

Abstract book

Free papers (orals)

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01.3.04 predicting Round window niche visibility by using single measurement in HRCT-TB in cochlear implant surgery

[Professor Layla Telmesani¹](#)

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Free paper 1.3, 3. Sociëteitskamer, September 5, 2024, 10:30 - 11:30

Background:

To evaluate the accuracy of a single measurement in temporal bone computed tomography in predicting the round window niche (RWN) visibility during cochlear implantation.

Methods:

A prospective study was conducted on 148 patients (165 ears) who had a cochlear implant (CI) from January 2010 to December 2018 at a tertiary CI center. The measurement was done for the angle of the basal turn of the cochlea (ABTC), which we defined as the angle formed by the cochlear basal turn and the cranium mid-sagittal plane, by 2 readers blindly from the axial images of computed tomography. The RWN visibility was classified according to the observation during surgery (through posterior tympanotomy) into full visibility, partial visibility, and invisibility. The measured angle was then correlated to the intra-operative visibility of the RWN.

Results:

The average ABTC was $57.48^\circ \pm 4.05^\circ$ (range: 45.0-68.0), and the RWN was found to be fully visible in 85%, partially visible in 11%, and invisible in 4% of the studied ears. The receiver operating characteristic analysis revealed a significant discriminating ability in predicting RWN visibility ($P < .001$) at a threshold ABTC angle of 58.5° . The mean ABTC was $56.71^\circ \pm 3.74^\circ$, 61.00° , and $63.86^\circ \pm 2.67^\circ$ for fully visible, partially visible, and invisible RWN, respectively. A statistical significant difference was found ($P = .0002$) when comparing the ABTC in patients with partially visible/invisible RWN ($61.80^\circ \pm 2.87^\circ$) with the fully visible RWN ($56.71^\circ \pm 3.74^\circ$).

Conclusion:

Round window niche visibility could be predicted by measuring the ABTC in relation to the cranium's mid-sagittal plane in CT preoperatively. An ABTC bigger than 58.5° could be an indication of poorly visible RWN.

01.4.01 The Role of electrocochleography in the management of bilateral Ménière's disease

Prof Edoardo Covelli¹, PhD Maurizio Barbara¹

¹La Sapienza

Free paper 1.4, 4. Kleine Zaal, September 5, 2024, 10:30 - 11:30

Objectives:

Ménière's disease (MD), a chronic inner ear disorder, causes fluctuating vestibular and auditory symptoms. Most severely affected are the 10–50% of patients in whom the disease progresses to bilateral MD. When the MD becomes bilateral, choosing the ear for pressure treatment becomes problematic. This study aimed to assess the role of electrocochleography (ECoChG) in choosing the ear candidate for the pressure treatment and the impact on the vestibular manifestations.

Methods:

This prospective study was conducted in a tertiary centre between 2018 and 2022. We included 24 patients who suffered from vestibular manifestations due to bilateral MD and were resistant to medical treatment. Clinical examination, pure tone audiometry, and ECoChG were done to confirm the diagnosis. They were done 1 week before the treatment, then were done 1 month, three months, six months, and 24 months after the treatment course. SP/AP ratio equal to or more than 0.5 was considered MD. The ear with the higher SP/AP ratio was selected for pressure treatment. After the placement of the ventilation tube, the subjects were received 1 month of self-administered low-pressure therapy with a portable device. The Dizziness Handicap Inventory (DHI) was evaluated before the treatment and 24 months after the conclusion the therapy.

Results:

The mean of the SP/AP ratio in the more affected ear before the treatment was 0.77 twenty-four months after the low-pressure treatment, with a statistically significant improvement as the P-value was 0.001. On the other side, the mean of the SP/AP ratio in the less affected ear before the pressure treatment was 0.6, while it was 0.55 twenty-four months after the pressure treatment with a statistically significant improvement as the P-value was; 0.001. The DHI score was 80.5 before the pressure treatment, while it was 18.5 after the with a statically significant improvement as the P-0.001. Twenty-two patients showed improved vestibular manifestations .

Conclusion:

This study showed that the low pressure treatment was an effective method to alleviate the vestibular manifestations of MD before going to more invasive methods, Also, ECoChG was effective mauver to choose the ear candidate for local treatment in cases with bilateral MD

01.4.03 Investigating the role of [18F]-FDG PET-imaging in the treatment of necrotizing external otitis

MD Anniëk van Gestel, [Md, Phd Jérôme Waterval](#)¹, Md Jasper Janssen¹, MD, PhD Dirk Kunst¹, MD, PhD Cristina Mitea, MD, PhD Anne Arens, Ismail Kurt

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Free paper 1.4, 4. Kleine Zaal, September 5, 2024, 10:30 - 11:30

Background:

Measuring treatment response in necrotizing external otitis (NEO) proposes a challenge. Previous research indicates that imaging with [18F]-FDG-PET has added value in the treatment evaluation, however no definitive criteria or cut-off points have yet been established for discontinuation of treatment using this form of imaging. This study aims to analyse observations on the SUVmax from previous research in a new cohort, and to explore treatment criteria by correlating these results with the clinical findings.

Methods:

For this retrospective study, patients of two university medical centers were included. A total of 13 new patients (group I) and 11 patients, previously analysed in other research, (group II) were included. All patients had proven NEO and at least two PET-scans over the course of their treatment. Maximum SUV were measured on the unaffected side and the affected side.

Results:

A significant decrease was found between the SUVmax of the affected side, at baseline versus post-treatment, in both groups (I: $p = <.001$; II: $p = .012$), unlike the SUVmax on the unaffected side (I: $p = .110$; II $p = 0.104$). After treatment, statistically significant differences remain between the SUVmax on the unaffected side and the affected side in both groups (I: $p = 0.004$; II: $p = 0.012$). The average SUVmax on the unaffected side post treatment, in group I, was 2.18 with 95%CI [1.92 – 2.45], and the average SUVmax on the affected side post-treatment in this group was 3.00 with 95%CI [2.50 - 3.50]. In group II, the average SUVmax on the unaffected side post-treatment was 2.50 with a 95%CI of [2.06 - 2.94], versus an average SUVmax on the affected side of 3.47 SUV-bw with 95%CI [2.44 - 4.51]. None of the patients had recurrence of the disease.

Conclusion:

When using hybrid imaging with [18F]-FDG-PET and MRI/CT, normalization of SUVmax on the affected side may not need to be achieved for safe discontinuation of treatment in patients with no clinical signs of ongoing infection. Further research is needed to determine factors that can guide in the establishment of cut off criteria in terms of Standard Uptake Values.

05.4.03 Speech perception in noise outcomes in single-sided deafness: RCT on the effect of cochlear implantation, bone conduction devices and contralateral routing of sound

MD, PhD Diane Smit¹, MD Jan Van Heteren¹, MD Anne Wendrich¹, MD, PhD Jeroen Peters¹, prof. Wilko Grolman, prof Robert Stokroos¹

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Free paper 1.4, 4. Kleine Zaal, September 5, 2024, 10:30 - 11:30

Objectives:

The aim of the current study is to investigate the current and advanced treatment options on speech perception in noise outcome in SSD patients up to 24 months of follow-up as part of an ongoing randomized controlled trial (RCT) investigating hearing outcomes for CI, BCD, CROS and no treatment for SSD patients.

Methods:

120 eligible patients were randomized to 3 groups: cochlear implantation, a trial period with first a BCD/ then CROS or a trial period with first CROS/ then. After the trial periods, participants opted for a surgically implanted BCD, a CROS, or no treatment. At the start of the follow-up, 28 participants were implanted with a CI, 25 with a BCD, 34 had a CROS, and 26 chose no treatment. Speech perception in noise was measured with the Crescent of Sound test in 3 configurations (speech and noise coming from different locations) and with the Speech, Spatial and Qualities of hearing (SSQ) questionnaire speech scale. Measures were completed at baseline, and at 3, 6, 12, and 24 months of follow-up to compare outcomes between groups.

Results:

At 24 months follow-up speech perception thresholds in the CI group were significantly lower (i.e., better) than for the BCD and CROS group for all 3 configurations. For sound and noise coming from the front (SONO) this resulted in scores for the CI group (SRTn: -4.1 [-5.9 to -1.6] compared to BCD (SRTn: -3.1 [-7.8 to 3.4], and CROS (SRTn: -2.8 [-6.9 to 0.0], ($p < 0.05$)). The Speech hearing subscale scores for the CI group (6.2 [3.2 – 8.6]) were significantly higher than for the BCD (4.2 [2.0 – 7.6]), CROS (4.8 [2.2.9 – 7.2]) and no treatment group (4.0 [1.7 – 7.0], $p < 0.001$).

Conclusion:

In this RCT, SSD patients treated with a CI outperformed those treated with a BCD or CROS or the no treatment group on objective and subjective measures of speech perception at 24 months of follow-up. This creates high level of evidence to optimize hearing abilities for those with single sided deafness.

O1.1.01 Principles for safe Total Endoscopic Surgery for Cholesteatoma

Mr Abdelrahman Ezzat Ibrahim¹

¹United Lincolnshire Hospitals NHS NHS Trust

Free paper 1.1, 1. Concertzaal, September 5, 2024, 10:30 - 11:30

Objectives:

Principles for safe endoscopic surgery

Methods and principles:

reviewing the Scans review and planning , the best Instrument with using proper endoscopic system and the Surgical steps and Operative techniques

Results:

using those techniques resulting of safe and less complication

Conclusion:

knowing the general principle for safe total endoscopic surgery help you to build up a fast and safe surgery. The learning curve is very important to develop endoscopic ear surgery.

O1.1.02 Endoscopic Tympanomastoid surgery five years outcome at East Suffolk and North Essex NHS foundation trust, Ipswich, United kingdom

Mr Gaurav Kansal¹, Mr Sachin Patil¹

¹East Suffolk and North Essex NHS Foundation Trust, Ipswich.

Free paper 1.1, 1. Concertzaal, September 5, 2024, 10:30 - 11:30

Objectives :

Endoscopic Mastoid surgery first described in 1990. There are few long-term results available. No long term or medium-term results available on residual or recurrent Cholesteatoma. We would like to present our results of prospective study of endoscopic mastoid surgery over last five years.

Methods:

Main outcomes measures : 1. Incidence of recurrent and residual Cholesteatoma, 2. Dry ear at 5 years, 3. Postoperative complications, 4. Waterproof status and 5. Any subsequent surgery required. Data collected prospectively for last five years. This is a longitudinal study in paediatric and adult population.

Results and discussion:

Thirty-Four paediatric and Ninety-two adults contributed to this study. At five-year study 7 patients lost follow up. Using Kaplan-Meier analysis the residual rate was 2% and recurrence rate was 1%. Of the 126 patients 94% achieved dry ears, 6% had some intermittent discharge. Using a cross sectional analysis, the otorrhea risk was 7%.

Conclusion-Endoscopic Mastoid surgery is a safe and less invasive. It has better outcome and comparable with open Mastoid surgery.^{2,3}

It is associated with low recidivism rate and high rate of trouble-free ear in long term.¹ Recurrent cholesteatoma is not related to endoscopic ear surgery or open approach but to the skill of the surgeon. Residual disease is related to the degree of complete and safe removal of the matrix.

Reference:

1. Endoscopic management of Paediatric chronic ear disease. *Otolaryngol Clin North Am.* 2021 Feb; 54(1):125-128. Ronner E, Cohen MS
2. Endoscopic Management of Paediatric Cholesteatoma. *J Otol.* 2020 Mar; 15(1):17-26. Ryan PJ, Patel NP.
3. Endoscopic middle ear and mastoid surgery for cholesteatoma. *J otorhinolaryngol.* 2013 Spring; 25(71):63-70, Sajjadi H. Iran

O1.2.01 Analysis of gustatory function in chronic otitis media without cholesteatoma

Dr. Mislav Malić¹

¹Department of ENT and H&N Surgery, University Hospital Centre "Zagreb".

Free paper 1.2. Annazaal, September 5, 2024, 10:30 - 11:30

Introduction:

It has not been sufficiently investigated how the gustatory function changes after successful surgical treatment. The aim of this study was to determine the gustatory function in the front two-thirds of the tongue in patients with unilateral chronic otitis media without cholesteatoma and to compare the results between the healthy and diseased side before and after surgical treatment.

Materials and methods:

Patients with unilateral chronic otitis media hospitalized for planned myringoplasty were included in this prospective cohort longitudinal study.

Results:

A total of 98 patients completed the study. In a total of 74 patients (75.5 %), there was an improvement three months postoperatively in the taste function of the diseased side compared to the results before the operation, and a total of 50 patients (51.02 %) reached the result of the healthy side. The postoperative gustatory function is significantly better if the tympanomeatal flap is not elevated (binary logistic regression, $p=0.003$, OR 8.894).

Conclusions:

Our results show that gustatory function partially recovers after a successful myringoplasty. There is a greater chance of achieving the full recovery potential of impaired taste function if we avoid chorda tympani manipulation during surgery.

O1.2.02 Atypical subacute mastoiditis - still a clinical challenge

Dr. Julia Arebro, MD, PhD Anna Granath^{1,2}, MD Lara Kakabas^{1,2}

Free paper 1.2, 2. Annazaal, September 5, 2024, 10:30 - 11:30

Objectives:

Atypical subacute mastoiditis is a form of chronic mastoid infection where nontuberculous mycobacteria occasionally are detected. We here review all pediatric cases of atypical subacute mastoiditis over 20 years to improve knowledge and future management strategies of this disease and to reduce the incidence of complications.

Methods:

In this retrospective single-center study, all children (0-17 years) hospitalized with atypical (subacute) mastoiditis at Karolinska University Hospital during 2003-2023 were included. Data was collected including age, sex, previous and current disease, symptoms at presentation, laboratory findings, microbiology findings, imaging, histopathology, antibiotic treatment, surgical interventions, and complications.

