

¹Yamagata University faculty of Medicine,
²Yamagata City Hospital Saiseikan, ³Yamagata
 Prefectural Shinjyo Hospital

Learning Objectives: To demonstrate that the endoscopic approach is a viable option when removing residual and recurrent cholesteatomas.

Introduction: While the endoscope has long been used in surgery, its adoption has been slower in ear surgery due to the narrowness, relative inaccessibility and delicateness of the ear. However, we have successfully used the endoscope in transcanal endoscopic ear surgery (TEES) as well as a combined transcanal-transcortical endoscopic approach. TEES is a less invasive procedure used initially to remove primary cholesteatomas located in the antrum and/or attic through the ear canal without the need for a large, invasive retroauricular incision. Moreover TEES can also now be used to remove residual and recurrent cholesteatomas if they are located in the attic and/or antrum. The combined transcanal-transcortical endoscopic approach is also being used to successfully remove recurrent cholesteatomas extending into the mastoid even after removal of the primary cholesteatoma via a transcortical mastoidectomy. Therefore the endoscopic approach should be considered as an option in the removal of residual and recurrent cholesteatomas regardless of their location.

Methods: The presence and location of residual and recurrent cholesteatomas were diagnosed by a CT scan and color mapped fusion imaging (CMFI). A CMFI was created by first combining a 1-mm thin slice non-EPI DWI with MR cisternography (MRC) and then performing color mapping to enhance the visualization of the cholesteatoma. TEES was used to remove cholesteatomas located in the attic and/or antrum. When the cholesteatoma extended into the mastoid, the dual transcanal-transcortical endoscopic approach was employed including a small retroauricular incision of less than 10 mm to insert the endoscope and other tools.

Results: We successfully removed residual cholesteatomas located in the attic and/or antrum and recurrent cholesteatomas extending into the mastoid using the endoscope.

Conclusion: The endoscopic approach is a viable option when removing residual and recurrent cholesteatomas regardless of their location.

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Post-Stapedectomy Granuloma: A Devastating Complication

Presenting Author: **Harry Powell**

Emma Watts¹, Harry Powell², Shakeel Saeed²,
 Richard Irving³

¹Royal National Throat, Nose and Ear Hospital
 and Queen Elizabeth Hospital Birmingham,

²Royal National Throat, Nose and Ear Hospital,

³Queen Elizabeth Hospital Birmingham

Learning Objectives: Surgical debulking can be beneficial in cases refractory to medical therapy. Although it is a rare complication, post-stapedectomy granuloma should be considered in any patient presenting with tinnitus, otalgia, vertigo or hearing loss after stapes surgery.

Introduction: Our aim was to report cases of post-stapedectomy granuloma and examine outcomes following surgical debulking.

Methods: Retrospective case review. Three patients presenting with otalgia following stapedectomy between 2010 and 2015. Tinnitus, hearing loss and facial paralysis occurred in two of these cases. When symptoms failed to improve despite maximal medical therapy, patients underwent exploratory tympanotomy and exenteration of granuloma.

Results: Intra-operatively, granulation tissue consistently surrounded the oval window niche, prosthesis and long process of the incus, emulating radiographic findings. The granulomatous reaction spread along the seventh and eighth cranial nerves to reach the cochlear nucleus in one patient. In all cases, clinical improvement was demonstrable although symptoms failed to completely resolve. Overall, facial nerve function recovered, variable reductions in pulsatile tinnitus occurred and otalgia persisted in all cases. Diminution of contrast enhancement on serial MRI scans corroborated clinical improvement and permitted post-operative monitoring of disease recurrence. Post-operative complications included Grade IV facial weakness and a pseudomonas aeruginosa meningitis, both of which completely recovered.

Conclusion: To the authors' knowledge, this is the only case where granuloma has tracked to the brainstem. Surgical debulking was beneficial in these three cases of post-stapedectomy granuloma refractory to medical therapy. Although it is a rare complication, post-stapedectomy granuloma should be considered in any patient presenting with tinnitus, otalgia, vertigo or hearing loss after stapes surgery.

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Revision surgery and complications after myringoplasty

Presenting Author: **Eva Westman**

Eva Westman

Umeå University

Learning Objectives: The aim of the present study is to analyze the number of revisionmyringoplasties and complications across Sweden, in the aspects of take rate/post-operative infection/tastedisturbance/tinnitus.

Myringoplasty is a common middle ear surgery performed to close a TM perforation.

Since 1997 these procedures have been reported by a majority of ENT clinics to a National Quality Register in Sweden. The data from the quality register have in this study been used to evaluate patients operated with

myringoplasties between 2002 and 2012 to study revision surgery and the complications reported in the register.

