

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-001

Instructional course about the Management of complications in the middle ear surgery. Material and methods: discussion of clinical scenarios by using power point presentation supported by medical videos and photographs. We will present cases of complications in the insertion of ventilation tubes, myringoplasty and tympanoplasty surgeries, stapes surgery, and in the surgery for exostosis treatment.

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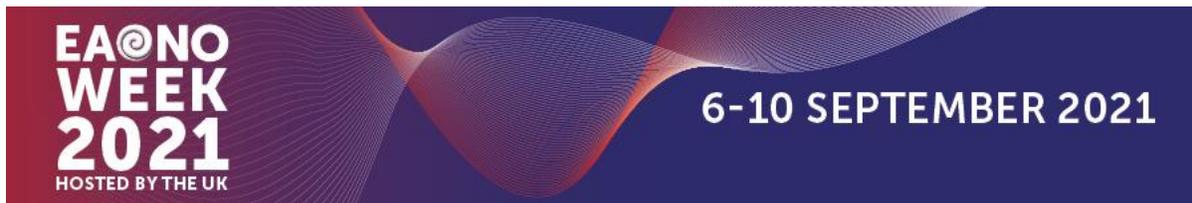
Introduction: This instructional course is intended to guide both senior and young otologist through the wide spectrum of possible complications of middle ear surgery which range from accidental eardrum perforation, to ossicular chain luxation, floating footplate or Labyrinthine fistulae. In the meantime we will discuss the 'Do and Do not' key for a proper surgery performance and complications solving. To accomplish this aim medical videos and photos will be used along with detailed schemes and algorithms of proceedings.

Key Learning Points: A visual and practical guidelines to the management of complications of middle ear surgery, specially to young otologist keen for bedrock knowledge and confidence to initiate and progress in this kind of surgical procedures.

Reinforce the knowledge about the complications from middle ear surgery is of main importance in order to avoid them.

Disclosure of Interest: None Declared

Keywords: Complications , Middle ear surgery, Myringoplasty, stapedectomy



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-002

Planning for the implementation of novel hearing therapeutics into healthcare systems

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Introduction: Driven by the unmet clinical need of hearing loss, equipped with new knowledge of its genetic and molecular causes and supported by large public and private funds, novel therapeutics that promise to protect, restore or regenerate the hearing system are being developed. If proven effective, the introduction of these drug, gene and cell therapies could radically transform hearing services within the next 5 years. It is therefore critical to start planning for their implementation now to accelerate patient access and prevent failed or delayed integration into healthcare systems.

In this workshop we will present our innovative research aimed at paving the way for novel hearing therapeutics

Key Learning Points: Developing precision medicine for sensorineural hearing loss: learning from existing datasets

Objective: To map existing (inter)national and regional datasets that include hearing data to inform the development of future hearing repositories.

Method: Systematic review

Summary: This first of its kind catalogue provides an overview of existing datasets that contain valuable information on hearing. This catalogue can be used to inform the development of (inter)national repositories of hearing loss data; and facilitate strategic collaboration between key stakeholder groups.

Applying machine learning to large hearing datasets for deep phenotypical analysis

Objective: To create a digital catalogue of hearing loss data using unsupervised machine learning for large-scale phenotyping of hearing loss.

Methods: Digitisation of hand-drawn audiograms and patient letters with data extraction by deep machine learning.

Summary: Historic hand-drawn audiograms represent an untapped dataset difficult to analyse at scale. We describe how extraction of raw data from paper-recorded hearing tests can be achieved using deep learning-assisted machine vision. This data can then be combined with medical record data to create a catalogue of hearing loss phenotypes.

An early health economic model to assess the potential added value of novel hearing therapeutics

Objective: To construct an early health economic model to assess the potential added value of novel hearing therapeutics, compared to the current standard of care.

Method: Development of a decision analytic model to assess the costs and effects of novel hearing therapeutics, compared to the current standard of care.

Instructional Sessions

Summary: There is considerable room for novel hearing therapeutics to be cost-effective. Our model can be used to inform the development of cost-effective hearing therapeutics; and help decision makers decide which therapeutics represent value for money.

A toolkit to guide the implementation of novel hearing therapeutics into healthcare systems

Objective: To build a robust toolkit that explains the conditions needed for novel hearing therapeutics to become implemented within healthcare systems

Method: Perform a detailed investigation of the interacting elements that influence the implementation of novel hearing therapeutics into healthcare systems.

Summary: We present a toolkit that explains the interacting elements that influence the implementation of novel hearing therapeutics in healthcare systems. This toolkit can be used to help prepare global healthcare systems for novel hearing interventions.

Disclosure of Interest: None Declared

Keywords: Novel hearing therapeutics

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-003

Active middle ear implant vibroplasties, active bone conduction implants, and bone anchored hearing aids: clinical decisions to optimise the outcome

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Introduction: Implantable hearing devices are gaining importance in rehabilitating deafness for which the conventional hearing aid would be unable to provide an optimal outcome. In the case of the most frequently used active middle ear implant, the Vibrant Soundbridge (VSB) system (MED-EL, Innsbruck, Austria), with the widening of the spectrum of indications, various coupling systems have been introduced for clinical use. Whilst indications overlap with active bone conduction implants and bone anchored hearing aids, those complex cases may also involve simultaneous or staged additional surgical procedures to manage pathologies causing or associating with the deafness. A correct clinical decision and good surgical planning will lead to an optimal hearing result and improve patients' quality of life in the long term. In this instructional session, we will present a series of case-based discussions to cover chronic otitis media/mastoid cavities, microtia/atresia, advanced otosclerosis, and temporal bone tumours. We will discuss the imaging modality choice, image analysis, amplification options, device choice, and surgical planning for these complex cases. We will also discuss the long-term outcome of active middle ear implants, active bone conduction implants and bone anchored hearing aids in our centre. We will explain to the audience our patient pathway and look at the potential complications and how to manage them. Discussion will be led by Harry Powell and Fiona Hill, and participated by their radiological and surgical colleagues, we will be showing how to use CT/CBCT, MRI, audiology to plan surgery and to advise device choice, surgical clips and outcomes.

Key Learning Points: * Hearing rehabilitation should be based on the patient's individual needs

* Active middle ear implant, active bone conduction implants, and bone anchored hearing aids have become an alternative to conventional hearing aids

* Patients needing implantable hearing device often have complex pathologies, they should be managed in a multidisciplinary environment

* Long term good outcomes depend on initial careful device choice and surgical planning

* Hearing rehabilitation should be based on the patient's individual needs* Active middle ear implant, active bone conduction implants, and bone anchored hearing aids have become an alternative to conventional hearing aids*

Patients needing implantable hearing device often have complex pathologies, they should be managed in a multidisciplinary environment* Long term good outcomes depend on initial careful device choice and surgical planning

Disclosure of Interest: None Declared

Keywords: active middle ear implant, Bone anchored hearing system, chronic otitis media, Microtia and Atresia

Instructional Sessions

Skull Base

Skull Base – Clinical

EAONO21-IN-004

Surgical outcomes in primary vestibular schwannoma resection- A 10 year retrospective review at UK National Centre

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Introduction: Primary resection of vestibular schwannoma (VS) aims for complete tumour removal. In situations where the facial nerve may be at high risk of injury, such as in large tumours, subtotal resection (STR) may be preferable. Despite protection afforded to the facial nerve in this approach, higher recurrence rates have been consistently reported necessitating further treatment, which may in turn, pose even greater risk to the facial nerve.

Over the last decade this transition has also been reflected in our practice and as such, we would like to share the outcomes for all primary vestibular schwannoma excisions performed during this time period. As the UK's National centre, we hope that the findings of this study will help to inform future practice so that an optimal balance between tumour control and quality of life may be achieved for all patients.

Key Learning Points: Methods

Study population

All patients with histologically confirmed vestibular schwannoma that underwent consecutive primary surgical resection between 2009 and 2019 were identified.

Surgical resection

All patients underwent tumour resection via a standard retrosigmoid or translabyrinthine approach. Degree of tumour resection has been defined as Gross Tumour Resection (GTR) representing no tumour remnant, Near-Total Resection (NTR) representing tumour remnant of <5%, Sub-Total Resection (STR) representing <10% remnant and Partial Resection (PR) representing >10% remnant tumour.

The degree of tumour resection was determined using volume calculations between pre and post-operative imaging via the 'XYZ' volume approximation method. Facial nerve function is reported using the House-Brackmann (HB) grading scale where grades I and II correspond to a good functional outcome, grade III as intermediate outcome and grade IV and V as poor.

Facial nerve function is reported immediately following surgery and at 12 months post op using the House-Brackmann (HB) grading scale where grades I and II correspond to a good functional outcome, grade III as intermediate outcome and grade IV and V as poor.

Results

Two hundred and ninety-three patients with confirmed vestibular schwannoma underwent primary surgical resection. Primary surgical approach was retrosigmoid in 165 patients (56.3%) and translabyrinthine in 128 patients (43.6%).

Average postoperative tumour volume was 1627mm³ +/-319mm³ (SD). Degree of resection as defined by percentage

Instructional Sessions

pre-operative minus the post-operative XYZ tumour volume was as follows: 89 GTR (30.4%), 70 NTR (26.9%), 24 STR (8.2% and 98 PR (33.4%).

Forty-seven patients underwent gamma knife therapy alone, 13 patients had 2 additional treatments and 2 patients had 3 or more additional treatments. The mean duration to additional treatment was 17.2 months +/- 3.3 months. In total 73 % of patients has 'good' long term facial nerve outcome (at 12 months), 12% had 'intermediate' and 14% had a 'poor' outcome. There was no evidence that facial function was affected by the number of treatments ($p=0.4$) or degree of surgical resection ($p=0.778$, ANOVA).

Conclusion

The treatment and management of VS has dramatically evolved over the last decade. The goal of the management should focus on tumour control and preserving patient quality of life of the patient. Compliance with national audit using approved standardised outcomes measures is essential to enable ongoing evaluation of surgical outcomes to inform decision making.