Results:

Eighteen patients were included, with the mean age of 7.6 years. Symptoms included ear discharge (78%), polyps in the ear canal (50%), red/inflamed tympanic membrane (50%), and presence of swelling close to the ear (11%). All 18 cases had a ventilation tube present in the tympanic membrane due to secretory otitis media (SOM). A computed tomography (CT) was performed in 17 (94%) of the patients, with temporal bone destruction detected in 82% of the cases. Of all children, 44% displayed a positive bacterial culture with nontuberculous mycobacteria positive in six cases. Upon histopathological examination, granulomas were detected in all cases. All cases were treated with antibiotics and underwent mastoidectomy and removal of the ventilation tube. Sigmoid sinus thrombosis was seen in four patients (22%) and an abscess was detected in nine cases (50%). Seven patients suffered from a remaining retroauricular fistula. One patient experienced facial palsy, however recovered, and one patient had an intracranial abscess, successfully treated without neurosurgical intervention. Four patients displayed sensorineural hearing loss at follow up. No deaths occurred.

Conclusion:

Atypical subacute mastoiditis should be suspected in children typically aged 7-8 years and with persistent ear discharge from a ventilation tube, where CT scan display bone destructions of the temporal bone and histopathological review report findings of granulomas. Complications including sigmoid sinus thrombosis, abscesses, fistulas and sensorineural hearing loss are frequently seen.

O1.2.03 Systematic Review and Global Estimates of Chronic Suppurative Otitis Media

[Anjola Onifade](#)¹, Henriette Wakatolo¹, Prof. Mahmood Bhutta¹

¹University Hospitals Sussex

Free paper 1.2, 2. Annazaal, September 5, 2024, 10:30 - 11:30

Objectives:

Chronic Suppurative Otitis Media (CSOM) detrimentally impacts hearing and quality of life, especially in low-resource environments. This study synthesizes recent peer-reviewed literature to provide a comprehensive global overview of CSOM's prevalence in community settings.

Methods:

Adhering to PRISMA guidelines, a systematic search was conducted on February 6, 2023, across the Ovid and Embase databases for original, community-based studies on CSOM published in English from 2002 to present. A narrative synthesis was employed due to the significant heterogeneity of studies, and risk factors were modeled where applicable. Meta-analysis was not performed.

Results:

From an initial pool of 4,854 articles, 29 cross-sectional studies met our criteria, revealing a global CSOM prevalence of 4.02%. These studies predominantly originated from lower-income regions and involved pediatric populations, displaying a prevalence correlated with income groups. Our analysis did not reveal consistent trends in prevalence when considering age, gender, or urban versus rural settings. Incidence rates were not reported. Hearing impairment was reported in 50-78% of cases in studies that included sequelae. However, detailed symptomatology, such as the frequency of otorrhoea, was notably underreported, with only one study providing such data.

Conclusion:

The study presents a significant global prevalence of CSOM, highlighting a persistent public health concern. The results emphasize the immediate need for standardized hearing impairment diagnostic criteria and comprehensive symptom documentation to guide effective public health responses. This review serves to reinforce the critical need for international initiatives to prevent and manage CSOM, with profound implications for healthcare providers and policymakers.

O1.2.04 Ear complaints in a general population; the normative data of the Otology Questionnaire Amsterdam in the Netherlands.

Prof Dr. Paul Merkus^{1,2}, Jeroen Kraak^{1,2}, Robel Michael¹, dr Jeroen Hoogland³, prof Sophia Kramer^{1,2}

¹Otorhinolaryngology, Amsterdam UMC, ²Amsterdam Public Health institute, ³Epidemiology and Data Science, Amsterdam UMC

Free paper 1.2, 2. Annazaal, September 5, 2024, 10:30 - 11:30

Introduction:

The Otology-Questionnaire-Amsterdam (OQUA) is an ear-domain specific questionnaire developed to evaluate severity and intensity of multiple ear complaints and the impact of these complaints [Kraak 2020]. It is validated to be responsive to any surgical and non-surgical intervention. It measures 8 complaints: earache, itch, tinnitus, hearing loss, pressure sensation, otorrhea, dizziness and loss of taste, and the impact on quality of life. A score (0-100) can be calculated for each domain. To value the outcomes of the OQUA the normative data in the Dutch general population is presented.

Methods:

500 healthy adults, stratified on categorized age groups were selected. Participants with a known ear disease or ear complaint were excluded. The 95th percentile of the distribution of scores in the normal population was taken as the threshold between a normal and abnormal score in seven age-groups. Gender differences were tested with independent t-tests.

Results:

500 Dutch adults completed OQUA. Four patients had to be excluded. Zero-inflated beta regression was needed due to heavily skewed to the right data. The 95th percentile was very high for tinnitus in the elderly population. The 95th percentile for otalgia, pressure, otorrhea, dizziness and itch diminished with age. Hearing complaints was high at a younger and higher age and with lower scores between age 40 and 60. Men scored higher (worse) on the loss of taste compared to women.

Conclusion:

The normative data of the OQUA in healthy adults by age-group and gender provide a reliable reference of the patients' ear complaints and their impact on quality of life in the Netherlands. These data are valuable in a shared decision-making consultation, providing better understanding of the patient's ear complaints and impact score compared to a healthy population. Together with the Minimal Important change, the OQUA forms a very powerful tool for Value Based Healthcare as it is validated for all ear diseases using pre- and post-intervention measurements.

Reference:

Kraak JT, et al. The Otology Questionnaire Amsterdam: a generic patient reported outcome measure about the severity and impact of ear complaints. Validation, Reliability and Responsiveness. Clin Otolaryngol 2020;45(4):506-516

01.3.01 Middle ear pressure remains low after mastoid obliteration or tympanomastoidectomy in children with cholesteatoma

[Professor Adrian James¹](#)

¹University of Toronto

Free paper 1.3, 3. Sociëteitskamer, September 5, 2024, 10:30 - 11:30

Objectives:

To evaluate the hypothesis that mastoid obliteration (MO) minimises recurrent cholesteatoma by blocking gas absorption in the mastoid and normalising middle ear pressure (MEP), MEP was compared in children with cholesteatoma after MO or canal wall up tympanomastoidectomy (CWU).

Methods:

Prospectively acquired data on a consecutive series of children having mastoid surgery for acquired cholesteatoma were reviewed. Tympanometric values of MEP were collected at clinical follow-up visits from both ears. Normal MEP values were derived from contralateral ears that were otoscopically normal, with Type a ($> -100\text{daPa}$) or c ($< -100\text{daPa}$) tympanogram. MEP measures were compared for MO and CWU surgery. Clustered analysis (single measure last clinic visit after last surgery) and linear fixed effects modeling accounted for different revision surgeries, the variable number of MEP measures per ear, and the known increase of MEP with age.

Results:

382 surgeries were completed on 248 ears with cholesteatoma. Post-op MEP was measurable in 992 tests from 1755 clinic appointments. At last clinic visit after last surgery (average age 15.3years (2.4 – 21.9)), type a tympanograms were present in tested ears of 27/61 (44%) that had MO surgery and 69/140 (49%) that had CWU (Chi-square, $p=0.51$), but of 123/138 (89%) normal contralateral ears. Median MEP was -75daPa (IQR: -156 to -16) after MO surgery and -60daPa (IQR: -162 to -5) after CWU (Wilcoxon, $p=0.705$) but 2daPa (IQR: -25 to 20) in normal contralateral ears (Wilcoxon, $p=0.026$). Using all MEP measures from all post-op visits, the mixed linear effects model showed that MEP increased with age ($p=0.048$) but was not affected by type of mastoid surgery ($p=0.839$) or numerator of surgery.

Conclusion:

MEP after surgery for paediatric cholesteatoma is similar after obliteration of the mastoid or CWU tympanomastoidectomy and remains lower than normal. Hypotheses that propose cancelation of gas absorption from the mastoid by MO or creation of a larger air volume reservoir to buffer changes in middle ear pressure by CWU are not supported by these findings. Selection of optimal surgical approach should be based on patient-focused outcome measures such as operative morbidity and revision surgery rate rather than unvalidated hypotheses.

O1.3.02 The necessity of head bandaging in patients undergoing middle ear surgery

Dr. Muhammad Sohail¹

¹Aga Khan University Hospital

Free paper 1.3, 3. Sociëteitskamer, September 5, 2024, 10:30 - 11:30

Objectives:

This randomized controlled trial (RCT) aimed to investigate the necessity of head bandaging in patients undergoing middle ear surgery by comparing outcomes and postoperative complications between patients with and without head bandages.

Methods:

A total of 80 patients scheduled for middle ear surgery were recruited and randomly assigned to two groups equally: The Standard Mastoid Bandage Group which is done with a crepe bandage around the head (Control Group), and the simple gauze bandage group (Intervention Group) in which a gauze is placed over postauricular wound and stuck with Mefix (self-adhesive fabric tape). All Surgical procedures were performed by a single experienced otolaryngologist using standardized techniques and he was kept blind of the interventions. Postoperative assessments, including pain scores, wound complications, wound healing, and patient satisfaction, were recorded and compared between the two groups.

Results:

The findings of this RCT revealed no statistically significant differences between the two groups in terms of hematoma formation or wound infection. Both groups demonstrated comparable outcomes, indicating that the omission of standard mastoid head bandaging did not adversely affect patient recovery or increase the risk of complications in middle ear surgery. Moreover 6 out of 40 patients had skin abrasion in the control group which was statistically significant ($P= 0.026$).

Conclusion:

Based on the results of this randomized controlled trial, Mastoid head bandaging does not appear to be a necessary component of the postoperative management for patients undergoing middle ear surgery. Omission of Mastoid head bandaging did not result in any significant differences in postoperative outcomes or complications. These findings suggest that the routine practice of head bandaging may not be warranted in middle ear surgery, allowing for potential cost savings and improved patient comfort. However, further studies with larger sample sizes and longer follow-up periods are recommended to validate these results and provide more comprehensive evidence for clinical practice.

O1.3.03 Glass Isonomer in Incudo - Stapedial reconstruction

dr Meenesh Juvekar¹

¹Bombay Hospital Medical & Research Centre , Mumbai

Free paper 1.3, 3. Sociëteitskamer, September 5, 2024, 10:30 - 11:30

Objectives:

Chronic Otitis media is one of the major Otology disease worldwide. This often results in Ossicular chain erosion or destruction resulting in conductive hearing loss. The incudostapedial joint is the commonest joint of ossicular discontinuity. The aim of the study was to develop a simple physiological and cost effective method of Incudostapedial joint reconstruction with significant improvement in post operative hearing.

Methods:

Glass Ionomer was used to repair the Incudostapedial joint intraoperatively in cases of Mucosal Otitis Media. The post operative follow up was done at 1 month, 3 months and 1 year intervals. The Pure Tone Audiometry was done with air conduction at 0.5, 1, 2, 3, 4, 6 and 8kHz and bone conduction at 0.5, 1, 2, 3 and 4kHz.

Results:

Patients showed significant hearing improvement with near closure of air bone gap. 91.67% patients had closure of ABG < 20 dB at end of 3rd month. Significant hearing improvement was seen even after 1 year of follow up.

Conclusion:

Glass ionomer is a simple, physiological and cost effective method of Incudo -Stapedial joint reconstruction maintaining the natural ossicular assembly.

01.4.02 Does co-presentation with migraine define a distinctive clinical subtype of Meniere's disease?

Prof Louisa Murdin¹, Mr John Phillips, Prof Peter Rea, Prof Lee Shepstone, Kelly Grant, Erika Sims, Mr Jonny Harcourt

¹Guy's And St Thomas' Nhs Foundation Trust

Free paper 2.3, 3. Sociëteitskamer, September 5, 2024, 16:45 - 17:45

Objectives:

There is increasing recognition that Meniere's Disease (MD) is a heterogenous condition with clinical subtypes. MD presenting simultaneously with migraine is a candidate subtype. This study was designed to explore the influence of migraine on the presentation of MD in a large national multicentre study.

Methods:

The study was a registry based project across 4 different UK specialist centres. 411 participants with MD confirmed by specialists entered data around their condition and general health into a managed database, supplemented by entries of technical condition related data submitted by clinical care teams. Data were collected on demographics, symptoms, comorbidity and disability (including the MIDAS scale for disability in migraine). Clinical features for those with both migraine and MD (MigMD) were compared with those who had MD alone (NoMigMD) using a logistic regression backward elimination method.

Results:

Out of the 411 consented participants, 130 (35.6%) declared having migraines as part of their medical history, with 235 (64.4%) declaring not having migraines (46 missing). The median MIDAS score was 2 (IQR 0-11). The MigMD group had a significantly younger age of onset of MD than the NoMigMD group ($p = 0.009$). This group also had higher rates of some comorbidities including drug allergy ($p < 0.001$), back pain ($p = 0.003$) and osteoarthritis ($p = 0.001$). The MigMD group also had higher scores on the situational vertigo questionnaire (SVQ), $p = 0.025$.

Conclusion:

This study of over 400 individuals with confirmed MD shows that those with migraine and MD have differences in presentation, disability scores and comorbidities that support the concept of MigMD as a distinct clinical subtype.

02.1.02 Antibiotics in conjunction with cholesteatoma surgery and postoperative infection: data from SwedEar

MD. Associate professor Per Olof Eriksson¹, MD. Phd. Jesper Edvardsson Rasmussen¹, MD. Associate professor Eva Westman²

¹Department of Surgical Sciences, Otorhinolaryngology, Uppsala university, ²Department of Clinical Sciences, Otorhinolaryngology, Umeå University

Free paper 2.1, 1. Concertzaal, September 5, 2024, 16:45 - 17:45

Introduction & objectives:

Cholesteatoma is characterized by an abnormal retainment of keratin in the middle ear and/or mastoid with the standard treatment being surgical. Prior research reports contradictory results of antibiotics on surgical outcomes. The Swedish Quality Register for Ear Surgery (SwedEar) is a national register including cholesteatoma surgeries since 2020. The aim is to evaluate antibiotics used per- and postoperatively in cholesteatoma surgery and effects on postoperative infection, healed tympanic membrane (TM), cholesteatoma-free ear, and hearing gain.

Methods:

A register-based retrospective cohort study of data from SwedEar. A studygroup of 1490 cholesteatomasurgeries were used for evaluation of pre-, per, and postoperative use of antibiotics. For analyses of surgical outcomes, 670 had a follow-up visit.

