATIENTS**

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**Aims**

Normal functioning of the ciliated epithelium of the upper respiratory tract is important for a person at any age. Frequent SARS specific to childhood, and the associated use of intranasal forms of drugs have a negative impact on the state of mucosa and the cilia motility. Existing methodology for assessing the activity of the ciliated epithelium require expensive equipment and is rarely used in pediatric practice. Therefore, the aim of our work was to create a simply method of estimation ciliary beat frequency (CBF) of nasal epithelium cells.

**Method**

Was carried out a microscopy of brush biopsy samples of nasal mucosa and recording the beating of the cilia. For estimation CBF we used the standard software of a personal computer running Windows - Windows Media Player in a single-frame playback. While viewing counted for a number of frames cilium make full oscillating cycle. To estimate the CBF it's necessary to divide the frame rate by the number of frames (must be known frame rate of the camera and the program used to the record). The calculation was performed using the formula:  $CBF (Hz (sec^{-1})) = \text{frame rate (frames / sec)} / \text{number of frames (frames)}$ .

**Results**

The results were comparable when using specialized software.

**Conclusion**

The advantage of this technique is its accessibility, since it avoids the use of specialized expensive software. This method is available for a wide range of researchers and can be easily applied to study mucociliary clearance in pediatric patients.



**ENDOSCOPIC TUBOPLASTY IN TREATMENT OF OBSTRUCTIVE SLEEP APNEA IN CHILDREN**  
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**Aims**

According to literature efficacy of adenotonsillectomy in children with obstructive sleep apnea syndrome (OSAS) varying from 25% to 100%. Hypertrophy of another part of lymphoid ring, for example tubal tonsil, can be a potential cause of residual apnea. There is small number of articles concerned with this problem. However tubal tonsil and torus tubarius, surrounding pharyngeal opening of auditory tube, are not synonyms.

Aim of the the study was to evaluate the efficacy of our first experience of endoscopic tuboplasty in treatment of the OSAS due to the torus tubarius hypertrophy.**Method**

Study included three children with sleep apnea, nasal obstruction, earlier operated concerning OSAS. Preoperatively nasopharynx endoscopy, polysomnography were performed. All patients underwent endoscopic tuboplasty, included resection of hypertrophic torus tubarius by microdebrider and its partial laser ablation. Special care was payed to parts of torus tubarius, spreaded through the choana in the posterior segment of the nasal cavity. Control polysomnography was performed one month after surgery. Effectiveness criterion of the surgery was calculated in accordance with the rules of AASM: decrease of the Apnea Hypopnea Index on 50% and above.

**Results**

In all cases there were no postoperative complications, excessive bleeding or tubal disfunction. Control polysomnography also showed positive results.

**Conclusion**

Torus tubarius hypertrophy can be the cause of recurrent obstructive sleep apnea after adenoidectomy or adenotonsillectomy in children. Endoscopic tuboplasty is an effective method of treatment of this pathology.

## FUNCTIONAL PARTIAL ENDOSCOPIC ADENOIDECTOMY

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### Aims

Considering the modern concept of the immune role of the pharyngeal tonsil, we began to use functional partial endoscopic adenoidectomy in routine practice that, on the one hand, allows the restoration of nasal breathing while, on the other hand, saves the pharyngeal tonsil as an immune organ. This study was conducted to assess the long-term outcomes of functional partial endoscopic adenoidectomy of this technique.

### Method

Retrospective analysis of the operations protocols and hospital sheets of 2053 children after partial endoscopic adenoidectomy, operated from 2001 to 2010, was performed. Afterward, the parents of these children were interviewed by phone.

### Results

Recurrence of the disease, which demanded a revision adenoidectomy, was observed in 1,02% of cases (21 children). The average age of the children underwent first adenoidectomy was 3±1,2 years old, in children underwent revision surgery - 6±1,8 years old. The vast majority of respondents rated the result of the intervention as satisfactory and considered the operation carried out in the childhood justified. The most frequent complication was bleeding at 47 (2,3%) children. 8 (0,39%) children needed posterior tamponade and only one (0,05%) - blood components transfusion. Also there was one case of emphysema of the mediastinum, whose symptoms were resolved within 2 hours, and one case of subluxation of the first neck-bone. There were no mortal outcomes.

### Conclusion

Analysis of functional partial endoscopic adenoidectomy long-term results has showed that this operation is highly-efficient method of surgical treatment of adenoids and connected with lower recurrence, smaller surgical trauma and minimal complication risks.

**NASAL CYTOLOGY IN PEDIATRIC AGE: PRELIMINARY EXPERIENCE**

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**Aims**

Nasal cytology examination is increasingly widespread in rhinology, very useful in making diagnosis, in monitoring the efficacy of treatment, and to formulate a prognosis. Its application in the pediatric population is at an initial stage and data in the literature are scant.

**Method**

We performed a retrospective evaluation of the rhinologic charts of patients aged less than 14, evaluated between February 2014 and March 2015. We collected data about demographic, presenting symptoms, cytologic diagnosis, comorbidities and treatment efficacy.

**Results**

We evaluated 24 patients, 14 males and 10 females. The most frequent symptoms were nasal obstruction and rhinorrhea. The main cytologic diagnosis was NARES in 6 patients (25%), NARESMA in 5 (20,8%), and NARNE in 2 (8,3%). Among other patients, we observed a minimal persistent inflammation and a bacterial rhinitis in 4 (16,7%) cases each. Three patients (12,5%) presented with normal cytologic findings. Adenoidal hypertrophy was observed in 8 patients (33,3%), of which 3 presented with bacterial rhinitis. Eleven patients were affected by concomitant allergic rhinitis. All patients were treated with saline nasal irrigation and, in most cases, with topical steroid therapy. Oral or, more rarely, topical antihistamine medications were prescribed in allergic patients. In case of bacterial rhinitis topical antibiotics were used.

**Conclusion**

In our experience nasal cytology was very useful to complete the diagnostic workup of pediatric patients with rhinologic symptoms not completely referable to adenoidal hypertrophy or allergic rhinitis. Properly examined patients are more prone to show a good clinical response to medical treatments.

**NASAL OBSTRUCTIVE DISORDERS AS CAUSE OF MEDICAL TREATMENT FAILURE IN PAEDIATRIC PERSISTENT ALLERGIC RHINITIS (THE NODPAR STUDY)**

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**Aims**

Allergic rhinitis (AR) is the most frequent chronic disease among children. When medical treatment fails, the presence of nasal obstructive disorders (NOD) should be investigated and surgery potentially indicated. There is a lack of knowledge about NOD prevalence among AR children. The study aim was to determine the influence of NOD in the refractoriness to medical treatment among children with persistent AR (PER).

**Method**

In a real-life prospective study, children and adolescents with PER (N=130, 13±2.8 years old, 68% males) were treated for at least 2 months by specialist-choice according to ARIA guidelines. After treatment, responders (R) and non-responders (NR) to medical treatment patients were assessed for comorbidities, improvement, nasal symptoms scores (VASs), PER severity by the modified ARIA (m-ARIA) classification, and NOD (septal deviation, turbinate and adenoidal hyperplasia) by nasal endoscopy.

**Results**

More patients were NR (N=86, 66.2%) than R (N=44, 33.8%). The NR group presented worse VASs for all AR symptoms, being nasal obstruction the predominant symptom for NR and sneezing for R. NR presented a higher frequency of severe PER (62.8% vs 22.7%, p=0.006), obstructive septal deviation (45% vs 11%; p=0.002) and severe turbinate enlargement (63% vs 0%; p=0.0001). Septal deviation (OR=0.4; p=0.001) and turbinate enlargement scores (OR=0.2; p=0.001) were inversely related to improvement after medical treatment.

**Conclusion**

Obstructive nasal septal deviation and turbinate enlargement, but not adenoidal hyperplasia, are strongly associated with a poor response to medical treatment in paediatric PER. Children not responding to usual medical treatment should be investigated for NOD.

**CHARACTERISTICS OF THE FRONTAL SINUS DRAINAGE PATHWAY IN CHILDREN**  
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**Aims**

In children, acute sinusitis extending to the orbit or intracranial space requires surgical treatment. However, the frontal recess in children is still developing. Therefore, it is crucial to understand anatomical characteristics of the frontal recess and the frontal sinus drainage pathway in children to safely perform sinus surgeries. This study aimed to illustrate the anatomical characteristics of the frontal recess and the frontal sinus drainage pathway in children compared to those in adults.

**Method**

The study was a retrospective chart review of Japanese children (age, 10–12 years) and adults (age, 22–73 years) (20 each) who received turbinoplasty and/or septoplasty without sinusitis. Using pre-operative computed tomography, the anteroposterior diameter between the agger nasi cell (ANC) and anterior wall of the ethmoidal bulla (EB), size of ANC, and presence of anterior frontal ethmoid cells (AFEC) and posterior frontal ethmoid cells (PFEC) were compared in children and adults.

**Results**

No significant difference was found in the anteroposterior diameter between ANC and anterior wall of EB of children [mean  $3.39 \pm 0.67$  mm (SD)] and adult ( $3.63 \pm 0.79$  mm). The anteroposterior diameter of ANC was significantly greater in adults ( $8.40 \pm 2.31$  mm) than that in children ( $5.86 \pm 2.09$  mm). In children, the ratio of the presence of AFEC (60%) or PFEC (77.5%) was smaller than that in adults.

**Conclusion**

The anteroposterior diameter of the frontal sinus drainage pathway in children was not narrower than that in adults. Anatomical characteristics, constructing the frontal sinus drainage pathway, were simpler in children than those in adults.

