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EES for beginners – tips and hints



Adrian James

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Abstract

Endoscopic ear surgery requires a different skill set from microscope-guided ear surgery. Most surgeons get used to working without a stereoscopic view of the middle ear using a 2D monitor, but different techniques are required to operate safely in the ear with one hand.

Teaching this technique on courses and in the operating room for more than 10 years, I have seen that some of us adjust to one-handed surgery more easily than others. For most of us the learning curve is long.

Teaching others while learning the technique ourselves can provide an additional challenge.

This talk aims to help new endoscopic ear surgeons progress more quickly up the learning curve and may give some new ideas to those already familiar with endoscopic ear surgery, including ideas that might be found useful when teaching.

Important principles for safe surgery will be emphasised and basics of instrument choice mentioned. But the main focus is to show tips to facilitate soft-tissue manipulation with one-handed surgery. Some of these may seem obvious in the lecture hall but might be found transformative if not previously tried in the operating room!

Transcanal Endoscopic Ear Anatomy and Dissection



Daniele Marchioni

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Abstract

Good knowledge of anatomy is fundamental for every surgeon. Middle ear anatomy is really complex and sometimes is challenging for otologists, who need to explore every single compartment for a radical removal of pathology. With introduction of the endoscope in middle ear surgery, anatomy of middle ear spaces has become wider and clearer due to a better magnification and to the possibility to look "behind the corner".

This article is a review of the state-of-art of endoscopic middle ear anatomy with description of every compartment, with particular attention to ventilation pathways and middle ear folds.

Lecture 2

Let's get started with TEES - Tips and Pitfalls -



Yu Matsumoto

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Japan

Abstract

In the past decade, Transcanal Endoscopic Ear Surgery (TEES) has received attention as a viable alternative to conventional microscopic surgery, offering patients several benefits, such as smaller incisions, faster recovery time, and reduced pain. TEES utilizes the external ear canal, a natural narrow bony corridor serving the endoscope, and the surgical instrument to access the middle ear. The lecture focuses on the essential knowledge and skills to help beginners to maneuver through such limited corridors. The talk covers the following: operating room set-up, reverse Trendelenburg positioning, straightening of the EAC, ear hair removal, vasoconstriction, endoscopic instruments, tympanomeatal flap elevation, effective use of cotton balls, identifying chorda tympani, use of bone curettes. Powered devices will be addressed in other lecture(s).

Lecture 3

Powered TEES - Tips and Pitfalls -



Kunio Mizutari

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National Defense Medical
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Japan

Abstract

In recent years, the use of endoscopes in otologic surgery has become common, and transcanal endoscopic ear surgery (TEES) is applicable to various middle ear diseases because it allows observation and treatment at a magnification rate higher than that of a microscope with a wider field of view, but it has been pointed out as a disadvantage that it is difficult to use a drill. To overcome this disadvantage, “powered TEES” using energy devices was established, and its application to relatively advanced cholesteatoma cases has been expanded.

The most common device used for Powered TEES is a curved bar attachment with a non-rotating shaft at the end of a standard electric drill handpiece. The non-rotating bar has many merits, such as no skin entrapment, but the biggest problem is that the bar attachment cannot be connected with an irrigation system for cleaning the drilling surface. To overcome this disadvantage, underwater endoscopic ear surgery (UWEES), which uses the endoscope cleaning system, was developed. The problems of heating the cutting surface and bone dust treatment by the curved bar were solved, and the curved bar could be used more easily.

In this seminar, I will explain the system and basic techniques necessary to perform TEES as clearly as possible for beginners.

Dos and Don'ts in Endoscopic Ear Surgery



Manuela Fina

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Neck Surgery
University of Minnesota
USA

Abstract

Do you find yourself struggling in certain steps of a challenging endoscopic ear case? You are not alone! We have all been there! Through surgical video clips and practical illustrations, we'll show you how to avoid improper handling of instruments and common mistakes that can occur during the climbing learning curve in endoscopic ear surgery. We will demonstrate correct techniques and operative steps that will help you to conduct safe surgery and to avoid surgical complications.

Personalized cholesteatoma surgery with endoscopic and exoscopic procedures



Tsukasa Ito

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Japan

Abstract

Our department has three options to select from for cholesteatoma surgery: non-powered TEES, powered TEES or a dual approach. Our selection is based on preoperative imaging of the extent of the cholesteatoma which we perform using a Color Mapped Fusion Image (CMFI). The CMFI system which we developed in-house is a color-mapped image of the signal intensity of MRI diffusion-weighted images which are fused onto an MRI cisternogram. The MRI diffusion-weighted images reveal the high signal of keratin debris associated with a cholesteatoma while the MRI cisternography reveals inner ear structures. Thus, a CMFI indicates not only the existence of a cholesteatoma but also the anatomical extension of that cholesteatoma.

