

*Learning Objectives:*

**Introduction:** Totally endoscopic ear surgery (TEES) facilitates cholesteatoma treatment giving enhanced visualization of middle ear recesses without the post-operative morbidity of open surgery. TEES is not as yet an acceptable option for all cases, or indeed all surgeons. This study reports on factors influencing the adoption of TEES in paediatric cholesteatoma by a single surgeon.

**Methods:** A paediatric cholesteatoma surgery database, maintained over an 11 year period, was searched to determine the proportion of cases completed by TEES or an open post-auricular approach each year. Comparison was made with factors potentially linked to the surgeon's ability to perform TEES including extent of cholesteatoma, patient age, availability of equipment and attendance at endoscopic courses.

**Results:** Of 649 surgeries 86 were by TEES and 37 by endoscope transcanal with microscope-guided assistance. The proportion of TEES cases per year increased from 1/75 (1%) to 35/57 (61%) over the last 7 years. Empirically, this increase correlated with acquisition of specialised instruments and attendance at courses. Overall, TEES cases were less extensive (median Mills stage: 1 versus 2;  $p < 0.001$ , MannWhitney) but similar in age (median 11.5 v 10.8 yr NS, MannWhitney). Over the last 50 open cases, extent of disease (54%), narrow ear canal (30%) and defect too large for reconstruction (12%) were noted as the commonest factors for utilising an open approach. Most recently, endoscopic canalplasty and non-autogenous grafts have further increased the range of TEES.

**Conclusions:** Cholesteatoma can be treated in a majority of children with TEES, but an open approach is still required when the ear canal provides inadequate access to the limits of the disease. The surgeon's ability to complete TEES is enhanced by appropriate training, acquisition of specialist instruments, motivation and experience. Development of surgical techniques is allowing a greater proportion of cases to be completed endoscopically.

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**ID: IP078**

### Extratympanic imaging of middle and inner ear structures of the mouse and rat model using optical coherence tomography(OCT)

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*Learning Objectives:*

**Background and Objective:** Noninvasive middle and inner ear imaging using Optical Coherence-Tomography (OCT) presents some unique challenges for real-time, clinical use in animals and humans. OCT has been used in other fields for obtaining high-resolution cross-sectional images of the tissue. The goal of this study was to investigate whether

OCT provides information about the middle and inner ear microstructures in both rats and mice by extratympanic approach.

**Materials and Methods:** Six BALB/c mice and Sprague Dawley rats were enrolled to the experiment, and to acquire an image of the entire tympanic membrane, the auricle and cartilaginous external auditory canal were removed, the swept-source OCT system was tested to identify the middle and inner ear microstructures. After that, the TM and bulla were removed to confirm whether more detailed middle and inner ear images might be obtained.

**Results:** It was possible to image through the tympanic membrane extratympanically and into the middle ear cavity involving several middle ear structures in both rats and mice. We could also obtain the inner ear images through the otic capsule and into the cochlea in the mice by extratympanic approach. However, the bulla should be removed to provide the inner ear structural images in the rats. The whole cochlea of the apical, middle and basal turn could be visualized and the bony thickness of the otic capsule covering the cochlea could also be measured simultaneously.

**Conclusions:** OCT is a promising technology to noninvasively assess middle ear and inner ear microanatomy in both mice and rats. These findings are meaningful because there were no previous report to describe the middle and inner ear structure looking by extratympanically. This imaging informations can be useful in the diagnosis of diseases of the middle and inner ear if it is clinically applied through further studies.

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### The Perioperative Strain Changes of Chronic Otitis Media Surgery

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*Learning Objectives:* chronic otitis media culture strain.

**Introduction:** The perioperative prophylactic antibiotic of chronic otitis media (COM) surgery is selected based on the result of preoperative bacterial culture. Learning objectives: To investigate the changes of strains of middle ear through COM surgery, we conducted bacterial culture before, during, and after COM surgery. Method: We analyzed the medical records of 156 patients who received COM surgery at Daejeon St. Mary's Hospital from March 2012 to September 2015. Preoperative bacterial culture was conducted with otorrhea or swap of middle ear mucosa, intraoperative culture was conducted with granulation tissue in either the middle ear or mastoid cavity, and postoperative culture was selectively conducted when otorrhea was developed after surgery. Results: Sixty cases of tympanoplasty only and 96 cases of both tympanoplasty and mastoidectomy were performed for 111 cases of COM-without-cholesteatoma and 45 cases of COM-with-cholesteatoma. The growths of

