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High-resolution imaging of the human cochlea through the round window by means of optical coherence tomography

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Human cochlea is deeply embedded in the temporal bone and surrounded by a thick otic capsule, rendering its internal structure inaccessible for direct visualization. Clinical imaging techniques fall short in their resolution for imaging of the intracochlear structures with sufficient detail and this results in lacking guidance for safe placement of the inner ear therapies inside the cochlea. In the past decades, optical coherence tomography (OCT) has proven valuable for non-invasive, high-resolution, cross-sectional imaging of tissue microstructure in various fields of medicine. There is an upcoming interest for OCT imaging of the cochlea, which so far was mostly carried out in small animals. In this temporal bone study, we focused on high-resolution imaging in the human cochlea. The cochlea was approached through mastoidectomy and posterior tympanotomy, standard surgical procedures in clinical practice. Subsequently, high-resolution images of the cochlear 'hook region' were acquired through intact round window membrane in four cadaveric human temporal bones with spectral-domain OCT imaging system from Thorlabs. We will discuss the qualitative and quantitative characteristics of intracochlear structures on OCT images.

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Surgical simulation in temporal bone surgical radio-anatomy learning

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Introduction and aim

We aimed to evaluate high-fidelity virtual reality simulation in learning of temporal bone radio-anatomy during ENT residency.

Material and methods

Primary investigation: fifteen ENT residents completed a radiological temporal bone anatomical testing before and after five training sessions on the VOXEL-MAN Tempo® surgical simulator. *Secondary investigation*: residents also completed a personal subjective assessment after these training session and residents' technical skills were assessed on cadaveric temporal bones.

Results

Primary outcome: Residents significantly improved their performance on the temporal bone radiological anatomy test after completing virtual training on the simulator. *Secondary outcomes*: The personal assessment survey indicated that 100% of the residents would integrate this virtual tool within the learning methods. No significant correlation was found between virtual simulator performances and surgical performances on cadaveric model, but a significant correlation was shown between the anatomical testing result and the performances on cadaveric model.

Conclusions

This study suggested that a high-fidelity virtual reality simulator, the VOXEL-MAN Tempo® device, improved teaching of temporal bone anatomy and specifically increased trainees' practical knowledge regarding radiological anatomy of temporal bone.

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The value of 4 stage vestibular hydrops grading and asymmetric perilymphatic enhancement in the diagnosis of menière's disease on MRI

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Introduction and aim

The diagnosis of Menière's disease (MD) is based on anamnesis and complemented by audiological and vestibular tests. However, there is no gold standard test. The 4-hours delayed gadolinium (Gd)-enhanced 3-dimensional fluid attenuated inversion recovery (3D FLAIR) high-resolution magnetic resonance imaging (MRI) has enabled us to visualize endolymphatic hydrops (EH), the histopathological basis of MD. The purpose of this study is to investigate the reliability and validity of this MRI and grading systems for EH and perilymphatic enhancement (PE).

Material and methods

Between January 2015 and December 2016, the MRI data of 148 patients (296 ears) with Menièriform symptoms were retrospectively analyzed. The degree of cochlear hydrops was categorized as none, grade I or grade II. For the degree of the vestibular hydrops, we used a modified 4-stage grading system. We added a lower grade I vestibular hydrops. The degree of PE was also evaluated. Vestibular and cochlear EH and PE were reviewed twice by three readers. The Cohen 's kappa statistic was used to estimate the degree of chance-adjusted agreement between the readers. IBM SPSS Statistics V24 was used for the statistical analysis.

Results

105 of 148 patients had unilateral disease resulting in 105 normal ears, 26 undefined ears, 1 probable MD ear and 78 definite MD ears. 13 Patients had bilateral disease resulting in 5 undefined ears, 5 probable MD ears and 16 definite MD ears. 30 Patients were classified with undefined problems. Cochlear PE and vestibular EH are the 2 characteristics which are needed to identify definite MD. Cochlear PE remains the most specific parameter with a maximum increase in sensitivity by adding vestibular EH in a 4-stage grading system.

Conclusions

Our study shows that delayed gadolinium-enhanced 3D FLAIR MRI using vestibular-cochlear EH and PE grading system is a reliable technique. A 4-stage vestibular EH grading system in combination with cochlear PE assessment gives the best diagnostic accuracy to detect MD. Cochlear EH and vestibular PE prove to have no additional diagnostic value.

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The MO-meatocanalplasty: long term results in the narrow external auditory canal with recurrent otitis externa or the inability to wear a hearing aid

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Objective

The MO-meatocanalplasty is the oblique modification of the M-meatoplasty. The MO-meatocanalplasty was designed to address the superior quadrants of the meatus and the bony canal without the need for a retro-auricular incision. This retrospective analysis was performed to evaluate the long term results of the MO-meatocanalplasty in the narrow external auditory canal (EAC) with recurrent otitis externa or the inability to wear a hearing aid.

Methods

Patient files of twenty-two ears in twenty-two consecutive patients who received a MO-meatocanalplasty for a narrow EAC with recurrent otitis externa or the inability to wear a hearing aid were analysed retrospectively. There were no patients included with any type of previous or planned second stage tympanoplasty procedures. A follow-up period of 3 years was analysed for post-operative recurrent narrowing, the self-cleaning capacity of the EAC, the recurrence of otitis externa, the inability to wear a hearing aid, change in hearing level and for all types of esthetical complaints.

Results

The MO-meatocanalplasty procedure was effective in 81,8% (n=18). Post-operative recurrent narrowing was detected in 9,1% (n=2). Insufficient self-cleaning capacity of the EAC was 9,1% (n=2). The ability to wear a hearing aid was restored in 3 out of 4 patients with the need for a hearing aid. No esthetical complaints were reported.

Conclusion

The MO-meatocanalplasty is an effective, safe and esthetical accepted procedure to address the narrow meatus and external auditory canal, without the need for a retro-auricular incision, to create a well aerated, dry, self-cleaning EAC in patients with a narrow EAC with recurrent otitis externa or with the inability to wear a hearing aid.

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Transmeatal procurement of allograft tympano-ossicular systems: a retrospective audit on clinical outcome

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Introduction and aim

Endoscopic transmeatal procurement of allograft tympano-ossicular systems (ATOS) has several advantages compared to the traditional transcranial Schuknecht bone plug technique: contact with the dura mater is avoided, eliminating the risk of prion transmission, it is less time-consuming and not esthetically invasive. Its technical feasibility has already been reported.
We have reported that there is no difference in clinical outcome between transplantation of endoscopically procured ATOS compared to transcranially procured ATOS in a prospective double-blind randomized audit with a small group of patients. Our aim is to investigate the clinical outcome after transplantation of endoscopically procured ATOS in a large group of patients.

Material and methods

Retrospective audit on all tympanoplasty cases in the Antwerp University Hospital between 06/2013 and 10/2018 where endoscopically procured ATOS were used to reconstruct the tympanic membrane. The endoscopic procurement technique was performed with a 30° rigid endoscope (Hopkins rod) and a portable Tele Pack (Storz). After a 360° Rosen incision, the meatal cuff and the fibrous annulus were released from the bony structures before harvesting the allograft. The data were gathered retrospectively. The graft take-rate was evaluated three months postoperatively. We used the post-operative consultation notes to collect data retrospectively.

Results

209 patients received transmeatally procured ATOS. 5,2% of the patients showed reperforation, 3,8% showed myringitis and 3,8% showed anterior blunting. Twelve different surgeons performed the allograft tympanoplasties. Three patients were lost to follow-up. Male/female ratio was 124/85. Median age was 34 years ranging from 4 years to 85 years.

Conclusions

Allograft tympano-ossicular systems can be safely procured by means of the endoscopic transmeatal technique. This technique has several advantages compared to the former transcranial procurement technique. It is not only esthetically less invasive, it avoids risk of prion transmission and is less time-consuming. This retrospective study demonstrates a low reperforation risk in a group of cases with various severities of chronic otitis media and therefore validates the endoscopic technique as the new standard procurement technique.

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Factors affecting audiometric outcomes in otosclerosis: a retrospective single-centred analysis of consecutive patients undergoing stapes surgery

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Introduction and aim

This study evaluated the results of stapedotomy with placement of a stapes prosthesis in otosclerosis performed in our centre, particularly the role of patient- and technique-related factors in the audiometric outcomes.
Material and methods
The analysis included consecutive stapedotomies with placement of a stapes prosthesis in confirmed otosclerosis, performed by a single surgeon starting from November 2011. Audiometric pre- and postoperative air (AC) and bone conduction (BC) thresholds at 0.5, 1, 2 and 4 kHz were retrieved and the air-bone gap (ABG) and gains calculated. Postoperative hearing success was defined as a postoperative ABG ≤20 dB. The more stringent criterion of a postoperative ABG ≤10 dB was also assessed. Evaluated factors were patient characteristics (gender, age, affected ear, retrofenestral extension, baseline audiometric data) and surgical properties (year of surgery, CO2 laser technique, prosthesis diameter, ossicular chain damage). Statistical analyses were performed using R Studio software.

Results

The interim analysis of data up to July 2017 included 168 interventions, mainly primary interventions (96.4%) using CO2 laser (94.6%) with placement of a 0.6mm prosthesis (84.5%). Preoperative versus postoperative AC, BC and ABG were all significantly different ($p<0.001$). The postoperative ABG was closed to ≤20 dB in 152 cases, which corresponds to a 93.3% success rate. The probability of achieving this hearing success was not significantly affected by any of the evaluated factors. However, the year of surgery had a significant impact on the achievement of the more stringent criterion of a postoperative ABG ≤10 dB.

Conclusions

In line with literature findings, stapedotomy with placement of a stapes prosthesis is an effective treatment option in otosclerosis. Our analysis could not detect any predicting factor, except for the surgeon's expertise. To investigate the growing experience over time, a comparison of the described cohort with our current cohort (2017-2018) is scheduled.

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Blast and cholesteatoma: our experience

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Introduction and aim

Brussels terrorist attacks of March 22, 2016 had numerous otological consequences, including blast-related tympanic membrane perforations. In this study, we analyze the evolution of these tympanic perforations, including the post-operative period, when surgery was indicated.

Material and methods

In this retrospective observational study, all patients were victims of Brussels terrorist attacks and are followed up at Saint-Pierre hospital for tympanic membrane perforations. They had no previous otological history. Tympanoplasties were performed by two different surgeons. Surgical outcomes were examined and we quantified rates of reperforations and postoperatives cholesteatomas.

Results

Six patients (12 ears) with bilateral tympanic membrane perforations were followed up. Two perforations had a spontaneous healing (2/12). One patient had an epidermal ingrowth around the perforation before surgery. After the first tympanoplasty with perichondrium (6/10), cartilage and perichondrium (3/10) or temporal fascia (1/10), there was a quick reperforation in 80% of cases (8/10) associated with epidermal invagination in 87% of cases. One patient has not been reoperated yet. A revision tympanoplasty with perichondrium (2/7) or cartilage and perichondrium (5/7), let once again to a reperforation in 28% of cases (2/7). One of these perforations had an epidermal invagination associated. Some patients had an epidermal pearl outside the tympanic membrane which could be removed at consultation (2/7). After a follow-up of almost 2 years, tympanic membranes are closed in 66% of the ears (8/12 ears), with cholesteatoma excluded.

Conclusions

In blast-induced tympanic membrane perforations, rate of reperforation and postoperative cholesteatomas are increased. We are trying to analyze this high incidence of cholesteatoma. A close clinical and radiological long term follow up is mandatory.

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Comparison of various outcome measures of transcutaneous bone conduction devices: passive (Baha® Attract) versus an active implant (BONEBRIDGETM)

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Introduction and aim

Bone conduction devices (BCD) aim to improve hearing by transferring sound by bone vibration directly to the cochlea and bypassing the outer and middle ear. It is indicated in conductive or mixed hearing loss (HL) as well as single-sided deafness (SSD). Literature on percutaneous BCDs reported significant hearing gains but also significant rates of skin complications and extrusion. Transcutaneous BCDs have a magnetic connection and leave the skin intact. In case of the passive BCD vibrations are generated in the external audioprocessor, while in the active BCD this occurs in the implanted transducer. The aim of this study was to report outcomes of a passive transcutaneous BCD, Cochlear Baha Attract, and an active transcutaneous BCD, the Medel Bonebridge.

Material and methods

A retrospective study was performed in 41 patients implanted at the Antwerp University Hospital (UZA) between 2015 and 2018 (30 passive and 11 active implants). Different outcome measures where measured pre– and postoperatively: pure tone audiometry (PTA), speech perception in quiet (SPIQ) and in noise (SPIN), subjective and objective datalogging and skin complications.

Results

The mean age of all patients at implantation was 55,4 years (10-79 years) and with 52,5% males. In the patients implanted with a passive BCD, 7 presented with conductive HL, 15 with mixed HL, 2 with unilateral severe sensorineural HL and 5 with SSD. In the patients implanted with an active BCD, 4 patients presented with conductive HL and 7 with SSD. SPIQ and SPIN improved significantly with both BCDs, with significantly better improvement of SPIN with the active BCD. The aided passive BCD condition and Baha on softband (preoperative trial) showed no significant difference in SPIN and SPIQ results. Datalogging showed that, per day, the active BCDs were used significantly longer (11.7 ± 4.4h) than the passive BCDs (5.4 ± 4.8h). No skin complications were reported in the group implanted with the active implant system. In the passive BCD, two patients needed revision surgery, one due to recurring osteomyelitis and the other because of intact skin irritation.

Conclusions

Transcutaneous BCDs produce a significant improvement of speech perception in quiet and noise in patients with a conductive HL, mixed HL or SSD. They lack the skin complications familiar to percutaneous BCDs, such as peri-abutment infection/inflammation, skin overgrowth, etc. leading to pain and non-use. Datalogging demonstrated that the active BCDs were worn longer throughout the day than the passive BCDs.

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Correlation between acoustic well-being of nursing home residents using hearing aids and acoustic levels in their institution

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Introduction and aim

Following the recent increase in life expectancy and subsequent ageing of the general population, progressive hearing loss is becoming more prevalent. Hearing aid use is also becoming more widespread, especially in nursing homes.
This work set out to observe and quantify the noise-related burden experienced by nursing home residents using hearing aids, inside the restaurant of five different nursing homes in the Walloon Brabant region of Belgium. We compared subjective patient-reported noise tolerance with objective sonometric measurements, in order to advise nursing homes on ways to improve the quality of life of residents.

Material and methods

We measured sound levels using sonometers in nursing home restaurants, as well and in residents' rooms (both empty and in real world situations). Then, residents were asked to fill out a questionnaire that evaluated noise-related nuisance.

Results

Only two of the five nursing homes that took part in this study complied to all current recommendations concerning noise absorption (duration of reverberation and acoustic pressure equivalence). Our study shows a correlation between residents' self-reported noise related burden and the level of acoustic absorption in their nursing home restaurant.

