

## Long term outcomes with a fully implantable middle ear device (Esteem®)

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### Introduction and aim

Esteem® is a fully implantable middle ear device that uses the tympanic membrane as a natural microphone. The device provides great comfort to hearing impaired patients with good sound quality and vocal comprehension. It has a long battery life of 5 to 6 years due to the use of piezoelectricity therefore requires no maintenance. Our aim is to analyze the long term outcomes of this promising device.

### Material and methods

Surgical implantation of the Esteem® device was performed mostly in patients who suffered from chronic eczema. Surgical time, complications and early auditory results were collected. Patients were required to fill out satisfaction questionnaires. The implanted patients were followed up until January 2023 with data collection of long term complications and evolution of the auditory gain.

### Results

14 patients were implanted between 2009 and 2012. Mean surgical time was 4.3 hours. 82% of patients were satisfied with the device. There was 1 skin necrosis (smoker), 3 early explantations and 2 revision surgeries for poor functional results. Early auditory results showed an average gain of 26 +/- 11dB HL (n= 14) and long term auditory results an average gain of 14 +/- 19dB HL (n= 9). Second surgery for change of battery was needed in 5 patients after 5-6 years of implantation. An additional 8 patients chose to be explanted, mostly at the time of the second battery change, with the need of ossicular chain reconstruction.

### Conclusions

The fully implantable hearing aid Esteem® has a long battery life and uses the tympanic membrane as the microphone. Early auditory results show a significant gain and satisfactory rate was high. However, device implantation entails ossicular chain disruption. The implantation and explantation surgery is long and requires a trained surgeon. Auditory gain worsened over time and multiple patients chose explantation of the device after 10 years.

## Risk factors determining natural hearing evolution including late-onset hearing loss in children with congenital cytomegalovirus infection

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**Introduction and aim:** Congenital cytomegalovirus (cCMV) is the major cause of congenital nonhereditary sensorineural hearing loss in children. Currently, no reliable biomarkers exist to identify infants at increased risk for unfavourable hearing outcome. This study was performed to identify risk factors for hearing improvement, deterioration, and late-onset hearing loss.

**Material and methods:** Data have been collected in the Flemish CMV registry for 15 years. Untreated cCMV-infected children with a minimal 4-year audiological follow-up were included in this multicentric cohort study. Primary outcome was hearing evolution (per ear analysis). The importance of gestational characteristics, clinical findings, timing of seroconversion, viral load and hearing status at birth in predicting hearing evolution was investigated using univariate tests. Effect sizes were measured using Cramer *V*, odds ratio (OR), or Hedges *g*.

**Results:** Of the 774 included ears, 683 (88.2%) showed normal hearing at birth. Ninety percent (700/774) of the ears showed stable hearing (normal hearing or stable hearing loss since birth) over time. Late-onset hearing loss was present in 43 ears (6.3% of normal-hearing ears at birth) whilst 24 ears deteriorated and 7 improved (26.4% and 7.7% of hearing-impaired ears at birth respectively). Prematurity was associated with hearing improvement (OR, 9.45; 95% CI, 1.64-54.50). Late-onset hearing loss was more prevalent in a first trimester infection (OR, 10.10; 95% CI, 2.90-34.48, none in the third trimester) and seems associated with congenital hearing loss in the contralateral ear (OR, 2.68; 95% CI 0.98-7.29).

**Conclusions:** A first trimester infection results in an elevated risk of late-onset hearing loss, as well as congenital hearing loss in the contralateral ear. None of the 104 ears with a third trimester seroconversion developed late-onset hearing loss. Premature children have a higher risk of hearing improvement. These novel insights can aid in parental counselling, patient stratification, policy making, prognosis, follow-up, and management.

## **Investigation of the Auditory, Visual, and Cognitive Abilities: differences between normal-hearing adults, hearing aid users, and cochlear implant users and the proposition of an AVC-profile**

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Introduction and aim: Speech understanding is a bi-modal and bi-directional process, whereby also visual information (i.e. speechreading) and cognitive functions (i.e. top-down processes) are involved. Therefore, the aim of this study was twofold: (1) to investigate the Auditory (A), Visual (V), and Cognitive (C) abilities in normal-hearing individuals, hearing aid (HA) users, and cochlear implant (CI) users, and (2) to determine an AVC-profile providing a comprehensive overview of a person's speech processing abilities, containing a broader variety of factors involved in speech understanding.

Material and methods: The study sample consisted of three matched groups of 31 participants: (1) normal-hearing (NH) adults, (2) adults with a moderate to severe hearing loss using HAs, (3) adults with a severe to profound hearing loss using a CI. The auditory assessments included pure-tone audiometry, speech audiometry in quiet and in noise. For evaluation of the (audio-)visual speech processing abilities, the Test for (Audio-)Visual Speech Perception was used [1]. The cognitive assessments included the Letter-number sequencing task [2], the Letter Detection Test [3], and an auditory Stroop test [4]. Differences between the groups were examined and a Principal Component Analysis was conducted to determine the AVC-profile.

Results: NH individuals scored significantly better for both auditory and cognitive abilities than HA- and CI users, listening in a best-aided condition. No differences were found for speech understanding in a visual-only condition. Furthermore, an AVC-profile was proposed, allowing to compose one comprehensive score for auditory, visual, and cognitive functioning.

Conclusions: It is suggested to evaluate individuals with hearing loss from a broader perspective, considering more than only the auditory abilities, when making decisions regarding hearing rehabilitation. In the future, the AVC-profile could be used to determine individual strengths and weaknesses for the different abilities related to the process of speech understanding, resulting in more person-centered care.

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## Congenital facial nerve palsy – single center study

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### **Abstract**

**Objectives:** This study will list the most common comorbidities of congenital facial nerve palsy and how to detect and treat them. Congenital facial nerve palsy is a very rare entity but in UZ Brussels hospital there was a follow-up of 16 children in the last 30 years.

**Methods:** Literature review has been done, combined with thorough research of our own series of 16 children with congenital facial nerve palsy.

**Results:** Congenital facial nerve palsy can be part of a known syndrome, most commonly Moebius syndrome, but can also appear solely. It appears often bilateral and with a severe gradation. In our series, hearing loss is frequently seen in association with congenital facial nerve palsy. Other abnormalities are dysfunction of the abducens nerve, ophthalmological problems, retro- or micrognathism and abnormalities of limbs or heart. The majority of the children in our series underwent radiological imaging (CT and/or MRI): the facial nerve but also the vestibulocochlear nerve and middle and inner ear can be evaluated.

**Conclusion:** A multidisciplinary approach of congenital facial nerve palsy is recommended as it can affect various bodily functions. Radiological imaging needs to be done to acquire additional information that can be useful for diagnostic and therapeutic purposes. Although congenital facial nerve palsy may not be treatable itself, its comorbidities can be treated and improve the quality of life of the affected child.

## Orientation of the Semicircular Canals in Patients with Unilateral Meniere's Disease: An MRI Study

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### Abstract

**Objective:** To evaluate the morphometric features and cranial orientations of the semicircular canals on Magnetic Resonance Imaging (MRI) in patients with different groups of unilateral Meniere's Disease and compare to their healthy sides.

**Methods:** The patients were clinically classified in three different groups for Meniere's Disease (MD). The first two groups were classified according to the updated 2015-AAO-HNS criteria defined as probable and possible MD, and the last group consisted of patients with fluctuating low-to midfrequency sensorineural hearing loss without fulfilling the updated 2015-AAO-HNS criteria. The height and width of the semicircular canals, the angles of the semicircular canals to each other, the shortest linear distance of the semicircular canals to the neighboring structures in the middle and posterior cranial fossa, and the lateral point of the cranial cavity, were measured for the semicircular canals on 3 Tesla MR imaging. The contralateral non-affected ears were taken as a control group. The measurements were also compared between the different groups of MD patients.

**Results:** The width of the posterior semicircular canal on the affected ear was significantly ( $p > 0.05$ ) larger (+0.10 mm) than the non-affected ear. The superior semicircular canal (+0.49 mm), lateral semicircular canal (+0.50 mm) and posterior semicircular canal (+0.31 mm) were situated more anterolaterally from the cerebellum in comparison with the contralateral non-affected ears. There were no differences in the anatomical measurements between the MD groups.

**Conclusion:** In patients with unilateral Meniere's Disease, the anatomical position of the semicircular canals and the dimensions of the posterior semicircular canal, may be a biomarker for presence of the disease.

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## Immunotherapy and its effect on the inner ear, an evolving story

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- Abstract body:

**Introduction and aim:** Immune checkpoint inhibitors (ICI) are an increasingly used form of cancer immunotherapy (IT) with improved overall survival and efficacy, compared to conventional chemotherapies in advanced cancers like Non-Small Cell Lung Carcinoma (NSCLC) and melanoma. However, immune-related adverse events (irAEs) are still common and can be severe, with most early side effects being dermatological, gastrointestinal or endocrine. In rare cases, inner ear irAEs have been reported. This study aimed to investigate the pathophysiology and incidence of audiovestibular manifestations associated with ICI treatment in patients with advanced staged melanoma or NSCLC.

**Materials and methods:** A pilot prospective longitudinal study was conducted in patients with melanoma or NSCLC treated with an ICI. A questionnaire based on the Speech, Spatial, and Qualities of Hearing Scale (SSQ), the Health Utilities Index Mark 2 and Mark 3 (HUI2/3), and the So Stoned questionnaire was used in conjunction with audiovestibular testing at baseline, 3 months, and 6 months.