Results:

The use of per- and postoperative antibiotics varied between 0-98% nationwide. Overall use of any antibiotics was 49% in the study population, with the most common pattern being per-and postoperative antibiotics in combination. Mean postoperative infection rates were 11%, which increased in the group that received antibiotics. The rates vary nationwide between 0-45%. There was a difference in postoperativ infection within 6 weeks, with a higher risk with the use of peroperative antibiotics. No difference could be seen for healed TM, cholesteatoma-free ear, and hearing gain.

Conclusion:

The use of antibiotics varies significantly nationwide, also the postoperative infection rate. The results suggest lack of beneficial effects of antibiotic use when analyzing postoperative infection rates.

02.1.03 Canal-wall up cholesteatoma surgery with mastoid obliteration leads to lower rates of disease recurrence without affecting hearing outcomes

Drs. Chiara Erfurt¹, Drs. Sanne F. Westerhout¹, Dr. Louise V. Straatman¹, Dr. Adriana L. Smit¹, Prof. Dr. Robert J. Stokroos¹, Dr. Hans G.X.M. Thomeer¹

¹Department of Otorhinolaryngology and Head & Neck Surgery, University Medical Center Utrecht

Free paper 2.1, 1. Concertzaal, September 5, 2024, 16:45 - 17:45

Objectives:

The primary objective was to determine whether obliteration of the epitympanic area and mastoid cavity during canal wall up (CWU) cholesteatoma surgery reduces the rate of recurrent and residual cholesteatoma compared to not obliterating the same area. The secondary objective was to compare postoperative hearing outcomes between both techniques.

Methods:

A retrospective cohort study was conducted in a tertiary referral center. One-hundred-fourty-three ears were included of patients (≥ 18 y) who underwent a CWU tympanomastoidectomy for cholesteatoma with or without bony obliteration between January 2015 and March 2020 in the University Medical Center Utrecht. The median follow-up was respectively 1.4 (IQR 1.1–2.2) vs. 2.0 years (IQR 1.2–3.1) ($p = 0.013$). For 73 ears bone dust, Bonalive[®] or a combination was used for obliteration of the mastoid and epitympanic area, the rest of the ears ($n = 70$) were not obliterated. In accordance with the Dutch protocol, included patients are planned to undergo an MRI scan with diffusion-weighted imaging (DWI) one, three and five years after surgery to detect recurrent or residual cholesteatoma.

Main outcome measure(s): The primary outcome measure was recurrent and residual cholesteatoma as evaluated by MRI-DWI and/or micro-otoscopy and confirmed by micro-otoscopy and/or revision surgery. The secondary outcome measure was the postoperative hearing.

Results:

In this cohort, the group treated with canal wall up tympanomastoidectomy with subsequent bony obliteration (73 ears, 51.0%) had significantly lower recurrent (4.1%) and residual (6.8%) cholesteatoma rates than the group without obliteration (70 ears, 25.7% and 20.0%, respectively; $p < 0.001$). There was no significant difference between both groups in postoperative bone conduction thresholds (mean difference 2.7 dB, $p = 0.221$) as well as the mean air-bone gap closure 6 weeks after surgery (2.3 dB in the non-obliteration and 1.5 dB in the obliteration group, $p = 0.903$).

Conclusion:

Based on our results, a canal wall up tympanomastoidectomy with bony obliteration is the treatment of choice, since the recurrent and residual disease rate is lower compared to the group without obliteration. The bony obliteration technique does not seem to affect the perceptive or conductive hearing results, as these are similar between both groups.

02.1.04 Functional Correlations of Tympanic Membrane Perforation Size

[Dr Bob Lerut¹](#), Dr Thomas Linder

¹Az Sint Jan Brugge

Free paper 2.1, 1. Concertzaal, September 5, 2024, 16:45 - 17:45

Objectives:

The correlation between tympanic membrane perforations and hearing loss was studied.

Study Design: Prospective data from 220 patients, who underwent primary surgery for simple chronic otitis media with a perforated eardrum, were analyzed.

Setting:

Tertiary referral center.

Patients:

One hundred fifty-one patients with 155 eardrum perforations, which were checked for correct diagnosis, normal middle-ear status, and integrity of the ossicular chain, were included.

Interventions: All patients underwent primary myringoplasty. Main Outcome Measures: Preoperative conductive hearing loss due to eardrum perforations.

Results: Hearing loss shows a linear relationship with increasing eardrum perforation size. Umbo involvement shows a worsening of the hearing by 5 to 6 dB ($p < 0.0001$). The least impact of a perforation is seen at the resonance frequency of 2 kHz. Above and below 2 kHz, an inverted V-shape of the air-bone gap is a consistent finding. If the air-bone gap exceeds the inverted V-shape pattern, additional pathology behind the eardrum must be assumed and addressed.

Conclusion:

We propose using standardized photographs or drawings to document preoperative perforation sizes. A linear relationship between the size of a perforation and the conductive hearing loss does exist. Umbo involvement at the perforation margin may worsen the hearing by 5 to 6 dB, whereas the position of the perforation itself does not play a role. The least impact of a perforation is seen at the resonance frequency of 2 kHz. An inverted V-shape pattern, above and below 2 kHz, of the air-bone gap is a consistent finding. If the air-bone gap exceeds this pattern, additional pathology behind the eardrum perforation must be assumed and addressed.

Key Words:

Conductive hearing loss, Frequency of hearing loss, Location, Resonance frequency, Relation between air-bone gap and perforation size, Tympanic membrane perforation, Umbo involvement.

02.3.01 Regeneration of hair cells in the adult (human and mouse) cochlea

[Dr. Louise Straatman](#)¹, dr. Natalia Smith-Cortinez, dr. Huib Versnel, dr. Hans Thomeer, prof.dr. Robert Stokroos

¹University Medical Center Utrecht

Free paper 2.3, 3. Sociëteitskamer, September 5, 2024, 16:45 - 17:45

Objectives:

Supporting cells (SCs) in the cochlea give rise to hair cells (HC) during embryonic development. It has been recently demonstrated that SCs in adult mice express progenitor cell markers, like LGR5. These SCs can potentially differentiate into HCs after manipulation of key signalling pathways. Here, we evaluated HC differentiation in cochlear organoids from adult patients undergoing surgery for skull-base tumors and from adult normal-hearing (NH) and deafened mice.

Methods:

Sensory epithelium of the cochlea and vestibular organ was collected from adult patients undergoing surgery for skull base tumors. Cochleas were harvested and digested to single cell suspension from adult NH and deafened Lgr5-eGFP-IRES-creERT2 heterozygous mice. Cells (derived from inner ear from patients or mice) were grown in 3D on expansion medium (EM, contains histone deacetylase inhibitor and Wnt activator) and differentiation medium (DM, contains Notch inhibitor). Organoids were evaluated by immunofluorescence microscopy.

Results:

Human vestibular-organ-derived and cochlea-derived organoids were generated in EM. After exposure to DM, vestibular organ-derived and cochlea-derived organoids produced MYO7A+ HC-like cells. Cochlear organoids from NH and deafened mice expressed LGR5 and Ki67 in EM and after differentiation newly produced MYO7A+ cells were visible.

Conclusion:

Cochlear and vestibular tissue from adult patients (and adult normal-hearing and deafened mice) possess progenitor potential and the capacity to generate inner ear organoids in vitro. After differentiation, MYO7A+ cells were visible in tissue derived from human cochlea, human vestibular organ, and adult mouse normal hearing and deafened cochlea. The adult inner ear has regenerative capacity and can produce new MYO7A+ hair-cell like cells.

02.3.02 Estrogen Deficiency and Auditory Impairment in Turner Syndrome: Implications for Hormone Replacement Therapy

[Prof. Yu Si¹](#)

¹Sun Yat-sen Memorial Hospital

Free paper 2.3, 3. Sociëteitskamer, September 5, 2024, 16:45 - 17:45

Background:

Turner syndrome (TS), a genetic disorder characterized by X chromosome aberrations, presents a multifaceted clinical landscape, including auditory complications. Despite therapeutic advancements, hearing loss persists as a prevalent concern, often linked to endogenous estrogen insufficiency. Estrogen, renowned for its neuroprotective attributes, emerges as a potential therapeutic modality. This study aims to elucidate the correlation between estrogen levels and auditory function in TS, offering insights into the therapeutic potential of hormone replacement therapy (HRT).

Study Design:

Prospective Cohort Study

Methods:

Since 2018, TS patients have undergone regular assessments at our institution, encompassing hormonal profiling and audiological evaluations. Pure tone audiometry, impedance testing, and otoacoustic emissions assessments were performed alongside hormone assays. Statistical analyses, including Pearson correlation coefficients, were employed to discern patterns between estrogen levels, auditory parameters, and the timing of HRT initiation.

Results:

Seventy-eight TS patients, with a mean age of 13.64 years, were enrolled, with a median follow-up duration of 3 years. Mosaic karyotypes were predominant (39.3%), followed by monosomy karyotypes (30.3%). Hearing loss exhibited a progressive trend with age, particularly pronounced in mosaic karyotype individuals ($P < 0.05$). Lower-frequency hearing thresholds demonstrated a more significant decline than higher frequencies ($P < 0.05$). A significant negative correlation was observed between estrogen levels and pure tone averages ($r = -0.34$, $p = 0.005$), indicating worsened hearing with lower estrogen levels. Additionally, a positive correlation was noted between otoacoustic emissions signal-to-noise ratios and auditory outcomes ($r = 0.47$, $p = 0.008$). The timing of HRT initiation correlated positively with current auditory status ($r = 0.57$), suggesting potential benefits of early intervention.

Conclusion:

Our findings underscore the importance of estrogen in auditory function among TS patients. Lower estrogen levels were associated with worsened hearing outcomes, emphasizing the potential role of HRT in mitigating auditory impairment. Early initiation of HRT may confer advantages in preserving auditory function, highlighting the importance of tailored therapeutic approaches in TS management.

02.3.03 OCT hallmarks in conductive hearing loss

Dr. Floor Couvreur¹, Junzhe Wang³, Jesse Yang³, Joshua Farrell³, Robert B A Adamson^{2,3,4}, David P Morris²

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Free paper 2.3, 3. Sociëteitskamer, September 5, 2024, 16:45 - 17:45

Objectives:

We present the basic principles of middle ear optical coherence tomography (ME-OCT) and show how optical coherence tomography (OCT) can be used to differentiate various causes of conductive hearing loss such as otosclerosis, malleus fixation and ossicular discontinuities.

Methods:

ME-OCT is a novel imaging modality that provides radiation-free, non-contact, real-time, in office structural and functional visualization of the middle ear through the intact tympanic membrane (TM) with high resolution and excellent soft-tissue contrast. Like ultrasound, ME-OCT generates depth-resolved images, but it does so using light instead of sound. ME-OCT also enables transtympanic, frequency-resolved Doppler vibrometry measurements of middle ear structures that can provide insight into the etiology of conductive hearing loss.

Our group has developed a turnkey, handheld ME-OCT system in an otoscopic form factor capable of real-time clinical imaging and applied it to a population of conductive hearing loss patients in our clinic. We included 18 pre-operative otosclerotic ears, 8 post-stapedotomy, 3 ears with an ossicular discontinuity, and compared their vibrometric measurements to 28 normal ears.

Results:

ME-OCT vibrometry measurements on these subjects show that relative to healthy ears, otosclerosis is typically characterized by a mild (<10dB) low-frequency reduction in umbo mobility and a larger (>15dB) reduction in incus mobility as measured by OCT Doppler vibrometry. Patients with ossicular discontinuity exhibit a low frequency hypermobility at the umbo, incus or both with the location of the hypermobility being an indicator of where along the ossicular chain the discontinuity occurs.

Conclusion:

These preliminary data shows that OCT is able to differ between different types of conductive hearing loss, and that it holds promise as a novel diagnostic tool for assessing conductive hearing loss.

02.4.01 Intracranial and skull base complications of otogenic infections in the paediatric population

Tamar Boot¹, Md, Phd Jérôme Waterval¹, Md Jasper Janssen¹, MD, PhD Dirk Kunst¹

¹MUMC+

Free paper 2.4, 4. Kleine Zaal, September 5, 2024, 16:45 - 17:45

Objectives:

This study aims to address the incidence and the course of pediatric cases experiencing intracranial complications due to otogenic and sinogenic skull base infections. The search was performed for both patient groups, but the emphasis in this presentation will be on otogenic infections. These complications encompass various types of abscesses (epidural, subdural, subperiosteal), meningitis, cerebral venous sinus thrombosis and skull base osteomyelitis, resulting from middle ear infection or sinusitis in children. The study aims to gain insight into the patterns of these complications, including their prevalence, general symptoms at presentation, duration of hospitalisation and antibiotic policies. Also, the role of Covid-19 could suggest a rise in the incidence recently, this question will also be addressed.

Methods:

A retrospective study of 57 patients consisting of children between (0-18) was performed. Patients were treated in the Maastricht University Medical Centre. The search tool Ctcue was used to assemble the files of patients admitted between February 2013 and December 2023. Data were collected from the patient records in Castor.

Results:

From the preliminary results, an increase of complicated otogenic and sinogenic infections can be confirmed over the past years. Furthermore, we will present on patient demographics, treatment duration compared to complication type, anticoagulant use for thrombogenic complications and radiological surveillance.

Conclusion:

Sinusitis and acute otitis media are highlighted as potential causes of intracranial suppurative complications, cerebral venous sinus thrombosis and osteomyelitis of the skull base. Understanding the patterns of the complications and prevalence of frequent pathogens are crucial for effective disease management, especially since there is a diverse clinical presentation associated with challenges in diagnosis and treatment.

02.4.02 Hearing loss and its association with the proteome of perilymph in patients with vestibular schwannoma

MD. Phd. Jesper Edvardsson Rasmussen¹, Associate professor Peng Li², MD. Prof. Göran Laurell¹, MD. Prof. Jonas Bergquist¹, MD. Associate professor Per Olof Eriksson¹

¹Uppsala University, ²Harvard Medical School

Free paper 2.4, 4. Kleine Zaal, September 5, 2024, 16:45 - 17:45

This study investigated the relationship between hearing loss in individuals diagnosed with sporadic vestibular schwannoma and the proteomic composition of perilymph.

Intraoperative sampling of perilymph was carried out in 32 vestibular schwannoma patients.