Conclusion

This study shows a correlation between the quality of acoustic absorption in nursing home restaurants and self-reported noise-related burden by residents. Following these results, we advise nursing homes to improve acoustic absorption in their facilities, so as to comply with current norms.

Additional note: Additional results will be available for the final presentation in February. We are looking at links between residents' personal financial wealth, price and quality of their hearing aids, and nursing homes fees.

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Influence of audio-visual integration abilities and residual hearing on performances with cochlear implant in post-lingually deafened adults

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Aim

The aim of this study is to assess the predictive value of the pre-implantation audiovisual abilities on the functional results after cochlear implantation in post-lingually deafened adults.

Material and method

This retrospective study is held in an academic referral centre. Forty- seven post-lingually deafened implanted adults (17 to 81 years old) are included.
Audio-visual abilities in pre- and at 1 year post-implantation are estimated with the "DEWA" perception test. This test consists in the auditory only (A), visual only (V), audio-visual congruent (AVC) and audio-visual incongruent (AVI) presentation of phonemes and monosyllabic words.
Auditory performances were assessed with tonal and speech audiometry (ACI) and various tests of words and sentences recognition. Those evaluations were performed in pre-implantation at 1, 3, 6 and 12 months post-implantation.

Outcomes

Patients with good pre-CI audio-visual performances (AVC+A+V > 30%) have a favourable evolution in post-CI (word recognition at 1 year > 70% in 95% of cases; p =.000). Patients with poor pre-CI audio-visual performances (AVC+A+V < 30%) present a risk for unfavourable evolution after cochlear implantation (word recognition at 1 year < 60% in 50% of cases). In this last group, patients with pre-CI residual audition (hearing level < 95 dB SPL) tend to present better oral results in post-CI (p=.042).

Conclusion

Pre-implantation audio-visual performance and residual audition have a predictive value for speech perception outcomes with cochlear implant.

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Force and pressure measurements in temporal bones

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Introduction

The aims of this study are to investigate a possible correlation between the time point at which peak hydraulic pressure and peak force on the cochlear wall appears during insertion of a cochlear implant electrode and to investigate whether a difference exists in maximum hydraulic pressure and maximum force on the cochlear wall during a fast and slow insertion, a manual and automatic insertion and an electrode insertion into a narrow or wide round window (RW) opening.

Material and methods

Twenty fresh frozen human temporal bones were used. Intracochlear hydraulic pressure and force on the cochlear wall were recorded during round window insertions of a straight electrode array with different insertion speeds, different insertion methods and with different widths of the opening of the RW.

Results

A statistical significant correlation between the time point at which peak hydraulic pressure and peak force on the cochlear wall appears was found ($r=0.91$, $p<0.001$). Furthermore, a slow insertion speed showed a higher hydraulic pressure and a higher force on the cochlear wall compared to a fast insertion speed ($p<0.001$). No statistically significant effect of insertion method or the width of the opening of the RW was found on hydraulic pressure and on force on the cochlear wall.

Conclusions

Peak hydraulic pressure and peak force on the cochlear wall during electrode insertion seems to appear at approximately the same time. Furthermore, a slow insertion speed seems to result in a higher intracochlear hydraulic pressure and a higher force on the cochlear wall.

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Post-operative pain after ear surgery: a prospective comparative evaluation of endoscopic transmeatal and microscopic endaural and retro-auricular approach

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Introduction and aim

Up to now little is known about post-operative pain after ear surgery. With the introduction of the endoscope in otology more procedures can be performed transmeatally with minimal soft tissue trauma. It is interesting to learn more about the effect on pain and quality of life after transmeatal endoscopic approach (Rosen incision) and compare this with patients who underwent an operation by endaural (Lempert incision) or retro-auricular approach. We postulate that there is less pain following surgery in the transmeatal group compared to the endaural and retro-auricular group. Moreover we aim to compare the influence on daily activities and quality of life post-operatively between the three groups.

Material and methods

This is a prospective study in which participants were asked to evaluate post-operative pain 10 times (day 1, 2, 3, 4, 5, 6, 7, 10, 14, 21). The Brief Pain Inventory, an internally reliable and validated questionnaire, was used to measure pain. Inclusion finished when 20 completed questionnaires per group were collected. To test our hypotheses Bayesian RM ANOVA was used.

Results

Seventy-two patients are included; 24 in the retro-auricular group, 27 in the endaural group and 21 in the transmeatal group. A Bayes factor of 1.50, 0.33 and 0.70 is found in the comparison of respectively maximum, minimum and average post-operative pain over the first week after surgery. A Bayes factor of 0.97, 8.57, 2.96 and 14.73 is found respectively in the comparison of general activities, normal work, sleep and influence on normal sleeping position.

Conclusion

Our data do not support the hypothesis that there is less pain following ear surgery performed transmeatally compared to an endaural and retro-auricular approach. The data show that a retro-auricular approach in ear surgery has more influence on sleeping position, compared to a transmeatal or endaural approach.

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Contribution of the dynamic visual acuity study to the diagnosis of vestibular deficit

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Introduction and aim

In healthy subjects, visual acuity is identical whether the head is static (Static Visual Acuity ,SVA) or in motion (Dynamic Visual Acuity,DVA). In contrast, patients with vestibular deficit typically display DVA deterioration. The main goals of the current study was to link DVA measures with those of other vestibular tests.

Material and methods

Data was collected in 170 patients seen between 2012 and 2016, presenting vestibular complaints, in an academic center. We compared their results of DVA measures to the results of Multitest Equilibre Test of Framiral (MTT) (N=129), Video Head Impulse Test (VHIT) EyeSeeCam (N=47), VHIT Synapsis (N=125), Vestibular Evoked Myogenic Potentials (VEMPs) (N=94) and videonystagmography (VNG) (N=123).

Results

Statistically, right sided DVA impairment was more highly correlated with pathological values in other vestibular tests like MTT, VHIT (right lateral and right anterior) and VNG (right caloric hyporeactivity). Saccular or utricular impairment did not seem to impact DVA testing in the horizontal plane. However, utricular impairment did significantly impact negatively DVA when measured in the vertical plane.

Conclusions

Left vestibular receptors dysfunction has less impact on the DVA than right disorders. Vestibular visual compensation is influenced by the hemispheric vestibular functional asymmetry.

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The vestibular patient on the road

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Introduction and aim

Vertigo is amongst the most common symptoms in our daily practice. However, little is known about the driving (dis)ability of vestibular patients. According to the Belgian law, patients who suffer from unexpected vertigo spells, are prohibited to drive. Currently, no further guidelines are available to counsel patients with vestibular disorders causing imbalance or positional vertigo spells. Patients with bilateral vestibulopathy typically suffer from oscillopsia and imbalance. Hence, it could conceivably be hypothesized that these patients present driving difficulties. In this literature review, our aim is to gain more insight in the driving ability of vestibular patients, especially those with bilateral vestibulopathy and presbyvestibulopathy.

Materials and methods

A literature search in the Pubmed and Cochrane database was conducted with the following search terms: "vertigo", "dizziness", "drive", "driving", "fitness to drive" and "questionnaire". Articles in English about driving ability and driving difficulties in patients with dizziness or diagnosed vestibulopathy were included.

Results

Seven studies were included. A questionnaire-based study in 118 vestibular patients revealed difficulties of driving in situations with less or complex visual feedback. In the American National Health Interview Survey (NIHS) of 2016 study, 0.4% of the participants who answered positive for vestibular vertigo had an injury due to a car accident while driving in the past three months, on the contrary for the participants who answered negative, this was 0.1% (OR 3.5). Sindwani et al. did a survey regarding vertigo patients, 12% of those had an injury due to a car accident in their life because of their dizziness. Next from the injured patients only 39% were diagnosed with a vestibular disorder. A questionnaire-based study in Finland reported for Meniere's disease that patients with the disease have fewer traffic accidents (annual risk 0.8%) as expected by the general population (annual risk 1.7%). In the National Health and Nutrition Examination Surveys (NHANES) of 2001-2004 vestibular dysfunction was associated with a twofold increased odds of driving difficulty (OR 2,16). A study in Alzeimer patients and patients with mild cognitive impairment with and without bilateral saccular impairment showed a significant odds ratio of 12 for driving difficulty.
Mc Dougal et al. analyzed head movements during driving of patients with a bilateral vestibular hypofunction and compared this with healthy controls during driving. However, the number and amplitude of head movements did not differ largely between these two groups.

Conclusions

Vestibular patients with vertigo and/or vestibular hypofunction, do report difficulties while driving. Currently there are no objective measurements to evaluate the driving ability in vestibular patients. Hence, further research is needed to develop practical guidelines to counsel vestibular patients about their driving (dis)ability.

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Correlations between vestibular function and imaging of the semicircular canals in DFNA9 patients

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Introduction and aim

Radiologic abnormalities on computed tomography (CT), incl. narrowing or sclerosis of the semicircular canals (SCC), and T2-weighted magnetic resonance imaging (MRI), incl. signal loss in the SCC, have been reported as features in patients with P51S-mutations in the COCH gene (i.e. DFNA9). The aim of our study was to correlate electronystagmography (ENG) data with imaging results in DFNA9 patients.

Material and methods

A retrospective study was performed in 45 patients with P51S-mutations in the COCH gene. ENG caloric responses, CT and MRI data were analyzed from June 2003 until May 2014. More than half of patients (54%) were candidates for cochlear implantation.

Results

In our population, 91% of patients had sclerotic lesions and/or narrowing in one or more SCC on CT-scan. All patients had SCC narrowing or signal loss on T2-weighted MRI. The lateral SCC was affected in 65% on CT-scan and 97% on MRI. However, in 83% of patients, all three SCC were affected on MRI. Furthermore, 77% of patients showed a bilateral, 11.5% a unilateral and 11.5% no hypofunction on ENG. CT abnormalities correlated with hypofunction of caloric responses. This statistically significant difference was present if abnormalities were observed in at least one of the SCC as well as in ipsilateral lateral SCC function loss. MRI abnormalities in at least one of the SCC correlated with ENG hypofunction, but there was no direct correlation between lateral SCC abnormalities on MRI and ENG.

Conclusions

Our retrospective analysis confirms the presence of CT and MRI abnormalities in DFNA9 patients with the P51S-mutation in the COCH gene. A correlation between these radiologic features and vestibular function (tested by means of caloric response) was found in this population.

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Clinical balance testing to screen for patients with vestibular disorders. An observational case-control study

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Introduction and aim

Balance disorders are common in the general population and are significantly associated with an increased rate of falls and work disability. This causes an increased cost for society. The possible causes of balance disorders are numerous, including vestibular disorders. However, there are few clinical tests available for the physician to rapidly screen for vestibular disorders.
The aim of our study is to identify useful clinical screening tests to proficiently screen for patients with vestibular disorders.

Materials and methods

In total, 318 healthy individuals and 315 patients with known vestibular disorders were included in our study and all of them performed the following balance tests: Romberg and Jendrassik manoeuvre with eyes closed (ROMJec); Standing on foam with eyes open (SOFeo) and eyes closed (SOFec); Tandem Romberg with eyes open (TReo) and eyes closed (TRec); Single leg stance with eyes open (SLSeo) and eyes closed (SLSec); Tandem gait (TG). With the results hereof used as dichotomized points, multivariate stepwise logistic regression analysis was performed, to identify the best combination of tests per age group (20-39.99 years, 40-59.99 years, 60+ years) to predict vestibular disorders.

Results

In the healthy population, age ranged from 20 to 83 with a mean of 49 years. In the patient population with vestibular disorders, age ranged from 15 to 90 with a mean of 55 years. There were no statistically significant differences in gender between the two groups. For the age group 20-39.99 years, SLSec (OR 7.2; P 0.0021) and TRec (OR 89.3; P<0.0001) proved to be the most predictive combination of testing (AUC 0.910; sens 88.6; spec 82), with a positive predictive value (PPV) of 83.1%. For the age group 40-59.99 years, TRec (OR 78.6; P<0.0001) was the most predictive test (AUC 0.890; sens 94; spec 84), with a PPV of 85.5%. For the patients over 60 years, the combination of SOFec (OR 13.2; P<0.0001) and SLSeo (OR 2.3; P 0.0294) was the most predictive for vestibular disorders (AUC 0.809; sens 92.1; spec 63), with a PPV of 71.3%.

Conclusions

Previous studies have shown that patient performance on balance tests demonstrates an age-dependency. Therefore, we believe that there is no suitable test or combination of tests available for the overall population. In the present study, combinations of clinical tests are proposed to promptly screen for vestibular disorders in specific age-groups.

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Tinnitus distress: a paradoxical attention to the sound?

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Introduction and aim

The implications and significance of clinical differences observed across tinnitus patients as well as the neurological mechanisms involved in tinnitus remain unknown. While past tinnitus studies have analyzed brain activity, they rarely have considered changes in connectivity. However, it appears that abnormal activities localized in specific brain areas are not sufficient to fully explain tinnitus pathophysiology and that tinnitus and tinnitus characteristics are related to the dysfunctional interaction between separable distributed networks. The present study explores whether the clinical characteristics of tinnitus are associated with specific brain activity and connectivity patterns.

Material and methods

A large sample of 135 tinnitus subjects underwent resting state fMRI and their behavioural scores were obtained using clinical evaluations. Networks were extracted using independent component analysis. The functional connectivity patterns in the extracted networks were evaluated by a graph theoretical approach. The effects of tinnitus for each network were investigated by correlating the graph strength of all the regions with the tinnitus behavioural scores using stepwise fit regression analysis.

Results

Our results provide evidence that alterations of functional interactions between key neural circuits of the brain can explain some tinnitus characteristics. Not only the auditory regions, but also the non-auditory regions are affected by tinnitus pathology. Specifically, the connectivity patterns of the right executive control network, which is relevant for perception of external stimuli, is related to tinnitus patients' distress level.

Conclusions

Persistent distressful tinnitus appears to be a pathological condition linked to modification of connectivity patterns of the right executive control network leading to hyper attention towards something that should not be salient to us. Identifying the brain's intrinsic system responsible for failed adaptation to the sound and increased distress could help in reducing the tinnitus burden and open new avenues for treatment of tinnitus.

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Clinical characteristics and therapeutic efficacy in tinnitus patients: results of a prospective, longitudinal study

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Introduction and aim

The tinnitus population represents a highly heterogeneous group, characterized by the tinnitus itself, concomitant medical conditions, and presence of other audiological complaints. In addition, a large variety of available therapies exists, without any proven efficacy for most of them. The aim of this study is to characterize a broad tinnitus population and assess therapeutic efficacy, taking into account possible influencing factors.

Material and methods

All patients, consulting the tinnitus clinic of Ghent University Hospital since January 2016, are prospectively included. Demographic, medical, audiological and tinnitus-related data are collected at intake, 3, 6 and 12 months follow-up. Therapeutic effect of a multidisciplinary approach is investigated using the Tinnitus Functional Index (TFI) score progression over time.

