

Subtotal petrosectomy is the basic procedure in skull base surgery. It involves complete exenteration of all air cells of the temporal bone (middle ear and mastoid). It includes the following air tracts: retrosigmoid, retrofacial, antral, retrolabyrinthine, supralabyrinthine, infralabyrinthine, subpratubal and peritubal carotid cells. Only a few cells in the petrous apex left behind. The otic capsule is either removed or left behind.

In advanced cholesteatoma cases, where numerous previous middle ear procedures could not reassure dry ear and when there is no possibility of hearing reconstruction and one wishes to attain a dry safe ear this procedure has proved to be the solution. Depending on the bone conduction result the procedure can be combined with the simultaneous application of vibrant soundbridge in the round window or BAHA/Bonbridge implants. During the past years we carried out subtotal petrosectomies in 4 cases due to advanced cholesteatomas. The steps of the procedure will be demonstrated and conclusions will be drawn based on our experiences. Further rare indications of this useful procedure will be briefly discussed too.

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New trends in cholesteatoma management (N733)

ID: 733.3

Bony obliteration technique (BOT) surgery in paediatric cholesteatoma cases

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Learning Objectives: bony obliteration technique in pediatric acquired cholesteatoma - results and discussion on advantages

Paediatric cholesteatoma is aggressive, destructive disease to all surrounding tissues. It has high recurrent tendency even after careful removal. High complication rate, severe, sometimes life-threatening complications can occur. Hearing deterioration is characteristic. Main goals of therapy are the following:

- complete eradication of the disease (no residual disease)
- prevention of recurrent disease, prevention complications
- improvement of the hygienic status of the ear
- preservation or improvement of hearing

Formerly in childhood mostly operations has been done in 2 sessions: one year after the first op – enough time to grow a „spider-egg” to be removed and reconstruction. Today the method of choice is in cases of invagination cholesteatoma the CWU /CWD with BOT, complete removal of the matrix and keratin, primary reconstruction of the ear. For control of recurrent/ residual cholesteatoma is done by non-epi DW MRI.

Own results: In the last 5 years we had 53 cholest cases, 4 congenital, 49 epitympanic, and invagination type. In non-obliteration cases (n = 32) the recurrent/residual rate was 37, 5% (12), in obliteration cases (n = 17) this figure was 5, 9% (1). Hearing results in obliteration group was better than in non-obliteration group (average ABG improvement was 5, 3 vs 12, 5 dB).

Conclusion: After a learning curve BOT surgery is the method of choice in paediatric invagination cholesteatoma cases.

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New trends in cholesteatoma management (N733)

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Middle ear gas exchange problems in OME and cholesteatoma

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Learning Objectives:

Background: Gas pressure balance is substantial for normal middle ear (ME) function, however, mechanisms involved in the ME pressure control are still not fully understood. In vivo examination of the ME gas pressure (MEP) regulation is difficult, therefore mathematical models are developed to describe and test hypotheses concerning ME gas exchange function.

Objective: To examine the role of ET function and mastoid pneumatization in MEP balance, and to interpret the possible clinical relevance of the mathematical model predictions.

Method of approach: A mathematical description and MatLab® modeling of the MEP development is presented in the function of different ME volumes (V_{ME}), considering normal and malfunctioning ET. Published data as input values and our 3D CT reconstruction data of healthy and pathological MEs of children are applied.

Results: The model predicted larger MEP fluctuations in $V_{ME} < 3 \text{ ml}$ than in $V_{ME} \geq 3 \text{ ml}$ considering normal ET function due to the different pressure change rate and pressure buffer effect of the MEs. Substantially larger MEP fluctuations can be expected in a $V_{ME} < 3 \text{ ml}$ with malfunctioning ET. Modeling mastoid obliteration predicts similar MEP fluctuations to a $V_{ME} \geq 3 \text{ ml}$ resulting from elimination of gas exchange surface. The 5-year follow-up study in children with persistent OME indicates lower ME growth rate as compared to healthy

children and decrease in ME volume over time in 40% of cases.

Conclusions: Results support that the ME volume, the ME surface area/volume ratio along with the duration of ET dysfunction influence the extent of ME pathological changes. These parameters can be important to consider for a pathophysiology-oriented approach to the ME surgery that may improve the long-term outcome.

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Bone conduction hearing devices in children (R734)

ID: 734.1

Tissue preserving technique for introducing bone conducting devices in children

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Learning Objectives: BHCD in children operated with tissue-preserving technique has a better outcome.

Objectives: A tissue preserving surgical technique has shown no increased inflammatory reactions after a non-skin reduction technique in adults. Objective was to evaluate in children the extent of the stability, the skin in contact with the device, numbness and clinical signs and symptoms of inflammation or infection at the site of the skin penetration.

Methods: A single-centre clinical investigation comparing the surgical technique without the skin thinning procedure with the results from earlier techniques, now using longer individualized abutments. Participants in the study were included consecutively and operated in general surgery in a day surgery setting. The Ostell instrument for registration of stability was used.

Results: Clinically there were no surface related adverse events, nor were any skin reactions noted in the test or control groups during 12 months follow up. Numbers of stability with RFA is given.

Conclusions: This human clinical trial in children, as compared to earlier techniques support and extend findings of newer surgical tissue preserving techniques, with good tissue response and no surface related adverse events.

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Bone conduction hearing devices in children (R734)

ID: 734.2

Use of bone conduction hearing devices in management of patients with congenital aural atresia and microtia- Experience in Hong Kong Chinese

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Learning Objectives: Understand the approach in using bone conduction hearing aids in children with aural atresia and microtia.

Introduction: The prevalence of external ear abnormalities is around 1 % in Chinese children in Hong Kong. Coexisting hearing loss could be of outer ear, middle ear or inner ear in origin. Management of hearing losses depends on whether it is unilateral or bilateral, the severity and type as well as the plan of management of the external ear abnormalities.

Methods: A review of the management of Chinese patients underwent bone-conduction hearing aid with co-existing outer ear deformities is made from 1995 to 2015 in a single tertiary referral centre in Hong Kong.

Results: Early cases were managed with percutaneous Baha™ until 2012. With the introduction of Bonebridge™ and Baha Attract in 2013 and 2014 respectively in our centre, there is a change of management leaning towards these transcutaneous devices. Adults or older children were managed with either Bonebridge™ or Baha™ Attract system and children were managed with Baha™ Attract.

Auricular reconstruction could be performed in the same procedure or as a separate procedure as long as a good surgical planning is made.

Two children and one adolescent (age 9, 13 and 19) with Nagata stage 1 auricular reconstruction and Baha™ Attract at same setting were described as an illustration of our technique. Adults with Bonebridge™ cum Nagata stage 1 were described in parallel for discussion.

Discussion and Conclusion: We describe the successful management of a series of congenital atretic and microtia patients with bone conduction hearing devices.

The transcutaneous system allows earlier switch on. The Baha™ Attract system is particularly suitable for some of these children with very thin skull. We see more patient/parental acceptance with transcutaneous devices after their introduction into clinical practice.

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Bone conduction hearing devices in children (R734)

ID: 734.3

Adapting the BAHA surgical technique for Children

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Learning Objectives: 1. Percutaneous and transcutaneous BAHA are both important options in children