**GROWING NOSE. NORMAL VALUES OF 4-PHASE-RHINOMANOMETRY IN DIFFERENT AGES AND ITS CORRELATION WITH AGE AND ANTHROPOMETRIC PARAMETERS.**

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**Aims**

To find reference values for the classification of obstruction by 4-phase-rhinomanometry in adolescents and the correlation with anthropometric parameters

**Method**

4-phase rhinomanometric measurements were done in 114 healthy adolescents (age, 10–15 years; 35 boys and 79 girls) and in 37 kids (age 7- 10 years; 16 boys and 21 girls). Logarithmical effective resistance and logarithmical vertex resistance were analysed. 7 anthropometric parameters have been measured

**Results**

Beside of descriptive statistics, the following correlations between anthropometric and rhinomanometric data were found:

- 1)with increasing age, height, weight, nasal height, nasal length, lateral nasal length, nasal height and alar length, logarithmic effective resistance and logarithmic vertex resistance decreases, and nasal patency improves;
- 2)logarithmic effective resistance and logarithmic vertex resistance increases with increasing nasal basis width, nostril width and upper lip length.
- 3)In children nasal resistance is significantly higher than in adults. As smaller the child as higher is nasal resistance.
- 4) The highest correlation was found between nasal length, lateral nasal length and logarithmic resistance values

**Conclusion**

Following the classification of obstruction in adults (Vogt et al.2016) the presented data allow the adaption of the obstruction classes in adolescents and children. The classification can be dynamically corrected by using the regression between lateral length and nasal length and logarithmic resistance values.

**IMPACT OF NASAL OBSTRUCTIVE DISORDERS ON QUALITY OF LIFE IN ADOLESCENTS WITH PERSISTENT ALLERGIC RHINITIS**

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**Aims**

Quality of life (QoL) is highly impaired in children with allergic rhinitis (AR). Studies on the impact of anatomical nasal obstructive disorders (NOD) on AR paediatric patient's QoL are lacking. The study aimed to determine the impact of NOD on QoL in adolescents with persistent allergic rhinitis (PER) and resistance to medical therapy.

**Method**

In a prospective, real-life, observational study, tertiary-care paediatric hospital, PER patients (N=84, 12-17 year old, 66.6% male) were treated for at least 2 months by specialist-choice according to ARIA guidelines. After treatment, responders (R) and non-responders (NR) to medical treatment were assessed for Adolescent Rhinoconjunctivitis Quality of Life Questionnaire (AdoIRQLQ), PER severity by modified ARIA (m-ARIA) severity classification, and NOD (septal deviation, turbinate and adenoidal hyperplasia) by nasal endoscopy.

**Results**

More adolescents were NR (N=52, 61.9%) than R (N=32, 38.1%). The overall AdoIRQLQ score was higher (worse) for the NR group (2.98 vs 1.78, p=0.000001). Moderate PER patients had lower (better) QoL scores than those with severe PER (1.7 vs 3.3, p=0.000001). Turbinate enlargement was associated with worse scores in nasal symptoms domain (OR=1.17 [1.1-1.3]; p=0.00003) and worse overall score (OR=2.39 [1.3-4.39]; p=0.0048). Improvement after medical treatment was related to better outcomes (lower scores) in all AdoIRQLQ domains.

**Conclusion**

PER adolescents with resistance to medical therapy have a higher NOD prevalence which is associated to QoL impairment. Early ENT referral would improve NOD diagnosis with potential surgical indication in order to improve the QoL adolescents with AR.

**PEDIATRIC EPISTAXIS IN RHINOLOGY PRACTICE**  
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**Aims**

Epistaxis is very common in children but its cause remains unknown. We postulate that nasal colonization with different bacterium's to inflammation, crusting, and ultimately new vessel formation.

**Method**

Twenty - one children were recruited, they were with epistaxis (14 had crusting in the nasal vestibule; 7 did not). A microbiology swab was taken from the anterior nasal cavity of each child.

**Results**

All groups were equally likely to have a positive culture. *St. aureus* was more common in the epistaxis group ( $p=0.007$ ) and *Str. pneumoniae* ( $p=0.005$ ). There was no difference in the prevalence of *St. aureus* and *Str. pneumoniae* between crust and noncrust groups. Epistaxis patients were much less likely to have isolates of respiratory pathogens or a skin commensal.

**Conclusion**

Children with epistaxis are more likely to have nasal colonization with *St. aureus* and *Str. pneumoniae*. Our data would support the hypothesis that these microorganisms causes inflammation and new vessel formation.



**JUVENILE NASOPHARYNGEAL ANGIOFIBROMA – CLINICAL FEATURES, SURGICAL MANAGEMENT AND PROGNOSTIC IMPACT**

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**Aims**

Juvenile nasopharyngeal angiofibroma (JNA) is a rare benign highly vascular tumour, with a locally invasive and destructive behavior, representing only 0.05% of all head and neck neoplasms. The purpose of this study was to assess the clinical and surgical features of this disease and its prognostic impact.

**Method**

From January 2003 to December 2014, all consecutive patients with the diagnosis of JNA treated with either an open or endoscopic approach and a 1 year minimum follow-up, in a single Oncology specialized centre, were retrospectively analysed.

**Results**

From 13 patients with JNA included in the analysis (all males, mean age 14.2±3.3) 69% presented with nasal obstruction and 77% with epistaxis. The distribution of JNA using the Radkowski's classification was: Ia-31%, Ib-8%; IIa-15%; IIc-31%, IIIa-8%, and IIIb-8%. Having nasal obstruction as the presenting symptom of the disease was significantly correlated with ethmoidal tumour extension ( $r=0.72$ ,  $p=0.006$ ). The main surgical approach was endoscopic surgery (46%); 37% of patients underwent an open approach. Mean follow-up time was 75±34 months, with a tumour recurrence rate of 31%, and a mean time to recurrence of 9±5 months. Therefore, in this cohort, the recurrence rate was significantly higher for patients treated with a combined approach ( $r=0.64$ ,  $p=0.019$ ).

**Conclusion**

JNA has wide variety of clinical features and extension sites. Ethmoidal tumour extension correlated with a presenting pattern of nasal obstruction. Larger tumour extension required a combined surgical approach and was associated with higher recurrence rates, during follow-up.

**MONSTROUS CHOANAL POLYP WITH COEXISTING CHRONIC RHINOSINUSITIS IN A 15-YEAR OLD BOY: A CASE REPORT**

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**Aims**

Antrochoanal polyps are benign lesions of the mucosa, usually unilateral, originating from maxillary sinus and extending on peduncle towards choana. Main symptoms are nasal obstruction and rhinorrhea. Diagnostics include examination with sinus endoscopy and computed tomography imaging. Treatment is surgical.

**Method**

We described a case of a 15-year old boy with monstrous antrochoanal polyp with coexisting chronic rhinosinusitis. After diagnostics were performed, patient was qualified for surgery. Preoperative treatment included oral antibiotics and steroids. Due to giant dimension of polyp- after cutting off its peduncle endoscopically, mass was removed via trans oral approach and then bilateral maxillary sinusotomy, partial left ethmoidectomy and total right ethmoidectomy were performed. Postoperative material was sent for histopathological analysis. Standard postoperative treatment was administered and regular follow-up visits in rhinologic clinic were planned.

**Results**

The results after operation were good. Standard postoperative treatment was administered and regular follow-up visits in rhinologic clinic were planned.

**Conclusion**

Authors emphasize, not to ignore symptoms like blocked nose and rhinorrhea in teenagers, because laryngological issue might be much more severe and early age does not exempt from intensified course of chronic rhinosinusitis.

THE INFLUENCE OF MORAXELLA CATARRHALIS ON CHRONIC ADENOTONSILLAR DISEASES

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**Aims**

The objective of this study was to investigate the detection of most commonly found bacteria of the human respiratory microbiota in patients with and without chronic adenotonsillitis.

**Method**

We collected tissue samples from palatine tonsils, adenoids, and nasopharyngeal washes from 37 children with chronic adenotonsillitis, characterized by the presence of adenotonsillar hypertrophy, and 14 control children undergoing cochlear implantation surgery. In this study was analyzed the genome presence from five bacteria (*Streptococcus pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Pseudomonas aeruginosa*) by real-time PCR, and correlated to clinical aspects.

**Results**

We found a high frequency (>20%) of *H. influenzae* in palatine tonsil and adenoid samples, and of *S. pneumoniae* in nasopharyngeal washes from control children, without adenotonsillitis, and in patients with adenotonsillitis, with similar frequencies between groups. Regarding the bacteria co-detection, we found a high frequency of co-detection of *H. influenzae* and *M. catarrhalis* in tonsils and adenoids. In addition, we found that co-detection of *M. catarrhalis* in adenoids and nasopharyngeal washes was related to the presence of chronic adenotonsillitis. This association was even higher when we analyzed only patients with severe tonsillar hypertrophy. Severe disease was especially observed in patients that presented *M. catarrhalis* in all evaluated sites.

**Conclusion**

*S. pneumoniae*, *S. aureus*, *H. influenzae* and *Moraxella catarrhalis* are frequently detected in tonsils, adenoids and nasopharyngeal washes in children, either with or without chronic adenotonsillitis. The detection of *M. catarrhalis* in all these sites in the same patient was correlated with the development of severe hypertrophic adenotonsillitis.

**ERS16-0248**

**UPPER AIRWAY INFLAMMATION IN CHILDREN**

**POST NASAL DRIP SYNDROME AND CHRONIC COUGH IN CHILDHOOD**

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**Aims**

Discuss the clinical features and the disease curing methods for the chronic cough caused by postnasal drip syndrome.

**Method**

Twenty two children who were diagnosed with postnasal drip syndrome were given systemic cure such as giving antibiotics, adopt a nasal decongestant, part system using glucocorticoid very carefully.

**Results**

All above of children follow-up three months. With subjectivity, if symptoms improve action appraises an index, cough of twelve children had different improve. Ten cases did not feel their symptom improve obviously.

**Conclusion**

The postnasal drip syndrome is complicated. Cough is an important clinical feature of postnasal drip syndrome. The treatment is difficult and requires combinative thinking and accurate diagnosis.