Results

Until now, 474 patient are included, with data collection still ongoing. Analysis of the first 250 patients reveals, among others, hyperacusis in 64.5%, and hearing loss in 32.8%. After multidisciplinary elaboration, therapeutic approach varied depending on the individual patient: for example, 24.8% only received psychoeducation, medication was prescribed in 26.4%; 25.2% received hearing aids; physiotherapeutic or dental treatment was advised in 29.2% and 5.2% respectively. Overall, we saw a clinically significant improvement in 34.8% after 3 months, and in 46.9% after 12 months. There was a statistically significant reduction in TFI score over time ($\chi^2(2)=10.739, p<0.005$), with a mean score going from 43.9 at intake to 34.1 at last follow-up.

Conclusions

A multidisciplinary tinnitus approach results in a statistically and clinically significant improvement after 12 months. Effectiveness of different therapies in specific subgroups will be presented, using data of all subjects.

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VSAD, a new battery for the evaluation of Visuo-Spatial Abilities in deaf children: a preliminary validation study

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Children who are deaf or hard of hearing (D/HOD) particularly rely on visuospatial perceptual and action abilities to interact with their environment and communicate. Unfortunately, hearing loss is regularly associated with vestibular deficits that can impact visuospatial development.

We will present a preliminary validation of a new battery designed for the evaluation of Visuo-Spatial Abilities in Deafness (VSAD) using Metrisquare software on a testing tablet. The VSAD included tasks assessing visuospatial working memory, mental rotation, visual planning and three tasks of selective visual attention (with different stimuli configurations in each tasks). Correlations and mean comparison analysis were performed between the different tasks and equivalent established clinical tests to evaluate their validity. Additional analyses between D/HOH and hearing children will also be presented. The results show that some tasks can detect cognitive difficulties associated with vestibular disorders.

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Risk of falling in 64 patients with bilateral vestibulopathy

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Background

Bilateral vestibulopathy (BVP) is characterized by a bilateral loss of function of the peripheral vestibular organs and/or nerves. Key symptoms include instability which worsens in the dark or on uneven ground, and oscillopsia. Patients with BVP are at risk of falling and thus possible severe injuries. However, little is known about the clinical characteristics that could prevent BVP patients from falling, or vice versa, elevate the risk of falling.

Objective

To explore the relationship between the risk of falling in BVP patients and (1) results of vestibular tests, (2) symptom questionnaires, (3) etiology of BVP, (4) patient's characteristics (age, body mass index BMI, sport practice).

Methods and results

Sixty-four BVP patients were evaluated with a prospective design. Fall risk was assessed by the Activities-specific Balance Confidence questionnaire, a validated tool evaluating a patients balance confidence, and the incidence of falls during the past month was asked. All patients received vestibular testing (calorics, rotatory chair test, video head impulse test and cervical vestibular evoked myogenic potentials). No significant correlation was found between any of the vestibular tests and the balance confidence (ABC) or incidence of falls during the past month. Furthermore, patients received the Dizziness Handicap Inventory (DHI) and the Oscillopsia Scale, which are both questionnaires assessing the severity of the symptoms in vestibular patients. The higher the DHI score, the worse the ABC score and the more falls were reported during the past month. Likewise, a higher oscillopsia score was associated with less balance confidence and more reported falls. Next, no significant difference between ABC score and fall incidence was found between patients with BVP caused by Menière's disease, by a COCH mutation resulting in DFNA9 disease or idiopathic BVP. Interestingly, the higher the BMI the more balance confidence was reported by a BVP patient. Similarly, an older age was associated with less reported falls. No association was found between sport practice and ABC score or incidence of falling.

Conclusion

In this study, less balance confidence in BVP patients was associated with worse scores on the DHI and Oscillopsia questionnaire. Furthermore balance confidence was higher in patients with a higher BMI. The incidence of falls during the past month was higher in BVP patients with more symptoms (DHI and Oscillopsia questionnaire); and in younger BVP patients. No association was found between the ABC score/incidence of falls and the vestibular tests, etiology of BVP and the sport practice of a BVP patient.

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A case of specificity: how does the Acoustic Voice Quality Index perform in normophonic subjects?

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Introduction and aim

The acoustic Voice Quality Index (AVQI) is a multiparametric tool based on six acoustic measurements to quantify overall voice quality in an objective manner. In the last decade many studies demonstrated its robust diagnostic accuracy and high sensitivity to voice changes across voice therapy in different languages. Hereby, diagnostic AVQI thresholds have been proposed for mostly treatment-seeking subjects using receiver operating characteristics (ROC) curve analysis. However, a study to provide data on AVQI's distribution and confidence intervals in a cohort of strictly normophonic subjects without voice complaints is still lacking. Therefore, the aim of the present study was to provide information regarding AVQI's performance in such normophonic non-treatment-seeking subjects.

Methods

Concatenated voice samples, consisting of sustained vowel phonation and continuous speech, from 189 subjects (108 females, 81 males; between 10 and 80 years old) without vocally relevant complaints were evaluated by three raters and run in AVQI v.02.05. According to this triple-judge auditory-perceptual hoarseness (G) rating protocol, two cohorts were set up with the first cohort consisting of 117 subjects with no perceived dysphonia and the second cohort consisting of 72 subjects with slight perceived dysphonia. First, age (10-19 years; 20-59 years; 60-80 years) and gender effects were investigated using the Student T test. Secondly, between-cohort differences in AVQI per age group were investigated with the Mann-Whitney U or Student T tests. Thirdly, with the number of judges giving G = 1 to partition four sub-levels of slight hoarseness (0 = unanimously normophonia, 1 = majority normophonia, 2 = majority slight dysphonia, 3 = unanimously slight dysphonia) as an independent factor, differences in AVQI across these sub-levels were also investigated with the omnibus Kruskal-Wallis H test and post-hoc Mann-Whitney U tests.

Results

Mean AVQI-scores ranged from 2.35 to 3.23 with a significant age effect ($p = .027$) but no significant gender effect. The two cohorts differed significantly ($t = -3.442$; $p = .001$) in AVQI. However, only the oldest age groups of the two cohorts differed in AVQI ($U = 5$; $p = .019$), as for the other age groups no significant differences were found. In the true normative group, AVQI yielded the following statistics: mean = 2.52, standard deviation = 0.80, and a range from 0.23 to 4.13. With the more judges deciding that a subjects' G indicates slight hoarseness, the more AVQI increases (chi-square = 21.018 and $p < .001$).

Conclusions

Maryn et al. (2010) found a diagnostic threshold of AVQI = 2.95 taking both sensitivity and specificity into account. Based on the present study, however, AVQI = 4.12 [i.e., mean + (2 * standard deviation)] would be a normative cut-off score with 100 % specificity. Furthermore, mean AVQI data differed significantly between groups with small differences in hoarseness. Specificity of AVQI as a diagnostic voice assessment tool will be discussed in light of the findings across studies so far.

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High-speed laryngoscopy: inter- and intra-rater reliability

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Introduction and aim

High-speed videolaryngoscopy (HSV) rises as an important laryngeal imaging technique of voice disorders next to videostroboscopy. It has potential to objectively quantify vibratory vocal fold characteristics. The software Glottal Analysis Tools (GAT) version 2018 enables objective determination of various glottal area waveform (GAW) quantities. Prior to having this program analyzing HSV-images, laryngeal region of interest and glottal area have to be segmented manually across the video. Subjective human interventions could induce variability across segmenters and consequently attenuate GAT measures' reliability. This study explored variability in GAW measures based on differences in glottis segmentation within and between segmenters.

Material and methods

20 HSV videos from the GZA Sint-Augustinus ENT department of normophonic and dysphonic subjects with various laryngeal pathologies were selected. From these, 5 (i.e., 25%) were randomly selected and appended to the experimental set for investigating intra-segmenter differences. There were 3 segmenters: 1 ENT-HNS trainee (S1), 1 consultant laryngologist (S2), 1 voice therapist (S3).
Upon analysis of GAW, GAT automatically offers 61 measures. Intra- and inter-segmenter-based variability in these measures was examined with single-measures consistency-type intraclass correlation coefficient (ICC).

Results

Across 61 measures, intra-segmenter variability yielded mean ICC=0.89 (SD=0.18) for S1, mean ICC=0.82 (SD=0.22) for S2, and mean ICC=0.77 (SD=0.35) for S3. Inter-segmenter variability yielded mean ICC=0.61 (SD=0.35). With 0.75 as arbitrary threshold for interpreting inter-segmenter ICC's, 29 GAW (47.5%) measures were considered reliable (i.e., unaffected), whereas 32 GAW (52.5%) measures were'nt.

Conclusions

Influence of intra-and inter-segmenter variability on GAW measures was investigated. Naturally, manual user interaction effects the outcome. Parameters were indeed differently effected by segmenters and their subjective adjustments. However, more than half of the GAW measures were reasonably immune to such effects. How strong these influences are and how to interpret them has yet to be investigated in more extensive further studies.

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Voice study in patients with total laryngectomy

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Introduction and aim

In Head and Neck cancer, total laryngectomy is a procedure used for advanced laryngeal or hypopharyngeal cancers. Three different ways of speaking after such procedure exist, esophageal (E), electrolarynx and tracheoesophageal speech (TE). TE is known as providing the best voice and intelligibility. In the literature, acoustic analysis, comparison between surgical details and voice quality exist but only few articles study the pharyngoesophageal segment morphologically during voice production. The aim of this study is to analyze morphological feature of the neoglottis in tracheoesophageal speakers and to compare it with voice quality outcomes

Materiel and methods

We are conducting an observational study of total laryngectomees using TE voice. Voice perceptual assessment, fibrostroboscopy during phonation provide information about anatomic and anatomo-physiological aspects of the pharyngoesophageal segment.

Results

We will present the preliminary results of this study.

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Follow-up with PET/CT and other imaging techniques in head and neck squamous cell carcinoma patients: a retrospective analysis

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Introduction and aim

The aim of this study is to evaluate the role of positron-emission tomography / computed tomography (PET/CT) in revealing recurrent disease or synchronous and metachronous primary malignancies (PMs) in patients curatively treated for oropharyngeal and hypopharyngeal squamous cell carcinoma.

Material and methods

A retrospective analysis on the follow-up of 132 patients was performed. Detection of recurrences and PMs were documented and survival after recurrence was analyzed. In addition, 370 PET/CT-scans were assessed for their performance to detect local, regional and distant recurrence at 4, 8, 12 months and 2, 3, 4, 5 years after completion of primary therapy.

Results

The relapse-free survival after 10 years was 41%. It was estimated that more than 90% of the recurrences occur within five years post-treatment. Asymptomatic clinical occult relapses were all detected by PET/CT and accounted for 28% of the cases. For locoregional recurrence, no significant difference in overall survival could be demonstrated between detection by PET/CT or clinical examination. Asymptomatic patients with metastases detected by PET/CT had a significant survival benefit compared to patients that were diagnosed in a symptomatic stage. In total 33 PMs were discovered after diagnosis of the HNC and 48% of them were first detected by PET/CT. The specificity and negative predictive value (NPV) of the PET/CT-scans to detect recurrence comprised a range of 85-100% and 83-100%, respectively. The sensitivity (56-100%) and positive predictive value (20-100%) were more heterogeneously distributed. There were no major differences found between the accuracy to detect local, regional and distant recurrences.

Conclusions

The important role of PET/CT-scans in the detection of PMs, clinical occult recurrences and especially asymptomatic metastases was observed in this study. In addition, PET/CT has a high specificity and NPV for all time intervals. However, no survival benefit could be demonstrated for locoregional recurrences detected by PET/CT.

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The role of 18F-FDG PET/CT for the management of the neck following definitive radiation therapy in patients with oro-pharyngeal squamous cell carcinoma

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Introduction and aim

Patients diagnosed with locally advanced (N+) oropharyngeal squamous cell carcinoma (OPSCC) are commonly treated by definitive radiation therapy (RT) or chemoradiotherapy (CRT) reporting less morbidity over surgery but with up to 40% residual neck disease. Thus some perform systematic neck dissection (ND) while others only when uncontrolled regional disease is suspected. RT aftereffects decrease the accuracy of contrast-enhanced CT (CECT) in this purpose leading to delayed or unnecessary treatment. We investigate the role and accuracy of 18F-FDG PET/CT in this application.

Material and methods

We included 42 patients which sustained neck dissection in our institution after definitive RT (41 CRT and 1 RT), conducting a total of 45 hemi-neck (39 unilateral, 3 bilateral ND). FDG PET/CT results were reviewed as positive or negative and compared to histopathologic findings in order to establish sensitivity, specificity and predictive values.

Results

Metastatic disease was assessed by histology in 17/45 (37,8%) hemi-neck. Among which FDG PET/CT suggests free of hyper metabolism (21/45) 6 had cancerous residual lymph node while on the 24/45 hypermetabolic lymph node it reliably predicted 11 persistent carcinomas (Se 65% Sp 54% VPP 46% VPN71%). We noticed important accuracy variation regarding the timeframe of FDG PET/CT after end of treatment (<12w: Se 50%, Sp47%, VPP 31%, VPN66%/>12w: Se 78%, Sp67%, VPP 64%, VPN80%).

Conclusions

Neck dissection vs careful observation after RT/CRT for N+ OPSCC is a challenging decision. Based on this small retrospective study, FDG PET/CT lacks of accuracy to rule that decision. Our practice matches the idea that surgeon must rely on disease history, clinical evaluation and structural imaging while functional imaging give additional support especially if performed >12 weeks after end of treatment.

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Transoral robotic supraglottic laryngectomy (TORS-SL): the experience of CHU UCL Namur

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Introduction and aim

Primary supraglottic cancer is the second most common type of laryngeal cancer. The basis of therapy is to cure the disease while maintaining the laryngeal functions. In this respect, the incidence of laryngeal tumors treated by (chemo-)radiation (CRT) has risen steadily. However, this therapeutic modality is accompanied by immediate and long-term complications. The aim of our study is to demonstrate the feasibility and the safety of TORS-SL, to analyze oncological and functional outcomes, complications rate and hospitalization length.

Material and methods

Forty-nine patients were prospectively included in this single tertiary university center study, conducted from March 2008 until December 2018. We report data analysis for surgical feasibility, perioperative adverse events, surgery duration, oncological outcomes, postoperative complications, hospitalization length and feeding tube dependency.

Results

Forty-nine patients underwent TORS-SL for oncological purpose. Twelve had a history of previous CRT. Forty-three patients received sentinel lymph node biopsy and among those, 18% had unilateral or bilateral neck dissection. One patient did not necessitate any management of the neck. No conversion was needed. No peroperative complication was noted. Postoperative pharyngo-cutaneous fistulae occurred in 1 patient, bleeding in 1 patient, pneumonia in 4 patients (with the need of a tracheotomy in 1 case) and 2 suffered from acute dyspnea.
One patient suffered from progressive disease, 1 from local recurrence and 2 from metastasis.
Liquid diet recovered on an average of 20 days (range 2-90), assuming a complete supraglottic healing at that time. The average length of hospitalization stay was 19 days (range 4-54). Two patients remained feeding tube dependent.

