

$p = 0.01$). Multivariate linear regression analysis showed LIDA to be the strongest predictor of Google ranking (Page rank decreasing by 0.10572 per LIDA score; $p = 0.01$).

Conclusion: As websites with better Google ranking were only weakly associated with higher quality rankings patients would benefit from being directed to reliable websites by clinicians. There is currently a gap in the available resources repository of otological information aimed at patients.

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Stem cell and their potential for hearing preservation (K853)

ID: 853.1

Stem cells and their potential for the restoration of hearing

Presenting Author: **Marcelo Rivolta**

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Learning Objectives: To present the current advances produced in our laboratory of the application of human pluripotent stem cells in the treatment of hearing loss.

The manipulation of human embryonic stem cells has opened new horizons for regenerative medicine, especially for incurable conditions like deafness. Hopes have been fuelled further by the potential to generate patient-specific, induced-pluripotent stem cells (iPSCs).

Pluripotent stem cells need to be driven into the desired cell lineages. In our laboratory, we initially tackled this problem by isolating stem cells from the human fetal cochlea, and used them to unravel the basic signals involved in producing sensory cells. We then developed a method to generate otic cells from human embryonic stem cells (hESCs) using molecules that induce the formation of the ear *in vivo*. In this way we generated otic progenitors that can produce sensory hair cell-like cells and auditory neurons. When hESC-derived otic progenitors were transplanted into an animal model of auditory neuropathy, they survived, engrafted and differentiated into neurons. Moreover, they connected with the hair cells and the brain and, more remarkably, they elicited a functional recovery represented by improved ABR thresholds. We are now exploring if hESC-derived auditory neurons could interact with experimental cochlear implants. We have also developed iPSC lines using different techniques and we are adapting the methods developed for hESC for their use with iPSCs.

The field is still at an early stage, but the progress already achieved is substantial. Although the use of stem cells for hearing loss is likely to be initially limited to some conditions, this will probably change with the development of more efficient ways of producing sensory cells and with the improvement of delivery and grafting techniques. In

summary, the presentation will revise the recent advances produced by our laboratory and the impact that this new technology could have in the future ways we treat this condition.

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Cholesteatoma imaging: current value and possibilities (K855)

ID: 855.1

Cholesteatoma: Pre- & Postoperative imaging

Presenting Author: **Jan Casselman**

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Learning Objectives: - Know the value of CT (CBCT) and non-EPI DWI in the diagnosis of cholesteatoma - Be familiar with the cholesteatoma mimickers and know how to avoid false positive and negative results - Be aware of the strength of MR in the post-operative follow-up.

For many years CT was the only available technique. Its accuracy was however low as it failed to visualise new and residual lesions in partially or completely non-aerated middle ears and post-operative cavities.

Characterization of lesions in the middle ear with MR became possible in well-, partially- and non-aerated middle ears. Cholesteatomas do not enhance, scar tissue and/or granulation tissue in postoperative cavities sometimes enhances only after 30 to 40 minutes. Therefore scar tissue can only be distinguished on contrast-enhanced T1W images made 45 minutes after contrast injection. However this technique is time consuming and requires gadolinium injection and false positive and negative results were reported.

Cholesteatomas have a very characteristic high signal intensity on non-EPI DWI images. High resolution non-EPI DWI is able to detect lesions down to 2 mm. False negatives are rare and are due to movement or metal artefacts, auto-evacuation etc.

Studies showed that non-EPI DWI is the only sequence needed, making cholesteatoma screening very short (< 8 min.) and obviating the need for contrast materials.

After CWU surgery, the bony walls of the EAC are still intact and therefore post-operative clinical inspection is limited. Hence the need for imaging to detect residual cholesteatoma.

The value of this technique is even more crucial in patients who were treated with a "bone obliteration technique" or "mastoid/middle ear/external auditory canal exclusion technique". Post-operative inspection or second look surgery is not a real option in these patients. The accuracy of pre- and post-op non-EPI DWI is high is therefore replacing CT and second look surgery throughout the world. Finally today excellent software is available which allows matching of non-EPI DWI and Cone Beam CT images. These images provide the surgeon with all necessary information in one

3D image series. All the above will be discussed and illustrated during this presentation.

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Management of difficult cases (R861)

ID: 861.1

Single stage and staged cochlear implant for chronic suppurative otitis media suffers

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Objective: To explore and summarize the operation method and operation stage for cochlear implant with chronic suppurative otitis media, to provide the reference for cochlear implant with chronic suppurative otitis media.

Methods: the clinical data of 6 cases of cochlear implant with chronic suppurative otitis media in our hospital was analyzed retrospectively. The operation stage, surgical skill, possible risk and prognosis was analyzed and summarized.

Results: 3 of 6 cases received single stage subtotal petrosectomy and cochlear implant. 3 of 6 cases received subtotal petrosectomy, they received staged cochlear implant 4 to 6 months later. No complications occurred, all of the cochlear implantee had good open set speech perception.

Conclusions: staged operation was the first choice for cochlear implant with chronic suppurative otitis media. Single stage operation took potential risks, it should be done cautiously. The key points for the operation was the clearance of the pathological tissue totally, this required experience hands and operation approach option.

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Management of difficult cases (R861)

ID: 861.2

Subtotal petrosectomy for large cholesteatoma and follow up using MR imaging

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Introduction and aim: Subtotal petrosectomy involves the complete exenteration of the tympanomastoid air cells with

blind sac closure of the external auditory canal and fat or muscle obliteration of the remaining cavity. The aim of this study is to review the different indications, hearing rehabilitation and long-term outcome results. Special emphasis is put on the use of diffusion-weighted MRI (DW-MRI) to follow up those ears after absence of possible micro-otoscopic control due to blind sac closure.

Material and methods: Retrospective analysis of all patient who underwent subtotal petrosectomy between 1995 and 2015 in a tertiary referral otological centre.

Results: Subtotal petrosectomy was performed in 102 consecutive cases. The indications were chronic middle ear disease with (n = 39) or without (n = 38) cholesteatoma, cochlear implantation in the unstable ear (n = 19), neoplasms of the petrous bone (n = 4) and cerebrospinal fluid leakage (n = 2). Residual cholesteatoma was found in 7 cases, 5 were originally cholesteatoma cases with wide extension and facial nerve involvement.

Conclusions: Subtotal petrosectomy is a reliable technique which can be used for different indications. With the introduction of DW-MRI surgical outcome can more accurately be assessed and screened for residual pathology. The latter can need revision surgery if one consider it potentially harmful for the patient. In elderly patients or in cases with an intermediate signal on DWI images a wait and scan attitude has been adopted in selected cases. Hearing rehabilitation strategy depends on the remaining inner ear function of both ears and the patient's demand as also on the risk for residual cholesteatomatous pathology. Staging after MRI-control can be a safer approach.

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Management of difficult cases (R861)

ID: 861.3

Management of CSF leaks and encephaloceles

Presenting Author: **Joe Kutz**

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Learning Objectives: 1. Describe the typical clinical presentation of CSF leaks and encephaloceles 2. Understand the advantages and disadvantages of imaging modalities to diagnosis and locate CSF leaks and encephaloceles 3. Compare surgical approaches and techniques to repair CSF leaks and encephaloceles.

Spontaneous cerebrospinal fluid (CSF) leaks and encephaloceles are uncommon but important conditions to recognize because of the risk for meningitis. Typical symptoms include a chronic effusion, tympanostomy tube otorrhea, or recurrent meningitis. Once a CSF leak is suspected, diagnosis may be challenging and is aided by laboratory testing of the fluid and imaging. Surgical approaches depend on multiple