**A CASE OF AIRWAY OBSTRUCTION CAUSED BY NASAL GLOMANGIOPERICYTOMA IN CHILD.**

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**Aims**

Glomangiopericytoma is a tumor occurring under a mucous membrane of paranasal sinus. The rate of this tumor is very rare with less than 0.5%. This tumor is established by WHO classification revision of 2005, and it is a new disease concept. 5-year survival rate is more than 90%, therefore, this tumor has a good prognosis. However, there is the thing classified in a progressive tumor, because of the size of tumor and histopathology testing. Progressive tumor may result in distant metastasis and local recurrence, and therefore what it is careful and observes is necessary.

**Method**

This time, we experienced 1 case for a progressive type of Glomangiopericytoma of the left nasal cavity origin. And it required tracheostomy because of airway obstruction.

**Results**

This case is 13-year-old boys. Chief complaint is nasal congestion. He consulted a nearby doctor, and showed a left nasal cavity tumor. A doctor performed a biopsy, and it was diagnosed neuroendocrine small cell carcinoma. For the purpose of a close inspection, and medical treatment, he consulted this hospital. The tumor occupied and it was full of pharynx to nasal. It was more likely to present with airway obstruction, at first we performed tracheostomy. After the tracheostomy, we performed tumor resection with the endoscope.

**Conclusion**

The final pathology was Glomangiopericytoma progressive type. From perioperative findings, we judged tumor to have been able to remove completely. The intranasal recurrence or distant metastasis are absent. Now, We are following it up severely.

**OUTCOMES OF ENDOSCOPIC DACROCYSTORHINOSTOMY PERFORMED IN A TERTIARY INSTITUTION**

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**Aims**

Endoscopic Dacrocystorhinostomy (EDCR) confers several advantages compared to the external approach. This study aims to review the outcomes in patients who underwent EDCR by a single surgical team in a tertiary institution.

**Method**

46 patients who underwent EDCR from January 2010 to December 2014, with at least 6 months of postoperative follow-up were retrospectively reviewed. All cases had been performed by the same surgical team consisting of a rhinologist and ophthalmologist. A standardized operative technique was employed for all cases including a wide osteotomy to expose the fundus of the lacrimal sac and the first few millimeters of the nasolacrimal duct (NLD), Mitomycin C application to the DCR site for 5 minutes and bi-canalicular lacrimal stenting.

**Results**

The indications for EDCR included primary NLD obstruction (58.7%), re-stenosis following previous DCR (8.7%), prior episode of acute dacrocystitis (17.4%), chronic dacrocystitis (4.3%), post-traumatic obstruction (4.3%) and mucocele (6.5%). Mean follow up duration was 364 days. 40 patients (87%) remained asymptomatic at 6 months or longer, 3 (6.5%) had mild recurrence of epiphora but did not require further surgery and 1 (2.2%) had recurrence with a subsequent successful revision EDCR. 1 patient had recurrent dacrocystitis post-operatively and 1 patient had dry eyes requiring a punctal plug.

**Conclusion**

The results from our institution are similar to the success rates of EDCR quoted in the available literature. Given its numerous advantages compared to the external approach, EDCR should be offered to patients requiring surgical intervention for NLDO if the institution has the relevant specialist expertise for the operation.

## ENDOSCOPIC ENDONASAL DRAINAGE OF ORBITAL ABSCESS FOLLOWING ACUTE FRONTAL SINUSITIS

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### Aims

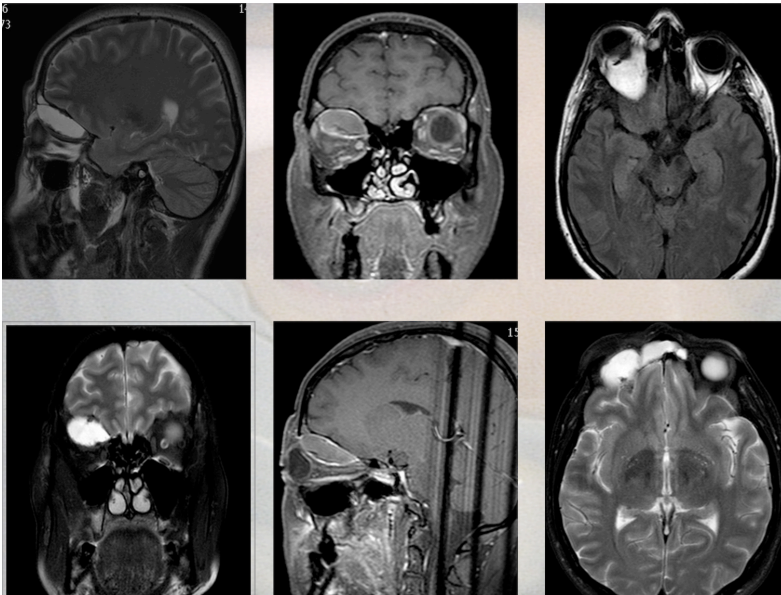
Orbital complications secondary to acute sinusitis may have different clinical presentations and may require different treatments. Chandler et al. classified orbital complications of rhinosinusitis into five categories:1)preseptal cellulitis;2)orbital cellulitis;3)subperiosteal abscess;4)orbital abscess;5)cavernous sinus thrombosis.

We report the successful treatment of a 45 yrs old female patient with history of 7 days of headache and proptosis of the right eye due to an orbital abscess secondary to acute frontal sinusitis.

### Method

The patient was admitted to the emergency department complaining 6 days of headache, cacosmia and post-nasal drip. On examination the patient showed right eye proptosis and decreased right eye movements(Fig1). CT scan and MRI showed right frontal sinusitis and orbital abscess with displacement of the superior rectus muscle and optic nerve(Fig2).

A right Draf 2A procedure was performed with drainage of purulent material from the frontal sinus, followed by a right orbital decompression by means of removing the lamina papyracea with a further drainage of purulent material. No fat prolapse was seen during the decompression.



### Results

Neurological and physical signs disappeared after surgery, with normalization of the visual field. Follow up at 2 and 4 weeks showed complete resolution of the inflammatory process and normal eyes movements(Fig3).

### Conclusion

Complications arising from acute sinusitis can result in life-threatening illness. Treatment algorithms of orbital complications of acute sinusitis differ in the literature, however an adequate and rapid therapy (stages I and II conservative, stages III and IV surgically, endoscopically, or combined within 24 hours) with appropriate follow-up should be made to achieve a good outcome.

**CONSERVATIVE MANAGEMENT FOR SUBPERIOSTEAL ORBITAL ABSCESS IN ADULTS; A 20 YEARS EXPERIENCE. EPHRAIM EVIATAR, BAESL JABRIN, OFER ISRAEL, HAIM GAVRIEL  
E. EVIATAR<sup>1</sup>**

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**Aims**

Objective - Orbital complications (OC) secondary to acute rhinosinusitis (ARS) in adults are uncommon, but can result in severe morbidity and mortality if not treated appropriately. These complications are more common in young children with assumed better outcome.

**Method**

Materials and methods –Adults with OC secondary to ARS between 1994 and 2014 were reviewed retrospectively. Parameters recorded included age, gender, clinical symptoms and signs, CT findings, duration of hospitalization, treatment before and during admission, cultures and outcome.

**Results**

Thirty seven adults with a mean age of 34.6 years, 27 males and 10 females, were diagnosed with OC, 19 (51.3%) with subperiosteal orbital abscess and none with orbital abscess/cellulitis or cavernous sinus thrombosis. Twelve patients (63.1%) with SPOA were managed conservatively mostly with Amoxicillin-Clavulanate and only 7 (36.8%) underwent surgical intervention. CT scan performed in 27 (72.9%) cases revealing sinusitis in all including frontal involvement in 19 (51.3%) patients and sphenoid sinus in 16 (43.2%).

**Conclusion**

A shift towards conservative treatment in cases of SPOA has long been integrated in the management protocols, mainly in children under 9 years old. The



**PREDISPOSING FACTORS IN DACRYOCYSTORHINOSTOMY FAILURE**

**M. GRANDA<sup>1</sup>, E. AMARILLO<sup>1</sup>, E. HERNANDEZ<sup>1</sup>, M. HERNANDO<sup>1</sup>, G. PLAZA<sup>1</sup>**

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**Aims**

The goal of this study is to identify risk factors associated to long-term failure of endoscopic dacryocistorhinostomy (DCR) in our hospital during the last 8 years.

**Method**

We analyzed 133 cases who went under an endoscopic DCR in our Department from January of 2005 to December of 2013.

We recollect data about age, previous surgery and kind of surgery performed, and infection of lachrymal duct, and then compare this data with failure of surgery. Minimum follow-up was two years, and median was 5 years. The analysis was performed using SPSS 15 statistical program

**Results**

Twenty-one cases (15,7%) had previous surgery done: 52% external DCR, 33% lachrymal stent of the lachrymal duct, and 15 % other ophthalmic procedures in the lachrymal duct. Of the 133 cases, 18 (13%) had presurgical repetitive episodes of infection of the lachrymal duct.

After a minimum of 24-month follow-up, success of endoscopic DCR was found in 76% (101/133 cases). Of these 32 failures, 9 (28%) had had lachrymal duct infections, and 5 (15 %) had been previously operated by Ophthalmology. First factor was statistically related to failure ( $p < 0.05$ ) while second was not ( $p > 0.05$ )

**Conclusion**

Endoscopic DCR was successful in 76% of cases after long-term follow-up. Previous infections were associated with a bad prognosis.

**PROLAPSE OF THE GLOBE INTO THE NASAL CAVITY WITH ORBITAL MEDIAL WALL FRACTURE - THE FIRST CASE REPORT-**

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**Aims**

To report a rare case that prolapse of the globe into the nasal cavity with orbital medial wall fracture.

**Method**

A 65-year-old man who had a history of Caldwell-Luc antrostomy was struck in the right eye by an iron pipe when felling trees. CT revealed fracture of the medial wall of the right orbit and dislocation of the globe into the nasal cavity. The right optic nerve and extraocular muscles were deemed to be intact from MRI, and the patient perceived light when a rigid fiberscope was inserted into the right nasal cavity.