Conclusions

Our results demonstrate that TORS-SL is a safe and feasible procedure. We report a very low complication rate. We had only one tracheotomy. As patient selection is correctly assessed, it is also a safe oncological procedure. Our initial functional outcomes for TORS-SL are encouraging but further prospective multicentric studies are needed.

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The value of awake nasopharyngoscopy in the prediction of response to mandibular advancement device therapy

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Introduction and aim

Mandibular advancement devices (MAD) have variable success rates at reducing the apnea-hypopnea index (AHI). The current study prospectively quantified the predictive value of upper airway characteristics during awake nasopharyngoscopy on MAD outcome.

Material and methods

One hundred OSA patients underwent polysomnography and awake nasopharyngoscopy at baseline. MAD was fitted intraorally in a fixed 75% position of maximal protrusion. Sixty-one patients [83.6% male; median AHI 16.5 events/hour (IQR: 11.1-23.3); body mass index (BMI) 28.2 ± 3.4 kg/m²] completed the 3-month follow-up polysomnography with MAD and a second awake nasopharyngoscopy with and without MAD. The awake upper airway characteristics were evaluated both during spontaneous breathing and during Müller's maneuver. Treatment response was defined as a reduction in AHI ≥ 50%, and deterioration as an increase in AHI compared to baseline.

Results

Adjusting for baseline AHI, BMI and age, patients with a narrow oropharynx during spontaneous breathing showed an odds ratio (OR) of 4.3 (p=0.044) for treatment deterioration. Furthermore, a decrease in overall velopharyngeal diameter during MAD application (OR 14.8; p=0.003) and a persistent posteriorly located tongue base (OR 5.9; p=0.035), were associated with treatment deterioration.
The concordance between the two separate Müller's maneuvers at different upper airway levels (kappa values ranging from 0.145 to 0.345) was overall slight to fair. Baseline epiglottis collapse (OR 14.6; p=0.021) and improvement of tongue base collapse with MAD (OR 4.4; p=0.048), seen during Müller's maneuver, were nevertheless both associated with a better MAD therapy outcome.

Conclusions

The awake endoscopic assessment of upper airway characteristics, especially when performed during spontaneous breathing, allows to determine MAD therapy outcome in OSA patients who are in particular prone to deterioration.

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Endoscopic treatment of idiopathic subglottic stenosis: a systematic review

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Introduction and aim

To identify the different techniques for the endoscopic treatment of idiopathic subglottic stenosis (iSGS) and to review the obtained treatment results.

Material and methods

Embase and Cochrane Library were searched for publications on endoscopically treated iSGS. Interventions included procedures with cold knife, dilation (rigid or balloon) or laser (CO2 or Nd:YAG), used in several combinations and supplemented with Mitomycin C and/or corticosteroids. Primary endpoint was time interval between successive endoscopic procedures. Secondary endpoints were rate of stenosis recurrence, amount of endoscopic interventions, tracheotomy rate and rate of open surgery.

Results

Eighty abstracts were reviewed and fifteen articles, with 862 pooled patients, were included in the analysis. Mean sample size was 57 subjects and mean age was 47 years (range 36-54 years). Rate of stenosis recurrence ranged from 40% to 100%, with a weighted mean of 68.20%. Amount of interventions per patient varied between 1.8 and 8.28, with a weighted mean of 3.67. Time interval between interventions ranged from 2 months to 21 months, with a weighted mean of 12.55 months. Tracheotomy rate varied between 0% and 26%, with a weighted mean of 7.1%, and rate of open surgery varied between 0% and 27.8%, with a weighted mean of 10.89%.
Single modality CO2 lasering showed highest rate of recurrence, highest amount of interventions and shortest time interval between interventions. Combined techniques generated overall better outcomes.

Conclusions

For endoscopic treatment of iSGS, a multitude of different endoscopic techniques and various combinations are currently being used, all with a high rate of recurrence but low morbidity. Consequently, endoscopic management is a valuable primary treatment but open surgery (cricotracheal resection) does still have an important role in iSGS management, especially in cases with multiple recurrences after endoscopic treatment.

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Effects of rapid maxillary expansion on respiratory events in children: are we doing no harm?

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Introduction and aim

Rapid maxillary expansion devices are used in children with upper maxillary transverse deficit and cross-bite. They were consistently shown to improve obstructive apnoea syndrome in children. However, the impact of the device in place into the child's mouth has never been studied. The aim of our study was to quantify the effect of the device on respiratory events while in place. Secondary endpoints were to evaluate its impact on quality of life and on respiratory events after treatment.

Material and methods

12 consecutive children with maxillary cross-bite were prospectively included in this cohort study. Respiratory events were recorded before, during and after rapid maxillary expansion using a validated type 3 polygraphy including jaw movements. Subjective outcomes were evaluated using Obstructive Sleep Apnea (OSA)-18 quality-of-life questionnaire (OSA-18). Maxillary width and 16/26 distance were evaluated before and after rapid maxillary expansion on anterior radiography.

Results

Estimated apnea hypopnea index increased from 2.67/h (±1.31/h) to 2.9/h (±2.4/h) with the device in place. Respiratory effort characterized by jaw motion > 0.4mm during the respiratory cycle increased from 7.58% (±10.01%) to 16.05% (±15.53%). Sleep-related breathing impairment was confirmed by parents' questionnaires.

Conclusion

While rapid maxillary expansion is an effective treatment for obstructive apnea syndrome in children, our study suggested a transient worsening of sleep breathing while the device is in place. It may be related to an incorrect tongue position and/or to the crowding of the device into the mouth.

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Pediatric tracheobronchial stenting: current state of the art

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Introduction and aim

Tracheobronchial stenting in infants and young children is a relatively recent and challenging procedure which can be performed when surgical and/or endoscopic treatments have failed or are contraindicated. Stents are classified according to their constituent material which entails specific advantages and disadvantages. Metallic and silicone stents were the only available devices until the recent introduction of a biodegradable polydioxanone stent. This study aims to review the literature about the use of this new device in children and present our experience.

Material and methods

A systematic search in the Pubmed database was performed using predefined search queries, in order to find relevant publications describing pediatric airway stenting using the biodegradable polydioxanone stent. Only English language literature was included.

Results

Four studies described the evolution of 12 infants and children treated by a biodegradable stent (ELLA-CS®). The indications were tracheo/bronchomalacia or stenosis.
Age at insertion ranged from 4 months to 2 years old; the resorption time of the stent varied from 5 to 15 weeks; 5 children needed more than 1 stent. Immediate improvement was observed in all cases; all patients were eventually in good respiratory condition apart from 2 (1 death unrelated to the stent, 1 death due to inadequate post-stenting care). No major complications were reported. The follow-up ranged from 5 to 40 months.
A case of recurrent postoperative tracheal stenosis treated with a biodegradable stent in our department will be presented.

Conclusion

Airway stenting in children can be a lifesaving treatment when surgical and/or endoscopic procedures have failed or are contraindicated. The biodegradable polydioxanone stent shows promising results such as a high biocompatibility and no long term complications. Further improvement could come from the increase of the resorption delay and the centralisation of children requiring this procedure.

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Lactobacillus casei AMBR2 as potential alternative treatment strategy for chronic rhinosinusitis

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Introduction and aims

Chronic rhinosinusitis (CRS) is one of the most common upper respiratory tract (URT) diseases with a major impact on public health. The exact role of bacteria in CRS pathology is still controversial and current treatment options often fail. Here, we aimed to analyze the URT microbiota to better understand the difference in potential health-promoting and pathogenic bacteria in CRS patients versus healthy controls, and to develop new treatment strategies based on beneficial bacteria from the URT.

Materials and methods

The microbiome of different URT niches was compared for healthy controls (n = 100) versus CRS patients (n=225) by Illumina 16S rRNA gene amplicon sequencing. Furthermore, lactic acid bacteria were cultivated from the URT and their potential as probiotics as alternative treatment option for CRS was explored.

Results

Extensive comparison of the URT microbial community showed that the occurrence of taxa from the genus Lactobacillus is decreased in CRS patients compared to healthy controls. This was of interest, because many Lactobacillus strains are already studied and marketed as probiotics for gastro-intestinal, urogenital and immunological health. Several Lactobacillus strains could also be cultured from the healthy URT. One of these isolates, L. casei AMBR2, showed interesting potential as URT probiotic due to its oxidative stress-resistance properties, its good adherence capacity to airway cells, its antimicrobial activity against important URT pathogens such as Staphylococcus aureus, and its immunomodulatory properties. In a preclinical trial in healthy individuals, the safety of this strain in a nasal formulation was tested, as well as the capacity of the strain to colonize the URT. The nasal spray containing this potential probiotic isolate was well-tolerated and no major complaints were observed. Furthermore, the strain was found to be able to temporary colonize the URT after nasal administration.

Conclusion

The recently isolated Lactobacillus casei AMBR2 strain shows potential as URT probiotic.

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Influence of oral doxycycline on wound healing after functional endoscopic sinus surgery for chronic rhinosinusitis with or without nasal polyps: a double-blind RCT

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Introduction and aim

Functional endoscopic sinus surgery is a frequently performed procedure in chronic rhinosinusitis (CRS). A subgroup remains uncontrolled after surgery. Post-operative tissue remodelling could influence the clinical outcome. Tetracyclines have a beneficial influence on the remodelling seen in CRS. Our aim is to evaluate the effect of doxycycline on wound healing after endoscopic sinus surgery in subjects with chronic rhinosinusitis.

Materials and methods

In total 33 chronic rhinosinusitis patients with (n=21) and without (n=12) nasal polyps who were scheduled for sinus surgery were randomly assigned to receive doxycycline 200 mg on day 1, followed by 100 mg daily until 56 days post-operatively, or placebo (1/1 ratio). Patients were followed up for 48 weeks and data collection occurred every 2 to 4 weeks during the first 24 weeks. Subjective and objective outcome measures were assessed; the total endoscopic healing score was considered the main endpoint.

Results

Doxycycline did not significantly improve wound healing in the whole study population. However, for CRSwNP, the endoscopic wound healing score was significantly better in patients treated with doxycycline as compared to placebo until the fourth post-operative week. Furthermore, endoscopically assessed healing problems requiring rescue treatment were only present in placebo-allocated CRS patients, whereas none of the patient in the doxycycline treated group necessitated additional medical treatment during the first 8 post-operative weeks The clinical outcome was similar between groups at the end of the study, 1 year after surgery.

Conclusions

Healing problems after functional endoscopic sinus surgery could be prevented by post-operative administration of doxycycline treatment.

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Do patients with complete unilateral medial maxillectomy have an empty nose syndrome?

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Introduction and aim

Medial maxillectomy is a safe and effective procedure for treatment of tumoral disease originating from the maxillary sinus. However endoscopic medial maxillectomy usually removes the inferior turbinate. The inferior turbinate has a critical function in the conditioning of the nasal airflow and its resection increases the risk of developing a dreaded complication: the empty nose syndrome.
The aim of this retrospective study is to evaluate if, after a complete unilateral medial maxillectomy with resection of the inferior turbinate, the patients have symptoms or signs associated with the empty nose syndrome.

Material and methods

It is a retrospective study on a cohort of 8 patients who underwent a complete unilateral medial maxillectomy (maxillectomy type 2 or more from Turri–Zanoni classification) with the resection of the inferior turbinate.
Empty nose syndrome status was assessed of the basis on a positive 6-item Empty Nose Syndrome Questionnaire (ENS6Q) score, the cotton test and the trigeminal function test.
The depression and anxiety levels of the patients were assessed with the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI).

Results

The median of the ENS6Q questionnaire is 3/30 ± 1 and is lower than the score in case of empty nose syndrome (> 10/30).

None of the patients had an improvement in their breathing after the cotton test. The median of total trigeminal function of patients is 30/40 ± 2 and is lower than the score in case of empty nose syndrome (< 24/40). The trigeminal function score on the side that had the medial maxillectomy is lower than on the other side (17/40 ± 2 vs 12/40 ± 2).
The patients had low levels of anxiety-trait and depression.

Conclusions

Patients who underwent a complete unilateral medial maxillectomy with resection of the inferior turbinate have no complaints of empty nose syndrome.

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The predicting factor of cephalometric imaging in the obstructif sleep apnoea/ hypopnoea syndrome

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Introduction and aim

Obstructive sleep apnoea/hypopnoea (OSAHS) is one of the most common sleep disorders among adults. OSAHS occurs by recurrent collapse of the upper airway during sleep. It results in complete (apnoea) or partial (hypopnoea) decrease of the airflow and has a strong relation with the upper airway anatomy. Some studies have shown a relationship between radiographic anatomy and the severity of OSAHS. The aim of this study was to determine wether the cervico-facial CT-scan is a predictive exam for sleep related breathing disorders. Furthermore, we verified if the CT imaging did reveal measures that can predict the severity of respiratory disorders.

Material and methods

A retrospective analysis was performed reviewing polysomnographic data and CT imaging of 170 patients. Cephalometric analysis has been used to quantify upper airway dimensions. The anteroposterior and the transversal diameter of the pharynx as well as the surface of the upper airway were established. Obstructive sleep apnoea severity was indicated by the index of hypopnoea and apnoea (IHA). Univariate regressions were performed to determine a correlation between these factors.

Results

The Pearson's correlation index between the IHA and the anteroposterior diameter ($p=0,46$), the transversal diameter ($p=0,11$) and the pharyngeal surface ($p=0,24$), were not statistically significant. The correlation between IHA and body mass index (BMI) was statistcally significant ($p<0,001$).

Conclusions

No correlation was found between the IHA and the cephalometric imaging. Further studies are necessary to determine the relationship and predictif factor of radiographic anatomy and the severity of OSAHS.

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Intratympanic injection of dexamethasone in thermosensitive gel in Ménière's disease: a randomised, double-blind, placebo-controlled trial demonstrating its therapeutic effect on vertigo

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Introduction and aim

Ménière's disease is a chronic idiopathic condition of the inner ear for which there has been no high-quality evidence to support the administration of an effective and safe drug treatment. The aim of this study was to perform a multinational randomized, double-blind, placebo-controlled trial of OTO-104 in Ménière's disease patients.

Material and methods

A randomized, double-blind, placebo-controlled study of intratympanic injection of OTO-104 in patients with definite Ménière's disease was conducted across six European countries. Following a 1-month lead-in period, eligible patients (18-85 years) received a single intratympanic injection of 12 mg OTO-104 (otic formulation of dexamethasone in thermosensitive poloxamer) or placebo (1:1) and were observed for 3 months. Primary objective was OTO-104 efficacy, measured by number of definitive vertigo days (DVD) at Month 3 (OTO-104 versus placebo). Secondary objective was OTO-104 safety and tolerability including adverse events, audiometry, tympanometry, and otoscopic exams.