Our first option, non-powered TEES is used when the cholesteatoma is restricted to the protympanum, the tympanic cavity, or the inferior portion of the attic. Non-powered TEES is performed via a transcanal atticotomy using only curettes and chisels with no powered instruments. However, our second option, powered TEES has allowed us to further expand the indications of TEES to when the cholesteatoma extends into the attic through to the antrum, by incorporating powered instruments. Powered TEES allows us to remove such a cholesteatoma by performing a transcanal atticoantrotomy using an ultrasonic aspirator and curved burr. Finally, we have developed a dual approach that is used to treat a cholesteatoma extending into the mastoid cells using both non-powered TEES and a microscopic/exoscopic canal wall up mastoidectomy.

In this seminar, I will introduce our strategy of the personalized cholesteatoma surgery based on the preoperative evaluation using CFMI that should produce optimal removal of a cholesteatoma with minimum invasiveness for each patient.

The Procedure of Tympanic Membrane Regeneration under Endoscopic Ear Surgery

- Dawn of the new era for ear surgery

Regeneration of the tympanic membrane -



Shin-ichi Kanemaru

Hearing Disturbance and
Tympanic Membrane
Regeneration Center in
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Japan

Abstract

Applying the principles of modern in situ tissue engineering, we developed a new regenerative treatment for tympanic membrane (TM) perforation using a combination of basic fibroblast growth factor (b-FGF), gelatin sponge, and fibrin glue. As a result, regenerative treatment for the tympanic membrane (TM) perforation was approved in November 2019 by the National Health Insurance in Japan.

There are numerous advantages of this regenerative treatment. Skin incisions and the harvesting of autologous tissues are not required. It is possible to regenerate normal TM morphology fully. High success/cure rates and optimal hearing improvements are possible. It can be performed within 20 minutes and is a simple, easy outpatient procedure.

Two years after the approval, the TM perforation closure rate in our KITANO hospital was 97% (224/231 ears), and favorable hearing improvement was achieved with little air-bone gap. In addition, no serious adverse events were observed.

Using endoscope, we can apply this regenerative treatment for patients with chronic otitis media, cholesteatomas, tumors localized to the TC, and narrow EAC. Through the use of this regenerative treatment, it may be possible to reduce the need for some tympanoplasty and most myringoplasty procedures in the near future.

In this session, we introduce tips and pitfalls of this regenerative treatment for the TM.

Endoscopic tympanoplasty type I: step by step procedure



Alessia Rubini

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and Neck Surgery
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Abstract

Tympanic membrane perforations are one of the most common issues in otology. Tympanoplasty type I is one of the first procedures that otologic surgeons learn during training.

The objective of the surgery is the closure of tympanic membrane perforations, with the improving the hearing threshold and closing of the air bone gap. Nowadays, the treatment should be expected to be minimally invasive, maintaining high success rates. The clear vision granted by the endoscope allowed reliable refreshing of the perforation margins and precise graft placement.

This instructional course focuses on endoscopic tympanoplasty type I and ossiculoplasty by showing the step-by-step procedure of cadaver dissection, clinical application, and literature review.

Advantages of the endoscope for middle ear anatomy and surgery teaching



Lukas Anschuetz

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Switzerland

Abstract

The endoscopic approach to the middle ear offers several advantages regarding the recognition of anatomical structures as well as the possibility to demonstrate and supervise trainees during their journey to improve both - anatomical knowledge and surgical skills. It has been demonstrated, that the enhanced endoscopic view of the middle ear as well as the possibility of the trainee to see the same screen as the operating surgeon have an impact on the quality of teaching and its efficiency.

The aim of this lecture will be to elaborate these advantages and to demonstrate its application regarding different settings.

After a short introduction of general principals regarding the acquisition of theoretical knowledge and surgical skills, the impact of the endoscopic approach on teaching will be presented. Several groups of participants of different degree of education and experience (medical students, residents, members of staff) were investigated and the results of these different studies will be presented and discussed. Thereafter, the evidence and personal experience using eye-tracking in the investigation of surgical proficiency will be presented. Several studies on this topic, which were performed during the last years are summarized and translated into clinically relevant conclusions.

Panel Discussion



Tips for case selection in your first EES



Jose Carlos Casquerio

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Ochoa
Spain

Abstract

I will discuss what cases should be the best to choose for beginners. Size selection, endoscope selection. Techniques and grafts. What cases should be avoided. Just a small talk about the matter.