**Results**

Four days later, surgery was performed by a surgical team comprising otolaryngologists, ophthalmologists, and plastic surgeons. The team succeeded in returning the globe into the orbit using a nasal endoscopic technique and lower eyelid incision. Since he experienced loss of sight three weeks after this first operation, ophthalmologists performed surgery for vitreous hemorrhage, but eyesight was not restored. The patient seemed satisfied with the cosmetic results, despite mild enophthalmos.

**Conclusion**

Bony opacification of the right maxillary sinus caused by the healing process after Caldwell-Luc antrostomy could force the globe outside the orbit, and entrapment within the nasal cavity could result.

**FRONTAL FIBROUS DYSPLASIA WITH SUPERIOR ORBITAL DEHISCENCE: A RARE CASE**

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**Aims**

To report a rare case of fibrous dysplasia with spontaneous fracture

**Method**

Retrospective review of case notes in a tertiary care centre

**Results**

Painless enlargement of facial bones with resultant facial asymmetry is the commonest presentation of facial fibrous dysplasias. Fractures of the weight bearing bones are known but rare in the flat facial bones.

We report a case of frontal fibrous dysplasia with spontaneous superior orbital wall dehiscence causing recurrent orbital emphysema.

Case Report:

A 31 yrs old lady developed orbital emphysema while performing valsalva. A CT scan showed bilateral frontal sinus ground glass hypodensity with left superior orbital wall dehiscence causing communication between the sinus and the orbit. Imaging features favored a diagnosis of expansile lesion suggestive of fibrous dysplasia.

Patient is offered an option of open approach surgery is considered for recurrent emphysema

**Discussion:**

Fibrous dysplasia is defined as an “arrest of bone maturation in woven bone with ossification resulting from metaplasia of a non specific fibro-osseous type of uncertain etiology.

Monostotic and polyostotic are terms used to describe the extent of disease. The pathology may involve both endochondral and membranous bones.

Craniofacial fibrous plasia is considered a different entity as despite multiple adjacent bones involvements due to contiguity of bones a true polyostotic still lacks. Pathological fractures occur in the weight bearing bone. This is first such reported case of fracture in a flat bone.

**Conclusion**

Craniofacial fibrous dysplasia is a distinctive entity. Pathological fractures of facial bone is rare and will require a more radical approach over a conservative decontouring

**ENDOSCOPIC REVISION OF DACRYOCYSTORHINOSTOMY**

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**Aims**

Endoscopic dacryocystorhinostomy (DCR) is increasingly used in recurrence of symptoms after external approach. Given the widespread use of endoscopic DCR, revision cases of this technique are also a reality. The aim of this study is to identify and highlight the factors responsible for DCR failure.

**Method**

Retrospective analysis of cases of endoscopic revision of DCR carried out in a tertiary referral center. Charts were reviewed for history, likely causes that lead to primary surgery failure and outcome of the revision procedure.

**Results**

Out of 105 cases done in a period of 5 years (from 2010 to 2015), 15 were revision cases. The revision was due to failure of external and endoscopic approach in 40 and 60% of the cases respectively. The most frequent causes for revision were incomplete exposure of the lacrimal sac/osteogenesis in 53.3% and synechiae formation in 26.6%. It was observed a high incidence of concomitant intranasal pathology in external approach revisions, which we believe have affected the outcome of primary surgery. Most of the failure causes were secondary to false localization of the sac, inadequate bone removal covering the sac, mucosal trauma/removal leading to synechiae formation and deviated septum too close to the rhinostomy site.

**Conclusion**

Understanding the factors of DCR failure will allow an improved surgical technique and lead to an increase in the success rate of the procedure. Endoscopic DCR is a suitable option for revising failed DCR, as it allows direct visualization and correction of major causes of failure.

**ERS16-0258**  
**ORBIT AND LACRIMAL SYSTEM**

**SURGICAL STRATEGIES OF NASOSINUSAL TUMORS INVOLVING THE ORBIT**

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<sup>1</sup>Hangzhou First People's Hospital, Otorhinolaryngological Department, Hangzhou, China

**Aims**

To investigate the methods and clinical effects of surgical resection of nasosinusual tumors involving the orbit under nasal endoscope.

**Method**

In recent 5 years, there were 34 cases of malignant nasosinusual tumors involving the orbit which were performed under nasal endoscope, including 21 males, 13 females, age from 26 to 81 years old, average 51.2 years old. There were 29 cases that the tumor involved the orbital periosteum, and 5 cases with the invasion of orbit. The radiotherapy and chemotherapy were performed in all cases. 6 cases were conducted before surgery, and the others received the intensity modulated radiotherapy and chemotherapy post-surgery.

**Results**

There were 2 cases recurrence in patients involving the periosteum and 1 case in patients involving the orbit. Only 1 case with vision loss before surgery required resection of orbital contents , the remaining cases whose medial rectus and optic nerve were not damaged;

**Conclusion**

The malignant tumors in the nasal sinuses can be resected completely under the nasal endoscope without destroying the orbital structure. The recurrence and survival rate were no less than the traditional destructive operation; The malignant tumors of intraorbital invasion (behind the ball, in the inner side of optic nerve ) can also try to be resected by nasal endoscopy, the current effect is encouraging.

**ENDOSCOPIC DACRYOCYSTORHINOSTOMY (DCR): IS IT NECESSARY TO EXPOSE THE FUNDUS?**  
**Y. Nour<sup>1</sup>**

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**Aims**

The objective of this study is to evaluate two techniques of endoscopic DCR that differ in the extent of intranasal exposure of the lacrimal sac.

**Method**

According to the extent of bone removal, two groups were identified. Group A underwent endoscopic DCR with exposure limited to the inferior part of the lacrimal sac and the entire nasolacrimal duct extending inferiorly to the membranous portion below the insertion of the inferior turbinate. In Group B, full exposure of the medial wall of the lacrimal sac extending to the fundus was performed. Main outcome measures were resolution of epiphora and patency of the intranasal ostium.

**Results**

Thirty one procedures were classified as group A and the remaining 25 procedures were considered as group B. The overall functional success rate with patent intranasal ostium was reported in 27 procedures (87%) in Group A and in 22 procedures (88%) in group B. Three patients (1 in group A and 2 in group B) reported recurrent epiphora inspite of patent intranasal ostium suggesting a functional failure of the tear pump mechanism. Air reflux into the eye during nose blowing was reported by 8 patients in group B. Three patients also reported intermittent reflux of nasal secretions.

**Conclusion**

Exposure of the inferior portion of the lacrimal sac with creation of a bony osteotomy with a wide anteroposterior diameter is as effective as full vertical exposure to the fundus of the lacrimal sac. This can be achieved without the use of powered instruments and without disrupting the agger nasi area.

**ENDOSCOPIC APPROACH FOR EXCISION OF ORBITAL APEX CAVERNOUS HEMANGIOMA**  
**E. Rebeiz<sup>1</sup>**

<sup>1</sup>Tufts University School of Medicine, Otorhinolaryngology-Head and Neck Surgery, Boston, USA

**Aims**

To describe the technique of transnasal endoscopic removal of an intral orbital apex cavernous hemangioma and review the literature.

**Method**

Case report: A 65-year-old woman with diplopia, left third nerve palsy and proptosis was found to have a 1.5 cm left orbital apex mass consistent radiographically with cavernous hemangioma. Because of its posteromedial location within the orbit, an endonasal endoscopic technique was used via an orbital decompression approach.

**Results**

The tumor was completely excised, and the patient had no complications. The diplopia and proptosis resolved, and there was no need for repair of the medial orbital wall.

**Conclusion**

The transnasal endoscopic approach to orbital apex cavernous hemangioma excision is a viable surgical approach for these difficult to access lesions. Diplopia and enophthalmos can be prevented by performing a limited dissection, and preserving the orbital fat.

**AESTHETICALLY FAVORABLE SURGICAL ALTERNATIVE FOR THE REMOVAL OF SINO-NASAL MALIGNANT TUMORS – THE MODIFIED FACIAL DEGLOVING TECHNIQUE**

***Z. Bella<sup>1</sup>, G. Vass<sup>1</sup>, A. Nagy<sup>1</sup>, L. Iván<sup>1</sup>, B. Pál<sup>1</sup>, R. László<sup>1</sup>***

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**Aims**

Maxillo-ethmoidal malignant tumors are removed routinely transnasally. If the endoscope approaches have limitations, the widely-used Weber-Ferguson's incision is performed. This surgical open approach provides a very good sight of the operative field but may cause postoperative aesthetic deformities. Conley and Price suggested hidden, sublabial and intercartilagineous incisions; by this so called facial degloving technique the soft tissues of the midface could be elevated.

**Method**

We have modified this approach and we have been using it since 5 years routinely at our Department as an alternative for the endoscopic approaches in cases of benign and malignant sino-nasal tumors. We demonstrate the technique and our results via three different malignant maxillo-ethmoidal tumors in different localizations if it necessary until to the skull base.

**Results**

Good functional and aesthetic results of the modified facial degloving technique are confirmed by postoperative photo-documentation of the facial muscles function and acoustic rhinometry.

**Conclusion**

With our method any kind of sino-nasal tumors of any localization could be removed with oncologically, functionally and aesthetically satisfactory result, without any skin incisions on the face.



**MANAGEMENT OF A LARGE CONGENITAL CLIVAL MENINGOENCEPHALOCELE**

**S.M.W. CHOW<sup>1</sup>, D.L.Y. Lee<sup>1</sup>, H.T. Wong<sup>2</sup>, M.C.F. Tong<sup>1</sup>**

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<sup>2</sup>The Chinese University of Hong Kong, Department of Neurosurgery, Shatin, Hong Kong- China

**Aims**

The aim is to report a case of large congenital clival meningoencephalocele.