Results

One hundred seventy-four patients qualified for the study and were randomized and treated with a single administration of OTO-104 (n=86) or placebo (n=88). The primary efficacy endpoint was achieved (count of DVD by Poisson regression in Month 3, n=174, p=0.029). The OTO-104 group demonstrated a 6.2-day reduction in mean reported number of DVD from baseline to Month 3 with a 2.5 day mean difference between OTO-104 and placebo in Month 3. A number of secondary vertigo efficacy endpoints were also statistically significant at Month 3, including vertigo severity, the effect of vertigo on daily activity (days at home sick or bedridden), and vertigo frequency. OTO-104 and the intratympanic injection procedure were well-tolerated, with no safety concerns identified.

Conclusions

This landmark study is the first large randomized, double-blind, placebo-controlled trial to present statistically significant results supporting treatment for patients with Ménière's disease. A single intratympanic injection of 12 mg thermosensitive dexamethasone gel was associated with a statistically significant reduction in vertigo outcome measures. This has important implications for the treatment of Ménière's disease and for our understanding of the potential mechanisms underpinning the etiology of this condition.

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Cartilage versus fascia myringoplasty in tympanic membrane perforation

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Objective

To analyse retrospectively the differences between two types of autograft material for the repair of pure tympanic membrane perforations: fascia versus cartilage myringoplasty.

Methods

Patient files of 103 consecutive patients who were operated for a tympanic membrane perforation with an intact ossicular chain, were reviewed from October 2009 to December 2017. The location of the perforation, the size, the approach (i.e. transmeatal (TM) versus retro-auricular (RA)), the one year take rate (i.e. tympanic membrane closed or reperforated), the postoperative hearing and hearing improvement at PTA frequencies, and the presence of myringitis were analysed.

Results

The study is divided into two groups. First the cartilage group with the currently used technique with 48 patients (19 revisions), divided in 17 TM and 31 RA approaches. Second the fascia group or the historical control group with 55 patients (2 revisions), divided in 8 TM and 47 RA approaches. At one year postoperatively, all patients were evaluated. In the cartilage group 2 reperforations (1 revision case) occurred giving a one year take rate of 96%. In the fascia group 12 reperforations occurred (all in primary cases), giving a one year take rate of 79%. Of the 12 reperforations in the latter group, 8 reperforations were successfully revised with cartilage (i.e. no perforation at one year post revision surgery). Of the other 4 reperforations of the fascia group, 1 reperforation was successfully revised with fascia, the other 3 reperforations were conservatively followed since they all had a small perforation without any symptom and these patients were not willing for revision surgery. In the cartilage group the postoperative PTA was 22.1 dBHL and the PTA-gain 10.8 dBHL while in the fascia group the postoperative PTA was 16.2 dBHL and the PTA-gain 14.9 dBHL. Correction for the revision cases in the cartilage group gave a PTA-gain of 12.2 dBHL.

Conclusion

Cartilage myringoplasty has a significant higher one year take rate than fascia. The postoperative hearing is acceptable after cartilage myringoplasty. Although the difference is small, fascia tends to improve the hearing somewhat more than cartilage (4.1 dBHL or 2.7 dBHL if elimination of revision cases in the cartilage group). Combining both the take rate and hearing outcome, cartilage should be considered as the first choice of autograft material in myringoplasty.

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Potential use of estetrol in sensorineural hearing loss protection

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Introduction and aims

A gender difference in audition and other experimental evidences suggest a protective role of estrogens against hearing loss. However, estradiol (E2) is not suitable in clinical practice, given the increased risk of cancer and thromboembolic events. There is thus a need to find new treatments that present a higher benefit/risk ratio. In this work, we studied the otoprotective role of a natural estrogen derivative, estetrol (E4), which offers a safer profile than E2. In addition, this analysis can also provide new insights into the mechanisms of action of estrogen in hearing function. Indeed E4 is known to trigger the genomic action of estrogen receptor that consists in target gene transcription regulation, but is not implicated in the rapid activation of membrane-bound receptors and downstream signaling cascades.

Material and methods

The otoprotective effect of E4 was analysed in vitro and in vivo by treating murine cochlear cultures and zebrafish larvae with gentamicin in combination with E4 or its vehicle. The number of hair cells present in the cultured cochleae and in the neuromasts of zebrafishes was quantified to monitor gentamicin-induced hair cell loss. We also investigated whether this molecule could protect mice from deafness. One month-old mice received daily intraperitoneal injections of E4 or vehicle during 4 days before a single transtympanic injection of gentamicin or artificial perilymph. The auditory function was assessed by recording Auditory Brainstem Responses (ABR) prior to and 5 days following gentamicin treatment.

Results

E4 significantly reduces gentamicin-induced hair cell death in vitro and in vivo. In addition E4 confers a significant protection against gentamicin-induced hearing loss in mice.

Conclusion

The beneficial effect of estetrol against hearing loss offers promising perspectives for its clinical use and highlights the importance of the genomic actions of estrogen receptor in hearing preservation.

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Epineurial pseudocyst of the intratemporal facial nerve: report of a rare case and review of the literature

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Introduction and aim

An epineurial pseudocyst of the intratemporal facial nerve is an uncommon finding during neurotologic imaging. Knowledge of the existence of such lesions among ENT specialists and radiologists guarantees correct management and prevents unnecessary investigations or treatment.

Case report

A 21-year-old patient presented with subjective hearing loss. Micro-otoscopy showed a retraction of the tympanic membrane. Mild conductive hearing loss and a negative pressure was seen on audiometry and tympanometry. A CT scan was conducted and showed a small, pedunculated, balloon-like lesion in the right mastoid, mimicking mastoid air cell disease. However, the lesion was connected with the mastoid segment of the facial nerve by a small canal. Further investigation of this lesion by MRI scan, showed a T2- hyperintense lesion without uptake of gadolinium. Radiologists reported an epineurial pseudocyst of the intratemporal facial nerve. An epineurial pseudocyst is either a very rare finding or it might have been regularly overlooked. There is only one publication that describes these lesions: Pretzborn et al described soft, pedunculated lesions with a fibrous sheeth in continuity with the epineurium and amorphous stroma during surgery, with dense fibrovascular tissue on histopathology. There is almost no information on the incidence, natural history and clinical significance.

Conclusions

An epineurial pseudocyst of the intratemporal facial nerve is presumably an uncommon, incidental finding. It presents on imaging as a cystic lesion connected to the intratemporal facial nerve, with a typical “lake connected to facial canal” configuration. Based on the information currently available, treatment is probably not necessary. Since there is only one article on this topic, further investigation on the incidence, natural history, clinical significance -among other in relation to facial nerve pathology - and necessity of treatment is important to ensure evidence-based management.

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Foreign body in middle ear, a rare hearing aid complication

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Introduction and aim

Creating an earmold impression for the fabrication of a custom hearing aid is considered a safe procedure. However, significant trauma to the middle ear with serious implications may occur. We report a rare case of silicone impression material as a foreign body in the middle ear, necessitating surgical intervention.

Case report

A 77-year-old man with a tympanic membrane perforation in his only hearing ear (right side) underwent hearing aid fitting at an outside facility. During injection of a pink silicone for making an earmold impression, the patient reported acute pain in his right ear. The clinical evaluation after some days by an otolaryngologist revealed otorrhea and the presence of impression material in the middle ear, and the patient was referred to our hospital. A computed tomography (CT) scan demonstrated blurring in the right middle ear whereas audiometric evaluation showed no additional hearing loss. A tympanomastoidectomy was performed and the foreign body was removed. Hearing thresholds remain stable after surgery.

Discussion

There are around 50 similar cases described in the literature. Most patients had pre-existing risk factors such as tympanostomy tubes, tympanic membrane perforations, retraction pockets, or an history of previous canal wall down mastoidectomy. Clinical presentation is often obvious and may include otalgia, worsening of hearing loss, otorrhea, tinnitus, vertigo and nausea. If one of these symptoms occurs after injection of silicone in the outer ear canal, referral to an ENT surgeon seems necessary. In cases of delayed presentation, symptoms may mimic chronic otitis media. It can be helpful when the color of the silicone does not resemble human tissues' color in order to recognize the foreign body material behind the ear drum. A CT scan is indicated to establish the extent of the middle ear involvement. In most patients, the foreign body was removed under general anesthesia, by transmeatal and/or transmastoid approach. Several of the reported patients had persistent otovestibular symptoms after surgery. In the reported case report, there were no residual symptoms reported after surgical removal of the impression material.

Conclusions

This case emphasizes that silicone injection in the outer ear canal to make an earmold impression can be tricky even when performed by qualified audiologists in accordance with well-established guidelines. Extra caution is recommended when patients present with risk factors. If there are remnants of silicone in the ear, a referral to an ENT surgeon for removal is obligatory.

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En Hamac Tympanoplasty and Canalplasty for optimal type-1 tympanoplasty outcomes

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Introduction and aim

Multiple tympanoplasty techniques have been developed with numerous differences in graft positioning, graft choice and approach. Anterior perforations often remain challenging with consequent worse surgical outcome. We believe insufficient stabilisation of the graft and inadequate visualisation are key aspects in anterior membrane reconstruction and we have been using the "en hamac" technique as possible solution. Moreover, routinely performed canalplasty can improve the ventilation postoperatively as well as visualisation during surgery and can thus lead to improved success rates. In this retrospective analysis we present our experience with type-1 tympanoplasty using these techniques to improve surgical outcome.

Material and methods

A retrospective review was performed using the prospective ONDB© database tool for otologic surgery. All primary type-1 tympanoplasty cases for tympanic membrane perforations (TMP) from 2010 to 2016 were selected for analysis, all performed by the senior author (BL). Minimal clinical & audiometric follow-up was 18 months. Cases were excluded in case of loss to follow-up (1 case), incomplete audiometry, combined ossiculoplasty or mastoid surgery and underlying immunodeficiency (1 case). Results were reported complying to level 1 of the guidelines.

Results

Of a total of 64 cases, the "en hamac" technique was performed in 25 cases. Complete canalplasty was performed in all cases. TMP closure was seen in 62 of all patients (96,88%). Two non-hammock cases had persistent perforation after surgery (95%) whereas none of the "en hamac" cases had residual or recurrence of perforation (P = 0.02). Bone conduction data was not available in 13 cases, resulting in 51 cases available for audiometric analysis. Audiometric data is shown in table 1. We analysed the impact of frequency selection in reporting results in table 2.

Conclusions

Type-1 tympanoplasty using canalplasty as well as the "en hamac" technique shows optimal results, with very high perforation closure rate (96,88%) as well as optimal hearing results (mean remaining ABG 8.50 dB).

Table 1

Audiometric data (n = 51)

Mean preoperative ABG	*16.32 dB*
Mean ABG difference (improvement)	*7.82 dB (P = 0.004)*
Mean remaining ABG	8.50 dB
Mean BC difference	2.11 dB *(P* = 0.97)
Closed ABG (<10dB)	72.55%
Remaining ABG 10-20dB	25.49%
Remaining ABG > 20dB	1.96%

Table 2

PTA frequency differences

500hZ - 1kHz - 2kHz	*Mean ABG difference*	9.02 dB (P = 0.002)
	Mean remaining ABG	6.54 dB
500Hz *- 1kHz - 2kHz - 4kHz*	Mean ABG difference	7.82 dB (P = 0.004)
	Mean remaining ABG	*8,50 dB*

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Sinonasal isolated amyloidosis: a case presentation of a rare clinical entity

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Introduction and aim

Localized amyloidosis of the head and neck is a unique clinical entity with the larynx being most commonly involved. Isolated sinonasal amyloidosis is extremely rare, with approximately 38 reported cases to date ([1]). It is a benign, slowly expansile lesion that presents with common rhinological symptoms mimicking chronic rhinosinusitis. Radiological findings are not pathognomonic.
Definite diagnosis depends on anatomopathological analysis with positive Congo red staining.
We report a case of isolated amyloidosis of the maxillary sinus, presenting with nasal obstruction and simulating a tumor peroperatively.

Case report

A 56-year old man presented with chronic nasal obstruction. On clinical examination we found nasal mucopurulent discharge on the right side and a septal deviation. Cone beam CT revealed bilateral obstruction of the ostiomeatal complexes with opacification of the maxillary sinuses, particularly on the right side. No contrast enhanced CT or MRI was performed.
A bilateral functional endoscopic sinus surgery (FESS) procedure and septoplasty were planned for the relief of nasal obstruction. Peroperatively, we found an irregular, undefined mass in the right maxillary sinus, suspicious for a tumor. The nasal septal mucosa on the right side appeared irregular as well. A peroperatively frozen section was negative for tumor, only oedematous sinus tissue was mentioned. The tissue was widely resected.
Anatomopathological analysis showed amyloidosis, with a positive Congo red staining. No evidence of systemic amyloidosis was found. The standard protocol of oral antibiotics, oral cortisone and saline spray was followed postoperatively.

Conclusions

Sinonasal amyloidosis imposes a diagnostic challenge mimicking common otolaryngological pathologies without pathognomonic or well-defined findings. Seldom they can simulate malignancy.
Thus, tissue biopsy with positive Congo red staining is needed for a definite diagnosis. Endoscopic surgery to provide symptomatic relief is the preferred treatment. Close follow-up is required due to its high recurrence rate and possible progression to systemic amyloidosis.

([1]) Kumar B, Pant B, Kumar V, Negi M. Sinonasal globular amyloidosis simulating malignancy: a rare presentation. *Head and Neck Pathol.* (2016).

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Spontaneous and idiopathic cerebrospinal fluid leak in the infrasellar, clival region

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Introduction and aim

Compared with traumatic cerebrospinal fluid (CSF) leaks (accidental and iatrogenic), spontaneously developed CSF leaks are rare and account for only 3-4% of all cases of CSF rhinorrhea. Patients are at risk for devastating consequences such as meningitis, intracranial hypotension, (meningo)encephalocele formation, or intracranial abscesses.

Case report

A 66-year-old man presented with headache and nausea, and no history of trauma. He used a mometasone nasal spray for a few weeks history of unilateral, watery rhinorrhea. CSF analysis and cultures revealed S. Pneumoniae meningitis, for which antibiotics were administered. On radiologic investigation varying levels of fluid in the left sphenoid sinus and a bony defect in the posterior sinus wall were seen. Surgical exploration revealed a tear-shaped dural defect. The CSF leak was closed using a multi-layer technique via an endoscopic, endonasal, transsphenoidal approach.
Spontaneous CSF leaks due to a clival defect are very rare and mostly occur in middle-aged and obese women. For a CSF leak to develop spontaneously, there must be a triad of dura disruption, a bony deficit, and a pressure gradient. Though there is no clear consensus on the pathophysiology, several mechanisms may contribute. Patients can present with (unilateral) rhinorrhea, nasal obstruction, headache, or signs of infection (fever, neurologic deficits…) in case of meningitis or brain abscess. Diagnosis is based on clinical and radiological features as well as analysis of the rhinorrheal fluid. Apart from investigating underlying risk factors, surgical closure is necessary and preferably via an endoscopic, endonasal approach. Late postoperative recurrence rates are high.