The reported complications 6–12 months after surgery are taste disturbances of corda tympani, new or persistent tinnitus and postoperative infections. National results as well as detailed results from 2 ENT clinics in Sweden, County hospitals have been analyzed to compare the frequency of complications.

A review of the patient records were made to further analyze the patients report of postoperative infections from the 2 county hospitals. To further analyze if taste disturbances and tinnitus is still persistent after a longer period after surgery a survey was sent home to all the reporter cases in the nation.

In summary patients have an increased risk for reoperation after revision surgery.

Men has a higher risk for tinnitus compared to women, an women have a greater risk for taste disturbances compared to men. Postoperative infections seem to be over reported. Tinnitus seems to be persistent long time after surgery.

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Comparisons of Auditory Performance and Speech Intelligibility after Cochlear Implant Reimplantation in Mandarin-Speaking Users

Presenting Author: **Che-Ming Wu**

Che-Ming Wu, Chung-Feng Hwang
Chang-Gung Memorial Hospital

Learning Objectives: This study documented the incidence of complications and revisions following CI and analyze causes and management outcomes in order to understand what could be learned from the experiences of revision CI surgery.

Introduction: Complications of Cochlear implantation (CI) sometimes lead to revision surgeries or even reimplantation. However, the auditory performance and speech intelligibility subsequent to reimplantation are not often discussed, especially in Mandarin-speaking users. This study review our experience with CI surgeries in Mandarin speaking users over a 16-year period, emphasizing causes, auditory performance, and speech intelligibility after reimplantation.

Methods: 589 patients who underwent CI in our medical center between 1999 and 2014 were reviewed retrospectively. Data related to demographics, etiologies, implant-related information, complications, and hearing and speech performance were collected.

Results: 22 (3.74%) cases were found to have major complications. Infection (n = 12) and hard failure of the device (n = 8) were the most common major complications. The incidence of minor complications was 11.04% (n = 65). In total, 18 (3.06%) patients underwent revision surgeries due to infection

(n = 9), device failure (n = 8), and severe hematoma (n = 1). Among them, 13 were reimplanted in our hospital. The mean scores of the Categorical Auditory Performance (CAP) and the Speech Intelligibility Rating (SIR) obtained before and after reimplantation were 5.5 versus 5.8 and 3.7 versus 4.3, respectively. The SIR score after reimplantation was significantly better than pre-operation.

Conclusion: The Mandarin-speaking patients who received reimplantation had restored auditory performance and speech intelligibility after surgery. Device soft failure was rare in our series, calling special attention to Mandarin speaking CI users requiring revision of their implants due to undesirable symptoms or decreasing performance of uncertain cause.

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MicroRNA-21 Promotes the Proliferation and Invasion of Cholesteatoma Keratinocytes

Presenting Author: **Chen Xiaohua**

Chen Xiaohua¹, Zhaobing Qin²

¹The First Affiliated Hospital of Zhengzhou University, ²Otolaryngology Department of the First Affiliated Hospital of Zhengzhou University

Learning Objectives: Cholesteatomas is characterized by a more rapid growth and extensive bone destruction in the middle ear and mastoid cavities. MicroRNAs (miRNAs) are posttranscriptional regulators of gene expression. The goal of this study was to investigate the posttranscriptional regulatory effects controlling proliferation, apoptosis and invasion in cholesteatoma keratinocytes. Specifically, the potential role of microRNA-21(miR-21) was focused on in this study.

Methods: Cholesteatoma tissues, taking from the patients at the time of surgery, were processed for RNA and cell culture. The cholesteatoma keratinocytes were transfected with miR-21 mimics, miR-21 inhibitor or negative control miRNA, and then growth curves were drawn. Real-time reverse-transcription polymerase chain reaction was used to assess the expression levels of miR-21. EdU incorporation assay and TUNEL staining were used to assess the proliferation and apoptosis of cholesteatoma keratinocytes, respectively. The invasive abilities of cholesteatoma keratinocytes were examined using 6-well Transwell plates.

Results: MicroRNA-21 showed an up-regulation respectively cholesteatoma keratinocytes transfected miR-21 mimics as compared with cells transfected miR-21 inhibitor or control miRNA. The number of proliferative EdU-positive(EdU+) cells increased in cholesteatoma keratinocytes transfected miR-21 mimics, as compared with cells transfected miR-21 inhibitor or control miRNA. The number of TUNEL-positive cells was increased in cholesteatoma keratinocytes transfected