Disclosure of Interest: None Declared

Keywords: facial nerve outcomes, salvage surgery, vestibular schwannoma

Instructional Sessions

Auditory Implants

Auditory Implants – Clinical

EAONO21-IN-005

Cochlear implantation in inner ear dysplasia and cochlear nerve deficiency: assessment, surgery and rehabilitation

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Introduction: Cochlear implantation for hearing rehabilitation is one of the most successful medical interventions from the last few decades and the indications are continually expanding. In individuals with congenital inner ear dysplasia and/or cochlear nerve deficiency, the clinician may face a number of challenges, from candidacy and assessment all the way through to surgery and rehabilitation.

This instructional session will take a hybrid format of short presentations and a round table discussion of real clinical scenarios. The panel will consist of implant surgeons and a neuroradiologist with a specialist interest in auditory implantation, covering a range of topics including cochlear dysplasia (Incomplete Partition Types I, II and III) and cochlear nerve deficiency (hypoplasia and aplasia). Particular emphases will be give to the modern radiological classification of cochlear dysplasia, imaging techniques and indications, device choice and surgical techniques. The session will cover both cochlear implants and auditory brainstem implants.

Key Learning Points: Overview of contemporary classification of congenital cochlear dysplasia

Pre-operative assessment with emphasis on imaging and consideration in device choice

Discussion of potential surgical challenges/pitfalls and management strategies

Overview of cochlear nerve hypoplasia and aplasia with emphasis on imaging and audiological assessment

Decision making process in cochlear implant vs auditory brainstem implant

Disclosure of Interest: None Declared

Keywords: cochlear implantation, Cochlear nerve deficiency, Imaging, inner ear anatomy

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-006

Otosclerosis: from standard to challenging cases. Indications and surgical techniques from an otological referral center

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Introduction: The course will be divided in 2 parts: in the first one, after an introduction regarding etiology, physiopathology and clinical aspect of otosclerosis, cases of standard stapes surgery will be shown with the description of the surgical technique, results and complications as well as the use the laser, new stapes prosthesis and endoscope. In the second part, challenging cases (encompassing malleus head fixation, dehiscent facial nerve, narrow oval window, obliterative otosclerosis and round window ossification) will be described with videos and a case series of revision stapes surgery (erosion/absence of the incus, perilymphatic fistula) will be shown.

Key Learning Points: Understand the classical technique of stapes surgery with the benefits of the laser, new prosthesis and endoscope

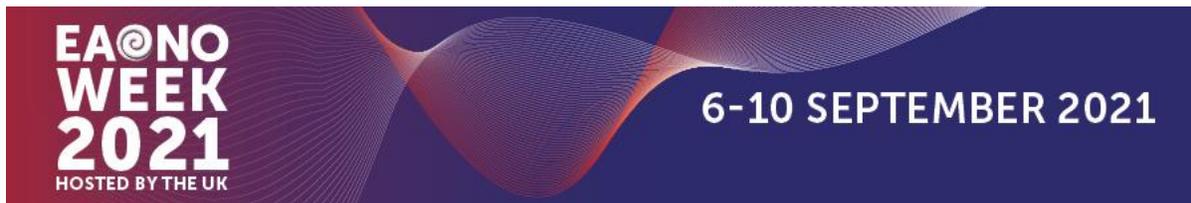
Recognize and manage difficult cases

Identify prognostic factors when dealing with revision stapes surgery

The gradual decrease in primary stapes cases available to the otologic surgeon makes the possibility of unsuccessful procedures more frequent (especially in less experienced surgeons), thus revision stapes surgery may also become more frequent; the aim of this course is to show the surgical technique in detail from the standard to the more challenging cases

Disclosure of Interest: None Declared

Keywords: ear



Instructional Sessions

Otology

Otology - Clinical Science

EAONO21-IN-007

Developing and evaluating novel inner ear therapeutics to treat sensorineural hearing loss, an exciting new field.

R. Pennings, C. Lanting*

Introduction: Hearing loss is one of the most prevalent disorders and impacts the lives of about 1.57 billion people worldwide. Conductive hearing losses may be amenable to otologic surgery, however, only a limited number of treatment options exist for sensorineural hearing loss. Most patients with moderate to profound deafness rely on rehabilitation options like hearing aids or cochlear implants which bring benefits but are far from optimal. Over the past decade a number of preclinical studies focusing on treating sensorineural hearing loss with novel therapeutics have emerged. This exciting new field is rapidly progressing along the translational pathway towards clinical testing for safety and efficacy in humans. These clinical trials are new to the field and come with challenges in terms of trials design, selection of participants, delivery of the investigational medicinal product, audiometric evaluation and safety issues. In this instructional course, the landscape of the developing field of inner ear therapy will be presented and examples will be given on how to proceed along the translational pathway towards clinical evaluation of novel inner ear therapeutics focussing on trial design and audiometric evaluation.

Disclosure of interest:

- Ronald Pennings is PI on the phase 1 AC102 Audiocure trial
- Cris Lanting is a consultant for ENT Clinical

Both authors will present during this instructional course

Key Learning Points: At the end of this instructional course, participants will be able to:

- present an overview of the translational pathway from preclinical towards clinical studies evaluating emerging inner ear therapeutics
- recall lessons learned from recent clinical trials that evaluated inner ear therapeutics
- state the different approaches of delivering inner ear therapeutics
- design (high-quality) clinical trials for inner ear therapeutics
- understand the importance of the cochlear site of lesion and its relevance for the definition of outcome measures

Disclosure of Interest: None Declared

Keywords: clinical trials, inner ear therapy, outcome measures, sensorineural hearing loss

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-008

Mastoid obliteration in chronic otitis media with and without cholesteatoma using S53P4 bioactive glass

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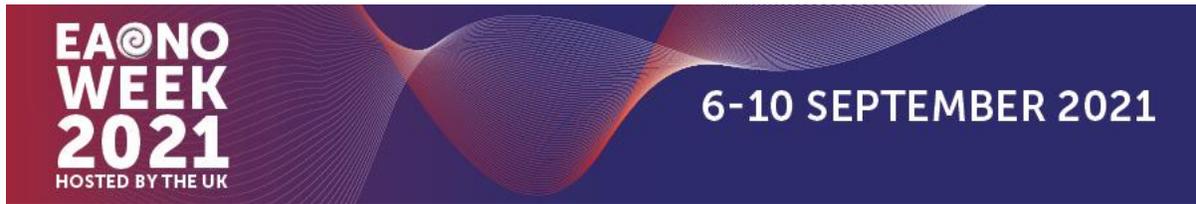
Introduction: Historically, the surgical treatment of chronic otitis media with or without cholesteatoma has been subject to discussion with propagators of both canal wall down (CWD) and canal wall up (CWU) tympanoplasty. To an increasing extent, these traditional techniques are combined with mastoid and epitympanum obliteration and this technique appears to improve the outcomes especially in chronic otitis media with cholesteatoma. This effect is likely independent from the material that is used for obliteration since a variety of materials are described such as bone dust, muscle and hydroxyapatite. However, in our centre, S53P4 bioactive glass is used and this material may have additional effects to improve disease control by its two main features: inhibition of bacterial growth and stimulation of bone formation. During this instructional session, we will introduce the audience to the beneficial properties of S53P4 bioactive glass. Furthermore, we will demonstrate our technique to use S53P4 bioactive glass in mastoid obliteration. Indications that will be covered include chronic otitis media with or without cholesteatoma, troublesome canal wall down mastoidectomy cavities and osteoradionecrosis. The instructional session will include discussion of our protocol including surgical videos as well as results of 559 cases that were treated in the past 10 years. Furthermore, the bioactive glass has also been used in mastoid surgery of 143 children and we will share our experiences in this population as well.

Key Learning Points:

- S53P4 bioactive glass can be safely used for mastoid obliteration in adults and children.
- S53P4 bioactive glass beneficial properties include inhibition of bacterial growth and stimulation of bone formation.
- S53P4 bioactive glass can be used for a variety of indications such as chronic otitis media with or without cholesteatoma, troublesome canal wall down mastoidectomy cavities and osteoradionecrosis.

Disclosure of Interest: None Declared

Keywords: Cholesteatoma, recurrence, CT-scan, MRI, second-look, pediatric, Cholesteatoma, recurrence, Pediatric, MRI, second-look, Mastoid obliteration



Instructional Sessions

Neuro Otology

Neuro Otology - Clinical Science

EAONO21-IN-009

Radiology for Otoneurotologists.

Radiology of the temporal bone is one of the areas of radiology and diagnostic imaging that deserves greater mastery and deep knowledge in the otoneurological area.

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Introduction: SUMMARY:

Introduction: Radiology of the temporal bone is one of the areas of radiology and diagnostic imaging that deserves greater mastery and deep knowledge in the otoneurological area. The structures that make up the ear are anatomically very small, complex and, in some cases, difficult to explore and access, which is why radiological tests are a fundamental tool for the otolaryngologist. These radiological tools, both computed tomography (CT) and magnetic resonance imaging (MRI), provide us with support in the suspicion of neurotological pathologies and offer us great performance for the otological study. The choice must be made on an individual basis and is part of the medical and surgical treatment.

Objective: To describe the normal anatomy and the parameters that should be evaluated from the external auditory canal, middle ear, inner ear, petrous apex and petroclival region, internal auditory canal, and cerebellopontine angle.

Differential diagnosis and imaging comparison of both the most frequent and the most infrequent temporal bone diseases will be presented, making the participant think, reflect and never forget the basis of temporal bone radiology. With this knowledge, the otologist should be able to detect by his own the main pathological entities and achieve surgeries safely.

Material used: Videos, diagram, and medical photographs. Slide presentation.

Conclusions: Imaging tests play a decisive role in determining pathology, medical treatment, and surgical planning.