Additionally, perilymph samples were obtained from three patients with meningioma and normal auditory function. Protein profiles were determined using liquid chromatography coupled with high-resolution tandem mass spectrometry. Preoperative auditory function was evaluated using pure tone audiometry, with mean values across frequencies of 500, 1000, 2000, and 4000 Hz (PTA4) in the tumor-affected ear used to categorize patients into three auditory groups.

Analysis of perilymph samples revealed a significant increase in complement factor H-related protein 2 (CFHR2) levels in patients with severe to profound hearing loss. Pathway analysis of biological functions indicated higher activation scores in the severe to profound hearing loss group for leukocyte migration, viral infection, and cell migration within perilymph.

The increased expression of CFHR2 and the activation of inflammatory pathways suggest the presence of chronic inflammation within the cochlea of vestibular schwannoma patients experiencing severe to profound hearing loss, which differs from patients with normal hearing or mild hearing impairment.

02.4.03 Automated measurement of vestibular schwannoma on MRI

[drs. Olaf Neve](#)¹, Yunjie Chen¹, professor dr. Jeroen Jansen¹, dr. Berit Verbist¹, prof. dr. Marius Staring¹, dr. Erik Hensen¹

¹Leiden University Medical Center

Free paper 2.4, 4. Kleine Zaal, September 5, 2024, 16:45 - 17:45

Objectives:

Validation of an automated measurement and growth detection tool of volume and two dimensional (2D) diameters of vestibular schwannomas on magnetic resonance imaging (MRI).

Methods:

MRI data from 214 patients in 37 different centres were retrospectively analysed. For the development of the volume measurement tool on T1+contrast and T2 sequences, a convolutional neural network (CNN) was trained. Quantitative analysis, including Dice index and surface-to-surface distance (S2S) was used to compare the computer and the human delineations. In addition, the volume model was validated using an external publicly available dataset. 2D measurements of the maximal extrameatal diameters in the axial plane were automatically derived from the 3D-CNN and compared to manual measurements by 2 human observers. Intra- and interobserver variabilities were calculated using the intraclass correlation coefficient (ICC), agreement on tumour progression using Cohen's kappa.

Results:

The volume model showed state-of-the-art performance, with a mean S2S distance of less than 0.6 mm and Dice index was 0.92 for T1+contrast MRI. T2-weighted images had a mean S2S distance less than 0.6 mm and Dice index was 0.87. The external validation showed S2S of 0.4 and Dice index of 0.8. For 2D measurement the human intra- and interobserver variability showed a high correlation (ICC: 0.98-0.99) and limits of agreement of 1.7 to 2.1 mm.

Conclusion:

Automated volume and 2D diameter measurements and growth detection of vestibular schwannomas are at least as accurate as human measurements. In clinical practice, measurements of the maximal extrameatal tumor (2D) diameters of vestibular schwannomas provide important complementary information to total tumor volume (3D) measurements. Combining both in an automated measurement algorithm facilitates clinical adoption.

02.4.04 Shifting management strategies in 30 years of multidisciplinary vestibular schwannoma care: an evaluation of 3139 patients

Nick De Boer¹, Dr. Radboud Koot², Prof. dr. Martijn Malessy², Dr. Heiko Locher¹, Prof. Dr. Jeroen Jansen¹, Dr. Erik Hensen¹

¹Otorhinolaryngology, Head and Neck surgery department LUMC, ²Neurosurgery department LUMC

Free paper 2.4, 4. Kleine Zaal, September 5, 2024, 16:45 - 17:45

Objectives:

To evaluate 30 years of multidisciplinary treatment and the survival for all patients with a vestibular schwannoma presenting at the Leiden Skull Base Team, Leiden University Medical Center. All treatment strategies, i.e., active surveillance, radiotherapy and surgery, were evaluated over time with a focus on shifts in management strategies.

Methods:

Cancer registries of the Leiden University Medical Center and the Integraal Kankercentrum Nederland (IKNL) between 1990 and 2020 were reviewed. Data from all patients with a vestibular schwannoma data on demographics, tumor size, treatment modality and survival were included.

Results:

In total 3139 patients were included for analysis, with an average follow-up of 139 months. Between 1995-1999 patients were initially surgically treated, in over 54%, compared to 10% between 2015-2020. Nowadays primary surgery is indicated for large vestibular schwannomas (98% of all operated tumors are >25mm, on average 32mm). Radiotherapy, in all periods, varied between 2-12%. Since 2000-2004 active surveillance is most often initially indicated, up to 89% in 2015-2020. Overall, 25% of all patients will undergo radiotherapy or surgery after a period of active surveillance, and 75% of all patients are not treated.

Conclusion:

The treatment paradigm has shifted from primary treatment to a more conservative regiment with active surveillance. Surgery remains.

03.1.01 Comparison of the Results of the First and Second Ear Stapes Surgery in Patients with Bilateral Otosclerosis

Behrooz Amirzargar¹, Dr. Hamed Emami¹, Dr Pedram Borghei¹, Dr Narges Alizadeh¹

¹. Otorhinolaryngology Research Center, Department of Otorhinolaryngology-Head and Neck Surgery, Tehran University of Medical Sciences

Free paper 3.1, 1. Concertzaal, September 6, 2024, 10:30 - 11:30

Objectives:

Otosclerosis is typically characterized by remodeling in the otic capsule, leading to conductive hearing loss. The objective of this study was to compare the outcomes of first and second ear stapes surgery in patients with bilateral otosclerosis.

Methods:

This retrospective cohort study involved 31 patients with bilateral otosclerosis who were referred to our tertiary hospitals and underwent binaural stapes surgery. Stapedotomy or stapedectomy was performed in all patients, and the same surgeon conducted the stapes surgery for both ears of each patient. Pre- and post-operative measures, including pure tone average (PTA), air-bone gap (ABG), as well as complications such as dizziness, tinnitus, and pain, were collected and analyzed.

Results:

The mean age of the patients was 42.06 ± 11.63 years. The mean air-bone gap (ABG) in the frequencies of 500-2000 after the surgery of the first ear was lower than the mean of the second ear, indicating a better hearing outcome in the first ear. This difference was statistically significant at frequencies of 500 and 1000 ($P < 0.05$). There was a significant improvement in the bone conduction (BC) threshold at a frequency of 2000 before and after the surgeries. The level of satisfaction did not significantly differ between the first and second surgeries ($P > 0.05$). Among the complications, the incidence of tinnitus was significantly higher in the first surgery compared to the second surgery.

Conclusion:

Stapes surgery in the second ear can be performed on all patients with bilateral otosclerosis to improve their hearing outcomes and increase their satisfaction.

Keywords:

Otosclerosis; stapes surgery; stapedotomy; hearing loss; ear

03.1.02 Improving results in Stapes Surgery

dr Meenesh Juvekar¹

¹Bombay Hospital Medical & Research Centre , Mumbai

Free paper 3.1, 1. Concertzaal, September 6, 2024, 10:30 - 11:30

Objectives:

Stapedotomy is one of the most rewarding surgeries for Otosclerosis. Different techniques of stapedotomy can be performed with the sole aim of restoring the hearing especially in young adults. In the presentation we discuss the tips and tricks in Stapedotomy giving normal hearing results.

Methods:

In the oral presentation we discuss the surgical steps and different conditions in stapes surgery. The diameter of piston, placement of piston and the other surgical details are elicited in short videos. Different prosthesis for Stapedotomy are also discussed.

Results:

Our results in our paper presentation show that a good technique and achieving finesse in stapes surgery is crucial for perfect results.

Conclusion:

Improving results of Stapedotomy surgery can be extremely challenging especially as most patients are young adults. A good technique is crucial for getting the perfect result.

03.1.04 POST-COVID SENSORINEURAL HEARING LOSS: A REALITY OR A MYTH? ----- STUDY OF 100 CASES IN A TERTIARY COVID CARE CENTRE

Dr Sekhar Bandyopadhyay

¹North bengal medical college

Free paper 3.1, 1. Concertzaal, September 6, 2024, 10:30 - 11:30

Objectives:

SARS-COV-2 neuroinvasion is associated with angiotensin converting enzyme-2 (ACE2) mechanism, acting as a functional receptor for the virus.

This enzyme is found in lung type-2 alveoli, glial cells and neurons. Thus Covid-19 patients present with otolaryngologic symptoms like anosmia, sore throat, running nose along with pulmonary symptoms like cough, breathlessness and desaturation. Rarely patients with covid 19 present with complaint of hearing loss. A study was conducted in a tertiary covid care centre amongst 100 covid 19 recovered patients with history, symptomatology and pure tone audiometry. Results were analyzed to assess the impact of covid 19 on hearing acuity.

Methods:

One hundred RT-PCR positive Covid19 patients, at North Bengal Medical College, Darjeeling (Between 1st April 2020 and 31st March 2021) were included in the study within 6 weeks of recovery.

History was taken with reference to hearing loss, tinnitus, giddiness, comorbidity and covid severity. Patients with pre-existing hearing loss and presbycusis were excluded from the study. One hundred healthy volunteers were taken as controls during the same period. Pure tone audiometry was done in all cases. An analytic cross-sectional study was done.

Results:

Covid recovered patients: n=100, Male:54, Female:46, Age : Youngest-11 yrs, Oldest: 52 years, Mean age 36.08 years. Cases in No. are as follows --Covid severity: MILD -80, MODERATE 11, SEVERE-9. HOSPITALISATION WITH Oxygen supplementation : 8, CCU SUPPOR :1. Pure tone audiometry: SENSORINEURAL HEARING LOSS—6. (MILD SNHL--4 , MODERATE SNHL -2). Control Group : n=100, Male :53, Female :47, Mean age : 32.9 years. Pure tone audiometry: SENSORINEURAL HEARING LOSS- 3 cases .(MILD SNHL-1, MODERATE-2). The CHI-SQUARE VALUE is 1.04 & p =0.303. These values in comparison with the control group are statistically insignificant.

Conclusion:

Although, out of 100 Covid19 patients 6 patients were detected to have sensorineural hearing loss, during the same period 3 cases were found to have sensorineural hearing loss in the control group of 100 healthy volunteers. With reference to p value and chi -square value, the incidence of sensorineural hearing loss in covid19 recovered patients is statistically insignificant .

03.2.02 Canal wall down cholesteatoma surgery with mastoid obliteration is associated with high rate of dry ear and lower rates of recurrence without affecting hearing outcome

Assoc. Prof., M.D., Ph.D. Petar Rouev¹

¹Trakia University

Free paper 3.2, 2. Annazaal, September 6, 2024, 10:30 - 11:30

Objectives:

The middle ear cholesteatoma is a severe destructive form of chronic otitis media. Despite the widely applied antibiotic therapy, even since early childhood, middle ear cholesteatoma is still an actual and socially significant disease. Obliteration of mastoid cavity and the epitympanic space during canal wall down (CWD) cholesteatoma surgery reduces the rate of recurrent cholesteatoma compared to not obliterating cases.

Methods:

A retrospective study was conducted in a tertiary referral center. For a period of 4 years (2018÷2021), 437 otosurgical interventions were performed in the ENT department of Trakia Hospital Stara Zagora, including 121 children. Of these, 157 were in patients with cholesteatoma of the middle ear (35.93%, n=437), including 49 children (40.5%, n=121). All patients underwent CWD tympanomastoidectomy with tympanic membrane reconstruction with or without ossiculoplasty, with some ending with posterior canal wall reconstruction and the others with obliteration with Bone Pate, Bonalive[®] or a combination of them. The median follow-up period was 2.0 years.

Results:

The results of two groups of patients (with reconstruction of the posterior wall of the external auditory canal versus those with obliteration of the mastoid cavity) are presented and compared in terms of hearing status, disease recurrence and the presence of dry ear.

Conclusion:

The objective of the obliteration of the mastoid is to eliminate the surgical radical cavity and to achieve dry and safe middle ear. Based on our results, a canal wall down tympanomastoidectomy with bony obliteration is the treatment of choice, if it is not possible to reconstruct the posterior wall of the external auditory canal. The bony obliteration technique does not seem to affect the hearing results, which mainly depends on the presence of an intact and mobile stapes.

03.2.03 The Surgify Safety Burr: The characteristics and surgical results of a novel tissue-selective cutting burr for temporal bone drilling

MD Laura Ihalainen^{1,3}, MD, adj. professor Matti Iso-Mustajärvi^{1,2}, MSc, PhD Pia Linder¹, MD, professor Aarno Dietz^{1,2,3}

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Free paper 3.2, 2. Annazaal, September 6, 2024, 10:30 - 11:30

Objectives:

Temporal bone (TB) drilling is often required in different medical conditions, such as cholesteatoma or chronic otitis media. However, it carries a potential risk of damage to the facial nerve, sinus sigmoideus, and dura. Conventional cutting burrs (CCBs) are effective at cutting bone but may easily cause soft tissue damage. A novel 5.4-mm cutting burr, the Surgify Safety Burr (SSBTM), with a moving, self-centering ring placed around the cutting tip, was developed to prevent soft tissue injuries. The tip requires gentle pressing against a hard surface to initiate cutting, and when it reaches the soft tissue, the pressure vanishes, allowing the ring to come out and prevent cutting and soft tissue injuries.

Methods:

SSBTM was compared with 5.0 mm CCB in 20 cadaveric fresh-frozen TBs. Ten TBs were drilled using SSBTM and ten using CCB. The time taken to complete the mastoidectomy and number of inadvertent errors were recorded. Mastoidectomies were performed by three otosurgeons (one novice and two experienced). Burr characteristics were graded on a scale of 1 (poor) to 5 (superior). Soft-tissue protection features of SSBTM were subjectively assessed using three cadaver heads. Three otosurgeons completed one mastoidectomy each (the sigmoid sinus and tegmen dura exposed) with SSBTM and provided a subjective assessment of soft tissue protection features.

Results:

No statistically significant differences were found in procedure times and number of inadvertent errors ($p=0.69$), efficiency of bone cutting ($p=0.14$), or noise level ($p=0.16$) between SSBTM and CCB. However, SSBTM was perceived as significantly superior to CCB in terms of the absence of jumping ($p<0.001$), durability ($p<0.01$), predictability ($p<0.001$), and precision ($p<0.001$). With three fresh cadaveric heads, SSBTM was determined to be excellent for soft tissue protection without perforation or tearing. A perforation of the sigmoid sinus was created only when drilling intentionally for an extended amount of time.

