

doi:10.1017/S0022215116002784

## Difficult Situations in Cholesteatoma Surgery (N713)

ID: 713.4

### Difficult Situations in Cholesteatoma Surgery

Presenting Author: **Mohan Kameswaran**

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*Learning Objectives:* In the Indian subcontinent, the otologist faces several challenges in cholesteatoma surgery due to the high prevalence of the disease and late presentation with advanced disease. Cholesteatoma extending into the oval / round windows, semicircular canal, or the internal auditory meatus are encountered. Revision surgery can be particularly challenging. This presentation will focus on these difficult situations in cholesteatoma surgery.

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doi:10.1017/S0022215116002796

## Middle ear implants – indications (R714)

ID: 714.1

### BCI or AMEI: how to select the right patient with chronic middle ear disease

Presenting Author: **Maurizio Barbara**Maurizio Barbara<sup>1</sup>, Simonetta Monini<sup>2</sup>, Chiara Filippi<sup>2</sup>, Francesca Atturo<sup>3</sup><sup>1</sup>*Sapienza University Rome*, <sup>2</sup>*Sapienza University, NESMOS Department, Rome, Italy*,<sup>3</sup>*Sapienza University, NESMO Department, Rome, Italy*

*Learning Objectives:* To give some hint of the principles that should drive for an appropriate selection of the correct auditory implantable device in case of chronic middle ear disease.

*Background:* Bone Conductive Implants (BCI) are widely used since several decades for the auditory rehabilitation of conductive and mixed hearing loss as well as for Single-sided Deafness (SSD). In mixed hearing loss, the role of Active Middle Ear Implants (AMEI) has recently been emphasised, with application and direct driving of the remnants of the ossicular chain or on the round window membrane. The present study aims to identify the best

candidature on the ground of pre-operative personalised headband test.

*Material and Methods:* At the Implanting Center of Rome La Sapienza, Sant'Andrea Hospital, a consecutive series of subjects were evaluated for an auditory rehabilitation involving the use of electronic, surgically-implanted devices. A thorough audiometric evaluation was performed under the unaided condition and when wearing a simulation device, such as with the headband, personalised according to the individual subject's performances. The clinical conditions related to the ear pathology or to an eventual surgical sequel were also taken into account.

*Results:* A BCI was indicated in all cases with conductive hearing loss and in the mixed cases when the BC threshold was not measured beyond 40 dB at all the tested frequencies. When the BC threshold was beyond this threshold limit but not beyond 65 dB especially at the high frequencies, an AMEI was advised. Considering that these advanced mixed cases were often present as a sequel of open tympanoplasty for cholesteatoma, a round window coupling of the AMEI was advised.

*Discussion:* A thorough, individualised pre-operative test represents the best approach for the choice of the rehabilitative device, especially in absence of precise guidelines. From our experience, a round window application could always be indicated in stable, open tympanoplasty sequel and a concomitant advanced form of mixed hearing loss.

doi:10.1017/S0022215116002802

## Cholesteatoma in Children (N715)

ID: 715.1

### Management of Congenital Cholesteatoma

Presenting Author: **Levent Sennaroglu**

Levent Sennaroglu

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*Learning Objectives:* In this presentation different forms of congenital cholesteatomas will be presented together with management strategies.

Between 2003–2016 author performed 817 tympanoplasties. 318 of these had cholesteatoma. 38 of these are classified as congenital cholesteatoma. 29 are primary cases and remaining 9 are revision cases. While three of the revision cases belong to the author, in remaining cases original operation had been performed in another center.

Youngest patient operated was 7 months old diagnosed with hearing screening.

Congenital cholesteatomas confined to the middle ear are usually attached to the neck of the malleus necessitating the removal of the neck and head of the malleus for complete removal. This can be managed without damaging the tympanic membrane. Ossicular chain is reconstructed with bone cement.

Larger cholesteatomas necessitate mastoidectomy with or without open cavity.

There is a group of congenital cholesteatoma extending into petrous bone. Resulting cavity can be managed by blind sac closure of the ear canal with subtotal petrosectomy.

These cases usually expose carotid artery, jugular vein dura and have a high rate of recurrence.