Key Learning Points: CT, MRI, Otology

Disclosure of Interest: None Declared

Keywords: CT, MRI, Otology, Radiology

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-010

Step by step guide for endoscopic myringoplasty /tyimpanoplasty using different martial for grafting

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Introduction: The endoscopic ear surgery with the advanced technicality has established itself as a minimally invasive technique, as solo tool or adjunct one for all aspects of otology.

The endoscopic approach is mainly a transcanal tympanoplasty, which is helpful in those patients having the narrow external ear canal or anterior wall protrusion.

The aim is to discuss many concepts essential for safe and successful endoscopic tympanoplasty. In primary and revision cases and those with restricted access due to abnormal anatomical conditions in addition to panoramic view of its surgical steps.

The endoscopic approach differs from the microscopic approach, therefore the steps and the techniques may be different as well.

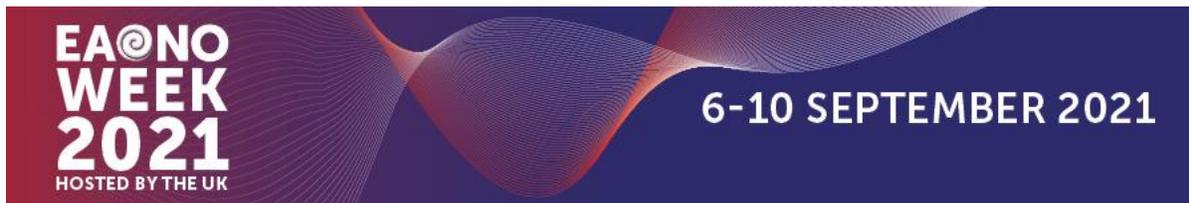
The instrument, techniques, steps and grafts for endoscopic tympanoplasty will be presented in this session.

The endoscopic tympanoplasty is a better alternative to microscopic approaches, but it need to knowledge and training.

Key Learning Points: Educational objectives: are to discuss many concepts essential for safe and successful endoscopic tympanoplasty.

Disclosure of Interest: None Declared

Keywords: endoscopic ear surgery



Instructional Sessions

Auditory Implants

Auditory Implants - Clinical Science

EAONO21-IN-011

Cochlear Implantation for Vestibular Schwannomas - Patient Candidacy, Surgical Approaches, and Postoperative Hearing

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Introduction:

Recent years the indication for cochlear implantation (CI) for single-sided deafness has been introduced to patients with resected or observed vestibular schwannomas (VS) as the cochlear nerve may function by electrical stimulation although acoustic hearing is lost.

This instructional course will explore CI for patients with VS by reviewing selected key literature and by presenting the Copenhagen experience with CI for VS with focus on a battery of objective postoperative outcomes and patient-reported outcomes. In addition, the surgical approaches depending on the tumor location (intracranial or intralabyrinthine) will be thoroughly illustrated with peroperative images and video recordings. Candidate patients, contraindications and potential pitfalls will be discussed.

Key Learning Points:

- VS management (conservative vs active) and CI
- Patient candidacy
- Strategies and considerations to ensure cochlear nerve integrity
- Video instructed surgical approaches for single-stage VS resection and CI
- Potential effects in single-sided deafness
- The Copenhagen experience with binaural hearing improvement measured with advanced hearing testing, including hearing in noise, localization and patient-reported outcomes

Disclosure of Interest: None Declared

Keywords: acoustic neuroma, binaural hearing, cochlear implantation, single-sided deafness

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-012

Necrotizing otitis externa - the challenges of diagnosis and treatment. Attempting to better understand the disease, based on several clinical studies on 87 patients.

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Introduction: Necrotizing otitis externa (NOE) is a relatively uncommon yet, potentially fatal disease. The classic characteristics of the disease, as originally described by Chandler have changed; as the typical microbiology has shifted from the classic *Pseudomonas A*, to several species of *fungi*. The course of the disease is greatly varied- ranging from a very slowly responding, severe otitis externa, all the way to a fulminant disease with cranial nerve and skull base involvement.

In this instructional course we demonstrate findings from 5 recent publications of our group, based on 87 patients. We discuss:

Clinical characteristics and differences between *Pseudomonas A*. and *fungi*.

Outcome of the disease.

Radiologic aspects, including spread on CT, as well as advancement and regression on MRI.

Glycemic control of these patients

Decision making in the management and indications for surgery.

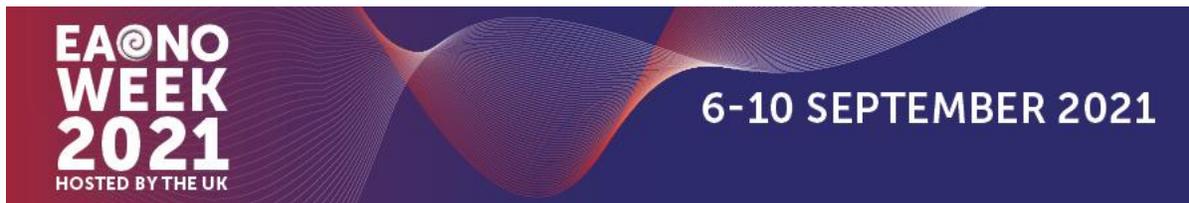
Key Learning Points: 1 Diagnostic challenges today

2 The use of imaging in diagnosing and following NOE patients

3 When is surgery indicated

Disclosure of Interest: None Declared

Keywords: None



Instructional Sessions

Auditory Implants

Auditory Implants – Clinical

EAONO21-IN-013

Patient experience and complications in cochlear and auditory brainstem implant recipients undergoing magnetic resonance imaging

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Introduction: Many patients with cochlear implants (CI) and auditory brainstem implants (ABI) require magnetic resonance imaging (MRI) following implantation. There are, however, some challenges associated with this because of the magnet within the implant. This includes image distortion, magnet displacement and magnet demagnetisation. Very early implants were not compatible with MR imaging but modern implants are MRI conditional. This session explores the patient experience of MRI scanning, identifying factors associated with pain, and the effect of interventions designed to enhance comfort and safety. It will explore the optimal means of carrying out MRI in this group of patients including how to head wrap patients to minimise magnet displacement.

Key Learning Points: Through a question and answer format the junior author, MS, and senior author, SL, will discuss all the issues surrounding MRI of patients who have auditory implants. This will be based on the institutional experience in Manchester, UK and on review of the literature. The Manchester team have carried out over 350 MRI scans in patients with auditory brainstem implants and cochlear implants.

The current guidance for imaging each of the implant manufacturers devices will be presented and modifications in the technology within the implant that facilitate imaging will be discussed. They will present institutional patient reported outcomes of pain during scanning and discuss factors that influence pain levels. This will be based on a study of 227 MRI scans in 66 patients. They will discuss the findings which include: most of the pain during scanning results from the bandage and not from the scan itself; pain is worse when scanning areas outside the head and neck region; local anaesthetic does not improve pain scores; MEDEL devices are associated with lower pain scores than devices produced by other manufacturers; the current generation of devices with rotating magnets produce the lowest pain scores and can be safely scanned at 1.5T without a head wrap; magnet displacement occurs in 3.5% of cases. They will suggest strategies to minimise symptoms and prevent complications based on their head wrapping technique that has been honed over several years. This will be demonstrated using a video. They will go on to discuss the potential complications that can occur during scanning and how to deal with them. They will then explain why signal distortion is such a problem in auditory implant recipients and will discuss strategies for minimising distortion.

Disclosure of Interest: None Declared

Keywords: Auditory implants, Magnetic resonance imaging, Patient experience

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-014

Primary stapes surgery - how to avoid complications and what to do if they arise. A practical approach

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Introduction: Outcomes following stapes surgery are very operator dependent. The fear of causing a dead ear can inhibit the surgeon from achieving the best hearing results. During stapes surgery, like most operations, there are a number of things that can go wrong. Many of these can be avoided by attention to detail at crucial stages of the procedure. From an experience of over 2500 stapes procedures the senior author will outline what can be done to reduce the risk of intraoperative complications as well as outlining strategies of what to do if things do go wrong.

Key Learning Points: Practical tips in achieving the best results in stapes surgery

Avoiding pitfalls

The correction of intraoperative complications

Disclosure of Interest: None Declared

Keywords: stapedectomy

Instructional Sessions

Auditory Implants

Auditory Implants – Clinical

EAONO21-IN-015

Autonomous image guided and robot arm assisted cochlear implant surgery: How and why?

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Introduction: Robot assisted cochlear implant surgery (RACIS) has reached clinical feasibility and progresses towards routine application. This type of autonomous assistive tools that are based on image guided surgery raise questions about surgeons responsibilities and manufacturers responsibilities. Is a surgeon responsible for segmenting radiological images or should we rely on a dedicated radiologist to assist with this type of RACIS to share responsibilities. What about the engineers or manufacturer responsibilities on accuracy of devices? Is a CE marking good enough to commercialize a highly experimental surgical tool? Is RACIS a new procedure to learn for surgeons on training and what is the learning curve.

In an interactive session I could explain the experiences of the first 25 cases of our protocol on automated RACIS. The session will address some otological radiology planning and segmenting strategies for a keyhole trajectory towards the inner ear. Also the above mentioned ethical aspects that we encountered during this clinical trial will be discussed preferably in an interactive manner.

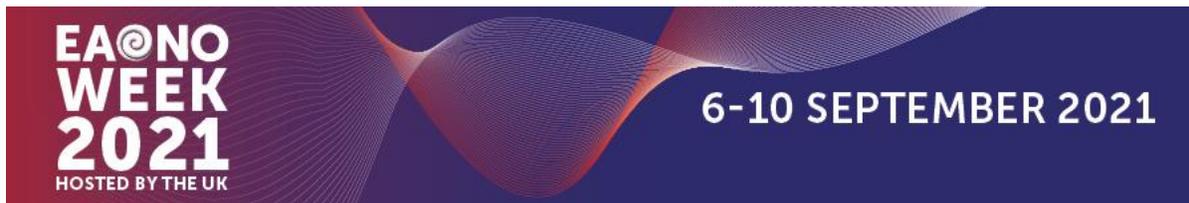
Key Learning Points: What is RACIS?