Pediatric Chronic Otitis Media with and without Cholesteatoma



Maurizio Levorato

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Abstract

Pediatric patients are especially prone to acute otitis media because of the immaturity of the Eustachian tube function and immunological system and, frequently, other associated clinical conditions such as adenoid hypertrophy and rhinitis. This can lead to Chronic Otitis Media (COM), especially when not properly treated during childhood. We have different types of COM and the one that we'll talk about are: COM with and without Cholesteatoma (Adhesive COM). In tertiary referral hospitals we are in contact with patients affected by other immunological deficiencies, congenital malformations and chronic conditions than can facilitate COM. Moreover, in the case of acquired cholesteatoma, they frequently present with a more aggressive behavior than adults.

The challenges in pediatric COM are: 1) the use of the less invasive approach with the most effective outcome 2) preserve hearing 3) good functional and anatomical reconstruction that permit easy check of recidivism/recurrence and dry ear.

Endoscopic Ear Surgery (alone or combined with Microscopic traditional approach), is a powerful instrument that has changed, in the last decades, the approach and the evolution of COM in children and we will present and discuss clinical cases and surgical videos.

Chronic otitis media with and without cholesteatoma: Reconstruction using the cartilage palisade technique



Francesc Larrosa Diaz

Hospital Clinic de Barcelona,
Servei Otolaryngology
Spain

Abstract

The cartilage palisade tympanoplasty is an excellent technique for high risk perforations: retractions and active perforations. The cartilage is resistant, and its rigidity facilitates placement of pieces as a one-handed maneuver using the endoscope. In addition, graft take rates are higher. The technique involves the placement of full thickness pieces of cartilage side by side and often overlapping, in an underlay position below the tympanic membrane remnant and bony rim until the defect is completely closed. This generally requires a 10-12 mm diameter graft (3-6 pieces of cartilage) harvested from the triangular fossa. The thinner perichondrium of the cartilage is left attached. After repositioning of the tympanomeatal flap, the grafts can be rearranged to correct any residual gap between grafts and perforation edge.

This technique can be combined with ossiculoplasty. To perform an endoscopic ossicular reconstruction it is suggested to simplify methods, in addition prosthesis should be easy to handle, self adjusting or easy to adjust. The TORP keeps it simple, preserves anatomy and avoids trauma to the ossicular chain. If there is a fracture of stapes crus or a weakness of the suprastructure is suspected, then PORP or incus interposition might not work so well in terms of hearing results.

No major pitfalls while uncovering fine details of congenital ossicular chain anomalies with EES



Kishiko Sunami

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Osaka City University
Graduate School of medicine
Japan

Abstract

Unlike some of the known procedures for cholesteatoma treatment where conversion from EES to MES might be desirable, EES might be almost always the preferred method for cases treating congenital ossicular chain anomalies. No major pitfalls were identified in 12 cases treated in Osaka Metropolitan University Hospital between the years 2017 and 2022. Here we present three cases where EES was particularly advantageous in identifying and treating fine structures as well as avoiding surgical complications.

The first case was with Malleus Bar, missing long process of incus, malformation of the superstructure of stapes, and abnormally bifurcated facial nerve attached to the malleus. EES was effective in preserving the chorda tympani nerve running through the Malleus bar and facial nerve. For the second case, we found missing superstructure of stapes and dysplasia of the oval window. Although the footplate of the stapes was tiny, the mobility was good and hearing improved after tympanoplasty type 4. The third case was for a patient with Pendred syndrome with an erosion-like defect on the long process of incus and a depressed superstructure of stapes. To avoid the gusher, we did no stapes surgery but tympanoplasty type4iI. We avoided drilling to keep its shock from potentially damaging sensorineural hearing.

New Developments in Otologic Endoscopy -Measurement of ossicular mobility and local injection of inner ear using endoscope-



Sho Kanzaki

National Institute of Sensory
Organ, National Hospital
Organization of Tokyo
Medical Center
Japan

Abstract

I will talk about two topics as below.

(1) Ossicular mobility measurement device for otoscopic surgical monitoring

Ossicular mobility is estimated by palpating the ossicles during otologic surgery, but since this technique is subjective and non-quantitative, we are developing a device that enables quantification.

We also have measured the load placed on the ossicles when palpating them.

(2) Transtympanic injection for sensorineural hearing loss using endoscope

We will discuss the clinical implication of transtympanic injection into the inner ear using the endoscope that allows visualization of the RWM.