**Results:** Ten out of 13 patients showed irAEs and six of them had to discontinue the ICI therapy before the end of the study. One patient experienced sudden bilateral sensorineural hearing loss, which was treated with high doses of corticosteroids resulting in hearing recovery. No vestibular abnormalities were observed. Although no significant changes were measured in the tonal audiogram of the other patients, the questionnaire showed a decrease in subjective hearing ability after six months.

**Conclusions:** The current literature about inner ear irAE remains mainly limited to case reports. Despite inner ear irAE being rare, this study identified one patient with acute bilateral hearing loss within the study group of 13 patients. Emphasizing the importance of awareness can lead to prompt diagnosis and treatment, as well as a better understanding of the pathophysiology and incidence of audiovestibular irAE.

# Does Cochlear Implant Insertion Trauma Induce Intracochlear Fibrosis and Ossification? A Human Temporal Bone Study

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**Introduction and aim:** Histological studies from donors with a cochlear implant (CI) show a variable degree of fibrosis and ossification. Intracochlear ossification is known to be negatively correlated with speech perception with the CI, results in increased electrode contact impedances and higher overall power consumption, and could potentially cause loss of residual hearing. Animal studies have suggested that acute insertional trauma induces intracochlear tissue formation. In the present study, we investigated the relationship between acute insertional trauma and intracochlear tissue formation in a human temporal bone study.

**Materials and methods:** 3D reconstructions were generated based on digitized histological sections of 21 human post-mortem temporal bones with a CI. The 3D reconstructions were virtually re-sectioned perpendicular to the cochlear spiral at high resolution. The proportion of the cochlear volume occupied by fibrosis and ossification was calculated for every virtual section.

**Results:** Cases with an osseous spiral lamina fracture ( $p=0.01$ ) or an SL perforation ( $p=0.02$ ) showed significantly more intracochlear tissue formation than those without major insertional trauma. Cochleostomy drilling appears to induce extensive local fibrosis and ossification at the base that is not seen with round window insertion.

**Conclusions:** Acute insertional trauma is associated with more pronounced intracochlear fibrosis and ossification after cochlear implantation.

## **Systematic review and proposal for protocol for necrotising otitis externa**

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Introduction and aim: Necrotising otitis externa (NOE) is an aggressive infection of the soft tissues of the external auditory canal and surrounding structures with expanding osteitis and/or osteomyelitis of the temporal bone. Prompt diagnosis and treatment reduces complications and shortens the duration of therapy. A proposal for a NOE diagnosis and treatment protocol was made up on a literature review and clinical experience in the Antwerp University Hospital. The protocol was interdisciplinary discussed with radiology, nuclear medicine and infectiology.

Material and methods: Embase and Cochrane Library were searched for reviews on malignant otitis externa / necrotising otitis externa. Articles older than 5 years were excluded. The primary endpoint was to establish a protocol or unified guideline for diagnosis and treatment of NOE. Secondary endpoints were incidence, complications, pathophysiology and follow-up.

Results: The most common pathogen was *Pseudomonas Aeruginosa* and recommended duration of antibiotic treatment was 6 weeks. An important feature of the protocol is to define the need for proper follow-up and determine when antibiotic therapy can be stopped.

Conclusion: The multidisciplinary approach with radiology, nuclear medicine and infectiology resulted in a clear and precise proposal for guideline for the diagnosis and treatment of NOE. The need to evaluate and reassess this guideline within patient population of the University Hospital of Antwerp is indicated.



# Physical activity, postural control and frailty are affected in older adults with benign paroxysmal positioning vertigo

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**Introduction and aim:**

Benign Paroxysmal Positioning Vertigo (BPPV) is one of the most commonly reported vestibular disorders, with a one-year prevalence rising steeply with age. This study aimed to assess physical activity, postural control and frailty in older adults with BPPV.

**Material and methods:**

Older adults ( $\geq 65$ y) diagnosed with BPPV (oaBPPV) were recruited at the vestibular department of ZOL Hospital. An age-, weight-, and height-matched control group of older adults ( $\geq 65$ y) without BPPV was also recruited. The Falls Efficacy Scale, Geriatric Depression Scale, Montreal Cognitive Assessment (MOCA) and Dizziness Handicap Inventory were used to question fear of falling, depression, cognitive functioning and the impact of dizziness on daily living, respectively. Physical activity was assessed with the International Physical Activity Questionnaire and an accelerometer-based activity logger, worn for at least 4 consecutive days. Postural control was assessed with the mini Balance Systems Evaluation test (mini-BESTest) and gait speed. Fried criteria were used to assess frailty. Significance level was set at  $\alpha=0.05$ .

**Results:**

Twenty-eight oaBPPV (mean age  $72.5\pm 4.5$ ) and 22 controls (mean age  $73.1\pm 4.7$ ) were included. Preliminary results revealed that oaBPPV experienced more fear of falling ( $p<0.001$ ), depressive feelings ( $p=0.002$ ) and impact of dizziness on daily living ( $p<0.001$ ) compared to controls. OaBPPV scored lower on the MOCA ( $p=0.003$ ), with a mean score of  $23.7\pm 4.1$ , indicative for mild cognitive impairment.

Both self-reported physical activity and objectively measured physical activity were significantly lower in oaBPPV. Accordingly, oaBPPV performed worse on the mini-BESTEST ( $p=0.001$ ), walked slower ( $p=0.003$ ) and were more frail ( $p=0.006$ ) compared to controls.

**Conclusions:**

OaBPPV were less healthy compared to controls, impacting their daily functioning. Future research should investigate whether physical activity, postural control and frailty recover after treatment with repositioning maneuvers, whether additional rehabilitation is necessary, or whether these symptoms were also decreased prior to presence of BPPV.

## **Impaired vestibular function after bacterial meningitis in children: assessment and management**

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**Introduction:** Bacterial meningitis is a severe infection with high morbidity and mortality. This infection may be responsible for long-term neurosensory sequelae.

Hearing loss related to bacterial meningitis is widely studied and its management is standardized. In contrast, few articles have studied vestibular function damage after bacterial meningitis. Posturomotor impairments due to vestibular loss after bacterial meningitis are often underdiagnosed and considered as neurological symptoms.

**Objective:** The aim of the study is to propose a systematic approach for vestibular system assessment and rehabilitation after bacterial meningitis.

**Methods:** We conducted a retrospective monocentric study in the ENT Department at the Queen Fabiola Children's Hospital. The records of nine patients who received a vestibular function evaluation after bacterial meningitis from 2015 to 2023 were analyzed. Vestibular function assessment included several tests for otolith and canal functions, a complete neuro-vestibular examination, and an auditory evaluation. Imaging of the temporal bone was also available.

**Results:** After vestibular function testing, five children had complete bilateral vestibular loss and four had partial vestibular loss. Seven children had associated bilateral profound deafness. All children had normal psychomotor development for their age before the meningitis. Children who already walked independently at the time of their infection had a better potential to compensate their vestibular loss and needed on average 5.16 months to walk again. In the group of children who had not yet acquired walking, significant posturomotor development delays were noted. All children received vestibular rehabilitation as well as regular coaching from a vestibular physical therapist.

**Conclusion:** Posturomotor delays related to vestibular loss after bacterial meningitis are frequent and need adequate rehabilitation quickly after the acute phase. Systematic and early vestibular function screening is necessary.

A diagnostic algorithm for vestibular function assessment will be proposed as a conclusion.

## **Cerebellar ataxia induced by hypomagnesemia: about two cases**

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### Introduction and aim

HiCS (Hypomagnesemia Induced Cerebellar Syndrome) is a rare, often unrecognized syndrome. Few cases have been reported in the literature. It is believed that the hypomagnesemia disturbs the auto regulation capacity of the posterior circulation vascular endothelium, resulting in oedematous changes and cerebral dysfunction, including intermittent and recurrent vertigo.

### Case report

We report the case of two patients with subacute vertiginous syndrome of progressive onset. In both cases, the clinical examination by the emergency physician and the blank CT scan of the brain were negative. An ENT opinion was requested in both cases for suspicion of BPPV. Iterative clinical examinations allowed to exclude BPPV, and showed a fluctuating, intermittent, multidirectional nystagmus, with cerebellar manoeuvres sometimes well performed, sometimes dysmetric. The HIT was normal in both cases. The statokinetic tests were inconsistent: sometimes retropulsion, sometimes latero-deviation. Both patients were cooperative and not confused. The cerebral MRI excluded any acute vascular problem or mass effect. The blood sample of both patients showed an undetectable magnesemia. After adapted suppletion, the dizziness disappeared progressively. In both cases, PPI were incriminated and discontinued. At distance, vestibular assessment was performed. In both cases, the gain of the semicircular channels were normal. The VNG showed neither nystagmic preponderance nor vestibular hyporeflexia, but there were signs of centrality. Three months later, the first patient kept a slight vertical nystagmus. The clinical examination of the second patient was completely normalized.

### Conclusion

Although it is a neurological condition, the history and clinical presentation may lead the ENT specialist to encounter patients with HiCS. The clinical examination is inconsistent and fluctuating. Imaging examinations are not very helpful. The diagnosis is based on blood sample, and the treatment is substitution therapy. An etiological diagnosis requires an opinion in internal medicine.

# **Diffusion-Weighted Imaging for the detection of cholesteatoma and its drawbacks : a report of two cases**

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## **Introduction and aim:**

Diffusion-weighted imaging (DWI) has emerged in the last decade as a very sensitive tool for the diagnosis and follow-up of cholesteatomas. Despite a high sensitivity, its lesser specificity may lead to false positive cases. We discuss several possibilities that aim to improve the specificity of the DWI and lessen the false positive diagnostic of cholesteatoma.