Conclusion:

SSBTM is a feasible alternative for TB drilling. Handling and controllability were superior, as indicated by the absence of soft-tissue damage. With proper training, SSBTM can result in safer TB drilling circumstances. Further studies are needed to comprehensively assess the features and limitations of SSBTM for TB drilling.

03.2.04 Mastoid Obliteration Using S53P4 Bioactive Glass Versus Mastoidectomy Alone for Refractory Chronic Suppurative Otitis Media

Drs. Victor Kroon^{1,2}, Dr. Steven Mes^{1,3}, Dr. Pepijn Borggreven¹, Dr. Rick van de Langenberg¹, Dr. David Colnot¹, Dr. Jasper Quak¹

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Free paper 3.2, 2. Annazaal, September 6, 2024, 10:30 - 11:30

Objectives:

Studies on the effectiveness of mastoid obliteration using S53P4 bioactive glass (BAG) for refractory chronic suppurative otitis media without cholesteatoma (CSOM) are lacking. Our aim is to assess the outcomes of mastoid obliteration and compare them to a cohort that underwent mastoidectomy alone. The main outcomes are the dry ear rate one year postoperatively, the rate of revision surgery during follow-up, need for ventilation tubes and audiometry.

Methods:

We performed a retrospective cohort study of cases that underwent canal wall up or canal wall down mastoidectomy with or without obliteration in the period 2010- 2022 for CSOM. Inclusion criteria were minimal 1year follow-up, refractory otorrhea as main preoperative symptom as indicated by merchant grade 2-3 despite maximal conservative treatment and involvement of mastoid air cells, defined as opacification on preoperative CT imaging.

Results:

In total, 240 cases were included, 147 obliteration cases and 93 non-obliteration cases. At one-year postoperatively, the dry ear rate, indicated by Merchant grade 0-1, was 136/147 (93%) in the obliteration cohort and 75/93 (81%) in the non-obliteration cohort ($p=0.006$). Continuous discharge (merchant grade 3), was only observed in the non-obliteration cohort ($n=1$). During follow-up, revision surgery of the mastoid due to refractory otorrhea was necessary in one obliteration case and 13 non-obliteration cases. The frequency of recurrent tympanic membrane perforations, ventilation tube need and audiometry results were comparable between the two groups.

Conclusion:

Our study indicates that for selected refractory cases of CSOM, mastoid obliteration using BAG results in superior outcomes compared to mastoidectomy alone. It results in significantly less postoperative otorrhea and revision surgeries. Surgery should be considered in cases of refractory CSOM.

03.3.01 The Impact of Unilateral Hearing Loss on Work Productivity and the Need For Recovery After Work

Cato Philips^{1,2}, Laure Jacquemin^{1,2}, Marc Lammers^{1,2}, Griet Mertens^{1,2}, Annick Gilles^{1,2}, Olivier Vanderveken^{1,2}, Vincent Van Rompaey^{1,2}

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Free paper 3.3, 3. Sociëteitskamer, September 6, 2024, 10:30 - 11:30

Objectives:

The impact of unilateral hearing loss (UHL) on work productivity is a topic that has remained largely unexplored. Based on communication difficulties experienced by this population it has been hypothesized that work productivity can be affected, resulting in an economic burden. This of this study was to investigate work productivity in a group of patients with UHL. Additionally, cognitive functioning was also examined to control for the possible intermediate effect of cognitive functioning on work productivity.

Methods:

Cross-sectional, observational data from 50 treated and untreated participants with UHL are included. Work productivity and short-term effects of fatigue caused by work activities were assessed using the Work limitations questionnaire (WLQ), the Work Productivity and Activity Impairment Questionnaire (WPAI) and the need for recovery (VBBA). Meta-analyses were conducted to establish normative WLQ and WPAI data. Patients on sick leave completed the Quickscan questionnaire to identify their risk for long term sick leave. The Repeatable Battery for the Assessment of Neuropsychological Status adjusted for Hearing-impaired individuals (RBANS-H) and the Corsi-Block tapping task were executed to assess cognitive functioning and visuospatial short-memory in the UHL study population.

Results:

Patients with UHL experienced reduced self-reported work productivity and increased need for recovery after work. In comparison to healthy controls, patients with UHL reported higher work productivity losses. Our study participants reported a higher need for recovery after work compared to normal hearing controls. The impact of UHL on cognitive functioning was limited. Only 13% of the participants scored below the 16th percentile on the RBANS-H and 13% scored below the norm of 5 for the healthy population on the Corsi-Block tapping task.

Conclusion:

Patients with UHL reported significant impact of their hearing loss on work productivity and need for recovery after work. The UHL seemed to have limited impact on cognitive functioning. Further research is needed to corroborate these findings and to investigate the effect of different levels of hearing impairments on work productivity and the need for recovery, as well as the effectiveness of rehabilitation using cochlear implants in reducing these effects.

03.3.02 The association of sociodemographic factors and risk behavior with unsafe use of personal listening devices in adolescents

Dr Marc van der Schroeff¹

¹Erasmus MC

Free paper 3.3, 3. Sociëteitskamer, September 6, 2024, 10:30 - 11:30

Objectives:

Many young people are potentially at risk of noise-induced hearing loss due to unsafe use of personal listening devices. The aim of this cross-sectional study was to examine the association of sociodemographic factors and risk behavior with unsafe use of personal listening devices in adolescents to identify a target group for prevention.

Methods:

A smartphone application was developed to objectively measure music listening habits among 314 adolescents with a mean age of 13 years and 7 months (SD \pm 5 months). Listening habits were characterized as safe or unsafe based on the weekly noise dose. Data on sociodemographic factors and traditional health risk behaviors were obtained by questionnaires.

Results:

Within the study group, 10.5% of the participants exceeded the 50%, and 4.8% the 100% recommended weekly noise dose. Adolescents with a lower socioeconomic status were more likely to engage in unsafe listening habits as compared to adolescents with a higher socioeconomic status. Additionally, risk behavior was associated with higher odds of having unsafe listening habits as compared to no risk behavior. Age, sex and educational levels were not significantly associated with unsafe listening habits.

Conclusion:

The findings of the present study indicate that interventions to promote safe listening habits should target adolescents with a lower socioeconomic status and higher risk behavior. Future research is needed to investigate how these adolescents can be motivated to adopt safe listening habits.

03.3.03 Risk factors for hearing decline from childhood to early adolescence

Dr Marc van der Schroeff¹

¹Erasmus MC

Free paper 3.3, 3. Sociëteitskamer, September 6, 2024, 10:30 - 11:30

Objectives:

To identify risk factors of hearing decline between 9 and 13 years of age. The risk factors examined included sociodemographic, health, and lifestyle-related factors.

Methods:

This study was embedded within a population-based prospective cohort study from fetal life onwards in the Netherlands. Pure-tone audiometry and tympanometry were performed at the age of 9 and 13 years. The hearing decline was defined as an increase in low-frequency or high-frequency pure-tone average of at least 5 dB in one of both ears. Multivariable logistic regression was performed to examine the association of possible risk factors with hearing decline. The study was conducted from April 2012 to October 2015, and from April 2016 to September 2019.

Results:

Of the 3,508 participants included, 7.8% demonstrated a hearing decline in the low frequencies, and 11.3% in the high frequencies. Participants who reported alcohol consumption were more likely to have a hearing decline in the low frequencies (OR 1.5, 95% CI 1.1; 2.0). Moreover, a lower educational level was associated with an increased odds of having a hearing decline in the high frequencies (OR 1.4, 95% CI 1.0; 1.8). Age, sex, household income, personal music player use, and body mass index were not associated with hearing decline.

Conclusion:

Educational level and risky behavior were significantly associated with hearing decline from childhood to early adolescence. The findings of the present study can help in the design of public health interventions to prevent hearing loss at a young age.

03.3.04 A 4-year follow-up study of hearing acuity in a large population-based cohort of children and adolescents

[Dr Marc van der Schroeff¹](#)

¹Erasmus MC

Free paper 3.3, 3. Sociëteitskamer, September 6, 2024, 10:30 - 11:30

Objectives:

To describe the prevalence of hearing loss among 13 year old adolescents, and to examine the change in prevalence between ages 9 and 13 years.

Methods:

This study was embedded within Generation R, a population-based prospective cohort study from fetal life onwards in the Netherlands. Pure-tone thresholds were obtained at 0.5 to 8 kHz, and tympanometry was performed. Sensorineural hearing loss (SNHL) was defined as a low-frequency and/or high-frequency pure tone average of more than 15 dB HL in one of both ears. Audiometric signs suggestive of noise-induced hearing loss (NIHL) included the presence of a notch and/or high-frequency hearing loss. The study was conducted from April 2012 to October 2015, and April 2016 to September 2019.

Results:

A total of 4572 adolescents with a mean age of 13 years and 7 months (SD, 5 months) were included, of whom 2334 (51.0%) were girls. Within the cohort, 6.4% (95% CI, 5.7%-7.2%) were estimated to have SNHL, and 12.4% (95% CI, 11.5%- 13.4%) met the criteria of NIHL. In total, 3675 participants were included in the longitudinal analysis. The prevalence of SNHL decreased from 8.0% to 5.3% between ages 9 and 13 years ($P < .001$). The prevalence of NIHL increased from 9.8% to 11.7% ($P = .004$), due to an increase in number of participants with a notch.

Conclusion:

The prevalence of SNHL significantly decreased by 2.7% (95% CI, 1.6%-3.9%) between ages 9 and 13 years, probably due to a change in alertness during assessment at the age of 13 years. Other possible explanations include the presence of selection bias or a decline in prevalence of conductive hearing loss. The number of participants with audiometric signs suggestive of NIHL increased by 1.9% (95% CI, 0.5%-3.3%).

03.4.02 Synthetic CT images from MRI of temporal, sinonasal and facial bones

[drs. Marlise Van der Veen](#), Dr. Bas Jasperse¹, Dr. Peter Seevinck², Dr. Marijn Van Stralen², Dr. Thadé Goderie¹, Drs. Gwijde Adriaensen¹, Dr. Linda Benoist¹, Drs. Hakki Karagozoglu¹, Prof. Bert Schulten¹, Dr. Pim De Graaf¹, Prof. Paul Merkus¹

¹Amsterdam UMC, ²MRGuidance B.V.

Free paper 3.4, 4. Kleine Zaal, September 6, 2024, 10:30 - 11:30

Objectives:

Prior to surgery of the head, such as Cochlear Implantation, the ENT-surgeon often requires visualisation of both soft and bony tissues. MRI provides optimal soft-tissue contrast, but CT is required to visualise bony structures. This means currently both MR and CT scans are needed. This study aims to train and evaluate a machine-learning algorithm to generate synthetic CT images from MRI of the head.

Methods:

Pairs of MRI and CT from the same patient were used to train a machine-learning algorithm to generate synthetic CT (sCT) images from MRI data.

To evaluate the algorithm, MRI scans not yet seen during training were used to create sCT images, which were compared to their corresponding true CT images.

Technical comparison between sCT and true CT was performed to quantify geometrical and radiodensity accuracy.

To clinically evaluate the algorithm, six surgeons and two radiologists will evaluate the visibility of clinically relevant landmarks for three areas (temporal, sinonasal and facial bones) on both sCT and true CT on a 4-point Likert scale.

Results:

Paired MRI and CT images have been obtained for 73 patients. Technical comparison of the images showed good results, with a surface distance error of 0.38 ± 0.37 mm and a mean radiodensity error of 4 ± 44 HU.

Preliminary results of the clinical evaluation are overall promising, with some areas being overestimated, while others are underestimated by the algorithm compared to the true CT images. In depth clinical analysis of the images is ongoing and will be presented during EAONO 2024.

Conclusion:

Generating synthetic CT images of the head from MRI is feasible, allowing visualisation of soft and bony tissues using a single, radiation-free imaging modality.

03.4.03 Factors associated with successful MRI scanning of the head without general anaesthesia in children under 6 months

[drs. Marlise Van der Veen](#)¹, [drs. Ithri Kaman](#)¹, [Dr. Bas Jasperse](#)¹, [Dr. Thadé Goderie](#)¹, [Dr. Fenna Ebbens](#)¹, [Dr. Mariam Slot](#)¹, [Prof. Marjo Van der Knaap](#)¹, [Prof. Paul Merkus](#)¹

¹Amsterdam UMC

Free paper 3.4, 4. Kleine Zaal, September 6, 2024, 10:30 - 11:30

Objectives:

To successfully obtain a Magnetic Resonance Image (MRI) of an infant, e.g. prior to cochlear implantation or for a diagnosis in the case of sensorineural hearing loss, it is important the infant remains still for the duration of the scan. This can be achieved without general anaesthesia by scanning infants in their natural sleep.

This retrospective study aims to determine the success rate of MRI scanning of the head without general anaesthesia in children under 6 months and to identify factors affecting the odds of success.

Methods:

Patient data was extracted from the hospital database for patients from the department of otorhinolaryngology who were scheduled for an MRI of the head without general anaesthesia during the years 2019-2022 and were under 6 months old at the time of scanning.

Each MRI-session was dichotomized into success (i.e., of sufficient quality for its clinical purpose) or failure and success percentages were calculated. Variables of interest were selected based on interviews with 8 medical specialists. A multivariate logistic regression analysis was performed to determine the association between success of MRI and the selected variables (age, sex, hearing loss, time of scanning and duration of scanning).

Results:

An overall success rate of 66% was determined for all children under 6 months (N=53). When only considering patients under 3 months (N=26), the success percentage was 85%. For children aged 3-5 months (N=27) the success percentage was 48%. For female patients (N=26) a success percentage of 81% was found, whereas the success rate for male patients (N=27) was only 52%. Multivariate logistic regression showed both the effect of age ($p=0.008$) and the effect of sex ($p=0.031$) were significant. Other variables showed no significant association.

Conclusion:

This study has shown a success rate for MRI of the head without general anaesthesia of 66% for children under 6 months. Age and sex have been identified as relevant factors for the odds of successful MRI scanning of infants without general anaesthesia. The success rate is higher for children aged under 3 months compared to children aged 3-5 months, and for female patients compared to male patients.