How and should I add assistive robotic tools to my surgical portfolio?

What are surgeons responsibilities in so called autonomous robotic procedures in otology?

Disclosure of Interest: None Declared

Keywords: Sensorineural hearing loss, Cochlear implantation, Robotic surgery, Image guided surgery



Instructional Sessions

Neuro Otology

Neuro Otology – Clinical

EAONO21-IN-016

Physiology of the vestibular system in children and assessment, diagnosis and management of vestibular disorders in children

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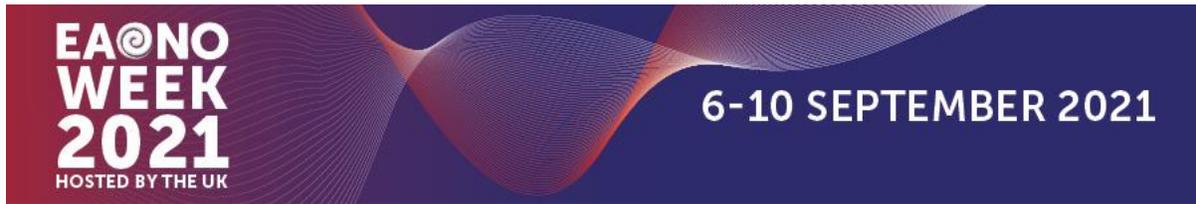
Introduction: Vestibular disorders in children are significant causes for childhood morbidity with various manifestations that are often unrecognised due to a possible lack of awareness. As a result, they not uncommonly remain underdiagnosed, misdiagnosed or even not diagnosed.

The aetiological profile for paediatric peripheral and central disorders is very heterogeneous. Application of the diagnostic algorithm with latest technology is a highly skilled art that can come from years of experience and knowledge about the paediatric vestibular system and its development. It is important to recognise the close overlap with paediatric neurology and indeed, a robust knowledge in neurology is essential to practice paediatric neurotology. This instructional course discusses the anatomy and the physiology of the developing paediatric vestibular system in children, aetiology of paediatric vestibular disorders– both central and peripheral, the diagnostic process with evidence based latest methods and their management. Demonstration of clinical tests and individual cases from the authors' own series in one of the largest tertiary/quaternary paediatric vestibular centres in the world will be presented.

- Key Learning Points:**
1. To learn about the basic sciences of the paediatric vestibular system
 2. To learn about the diagnostic clinical algorithm and the latest objective test battery to qualify and quantify the vestibular system in children
 3. To learn about the disease profile and customised management of paediatric vestibular disorders

Disclosure of Interest: None Declared

Keywords: paediatric, vestibular, children



Instructional Sessions

Auditory Implants

Auditory Implants – Clinical

EAONO21-IN-017

Cochlear implantation under local anesthesia. An instructional workshop on the indications including tips and tricks on how to make it tolerable for the patient.

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Introduction: Today, cochlear implants are a standard care for severe-to-profound HL and CI recipients of advanced age gain significant improvements in speech recognition and quality of life. CI treatment may delay or even halt cognitive decline in those patients. There is, however, a substantial under-utilization of CIs especially in this group of patients. Although CI surgery has been found to be relatively safe also in elderlies, many of them still refrain from treatment due to its invasive nature and the need for general anesthesia. Recently, postoperative cognitive dysfunction (POCD), which refers to a delayed deterioration of cognitive function in the elderlies after general anaesthesia, has been gaining more attention. The pathophysiology of POCD is still unclear but appears to be associated with the neurotoxicity of volatile and intravenous anesthetics. For these reasons, the avoidance of general anaesthesia in elderly patients is highly desirable.

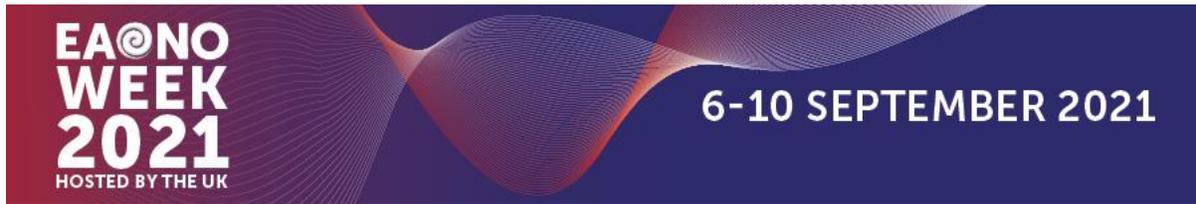
In the recent years, there is an increasing interest in the preservation of residual acoustic hearing with cochlear implantation as it has shown to improve outcomes. CI surgery under LA enables to monitor the patient's hearing threshold during surgery and may help the surgeon to perform less traumatic insertions. Therefore, in patients eligible for electro-acoustic stimulation cochlear implantation under LA offers the benefit of real-time cochlear monitoring which may decrease the risk for postoperative loss of the residual hearing.

The literature about CI surgery under local anesthesia (LA) is sparse and consisting mainly of small sample reports. We report of our experience in over 100 patients with tips and tricks of how to make the procedure smooth and tolerable for the patient.

Key Learning Points: 1) CI under local anesthesia is feasible for elderlies and patients with residual hearing; 2) The patient's hearing can be monitored during the insertion of the electrode; 3) When performed appropriately, CI under local anesthesia is well tolerated. 4) Good communication between the patient and the surgical team is essential

Disclosure of Interest: None Declared

Keywords: cochlear implantation



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-018

Balloon Eustachian tuboplasty: indications, technique, long-term outcome, complications and future research perspectives

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¹Head and Neck Center, Otorhinolaryngology – Head and Neck Surgery, Helsinki University Hospital, Helsinki, Finland

Introduction: Balloon Eustachian tuboplasty (BET) aims at improving Eustachian tube function, thereby preventing and treating chronic ear diseases. BET is a relatively new treatment modality without international consensus for its indications. The national indications formed by the Finnish Otosurgical Society are presented. Diagnostics of the Eustachian tube dysfunction is challenging, and we present our model of “Eustachian tube clinic”, that can be adapted to different institutions. BET is traditionally carried out under general anesthesia, but our group has developed techniques for local anesthesia procedures with different BET devices and local anesthesia methods. Different techniques and devices are presented. The complications will be discussed. Short-term outcomes of BET are promising, and there is accumulating body of evidence of long-term benefits, but controlled studies are dearly needed. The current knowledge on long-term outcome is critically reviewed, and an ongoing randomized placebo-controlled double blind study is presented.

Key Learning Points: Goal of the instructional course is to summarize the current knowledge on the diagnostic, technical and efficacy aspects of BET. The course will give the clinicians substantial practical advice to set up their own diagnostic and treatment workup, and help them in patient counseling.

Disclosure of Interest: None Declared

Keywords: Balloon Eustachian tuboplasty

Instructional Sessions

Neuro Otology

Neuro Otology – Clinical

EAONO21-IN-019

Surgical treatment of vertigo: Our institutional experience and the evidence base

M. Smith¹, S. Freeman¹, S. Lloyd^{2,*}

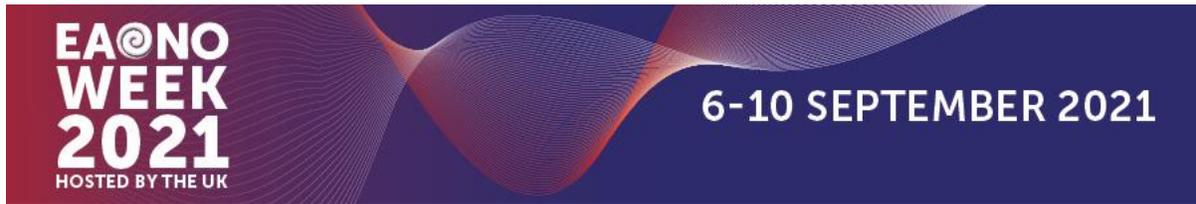
¹ENT Surgery, Salford Royal Hospital, ²ENT Surgery, Manchester University NHS Foundation Trust, Manchester, United Kingdom

Introduction: Surgery for vertigo can be controversial, however with careful case selection and sufficient surgeon training, surgery can achieve symptom remission in patients where medical therapy has failed. We provide a literature review and 10-year retrospective institutional case review (two surgeons) of surgery for Menieres disease and benign paroxysmal positional vertigo (BPPV) resistant to medical therapy, and for superior semi-circular canal dehiscence.

Key Learning Points: The session will be divided into three parts, one focussing on each condition, and the junior presenter MS will question the senior presenting clinician SL, generating a discussion appraising the literature, focussing on the systematic work-up of candidate patients, and both institutional and literature-reported outcomes. Outcomes will be reported in terms of symptom control, pure tone audiometry and adverse events. Menieres management strategies explored will include endolymphatic sac decompression, duct clipping, vestibular nerve section and labyrinthectomy. Posterior canal occlusion outcomes will be compared to the wider BPPV cohort managed with Epley manoeuvre. For superior semi-circular canal dehiscence, the transmastoid resurfacing approach will be compared to canal occlusion, both in our own case series and in the literature. Intraoperative video-recordings will be used to complement the discussion. Essential aspects of patient counselling will be highlighted. The session will provide an overview systematic and evidence-based approach to the management of Menieres, BPPV and superior semi-circular canal dehiscence.

Disclosure of Interest: None Declared

Keywords: dizziness, Menieres, surgery, Vertigo



Instructional Sessions

Otology

Otology - Clinical Science

EAONO21-IN-020

Retraction Pockets; When and How to Act?