Conclusions

An idiopathic clival defect causing a spontaneous CSF leak is an extremely rare but potentially life-threatening condition, warranting timely endoscopic, endonasal repair.

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Impact of a shift in treatment funding on a multidisciplinary sleep clinic: a cohort study

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Introduction and aim

A shift in Obstructive Sleep Apnea (OSA) funding was implemented in Belgium on January 1, 2017. Funding was allowed for moderate to severe OSA and the rules shifted for treatments delivery and monitoring by authorised medical opinion. Multidisciplinary Sleep Clinics have long existed, bringing together sleep specialists, dentists, orthodontists and surgeons. We aimed to assess whether a shift in treatment funding was associated with a change in the multidisciplinary sleep practice.

Material and methods

Sample consisted of all patients discussed in the sleep multidisciplinary team meetings of the University Hospital of Liege from January 2016 to December 2018. Interrupted times series, Mann-Whitney U tests and descriptive statistics were produced.

Results

There were no differences in patients age, male sex preponderance, body mass index, clinical presentation and level of obstruction. Baseline OSA severity was significantly lower (mean apnea-hypopnea index and mean oxygen desaturation index lowered respectively with $p = 0.0189$ and $p = 0.0466$) after the funding rules changed. Oral appliance and ENT surgery were more often offered after the shift in funding.

Conclusion

Sleep multidisciplinary team meeting changed patient selection and management after the implementation of the new funding rules for OSA. The shift in funding often resulted in treatment options change, reaching more people and offering more options.

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A rare case of a retropharyngeal lipoma

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Introduction and aim

Lipomas are common soft tissue mesenchymal neoplasms involving tissues containing mature lipocytes. A lipoma may occur in almost any organ of the human body. Retropharyngeal lipomas are very rare. They are slow growing tumours that attain a large size before manifesting clinical symptoms. Due to non-specific symptomatology, clinical diagnosis can be difficult.

Case report

A 83-year-old female patient presented at the outpatient ear-nose-throat clinic with dyspnea d' effort since two months, especially when eating and walking upstairs. The patient also described a voice alteration (hot potato voice).
Clinical examination of the throat showed a mass bulging from the posterior pharyngeal wall more pronounced on the right side. The soft palate was displaced anteriorly by this mass. Fiber-optic laryngoscopy was performed and revealed a big submucosal mass arising from the posterior pharyngeal wall at the nasopharynx extending to the hypopharynx, with narrowing of the airway.
On CT-scan, a well-defined retropharyngeal hypodense mass was detected (-114 HU). MRI of the neck demonstrated on T1 a huge retropharyngeal lipoma with a cranio-caudal axis of > 10 cm.
Transoral surgical excision of the tumor was performed under general anaesthesia. A longitudinal midline incision was made in the retropharynx. After developing mucosal flaps bilaterally, the tumour was dissected. Feeding was administered via a nasogastric tube during the first postoperative days. The intra-operative and immediate postoperative periods were uneventful.
Macroscopic examination of the mass showed a smooth-surfaced, solitary and well capsulated yellow mass without signs of malignancy. Pathological examination revealed mature adipocytes without cellular atypia.

Conclusion

Lipomas of the retropharyngeal space are rare. The clinical history of lipoma is that of a slow growing mass and may go undiagnosed because of patients getting habituated.

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Congenital hairy polyp of the oropharynx: a report of two cases and literature review

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Hairy polyp is a rare bigerminal mass, arising most often in de naso-orophaynx. With an incidence of 1 in 40.000 live births, it is an entity that is generally not very well known by ENT-specialists, neonatologists or pediatricians, confronted with newborns. Because of its location, a hairy polyp can have serious consequences. In newborns with respiratory obstruction or feeding difficulties, this diagnosis must be considered and a thorough examination by flexible nasopharyngoscopy must be performed. We report two cases of hairy polyp in the oropharynx and review the literature.

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The link between hearing loss, vestibular loss and cognition in patients with bilateral vestibulopathy

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Background

Several studies have demonstrated cognitive deficits in patients with bilateral vestibulopathy (BVP). So far, hearing status has not been considered when evaluating cognition in this population. Given the well-established link between sensorineural hearing loss (SNHL) and cognitive decline and the high prevalence of SNHL in BVP patients, it remains unclear if the cognitive deficits in BVP patients are solely due to their vestibular loss or might be, partially, explained by a concomitant SNHL.

Objective

To evaluate the link between cognition, hearing and vestibular loss in patients with BVP.

Design

Prospective cross-sectional analysis of cognitive performance in patients with BVP and control participants without vestibular loss. Both groups included subjects with a variety of hearing (dys)function. Cognition was assessed by means of the Repeatable Battery for the Assessment of Neuropsychological Status for Hearing Impaired Individuals (RBANS-H).

Results

Sixty-four BVP patients were evaluated and compared with 83 control participants. Multiple linear regression models were fitted with both vestibular loss and hearing loss as main factors. All analyses were adjusted for age, sex and education. Hearing loss seemed to be associated with worse outcome on the total RBANS-H scale and subscales immediate memory and language. Vestibular loss, on the other hand, was linked to worse performance on the attention subscale of the RBANS-H. Furthermore we did not observe a correlation between saccular function and cognition.

Conclusion

This study has found general cognitive deficits in a large sample size of BVP patients. Multiple linear regression models revealed that both vestibular and hearing were associated with different subscales of the RBANS-H. Whereas hearing loss was associated with worse performance on total RBANS-H score, immediate memory and language, vestibular loss was observed to negatively affect attention performance on the RBANS-H.

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Psychometric properties of motor and cognitive dual-task studies with the aim of developing a test protocol for vestibular-impaired patients: a systematic review

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Introduction and aim

Patients with vestibular disorders frequently suffer from cognitive impairment, which can be attributed to extensive vestibular projections throughout the cortex and subcortex or to increased cognitive-motor interference (CMI). CMI can be assessed by performing dual-tasks, however, literature on this topic is scarce in the vestibular population. Therefore, before implementing a dual-task protocol in these patients, a systematic review on the psychometric properties of dual-tasks in a variety of populations was conducted.

Materials and methods

The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. An extensive literature search was run on MEDLINE, Embase, and Cochrane Databases. Their eligibility was assessed by two independent researchers, and their methodological quality was evaluated using the Consensus-based Standards for the selection of health Measurement Instruments (COSMIN).

Results

Thirty-three studies were included in the current review. The cognitive and motor tasks varied in terms of test-retest reliability, and some were valid in persons with Parkinson's Disease, multiple sclerosis, dementia, stroke, or elderly.

Conclusions

In order to maximally evoke CMI in the vestibular population, both static and dynamic motor tasks should be performed while challenging the vestibular cognitive domains (visuospatial abilities, memory, attention, executive function, and processing speed). Out of the large amount of cognitive tasks employed in dual-task studies, multiple tests can be suggested for executive function and processing speed. For the cognitive domain memory, only the Backward Digit Span Test can be recommended. As attention is required in every dual-task protocol, this component cannot be challenged separately. Finally, visuospatial cognition was not assessed in a reliable or valid way in the included dual-task paradigms. The use of dual-tasks will give a more accurate and daily life representation of cognitive and motor deficiencies and their interaction in the vestibular-impaired population.

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Recovery of dynamic visual acuity in patient with acute vestibular deficit: does visual rehabilitation help?

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Introduction and goals

The capacity to maintain visual acuity during head motion is referred to as Dynamic Visual Acuity (DVA). Patients with a vestibular deficit typically display a defective DVA, resulting in oscillopsia and vision instability during head rotation. In this prospective study, we compare DVA test results in patients with an acute vestibular deficit. The effect of specific visual rehabilitation on DVA test results is evaluated and compared to a more classical postural rehabilitation. Our goal was to see if specific visual rehabilitation was more effective in improving DVA related to vestibular pathology.

Material and methods

We examined data obtained from 33 outpatients that presented to our clinic with acute unilateral vestibular dysfunction. Patients were randomly divided into two groups and DVA was assessed Group 1 initially received 3 sessions of postural rehabilitation, while group 2 received specific visual rehabilitation. DVA was reassessed at the end of this first phase. During the second phase of the study, rehabilitation modalities were switched between both groups (phase 2). DVA was then tested again after completion of both rehabilitation modalities. Final results (phase 2) were cross-compared as well as compared to the results obtained after a single rehabilitation modality (phase 1).

Results

DVA improved significantly during rehabilitation regardless of the rehabilitation modality that the patients received. Although no significance was reached, DVA scores were higher after specific visual rehabilitation compared to postural rehabilitation. The sequence in which patients received the two rehabilitation methods did not alter the final outcome.

Conclusion

This study suggests that specific visual rehabilitation may improve DVA faster than classical postural rehabilitation. Consequently, specifically targeted rehabilitation could help restore DVA in patients with acute vestibular dysfunction, alleviating their sensation of instability.

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Vestibular function in children with neurodevelopmental disorders: a systematic review

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Introduction and aim

Emerging evidence suggests that a vestibular dysfunction may considerably influence children's development and may result in motor, cognitive, educational and/or psychosocial symptoms which tend to overlap with symptoms found in children with neurodevelopmental disorders (NDDs). Furthermore, several children with NDDs are known to have postural and/or motor disturbances. Evidence whether these balance problems are accompanied with a vestibular dysfunction is limited. Therefore, to investigate the characteristics of vestibular function in this population, a systematic review was performed.

Material and methods

MEDLINE, EMBASE, Cochrane Register of Controlled Trials and reference lists of all included studies were screened by two independent researchers. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines were followed. Risk of bias was verified using the Newcastle-Ottawa Scale and interrater reliability was established using Cohen's Kappa.

Results

Twenty studies, discussing vestibular function in children with NDDs were retained for synthesis. Several authors suggested a possible vestibular involvement in patients with NDDs since in a subset of these patients central and/or peripheral vestibular aberrations were found. These alterations may result in symptoms of distorted motor coordination or postural instability, respectively, and might explain the balance problems observed in some of these children. However, current findings are ambiguous and mainly based on evaluation of the horizontal semicircular canals alone.

Conclusions

High-quality studies with an extensive vestibular test battery are required to further characterize the vestibular function in children with NDDs. Importantly, since comparable symptoms may occur in both groups, clinicians should be aware of these similarities when establishing the diagnosis in these patients.

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Feasibility of extensive vestibular assessment in young children: recommendations for clinical practice

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Introduction and aim

Vestibular dysfunctions in children are not as uncommon as generally assumed and can compromise their development on many levels. Unfortunately, vestibular assessment in children is challenging, and therefore not yet fully established in clinical practice. The aim of this presentation is to discuss the feasibility of extensive vestibular assessment in young children, and to present practical tips on how to maximize this feasibility.

Material and methods

Fifty-eight healthy children (5mo-6yr) were subjected to an extensive vestibular test protocol. Children younger than three were examined with the video head impulse test (vHIT), rotatory test, and cervical vestibular evoked myogenic potentials (cVEMP). From the age of three, the protocol was extended with the caloric test and ocular vestibular evoked myogenic potentials (oVEMP).

Results

In the younger subjects (<3yr), the highest success rate was achieved for the cVEMP (94.1%), whereas the rotatory test appeared to be the most difficult to conduct reliably (73.5%). In contrast, the rotatory test was successful in all cases (100.0%) in the older group (>3yr), as were the cVEMP and oVEMP. In the extensive protocol, the caloric test remained the most challenging (82.6%).

Conclusions

The vestibular evoked myogenic potentials are the most feasible vestibular tests in young children. However, our results show that other vestibular examinations (vHIT, rotatory and caloric test) should also be considered as they prove to be quite feasible as well, provided that some adjustments are made.

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Prospective analysis of the symptomatology of superior canal dehiscence syndrome

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Introduction and aim

Superior canal dehiscence syndrome (SCDS) is a rare condition, characterized by a defect in the bone overlying the superior semicircular canal, creating a third mobile window into the inner ear. This changes the fluid mechanics in the inner ear in both the vestibular and the cochlear partitions, whereby pressure or soundwaves can evoke vestibular and auditory symptoms. The most common symptoms of SCDS include sound- or pressure-induced vertigo, autophony, pulsatile tinnitus, and fullness/pressure in the ear. However, there is a huge variety of possible symptoms, so SCDS has been labelled as a "great otologic mimicker".
The purpose of this study is to perform a prospective analysis on the symptomology of patients with SCDS, who did not undergo surgery.

Material and methods

A prospective study was performed on patients diagnosed with SCDS, who have not undergone reconstructive surgery yet in 3 tertiary referral neurotology centers: Antwerp University Hospital, Johns Hopkins Hospital and Maastricht University Medical Center. Patients were recruited between November 2017 and November 2018 and asked to complete a specific questionnaire, based on the 22-item common symptom set defined in a previously published systematic review. The questionnaire is based on a 5-item Likert scale (0 – 4). Zero means the person does not experience any problem as inquired by the question. Four means the person does experience the problem as severe as conceivable. These results were also compared with the retrospective review.

Results

A total of 26 patients completed the questionnaire. Age ranged from 35 to 74 years with a mean age of 52 years (46% males and 54% females). The most prevalent symptom and the symptom with the highest level of impact was "having a full ear or feeling a pressure". The second most prevalent symptom was spontaneous occurrence of dizziness, followed by "feeling that the world is tilted". Among the symptoms reported as most bothersome "feeling of pressure" was followed by "hearing my voice abnormally loudly" and "hearing my heartbeat or pulse at any time". Comparison of these results with the systematic review revealed that all the symptoms of the 22-item common symptom set were more prevalent in this prospective analysis.

Conclusions

SCDS can cause a large variety of vestibular and auditory symptoms. This prospective study demonstrates that the prevalence and severity of those symptoms is much higher than previously anticipated.

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The ototoxic potential of cobalt from metal-on-metal (MoM) hip implants: objective auditory and vestibular outcome

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Introduction and aim

Local and systemic toxic side effects have been associated with excessive metal ion release from MoM implants, in which cobalt (Co) plays an important role. Systemic cobaltism seems to manifest as a clinical syndrome including hearing- and balance-related symptoms. In most cases, revision surgery and the subsequent drop in blood Co level led to (partial) symptom alleviation, suggesting a causal relationship with Co exposure. Moreover, the ototoxic potential of Co has recently been demonstrated in animal experiments. Therefore, the current study aimed to objectively examine the auditory and vestibular function in this population.