**Method**

A premature baby was born cyanotic at 31 weeks of gestation and intubated in the delivery suite. Examination of pharynx by the attending pediatric otolaryngologist revealed a large cystic swelling occupying the whole nasopharynx and oropharynx (Figure 1a,b). The Magnetic Resonance Imaging confirmed a large meningoencephalocele with herniation of the basilar artery through a clival bony defect measured 1.6 x 1.8cm (Figure 1c). The baby was tracheostomized on day 42 of life. Subsequently, she suffered from 2 episodes of bacterial meningitis and eventually we waited until she was weighed 7.2 kg at 9- month of age. Transoral approach was used to resect the redundant fibrous sac wall of the meningoencephalocele. Subdural space was entered and basilar artery was positively identified (Figure 2a). A piece of Durafoam was placed as an underlay while fascia lata was the overlay for a watertight dural repair. Finally it was important to have a tension-free mucosal repair (Figure 2b).

**Results**

The postoperative result was good (Figure 2c).

**Conclusion**

A congenital meningoencephalocele could be effectively managed in the infancy with a minimally invasive approach.

**UTILITY OF EARLY POSTOPERATIVE IMAGING AFTER COMBINED ENDOSCOPIC AND OPEN VENTRAL SKULL BASE SURGERY**

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**Aims**

Immediate postoperative imaging is frequently obtained after combined skull base surgery (SBS) with endoscopic endonasal and open transcranial approaches. The importance of early postoperative imaging for detecting complications in these patients is still debatable. In this study, we investigate the clinical utility of early postoperative imaging after combined SBS for determination of postoperative complications.

**Method**

A retrospective chart analysis of 21 cases of combined SBS between 2009 and 2015 was performed. Data on postoperative CT and MRI and hospital course were collected. We separated interpretations of postoperative imaging into two groups: 1) using radiologist's interpretation alone and 2) using surgeon's knowledge of the case in conjunction with imaging.

**Results**

Forty-two postoperative scans were obtained (21 CT, 21 MRI) within 48 hours of surgery. There was a significant statistical difference between imaging interpretation by surgeons and radiologists for CT interpretation only. For CT interpretation the true positive (TP), false positive (FP), true negative (TN) and false negative (FN) rates for radiologists (TP=0/21, FP=6/21, TN=11/21, FN=4/21) slightly deviated from surgeon interpretation (TP=1/21, P=1.000; FP=0/21; P=0.0207; TN=17/21, P=0.1001; FN=3/21, P=1.000). Rates for MRI interpretation by both groups were nearly identical with no significant difference found. The overall postoperative complications rate was 23.8% (5/21). Patients exhibited clinical symptoms in all instances of postoperative complications requiring further intervention.

**Conclusion**

The benefit of early postoperative imaging to detect complications after combined SBS is limited. In this cohort of patients, positive imaging findings' effects on patient management were dictated by the presence of supporting clinical symptoms.

**LONG-TERM RADIOLOGICAL FINDINGS AFTER ENDONASAL ENDOSCOPIC APPROACH TO THE SKULL BASE.**

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<sup>3</sup>Department of Radiology, Hospital Clinic, Barcelona, Spain

**Aims**

To study the long-term radiological findings after endonasal endoscopic approach to the skull base.

**Method**

Prospective study that included 55 patients who underwent advance endoscopic skull base surgery. All patients were evaluated with MRI before, 3 months and 12 months after surgery. We used the Lund-Mackay staging system for chronic rhinosinusitis to evaluate the paranasal cavities and the sinonasal scoring system to assess sinonasal symptoms.

**Results**

Seventeen patients (30.9%) underwent extended endonasal approach that requires a nasoseptal flap (NSF) for reconstruction of skull base. At baseline the mean total Lund-Mackay score was  $0.63 \pm 1.2$  (range 0-4), and at 3 and 12 months postoperative the mean score were,  $3.5 \pm 3.8$  (range 0-14) and  $2.0 \pm 2.5$  (range 0-8) respectively. Patients who needed a NSF for reconstruction had a greater Lund-Mackay score ( $p < 0.05$ ). Moreover, NSF is correlated with sinonasal mucosal thickening and fluid retention at 3 months ( $r = 0.45$ ,  $p < 0.01$ ) and 12 months ( $r = 0.4$ ,  $p < 0.01$ ). Total 5-symptom score (T5SS) was similar between both groups at baseline. Patients with extended endoscopic approach reported more smell loss ( $40.1 \pm 26.2$ ;  $p < 0.05$ ) and posterior nasal discharge ( $49.3 \pm 30.1$ ;  $p < 0.05$ ) than TTEA patients ( $21.6 \pm 30.9$  and  $22.5 \pm 27.5$  respectively).

**Conclusion**

We observed that sinus opacity is still present after one year of advance endoscopic skull base surgery but symptoms seem to return to basal after 12 months of follow-up.

**TREATMENT OUTCOME OF ENDOSCOPIC TRANSPTERYGOID APPROACH FOR THE SINONASAL AND SKULL BASE LESIONS**

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<sup>2</sup>Chonnam National University Hwasun Hospital, Jeollanam-do, Republic of Korea

**Aims**

Our objective in this study was to present our treatment outcome of the patients with the sinonasal and skull base lesions treated with endoscopic transpterygoid approach (ETA).

**Method**

This study was performed in 34 patients who underwent ETA for the skull base lesions involving the lateral recess of the sphenoid, pterygopalatine fossa, infratemporal fossa, cavernous sinus, and nasopharynx. Medical records of the patients in the study were retrospectively reviewed and treatment outcomes of ETA were analyzed.

**Results**

Among 34 patients, there were 23 males and 11 females with a range of age from 6 to 88 years. Malignant tumors (n=19) included 10 malignant lesions involving the nasopharynx, 6 sinonasal malignancies, and benign lesions (n=15) included 3 angiofibromas, 5 mucoceles, 2 schwannomas, 3 spontaneous cerebrospinal fluid (CSF) leaks. According to surgical corridors, 34 patients were approached with 30 exclusive endonasal ETAs, 2 transoral ETAs, and 2 ETAs combined with preauricular infratemporal fossa approaches. Image guidance system was applied in 30 cases. No recurrence was observed in 15 cases with benign lesions. In 17 cases with malignant lesions who were treated with curative intent, 3- and 4-years local recurrence free survival rates were 62% and 31%, respectively.

**Conclusion**

Our results show that ETA was a feasible surgical method which can be applicable for the various sinonasal and skull base lesions, but local control rate in malignant lesions progressively worsened despite early favorable outcome. Therefore, further large case studies are needed to validate the efficacy of ETA on malignant lesions.

**INVERTED PAPILOMA: MANAGEMENT OF THE RECURRENT LESION**

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**Aims**

To characterize the clinical presentation, management and risk factors for recurrent Inverted Papillomas (IP) in our institution. To report epidemiological data, clinical staging and treatment modalities of all patients with inverted papilloma.

**Method**

Retrospective review of medical records of patients with inverted papillomas from January 2006 until December 2014. Demographic and tumor data, operative notes, complications, and recurrence rates were collected. Krouse's staging system was used for tumor grading.

**Results**

Nineteen patients (15 males, 4 females) were identified with IP. Mean age was 57 years, with a median follow-up of 33 months (range 6–86). Rate of tumor recurrence was 21.1% (4 cases), with median time to recurrence of 50 months. In patients with recurrence (1 female and 3 males) the left side was more affected and the frontal sinus the most common location, 3 cases in stage III and 1 in stage II of Krouse's Staging System; an endoscopic approach was used in 2 cases, the other 2 cases had malignant transformation and invasion of the orbit through the frontal sinus. One case was treated in our department with a combined approach and the other case was referred to a tertiary oncologic center. There were no major complications.

**Conclusion**

A close follow-up is essential to monitor for tumor recurrence. Precise determination of the tumor's origin during the operation is the key to successful treatment. Recurrent inverted papilloma tends to behave more aggressively than the primary lesion. A larger number of cases would be necessary to confirm the review's results.

**THE ENDOSCOPIC TRANSNASAL APPROACH FOR THE TREATMENT OF BENIGN AND MALIGNANT LESIONS EXTENDING TO THE PTERYGOMAXILLARY AND INFRATEMPORAL FOSSA**

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**Aims**

The authors reported their experience for the transnasal endoscopic treatment of 75 cases affected by malignant (44 cases) and benign (31 cases) tumors involving the pterygomaxillary and the infratemporal fossa.

**Method**

Between September 1997 and September 2014, 75 patients underwent a transnasal endoscopic approach for the treatment of tumours of sinonasal tract involving the pterygomaxillary and/or infratemporal fossa either at the Department of Otorhinolaryngology-University of Bologna, or at the Department of Neurosurgery-Bellaria Hospital in Bologna

**Results**

Twenty seven patients out of 44 (61.4%) malignant tumours received a complete tumour resection while fourteen patients out of 44 (31.8%) had a partial tumour resection. Three cases of malignancy received only an intraoperative biopsy. With reference to benign tumors, 7 cases out of 31 received a partial resection (22,6%).

**Conclusion**

The authors wanted to describe the transnasal endoscopic approach as an effective technique for the treatment of either benign or malignant tumors involving the pterygomaxillary and the infratemporal fossa. However, the surgeon must possess both a thorough knowledge of the anatomy and surgical skills before to tackle tumors of these challenging anatomical areas.

**A CASE OF INVASIVE SKULL BASE MYCOSIS WITHOUT PARANASAL SINUS INVOLVEMENT**  
***Y. Yamashita*<sup>1</sup>, *M. Noda*<sup>1</sup>, *H. Hirai*<sup>1</sup>, *K. Hamada*<sup>1</sup>, *S. Ota*<sup>2</sup>, *O. Mitsuhiro*<sup>3</sup>, *R. Omichi*<sup>3</sup>, *K. Nishizaki*<sup>3</sup>,  
*N. Kikuko*<sup>1</sup>**

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<sup>3</sup>Okayama university medical school, otorhinolaryngology, Okayama, Japan

**Aims**

Invasive skull base mycosis shows high mortality, especially in immunocompromised hosts. We experienced a rare case of invasive skull base mycosis without paranasal sinus involvement successfully treated with antifungal agent.