03.4.04 T2WI-DWI fusion images for cholesteatoma localization and surgical planning

MD, PhD Irina Arechvo¹, MD Martynas Kucinskas¹

¹Republican Vilnius University Hospital

Free paper 3.4, 4. Kleine Zaal, September 6, 2024, 10:30 - 11:30

Objectives:

Precise cholesteatoma localization and assesment of temporal bone landmarks is crucial in preoperative planning of the middle ear surgery. Recently, improved assessment of middle ear recurrent cholesteatomas using a fusion of CT and non-EPI-DWI MRI was shown. Furthermore, it was proposed that T2WI-DWI fusion images could replace CT-DWI in the preoperative selection of surgical options for middle ear cholesteatoma. The aim of this pilot study was to evaluate T2WI-DWI fusion technique in preoperative assessment of the cholesteatoma.

Methods:

For all MR imaging, a 1.5T Ingenia Ambition X (Philips) system was used. CT images were acquired using Revolution EVO (GE Medical Systems) scanner. MR and CT images were analyzed using Philips IntelliSpace Portal work station by general radiologist and neuroradiologist.

The most important middle ear areas (epitympanic recess, aditus of mastoid antrum, mastoidectomy cavity, facial nerve, mesotympanum, vestibulum, semicircular canals, dura mater, carotid artery, cochlea, temporal lobe) were evaluated.

Results:

T2WI-DWI fusion produced images of good overall quality, with high sensitivity, specificity, and accuracy for landmark localization of recurrent cholesteatoma.

Conclusion:

T2WI-DWI fusion technique may be useful for preoperative surgical evaluation of the recurrent cholesteatoma. Further research with a larger number of patients is needed.

05.1.02 Magnetic resonance imaging compatibility of a new active transcutaneous bone conduction implant

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Free paper 3.4, 4. Kleine Zaal, September 6, 2024, 10:30 - 11:30

Objectives:

Subjecting hearing implants containing magnetic material to magnetic resonance imaging (MRI) scanning poses several potential challenges, such as exerting of forces that may result in discomfort or pain, demagnetisation, heating and image quality disturbances. The aim of this preclinical study was to investigate the compatibility of a new active bone conduction implant (Sentio Ti Implant, Oticon Medical AB, Sweden) to 1.5T MRI. Furthermore, the aim was to collect the experiences from implanted patients subjected to 1.5T MRI scans performed according to the manufacturer's instructions.

Materials:

The device under investigation (Sentio Ti Implant) consists of an electromagnetic transducer and antenna with a retention magnet. The retention magnet and its casing are encapsulated in silicone and mechanically attached to the transducer.

The system was evaluated according to recognised standards and additional verifications to determine the effect of the static and gradient fields on aspects such as torque, magnet dislocation, demagnetisation, heat generation and image artefacts. As a part of an ongoing clinical study of the Sentio system, a subset of the patients were exposed to an MRI scan and their experiences were recorded.

Results and conclusion:

The magnetically induced torque on the retention magnet generated a pressure of approximately 33 kPa distributed over the antenna area. Exposure to 1.5 Tesla did not result in magnet or antenna dislocation or any damage to the implant, hence, mitigation, such as bandaging or magnet removal, is not needed. No demagnetisation of the retention magnet was recorded, whereas the slight effect on the transducer magnets did not affect the implant performance. The maximum temperature increase on the device surface was below the safety level of 2°C. The maximum image artefact for the Sentio Ti implant was 180 mm (sagittal plane gradient echo).

In conclusion, a preclinical study demonstrated that the Sentio Ti implant is 1.5T MRI conditional without need for bandaging.

04.2.02 The Healthy Hearing Ears Initiative - Describing current treatment of patients with chronic otitis media related hearing loss in Spain, Germany and France

Dr, MD, PhD, FEBEORL-HNS Xabier Altuna, Susan Arndt, Olivier Deguine, Sara Euteneuer, Jérôme Nevoux, Serafin Sánchez

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Free paper 4.2, 2. Annazaal, September 6, 2024, 15:45 - 16:45

Objectives:

Chronic otitis media (COM) is a common cause of acquired hearing loss and strategies for hearing rehabilitation must accompany infection control in surgical planning. In addition, control of possible cholesteatoma recurrence must be ensured. To evaluate the effectiveness of current treatments for COM-related hearing loss, an international steering committee of eleven ENT surgeons formed the Healthy Hearing Ears Initiative. Following an analysis of the available clinical evidence, a retrospective medical record study using electronic patient records was conducted with the aim of defining current treatment pathways and hearing outcomes for patients with COM-related hearing loss.

Methods:

Six clinics in Germany, France and Spain participated in the study. Patients with COM with or without cholesteatoma who had a PTA4 air-bone gap at 500, 1000, 2000, 4000 Hz of >30 dB or >25 dB with air conduction threshold \geq 40 dB HL after their primary tympanoplasty were included. Hearing outcomes, quality of life, costs and used healthcare resources, were captured over a period of 6-12 years after primary tympanoplasty using electronic patient records combined with a prospective evaluation.

Results:

69 patients were enrolled in the study. Results suggest that the hearing loss may increase over time for a substantial share of the patients. Subjectively patients saw the hearing loss as a bigger challenge compared with the ear symptoms, highlighting the need for close follow up of this patient group. Additional surgeries are common, with some patients having up to four revision middle ear surgeries during the follow-up period, leaving most patients with mild to moderate hearing loss.

Conclusion:

Patients with poor hearing outcomes after primary tympanoplasty often undergo multiple additional treatments that may not adequately address the hearing loss. A detailed overview of the treatments performed, hearing outcomes, quality of life and healthcare utilisation recorded in this medical record study is presented.

04.2.03 Postoperative Antibiotics Following Cochlear Implantation: Are They Necessary?

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¹Oman Medical Speciality Board (omsb)

Free paper 4.2, 2. Annazaal, September 6, 2024, 15:45 - 16:45

Objectives:

Evaluate whether antibiotics administered following cochlear implantation (CI) surgery impact short-term infection rates.

Design:

Retrospective cross-sectional study.

Methodology:

All pediatric patients aged less than 18 years who underwent cochlear implantation surgery from Jan 2020 to Dec 2023 performed by two Otology consultant in a tertiary hospital were included. Patients were divided into two groups, a group who didn't receive post op antibiotics (intervention) and a group who did receive antibiotic as a prophylaxis.

Main outcome measure:

Postoperative infection rates for a period of (0-30 days) post cochlear implant surgery.

Results:

The study included 35 patients who received post CI antibiotics compared with 33 patients who did not receive post CI antibiotics. Mean age was 3 years. All patients received 1 dose of peri-operative IV antibiotic.

Only one patient developed post operative wound infection (5th day post operative) from the group which did not receive post operative antibiotics. The patient was admitted for IV antibiotic and did not require any further intervention.

This result is statistically insignificant, in other words, getting infected was not related to post op antibiotic administration.

Conclusion:

In this study, there was no difference between the group who did receive post operative antibiotics and the one who did not receive. Consequently, post CI antibiotics showed no impact on post operative infection rate. Reevaluation of standard practice on antibiotic use after CI surgery will reduce unnecessary antibiotics use that will have great impact in bacterial resistance rate, allergic sequelae and reduce unnecessary costs.

04.2.04 Analysis and comparison of clinical practice guidelines regarding treatment recommendations for chronic tinnitus in adults

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¹Department of Otolaryngology and Head and Neck Surgery, UMC, Utrecht, Netherlands.

Free paper 4.2, 2. Annazaal, September 6, 2024, 15:45 - 16:45

Objectives:

To determine if, and to what extent, published clinical practice guidelines for the treatment of chronic tinnitus vary in their recommendations.

Methods:

A systematic review of published clinical practice guidelines for the treatment of chronic tinnitus was performed. Data sources PubMed, EMBASE and GIN electronic databases were searched till June 2023. We included clinical practice guidelines that gave recommendations on the treatment of tinnitus. No language restrictions were applied. Two independent reviewers extracted the data and used the AGREE checklist to report on reporting. Outcomes and recommendations were compared between guidelines.

Results:

A total of 10 guidelines were included, published between 2011 and 2021. Recommendations for 13 types of tinnitus treatments were compared. Large differences in guideline development and methodology were found. Seven of the 10 guidelines included a systematic search of the literature to identify the available evidence. Six of the 10 guidelines used a framework for the development of the guideline. Reporting was poor in multiple guidelines. Counselling and cognitive behavioural therapy were the only treatments that were recommended for treating tinnitus associated distress by all guidelines that reported on these topics. Tinnitus retraining therapy, sound therapy, hearing aids and cochlear implantation were not unanimously recommended either due to the lack of evidence, a high risk of bias or judgement of no beneficial effect of the specific treatment.

Conclusion:

There were notable differences with respect to whether guidelines considered the available evidence sufficient enough to make a recommendation. Notably, we identified substantial differences in the rigour of guideline design and development. Reporting was poor in many guidelines. Future guidelines could benefit from the use of reporting tools to improve reporting and transparency and the inclusion of guideline experts and patients to improve the quality of clinical practice guidelines on tinnitus.

O4.2.05 Neuroanatomical anomalies associated with the LAMM syndrome: Implications for ABI placement

Prof. MD PhD Johan Frijns^{1,2}, MA Roos Geerders¹, BA Eshter Scholing¹, MD PhD Berit Verbist¹, MD PhD Radboud Koot¹, Prof MD PhD Martijn Malessy¹, MSc Peter-Paul Boermans¹, PhD Jeroen Briaire¹

¹Leiden University Medical Center, ²Delft University of Technology

Free paper 4.2, 2. Annazaal, September 6, 2024, 15:45 - 16:45

Objectives:

To illustrate how careful observation of the outcomes of auditory brainstem implants (ABIs) can uncover structural abnormalities of the auditory brainstem associated with a specific disorder, in this case the LAMM (Labyrinthine Aplasia, Microtia and Microdontia) syndrome, and to demonstrate its clinical impact.

Methods:

Three MedEl Synchrony Pin ABIs were placed in two congenitally deaf male siblings with the same compound heterozygotic pathogenic mutations in the FGF3 gene, associated with the LAMM syndrome. Both children had bilateral cochleovestibular aplasia, precluding cochlear implantation, and microdontia, but just minor resp. unilateral microtia. Pre-operative workup included both CT and MRI scans. Intra-operative eABR recordings were performed with the placing and the actual electrode. Oral speech and language development was monitored with the Dutch version of the IT-MAIS questionnaire.

Results:

The elder brother received an ABI at the age of 14 months, with very limited auditory responses on all four positions of the implant tested. During the ABI-surgery of the younger subject (aged 13 months) excellent auditory responses could be obtained when the electrode array was placed considerably more caudally and more medially than standard, in line with the observation that the foramen of Luschka was located more caudally. In view of this observation and the good auditory development of the latter child, it was decided to give the older child a contralateral ABI (at the age of 60 months), even though we were not able to visualize the abnormal position of foramen of Luschka on the MRI in any of the children. Again, during surgery, it turned out that the anatomy of the brainstem was abnormal with a more caudal location of the foramen of Luschka and the cochlear nucleus, and with his second implant this child is showing good progress with his auditory development.

Conclusion:

One should be aware of anatomical differences at the level of the brainstem when placing ABI in children with genetic disorders. This also underpins the need of a multidisciplinary approach with closely collaborating team members and good family guidance when diagnosing and treating children with rare deafness.

04.1.01 Safely opening the semicircular canals for vestibular implant surgery with a hand-guided robotic drill?

Joost Stultiens¹, Xinli Du², Jérôme Waterval¹, Nils Guinand³, Raymond van de Berg¹

¹Maastricht University Medical Center, ²Brunel University, ³Geneva University Hospitals

Free paper 4.1, 1. Concertzaal, September 6, 2024, 16:45 - 17:45

Objectives:

A vestibular implant can partially restore vestibular function in patients with bilateral vestibulopathy. More than half of these patients have no severe hearing loss, but vestibular implantation may induce sensorineural hearing loss. Surgically fenestrating the semicircular canals for electrode insertion may lead to opening of the endolymphatic compartment, which may result in hearing loss. A force-sensing hand-guided robotic drill might detect a change of drilling medium from the bone and protect the membranous labyrinth. The primary objective was to investigate the feasibility of this drill to fenestrate the semicircular canals without damaging the membranous labyrinth. A secondary objective was to evaluate whether an electrode would fit through the created fenestration.

Methods:

Formalin-fixed cadaveric temporal bones were prepared by performing a cortical mastoidectomy and then exposing and bluelining the bony semicircular canals. The hand-guided robotic drill was used to create two fenestrations in each semicircular canal. Possible damage to the underlying membranous labyrinth was evaluated with the surgical microscope. A silicone dummy was attempted to insert through the fenestration.

Results:

10 temporal bones (30 semicircular canals) were included. In 54 fenestrations, no damage to the underlying membranous labyrinth occurred (19 in superior and posterior, 16 in lateral canals). In 6 fenestrations, a technical issue related to drill bit fixation was present. In 44 of the 54 fenestrations (81%), the fenestration was large enough to advance the electrode in the canal.

Conclusion:

The investigated hand-guided robotic drill seems promising for enhancing protection of the membranous labyrinth during fenestration of the semicircular canals. This may be beneficial for vestibular implantation in patients with residual hearing. Furthermore it could potentially benefit vestibular interventions such as plugging of a semicircular canal (e.g. for superior canal dehiscence/benign paroxysmal vertigo).

04.1.02 Benefits of developing a Cochlear Implant Robot

Professor Vedat Topsakal¹

¹Vrije Universiteit Brussel

Free paper 4.1, 1. Concertzaal, September 6, 2024, 16:45 - 17:45

Objectives:

The aim of this Instructional Course is to give an overview on the developments of image guided and robot arm assisted cochlear implant surgery since 2018 with the HEARO procedure: a surgical precision tool for keyhole surgery. How robotics can also change the way we approach conventional surgery will also be discussed.

Methods and results:

The HEARO procedure is now being performed over 6 European centers with almost 70 cases. Our group had published the about every improving step along the years. These data will be discussed.

Results:

The results of the largest series of 38 cases will be discussed, together with the introduction of OTODRIVE: yet another tool added to the HEARO procedure to standardize insertion speed of cochlear implant arrays into the inner ear.

