

technique for disease control for example between canal wall up (CWU) or down (CWD) and mastoid preservation or obliteration.

In an attempt to clarify this relationship between disease, patient and surgery, a single-surgeon prospective database of consecutive cholesteatoma surgeries was analysed. Analysis was restricted to cases with no prior history of cholesteatoma surgery. Out of 368 paediatric cases, 328 (89%) were completed with CWU of which 69 were totally endoscopic (TEES), and 40 were completed with CWD of which 10 had primary obliteration. Overall 34 (9%) were found to develop recurrent cholesteatoma. Kaplan Meier survival (KM) analysis was used to control for the cumulative increase in recurrence with time, giving an overall recurrence rate of 12% at 5 years and 18% at 10 years. Perhaps surprisingly, KM analysis suggests that gender and younger age had no impact on likelihood of recurrence. Similarly the same rate of recurrence was found for congenital and acquired cholesteatoma and whether disease was acquired from pars tensa or pars flaccida retraction. The most significant pre-operative determinant of outcome was extent of cholesteatoma, with cholesteatoma involving 4 sub-sites (meso- and epitympanum, antrum and mastoid) having significantly greater risk of recurrence than smaller disease (30% at 5 years; KM log rank statistic $p = 0.002$).

While canal wall down surgery (CWD) is commonly considered to have a lower risk of recurrence than intact canal wall surgery (CWU), in this series, KM analysis showed no difference in rate of recurrent cholesteatoma between these different techniques. Subgroup analysis, in which the sample sizes are small, suggests (a) the same recurrence rate with TEES and (b) no difference in revision surgery for uncontrolled disease for CWD cases with or without obliteration of the mastoid. In contrast to the perhaps unreachable gold-standard of a randomized prospective trial to control for differences between patients, it must be noted that selection of surgical technique was allocated according to patient and disease factors, for example CWD surgery was used more often for larger cholesteatoma.

Careful recording and analysis of surgical intervention and outcome provides valuable insight into the effectiveness of otologic intervention for cholesteatoma.

Survival analysis is required to control for the increasing incidence with longer follow up. It is also important to control for other risk factors such as the extent of cholesteatoma. Understanding of the mechanisms of recurrent cholesteatoma is confounded by selection of surgical technique according to the extent of disease.

Nevertheless, as it seems that “*Bad ears do badly and good ears do well*” it is arguably most important maximise strategies to prevent recurrent disease in those thought to be most at risk.

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Paediatric Cholesteatoma (R811)

ID: 811.4

Management of Pediatric Cholesteatoma: The Gruppo Otologico Experience in the Management of 618 Cases

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Learning Objectives: Management of pediatric cholesteatoma and the long term outcomes of canal wall up mastoidectomy.

The objective of this study is to report the Gruppo Otologico experience in the surgical treatment of paediatric cholesteatoma. This is a retrospective study wherein 572 charts of young patients who underwent surgery between 1983 and 2015 were analysed. 46 patients had bilateral disease and the average age was 10.6 years old. The extension of cholesteatoma was defined using Sanna and Zini’s cholesteatoma classification. The most commonly surgical procedure used in children were Canal Wall Up and a Canal Wall Down tympanoplasty. Canal Wall Up Tympanoplasty (CWU) was performed in 263 patients, while, Canal Wall Down Tympanoplasty (CWD) that includes Modified Bondy Technique (BT) and Radical Mastoidectomy (RM), was used in 258 patients. There were more numbers of revision surgeries in CWU (34%) than CWD (10%) tympanoplasty. In all surgeries put together, we had an improvement of hearing of a mean of 8.5 dB HL. The mean follow-up was 10 years. In conclusion, the technique of choice for pediatric cholesteatoma is CWU tympanoplasty. However, the use of a CWD approach to surgically treat extensive cholesteatoma in children results in a low recurrence rate with a high rate of trouble-free ear in the long term.

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Paediatric Cholesteatoma (R811)

ID: 811.5

Long term functional and hearing outcomes of surgery in pediatric cholesteatoma

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Learning Objectives: The aim of this study is to retrospectively analyze the functional and hearing outcomes of surgery for cholesteatoma in pediatric population.

Study Design: Retrospective study

Setting: Gruppo Otologico, a quaternary referral center for Otolaryngology and Skull Base Surgery in Italy.