The goal of this course is to discuss the current assesment and management of retraction pockets accompanied by cases presentations and 10 short videos.

M. I. Hizalan*

Introduction:

Retraction pockets are important because they may cause the discontinuity of the ossicles, may result in adhesion and may lead to cholesteatoma. It is important to make a clear distinction between a retraction, an atelectasis, an adhesive otitis and a retraction pocket.

Middle ear pressure regulation systems try to maintain the pressure near equivalent to the ambient pressure while gas exchange system decides the composition and partial pressures of gases.

In childhood retractions are well known to occur in association with otitis media with effusion.

Key Learning Points:

- “ Middle ear ventilation,
- “ Formation, classifications and natural course(?) of retractions,
- “ Management of retractions,
- “ Clinical evaluation of an ear with retraction;
 - when to observe? how?
 - when to ventilate? how?
 - when to operate? how?
- “ Discussion on management of different examples of retraction
 - retractions in pediatric patients
 - different localisations: attic, anterior, postero-superior
 - with or without hearing loss
 - etc...

Disclosure of Interest: None Declared

Keywords: retraction pocket

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-021

Contemporary use of endoscopes for temporal bone pathologies: A progressive perspective from basics to multimodality

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Introduction: Through continuous advancement in endovision technologies and instrumentation that enable constant improvement in surgical techniques and skills, nowadays endoscopic procedures have become an important versatile powerful tool in our hands to feasibly improve outcomes while managing temporal bone pathologies. Although endoscopes were in use in otology and skull base surgery for many years, mostly complementing standard microscopic techniques, the currently achieved dynamic high-resolution, wide-angled close-up views, combined with dedicated instruments that allow single-handed endoscopic dissection let us effectively perform transcanal fully endoscopic approaches in appropriate cases. Additionally, when required in transmastoid or transtemporal approaches, endoscopes enable around the corner visualization beyond the reach of microscopes without the need to drill-out important structures, thus reduce morbidity and further minimize the reconstruction need. Moreover, for some temporal bone pathologies an anterior endoscopic approach might pose the best management option. In this course the versatile use of endoscopes in and around the temporal bone will be discussed in a case centered approach reflecting our experience. In a progressive manner from basics to multimodal utility, a broad perspective of endoscopic surgery with its limits will be given with practical tips and tricks, also reflecting decision-making process for optimal management of temporal bone pathologies.

Key Learning Points: - Basic concepts of endoscopic technique, sense of depth, safe dissection and avoidance of complications

- Utility of pure transcanal endoscopic approach: from tympanoplasty, ossiculoplasty, stapes and cholesteatoma surgery to inner ear surgery

- Enhancing transmastoid and transtemporal approaches with endoscopic techniques: seeking better outcomes while reducing morbidity

- Anterior endoscopic approaches to petrous apex and infratemporal fossa: combining two worlds for the benefit of the patients

- Emerging technologies and applications of endoscopic visualization, instrumentation and techniques that can further improve our management and success

Disclosure of Interest: None Declared

Keywords: anterior approaches to temporal bone, endoscope assisted otologic approaches, transcanal endoscopic approach

Instructional Sessions

Neuro Otology

Neuro Otology - Clinical Science

EAONO21-IN-022

Extended Retrolabyrinthine Approach & Intraoperative Neuromonitoring in Hearing Preservation Surgery

H. C. R. Sass, P. Cayé-Thomasen*

Introduction:

This session will present and discuss the extended retrolabyrinthine approach, commonly available neuromonitoring methods and introduce our experiences using a novel system for intraoperative near-real time monitoring of hearing. Brainstem Auditory Evoked Response and Cochlear Nerve Action Potential, which include Electrocochleography and Direct Eight Nerve Monitoring, are the most common neuromonitoring techniques used when performing hearing preservation surgery. A novel method, which records brainstem Dorsal cochlear Nucleus Action Potentials (DNAP), offers new cranial nerve identification and preservation possibilities during surgery. Hearing preservation data from our center, using the extended retrolabyrinthine approach alongside the novel DNAP system called the cerebellopontine angle master (CPA Master), will be presented and future perspectives discussed.

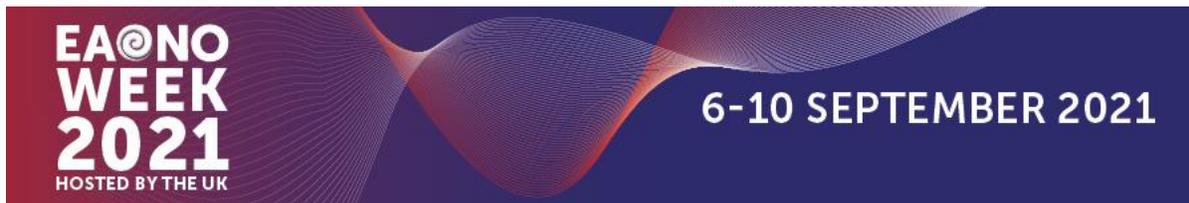
Key Learning Points:

In the extended retrolabyrinthine approach, the bone medial to the semicircular canals, subsequently posterior, inferior and superior to the internal auditory canal is removed. This allows for not only improved access to the medial part of the internal auditory canal, but it allows for identification of the lower cranial nerves, which is of importance in relation to placement of the cochlear nerve monitoring electrode upon the brainstem.

A novel device called the cerebellopontine angle master (CPA Master) offers a new neurophysiological monitoring technique. The recording electrode is placed directly on the brainstem via the foramen of Luschka (equivalent to an auditory brainstem implant). A very important feature of this system is the unique option to map the localization of both the vestibular and the cochlear part of the VIIIth cranial nerve in its entire trajectory from the fundus of the inner ear canal to the root at the brainstem.

Disclosure of Interest: None Declared

Keywords: Neuromonitoring, neuro-otology, Skull base surgery



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-023

Management of difficult ear cases with unfavourable anatomy through transcanal endoscopic ear approach

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¹ENT, United Lincolnshire Hospitals NHS Trust, Lincoln, ²ENT, Southampton University Hospital, Southampton, United Kingdom

Introduction: Recently we have used rigid ear endoscopes as a standard for otologic procedures. Aberration of the ear anatomy in the cases that need surgical intervention is considered a major challenge to the surgeons, which requires a clear access and exposure along with careful surgical approach. Our illustrative presentation will be showing how to deal with those cases as exposed facial nerve and dural, narrow external auditory canal and, others which need surgical intervention.

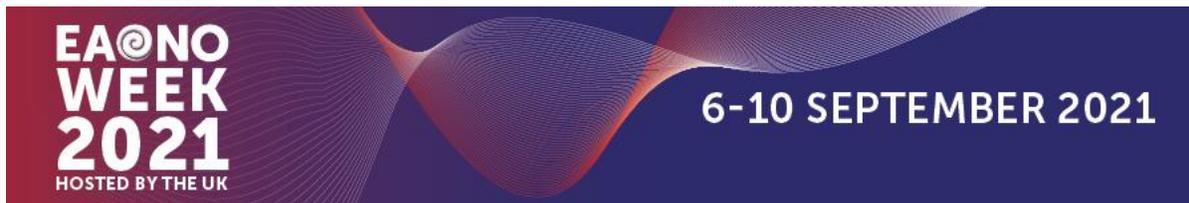
The aim is to share the experiences of the preference of transcanal endoscopic ear surgery (TEES) approach to deal with difficult primary and recurrent ear cases with restricted access due to abnormal anatomical conditions in addition to simplifying the orientation of its surgical steps.

From our experience TEES offers preference in operating primary and recurrent difficult ear cases by allowing perfect exposure of the ear anatomy which is difficult to deal with.

Key Learning Points: Educational objectives: To share the experiences of the preference of transcanal endoscopic ear surgery (TEES) approach to deal with difficult primary and recurrent ear cases in addition to simplifying the orientation of surgical steps of straightforward cases.

Disclosure of Interest: None Declared

Keywords: None



Instructional Sessions

Auditory Implants

Auditory Implants - Clinical Science

EAONO21-IN-024

How to design a mixed methods research: Our experience of designing a large scale randomised controlled trial on hearing rehabilitation of children and teenagers with bilateral cochlear implants in the UK

D. Jiang^{1,*}, D. Vickers²

¹Hearing Implant Centre, Guy's and St. Thomas NHS foundation Trust, London, ²Clinical Neurosciences, Cambridge University, Cambridge, United Kingdom

Introduction: Older children and teenagers with bilateral cochlear implants do not fulfil their potential due to poor sound localisation abilities and degraded speech-in-noise perception. These deficits jeopardise speech and language development, education, and social well-being. The lack of protocols for fitting bilateral cochlear implants, ecologically valid outcome measures, and resources for spatial-hearing training, contribute to these listening difficulties. Spatial hearing abilities develop over time with bilateral experience. A large body of research demonstrates that sound localisation can improve with training, underpinned by plasticity-driven changes in the auditory pathways for children and adults.

A group of clinicians, engineers, scientists with help of children and teenagers (public and patients involvement PPI) have developed a package of Virtual-Reality games (BEARS, Both EARS) to train spatial hearing in older children and teenagers with bilateral implants. We have put a programme together to evaluate this package. In this programme, we will use the “mixed methods research” approach whereby we collect and analyse both quantitative and qualitative data within the study. During the development phase (years 1 and 2), we will optimise BEARS using participatory design methods with a PPI Group as co-creators. Another group will inform the content of a qualitative topic guide for the clinical trial and define the Normalisation Process Theory elements for use in a Process Evaluation and for Scaling Up BEARS for mainstream use in the NHS. A clinician group will manualise the Usual Care Pathway. Additionally, the age-appropriate normal-hearing range will be determined for the new virtual spatial speech-in-noise measures. An existing bilateral hearing-specific quality of life measure and a tool for capturing healthcare resource usage will be adapted for older children and teenagers with bilateral implants for use in the clinical trial. In the trial phase (years 3, 4 and 5), we will recruit 384 children (8-16 years) with bilateral implants from 9 clinics across the UK. They will be randomly allocated to one of two groups: BEARS or Usual Care. Qualitative interviews will occur following the trial. Outcomes include spatial speech-in-noise measures, quality of life, resource use and perceived benefits. Assessors will be blind to group allocation. A Process Evaluation will evaluate the trial quality and the intervention engagement. A cost-utility analysis using trial data will be performed.