## **Case Report :**

We report the case of 2 patients who had a DWI for the detection of cholesteatoma. In both cases, the radiologist's protocol described a suspicion of cholesteatoma.

The first case is a patient with a history of chronic right mastoiditis during childhood who described otorrhea for months. The otoscopy showed a polyp on the inferior part of the tympanum with pus at the anterior angle. DWI indicated a cholesteatoma identified with a hypointense signal on T1 acquisition and hyperintense on the diffusion image. However, the surgical exploration did not find any cholesteatoma, but a fibro-adhesive otitis. The pathological examination (PE) characterized a chronic inflammation without sign of cholesteatoma.

The second case refers to a patient who had a type 2 tympanoplasty for an adhesive chronic otitis. The lack of post-operative hearing gain and suspicion of residual retrotympenic liquid diffusion motivated the realization of a DWI, which came positive for a cholesteatoma. However, the surgical exploration and PE confirmed only scar tissue in absence of cholesteatoma. The revision of the multiple DWI and classic MRI sequences showed an inaccurate radiology protocol.

## **Results :**

The common false positive diagnoses on DWI are cholesterol granuloma, granulation tissue with fibrosis and bone pate. The Apparent Diffusion Coefficient (ADC) is gradually emerging as a parameter that allows the distinction between cholesteatoma and its differential diagnosis. Some authors have identified a value of ADC below which the specificity of cholesteatoma diagnosis reaches around 100%. In the first case, the calculation of the ADC might have spared a second look surgery. In the second case, the understanding of the DWI by the ENT could have rectified the wrong protocolled diagnosis.

## **Conclusions:**

DWI is a very sensitive and non-invasive means to diagnose cholesteatoma. However, its specificity might increase with the calculation of the ADC on the imaging. More studies are needed to assess this parameter. Basic DWI knowledge by the ENT could avoid a wrong diagnosis.

# Retrospective analysis of cartilage-sparing resection of melanoma of the external ear

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## *Introduction and aim:*

External ear melanoma accounts for 7-20% of all head and neck melanoma. There is still no sufficient data regarding the most optimal surgical technique and its optimal prognosis. Excision of melanoma of the external ear is a challenge for surgeons because they must find a balance between tumor-free margins, aesthetically acceptable results and function maintenance of the ear. This retrospective study investigates whether a cartilage-sparing approach is a useful surgical technique to find this balance.

## *Materials and methods:*

This is a retrospective study of patients treated with a cartilage-sparing excision of melanoma of the external ear between 2011 and 2022 at a university-based tertiary hospital.

A structured review on Pubmed was conducted to evaluate studies about the surgical techniques of melanoma of the external ear and studies reporting local recurrence and survival rates for melanoma of the external ear treated by a cartilage-sparing approach. A clinical record review of patients who were treated for melanoma of the external ear at the Ghent University Hospital between 2011 and 2022 was performed. 14 patients were included and were treated with a cartilage-sparing resection. Reconstruction was made by using primary closing of the wound, split thickness skin grafts or full thickness skin grafts. For this population, occurrence of local and locoregional recurrence and metastasis on distance was observed. Statistical analysis was performed by using the Kaplan-Meier survival analysis.

## *Results:*

All patients were males (14/14 patients) and most tumors were located on the helix of the ear (9/14 patients). Superficial spreading melanoma (7/14) compromised the most common histological subtype. The average Breslow thickness was 1,24mm. All patients underwent a cartilage sparing resection of the tumor. Four patients had reconstruction using a full thickness skin graft, 9 patients had a split thickness skin graft and 1 patient had a primary closing of the wound. A sentinel lymph node biopsy was performed in 9 patients simultaneous with the resection of the primary melanoma. All of these sentinel lymph node biopsies were negative. One patient had a local recurrence after 9 months. The estimated time until local recurrence was 118 months (95% CI, 95,825-140,175months). We had 1 patient with a locoregional recurrence in a lymph node after 27 months. The estimated time until lymph node metastasis was 119 months (95% CI, 97,400-139,873months). We had no patients with metastasis on distance.

The local control rate was 92,86%, the overall survival was 100% and the disease-specific survival was 100%. Average follow-up was 41 months.

## *Conclusion:*

The results for local control rate, overall survival and disease-specific survival were excellent. This indicates that a cartilage-sparing resection of melanoma of the external ear could be an acceptable treatment with respect for tumor-free margins and with preservation of an aesthetically acceptable result and function maintenance of the ear.

## **Can radiological estimation predict the stapes prosthesis length? The correlation between radiological estimations of stapes height and the piston's surgically measured length**

**Objective:** The aim is to determine whether the length of the stapes prosthesis can be predicted with preoperative imaging.

**Study Design:** A retrospective case review.

**Setting:** Tertiary referral center.

**Patients and Intervention:** All patients undergoing primary stapedotomy.

**Main Outcome Measure:** The correlation between the intraoperative measurement of the prosthesis length and the preoperative stapes measurement on a CT scan.

**Results:** No significant correlation existed between prosthesis length and measured stapes height.

**Conclusions:** Preoperative radiological stapes height evaluation could not significantly correlate to prosthesis length measured and placed intra-operatively. This may have a relation to the personal preferences of the surgeon.

## **Faut-il souffrir pour avoir un nouveau nez?**

Do we have to suffer to have a new nose ?

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Introduction and Aim :

To hear patients tell it, nose and sinus surgery has the reputation of being very painful. Often, the painkillers used in the postoperative period are among the strongest. However, the surgical and technical evolution allows us to limit the pain of these operations and to prevent the abuse of medication.

The aim of this study is to present our results concerning postoperative pain after nasosinus surgery, to compare these results with the literature and to deconstruct the myths around this intervention.

Materials and methods :

Between 01/01/2013 and 31/12/2022, a prospective quantitative descriptive study was performed by the same operator. He analyzed the postoperative pain by means of a 100-mm visual analog scale (VAS) in all the patients operated on the nose at postoperative days (PODs) between 9 and 14. They were asked for a global evaluation of the postoperative pain and the removal of the nasal packing. Finally, the analgesics taken after the operation in addition to their usual treatment were listed.

Results :

During these 10 years, 821 patients underwent rhinoseptoplasty with or without endoscopic sinus surgery (ESS), 440 underwent septoplasty with or without ESS, 29 underwent unilateral or bilateral middle meatotomy, 50 underwent unilateral or bilateral ethmoidectomy. The different levels of pain were analyzed, in each group, and correspond on average to a "mild" level on VAS-score. All this will be detailed.

Conclusions :

The evolution of surgical techniques now makes it possible to have a new nose with little or no pain.



# Wound healing in rhinoplasty – the effect of fibrin glue on ‘dead space’ closure

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## **Introduction and aim**

The presence of ‘dead space’ in rhinoplasty creates a welcoming environment for erratic soft-tissue contraction. Poor redraping of the skin over the underlying osseocartilaginous framework may result in its formation. If rhinoplasty surgeons can control and reliably predict skin contraction and wound healing, rhinoplasty results will undoubtedly improve. Fibrin sealant application has previously demonstrated a reduction in adverse events in various medical fields. Fibrin sealant offers multiple potential benefits including decreasing downtime, reducing complication rates, and improving patient satisfaction. The objective is to evaluate the effectiveness of homologous fibrin glue (Tisseel, Baxter AG, Vienna, Austria) on the healing process in rhinoplasty.

## **Material and methods**

We performed a retrospective propensity score matched analysis in 154 patients enrolled for rhinoplasty. Aesthetic evaluation was performed with the FACE-Q nose and nostrils and the Utrecht Questionnaire. Assessments were conducted prior to surgery and post and 12 months. After propensity score matching, two equal groups of 66 patients were retained. The first cohort of 66 patients underwent a rhinoplasty without the application of fibrin glue, in the second cohort of 66 patients fibrin glue was used to achieve better adherence of the skin to the underlying osseocartilaginous framework.

## **Results**

All patients had a high statistically significant improvement on all PROMs postoperatively versus preoperatively. The postoperative results remained stable over the different time points. However, no statistically significant difference on the aesthetic outcome was found whether fibrin sealant was used or not.

## **Conclusions**

Obliteration of dead space is a key component in rhinoplasty as it minimizes soft-tissue contraction, resulting in a more predictable outcome. Although fibrin glue is successfully used in various medical fields, in the present study, the use of fibrin glue had no long-term beneficial effects on patient satisfaction. Future studies are necessary to verify its effect on immediate postoperative healing.

## **Sinonasal organized hematoma : about two cases**

*A Fasseaux MD<sup>1</sup>, C Huart MD, PhD<sup>1</sup>*

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### **Introduction and aim**

Sinonasal organized hematoma is a rare clinical entity. It is characterized by an unilateral sinus mass with an osteolytic potential with local aggressivity. The physiopathology remains unclear. This article describes two cases of sinus organized hematoma (OH) in one center of Belgium.

### **Cases report**

The first case concerns a 57 years old man with a mass in the left maxillary sinus and finally underwent a medial maxillectomy after two biopsies. The second is a 69 years old woman with a right maxillary mass who was treated, after one biopsy, by middle meatus antrostomy with a prelacrimal approach. They both had a CT scan and MRI showing aggressive heterogeneous tumor characteristics.