Materials & methods: A retrospective analysis is presented of 664 cases of cholesteatoma in pediatric population who were treated by surgery. The surgical approach was chosen according to the hearing loss, symptoms, status of tympanic membrane and radiological finding. Surgical procedures included Canal Wall Down mastoidectomies, Modified Bondy mastoidectomies, Canal Wall Up mastoidectomies, Radical mastoidectomies, revision surgeries and Subtotal Petrossectomies. In some of these patients

additional procedure included Cochlear Implants or Bone-anchored hearing aids. Charts were analysed for type of cholesteatoma, surgical procedures, hearing results, recurrence and follow up.

Results: Charts of 664 patients were analysed. Of these patients, 39% underwent CWD surgery, 38% CWU surgery, 4.9% CWD with Bondy's technique, 4.3% radical CWD, 0.75% subtotal petrosectomy and 13% of patients underwent a revision tympanoplasty. For long-term functional and hearing outcomes, 552 patients with a follow-up of > 1 year were analyzed separately. Our experience shows an incidence of recurrent cholesteatoma of 19% during 10 years of follow up. In most of these cases CWU procedure was converted into a CWD mastoidectomy. Hearing results will be discussed upon presentation.

Conclusion: Surgery for cholesteatoma is especially challenging in a pediatric population because of the need for hearing preservation. Hence canal wall up mastoidectomy in a single or two stages should be the approach of choice in the pediatric population. The modified Bondy technique is a very useful hearing preservation procedure in limited epitympanic cholesteatomas. Radiological follow-up by DWI is mandatory in children for more than 5 years as recurrences can be seen even after 5 years.

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Free Papers (F812)

ID: 812.1

External auditory canal pathology and Cholesteatoma complication. Management

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Learning Objectives:

External auditory canal (EAC) pathology very often is not a simple pathology. To resolve these ear problems: malformations, infections, tumors etc., is necessary to have good medical and surgical knowledge. Cholesteatoma remains one of the most challenging ear diseases, its evolution leading sometimes to serious complications (facial palsy, vestibular disorders, meningitis, intracranial abscesses, sigmoid sinus thrombosis etc.). Surgical treatment is always required.

Methods: We reviewed the operative reports of 534 cases treated in the ENT clinic from Cluj between 1998–2005. Patients' ages ranged from 3 to 81 years, with a mean age of 30. The surgical procedure was to follow the cholesteatoma extension from the tympanic cavity to the mastoid cavity. We used for ossicular chain reconstruction incus body without osteitis, head of the malleus, and temporal cortical bone. For the reconstruction of the eardrum and the canal wall we used perichondrium, cartilage with

perichondrium (palisade technique), or only cartilage. Patients with complications underwent the canal wall-down technique.

Results: Recurrence of supuration was noticed in 28% of cases, requiring a second intervention.

Hearing improvement was obtained in 58% of cases, satisfactory results 19% of the patients, and 23% showed no improvement of the hearing.

The best outcomes in the hearing recovery were obtained by using the head of the malleus or the incus as a PORP prosthesis (40%). Tragal cartilage was used as the columella between the eardrum and the stapes with good results (15%). We also used temporal cortical bone grafts as TORP prosthesis with good results (13%).

Conclusions: In EAC disease infections need medical treatment, the tumour surgery and the malformation restoring of hearing and sometime of aesthetics surgery.

Reconstructive techniques using autologous materials proved to be valuable procedures for the recovery of the patient's hearing.

The cholesteatoma must always be operated, the technique being individualized from case to case.

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Free Papers (F812)

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Studies to establish the safety of middle ear pellets using auditory brainstem response, cytochrome c and histology

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Learning Objectives: Otitis Media with Effusion (OME) is the commonest cause of paediatric hearing impairment globally. Primary treatment is ventilation tube insertion with a 25% recurrence rate. Antibiotic laden pellets placed in the middle ear present a potential novel treatment strategy. This study aims to establish the safety of these pellets *in vivo*.

Introduction: Otitis Media with Effusion (OME) is the commonest cause of paediatric hearing impairment globally (Mandel et al 2008). Primary treatment is ventilation tube insertion (NICE Guidelines 2008) with a 25% recurrence rate (Gates et al 1987). Antibiotic laden pellets placed in the middle ear present a potential novel treatment strategy. This study aims to establish the safety of these pellets *in vivo*.

Methods: Rifampicin and Clindamycin loaded pellets made of poly lactic-co-glycolic acid were surgically placed in guinea pig middle ears. Auditory Brainstem Responses