In this instructional session, we will take you through our journey of designing the project, from developing the logical model to forming the research collaboration, the rationale of using mixed methods research approach, pitfalls of design the large clinical research program.

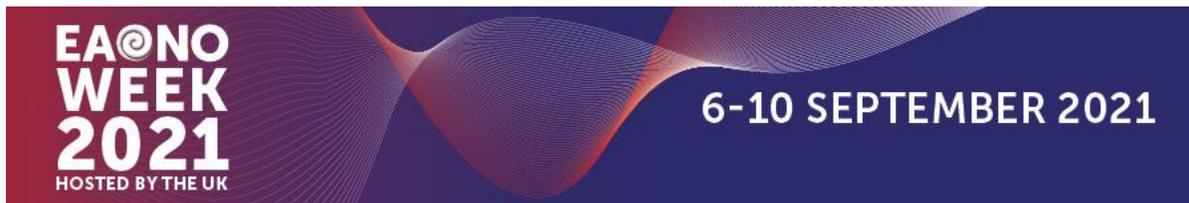
Key Learning Points: The BEARS is a large scale clinical study program to determine whether the use of BEARS leads to improvements in everyday hearing for older children and teenagers with bilateral cochlear implants

Instructional Sessions

'Mixed methods' is a research approach whereby researchers collect and analyse both quantitative and qualitative data within the same study, it draws on potential strengths of both qualitative and quantitative methods
Patient and public involvement should go beyond helping design the study and should play a role in all stages of the research cycle from identifying and prioritising research topics, through to monitoring and evaluation

Disclosure of Interest: None Declared

Keywords: Bilateral Cochlear Implant, Mixed methods research, randomised controlled trial , Virtual reality in hearing rehabilitation



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-026

Cholesteatoma surgery radical or functional, a scientific approach rather personal preference or experience

S. S. Hashmi^{1,*}, A. Qayyum

¹ENT, Peterborough City Hospital, Peterborough, United Kingdom

Introduction: A number of surgical approaches have been described in the literature for the management of cholesteatoma e.g., Modified radical mastoidectomy with or without obliteration, atriotomy again with or without reconstruction, combined approach tympanoplasty, and more recently endoscopic ear surgery etc. It has always remained controversial since last many decades that which approach is superior. Almost every otology platform debates on canal wall up vs canal wall down mastoidectomy. This put the trainee otologic surgeons in great confusion to which they should adopt to.

With the advent of more advanced surgical and imaging technologies, we believe it is the patient selection not merely the technique to predict the outcome. Hence, we present a scientific approach to address cholesteatoma rather personal preference or experience.

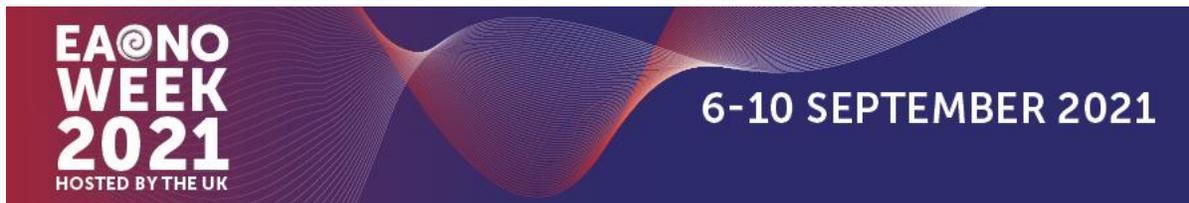
Key Learning Points: Every Cholesteatoma surgery should be customized for every individual according to

- Disease extent
- underlying etiology
- anatomy of temporal bone
- Available equipments
- Surgical expertise
- Misc Health care factors
- Misc Patient factors

Emerging otologic surgeons should learn different techniques and their appropriate and timely application

Disclosure of Interest: None Declared

Keywords: Cholesteatoma, chronic suppurative otitis media, endoscopic ear surgery, mastoidectomy



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-027

Management of Cholesteatoma of the Middle Ear; How to reduce recurrences/residuals? From endoscopy to mastoid obliteration

D. Bernardeschi*

Introduction: Based on advanced in imaging of middle ear cholesteatoma, the possibility of rehabilitation of open technique, and the use of the endoscope, the eternal debate on open/close technique should be overpassed. This course will define the surgical procedures tailored to the extension of cholesteatoma and the rationale of the obliteration of an open and closed technique, with special focus on the decrease in the rate of residual/recurrent cholesteatoma we experienced when adopting these techniques. This course will provide clinical cases of middle ear cholesteatoma treated with different techniques and the rationale of this approach, and also discussion on management of complications.

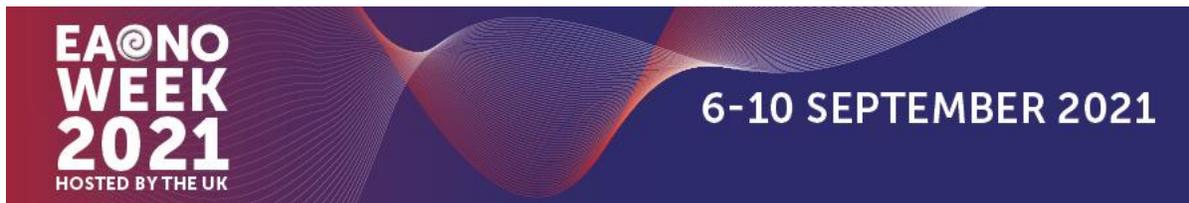
Key Learning Points: Understand the physiopathology of acquired cholesteatoma and how this should guide the surgical strategy

Clarify the concept of "adapted" technique to treat cholesteatomas of the middle ear

To elucidate the role of imaging in the post-operative follow-up

Disclosure of Interest: None Declared

Keywords: None



Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-028

Acute Otitis Media in 2021: Disease Management of the Late Post-Pneumococcal Conjugated Vaccine Years

T. Marom*

Introduction: Otitis media (OM) is a common childhood infection, and a leading cause for increased healthcare utilization, such as frequent office visits, repeated antibiotics prescriptions, and absence from school and parental work. Children with recurrent AOM episodes impose an additional burden, since they are frequently referred to be evaluated for possible hearing loss associated with chronic middle ear effusion and the need for tympanostomy tubes (TT) surgery. Four major efforts have been made to reduce OM burden: 1) publication of OM diagnosis and management guidelines for primary caregivers, 2) publication of indications for TT insertion, 3) introduction of effective new vaccines: pneumococcal conjugate vaccines, influenza and the new-coming RSV vaccine, and 4) educational and teaching activities. These interventions changed the management of OM in ambulatory care and also the presentation of advanced/refractory OM cases and associated complications, such as mastoiditis. Despite the call to adopt a 'watchful waiting' approach in most mild-moderate OM cases, antibiotics administration rates are still high, and in many cases, unnecessary. The bacterial changes have also resulted in the decrease of pneumococcal-OM and a concomitant increase in H. influenzae-OM. The latter infections have a higher rate of treatment failure, due to the production of beta-lactamases. A future switch of the first line therapy for OM from amoxicillin to amoxicillin/clavulanic acid is now under consideration.

Key Learning Points: 1. To review major interventions aimed to reduce otitis media (OM) burden: OM diagnosis and management guidelines, tympanostomy tubes insertion guidelines, vaccines (pneumococcal conjugate vaccines, influenza, RSV) and continuous medical educational activities.
2. To review time trends in antibiotics treatment policy, in light of local bacteriology and antibiotic resistance patterns.

Disclosure of Interest: None Declared

Keywords: Otitis Media

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-030

Tuberculosis of the ear

E. Oymak*

Introduction:

The tuberculosis of the ear is an uncommon condition and has been said to be the rarest form of localized and extrapulmonary tuberculosis which mostly presented in undeveloped countries. On the other hand, it is the most frequent disease of tuberculosis etiology seen by otolaryngologists. Taking these into consideration, it is hard to diagnose the tuberculosis of the ear due to its low incidence and the high possibility of misdiagnose with the other infectious diseases of the ear. Delay in initiating therapy may conclude in critical complications such as hearing loss, ear discharge, early destruction of the middle ear, labyrinthitis and facial paralysis. In this presentation, it is aimed to raise awareness of middle ear tuberculosis, and to consider tuberculosis in the differential diagnosis of chronic otitis media with complications by reporting a case of middle ear tuberculosis in a 67-year-old patient presenting with facial paralysis and left ear discharge.

Key Learning Points:

The tuberculosis of the ear is an uncommon condition and has been said to be the rarest form of localized and extrapulmonary tuberculosis which mostly presented in undeveloped countries. On the other hand, it is the most frequent disease of tuberculosis etiology seen by otolaryngologists. Taking these into consideration, it is hard to diagnose the tuberculosis of the ear due to its low incidence and the high possibility of misdiagnose with the other infectious diseases of the ear. Delay in initiating therapy may conclude in critical complications such as hearing loss, ear discharge, early destruction of the middle ear, labyrinthitis and facial paralysis. In this presentation, it is aimed to raise awareness of middle ear tuberculosis, and to consider tuberculosis in the differential diagnosis of chronic otitis media with complications by reporting a case of middle ear tuberculosis in a 67-year-old patient presenting with facial paralysis and left ear discharge.