### **Results**

Endoscopic surgery was performed in both cases. Final histopathological and radiological findings allowed to conclude to a sinus organized hematoma. There were no recurrence afterwards.

### **Conclusion**

Sinonasal organized hematoma may be confused with aggressive sinonasal tumor. It can lead to misdiagnosis and repeated biopsies. Endoscopic surgery is a safe and completely effective therapy.

# Presence of neurogenic pathways contributing to nasal hyperreactivity in type 2-predominated chronic upper airway inflammatory phenotypes

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## Introduction

Nasal hyperreactivity (NHR) comprises the induction of nasal symptoms upon encounter of environmental stimuli like temperature or humidity changes. NHR is prevalent in all chronic upper airway inflammatory phenotypes, including allergic rhinitis (AR) and chronic rhinosinusitis with nasal polyps (CRSwNP). Although it seems to be mediated by neurogenic pathways in patients with non-allergic rhinitis, AR and CRSwNP are classically considered to be mediated by type 2 inflammatory pathways. We therefore investigated the pathophysiology of nasal hyperreactivity in these phenotypes.

## Methods

Eighteen healthy controls and 45 patients with symptomatic AR/CRSwNP underwent a cold, dry air (CDA)-provocation test for objective diagnosis of NHR. Before and after, questionnaires were filled out and nasal secretions and biopsies were collected. Markers for neurogenic inflammation (SP, calcitonin gene-related peptide, neurokinin A), epithelial activation (IL-33), and histamine were measured in secretions by ELISA; and *PGP9.5*, *TRPV1*, and *TRPM8* expression was studied in biopsies by RT-q-PCR. Sensitizing properties of histamine on TRPV1/A1 were studied with Ca<sup>2+</sup>-imaging using murine trigeminal neurons.

## Results

CDA-provocation reduced Peak Nasal Inspiratory Flow (PNIF) of patients with subjective NHR but not of non-NHR controls/patients ( $p < 0.0001$ ). Subjective (VAS effect CDA) and objective (decrease in PNIF) effects of CDA were significantly correlated ( $p < 0.0001$ ). Levels of neuropeptides and histamine in nasal secretions and expression of neurogenic markers *PGP9.5*, *TRPV1*, and *TRPM8* correlated negatively with CDA-induced PNIF-reduction ( $p < 0.05$ ). CDA-provocation induced an increase in IL-33-levels. Both neurogenically expressed TRPV1 and TRPA1 were sensitized by exposure to histamine. ( $p < 0.05$ ).

## Conclusions

NHR is not an on/off phenomenon, but spans a continuous spectrum of reactivity. A neurogenic inflammatory background and increased histamine-levels are risk factors for NHR in type 2 upper airway inflammation. CDA-provocation induces increased IL-33 levels, reflecting epithelial damage. Future studies should focus on the missing links between cold, dry air provocation and induction of nasal symptoms.

# The nasal basal cells shift towards a pro-inflammatory state in allergic rhinitis

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**Introduction and aim:** The airway epithelium is composed of diverse cell types that form a protective barrier and maintain tissue homeostasis. The integrity of the epithelium is guarded by the airway basal cells that serve as progenitor cells and restore wounds in case of injury. Interestingly, basal cells are a heterogeneous population and specific changes in their behavior are associated with chronic barrier disruption, mechanisms that have not been studied in great detail in allergic rhinitis (AR). We here aim to study basal cell (sub)types in AR and healthy controls using single-cell RNA sequencing (scRNAseq).

**Material and methods:** scRNAseq of the nasal epithelium was performed on non-allergic and AR patients to reveal basal cell heterogeneity and to identify allergy-related alterations. Flow cytometry of the CD142+/CD151+ basal cell population was performed to confirm phenotypic findings at protein level.

**Results:** scRNAseq and flow cytometry revealed that basal cells are heterogeneously present in the upper airway epithelium, suggesting the presence of basal cells, including stem-like, cycling, mobile and stress-responsive basal cells. In addition, the total basal cell fraction within the epithelium in AR is increased compared to non-allergic controls (67.01% vs 46.22%,  $p < 0.01$ ). Moreover, scRNAseq demonstrated that protective basal cells are missing in AR epithelium, while a pro-inflammatory population of allergy-associated basal cells, characterized by prostaglandin metabolism and the expression of protease-activated receptor 2 (PAR2) and histamine receptor 1 (H1R), is more dominantly present. Furthermore, *in vitro* experiments are being executed to illustrate the role of basal cells in AR in detail.

**Conclusions:** The nasal basal cell population is abundant, heterogeneous and shifts towards a pro-inflammatory state in AR. The absence of protective subtypes and the rise of a pro-inflammatory population might suggest that basal cells are important players in directing and maintaining epithelial barrier defects in AR.

## Nasal Nitric Oxide (nNO): Potential role in the diagnosis of aspirin/NSAID hypersensitivity in patients with Chronic Rhinosinusitis with Nasal Polyps (CRSwNP)

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**Introduction and aim:** Although the EU guidelines recommend changes in nasal resistance, patency and/or geometry to assess nasal response after nasal aspirin challenge allowing to assess aspirin intolerance, studying inflammatory parameters might be a good alternative, but has not been explored so far.

We here determine changes in the concentration of nasal and exhaled NO and type 2 inflammatory cytokines IL-4, IL-5 and IL-13 in the nasal cavity after a nasal aspirin challenge in CRSwNP patients with/without a positive history of aspirin/NSAID hypersensitivity.

**Material and methods:** 26 CRSwNP patients and 10 controls were challenged nasally with increasing doses of lysine aspirin (LAS) drops starting with 5 mg aspirin equivalent, then 10 mg, 20 mg, 40 mg at 45 min intervals, until either the study participant had responded with induction/aggravation of nasal and chest symptoms or a cumulative dose of 75 mg was reached. The challenge was considered positive if peak nasal inspiratory flow (PNIF) or forced expiratory volume in 1 second (FEV1) dropped with 20% or more. Nasal fluid was harvest by placing Merocel<sup>®</sup> sponges in the nostril during 10 min at different timepoints.

**Results:** 34.6% (9/26) of patients showed a positive reaction to nasal LAS challenge. When nasal aspirin challenge induced/aggravated nasal symptoms, nNO (left: pre: 511.8 vs. post: 186.3 ppb; p =.008) (right: pre: 534.4 vs. post: 214.7 ppb; p =.005), PNIF (pre: 121.7 vs. post: 65.0 L/min; p =.001) decreased significantly, whereas FEV1 (pre: 86.3% vs. post: 83.7% p =.012) did not alter. FeNO remained constant pre versus post aspirin lysine challenge.

**Conclusion:** Nasal NO measurement might be a good objective technique to assess aspirin/NSAID hypersensitivity in nasal aspirin challenges.

## Rapid real-life effects of biologic treatment in uncontrolled severe chronic rhinosinusitis with nasal polyps in Belgium

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**Background:** Since 2022, two biologics (mepolizumab and omalizumab) are reimbursed for the indication of severe chronic rhinosinusitis with nasal polyps (CRSwNP) in Belgium. Their efficacy has been demonstrated in large double-blind placebo-controlled trials. However, only very limited reports on real-world efficacy data have been published.

**Methods:** The first 50 patients from 6 medical centers in Belgium, who were prescribed a biologic for CRSwNP were prospectively studied for 6 months. Reimbursement criteria, clinical parameters and biomarkers determined the choice of the biologic. Here, we did a first analysis of the baseline characteristics (demographics, medical history, comorbidities, nasal polyp(NP)-score, nasal congestion score (NCS) and quality of life (SNOT-22 score)), and the clinical effects (NP-score, NCS and SNOT-22) after three months.

**Results:** 50 patients were included in the trial, with a mean SNOT-22 score of  $45.0 \pm 20.4$  and a mean NP-score  $4.7 \pm 1.7$ . The mean age was 53 years old and 45% had a disease duration of more than 10 years. 44 patients received mepolizumab and 6 patients omalizumab. After 3 months the NP-score ( $4.7 \pm 1.7$  vs.  $3.0 \pm 2.0$ ;  $p < 0,001$ ), SNOT-22 score ( $45.0 \pm 20.4$  vs.  $27.6 \pm 19.4$ ;  $p < 0,001$ ), and NCS ( $2.0(1.3-2.0)$  vs.  $1.0(1.0-2.0)$ ;  $p < 0,01$ ) all improved significantly. There was no significant difference between the overall response to the 2 biologics. Only 10% of patients had no response after 3 months of therapy.

**Conclusions :** This real-world Belgian study shows an effectiveness of biologics (mepolizumab and omalizumab) after only 3 months, with both NP-score, NCS as well as quality-of life parameters significantly improved after this short amount of time.

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# **Does uvulopalatopharyngoplasty have a real benefit compared to a simple tonsillectomy in patients with tonsillar hypertrophy suffering from Obstructive Sleep Apnea ?**

Authors : *D. Toorens, V. Moonen*

Institutions : University of Liege, CHR Citadelle

Abstract body :

Introduction and aim : to prove that simple tonsillectomy would be as effective as uvulopalatopharyngoplasty (UPPP) in the treatment of moderate to severe Obstructive Sleep Apnea (OSA) in adult patients with tonsillar hypertrophy.

Material and methods : this retrospective study would compare patients who underwent surgery from ... *month/year* until ... *month/year*, in the CHR Citadelle hospital of Liege, Belgium. We defined eligible criterias for patients as tonsillar hypertrophy (grade 3 or 4 according to the Friedman staging), and performing two polysomnograms, one before surgery showing a moderate to severe OSA, and one after surgery to show the improvement. Age, sex and ethnicity were not considered. Data analyses would be performed between March and April 2023.