bacteria were observed in 71 patients (45.5%) of preoperative culture, in 21 patients (13.5%) of intraoperative culture, and in 7 patients (4.5%) of postoperative culture. Methicillin-resistant staphylococcus (MRSA) was identified most commonly in all of tests, and it was identified from 23 of 71 cases (32.4%), 11 of 21 cases (52.4%), and 5 of 7 cases (71.4%), respectively, and the percentage of MRSA was increased from the intraoperative to postoperative identification tests. In 23 cases of MRSA in preoperative tests, 6 cases showed MRSA also in intraoperative tests, and 3 cases showed MRSA in postoperative tests. Conclusions: The distribution of strains in middle ear was changed through COM surgery, and the percentage of resistant strains, in particular, MRSA was increased. But, the bacterial culture results of post-operative otorrhea showed lower agreement with that of pre-operative or postoperative culture, and the re-identification of strains is needed.

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#### ID: IP080

### cVEMP testing in trans-mastoid occlusion surgery for superior semicircular canal dehiscence

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#### Learning Objectives:

**Introduction:** Semicircular canal dehiscence syndrome (SCDS) is caused by a bony defect of the superior semicircular canal, resulting in autophony, bone conduction of bodily sounds and pseudo conductive hearing loss. Vestibular manifestations include sound- or pressure-evoked vertigo. cVEMP (cervical vestibular evoked myogenic potential) testing is used as the diagnostic gold standard in addition to CT scanning. The aim was determine the pre and post-operative cVEMP changes in patients undergoing transmastoid occlusion surgery for SCDS.

**Methods:** All patients suggestive of SCDS underwent CT scanning and cVEMP testing. All those with positive findings for both (dehiscent superior canal and asymmetrical cVEMP thresholds >35%) then underwent surgery. cVEMP thresholds were measured 3 months post-operatively in a standardised manner. Asymmetry between ears was assessed by means of the Jonkees formula and diagnostic of SCDS when greater than 35%. Data was identified and collated retrospectively.

**Results:** Twenty patients, with 22 affected ears underwent surgical occlusion with pre-operative and post-operative cVEMP testing. All patients with unilateral SCDS had asymmetrical cVEMP thresholds >35% with a mean of 164% (N = 14, SD 224). In the 17 ears with recordable cVEMPS, all demonstrated normalisation of thresholds except in one, who had persistent symptoms and BPPV. In 10 out of 12 unilaterally affected patients, the postoperative cVEMP threshold was less than or equal to the contralateral

ear. In two patients there were no recordable thresholds in the contralateral ear.

**Conclusion:** cVEMP testing continues to be a valuable assessment tool in patients with symptoms suggestive of SCDS. Our results show that with the transmastoid occlusion technique, the post-operative cVEMPs return to normal (as compared with their contralateral side) in the majority of cases.

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#### ID: IP081

### The recovery of middle ear and mastoid cavity using T-tube in adhesive otitis media

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#### Learning Objectives:

The repeated dysfunction of Eustachian tube repeatedly may occur acute, chronic serous otitis media that can exacerbate the tympanic membrane status as adhesive otitis media, which is a result of chronic inflammation of middle ear and mastoid cavity. It may occur erosion of ossicles, which can make conductive hearing loss or cholesteatomatous otitis media while in progress. We have experienced not only recovery of middle ear, mastoid aeration, but also recovery of hearing through using only ventilation T-tube for long period. The patients were 10-year-old female, 30-year-old female and 20-year old male who visited outpatients because of otorrhea and hearing disturbance. The T-tube were inserted at operating room under general or local anesthesia. The difference of air-bone gap between preoperative and postoperative hearing were 45 dB, 18 dB and 17 dB each, and each period of tubing were 53 months, 40 months and 26 months. All patients performed temporal bone computer tomography (CT) before surgery, and all of them showed soft tissue density in middle ear and mastoid cavity, and sclerotic mastoid bone changes. However all patients showed improvement of temporal CT finding without soft tissue density in middle ear and mastoid cavity postoperatively. We propose this treatment because it may be simple and have cost-benefit compared with other methods. However close observation of tympanic membrane perforation and recurrent otorrhea after tube insertion might be necessary.

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#### ID: IP082

### Clinical and Audiological Characteristics of 1000 Hz Audiometric Notch Patients

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