Disclosure of Interest: None Declared

Keywords: None

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-031

Revision stapes surgery: How to do it safely and achieve the best hearing results - a practical exposition

J. Lavy^{1,*}, N. Mehta¹

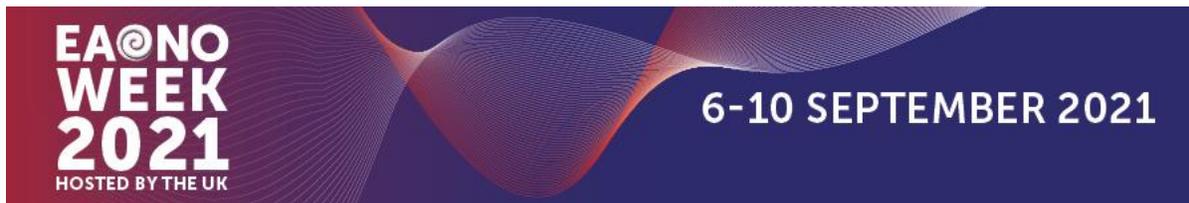
¹Royal National ENT Hospital, London, United Kingdom

Introduction: The range of hearing outcomes in revision stapes surgery can be huge. Availability of lasers, modern piston design and bone cements have revolutionised this branch of otologic surgery. Careful attention to the history plays a crucial role in the assessment of these patients as does preparedness for whatever eventuality is found at surgery. The senior author has an experience of over 2500 primary and revision stapes surgeries and will outline a systematic approach to the management of this group of patients

Key Learning Points: Assessment and management of the patients with residual/recurrent conductive hearing loss following primary stapes surgery

Disclosure of Interest: None Declared

Keywords: Otosclerosis



Instructional Sessions

Auditory Implants

Auditory Implants - Clinical Science

EAONO21-IN-032

Bone Anchored Hearing Implants - A Journey from Past to Current Practice, and Into Future Perspective

M. Hol^{1,2,3,*}, E. Teunissen⁴ and Radboudumc & UMCG BI teams

¹Otorhinolaryngology/Head and Neck Surgery, University Medical Center Groningen, Groningen, ²Research School of Behavioral Neurosciences, Graduate School of Medical Sciences, University of Groningen, ³Otorhinolaryngology/Head and Neck Surgery, Radboudumc, ⁴Otorhinolaryngology/Head and Neck Surgery, Radboud University Medical Center, Nijmegen, Netherlands

Introduction: The bone-anchored hearing implant (BAHI), introduced in 1977 and in clinical use since the 80s', ensures hearing rehabilitation in patients with hearing loss whose hearing cannot be restored by conventional hearing aids or middle ear surgery. To achieve firm anchoring of the implant in the mastoid bone combined with low soft tissue-related complications postoperatively, several surgical techniques and implant designs were introduced, used and evaluated over the past decades. In addition to the surgical techniques and implant designs, the bone conduction devices (BCD)s itself have had undergone a transformation as well – and are transforming still.

In this instructional session we would like to take the EAONO-participants on a journey into the past and current practice of the BAHI, the different types of BAHI surgery, and the associated BCD. Furthermore, we would like to show the attendants a glimpse of the promising future of these implants, implanting techniques and devices. Inventions – and their outcomes – that will pass review during the instructional session include the different fixture and abutment designs over time, such as the 'wide diameter implant', the variety of abutment lengths, and the transcutaneous implants. Surgical techniques that will be presented include the Nijmegen linear incision technique with tissue reduction / preservation (LIT-TR / LIT-TP), different punch techniques such as the Minimally Invasive Ponto Surgery (MIPS) technique, and 1-stage surgery in very young (4-9 years) children. Lastly, we will give a look into the future of the BAHI. With the clinical outcomes of more than 2,000 implants that were placed in our BAHI-specialized tertiary referral center between 1988 and now, and the ability of collecting data on more than 1,800 of these implants, we can give a clear and scientific picture of the past, present and the future of BAHI-care.

Key Learning Points: Show the differences between BAHIs, implant techniques and BCDs over time and advise when to use which implant, technique and/or device in current practice.

Disclosure of Interest: None Declared

Keywords: bone conduction implants

Instructional Sessions

Otology

Otology - Basic Science

EAONO21-IN-033

Current understanding of the otosclerosis pathophysiology and its relevance to possible pharmacotherapy

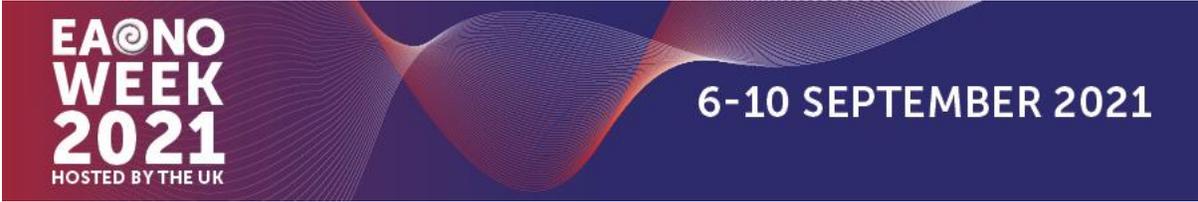
M. Rudic¹, A. Herman^{1,*}

¹ENT, Stockport NHS Foundation Trust, Stockport, United Kingdom

Introduction: Otosclerosis (localised bone dysplasia) is a primary disease of the human otic (labyrinthine) capsule and stapes footplate. It is predominantly a Caucasian disease correlating well with their geographical distribution throughout the world and with the mean prevalence estimated at 3/1000. The clinical presentation is mainly conductive hearing loss, but if otosclerotic lesions involve cochlear part of the otic capsule, it can cause progressive sensorineural hearing loss as well as tinnitus and vertigo. Symptoms usually occur in the late third decade of life although the shift in onset toward later age has been reported. Bilateral form of the disease is present in almost 80% of the cases. The course and progression of otosclerosis are very variable but hormonal factors during pregnancy and menopause have been linked with the disease progression. Histological otosclerosis refers to a disease process without clinical symptoms, discovered only on routine sectioning of the temporal bone. Its prevalence is estimated at around 8-11% in the general population. There are three forms of histological lesions: otospongiosis, transitional phase, and final otosclerosis. Otospongiosis is an early active phase with presence of histiocytes, osteoblasts and osteoclasts which absorb the bone around the pre-existing blood vessels. As osteoblast get involved, these areas become more rich in ground substance and deficient in the nature collagen, resulting in the formation of a new more spongy bone. The later phase (otosclerosis) is characterised by formation of denser, more sclerotic bone in the areas of the previous bony resorption. The process begins in the endochondral bone. As the spongiosis and sclerosis continue, the endosteal and periosteal layers also become more involved.

Despite intensive research, the pathophysiology of otosclerosis is still not fully understood. Current understanding is that otosclerosis is a complex disease with involvement of different environmental, genetic and other etiological factors such as human leukocyte antigen (HLA), autoimmunity, persistent measles virus infection, inflammation, hormonal factors (i.e. Renin-Angiotensin-Aldosterone System) and oxidative stress. Currently, the surgical replacement of stapes (stapedotomy) remains the best possible treatment option. This procedure can improve the conductive hearing loss component, but it does not stop the disease progression. Although typical otosclerotic predilection sites in more than 90% of cases are area anterior to the oval window (fissula ante fenestram) and stapes footplate, recent studies suggest a possible more general bone metabolism involvement. Therefore, different pharmacological agents able to interfere with the bone metabolism processes have been investigated for possible treatment of otosclerosis. They include: sodium fluoride, bisphosphonates, bioflavonoids, vitamins A and D, steroidal and non steroidal anti-inflammatory drugs, as well as immunosuppressants and targeted biological factors like anti Tumor-Necrosis-Factor-alpha, osteoprotegerin and anti osteoporotic targeting therapies and antiviral drugs.

Key Learning Points: The objective of this study was to analyse different etiological factors studied so far in otosclerosis pathophysiology and discuss and review most recent findings and possible new research pathways with its relevance to pharmacotherapy.



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Instructional Sessions

Disclosure of Interest: None Declared

Keywords: Bone metabolism, Otosclerosis, Pathophysiology, Pharmacotherapy

Instructional Sessions

Otology

Otology – Clinical

EAONO21-IN-034

Serum Galectin -3 and α -1-Acid glycoprotein Levels in Diagnosis and Prognosis of Idiopathic Sudden Sensorineural Hearing Loss

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Introduction

Idiopathic sudden sensorineural hearing loss (ISSNHL) is an otologic emergency which etiopathogenesis is still unknown. As many disorders are blamed to be the cause, different treatment modalities are used without any certainty to cure. The aim of this study is to analyze whether there is correlation between serum α -1-acid glycoprotein (AGP) and galectin-3 levels with ISSNHL and prognosis of ISSNHL.

Key Learning Points: Galectin-3 is an important biomarker for patients with ISSNHL. Patients with high serum galectin-3 levels come across with unresponsiveness to standard therapy. Serum AGP level is not a predictive for ISSNHL.

Disclosure of Interest: None Declared

Keywords: Galectin, Idiopathic Sudden Sensorineural Hearing Loss, Sensorineural Hearing Loss, α -1-Acid glycoprotein

Instructional Sessions

Otology

EAONO21-IN-035

Management of major earmalformations

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Introduction: In this course the different therapeutic options are presented when dealing with major earmalformations. In unilateral cases priority is given to the esthetic aspect, although the hearing rehabilitation might be important in some cases. In bilateral cases however early hearing rehabilitation is required, and the esthetic aspects receive later but also important attention. The different therapeutic functional options are reviewed in detail and commented: canal-plasty, hearing aids, bone anchored hearing devices, implantable hearing aids. The pros and contras of the different options are presented. The different esthetic options are also reviewed and described in detail: the adaptation of an auricular prosthesis and the auricular reconstruction using ribcartilage (or medpore). Surgical aspects, tips and tricks in reconstructive ear surgery are presented. The advantages and disadvantages of the different options are reviewed and results in over 30 years of experience in this difficult but fascinating domain are presented.