**Method**

A 77-years old man was referred to our hospital due to intractable left otalgia and headache. He had a history of diabetes mellitus. CT examination showed an abnormal shadow that spread from nasopharynx to left ear without paranasal sinus involvement. Bone erosion in the middle skull base and slight swelling of the nasopharynx were also seen. Biopsies from the nasopharynx and left external ear showed inflammation with no malignancy. PCR for *Mycobacterium tuberculosis* and culture inspections of bacteria or fungi from the collected tissue were negative. At this time, serological examinations including  $\beta$ -D glucan, and angiotensin converting enzyme were negative.

**Results**

Empiric treatment with amoxicillin gave a relief of headache and left ear inflammation. However, 2 month later he complained severe headache again and showed hoarseness due to left vocal cord paralysis. We gave a diagnosis of invasive skull base mycosis leading to vagus nerve paralysis at Foramen juglare. Empiric treatment with liposomal amphotericin B gave a prolonged relief of headache and tissue swelling. At that time Serum,  $\beta$ -D glucan turned to positive.

**Conclusion**

Invasive skull base mycosis without paranasal sinus involvement may be considered in patients showing abnormal radiological examinations and intractable headache. Repetitive examination of serum  $\beta$ -D glucan is useful for the diagnosis of this condition.

ERS16-0601

## CSF-LEAK AND MANAGEMENT OF ANTERIOR SKULL BASE DEFECTS

### SEUL BASE FRACTURE MANAGED BY ENDOSCOPIC ENDONASAL SURGERY IN CHILD

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#### **Aims**

INTRODUCTION: The limits of what can be done with endoscopic endonasal surgery have expanded as fast as surgeons have gathered experience with the basic technique and ventured out of the nose and sinuses into neighboring territories, such as the skull base and the orbit. Doing so experienced endoscopic surgeons came to offer minimally invasive solutions to some dramatic cases in other specialties, which otherwise would require much more aggressive treatment options.

#### **Method**

MATERIAL AND METHODS: To illustrate how a traumatic fracture of the skull base in a comatose 12-year old child, with a pneumoencephalocele and an abundant CSF leak, can be successfully treated with endoscopic endonasal surgery, the authors present a video documenting the details of the surgery.

#### **Results**

RESULTS: Effective sealing of the complex skull base defect allowed the child to fully recover, with no sequelae and no need for a craniotomy.

#### **Conclusion**

CONCLUSION: Endoscopic endonasal skull base surgery is one expanding area in ENT surgery that has been showing advantages in the treatment of selected, but ever growing, Neurosurgical pathology.



**ENDOCRANIAL COMPLICATIONS OF NON-OPERATED NASAL POLYPOSIS**

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**Aims**

Our aim is to evaluate does endocranial complications occure more at patients with non-operated Nasal Polyposis than at patients which underwent operative treatment.

**Method**

Prospective analysis of patients history which were operatively treated for massive nasal polyposis ( FESS ) at our hospital in 3 years period ( January 2013 –December 2015 ) with follow-up period up to 3 years, and group of patients with nasal polyposis which delays operative treatment 3- 5 years from first endoscopic evaluation and diagnose of Nasal polyposis. CT scan was made at all patients which had headache, nasal congestion , nasal secretion, from both groups

**Results**

Operated patients were 227, ( n=227, 138 male , 89 female ), control CT scan was made at 67 patents. No one had postoperative Endocranial complication. At non operated group ( n= 11, male 4 female 7) there were 3 cases of endocranial complication. One had right phlegmona oculi with defect on frontal sinus floor and presence of small communication with anterior cranial fossa without any cranial symptomatology. Other two cases had communication with anterior cranial fossa,wide more than 1 cm, severe headache, and local encephalitis .

**Conclusion**

Patients which delays operative tretmant of nasal polyposis have an increased risk for some endocranial complication then patients underwent FESS .

**MENINGOENCEPHALOCE OF PLANUM SPHENOIDALE, WATCH OUT THE OPTIC NERVE!**

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**Aims**

Cerebrospinal fluid leak can occur in sphenoid sinus. Although it is common after fractures caused by blunt head trauma, spontaneous leaks are less common in the sphenoid sinus. In either situation, if there is a considerable bony defect of planum, the subsequent meningoencephalocele can push the optic nerve or chiasm downward or carry it in the sac. This situation is challenging as the encephalocele could not be cauterized or reduced.

**Method**

Two cases of traumatic and 1 case of spontaneous CSF rhinorrhea due to planum sphenoidale meningoencephalocele are presented with pre- and postoperative imaging and intraoperative videos. All the patients underwent surgery with the endoscopic endonasal approach, and the defects were closed using a multi-layer technique.

**Results**

The patients included 1 man (25 years old) and 2 women (23 and 26 years old). The surgeries were successful with no visual complication or recurrence of the leaks.

**Conclusion**

This series, although numerically limited, discusses the surgical management of this entity and highlights the need for the surgeon to be aware of the possibility of damage to the optic nerve in the encephalocele of planum sphenoidale. The need for simultaneous evaluation of sagittal images of CT scan and MRI for the proper diagnosis should be reemphasized.

**ENDONASAL ENDOSCOPIC SUTURING REPAIR OF DURA IN LIMITED ACCESS IATROGENIC CEREBROSPINAL FLUID LEAK**

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**Aims**

To share our experience on the successful repair of limited access cerebrospinal fluid (CSF) leak due to iatrogenic dural defect using the practical suturing technique.

**Method**

We report a case of surgically induced dural defect due to the functional endoscopic sinus surgery (FESS) in a 19-year-old woman presenting with eosinophilic fungal rhinosinusitis. Ethmoidectomy and sphenoidectomy was performed, the skull base area was rigorously cleaned off remnant cells and the surrounding mucosa was reflected against the dural defect. Layer-by-layer repair of the CSF leak was initiated by insertion of muscle and then fascia lata inside the defect. This early repair was then reinforced on the inferior surface by 5.0 round silk suturing threads approximating the bilateral sides of the dural tear. At this point, the CSF leak had completely stopped. Finally, an adhesion crust consisting of crushed muscles enriched in cellulose material were laid beneath to pack the surgical site.

**Results**

Endonasal endoscopic closure of the iatrogenic CSF leak was successfully achieved by the novel use of endoscopic limited suturing technique. Three months post-operatively, the patient reported no complication related to the CSF leak or suggestive of the meningitis.

**Conclusion**

Effective suturing repair of the iatrogenically induced CSF leak in combination with endoscopic surgery is possible in a physically confined area with very limited room to perform suturing maneuvers. Important advantages of this technique include the lack of additional flap-related donor- and recipient-site morbidity and the comparatively lower cost of the procedure compared to conventional endoscopic techniques.

**OUR EXPERIENCE OF TRANSNASAL TRANSSPHENOIDAL ENDOSCOPIC REPAIR OF CEREBROSPINAL FLUID LEAKS FROM THE SPHENOIDAL SINUS**

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**Aims**

Nontraumatic sphenoid sinus leak is rather rare but very dangerous disease. All persistent cerebrospinal fluid (CSF)

leaks should be repaired because of the attendant risk for life-threatening complications such as brain abscess, meningitis, or pneumocephalus.

**Objective**

CFS fistula of the sphenoid sinus could be repaired by using autologous transplantants (fascia lata flap, piece of bone) and regional vascularized flap.

**Method**

We used an endoscopic endonasal approach. The anterior wall of sphenoid sinus was totally removed. In case of meningocele or meningoencephalocele we managed mobilization of the meningocele sac with its removal. When the CFS fistula had been founded we estimated the bone defect. After using of fascia lata flap, piece of bone (anterior wall of sphenoid sinus) and nasoseptal flap, supported by balloon of Foley catheter, we repaired the skull base defect.

**Results**

We performed such technique in 12 patients with CFS leaks from the sphenoidal sinus. In 4 cases we used lumbar drainage from the day of intervention. No CFS leak recurrences were observed.

**Conclusion**

We conclude that transnasal transsphenoidal endoscopic repair of CFS leaks in sphenoidal sinus region by using autologous transplantants and regional vascularized flap is effective, safe and inexpensive method.

**RENAL CELL CARCINOMA METASTASES TO THE SINONASAL CAVITIES : REPORT OF 8 CASES**

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**Aims**

Metastases of Renal Cell Carcinoma (RCC) to the sinonasal cavities are rare and could represent the initial presentation of the disease. The objectives of this study are to report the clinical presentation, the imaging aspects and the treatment of cases of RCC metastases to the sinonasal cavities

**Method**

Eight patients diagnosed with RCC metastasis in two tertiary referral centers were reviewed and analyzed retrospectively.

**Results**

There were 5 men and 3 women. The mean age at metastasis diagnosis was 69,5±14,3 years. The main complaints of the patients were nasal obstruction, epistaxis and diplopia. The metastases were located to the ethmoid (3 cases), to the sphenoid and the clivus (3 cases), to the nasal septum (1 case) and the maxillary sinus (1 case). The metastases lead to the diagnosis of the RCC in 4 cases. In the remaining cases, the sinonasal metastasis appears between 1 and 21 years after diagnosis of the RCC. The local treatment was metastasis resection and adjuvant radiotherapy in 4 cases, radiotherapy in the 4 other cases. Three patients had embolization of the lesion before the surgery. There was no recurrence of the metastasis in patient treated by surgery and radiotherapy at the last follow-up (from 6 to 40 months).

**Conclusion**

Sinonasal metastasis should be suspected in front of nasal bleeding in patients diagnosed for RCC. Embolization may avoid abundant bleeding during removal. Surgery may improve the quality of life of these patients while decreasing nasal obstruction and bleeding.

**SINONASAL ADENOCARCINOMA: CASE REPORT**

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**Aims**

To describe a case of a sinonasal adenocarcinoma.

**Method**

Case report.

