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Learning Objectives: To understand that, in Cambodia, cholesteatoma is often at an advanced stage at presentation. Extrapolation from geographic data suggests that there are barriers to access in remote locations.

Introduction: We have recently instigated the first continual program for tympanomastoid surgery in Cambodia at the Children's Surgical Centre, Phnom Penh. We provide care for adults and children, and cover a population of 15 million individuals, who have previously had no access to otological surgery. We set out to ascertain the severity of disease presenting to us, and proxy measures of access to care, through a retrospective review of patient records.

Methods: We reviewed operative records of all patients undergoing tympanomastoid surgery between February 2014 and March 2016. We recorded the extent of disease, the presence of ossicular erosion, and the location and extent of erosion of the temporal bone. We compared our findings to those reported in the literature. We also used the home address of those presenting to our services to calculate the distance travelled to our centre, and compared this to the population density of each region.

Results: We retrieved records of 74 cases. Erosion of the facial canal, lateral semicircular canal, tegmen, and the ossicles is more extensive and common than reported in previous epidemiological studies. Very extensive disease is also recorded, including post-aural fistulae or abscesses, erosion into the parotid gland, exposure of the sigmoid sinus, and erosion into the internal auditory meatus. Many people had suffered for years before seeking medical care. People living near to our centre were over-represented in our cohort.

Conclusions: Cholesteatoma in Cambodia is at an advanced stage compared to that presenting in the developed world. The epidemiology of those presenting to our centre suggests that awareness of, and access to care is a significant issue for those in remote locations. This is one of the first studies to report on cholesteatoma epidemiology in the developing world, and the findings give impetus to efforts to develop infrastructure to support ear care across the developing world.

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ID: IP223

Early Detection of Residual Cholesteatomas by Color Mapped Fusion Imaging and Removal by Transcanal Endoscopic Ear Surgery

Presenting Author: **Akiko Saitoh**

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Learning Objectives: To demonstrate that CMFI is a reliable diagnostic modality for not only preoperatively identifying cholesteatomas but also postoperatively identifying early-stage residual cholesteatomas.

Introduction: Residual cholesteatomas have been difficult to accurately detect at an early stage during follow-up examinations of patients whom had previously undergone surgery for removal of a primary cholesteatoma. Typically shadows will appear on a CT scan, but cannot be confirmed as a residual cholesteatoma until a second CT scan is taken several months later. This second CT is then compared to the first CT scan to determine whether the shadow has increased in size, thus strongly suggesting the presence of a cholesteatoma. However, color mapped fusion imaging (CMFI) can be used to immediately evaluate such shadows. If a shadow shows up as a red area, the shadow is likely to be a residual cholesteatoma and can be immediately removed. Thus CMFI is useful in the postoperative follow-up evaluations of patients for residual cholesteatomas.

Patients and Methods: Ninety patients who had undergone the removal of a primary acquired middle ear cholesteatoma and were undergoing postoperative follow-up evaluations for residual cholesteatomas at 6-month intervals. Each patient initially underwent a CT scan. If a shadow was found which suggested the presence of a residual cholesteatoma, a CMFI was taken to determine whether the shadow was actually a cholesteatoma. This CMFI is created by combining a 1-mm thin slice non-EPI DWI with MR cisternography (MRC).

Results: Shadows were found on the initial CT scan in 68/90 patients. The presence of a residual cholesteatoma was strongly suggested in 5/68 patients based on the CMFI. These 5 patients all underwent surgery for cholesteatoma removal. The CMFI evaluations for these patients were compared to the intraoperative findings. All 5 patients were found to have a residual cholesteatoma in the same anatomical location as indicated by the CMFI and these cholesteatomas were all successfully removed.

Conclusion: CMFI is a reliable diagnostic modality for postoperatively identifying early-stage residual cholesteatomas.

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Endoscopic Ear Surgery for the Removal of Residual and Recurrent Cholesteatomas

Presenting Author: **Tomoo Watanabe**

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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**

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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 eight 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**

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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 perfomed to close a TM perforation.

Since 1997 these proceduren 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