Key Learning Points: Management of major ear-malformation should be centralized in clinical units dealing with a sufficient work-load of cases and dedicated expertise.

Disclosure of Interest: None Declared

Keywords: None

Instructional Sessions

EAONO21-IN-036

Surgery for vestibular pathologies

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This instructional course describes the changes in the approach to the treatment of chosen common vestibular pathologies including the dehiscences of semicircular canals and untractable canalolithiasis, the spontaneous perilymphatic fistula (sPLRF), Menière's disease (MD), Large Vestibular Aquaduct Syndrome (LVAS) and bilateral vestibular areflexia. The authors share their experience with surgical treatment of these vestibular pathologies. Every technique is illustrated with the surgical video.

Key Learning Points: to demonstrate how accurate radiological and audiological diagnostics together with the new technological developments allow for re-appearance/revival of surgical techniques that can be used in therapy of above-mentioned vestibular problems.

Instructional Sessions

Otology
Clinical

EAONO21-IN-037

Individualized cochlear implantation

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Introduction: Cochlear implantation has become a very successful rehabilitation method for patients with severe and profound hearing loss. The extension of criteria involves also patients with residual hearing that should be preserved and considered for postoperative use. This requires an individualized approach to select the possible cochlear implant procedure e.g. electric stimulation versus electro-acoustic stimulation.

Method: In order to improve the results with cochlear implants an individualized approach has been developed. Patients with residual hearing were implanted with different electrodes. Results of hearing preservation were related to the length of electrode, the amount of residual hearing and the cochlear size / length.

Results: Results show clearly that the risk for postoperative hearing loss is directly correlated with the length of the electrode in use. In cases of preservation of residual hearing patients perform much better with EAS compared to electric stimulation. These findings are brought together in the concept of partial cochlear implantation that allows to optimize hearing preservation and the chance to use residual hearing. In case of hearing loss the electrode can be inserted deeper to compensate for a short electrode length which is non-favourable for electric stimulation only.

Conclusion: Individualized approaches in cochlear implantation optimize the hearing in patients. A concept to be explained and derives from existing data in patients with cochlear implantation. Results of this approach will be shown, the method will be explained.

References:

Individual Hearing Preservation Cochlear Implantation Using the Concept of Partial Insertion
Lenarz T, Timm ME, Salcher R, Büchner A.
Otol Neurotol. 2019 Mar;40(3):e326-e335

KEY WORD: Patient specific implantation

Instructional Sessions

Neuro Otology

Neuro Otology – Clinical

EAONO21-IN-044

Jugular paraganglioma - who still needs surgery?

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Introduction: The evolution of the treatment of jugular and jugulotympanic paraganglioma has moved from complete surgical resection being the primary treatment modality, through an era of conservative subtotal resection, to an appreciation that primary radiotherapy should be the default treatment for the majority of patients. However surgical treatment is still indicated in a minority of patients. Current indications for surgery will be explored with illustrative cases and results.

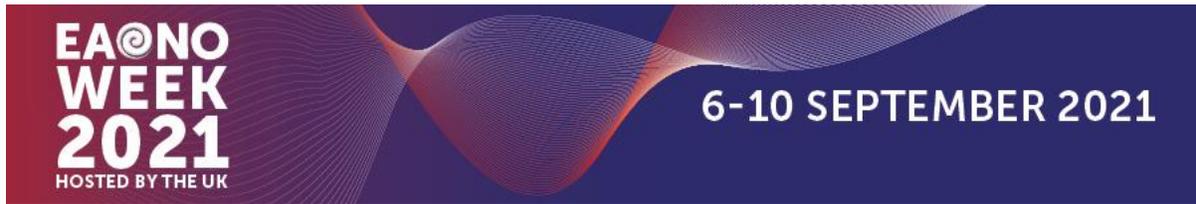
Methods: A retrospective review of Jugular Paraganglioma managed in the last decade by the Guys multidisciplinary team, with particular emphasis on indications for surgical treatment with representative cases explored in more detail.

Results: Illustrated indications for surgery include: catecholamine secreting tumours, resection in order to facilitate reanimation, tumours anatomically suitable for complete resection without associated morbidity

Conclusions: The majority of Jugular paraganglioma requiring treatment should be treated with radiation. However, surgical treatment remains an important option for selected cases.

Disclosure of Interest: None Declared

Keywords: Paraganglioma



Instructional Sessions

Otology
Clinical

EAONO20-IN-047

Drug eluting individualized implants in otology

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Introduction: Local drug delivery to the inner ear might be a powerful method to treat different inner ear disorders including sudden hearing loss, Meniere's disease or even progressive hearing loss. However current methods of drug application are not standardized and might lead to a different drug concentration at the penetration side e.g. the round window membrane.

Method: In order to overcome several of the limitations individualized drug eluting implants can be a solution. The method was developed which allows a 3D printing of individualized implants for the round window niche. Taking imaging data from cone beam CT the round window niche is segmented and a model created (Matin et al. 2021). This model is then used to print individualized drug eluting implants. The material is based on silicon rubber. Drugs can be integrated into the silicon rubber and will be released after placement in the round window niche.

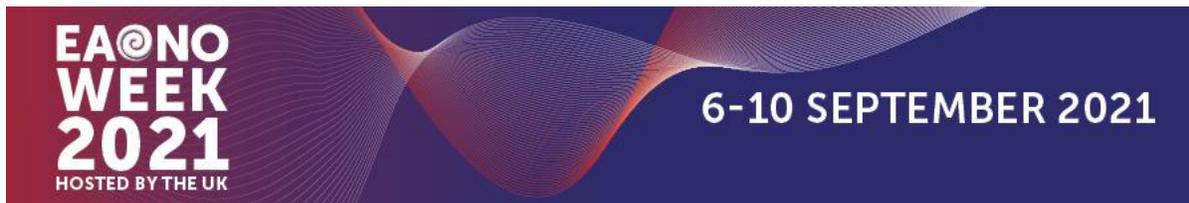
Results: So far 10 patients have been implanted with these individualized implants. The intraoperative findings show that there is good fit in all of the patients with the preproduced implants. The implants are made in sterile fashion so that no sterilisation is necessary. They can be directly placed into the round window niche.

Conclusion: This method allows the production of individualized implants for the round window niche. The implants fit into the individual anatomy at the round window niche and are in direct contact with the membrane. They allow to optimize drug delivery at the side by drug release from the silicon rubber implant.

References

Matin F, Gao Z, Repp F, John S, Lenarz T, Scheper V. "Determination of the round window niche anatomy using cone beam computed tomography imaging as preparatory work for individualized drug-releasing implants" J. Imaging 2021, 7(5), 79; <https://doi.org/10.3390/jimaging7050079>

KEY WORD: Cochlear



Instructional Sessions

EAONO21-IN-050

Long-term outcome of active middle ear implants.

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Active middle ear implants (AMEI) have become part of the otological armamentarium for rehabilitation of specific cases of hearing loss for which conventional hearing aid (cHA) use is either inappropriate or inadequate. At Sant'Andrea University Hospital in Rome, AMEI application has been since nearly 15 years part of the auditory solutions that also included cochlear implantation and bone anchored conduction devices. Selection criteria have been thoroughly followed and a prior use or trial with cHA considered mandatory before inclusion. The AMEI taken into account were 45 Esteem[®] (Envoymedical, St. Paul, USA); 5 Carina[®] (Cochlear, Melbourne, Australia); 28 Vibrant Soundbridge[®] (Medel, Innsbruck, Austria), 21 as round window and 7 as incus coupling; and 3 Maxum[®] (Ototronix, St. Paul, USA). The parameters taken into account for the evaluation were: a) surgical complications; b) auditory gain; c) post-op quality of life; d) hardware failures; e) behavior of the implanted hearing ear; f) explant rate; g) transition to alternative rehabilitation procedures. The majority of the selected patients have reached a successful outcome, regardless of the device chosen. The selection has depended upon various factors that include device availability at the time of surgery and request for an esthetic solution (fully-implantable devices). Hardware failure was rarely observed for all the devices, except for the Esteem[®]. Remarkably, the auditory threshold of the implanted ear showed over time a sensible deterioration that was the major cause for a further auditory rehabilitation by cochlear implantation. It is possible to conclude that AMEI may provide a solution for hearing impairment as an alternative to cHA that should, however, be always tested before. Regardless of the AMEI model, it should be expected in a consistent number of implanted subjects the occurrence of a further hearing deterioration in the operated ear that may require a further rehabilitative protocol including cochlear implantation.

Instructional Sessions

EAONO21-IN-053

Meniere's disease: different mechanisms for hydrops and implication of treatments – an update.

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With

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The course and symptoms in Meniere's disease is highly variable. While some patients have a high frequency of attacks and continuous symptoms, other have sporadic attacks and others again go into remissions that last for years. The responses to different treatments are similar. While one patient may respond to a certain treatment, this may not help another. This holds true for most non-destructive approaches. Actually, the literature report most treatments seems to have a success rate of about 2/3rd. which, resembles the number going into spontaneous remission when observed for several months. We can thus suggest the "two-third problem" in Meniere's disease. The heterogeneity of treatment responses, the number of different treatments suggested and the variety in the spontaneous course and in symptoms, may lead to a suspicion that there is either more than one etiology causing similar symptoms and/or that this is actually more than one disorder.

Meniere's disease is suggested to be related to endolymphatic hydrops, and it is now possible to visualize the endolymphatic compartment with MRI after either an i.v. or intratympanic administration of gadolinium.

As we have encountered, developing an experimental model creating a hydrops in mice, visualizing it with a 9,4T animal MRI system with specially developed sequences, there seem to be different mechanisms to develop hydrops. Even on a cellular level. This has implication on the treatment regime.

Here, we will present an overview on treatments relative etiology of Meniere's disease or hydroptic inner ear disease, as based on present knowledge and experience. We will suggest that the new data seems to suggest an open minded approach to the patients and a multi modal therapeutic approach.