**Results**

The present case reports to a 52-year-old man, with a history of unilateral nasal obstruction and facial pressure with 2 months of evolution. The rhinoscopy showed a total filling of the right nasal cavity due to an extensive mass that blocked the progression of the endoscope. CT scan confirmed the presence of a nasal tumor, with consequent sinusitis of all cavities on the right side. The patient underwent functional endoscopic sinus surgery with total resection of the tumor. Histological examination confirmed an intestinal type of sinonasal adenocarcinoma. Post-operative MRI showed complete resection of the lesion, and there was no local ou distant involvement.

**Conclusion**

Sinonasal adenocarcinoma is a rare diagnosis. Complete surgical excision is the preferential treatment. In cases of extensive disease, radiotherapy may be utilized. Despite local recurrence in a few cases, low grade sinonasal adenocarcinoma has a favourable prognosis.

**THE USE OF AN ENDONASAL DOPPLER TO LOCATE THE VASCULAR PEDICLE OF NASOSEPTAL FLAP PRIOR TO HARVESTING DURING AN ENDOSCOPIC NASOPHARYNGECTOMY FOR RECURRENT NASOPHARYNGEAL CARCINOMA**

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**Aims**

To assess the survival rates of nasoseptal flaps harvested with and without the use of an endonasal Doppler (Minidop Detector, Koven®, USA) to locate the vascular pedicle in patients irradiated for nasopharyngeal carcinoma during an endoscopic nasopharyngectomy. Radiotherapy can cause stenosis or occlusion of the posterior septal branch of sphenopalatine artery.

**Method**

Retrospective chart review.

**Results**

Nine endoscopic nasopharyngectomies were performed on patients with locally recurrent nasopharyngeal carcinoma after radiotherapy between May 2012 and October 2015 in a tertiary referral hospital. Nasoseptal flaps were used to cover the nasopharyngeal wound surface following nasopharyngectomy in 8 cases. For the first 4 cases, the endonasal Doppler was not used to locate the vascular pedicle of the nasoseptal flap before harvesting, and of these, only one flap survived (25%). For the next 4 cases, an endonasal Doppler was used to locate the vascular pedicle with the aim to protect it during harvesting. A positive identification was achieved in 3 cases, and all 3 flaps survived (100%). The pedicle could not be located in one of these cases. As a result a nasoseptal flap with wide pedicle based from the sphenoid ostium to the roof of the posterior choanal was harvested, but eventually the distal end of the flap developed ischaemia.

**Conclusion**

Using an endonasal Doppler to locate the vascular pedicle of a nasoseptal flap harvested to cover a nasopharyngeal wound following a nasopharyngectomy in a patient previously irradiated for nasopharyngeal carcinoma increases the survival rate of the nasoseptal flap.

**CROSSLINKED HYALURONAN INHIBITS MIGRATION AND INVASION OF NASOPHARYNGEAL CARCINOMA CELLS THROUGH DOWN REGULATION OF EGF-EGFR SIGNALING**

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**Aims**

High molecular mass hyaluronan (HA) was reported to mediate cancer resistance in a rat model. Hereon, we evaluated the impact of crosslinked HA gel (CHAG) on migration and invasion of nasopharyngeal carcinoma (NPC) cells and investigated the influence of CHAH on EGF-EGFR pathway in an *in vitro* study.

**Method**

Human NPC cell lines, CNE-1 and CNE-2, were used for this study. Cell migration assays were performed with transwell cell migration chambers and cell invasion test was performed using ECM-gel in the chambers. Cell suspensions of CNE-1 or CNE-2, containing serum-free 1640 culture medium and CHAG at the concentrations of 125µg/ml, 250µg/ml, 500µg/ml, and 1000µg/ml, with or without epithelial growth factor (EGF), were prepared and added to the upper chambers while the lower chambers were filled with 1640 culture medium containing 10% FBS. After 24 hours incubation, the migrated or invaded NPC cells were stained and counted. For western blot analysis, NPC cells were culture-expanded on monolayer with the same condition above. Cells were lysed and proteins were detected by antibodies against p-EGFR (Y1068), p-ERK(T202/Y204), p-Akt(S473), EGFR, ERK, Akt and β-actin.

**Results**

CHAG significantly inhibited EGF-induced migration and invasion of NPC cells. Such inhibition effects might be mediated through down-regulating EGF-EGFR downstream signaling pathway since levels of p-EGFR, p-ERK, and p-Akt were all reduced by CHAG treatments.

**Conclusion**

Crosslinked hyaluronan is able to inhibit the migration and invasion of nasopharyngeal carcinoma cells. It could be applied onto the surgical area after carcinoma excision to prevent cancer cell local recurrence meanwhile reducing tissue adhesion.



**IMPACT ON SINONASAL-RELATED QUALITY OF LIFE IN PATIENTS UNDERGOING TRANSNASAL ENDOSCOPIC SURGERY OF PITUITARY - PRODUCING ADENOMA ACTH VERSUS NON-PRODUCING ADENOMA**

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**Aims**

While the transnasal endoscopic approach may seem minimally invasive because of avoiding craniotomy, it significantly disrupts structures and nasal cavity mucosa. Structural and physiological nasal changes may occur, with synechiae, crusting, smell changes, nasal airflow obstruction. The ACTH-producing adenomas lead to an increased production of cortisol by the adrenal glands, the Cushing's Syndrome, causing deleterious effects to most tissues of the body, including the nostrils. Also, nasal mucosa changes are observed in these patients, such as atrophy, bleeding and adhesions formation.

**Method**

Retrospective study of 16 patients undergoing endoscopic transnasal pituitary, from January 2012 to December 2014. The patients were divided into two groups, the ACTH adenoma producers and the ACTH adenoma non-producers. The patients with other adenomas producers of hormones were excluded. The data collected were preoperative complaints, postoperative nasal status, the presence of residual tumor, endocrine control and nasal status, noting the presence of previous drilling, nasal flaps and mucus stasis.

**Results**

8 patients had adenomas with ectopic ACTH, and 8 nonfunctioning (n=16). About those with nonfunctioning adenomas, 50% had hormonal disorders, while 3 of those with adenomas with ectopic ACTH had hormonal control. Most of the patients had preoperatively visual complaints, which improved after surgery. Residual tumor occurred in 3 patients non-producers and in 5 producers.

**Conclusion**

The endonasal endoscopic pituitary surgery is a viable technique, yielding good surgical and functional results and low morbidity in both groups, tending to better results in adenomas non-producers than adenomas producers.

**BURKITT LYMPHOMA PRESENTING AS UNILATERAL CAVERNOUS SINUS SYNDROME**

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**Aims**

Burkitt lymphoma (BL) is a highly aggressive B cell non-Hodgkin lymphoma (n-HL). This sporadic variant accounts for less than 1% of all adult n-HL with an incidence of 2.2 cases per million persons per year. Patient's rarely present with sinonasal and CNS involvement.

**Method**

We report a case of a gentleman who presented with a three week history of progressive left sided facial paraesthesia and neck swelling following a dental extraction. He subsequently developed left lateral gaze impairment, diplopia and total ophthalmoplegia with pupillary involvement.

**Results**

CT and MRI of the head and neck demonstrated an extensive soft tissue mass involving the left maxillary sinus, ethmoidal and sphenoidal sinuses and skull base with infiltration of both cavernous sinuses and encasement of the internal carotid arteries. Functional Endoscopic Sinus Surgery and biopsies showed respiratory mucosa which displayed stromal infiltration by sheets of monotonous medium-sized lymphoid blasts containing prominent nucleoli, clumped chromatin and small volume basophilic cytoplasm with a 'starry sky' pattern of numerous admixed macrophages. Cells were positive for CD10, CD20, CD79a, CD138, bcl-6 and MUM1 with a ki67 proliferation rate of almost 100% consistent with a high grade B cell lymphoma with Burkitt-like features.

**Conclusion**

The patient was urgently commenced on intra-thecal CHOP (cyclophosphamide, doxorubicin, vincristine and prednisolone) chemotherapy and is still undergoing treatment. This case highlights the need for urgent tissue biopsy for early diagnosis and treatment when dealing with aggressive but treatable malignancies to prevent progression and further complications which are potentially fatal.

**COMBINED APPROACH OF AN ENDONASAL ENDOSOPIC APPROACH AND A TRANSCRANIAL APPROACH BY TWO SURGICAL TEAM FOR OLFACTORY NEUROBLASTOMA WITH MASSIVE BRAIN INVASION.**

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**Aims**

To evaluate of the efficacy of combining an endonasal endoscopic approach and a transcranial approach for olfactory neuroblastoma.

**Method**

This is a case report of olfactory neuroblastoma with massive brain invasion that was operated by two surgeon (rhinologist and neurosurgeon) simultaneously via two different corridors, endoscopic endonasal and transcranial approaches.

**Results**

Olfactory neuroblastoma staged as Kadish C and Dulguerov T4 was found in a 79-year male. The operation is performed by a two-team approach by rhinologists working from the nasal cavity and neurosurgeons working from the anterior cranial fossa. The rhinologists performed endoscopic endonasal surgery involved the resection of the posterior wall of the frontal sinus, the anterior wall of the sphenoid sinus, and the bilateral medial wall of the orbit. The neurosurgeons started with bi-frontal craniotomy and opened the frontal lobe dura through the resection of the intra cranial tumor. The skull base was then drilled out through an endoscopic endonasal approach. The skull base defect was reconstructed with fascia, Galeal flap, fascia and pedicled septal flap from the intradural space to the nasal cavity. The patient became delirium two weeks after the surgery, but no other perioperative complications including CSF leakage, bleeding or infection. The patient received postoperative radiotherapy and has been followed up with no evidence of disease.

**Conclusion**

Combined management between rhinologists and neurosurgeons via different surgical corridors allows a clear margin resection and minimizes surgical time. However, it requires time and experiences to become proficient at a combined approach.