Results : This trial includes ... patients. Out of these, ... underwent simple tonsillectomy and ... UPPP. The result is calculated on the base of the AHI score (which is the number of events of apnea-hypopnea/ hour) and then compared in each group. The mean (SD) AHI score for the simple tonsillectomy group is decreased by ...% (from ... to ...), and ...% for the UPPP group (from ... to ...). The difference between the two groups correspond to ... events/hour, which is clinically relevant / which is not clinically relevant.

Conclusion (a): In this study, we proved that UPPP surgery has no significant benefit over a simple tonsillectomy for patients with tonsillar hypertrophy suffering from OSA. Therefore, a simple question pops up : should we consider using simple tonsillectomy in the treatment of moderate to severe OSA ?

Conclusion (b) : In this study, we proved that UPPP surgery has a significant benefit over a simple tonsillectomy for patients with tonsillar hypertrophy suffering from OSA. Therefore, another interesting trial would be to study differences between all types of UPPP such as, uvulectomy, uvuloplasty, barbed reposition pharyngoplasty (BRP), anterior pharyngoplasty (PA), and modified anterior pharyngoplasty (PAM).

# Postmortem bedside endoscopic procedure as sampling method to study the olfactory mucosa, olfactory bulb and adjacent tissues

## **Authors:**

M. Clijsters<sup>1</sup>, W. Backaert<sup>1</sup>, M. Khan<sup>2</sup>, P. Mombaerts<sup>2</sup>, L. Van Gerven<sup>1</sup>

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## **Abstract**

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### **Introduction and aim:**

Harvesting high-quality tissue from the human olfactory mucosa and olfactory bulb has proven challenging using existing methods such as biopsy or during autopsy. We therefore developed a protocol for rapid postmortem bedside sampling of these tissues, using an endoscopic endonasal surgical technique adapted from skull base surgery.

### **Material and methods:**

The protocol involves complete resection of the inferior, middle, and superior turbinates to harvest respiratory mucosa, followed by a sharp subperiosteal dissection of the entire mucosa lining the olfactory cleft to procure olfactory cleft mucosa. The skeletonized anterior skull base is then removed, followed by incision of the dura mater, to expose the olfactory bulb and adjacent brain regions for sampling.

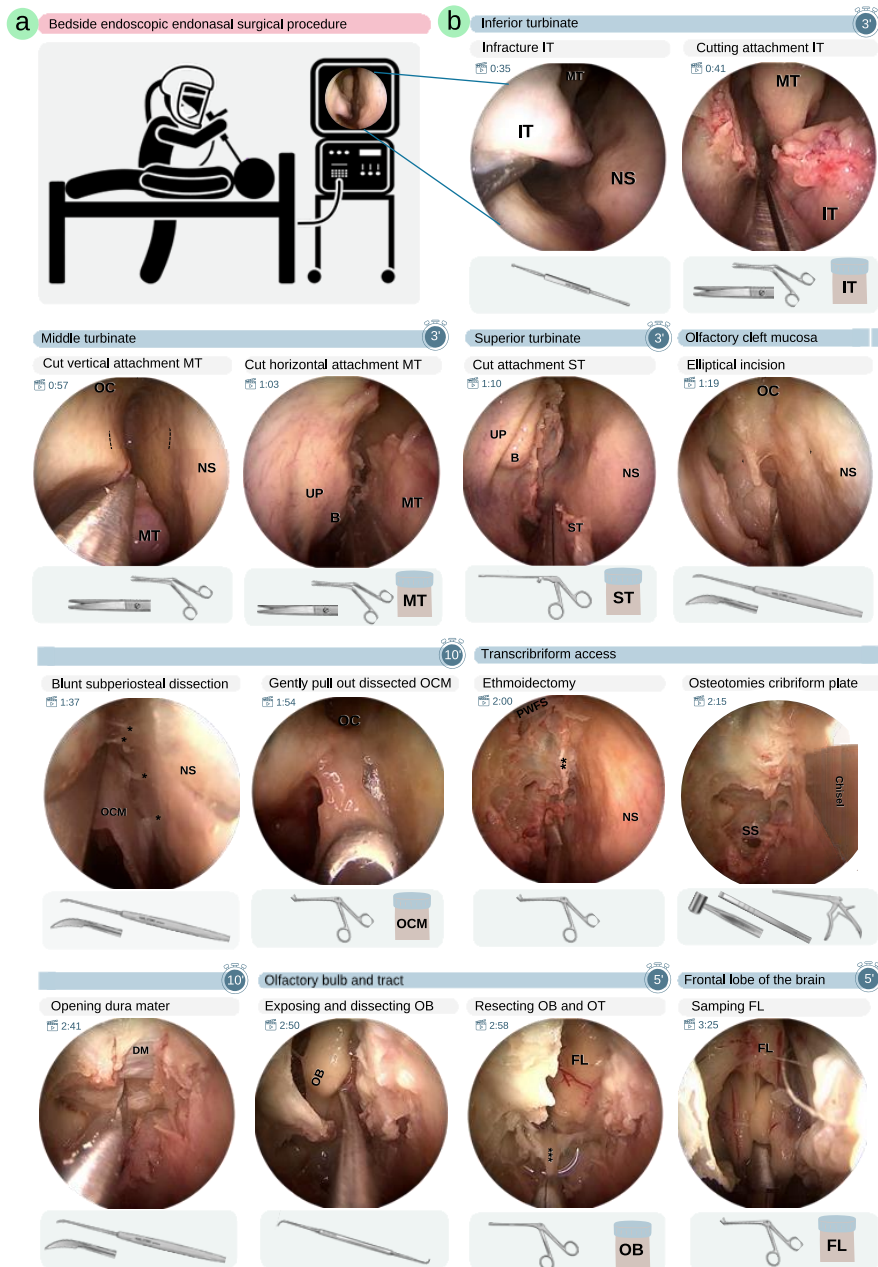
### **Results:**

With some experience in endoscopic sinus surgery, the sampling protocol can be performed within 1 hour. In contrast to conventional autopsies, this endoscopic method leaves no visible scars and facilitates a rapid response and logistic flexibility in various settings, thereby drastically reducing postmortem intervals (median: 89 minutes, n=138), resulting in large tissue samples in pristine condition.

### **Conclusions:**

This protocol provides an efficient and comprehensive sampling method for histomolecular investigations of human olfactory tissues.





**Figure | Bedside endoscopic endonasal surgical procedure in steps**

**a**, Pictographic display of the postmortem bedside endoscopic endonasal procedure.

**b**, Step-by-step depiction of key-frames of the endoscopic endonasal procedure, shown here for one side (the right nasal cavity) only. The time in the left-upper corner of each snapshot refers to the corresponding part of the video. Under each snapshot the requisite surgical and collection material are displayed. The duration for each group of steps is indicated in minutes in the stopwatch.

# **Leukocyte- and Platelet-Rich Fibrin in endoscopic endonasal skull base reconstruction: study protocol for a multicenter prospective, parallel-group, randomized controlled non-inferiority trial**

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**Introduction and aim:** Recent advances in endoscopic endonasal transsphenoidal approaches (EETA) for skull base lesions resulted in significantly increased extent and complexity of skull base defects, demanding more elaborate and novel reconstruction techniques improving healing and preventing reconstruction failure which may result in cerebrospinal fluid (CSF) leakage. Commercially available fibrin sealants (CAFS) are currently used to enforce sellar floor reconstruction. However, problems have been reported regarding safety, efficacy and costs. This trial aims to investigate autologous Leukocyte- and Platelet-Rich Fibrin (L-PRF) membranes as an alternative to CAFS in EETA-related skull base reconstruction enforcement. The study was registered at Clinicaltrials.gov NCT03910374 on 10 April 2019.

**Material and methods:** This multicenter, prospective randomized controlled trial aims to demonstrate non-inferiority of L-PRF membranes compared to CAFS in EETA cases (1) without intra-operative CSF-leak as dural or sellar floor closure enforcement and (2) in EETA cases with intra-operative CSF-leak (or very large defects) in which classic multilayer reconstruction has been made as additional sealing. Patients in three centers in Belgium, undergoing EETA are randomized 1:1 comparing L-PRF with CAFS. The primary endpoint is postoperative CSF leakage. Secondary endpoints are risk factor identification for reconstruction failure, rhinological symptom assessment, interference with postoperative imaging and a cost-effectiveness analysis.

**Conclusion:** With this trial, we will evaluate the safety and efficacy of L-PRF compared to CAFS.

# Influence of general anaesthesia for respiratory epithelial samples on ciliary functional analysis

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**Introduction:** Digital high-speed videomicroscopy (DHSV) is highly sensitive and specific for primary ciliary dyskinesia diagnosis. However, the effect of general anaesthesia for sample collection on ciliary beating has never been studied. Our goal was to compare ciliary function before and during general anaesthesia.

**Material and methods:** Ciliated epithelial samples were obtained by lower and middle turbinate brushing from 3 patients suspected for primary ciliary dyskinesia diagnosis before general anaesthesia in one nasal cavity and during general anaesthesia in the contralateral nasal cavity. DHSV assessed ciliary beat frequency (CBF) and percentage of normal ciliary beat pattern (CBP).

**Results:** Ciliary function evaluated immediately after nasal brushing showed no significant difference of CBF (Hz) and CBP (percentage of normal CBP) in the mucosa before general anaesthesia compared to during general anaesthesia. In addition, we compared the results to our normal laboratory values for children ( $13,11 \pm 6,83$ ). Specific data for each patient will be presented.