Materials and methods

20 MoM hip implanted patients and 20 age- and gender-matched controls were subjected to an extensive audio-vestibular test battery and a blood sample collection to determine the plasma Co concentration.

Results

The plasma Co concentration was significantly higher in the MoM patient group versus the control group ($p<0.001$). Within the auditory test battery, a clear trend was observed towards higher audiometric thresholds (11.2–16 kHz), lower DPOAE (4 & 8 kHz) and total TEOAE (1-4 kHz) amplitudes, and a higher inter-aural latency difference for wave V of the ABR in the patient versus control group ($0.0 \leq p<0.05$). Within the vestibular test battery, considerably longer cVEMP P1 latencies, higher oVEMP amplitudes ($0.01 \leq p<0.05$) and lower asymmetry ratio of the vHIT gain ($p<0.01$) were found in the MoM patients.

Conclusion

The auditory results seem to reflect signs of Co-induced damage to the high-frequency hearing function, largely corresponding to previous findings on drug-induced ototoxicity and recent animal experiments with cobalt. The vestibular outcomes are currently inconclusive and require further elaboration, especially in animal studies. The dose-response relationship could not be accurately evaluated in this study, but recent findings in MoM hip implant patients have confirmed that this relationship can be complicated by many patient-specific factors.

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Congenital cholesteatoma of mastoid origin presenting as a stenosis of the external auditory canal

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Introduction and aim

A congenital cholesteatoma is an epidermoid cyst derived from remnants of keratinizing squamous epithelium of the temporal bone. Embryologically, it originates from the ectoderm of the primitive notochord. Congenital cholesteatomas represent only 2 to 4% of the cholesteatomas, and they can be found at various areas within the temporal bone. Rarely, the site of origin is the mastoid process. As these lesions are slowly growing, they often remain silent during childhood. We report a case of a congenital cholesteatoma of the mastoid, presenting as a stenosis of the external auditory canal.

Case report

An 18-year old woman with a history of ventilation tubes as a child presented with aural fullness and subjective hearing loss on the right side. Otomicroscopy showed an extremely narrow external auditory canal, which did not allow to visualize the entire tympanic membrane. Pure tone audiometry was normal at both sides. A computed tomography (CT) revealed an expansive lesion within the mastoid, with an important destruction of the external auditory canal, bony plate of the sigmoid sinus and mastoid portion of the facial nerve canal. Furthermore, a fistula of the posterior semicircular canal was observed. Non-echo-planar diffusion weighted imaging (non-EP DWI) confirmed the presumption of a cholesteatoma. As there was no involvement of the middle ear, this lesion was diagnosed as a congenital cholesteatoma of mastoid origin. Under general anaesthesia surgical removal was performed. Bone chips were used to reconstruct the external auditory canal. The fistula of the posterior semicircular canal was sealed with fascia and fibrin glue.

Conclusions

A congenital cholesteatoma of the mastoid process is very rare and may present as a stenosis of the external auditory canal. Often these lesions only become apparent after substantial destruction has taken place. In addition to surgical removal, canal wall reconstruction or sealing of a labyrinth fistula may be needed.

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Sensorineural hearing loss and brain atrophy: a systematic review

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Introduction and aim

Several cross-sectional and longitudinal studies have established a relationship between cognitive decline and hearing loss. Moreover, hearing loss has recently been recognized as an independent risk factor for dementia. However, the neurobiological mechanisms that underpin this relationship are still a matter of debate. The aim of this study is to critically assess the current status of the literature on changes in human brain volume related to hearing loss.

Materials and methods

Studies were identified by an electronic search using MEDLINE and Cochrane Library. We used the following search string: «hearing loss»[All Fields] AND «brain volume»[All Fields].

Results

A total of 12 articles was found. Firstly, in patients with presbycusis, studies, Ren et al. have shown a correlation between hearing loss and gray matter atrophy. In particular, atrophy of several auditory cortical areas was observed, as well as of the nodes in the default mode network, including the bilateral precuneus, the inferior parietal lobule and the right posterior cingulate cortex. Additionally, a thicker right insula has been associated with better speech perception in patients with presbycusis. These studies suggest that presbycusis has cascading consequences for not only the neural processes supporting hearing function, but also those supporting cognitive function, both perception of speech and cognition. Secondly, in patients with unilateral hearing loss, an increase in gray matter volume was observed in the somatosensory and motor systems. However, atrophy of the brain regions involved the auditory and visual systems, respectively in the superior temporal gyrus and Heschl's gyrus and the calcarine cortex. While the reductions in grey matter volume are significantly correlated with the subjective hearing ability, the hearing damage duration is related to the volume reduction in brain regions that subserve high-level cognitive functions and with the compensation by the visual system. Thirdly, several analyses in deaf patients revealed a decreased cortical thickness of the whole brain. They showed significant thinning in the left precentral gyrus, right postcentral gyrus, the left superior occipital gyrus and the left fusiform gyrus compared with the hearing subjects. The reduction in white matter volume was located in the left middle frontal gyrus and the right inferior occipital gyrus. Furthermore, Uchida *et al*. found smaller hippocampal volumes in patients with hearing loss compared to their normal hearing peers.

Conclusion

Strong evidence exists that hearing dysfunction correlates with atrophy of different brain regions, including the hippocampus. The most affected brain regions in patients with hearing loss are the auditory and visual cortical areas, the bilateral precuneus, the inferior parietal lobule and the right posterior cingulate cortex. However, as most studies are conducted with a cross-sectional design, it remains difficult to identify a causal relationship.

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Long-term effects of early cochlear implantation: a success story?

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Introduction and aim

Few studies investigate the long-term outcomes of children who received their cochlear implants (CIs) at an early age. In Flanders, a group of early implanted children has currently reached adolescence. The aim of this study was to give an overview of some of their long-term outcomes, including their school results and their speech understanding in class.

Material and methods

26 students with CI (CI students) were included. All of them were implanted before the age of two and were enrolled in secondary mainstream education. Their school performance was derived from two tests (OVSG and IDP tests) conducted in the last year of elementary school. Their speech perception was assessed with a class-like speech in noise audiometry (Sound-C) and a questionnaire (LIFE-R) was used to document their experienced listening difficulties in class. Data of their normal hearing (NH) peers were collected as well.

Results

CI students performed within the normal range of their NH peers for dictation, reading, grammar, arithmetics and measurement. CI students performed worse than their NH peers on knowledge of numbers and geometry, which requires conceptual knowledge (language). These tests were highly correlated with their testresults on grammar. CI students also failed on the listening test, which corresponds with their reported listening difficulties in class (LIFE-R). The scores of the listening test correlated well with their results on the Sound-C.

Conclusions

Early implanted CI students are doing remarkably well in mainstream education, but they encounter more listening difficulties than their NH peers and perform worse on mathematical tasks requiring conceptual knowledge.
Further research is necessary to disentangle the underlying effects of their language skills and their ability to hear in difficult listening situations.

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Luc's abscess: an unusual complication of acute otitis media

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Introduction and aim

Acute otitis media (AOM) is a disease mostly encountered in pediatric population. The evolution is usually favorable and suppurative complications became exceptional since the advent of modern antibiotics. Luc's abscess (LA) is a rare and usually benign complication of AOM and is defined as a subperiosteal temporal collection of otitic origin.
The aim of this study is to enable physicians to be aware of this entity and to ovoid useless mastoidectomy.

Case report

A 3-year-old boy presented for sudden swelling of left temporal and retroauricular regions accompanied by a left otorrhea, otalgia and fever for 2 days. No previous infection was reported. Micro-otoscopy demonstrated an important stenosis of external auditory canal (EAC). A left mastoiditis was suggested and ceftriaxone, metronidazole and aural trafloxal drops were started. There was no improvement. We decided to realize a contrast-enhanced CT-scan that showed an opacification of the left mastoid and middle ear associated with subperiosteal collection in the temporal fossa, in the retroauricular area and in the superior part of the EAC. There was also a sigmoid sinus thrombosis related to an extra-dural empyema. A mastoidectomy was performed and a grommet was inserted. The cortical mastoid bone showed no erosion and there was no pus in the mastoid cavity. During surgery, we confirmed that the pus was coming from the subperiosteal part of the EAC. Enoxaparine was added to treatment for 6 months and the patient was discharged 2 weeks after surgery. No pathogen was identified in the different samples.

Conclusions

LA has been first described as a spreading of bacteria in the middle ear to the subperiosteal space in the EAC up to the temporal region. Although primarily described as benign, different cases reported an association of LA and mastoiditis. Therefore CT-scan is essential to define if mastoidectomy is required.

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Case report: stapes fracture in otosclerosis due to delivery

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Introduction and aim

Conductive hearing loss (CHL) after trauma with ossicular chain interruption is a frequent disorder. While the incudo-stapedial (IS) joint is most commonly affected, we present an exceptionaly rare case of a fracture of the stapes arch due to a totally different kind of trauma.

Case report

A 32-year-old women, with no specific medical history, presented at the ENT department of the University Hospital of the Vrije Universiteit Brussel with a right-sided conductive hearing loss of 70 dB Hl. A sudden and important deterioration of a pre-existing and progressive ipsilateral hearing loss was experienced by the patient shortly after giving birth to her youngest child. Only after surgery and with an anamnesis more focused on the delivery, the following details emerged: While giving birth the patient heard something cracking in her ear, followed by an ipsilateral tinnitus that lasted for weeks. Once this tinnitus subsided, the diminished hearing became particularly annoying for the patient. Before the operation and due to a typical combination of the patient's age, progressive hearing loss during and after prior pregnancy, otosclerosis was rightly assumed and proven by CT-scan. However, during stapedotomy hypermobility of the malleus and incus, with the superstructure of the stapes still attached to the incus and floating without any contact with the footplate, was observed. The footplate was (predominantly white with a central blue zone) completely fixed. By means of a small-hole stapedotomy with insertion of a Fisch-stapes prosthesis a reduction of the air-bone gap with 30 dB HL was obtained.

Conclusion

It is assumed that due to excessive strain against a closed glottis while giving birth the stapes superstructure was pulled loose from the footplate, footplate fixed by otosclerosis.

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Idiopathic spontaneous sublingual hematoma: a case report and literature review

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Introduction and aim

Sublingual hematoma is a rare complication seen in bleeding disorders, trauma, dental procedures or the use of anticoagulation. Only a few cases described idiopathic spontaneous sublingual hematoma, suspecting severe hypertension as etiology. In severe cases a sublingual hematoma may compromise the patient's airway and can be a fatal condition.

Case report

This case report describes a 48-year-old male patient with a spontaneous sublingual hematoma, which needed to be treated with an urgent tracheostomy. Drainage of the old hematoma followed 11 days later. Clinical examination using fiberoptic nasolaryngoscopy, an urgent CT scan, control MRI and biopsy of the sublingual salivary gland were performed, but could not reveal a cause for the bleeding.

Conclusions

Clinical work-up is necessary to find the cause of the sublingual hematoma. Aggressive airway management should be the first step in treatment. To date there is no consensus about the management regarding the hematoma itself. Mostly, clinicians start with close observation for spontaneous resolution of the hematoma and when possible to treat causative factors. Surgery is performed when conservative treatment is not sufficient.

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Squamous cell carcinoma in Zenker diverticulum, a case report

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Introduction and aim

Zenker diverticulum is found in elderly populations and is formed by a herniation of the mucosa and submucosa of the posterior wall of the oesophagus between the cricopharyngeal muscle and the inferior pharyngeal constrictor muscle in the Killian's triangle. Arising of a squamous cell carcinoma in a Zenker diverticulum is very rare. Nonspecific symptomatology and uneasy accessibility for sampling make the preoperative diagnosis difficult.

Case report

A 48-year-old patient was seen in ENT consultation for dysphagia and blockage when swallowing. A barium swallowing examination has been conducted and showed a pharyngeal diverticulum. The endoscopy of the pouch revealed an ulceration which was biopsied. The pathological assessment confirms a squamous cell carcinoma. PET-CT was performed and revealed a hypermetabolic lesion of 15 by 8mm and infracentimetric non-hypermetabolic bilateral cervical lymph nodes. Open neck surgery including diverticulectomy, cricopharyngeal myotomy and bilateral neck dissection was performed. The pathological analysis confirmed a moderately differentiated squamous cell carcinoma with tumour-free resection margins. None of the cervical lymph node was involved. Consequently, no post-operative radiotherapy was performed. The feeding could be carried out one month after the surgery. The patient still alive and disease free after six years follow-up.

Conclusions

Despite the rare association of Zenker diverticulum and epidermoid carcinoma, it must be consider when patient with a pharyngeal pouch present atypical signs such as a cervical mass, haemoptysis or bloody saliva and weight loss. We suggest a systematic pre-operative biopsy for atypical aspect of the mucosa in the pouch. No define guideline for the management of carcinoma in a Zenker diverticulum have been published. We recommend surgical approach with neck dissection. Radio chemotherapy can be alternative option in case of pejorative risk factors.

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Transoral robotic surgery and geriatric population: which benefit?

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Introduction and aim

As a result of increased life expectancy, the proportion of elderly patients with head and neck cancer is constantly rising. Transoral robotic surgery has developed over the last ten years as a minimal invasive surgical procedure. The purpose of this study is to evaluate the place of this technique for elderly patients.

Material and method

Between March 2008 and March 2018, 28 elderly patients (> 75 years) with squamous cell carcinoma, retrospectively included, underwent trans-oral robotic surgery with curative intent.
The different locations were 18 laryngeal (10 glottic carcinoma with total laryngectomy and 8 supraglottic laryngectomy), 3 hypopharyngeal, 2 oral cavities and 5 oropharyngeal carcinoma respectively.

Results

Twenty-eight patients, 23 men and 5 women, with an average of 79 years old (75 - 87) were successfully operated without open conversion. The average of significant comorbidities was 5.7 and polymedication was frequent (average of 5.6 drugs/patient). We assessed the fragility of the population of our study by using validated oncogeriatric scale “G8”. The average rate is 10.4/17.
Three patients had loco-regional recurrences, with two subsequent deaths. Seven patients died during follow-up from other causes.
The operating times could be reduced to an average of 120 minutes (including exposure). All patients could be extubated the same day or the day after. Three transient tracheostomies were performed. Patients started oral feeding after an average of 25 days for total laryngectomy, 12 for supraglottic laryngectomy, 20 for hypopharynx, 10 for the oral cavity and 10 for oropharynx. Only two patients had inhalation pneumonia. The average hospitalization stay was 28 days.

Conclusion

Robotic surgery is a valuable option in the treatment of selected head and neck carcinoma in the elderly. Early postoperative rehabilitation limits swallowing disorders and pulmonary complications. The operating times is reduced compared to conventional open surgery which is an advantage for this fragile population.