Videos will be provided for each pathology showing the technique of removal and hearing reconstruction.

doi:10.1017/S0022215116002814

## Cholesteatoma in Children (N715)

**ID: 715.2**

### Long term results of total ossiculoplasty in pediatric cholesteatoma surgery

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*Learning Objectives:* To evaluate the long-term results and predictive factors of a good outcome with the use of a total ossicular replacement prosthesis in pediatric cholesteatoma surgery.

*Objective:* To evaluate the long-term results and predictive factors of a good outcome with the use of a total ossicular replacement prosthesis in pediatric cholesteatoma surgery.

*Design and setting:* Retrospective case review in a tertiary referral center.

*Patients:* The study included 114 children (116 ears).

*Interventions:* A total of 116 ears underwent total ossicular chain reconstruction with a titanium prosthesis. Cartilage was always used for tympanic membrane reconstruction.

*Main Outcome Measures:* Audiological results were evaluated according to the guidelines of the American Academy of Otolaryngology–Head and Neck Surgery. Predictive factors of audiological results were determined. Logistic regression and X2 tests were used for statistical analysis.

*Results:* The mean age at surgery was 9.8 years. Ossiculoplasty was performed during second-look surgery in 91 ears (78.4%) and during another stage in 25 ears (21.6%). The first-stage procedure was always performed for cholesteatoma. Audiometric results were available for 116 ears at 1 year, for 89 ears (76.7%) at 2 years, and for 42 ears (36.2%) at 5 years. Closure of the average air-bone gap (ABG) to within 20 dB was achieved in 65 ears (56%) at 1 year. The mean (SD) preoperative and postoperative (at 1 year) ABGs were 41.0 (9.5) dB and 22.4 (12.6) dB, respectively. There were no cases of extrusion, but 17 luxations of the prosthesis were confirmed by computed tomography. Luxation occurred on average at 31.4 months. Three 4000-Hz degradations of bone conduction were reported, with no dead ears. We examined 3 predictive factors of

auditory results: preoperative ABG, footplate status, and postoperative otoscopic findings.

*Conclusions:* Total ossiculoplasty is a reliable technique in children. Long-term hearing outcomes are stable and satisfactory, but luxation can occur at any time. Preoperative ABG and footplate status are negative predictive factors of auditory results.

doi:10.1017/S0022215116002826

## Ventilation and Gas exchange in middle ear (R716)

**ID: 716.1**

### Middle ear pressure maintenance: 1) a concert played by many instruments. 2) Pathology as compensation.

Presenting Author: **Udi Cinamon**

Udi Cinamon  
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*Learning Objectives:* Middle ear pressure maintenance: 1) a concert played by many instruments. 2) Pathology as compensation.

It is crucial that the pressure in the middle ear (ME) will be kept circa to ambient pressure. As a physiological system that needs to confront constant intrinsic and extrinsic changes (e.g., cardiovascular system, respiratory system, etc.) the ME requires to possess special capabilities to maintain a physiological steady state. This ME pressure homeostasis is a concert played by several mechanisms, i.e., pressure regulators meant to neutralize or minimize pressure changes. Adjusting the amount of gas, its flow and diffusion, as well as the volume of the middle ear cleft, temperature all mechanism that follow the law of gases [PV = nRT]:

*Volume:* Size matters, the mastoid and the tympanic membrane (TM) being a “pressure buffers”.

*Surface matters:* The “radiator” effect of the ME cleft regarding gas exchange, temperature, moisture (number of molecules, Temperature). The Eustachian tube (ET) being a conduit possessing a pumping effect. Nerves and pressure receptors may control ventilation by opening the ET. When one or more of these mechanisms fails a “disorder” may kick-in. Therefore, developing a chronic ME insufficiency is accepted as the patho-physiological setting for developing chronic ME disease, clinically presented as otitis media with effusion, atelectasis of the TM or associated with developing cholesteatoma.

These chronic changes can be addressed as compensatory mechanisms (e.g., heart hypertrophy to keep-up with perfusion having a failing heart). Edema of the mucosa, engorgement of vessels and transudate will diminish the volume and influence gaseous content in the ME elevating pressure. TM atelectasis changes the ME volume being a pressure buffer.

Failure to confront a prompt and significant pressure change, a situation in which the ME pressure needs to be elevated instantly, will be presented as barotrauma. The consequence would be transudate, hemorrhage, and TM perforation all means “trying” to compensate.