**Conclusion:** This pilot study suggested that general anaesthesia might not have an effect on ciliary function in patients suspected of primary ciliary dyskinesia. Larger studies are needed to confirm these preliminary results.

**Keywords:** Primary ciliary dyskinesia, Ciliary motility disorder, Diagnosis, Microscopy.

*This study was approved by the ethic committee of the CHU Liege.*

# Modifications of the tumor microenvironment in head and neck cancer after administration of afatinib in a window-of-opportunity study (EORTC90111-24111)

## Authors

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## Objectives

The EORTC-90111-24111 phase II window-of-opportunity study evaluated afatinib vs no preoperative treatment in patients with primary squamous cell carcinoma of the head and neck (HNSCC). We investigated afatinib-induced tumor and microenvironment modifications by comparing post- and pre-treatment tumor biopsies.

## Materials and Methods

Thirty treatment-naïve patients with primary HNSCC were randomized in a 5:1 design. Twenty-five patients received afatinib, a pan-HER inhibitor, for 14 days before curative surgery (40mg 1x/d) and five patients were included in the control arm. Tumor biopsies were taken at diagnostic endoscopy and during surgery. Good quality RNA samples were used for omics analyses. Immunohistochemistry and quantitative reverse-transcriptase (qRT) PCR analyses were realized on the corresponding samples. The control arm was enlarged by samples coming from our previous similar window-study (Schmitz et al. 2013).

## Results

Immunohistochemistry (IHC) analyses of afatinib-treated tumor biopsies showed a decrease in pEGFR ( $P \leq .05$ ), pERK ( $P \leq .05$ ), and an increase in CD3+ ( $P \leq .05$ ) T-cells density, and CD3+ ( $P \leq .01$ ) and CD8+ ( $P \leq .01$ ) T-cells infiltration as assessed by spatial analysis. RNA-sequencing

analyses of afatinib-treated tumor samples showed downregulation of gene sets linked to mitosis, upregulation of inflammatory gene sets and increased expression scores of signatures predictive of response to PD-1 blockade ( $P \leq .05$ ). In treated patients, gene expression profile, qRT-PCR and IHC analyses highlighted two clusters of patients. Cluster 1 showed upregulation of markers by IHC and gene sets implicated in epithelial-to-mesenchymal transition (EMT) and activation of cancer-associated fibroblasts (CAFs). Cluster 2 and control arm did not show similar changes.

### **Conclusions**

Two weeks of pre-operative treatment of afatinib in primary treatment-naïve HNSCC induces CD3+ and CD8+ tumor infiltration and, in some patients, EMT and CAFs activation. These results open perspectives to overcome resistance mechanisms to anti-HER therapy and to potentiate activity of immune checkpoint inhibitors.

## **Patient-reported outcomes of Barbed Reposition Pharyngoplasty in unilevel palatal snoring: a prospective study**

-Authors: *Q-A. Parys, M. Claerhout, J. Verfaillie, P. Serry*

-Institution: AZ Delta, Roeselare, Belgium

-Abstract:

Introduction and aim:

This prospective study aimed to evaluate the benefit of Barbed Reposition Pharyngoplasty (BRP) in the management of patients presenting with isolated unilevel palatal snoring, regardless of the presence of obstructive sleep apnea (OSA).

Material and methods:

BRP was performed in sixteen patients with unilevel palatal snoring observed during drug-induced sleep endoscopy. Non-obese patients with no concomitant hypersomnolence or severe OSA (obstructive apnea-hypopnea index <30/hr) were included. Patient-reported snoring questionnaires were taken before surgery and at two weeks, six weeks, and six months after surgery. These include Snoring Intensity, Snoring Severity, Snoring Score, and the Epworth Sleepiness Scale (ESS). Additionally, postoperative data including pain scores, duration of hospitalization, and complication rates were reported.

Results:

The mean snoring intensity dropped significantly from  $8.1 \pm 2.0$  preoperatively to  $3.5 \pm 2.1$  after 6 months ( $p < 0.001$ ). The mean preoperative and postoperative snoring severity were  $7.0 \pm 1.5$  and  $3.1$

$\pm 1.7$  respectively ( $p < 0.001$ ). The mean snoring score decreased from  $8.5 \pm 1.5$  to  $3.6 \pm 2.0$  ( $p < 0.001$ ). ESS scores decreased from  $6.7 \pm 4.2$  to  $4.9 \pm 5.0$  but this reduction did not reach significance ( $p = 0.087$ ). Mean pain scores reached a peak at  $6.4 \pm 1.8$  on day 4. The average hospitalization period was  $1.06 \pm$

$0.25$ . Tread extrusion occurred in five patients (31.3%) with no clear effect on the outcome measures.

Conclusions:

Barbed reposition pharyngoplasty is an effective surgical treatment option for patients with unilevel palatal snoring and indications for palatal surgery should not be limited to OSA.

Longer follow-up time is needed to evaluate the durability of the procedure.

# Establishment of patient-derived organoids in head and neck squamous cell carcinoma

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## **Introduction and aim:**

Organoids are 3-dimensional, patient-derived structures grown out of cells obtained from patients. Imbedded in a mix of growth factor and other nutrients these will self-organize into complex structures that greatly mimic morphology, phenotype, and heterogeneity of the original tissue. Studies show that patient-derived organoid response to treatment is, in most cases, predictive of patient response. Therefore the organoid model might spark the evolution toward personalized cancer treatment. However, the establishment of organoids is technically challenging and requires experience. Previous reports on organoid establishment efficiency in head and neck squamous cell carcinoma (HNSCC) ranged from 30 to 70%. The aim of this study is to prospectively identify factors impairing or promoting organoid growth.

## **Material and methods:**

Inclusion was proposed to every patient presenting with HNSCC at the Antwerp University Hospital, after informed consent, accepted by the ethics committee. The study did not adjust the standard of care in diagnosis and treatment. We identified two groups: the first group included fresh biopsy tissue, while tissue after surgical excision and margin control was used in the second group. Lymph node metastases of HNSCC were excluded from analysis. P16 status was determined in every specimen, and time from tissue removal to processing and digestion was monitored.

In short, the tissue processing included physical fragmentation and enzymatic digestion (Trypsin 0.125%/DMEM-F12) to retrieve single cell suspension. After cell straining (100µm) and washing steps, the resulting cell pellet was resuspended in Cultrex growth factor-reduced basement membrane extract type 2. Culture droplets (domes, 20µL) were formed via the hanging droplet technique. Organoid establishment was considered successful if 3D multi-cellular structures were formed and splitting/expansion could be performed.

## **Results:**

Twenty-six squamous cell tumor samples were processed to establish organoids. The mean age of the patients was 66±9 years. 14 biopsy specimens and 12 resection specimens were obtained from different subsites: including 9 oral cavity tumors, 2 oropharyngeal, 3 hypopharyngeal, 11 laryngeal/piriform sinus tumors and 1 maxillary sinus tumor. Organoid outgrowth was successful in 11/14 biopsy specimens and in 6/12 resection specimens, resulting in 65% of all tumor samples. We did not see any significant changes in outgrowth, when comparing tumor subsite, previous treatment, age or T-grading. Nevertheless, we see a tendency towards improved outgrowth in biopsy specimens when compared to surgical

resection fragments. Preliminary data suggests that surgical resection increases cellular ischemia before removal out of the patient and therefore contributes to necrosis of tissue before processing.

**Conclusion:** Organoid establishment in HNSCC is a complex and time-consuming process, nevertheless achieving acceptable outgrowth percentages is feasible. We hypothesize that tissue ischemic time is the main factor impairing outgrowth. We strongly believe that the findings in this study will improve organoid success rates due to a better understanding and identification of critical parameters influencing their establishment.



# Deep neck abscess draining through the external auditory canal: a case report

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## ***Introduction and aim:***

Retropharyngeal and parapharyngeal abscess are uncommon complications of upper respiratory infections in children. The clinical presentation usually involves fever, neck pain, odynophagia, neck oedema and airway obstruction. Otorrhea as a presenting symptom for a neck abscess is highly unusual. This infrequency and the fact that the affected tissues are deep and impossible to palpate or visualize externally make it a diagnostic challenge.

## ***Case report:***

A 2-year-old boy presented to the emergency department with fever, a sore throat, and bilateral otalgia. Clinical examination revealed an asymmetry of the tonsils with mild tumefaction of the right pharyngeal wall and bilateral cervical adenopathies. Otoscopy showed excessive purulent right-sided otorrhea with intact eardrums.

Contrast-enhanced computed tomography scan revealed a right retro- and parapharyngeal collection tracking into the right ear canal through a bony defect in its anterior-inferior wall, compatible with the foramen tympanicum.

The patient was treated with a course of antibiotics in view of his stable condition and lack of airway compromise. The patient responded clinically and a control computed tomography a week later showed complete resolution of the abscess.

## ***Conclusions:***

Spontaneous drainage of a parapharyngeal abscess through the external auditory is extremely rare. On the CT scan, one can see expansion through a congenital defect, occasionally present in the anterior-inferior part of the external meatus, known as the foramen of Huschke. The tympanic part of the temporal bone usually undergoes an ossification from birth with completion by age 5 years.

The fact that the abscess could drain spontaneously through the ear canal is probably the main reason for the mild outcome of such a dangerous infection. Early diagnosis of these infections and adequate treatment by drainage and antibiotic therapy is critical for a good outcome.

