

structures including jugular bulb, carotid artery, middle and posterior cranial fossa dura. Resection of the disease from the labyrinth and facial nerve may cause devastating long term effects and must be considered in light of patient preference for revision surgery against long term deficits. We present a series of patients from the Manchester Skull Base Unit and the management of their disease.

Methods: A prospective database has been collated with all patients with petrous bone cholesteatoma managed in the unit. Surgery was dependent on site of disease. All patients were monitored with yearly DWI Propeller Sequence MRI to ensure no recurrence of disease.

Results: We present 63 patients who have presented with petrous bone cholesteatoma at a tertiary referral skull base unit, aged 10 to 87. 38 patients (60%) presented with a good functioning facial nerve (House Brackmann equivalent 1–2) and 21 (33%) presented with useable hearing. The most common location of disease was supralabyrinthine 33% although 28 (44%) had apical disease.

Complications were limited with one patient developing a CSF leak, one patient an abdominal wall haematoma, and one patient an infection in the wound. Only 7 (11%) had residual hearing following surgery. 40 (63%) have a good functioning facial nerve (HB 1–2) post operatively at 1 year. 19 patients (30%) had residual or recurrent disease requiring repeated procedures.

Conclusions: Most patients can expect to maintain good facial nerve function despite aggressive surgery. Residual or recurrent disease can be monitored using advanced MRI technique and repeat surgery can be performed as necessary.

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Clinical outcomes of tympanoplasty without mastoidectomy for chronic otitis media

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Learning Objectives:

Introduction: Since 2009, we perform tympanoplasty (TP) without mastoidectomy (w/o M) for chronic otitis media (COM), aiming preservation of the ventilating function in the mastoid air cells. In this paper, clinical outcomes of that surgery were reviewed.

Methods: We analyzed 54 cases with COM, who underwent the first operation of TP w/o M. Age distribution was 8–78 (median 61) and the minimum follow-up period was 12 months. We compared the rate of complete closure, hearing outcome, and preoperative CT findings between type I and type III cases. As for hearing, successful

outcome means meeting one of the following criteria using an average (0.5, 1.0, 2.0 kHz); 1. Air-bone gap is less than 15db. 2. Hearing threshold improved more than 15db. 3. Hearing threshold is less than 30db.

Results: Type I TP was performed in 31 cases and type III TP was done in 23 cases. Autologous bone was used as columella in all cases with type III TP. The TM closure rate of type I and type III at 12 months follow-up was 74.2% and 82.6%, respectively ($p = 0.68$). The successful hearing rates of type I and type III were 80.6% and 78.2%, respectively ($p = 0.82$). Only 1 case with type I TP presented with soft tissue density area in the mastoid in the preoperative CT, whereas 16 cases with type III TP was shown to have such area. There was no statistically significant difference in TM closure rate between cases with and without soft density area in the mastoid (81.2% vs. 85.7%, $p = 0.35$).

Discussion: There was no significant difference in either TM closure rate or hearing outcome between type I and type III. In type III TP, incus and the head of malleus are usually removed to secure the ventilation route from the Eustachian tube through the mastoid. This may be the reason for less disadvantage of TP w/o M even for COM with mastoid granulation. Another factor should be searched on the failure of TP w/o M.

Conclusion: Type III TP w/o M has similar benefit to type I TP even on COM with mastoid granulation.

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A Clinical Study on 87 Cases of Congenital Cholesteatomas Based on Potsic's Staging System

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Learning Objectives:

Objectives: We investigated the clinical features and surgical results of congenital cholesteatoma according to Potsic's staging system. Potsic proposed a classification system comprising four stages to evaluate the extent of disease as follows: I, disease confined to a single quadrant; II, cholesteatoma in multiple quadrants, but without ossicular involvement or mastoid extension; III, ossicular involvement without mastoid extension; and IV, mastoid disease.

Methods: A total of 87 patients who had undergone surgery at our hospital were retrospectively analyzed for presenting symptoms, the location of cholesteatoma, and surgical results according to Potsic's staging system.

Results: Of the 87 patients, 25 were classified as Potsic stage I, 13 as stage II, 35 as stage III, and 14 as stage IV. More than half of the patients with early-stage congenital cholesteatoma

(stages I and II) were diagnosed asymptotically by a chance visit to a clinic or on ear screening. Others were diagnosed following a complaint of hearing loss, acute otitis media, or otitis media with effusion. The location of congenital cholesteatoma varied somewhat by stage. In stage I congenital cholesteatoma, the most frequent location was behind the anterior-superior quadrant of the tympanic membrane; however, in stage III congenital cholesteatoma, it was behind the posterior-superior quadrant. All patients were treated surgically. Recurrence was detected in 11 of the 87 patients (12.7%). Recurrent lesions were removed during revision surgery.

Conclusions: Potsic's staging system is a clinically useful procedure for evaluating the extent of congenital cholesteatoma. As the classification is simple, and the stage is easily determined based on otoscopic and CT findings.

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The application of endoscopes and microscopes to middle ear surgery

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Learning Objectives: The ratios of microscope and endoscopic use in middle ear surgery in our hospital were investigated, and the effective application of microscopes and endoscopes in middle ear considered.

Objective: The ratios of microscope and endoscopic use in middle ear surgery in our hospital were investigated, and the effective application of microscopes and endoscopes in middle ear considered.

Materials and methods: Middle ear surgery was performed for 63 cases of chronic otitis media with cholesteatoma and 40 cases of chronic otitis media without cholesteatoma in our hospital over a five year period from October, 2011 to September, 2015. The medical records for the 103 patients were reviewed.

Results: Thirty-seven of the 63 cases of chronic otitis media with cholesteatoma underwent surgery with a microscope alone, 15 cases with a combination of microscope and endoscope, and 11 with endoscope alone. Eighteen of the 40 cases of chronic otitis media without cholesteatoma underwent surgery with a microscope alone, 7 cases with a combination of microscope and endoscope, and 15 with endoscope alone. Surgery was performed with an endoscope alone for localized cholesteatoma in the tympanic cavity and for cases in which the edge of the perforation could not be evaluated under microscopic observation. The cases which

were required mastoidectomy or in which the edge of perforation was completely visualized underwent surgery with microscope alone.

Discussion: The endoscope has been used as a tool for improving the visual exposure of hidden structures and deep recesses, obtaining a wider angle of view, and achieving minimally invasive intervention. However, its usage during surgery is limited due to its one-hand operation in comparison with surgery under microscopic observation.

Conclusion: The ratios of microscope and endoscope use during middle ear surgery in our hospital were investigated. Improvement in surgical results can be expected by undertaking interventions with an understanding of the advantages and disadvantages of each instrument.

Ethics Committee Approval: Ethics committee approval was received for this study from the local institutional review board (2015/2556).

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Marked Hearing Improvement After Surgical Removal of Vestibular Schwannoma With Profound Hearing Loss

Presenting Author: **Sejoon Oh**

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Learning Objectives: The preoperative hearing status is one of the important factors to determine the method of surgical approach to the vestibular schwannoma. It has been widely recognized that the hearing preservation surgery is not valuable if the patient has no serviceable hearing. The worldwide reported cases of hearing improvement after surgical removal of vestibular schwannoma with profound hearing disturbance are extremely rare so far. The authors have experienced a significant hearing improvement after surgical removal of vestibular schwannoma with preoperative unilateral total deafness but normal otoacoustic emission response, therefore we should consult the OAE response when deciding the approach method of vestibular schwannoma surgery.

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Endoscopic Autologous Cartilage Injection for the Patulous Eustachian tube