Conclusion:

The HEARO procedure the least invasive intervention to place an electrode in gthe inner ear. Whether it will make a great diffenece in preserving residual hearing remains to be studied.

04.1.03 HEARO Procedure equipped with OTODRIVE

Professor Vedat Topsakal¹

¹Vrije Universiteit Brussel

Free paper 4.1, 1. Concertzaal, September 6, 2024, 16:45 - 17:45

Objectives:

In the development of a cochlear implant robot several hurdles have been overcome. Recently our group was able to perform a fully robotic cochlear implant surgery.

Methods:

The HEARO procedure is a well proven surgical tool to drill a keyhole access through the facial recess into the middle ear. Here we equipped this device with yet another feature called OTODRIVE for standardizing the speed of insertion of cochlear implant arrays into the inner ear.

Results:

The results of the first OTODRIVE application in a conventional CI procedure and also in a HEARO procedure has successfully been performed.

Conclusion:

AN OTODRIVE is yet another feature in the HEARO procedure that can also be used as a stand alone for cochlear implant placement at a steady speed to minimize surgical trauma.

04.1.04 Live streaming of stereo microscope videos during microsurgery for remote 3D viewing for assistance and education

Ir. Ruud Verdaasdonk¹, [prof. dr. ir. Ruud Verdaasdonk](#)², MD PhD Pauline Van Kempen³, MD PhD Joeri Buwalda³, MD PhD Jeroen Peters³, MD PhD Steven Bom³

¹Deventer hospital, ²University of Twente, ³Deventer hospital

Free paper 4.1, 1. Concertzaal, September 6, 2024, 16:45 - 17:45

Objectives:

A stereoscopic (3D) view is essential for orientation and clinical judgement during surgery through an operating microscope. For advice from expert colleagues or supervision of trainees, presence in the operation room (OR) is necessary for stereoscopic viewing. In this study, a technological solution has been developed to stream and view stereoscopic videos from the operating microscope in real time with minimal latency to any place in the world with cellular/internet reception.

Methods:

The system consists of a stereoscopic surgical microscope from which the left and right ocular views are combined into a side-by-side 3D video and streamed to the outside world through a secure link using TeamLink video conference software. On the reception side, the side-by-side video stream is displayed full screen on a mobile phone which is placed in VR glasses consequently giving the receiver live stereoscopic viewing similar to the operating microscope. Surgeons in the OR have hands-free communication using a neckband speaker/microphone while the receiver uses the mobile phone. In a user feasibility study during live otologic surgical procedures, seven spectators viewed remotely in different Dutch hospitals after which a questionnaire was completed.

Results:

Technically the system functioned well with minimal latency (< 0.5 s) of the videos, clear communication between surgeon-spectator and minimal disturbance of the workflow inside the OR. Remote viewers showed positive reactions towards the setup: 86% strongly agreed that the 3D vision has added value compared to 2D vision in being able to distinguish different structures/tissues and following the procedure performed by the surgeon. 43% strongly agreed and 43% agreed that the setup was of sufficient quality to base medical decisions on.

Conclusion:

Live remote 3D viewing during microsurgeries proves to be practical and cost-effective for education, supervision and ad hoc expert assistance improving the quality of health care. The main concern is in ensuring secure private streaming of the footage and complying with applicable medical device regulations, requiring that this setup cannot be implemented in its current form until these regulations are met and more research is done.

04.3.01 Estimation of cochlear implant electrode array location using intracochlear electric field measurements

MD, PhD Samuel Söderqvist, MSc, PhD Ville Sivonen, MD, PhD, Docent Saku Sinkkonen

¹Department of Otorhinolaryngology – Head and Neck Surgery, Vaasa Central Hospital

Free paper 4.3, 3. Sociëteitskamer, September 6, 2024, 16:45 - 17:45

Objectives:

The longitudinal spread of electric field (EF) along the cochlear implant electrode array can be estimated using e.g. monopolar transimpedance matrix (TIMmp). Local potential differences in the vicinity of the stimulating electrode can be measured using bipolar TIM (TIMbp). The combination of TIMmp and TIMbp allows estimation of the distance between an electrode contact and the modiolar wall (electrode-to-modiolar wall distance, EMWD) and the scalar cross-sectional area (scala area, SA) at the location of each contact in complete electrode array insertions. The objective of this study was to evaluate the usefulness of the estimation model when the electrode array lies only partially in the intracochlear space.

Methods:

One lateral-wall (LW) and two different perimodiolar (PM) electrode array types were completely inserted into six temporal bones (TB) subsequently. The TBs were imaged with cone-beam computed tomography (CBCT) simultaneously with the TIM measurements. Thereafter, the electrode array was drawn halfway out of the cochlea, and the CBCT-imaging and the TIM measurements were repeated. The EMWD and SA were measured from the CBCT images. At first, a multiple linear regression (MLR) model was created using the information from the complete insertions: either EMWD or SA was used as a dependent variable and the TIM measurements and inspected insertion depth as independent variables. Further, the TIM parameters acquired from the partial insertions were applied in the MLR model to estimate the EMWD and SA. Finally, the measured and estimated EMWD and SA were compared.

Results:

For the LW array, the estimated EMWD was accurate. The measured EMWD was always within the 95% confidence interval (CI) of the estimated EMWD. For the PM arrays, the EMWD estimation was not reliable, as the measured EMWD was not always included in the 95% CI. The estimation of SA was precise regardless of the electrode array type.

Conclusion:

The SA estimation is reliable for all investigated electrode array types also in partial insertions. As the scalar size decreases gradually towards the apex of the cochlea, the EF measurements may be useful in the estimation of the insertion depth and the correct alignment of the electrode array.

04.3.03 Patient reported outcomes from a prospective, multicenter study of a new active transcutaneous bone-anchored implant system

Drs Tjerk Aukema^{1,2}, prof. dr. Myrthe Hol¹, prof. dr. Emmanuel Mylanus²

¹UMC Groningen, ²Radboudumc

Free paper 4.3, 3. Sociëteitskamer, September 6, 2024, 16:45 - 17:45

Objectives:

Sentio (Oticon Medical AB, Sweden) is a new active transcutaneous bone-anchored implant system under evaluation for safety and performance in a multi-centre, single-arm, prospective, clinical investigation (Clinicaltrials.gov identifier NCT05166265). The objective of this abstract is to focus on patient reported outcomes and health-related quality of life measurements from the full cohort of 51 individuals with conductive/mixed hearing losses (CHL/MHL) or single sided deafness (SSD).

Methods:

Three months after implant installation patient reported outcomes were collected by means of; 1) the Glasgow Benefit Inventory (GBI) for patients' perceived quality of life from an otorhinolaryngology intervention, 2) the Speech, Spatial and Qualities of Hearing Scale (SSQ12) to measure self-reported auditory disability, and 3) a study specific questionnaire specific to the investigated device covering for example usage hours, comfort, and sound quality. The SSQ12 was compared to baseline assessment and other questionnaires were used as a single observation only.

Results:

After implant installation, the studied population showed an improved quality of life, that is, a GBI total score of 28.4 (\pm 15.7). Sub-scores showed values of General 39.2 (\pm 21.4), Physical: 7.35 (\pm 24.3), and Social 5.9 (\pm 15.8). For the SSQ12, all individuals showed an increase in ability after treatment. The results were consistent on single item level, on group level (Speech, Spatial, Quality), and on total score level. The total score increase was +2.62 (\pm 1.28). The device specific questionnaire showed high overall usage with 94% using their sound processor 4-8 hours or more. Furthermore, 74% reported comfortable use and 80% of a 'natural' sound experience using the sound processor.

Conclusion:

There are significant patient benefits and quality of life gains after implantation, and 3-months follow-up, with the new active transcutaneous bone-anchored implant.

04.3.04 Hearing thresholds and speech recognition in conductive/mixed hearing loss and single sided deafness treated with a new active transcutaneous bone-anchored implant system

Professor Emmanuel Mylanus¹, Herman Kok¹, Professor Myrthe K. S Hol², Sander Ubbink², Mihalache Marwa³, Gwawr Jones³, Abi Asher⁴, Hannah Meakin⁴, Stefanie Wolf⁵, Thomas Wesarg⁵, Susan Busch⁶, Thomas Giere⁶, Hannes Maier⁶

¹University Medical Center Groningen, ²Radboud University Medical Center, ³University Hospitals Birmingham, Queen Elizabeth Hospital, ⁴Addenbrooke's Hospital, Cambridge University Hospitals, ⁵Universitätsklinikum Freiburg, ⁶Medizinische Hochschule Hannover

Free paper 4.3, 3. Sociëteitskamer, September 6, 2024, 16:45 - 17:45

Objectives:

Sentio (Oticon Medical AB, Sweden) is a new active transcutaneous bone-anchored implant system under evaluation for safety and performance in a multi-centre, single-arm, prospective, clinical investigation (Clinicaltrials.gov identifier NCT05166265). The objective of this abstract is to focus on audiological outcomes, including hearing thresholds and speech recognition, from the full cohort of 51 individuals with conductive/mixed hearing losses (CHL/MHL) or single sided deafness (SSD). Assessment is done 3 months after implant installation.

Methods:

Audiological outcomes included sound field thresholds, speech intelligibility in quiet, and speech recognition in noise. Comparisons were made between unaided/aided Sentio and also between Ponto sound processor on softband)/aided Sentio. Speech intelligibility was measured in a sound-proof booth using five-word matrix sentences. Speech recognition in quiet was measured with the speech coming from a speaker at 0 degrees (fixed signal at 65 dB SPL). Speech recognition thresholds in noise was measured with the speech signal coming from the aided side (± 90 degree) and noise from 0 degree. For subjects with SSD, a separate set-up was used for speech recognition in noise with speech coming from the aided side (± 90 degrees) and noise from the non-implanted side (± 90 degrees).

Results:

The mean aided threshold, i.e., 26.2 (SD 4.3) dB, measured after treatment was significantly lower compared to the unaided situation; 59.0 (SD 9.2) dB. This resulted in a functional gain PTA4 of 32.8 dB (SD 8.4), 95%CI: 29.9; 35.8 dB. Speech recognition in quiet was improved from 46.2% (SD 36.2) unaided, to 97.9% (SD 3.5) aided. Speech intelligibility in noise was improved between the Ponto on a softband and aided with Sentio by a -2.91 (SD 3.36) change on SNR. For SSD patients, SNR went from 0.94 (SD 1.98) dB unaided to -4.47 (SD 4.36) dB aided with Sentio.

Conclusion:

Significant improvements in hearing outcomes and audiological assessments are seen after implant installation of Sentio in the studied population. Results are considered applicable for adult people with CHL, MHL, and SSD.

04.4.01 Complications in Chronic Ear Surgery - a rapport from SwedEar, a Swedish Quality Register

Md, Phd Åsa Bonnard^{1,2}, PO Eriksson³, Sara Olaison⁴, Eva Westman⁵

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Free paper 4.4, 4. Kleine Zaal, September 6, 2024, 16:45 - 17:45

Objectives:

A descriptive study on the national incidens of complications after chronic ear surgery in Sweden

Methods:

A cohort of all chronic ear surgeries with a follow-up of 1 year reported to the Swedish Quality Register for Ear Surgery (SwedEar) oct 2020-sept 2022 (n=1 563) was used. Incidence of postoperative complications after surgery regarding postoperative infection in need of antibiotic treatment, facial palsy, severe dizziness and thrombosis was calculated.

Results:

8.8% of all surgeries had a postoperative infection needing antibiotic treatment with a higher incidence for Cholesteatoma and retraction surgery (12.0%). 45% was treated with both local and systemic antibiotics and 37% only with local antibiotics. Facial palsy was registered after 0.9% of the surgeries, and was twice as common after myringoplasty than cholesteatoma surgery. The incidence of postoperative infection is higher in this group. 79% was resolved within one year. 0.9% of the patients have seeked medical attention for severe dizziness within 6 weeks after surgery. Two cases of thorombosis was reported after ear surgery (0.01%) and both were retraction or cholesteatoma surgeries and treated with anticoagulants perioperatively. Only 23% of ear surgeries in Sweden had been treated with peroperative anticoagulats but other methods to prevent thrombosis is whidely used.

Conclusion:

Sever complications after ear surgery is rare but postoperative infection after surgery is more common than predicted. Further investigation in the use and effect of prophylactic antibiotics in ear surgery is needed as well as the use of and need for anticoagulats in ear surgery is needed.

04.4.02 SwedEar: The Swedish Quality Register for Ear Surgery: Developing and expanding a national Quality Register

Eva Westman¹, [Jesper Rasmussen](#)

¹Umeå universitet

Free paper 4.4, 4. Kleine Zaal, September 6, 2024, 16:45 - 17:45

Introduction and Objectives:

SwedEar is a national Quality Register for all middle ear surgery including retraction pockets and cholesteatoma. The participation is nationwide and approximately 80% of the included surgeries are registered. Participation is voluntary. Surgeries not included are otosclerosis (The Swedish Quality Register for Otosclerosis Surgery) and grommets.

Is it possible to develop and maintain a national quality register with middle ear surgery including cholesteatoma?

Methods:

Data registered at 3 timepoints. Online registration of the operative form and a follow-up form recommended one year after surgery. A PROM, patient survey, that the patient receives one year after surgery with 15 questions.

Results:

there are 11463 procedures registered since 2013. 88% have a healed TM at follow-up. Since October 2020, 1904 procedures for cholesteatoma/retraction surgery are registered. Postoperative infection rate is 9%. Statistics are available online open.

Conclusion:

It is possible to develop and maintain a national quality register with middle ear surgery including cholesteatoma. There are constant challenges which will be discussed.

04.4.03 The health-related quality of life after mastoid obliteration following canal wall up or canal wall down tympanomastoidectomy: a retrospective analysis

Drs. Chiara Erfurt¹, Drs. Jantine J. Lindeboom¹, Dr. Jeroen P.M. Peters¹, Dr. Pauline M.W. van Kempen¹, Dr. Joeri Buwalda¹, Dr. Steven J.H. Bom¹

¹Department of Otorhinolaryngology, Deventer Hospital

Free paper 4.4, 4. Kleine Zaal, September 6, 2024, 16:45 - 17:45

Objectives:

This study aimed to compare health-related quality of life (HRQoL) before and after canal wall up (CWU) or canal wall down (CWD) tympanomastoidectomy with mastoid obliteration in patients with cholesteatoma or chronic suppurative otitis media (CSOM). The secondary goal was to describe the audiometric results.