## **Parotid Actinomycosis - Annals finding in head and neck pathology - A case report, review of the literature and actualized attitude**

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Introduction: Actinomycosis of the parotid gland is very rare and there is little data from the scientific literature on this subject. We follow for six years an 82 years old woman with a left parotid actinomycosis treated only with antibiotics with several relapses. Based on the literature, we sought to analyze the imaging findings, biological analyzes, clinical evolution, the antibiotic's chose and the place of the surgery. We retrospectively followed the patient from September 2016 to now.

Case report: The non-immune compromised patient presented to our department for the first time in September 2016 for left parotid pain and swelling. A few days later, the lesion fistulized to the skin. She underwent an ultrasound and an MRI which were in favor of a tumor or an infection. Ultrasound-guided fine-needle aspiration cytology revealed penicillin-sensitive actinomyces odontolyticus infection. We determined the duration or dose of antibiotic treatment in consultation with an infectious disease specialist after checking the patient's symptoms and the severity of the disease. Antibiotic therapy with Amoxicillin 1g 4x/d lasted 4 months. Almost 6 years later, the infection recurred in the same location. Treatment with Amoxicillin for 10 days was enough to cure the infection, but it recurred 3 months later. Despite the advanced age of the patient, surgery seems to be the treatment of choice to prevent a future recurrence.

Conclusion: It is difficult to differentiate actinomycosis from parotid tumors based on imaging tests including ultrasound, CT, MRI and PET scan. Treatment for actinomycosis of the parotid gland involves antibiotic therapy and surgery in case of doubt about the diagnosis or recurrence. Penicillin is the drug of choice, but other antibiotics may be used based on antibiogram and in discussion with the department of infectious medicine.

# First-time use of a porcine small intestine submucosal plug device to close an acquired tracheo-esophageal fistula

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**Abstract body:**

**Introduction and aim:** Acquired tracheo-esophageal fistula (TEF) is a rare, life-threatening pathology, responsible for severe comorbidities. Its management is a real therapeutic challenge and remains controversial.

**Case report:** We report the first case of endoscopic treatment of TEF by using a porcine small intestine submucosal (SIS) plug device in a young quadriplegic patient after failed surgical closure by cervicotomy.

**Results:** After one year of follow-up, oral feeding of the patient was resumed and no clinical signs of fistula recurrence were evident.

**Conclusions:** To our knowledge, we obtained for the first time, a satisfactory result for TEF closure with the use of a porcine SIS plug.

## Unilateral non selective laryngeal reinnervation - clinical case

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<sup>1</sup>: ENT Department, University Hospital of Liege, Belgium

### *Introduction:*

Unilatéral laryngeal paralysis is a pathology often of iatrogenic origin. The treatments classically proposed allow a static and sometimes transient medialization of the vocal cord. Non-selective unilateral reinnervation is a relatively recent and more physiological technique that has demonstrated its effectiveness for the treatment of unilateral laryngeal paralysis.

### *Case report:*

Mr. D, aged 56, presented with unilateral laryngeal paralysis following neuroborreliosis. Treatment by intracordal injection of hyaluronic acid resulted in inconclusive and transient improvement. After 1 year of evolution and in spite of a well-conducted speech therapy rehabilitation, the patient kept a mediocre vocal quality. He underwent non-selective unilateral laryngeal reinnervation associated with an injection of fat into the vocal cord.

### *Results:*

At 1 year after reinnervation, we noticed a very significant improvement in both objective and subjective phonation scores.

### *Conclusion :*

Non-selective unilateral laryngeal reinnervation is an excellent treatment to allow recovery of optimal voice quality in cases of unilateral laryngeal paralysis.

# **Residual hearing after cochlear implant surgery: a monocentric retrospective study**

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## Introduction and aim

In this retrospective study, we aim to evaluate the hearing remnants after cochlear implantation in patients with residual hearing before surgery and to determine the impact of a gentle surgical technique on hearing in comparison with the literature.

## Material and methods

We retrospectively collected the medical records of 102 patients who were implanted in our institution, University Hospital CHU UCL Namur, Mont-Godinne, Belgium during the period from 2013 to 2021. Of these 102 adult patients, 89 had residual hearing before surgery (50 females, 39 males, mean age: 60.5 years), of which 2 were implanted bilaterally. All patients underwent an audiometric test before and after the operation (about 6 months post-operatively). They underwent an identical surgical procedure (round window slow manual insertion) performed by the same surgeon. Statistical analysis was performed by Xcel Stat.

## Results

According to the Herring group classification, the results indicate respectively a complete, partial and minimal preservation of auditory remnants in 25 patients (28%), 31 patients (35%), 33 (37%) for frequencies ranging from 125 to 1000Hz for the whole cohort with auditory remnants (n=89). Among all of the patients, total deafness was found in 26% of cases.

Considering a subgroup of 16 patients whose preoperative PTA 125-500Hz is less than or equal to 80dB, complete preservation among frequencies ranging from 125 to 1000Hz is seen in 68.75% of cases and partial in 31.25%. Difference between the first group and the subgroup is significant ( $p < 0.01$ )

## Conclusion

Gentle surgery can preserve the hearing remnants completely in 68.75% of cases in patients with a preoperative PTA 125-500 less than or equal to 80dB. These results correlate with those found in the literature.

These results also show the importance of such surgery on patients with significant hearing remains and should be an argument in favor on an enlargement of the restricted reimbursement criteria of patients eligible for an implant.

# **Gradenigo Syndrome complicated by partial cavernous sinus thrombosis and internal carotid artery arteritis**

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## **Abstract**

### **Introduction and aim:**

Gradenigo Syndrome (GS) is a rare condition characterized by a triad of suppurative otitis media, ipsilateral abducens paresis, and trigeminal neuralgia. The disease results from infection of the os petrosum by a suppurative otitis media.

### **Case report:**

We present a case of a six-year-old boy with GS complicated by partial cavernous sinus thrombosis and internal carotid artery arteritis.

### **Conclusion:**

Otitis media is a very frequent condition, especially in childhood, with a prevalence of over 80% before the age of six. Otitis media should always be closely monitored as it can cause several life-threatening complications. Any child with acute otitis media who is suspected of having intracranial complications should be further examined with appropriate imaging.

Because of the advent of antibiotics, the incidences of GS have been greatly reduced. Nevertheless, due to antibiotic resistance it is very important to keep this diagnosis in mind because of serious uncommon life-threatening complications.

## **Solitary lung metastasis in the internal auditory canal: a case report**

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**Introduction:** Non-small cell lung cancer (NSCLC) accounts for 85% of lung cancer cases and approximately 30-40% of these cancers have distant metastases at diagnosis. Although the most frequent sites of metastasis are bone, lung and brain, the temporal bone is rarely involved, and metastatic involvement of the internal auditory canal (IAC) is extremely rare. We report here a case of a solitary metastatic tumor of the IAC due to NSCLC.

**Case Report:** A 58-year-old man presented himself at our department with a month-long history of left-sided hypoacusis, tinnitus and instability, followed by peripheral left facial palsy two weeks later. He had been diagnosed with NSCLC (T4N1M0) two years prior and treated with concurrent radiochemotherapy and maintenance immunotherapy for 4 months. His last follow-up, performed a month prior to symptoms onset, showed no tumor recurrence. Physical examination showed grade 6 left facial palsy and positive left head impulse test without nystagmus. Pure tone audiometry confirmed profound sensorineural hearing loss. A head Computed Tomography (CT) scan demonstrated a nodular contrast-enhanced lesion of the left IAC. Magnetic Resonance Imaging of the brain showed a contrast-enhanced fusiform lesion of the VII and VIII nerves, extending from the pontocerebellar angle to the bottom of the IAC and along all facial nerve segments. Due to the rapidly progressing sensorineural hearing loss, followed by facial palsy, and oncological past, a diagnosis of solitary metastasis of a poorly differentiated NSCLC within the IAC was evoked in the first instance. A biopsy will be performed to confirm the definitive diagnosis.

**Conclusion:** Metastasis in the IAC is extremely rare but its diagnosis should be evoked in patients with rapidly evolving acoustic-facial bundle symptoms and oncological history.

## **An ossicular chain is only as strong, in conduction, as its weakest link**

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### Abstract

*Introduction:* Ossicular chain dislocations can occur after (high energetic) trauma and can account for a conductive hearing loss in 4% of the patients. A dislocated ossicular chain resulting in a persistent conductive hearing loss is thus rather a rare occurrence after trauma. The most common site for a dislocation has been reported to be the incudostapedial joint. A case of a post-traumatic luxation of the incus is thus even a rarer occurrence.

*Aim:* The aim is to report a very rare case of an ossicular chain dislocation after trauma that was resolved after a standard otological procedure.

*Intervention:* Transcanal ossiculoplasty

*Outcome measurements:* The results of pure-tone audiometry and speech audiometry

*Conclusion:* Although ossicular chain dislocations are a relatively uncommon finding causing conductive hearing loss, they often can be resolved with minimal invasive standard otological interventions to the comfort of patients.



# **Paucisymptomatic post-surgical megamucocele of the sphenoid sinus. Case report**

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## **Abstract**

### **Introduction**

We present a case report of a patient with a mucocele in the sphenoidal sinus. Mucoceles are benign pseudo-cystic tumors that mostly develop in the frontal-ethmoid complex of the sinus. Although sphenoidal inflammatory phenomena are rare, sphenoidal mucoceles represent about 17 to 35% of such cases. The importance of endoscopic and radiographic examinations in diagnosing this condition is emphasized.