**ERS16-0778**  
**ENDOSCOPIC SURGERY OF SKULL BASE TUMOURS**

**PATIENTS WITH ADENOCARCINOMA SINUS MAXILLARIS DETECTED AT A LATE STAGE**  
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<sup>2</sup>General Hospital, ENT and CFS, CACAK, Serbia

**Aims**

About 80% of tumors of paranasal cavities are located in sinus maxillaris. Malignant tumors are given long asymptomatic period of time.

**Method**

Review of two cases of late detection of adenocarcinoma sinus maxillaris featured by expansive tumor growth and mutilating destruction of the nose and the eye protrusion of the bulbus.

**Results**

A patient, male, 60 years of age, have obstruction in breathing through the nose, secretion, headache and protrusion of the left bulbus oculi. CTPNS left maxillar sinus and the nasal cavity were filled with a 40 x 43 x 52 mm malignant soft tissue, mutilation on front and the medial wall, destruction front wall of sphenoidal sinus and orbit ground.

Performed surgery: rhinotomy on the left in accordance with Moor, post-operative radiotherapy. After six months total maxillactomy was done and six cycles of chemotherapy. The nose of the patient was so enlarged that he had no binocular sight. The lethal outcome occurred two years upon the diagnosis.

Another patient, aged 73, with protrusions of the left bulbus oculi and left cheek. CTPNS, left sinus maxillaris was completely filled with tumor penetrating into the orbit, left ethmoidal sinus, nose passage and buccal region; destructions bone structures of the hard palate and alveolar arch of the maxilla: 9cm x 7 cm x 5 cm. PH findings: adenocarcinoma anaplasticum. The Oncologists' Council decided to apply radiotherapy, 15 months after the diagnosis, the patient died.

**Conclusion**

Adenocarcinoma sinus maxillaris is given worse prognosis if detected at a later stage and very destructive and infiltrative.

**COMBINED TRANSCRANIAL AND ENDOSCOPIC NASAL RESECTION FOR PAEDIATRIC PRIMARY NON-INTESTINAL ADENOCARCINOMA IN A 9-YEAR-OLD BOY**

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**Aims**

Sinonasal adenocarcinoma (SADC) is a rare neoplasm, most often found in 50-80-year-old men, traditionally linked to exposure to wood dust. To our knowledge there are no paediatric cases of SADC reported in the literature.

**Method**

CASE REPORT

**Results**

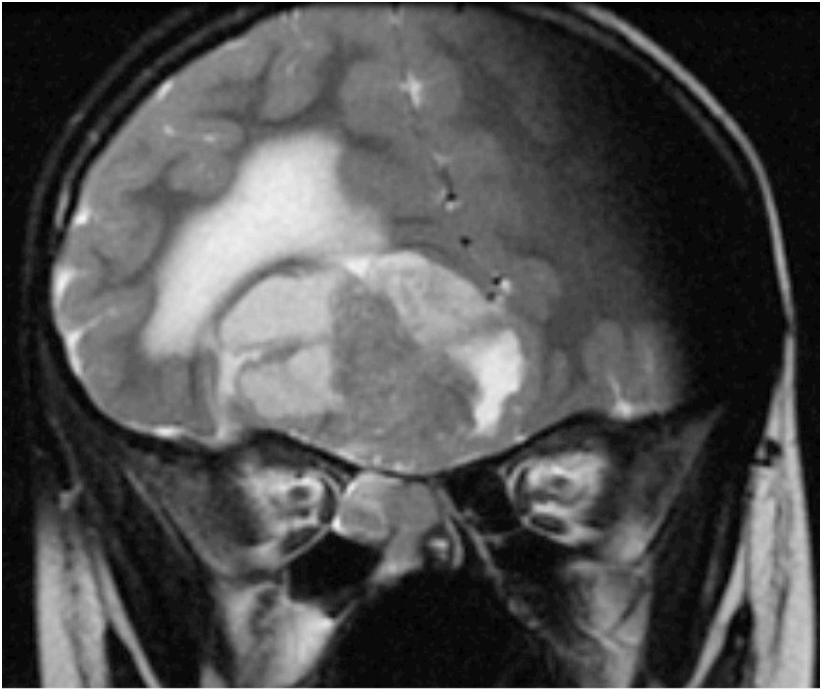
A 9-year-old boy presented with 2 months of persistent headache, vomits and fever.

CT scan and MRI (Fig.1) showed a heterogeneous mass filling the right ethmoid region with bony destruction of the middle turbinate, the cribriform plate, and invasion of the anterior cranial fossa.

Preoperative transnasal biopsies confirmed the histologic diagnosis of high-grade adenocarcinoma.

Total macroscopic resection was performed through a combined frontal craniotomy and endoscopic nasal microdebrider-assisted approach. A pericranial flap and an inferior turbinate free mucosal graft were used for skull base reconstruction.

The patient underwent postoperative chemotherapy and radiotherapy, and remains asymptomatic and free of disease after 11 month follow-up.



### **Conclusion**

SADC is often diagnosed at advanced stages. In these aggressive tumours, local control is the determining prognostic factor.

Traditionally, the treatment of choice for SADC involved a craniofacial and/or transfacial approach. Minimally invasive ENT surgical oncology has made major strides in recent decades with the development of endonasal resections of malignant tumours in adult patients.

**This case demonstrates the feasibility of a combined external and endonasal endoscopic approach for a successful resection of SNAC in a paediatric patient.**

**ERS16-0056**  
**ENDOSCOPIC SURGERY OF SKULL BASE TUMOURS**

**SINONASAL MUCOSAL MELANOMA IN A RHEUMATOID ARTHRITIS PATIENT TREATED WITH METHOTREXATE. CASE REPORT AND REVIEW OF THE LITERATURE**

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**Aims**

Mucosal melanoma of the sinonasal region is a rare tumor and usually carries a poor. It has been suggested that these tumors grow slowly, and symptoms tend to appear late in the course of disease which leads to delay in diagnosis.

**Method**

We present a case of a 63 year old woman with a past history of methotrexate use and left maxillary sinusitis complicated by orbital cellulitis. She had a left maxillary sinus biopsy negative for malignancy and 18 months later presented with new onset left nasal obstruction and epistaxis. A second endoscopic sinus biopsy of the area demonstrated a left maxillary sinus mucosal melanoma extending into the posterior aspect of the nasal cavity. We performed excision of the tumor with negative margins.

**Results**

Our case report suggests that this tumor developed in the 18-month time since her negative biopsies. Studies have suggested the possibility of a link between between methotrexate use and the development of melanoma, however no such cases of mucosal melanoma and methotrexate use have been reported. Because of prior Endoscopic sinus surgery and the patency of the maxillary sinus, it is possible that the tumor extended into the nasal cavity early on therefore became symptomatic and was diagnosed earlier.

**Conclusion**

Clinicians should aware of the potential for malignancies in patients treated with Methotrexate or other immunosuppressant medications as the risk for malignancies increase significantly. A high index of suspicion is important and leads to early work up, diagnosis and management which are essential to an improved prognosis.

**ENDOSCOPIC MEDIAL MAXILLECTOMY COMBINES WITH OUTSIDE-IN DRAFT 3 TECHNIQUE FOR SINONASAL SQUAMOUS CELL CARCINOMA**

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**Aims**

Surgical resection is the main choice for sinonasal malignant tumors. However, access to the lesion inside the frontal sinus is quite challenging to physicians, particularly in situations lacking navigation system guidance; moreover, locating the frontal recess becomes extremely difficult under circumstances of tumor infiltration and severe scarring induced by revised surgery. Several techniques have been developed for overcoming the challenges.

An outside-in Draft 3 technique can enable the timely determination of dissection limits and prevent penetrating the frontal recess initially. This is a reliable technique for treating sinonasal tumors, particularly inside the frontal sinus. Another advantage of this technique is that it is independent of navigation system guidance.

**Method**

We report on a 46-year-old male with right sinonasal squamous cell carcinoma, and it was verified to infiltrate the ethmoid, maxillary, frontal sinus, and nasolacrimal duct. Endoscopic medial maxillectomy combined with the outside-in Draft 3 technique was conducted without navigation system guidance, and adjuvant radiotherapy was scheduled for perineural invasion.

**Results**

There was no post-operative complications (CSF leakage, massive nasal bleeding, orbital hematoma etc.) This patient discharged 2 days later, was followed up for 18 months without local recurrence.

**Conclusion**

Outside-in Draft 3 technique provides full access to the frontal sinuses, particularly in situations lacking landmarks of frontal recess due to scarring or tumor infiltration. When comparing to traditional Draft 3 procedure, the needs for navigation system is selective as the equipments are unavailable in some hospitals. We believe this technique is safe and reliable for tumor or refractory sinusitis inside the frontal sinus



ENDOSCOPIC MANAGEMENT OF NASAL TUMORS INVOLVING THE ORBIT OR SKULL BASE

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**Aims**

**Objective:** The purpose of this study is to review the management of patients with nasal tumors involving the orbit or the skull base.

**Method**

A retrospective analysis of the management of all cases of nasal tumors involving the orbit and the skull base treated in our department since 2010. Patient demographics, treatment and outcomes were registered.

**Results**

: A total of 9 patients with nasal tumors involving the orbit or the skull base were treated in our department since 2010. Of them 4 patients were female and 5 were male. There were two cases of squamous cell carcinoma involving the anterior skull base. Three cases of squamous cell carcinoma involved the orbit. Four cases of inverted papilloma involved the orbit. All cases were managed with minimally invasive endoscopic tumor resection. Adjunctive radiotherapy and chemotherapy was utilized in the squamous cell carcinoma patients. There was no recurrence in the cases of inverted papilloma. There was local recurrence in three cases of squamous cell carcinoma. In one case of SCC there was distant recurrence. Mean hospitalization was four days and mean follow up – 36 months.

**Conclusion**

Squamous cell carcinoma involving the anterior skull base carries a poor prognosis but endoscopic tumor resection in combination with chemo-radiotherapy is a reasonable treatment modality with less morbidity compared to craniotomy. Endoscopic resection of inverted papilloma is safe and effective and is the treatment of choice in our department.