Methods:

This was a retrospective cohort study. All adult patients (≥ 18 years) who underwent mastoid obliteration following either CWU tympanomastoidectomy or posterior canal wall reconstruction (CWR) due to previous CWD tympanomastoidectomy between September 2018 and September 2022 at the XXX Hospital were contacted for participation. Those who provided informed consent received three different patient reported outcome measures (PROMs): the Otology Questionnaire Amsterdam (OQUA), the Chronic Otitis Media Questionnaire (COMQ-12) and the Glasgow Benefit Inventory (GBI). The OQUA and COMQ12 were sent at two different time points and completed according to the pre- and postoperative situation separately. The GBI was sent at the second time point only because it is a postoperative questionnaire. Patient and surgical characteristics as well as audiometric data were collected.

Results:

Of the 71 patients who met the inclusion criteria, 30 completed both pre- and postoperative questionnaires (response rate = 42%). All three questionnaires revealed a significant improvement in the HRQoL. The PROMs demonstrated a wide range of symptoms within this population. The mean postoperative air conduction thresholds and air-bone gap had significantly improved ($p = 0.010$).

Conclusions:

All questionnaires demonstrated a significant improvement in the overall HRQoL and audiometric outcome. Otologic and social complaints varied within this population.

04.4.04 Health-Related Quality of Life after otologic surgical treatment for chronic otitis media

[Esther Schouwenaar](#)¹, Dr. Jérôme Waterval¹, Dr. Katja Hellingman¹

¹Maastricht UMC+

Free paper 4.4, 4. Kleine Zaal, September 6, 2024, 16:45 - 17:45

Objectives:

The aim of this systematic review was to describe the impact of otologic surgery as a treatment for chronic otitis media (COM) with or without cholesteatoma on the Health-Related Quality of Life (HRQoL) of adult patients.

Methods:

This systematic review was performed according to the PRISMA guidelines. All studies which prospectively measured HRQoL with the use of a validated chronic otitis media specific HRQoL questionnaire pre- and postoperatively were included. The study population were patients with chronic otitis media with or without cholesteatoma who underwent otologic surgery.

Results:

Sixteen studies were included in this review. In total four different chronic otitis media specific questionnaires were used. These included the CES¹, COMOT-15², COMQ-12³, and ZCMEI-21⁴. The questionnaires differ with regard to which and to what extent domains of HRQoL are covered. Each questionnaire has therefore a slightly nuanced HRQoL as outcome. The study populations were heterogenous and briefly described regarding preoperative characteristics. Chronic otitis media comprises various manifestations of the disease with different chief symptoms which causes differences in the experienced burden. Inherently linked to this, the indication for surgical treatment differs per subcategory. Nevertheless, all studies indicated statistically significant improvement in the HRQoL after surgical treatment. However, statistical significance can not directly be translated to clinical relevance of the change to the patients. The minimal clinically important differences (MCID) of the HRQoL change value are still unknown, except for the ZCMEI-21 questionnaire.

Conclusion:

Otologic surgical treatment for chronic otitis media with or without cholesteatoma positively impacts health-related quality of life among adult patients. However, on the level of preoperative experienced chief symptom or subcategory of chronic otitis media it is still unclear to what extent surgery influences the health-related quality of life. This specific information has the potential to aid ENT-surgeons in preoperative counseling and expectation management of individual chronic otitis media patients in the future.

¹CES = Chronic Ear Survey

²COMOT-15= Chronic Otitis Media Outcome Test 15

³COMQ-12 = Chronic Otitis Media Questionnaire 12

⁴ZCMEI-21 = Zurich Chronic Middle Ear Index 21

05.1.01 Effect of cochlear implant, bone conduction device and contralateral routing of sound hearing aid on tinnitus in SSD

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Free paper 5.1, 1. Concertzaal, September 7, 2024, 10:30 - 11:30

Objectives:

Currently, there is a lack of high-level evidence studies comparing the effect of different treatment options for SSD patients on tinnitus. In this study we aimed to evaluate the effect of a cochlear implant (CI), bone conduction device (BCD), contralateral routing of sound hearing aid (CROS) and no treatment on tinnitus outcomes in SSD patients, up to 24 months of follow-up.

Methods:

120 eligible patients were randomized to 3 groups: CI, a trial period with first BCD/ then CROS, or to a trial period with first CROS/ then BCD. After the trial periods, participants opted for a surgically implanted BCD, a CROS, or no treatment. At the start 28 participants were implanted with a CI, 25 with a BCD, 34 had a CROS, and 26 chose no treatment. The Tinnitus Handicap Inventory (THI), Tinnitus Questionnaire (TQ) and Visual Analogue Scale (VAS) tinnitus burden were completed at baseline, and at 3, 6, 12, and 24 months of follow-up.

Results:

All treatment groups (CI, BCD, CROS) showed statistically significant decreased tinnitus impact scores at 24 months of follow-up compared to baseline. The CI group showed the largest statistically significant decrease on all tinnitus impact scores up to 24 months of follow-up. The median THI score for the CI group decreased with 23 points, the TQ score decreased with 17 points and the VAS score with 60 points at 24 months of follow-up compared to baseline. Moreover, at 24 months of follow-up, 7 out of 24 (29 %) CI patients indicated to experience complete resolution of tinnitus. There were no patients in the CI group who reported the onset of tinnitus after cochlear implantation.

Conclusion:

In this RCT, SSD patients treated with a CI, BCD or CROS showed overall decrease on tinnitus impact scores up to 24 months of follow-up compared to baseline. Cochlear implants appear to be superior to BCD, CROS and no treatment in achieving partial or complete resolution of tinnitus in patients with SSD.

05.1.03 Evaluation of semi-automatic radiological tools for detection of scalar translocation

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Objectives:

Intracochlear positioning of the electrode array is an important factor in speech recognition outcome and preservation of residual hearing after cochlear implantation. Postoperative feedback of translocation of the electrode from scala tympani to scala vestibuli is relevant for device fitting, refining surgical technique and improving electrode design. Detection of scalar translocation is possible using computed tomography (CT) images but manual detection is labor-intensive and prone to interobserver variability. The aim of this study was to evaluate the diagnostic performance of two novel radiological tools that semi-automatically detect scalar translocation.

Methods:

Both tools use the preoperative CT to obtain a 3D cochlea model and the postoperative CT to localize the electrode contacts, but employ different methods to do this. Based on co-registration of the CT's, the scalar location of each electrode contact is determined. To evaluate diagnostic performance, we used a dataset containing 116 ears with HiFocus Mid-Scala (MS) implants and 52 with HiFocus 1J implants. We compared semi-automatic with manual scalar locations from an experienced radiologist, and computed intraclass correlation coefficient (ICC) for individual contacts and sensitivity and specificity for translocation of an array, defined as two or more contacts located in scala vestibuli.

Results:

One tool supports MS implants only, for the scalar position of individual contacts we found an ICC of 0.89 and for the arrays as a whole sensitivity and specificity of 0.97 and 0.96 respectively. For the other tool, ICC, sensitivity and specificity were 0.82, 0.90 and 1.00 respectively for MS patients and 0.44, 0.83 and 0.67 respectively for 1J patients.

Conclusion:

The radiological tools both have excellent diagnostic performance for translocation detection in MS patients. For 1J patients performance was not as good, which may be a reflection of the differences in shape, size and insertion depth between these array types.

05.1.04 Comparison of CT with and without artefact removal algorithms and CBCT in post operative CI imaging; a temporal bone study

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Objectives:

The constant development of imaging devices and image processing has resulted in better image quality with more detailed visualization of anatomical structures. In CI imaging, metal artifacts can still obscure the evaluation of electrode placement, particularly electrode dislocation through the basilar membrane. Artifact removal algorithms (ARA) for pacemakers (PM) and neurostimulators (NS) have been developed to minimize distortions in images caused by these implants. For CI imaging, the use of ARAs have not yet been reported. In addition, the cone-beam computed tomography has been shown to be better in terms of postoperative CI imaging of metallic artifacts. We aimed to evaluate computed tomography (CT) images with and without ARA in comparison with CBCT images to determine the most suitable postoperative imaging modality for clinical use.

Method:

We gathered six freshly frozen temporal bones (TB) and inserted three SlimJ electrodes and three MidScala electrodes (Advanced Bionics, Valencia, USA). The TBs were imaged with CT (Siemens Somatom, Erlangen, Germany) and CBCT (Promax Planmeca, Helsinki, Suomi). Both CT and CBCT were used to scan the TBs according to a clinical protocol. Additionally, in the CT scans, a PM and NS ARA were used. Images were evaluated by two neuroradiologists and two ENT specialists regarding the overall image quality (OIQ) and suitability for trauma evaluation (TE) (scores from 1 to 5).

Results:

The CBCT protocols were ranked best in both OIQ (mean 4.125, median 4, IQR; 4, 5) and TE (mean 4.42, median 4, IQR; 4, 5). CT without ARA had a mean evaluation score of 3 (median 3, IQR; 3, 3). The poorest evaluations were NS (mean 1.3, median 1, IQR; 1, 2) and PM (mean 2.9, median 3, IQR; 3, 3). CBCT was evaluated significantly better than CT in terms of both OIQ and TE ($p < 0.001$).

Conclusion:

Overall, CBCT was evaluated better in postoperative CI imaging of TBs. The ARAs tested in this study did not provide any benefits in CI imaging. Currently, no specific ARA have been developed for CI imaging, and the use of ARAs developed for different regions and implants is not recommended.

05.4.01 Evaluation of children who passed the newborn hearing screening, but presented with sensorineural hearing loss within 5 years of age

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Free paper 5.4, 4. Kleine Zaal, September 7, 2024, 10:30 - 11:30

Introduction:

The newborn hearing screening (NHS) has existed in the Netherlands in its current form since January 1, 2006. The NHS detects a uni- or bilateral hearing loss >40 dB using otoacoustic emissions (OAEs) and automated auditory brainstem response (AABR). In 2020, 125 newborns with bilateral and 81 newborns with unilateral hearing loss were detected with the screening in the Netherlands, where hearing rehabilitation could be quickly started to prevent speech and language developmental delay. However, the screening method does not provide sufficient insight into the number of newborns who incorrectly pass the screening. This study attempts to describe the children who passed the screening, but presented with sensorineural hearing loss within 5 years of age.

Method:

Retrospective status research was conducted on patients who presented to the Ear, Nose and Throat Department, the audiology center or the Clinical Genetics department of the Radboud university medical center between 2014 (after the establishment of the EPD) and 2023, with a sensorineural hearing loss before the age of 5 and passes the NHS. Additional etiological diagnostics were performed on the patients, including imaging, cCMV determination and otogenetic diagnostics.

Discussion:

At the EAONO we would like to present the answers to the following questions: what is the average age of presentation? What are the causes for hearing loss in this group? Can we distinguish between (missed) congenital or early-onset hearing loss? Are there factors that warrant additional screening?

05.4.02 Genetic etiology of unilateral hearing loss and single-sided deafness

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Free paper 5.4, 4. Kleine Zaal, September 7, 2024, 10:30 - 11:30

Objectives:

Unilateral hearing loss (UHL) and single sided deafness (SSD) are commonly associated with non-genetic causes such as sudden sensorineural hearing loss, cochlear nerve hypoplasia or congenital cytomegalovirus infection. It is generally assumed that genetic defect has the same effect on the paired organs resulting in bilateral dysfunction. Nevertheless, sporadic data in the literature and anecdotal clinical observations indicate that at least some of the SSD/UHL cases may be attributed to genetic etiology.

Methods:

We performed a systematic literature review, including Pubmed, Scopus and Web of Science databases.

Results:

More than 70 relevant articles were found (mostly case reports and cohort studies) dealing with genetic investigation in SSD/UHL patients. The confirmed genetic etiologies (in >250 subjects) most frequently included chromosomal aberrations (numerical or microdeletions/microduplications), Waardenburg syndrome, mosaicism cases, and different rare syndromes.

Conclusion:

In contrast to hereditary bilateral sensorineural hearing loss, the vast majority of patients with SSD/UHL and confirmed genetic cause suffer from syndromic form of hearing loss. Although genetic testing has not been routinely implemented in the diagnostic workup of SSD/UHL, it may be recommended for cases presenting with other organ manifestations. The cost-effectiveness of molecular-genetic investigation in nonsyndromic SSD/UHL remains questionable. This work was supported by research grant VEGA 1/0572/21.

05.4.04 Treatment evaluation and liquid biopsy- based evidence of a high rate of perilymphatic fistula in sudden sensorineural hearing loss

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Free paper 5.4, 4. Kleine Zaal, September 7, 2024, 10:30 - 11:30

Introduction:

Sudden sensorineural hearing loss (SSNHL) is assumed to be multicausal and has often been associated with perilymphatic fistula (PLF). Although round window (RW/OW) coverage is regularly performed in the treatment pathway of SSNHL, no evidence has been given of the rate of presence of a PLF in severe SSNHL.

The present study aimed to evaluate cochlin-tomoprotein (CTP) as a marker for PLF in cases of severe SSNHL and its correlation to hearing thresholds after window coverage.

Material and Methods:

In 53 cases of SSNHL with a pure tone average (PTA) (4 Freq.) of more than 60 dB, we performed an RW or RW and OW coverage after an unsuccessful steroid treatment. During window coverage, middle ear samples were taken for CTP evaluation and compared with the subjective evaluation of PLF assessment. Additionally, controls were evaluated (N=18).

Results:

We observed a rate of 47,2 % (25 out of 53) positive CTP cases. In 21 cases, the CTP result was intermediate. In the group of CTP-positive cases, the rate of an increase in bone conduction (BC) after the window closure was higher than in the intermediate group. The rate of BC increase was higher, if both windows (RW and OW) were covered. Controls showed a sensitivity of 90 % and specificity of 100 % of CTP testing. Visual assessment of PLF showed a sensitivity of 76,9 % and a specificity of 73,7 %.

Conclusion:

PLF occurs frequently in cases of severe SSNHL. Surgically, both windows (RW and OW) should be covered.