### **Case report**

The patient in this case had a history of neurosurgical and frontal surgery and radiotherapy 20 years ago. She was sent to the center after imaging revealed an expansive lesion in the left ethmoidal and sphenoidal sinuses. Although the examination did not show any significant symptoms apart from a septal deviation, a preoperative CT scan revealed a voluminous mass in the sphenoidal sinus. The lesion was diagnosed as a megamucocele, and the patient underwent a large endoscopic marsupialization with postoperative treatment including nasal care, antibiotic therapy, and cortisone spray. The postoperative period was uneventful and the stoma is still open six months after the marsupialization.

The discussion covers the etiology and symptoms of sphenoidal mucous cysts, which are often difficult to diagnose due to the variety of symptoms and their aspecificity and highlights the importance of imaging for accurate diagnosis.

### **Conclusion**

A sinus CT-scan must be performed in all patients with naso-nasal complaints if he underwent a sinus surgery in the past and when the nasal endoscopy cannot control clearly all the sinus cavities.

The severity of the complaints is not necessarily correlated to the size and the expansion of the mucocele.

## **Neonatal bilateral vocal cord paresis due to MUSK mutation: a report of a rare case**

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Introduction and aim:

The MuSK gene is responsible for the tyrosine kinase receptor present in the post synaptic neuromuscular junction.

MuSK mutations can present clinically with a large spectrum of myasthenic pathologies with different degrees of severity.

Most phenotypes present a post synaptic congenital myasthenic syndrome. Clinically, this syndrome is characterised by ophthalmoplegia as well as diffuse muscular weakness of the bulbar, torso and limb muscles. In our case, the lesion seems to involve only the abductor muscles of the larynx as no other muscular abnormality was discovered.

Case Report :

We report a case of neonatal respiratory distress at birth due to vocal cord paresis and inability to sustain efficient abduction of the vocal cord muscles.

The newborn was stable when resting but desaturated rapidly when agitated, crying or eating.

Non invasive positive pressure ventilation was used during the first month of life to maintain normal saturation levels. As stridor, cyanosis and desaturation still occurred, the decision was made to place a tracheotomy at 30 days of life.

Ephedrin was also prescribed, as it is advised in myasthenia gravis, but brought no benefit to our patient.

It is to be noted that the parents, who were homozygote carriers of the mutations were asymptomatic. Our patients' older brother, died at the age of 5 days from respiratory failure. Fibroscopy had not been performed in this patient and it is now thought that he might equally have suffered from isolated vocal cord paresis.

Conclusion :

We report the case of a rare biallelic heterozygote mutation of the MuSK gene, presenting with isolated neonatal vocal cord paresis and respiratory distress.

This isolated lesion of the laryngeal abduction muscles is extremely rare, only one other case has been reported in the literature.

This case highlights MuSK mutations as possible differential diagnosis for vocal cord paresis in newborns.

# Impact of DFNA9 on speech understanding in noise: a moderator regression analysis

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## Introduction and aim:

DFNA9 is an autosomal dominant disorder, characterized by progressive sensorineural hearing loss and vestibular deterioration. It is caused by mutations in the Coagulation Factor C Homolog (COCH)-gene. In this study we aimed to compare the speech perception in noise (SPIN) in DFNA9 patients (pts) with subjects with hearing loss due to non-genetic causes.

## Material and methods:

92 ears with the p. (Pro51Ser) mutation in the COCH-gene were matched based on high fletcher index (HFI) with 94 ears with no genetic mutation. A moderator regression analysis is used to determine whether the relationship between HFI and SPIN depends on (is moderated by) the presence of DFNA9.

## Results:

The difference in median age between the subjects with and without DFNA9 was approximately 15 years with an associated P value of < 0.0001. There was no significant difference in frequency of genders, HFI and SPIN results. The average performance in DFNA9 pts on SPIN was -0.81 dB SNR compared to -2.53 dB SNR in healthy ears. There is a strong causal effect between HFI and SPIN (P-value < 0.00001). DFNA9 has a significant effect on the relationship between HFI and SPIN (P-value < 0.00001).

## Conclusions:

This study shows that DFNA9 causes faster regression of SPIN than expected based on tonal audiometry. This is an interesting finding as it emphasizes that this alone is not sufficient in the standard follow-up of this category of pts since they will need hearing aids more quickly based on alternative criteria.

# « Having a carotid in the throat » : A rare case of internal carotid medialization induced dysphonia

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## **Introduction and aim**

Aberrant positions of the extracranial internal carotid artery (eICA) affect between 10 and 40% of the population and can present several forms that can bring them close to the pharyngeal walls. Although usually asymptomatic, some aberrant positions of eICA may cause symptoms such as cough or dysphagia but rarely dysphonia. Depending on their location they can also represent a great risk during oro/hypopharyngeal interventions or intubations. The aim of this study is to describe a rare case of medialization of the internal carotid artery causing dysphonia and to draw the attention of ENT specialists to the associated operative risk.

## **Case report**

A 72-year-old patient came for a first consultation with a little progressive chronic dysphonia without associated dysphagia or cough. The nasofibroscopy revealed a pulsatile retrocricoid mass pushing the right arytenoid forward. Otherwise, the clinical examination of the ENT sphere was normal.

A cervicofacial CT scan revealed a major medialization of the right carotid bifurcation and the eICA located within the retropharyngeal fatty space and causing a mass effect pushing forward and downward the right arytenoid and the piriform sinus, resulting in a loss of horizontality of the glottis plane.

Given the absence of life-threatening complications and the associated risk of surgery, no treatment was proposed. A follow-up was established after discussion with the patient.

## **Conclusions**

We report here a rare case of isolated dysphonia caused by right internal carotid medialization with mass effect on the arytenoid cartilage. It seems important for ENT to know these rare causes of dysphonia and/or dysphagia due to anatomical variations of eICA in order to avoid the operative risks associated with possible future therapeutic procedures in these patients.

# Progressive cochleovestibular dysfunction revealing an atypical Sturge-Weber syndrome

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## Abstract

**Introduction and aim:** Sturge-Weber syndrome is a rare congenital disorder characterized by a facial port-wine birthmark in the dermatomes of the trigeminal nerve, venous and capillary malformations in the brain and increased ocular pressure. The clinical presentation is very heterogeneous. Visual impairment due to glaucoma is common. Neurological symptoms include seizures, mental retardation, hemiparesis and headaches, which are caused by leptomeningeal angiomatosis. Neuro-otological manifestations of Sturge-Weber are only rarely described in the literature. We here present a case of a patient with vertigo and hearing loss caused by Sturge-Weber syndrome.

**Case Report:** A 31-year-old man, with a recent history of left-sided vestibular areflexia, presented with sudden high-frequency sensorineural hearing loss and tinnitus on the same side. He has a congenital port-wine stain of the left facial hemisphere, involving V3, C2 and C3, and a congenital absence of the left forearm. No history of glaucoma was present. MRI scan with gadolinium injection showed prominent leptomeningeal enhancement in the left internal auditory canal. In addition, a decreased T2-signal of the endolymph and perilymph was seen in the left inner ear structures. Extensive neurological investigations including blood tests, lumbar puncture and PET-CT scan were all negative. The combination of leptomeningeal angiomatosis and the facial birthmark lead to the diagnosis of an atypical Sturge-Weber syndrome.

**Conclusions:** This case report shows that neuro-otological symptoms are possible manifestations of Sturge-Weber syndrome. In patients with hearing loss or vertigo and a facial port-wine stain, MRI is warranted to rule out leptomeningeal angiomatosis.

## Primary invasive aspergillosis of the larynx in an immunocompromised patient: case report and literature review

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Introduction and aim:

Laryngeal aspergillosis is rare and most of the time the extension of a pulmonary or systemic infection. We discuss here the case of a 66-years-old man suffering from pancytopenia who developed primary invasive aspergillosis of the larynx. Through this case report and literature review, we aim to remind ENT practitioners of this rare condition.

Case report:

A 66-year-old man recently diagnosed with aplastic anemia leading to pancytopenia developed a sore throat and dysphonia. Indirect laryngoscopy revealed right arytenoid and aryepiglottic fold oedema with right laryngeal hemiparesis. Cervical CT scan demonstrated right laryngeal mucosal oedema beginning downstream of the vallecula and extending to the larynx over 6 cm with no underlying mass or abscess. Diagnosis of primary laryngeal invasive aspergillosis was finally made based on biopsies performed ten days after initial symptoms; a secondary pulmonary involvement was discovered on a renewed CT scan. Amphotericin B was started but had to be switched to Voriconazole due to renal failure, and finally to Isavuconazole when the antibiogram demonstrated a multi-sensitive *Aspergillus fumigatus*. We perform a second suspension laryngoscopy and discovered extensive pharyngo-laryngo-tracheal necrosis. A multidisciplinary staff was held with the family, which decided on treatment de-escalation. Autopsy revealed an invasive aspergillosis involving the lungs, heart, liver, thyroid, larynx, and trachea, with massive necrosis found in the larynx and trachea.

Conclusion:

Primary laryngeal invasive aspergillosis in an immunocompromised patient is a rare condition; our literature review demonstrated only ten other cases. Laryngeal aspergillosis should be suspected in all immunocompromised patients suffering from laryngitis-like symptoms and a prophylactic treatment has to be started as soon as aspergillosis is suspected. Clinical diagnosis is difficult and early biopsies will help to identify the fungus rapidly. A delay in treatment can cause fatal consequences.