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Transoral radiofrequency of the terminal branches of the recurrent nerve in the treatment of adductor spasmodic dysphonia: a case series

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Introduction and aim

In the last decade, botulin toxin injection has become the standard treatment in adductor spasmodic dysphonia. Recurrence of the symptoms necessitating repetitive injections, resistance's emergence and cost of the treatment are the main disadvantages of this technique. To improve patient's quality of life, the development of surgical alternatives is needed. Based on previous description by Remacle et al (2005), we present recurrent nerve terminal branches coagulation by transoral radiofrequency under general anesthesia.

Case report

We report the history of 12 patients with adductor spasmodic dysphonia previously treated by botulin toxin therapy and/or voice rehabilitation who benefited from iterative laryngeal radiofrequency procedures. Of the 26 interventions carried out between 2009 and 2018, postoperative complications, preoperative and postoperative vocal assessments (including GRBASI scale, aerodynamic and acoustic measurements and voice handicap index) and delay between procedures were retrospectively analyzed.One posterior glottis defect was noted after a third procedure with consequent hypophonia. No other adverse event occurred.
Four patients underwent only one surgery and 8 patients benefited from 2 to 4 distinct procedures with a median delay of 16 months. Only 2 transient paresis were found but no significant change in aerodynamic measurements was measured.
Despite important individual disparities, voice handicap index was globally improving with radiofrequency and patient's satisfaction was achieved in most of the cases.

Conclusions

Transoral radiofrequency of the recurrent nerve terminal branches is a safe procedure and shows promising vocal results. Despite a long lasting effect, symptoms recur and repeated procedures are frequently needed over time. In our opinion, it is a very interesting alternative to botulin toxin as a second step procedure in case of toxin resistance or patient's lack of compliance. Further studies are definitely necessary to challenge toxin injection as a standard of care.

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The postoperative care of a bilateral vocal cord paralysis following the correction of a tracheoesophageal fistula, a case report

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Introduction and aim

A tracheoesophageal fistula (TEF) is a rare entity with an estimated prevalence of 1/10.000 and can be a life-threatening event at birth due to respiratory distress.
The patients may present them with a persistent tracheal air leak, abdominal distention, pulmonary aspiration, cough with swallowing, copious bronchopulmonary secretions and respiratory distress, which can lead to a tracheostomy emergency.
A genetic cause should not be overlooked as it can be associated with VACTERL-association.
A vocal cord dysfunction is seen in 21% of patients.

Case Report

We present a case of a now 7-month-old infant, with a mid-tracheal TEF, with a bilateral vocal cord paralysis after correction of this fistula. During the intervention, both recurrent laryngeal nerves were identified and undamaged, though postoperatively the child was progressively stridorous over the coming weeks. A tracheotomy was performed with placement of a neonatal canula.
Five months postoperatively a spontaneous recovery was seen of the left vocal cord with a persistent paralysis of the right vocal cord in a paramedian position.

Conclusions

A patient with VACTERL-association was diagnosed with a TEF. Postoperatively, a progressive stridor was seen with the need of a tracheostomy tube placement. In a follow-up period of 5 months, there was a spontaneous recovery of the left paralytic vocal cord. Only in 36% of cases a spontaneous recovery is seen of the vocal cords. Attention should be given to the long-term complications of corrections of TEF.

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Midazolam premedication versus a non-pharmacological preoperative preparation by a virtual game 'Hospi-Avontuur' in children undergoing ENT surgery. A randomised clinical trial

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Introduction and aim

Preoperative anxiety is a major problem in paediatric surgical patients. Premedication with midazolam reduces anxiety but may cause adverse effects. The aim of this prospective, randomized clinical trial was to evaluate the efficacy of 2 different methods in reducing preoperative anxiety of children undergoing elective surgery.

Material and methods

Between December 2017 and September 2018 , we enrolled 41 children between the age of 4 and 7 years, scheduled for elective ENT surgery. Children in the control group were administered an oral preparation of midazolam(0.5mg/kg). Children in the intervention group were instructed to play a virtual game 'Hospi-Avontuur'. This interactive game simulates two days of the life of a girl who experiences a surgery and hospitalisation.
Pre-operative anxiety level was measured by a questionnaire completed by the parents (VAK-questionnaire (Vragenlijst Angst Kinderen)) and an observational scoring scale by the investigators (mYpas-SF (modified Yale Preoperative Anxiety Score – Short Form)). In addition, the child's behaviour was quoted by the anaesthetist during induction of the anaesthesia.
Postoperatively delirium and pain were scored by the anaesthetist and a clinical scientist by PAED (Paediatric Emergence Delirium scale), OPS (Objective Pain Scale) and by FPS-R (Faces Pain Scale – Revised). A few days postoperative, the parents were contacted by phone to score the child's behaviour.

Results

The preliminary results based on 41 children, showed no significant differences in the outcome measures between both groups.

Conclusions

This ongoing study demonstrates no difference in pre-operative anxiety or postoperative behaviour between children prepared for surgery by a virtual game or receiving an oral administration of midazolam.

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Thyroid hormons fluctuations and thyroidectomy

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Introduction

Thyroid storm (or Thyrotoxicosis crisis) is a well-known and feared entity.
However, the pathophysiological mechanisms are not clearly established.
Thyroidectomy is a routine surgery and suspected of triggering thyrotoxicosis crisis, a life-threatening situation.
Nevertheless the link between thyroidectomy and thyrotoxicosis crisis has not been proved yet.
The aim of this study is to evaluate whether fluctuations exist in thyroid hormones in the peri-operative care, during total thyroidectomy.

Materials and methods

This is a prospective observational study of a cohort of patients who have undergone total thyroidectomy in our institution, from september 2017 until today, since the study is still ongoing.
We included all patients who have undergone total thyroidectomy for any indication. In addition, thyroidectomies must have been performed by one of the three specialized surgeons of the ENT department.
Patients who have undergone total thyroidectomy at the same time as pharyngo-laryngectomy or thyroid lobectomies were excluded.
The values of TSH, T4, T3 and thyroglobulin were observed in blood tests at three moments around the surgery. First, at the induction of the anesthesia, then, 30 minutes after the fall of the thyroid and finally, in the recovering room, the next morning.
Presence of variations in values of TSH, T4, T3 and thyroglobulin before and after the surgery were evaluated.

Results

The following section displays preliminary results.
Our sample includes 43 patients.
A paired sample student t test was conducted to evaluate whether a difference exists between each thyroid values pre-, per- and post-op.
Significant statistical differences ($p<0,05$) were observed between TSH, T4 and T3 values pre- and post-op (mean decreases of 1,11; 1,46; 1,57) and per- and post-op (mean decreases of 1,31; 2,71; 1,67).

Conclusions

This is an original study. No study has yet shown whether hormonal fluctuations exists in the peri-operative period. Assessment of the results, their validity, and their clinical applications will be studied.

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ENT surgical training in 2018: national cross-sectional study

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Introduction and aim

This study aimed to draw up an inventory of the current practical training from the surgical trainees' point of view, identifying strengths and gaps of current training and potential tools to be developed.

Material and methods

We conducted a broad national survey among Belgian population within the North-part and South-part universities of the country. The questions included self-assessment, training objectives, training quality and training tools.

Results

35.7% of trainees evaluated their level of overall surgical competence at 3/5 compared to an ideal mastery. More than a half (55%) of trainees did not know the training objectives and 73% did not know the basic surgical procedures that a qualified ENT surgeon should be able to perform. The main mode of learning (41%) was the observation of a senior and repetition under supervision (companionship). The results showed mainly logistical and economic drawbacks, on which it seems possible to act using learning methods based on the implementation of organized training sessions, associated with different learning tools such as surgical and procedural simulation. Some of these are already available in our country but remain difficult to access or to develop.

Conclusion

This study revealed a real demand and motivation from trainees and could serve as a basis to sketch a teaching scheme improving skills and confidence of future surgeons. Additional studies are needed to identify the most effective ways for implementing this type of teaching within the constraints of the surgical curriculum and teaching hospitals resources.

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Partial bony obliteration tympanoplasty for chronical otitis media with an intact ossicular chain

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Introduction and aim

The use of a canal wall up approach with bony obliteration of the mastoid and epitympanic space to surgically treat chronical otitis media with cholesteatoma results in low residual and recurrence rates. When the ossicular chain remains intact during a tympanoplasty procedure, a bony obliteration with complete closure of the epitympanum is not possible without disruption of the ossicular chain. To improve the safety results of a classical canal wall up tympanoplasty in these situations a partial bony obliteration might be an option. Since in most of these ears the ossicular chain remains functional intact, this gives the expectation of a good postoperative hearing. Today there is few data about the long term safety, hygienic and hearing results after partial bony obliteration of the paratympanic spaces, in which the attic remains partially open.

Material and methods

A total of 22 consecutive operated ears in 22 patients who underwent a canal wall up approach with partial mastoid obliteration for chronical otitis media with or without cholesteatoma from January 2010 to 2014 was identified from the operation database. Patient files were retrospectively analyzed.

Results

In 15 patients a partial bony obliteration tympanoplasty was performed for cholesteatoma (14 attical, 1 pars tensa). Another 7 patients were operated for severe chronical otitis media without cholesteatoma. The mean age at surgery was 37 years (range 7-63). Residual cholesteatoma was detected at routine radiological follow-up with non-Echo Planar Diffusion-Weighted MRI in 13.3% (n=2) of the cholesteatoma group. No recurrences were detected in the cholesteatoma group during micro-otoscopic follow up. In the severe chronical otitis media group 1 patient developed a cholesteatoma behind an intact tympanic membrane during follow up. The mean postoperative PTA-High was 41.3 dBHL. The mean postoperative ABG at PTA-High frequencies was 15.5 dBHL without any correction for labyrinthine fistulas and erosion of the ossicular chain with the need for ossicular reconstruction.

Conclusions

In this retrospective analysis, the partial bony obliteration tympanoplasty in chronical otitis media shows excellent results concerning safety and hearing. Partial bony obliteration tends to reduce the recurrence rate in canal wall up tympanoplasty for cholesteatoma combined with good hearing and an acceptable residual rate.

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Ossification of the tympanic membrane: two case reports

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Introduction

Chronic otitis media is a common disorder that may result in tympanic membrane perforation in many cases and for which myringoplasty can be considered. Chronic middle ear inflammation can cause heterotopic ossification which typically develops after a long history of chronic or recurrent otorrhea before development of a dry ear1. On the contrary, ossification of the tympanic membrane is extremely rare. Here we report tympanic membrane ossification in two patients with a history of a chronic otitis media and middle ear surgery, causing rapidly progressive conductive hearing loss. The assessment and management are discussed.

Case report

Case 1. A 7-year-old Caucasian girl developed unilateral rapidly progressive hearing loss within 6 months after revision myringoplasty for a tympanic membrane perforation, that was unsuccessfully repaired one year earlier. Otoscopy showed a white pallor bulging of the posterior half of the graft which was bony on palpation. CT showed an ossification of the tympanic membrane. As treatment we opted for conventional hearing aids.

Case 2. A 51-year-old Indian female patient with a history of chronic otitis media and middle ear surgeries, presented with bilateral conductive hearing loss, the rightsided hearing loss was due to a complete graft ossification, causing a complete fixation of the remnants of the ossicular chain which was confirmed on CT. A revision tympanoplasty was performed which resulted in considerable and stable hearing gain.

Conclusion

Ossification of the tympanic membrane is an exceptional complication which comes with a progressive moderate conductive hearing loss and can already appear in the early postoperative period (<6 months). In literature only two papers refer to this phenomenon. These reports tend to show high risk of recurrence of this ossification when surgically addressed We therefore chose not to revise the younger patient #1. As for patient #2, the patient insisted on undergoing surgery, her hearing remains stable and at a satisfying level until present (6 months after surgery).

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Combined approach thyroidectomy for intrathoracic goiters: safe use of an Endo Catch retrieval system through cervical incision

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Introduction and aim

Diving goiters can descend the cervical region and expand into the thoracic cavity. Therefore, thyroidectomy for retrosternal/intrathoracic goiters is not always possible through cervicotomy. In some cases, a sternotomy, a video-accompanied thyroscopic surgery (VATS) or a thoracotomy is needed, which is a more invasive technique yielding the risk of major complications. In our hospital we prefer a VATS whenever possible, however, the major draw-back of this technique is the length of the thoracic incision, which limits the retrieval of large goiter through relatively small incisions.

Material and methods

The authors report the first case of an Endo Catch retrieval system through cervicotomy combined with a VATS technique for resection of a large intrathoracic goiter.

Results

The goiter was successfully and safely resected with the use of an Endo Catch retrieval system without complications.

Conclusions

A combined approach thyroidectomy consisting of cervicotomy and VATS is a safe technique as described in literature. This combined approach is also possible with an Endo Catch retrieval system through cervicotomy in case of massive goiters. The use of VATS in thyroidectomy offers a minimally invasive approach with good exposure and less morbidity.

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Hearing level in patients with sporadic vestibular schwannoma

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Introduction and aim

Vestibular schwannomas are benign tumours arising from the vestibulocochlear nerve. Vertigo, hearing loss, tinnitus and ear fullness are the most common symptoms reported among these patients. An MRI-scan of the cerebellopontine angle (CPA) typically leads to the diagnosis of the vestibular schwannoma. Based on a large study group of patients with a sporadic unilateral vestibular schwannoma, our aim is to study correlations between size of tumour, age and hearing levels.

Material and methods

A retrospective study was performed on 384 patients diagnosed with a unilateral sporadic vestibular schwannoma at a tertiary referral centre for skull base surgery. This group of patients aged 11 to 92 years old, consisted of 50.4% males and 49.6 % females. Patients with intralabyrinthine tumours, neurofibromatosis type 2, meningioma as well as patients treated earlier by means of surgery or radiotherapy elsewhere were excluded from our study. Demographic data and presenting symptoms were retrieved from the medical history while maximal diameter in the CPA, the presence of cystic components and/or brainstem compression were studied on the first MRI performed in each patient. Hearing levels were based on their first audiometry.

Results

Dividing the patients by size of the tumour and calculating the average Fletcher-Index (FI) (sum of 500-1000-2000Hz) we diagnosed 117 patients with a intracanalicular tumour (FI 35.4dB), 78 patients with a small tumour (FI 41.9dB), 108 patients with a medium tumour (FI 42.9dB), 50 patients with a moderately large tumour (FI 45.5dB), 22 patients with a large tumour (FI 52.7dB) and 9 patients with a giant tumour (FI 48.9dB). No correlation could be observed between size of the tumour and age, although there is a trend of increasing tumour size with age. There is no clear correlation between size of tumour and amount of hearing loss when we subdivide the hearing loss in different hearing loss levels (normal, mild, moderate, severe, profound sensorineural hearing loss).

Conclusions

There is a significant variability in hearing level throughout different vestibular schwannoma stages. Indeed, patients with giant tumours can have normal hearing, while intracanalicular tumours can cause profound sensorineural hearing loss.