Learning Objectives:

- Review the indications for endoscopic middle ear surgery.
- Compare the short-term outcomes of endoscopic with conventional middle ear surgery.
- Discuss the application of endoscopic techniques within the UK patient population.

Introduction: Totally Endoscopic Ear Surgery (TEES) and Endoscopic Assisted Microsurgery (EAMS) is still a new concept. Endoscopic techniques for the treatment of pathological conditions of the middle ear have been gradually introduced since 1990. However, relatively few centres in the UK are performing them. Advantages over standard techniques include better visualisation of difficult to reach areas, such as the sinus tympani, and limited external incisions[1,2].

Here we report our short-term outcomes for endoscopic middle ear surgery.

Methods: We performed a prospective review of the first 97 consecutive patients undergoing TEES or EAMS in Monklands District General Hospital undertaken by one operator. Outcomes assessed were: tympanic membrane healing, audiological data and complications.

Results: 23 patients underwent EAMS while 74 had TEES. Operations performed included: cholesteatoma surgery, stapedectomy and myringoplasty. We had no reported cases of dead ear or permanent facial nerve palsy. Average air-bone gap following stapedectomy was 6.49 dB. The tympanic membrane healing rate was 87%.

Conclusion: Our results confirm that endoscopic middle ear surgery is safe with short-term outcomes that are comparable with conventional surgery. We feel that it offers and exciting way of improving the management of middle ear pathology through improved access and visualisation. This in turn has implications for teaching and training.

References

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Free Papers (F862)

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Endoscopic Stapes Surgery: Our Experience

Presenting Author: **Rhona Sproat**

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Learning Objectives: To report our experience with the use of endoscopes in stapes surgery in terms of complication rates and hearing outcomes.

Introduction: Endoscopic ear surgery is a rapidly developing area in otology. The endoscope can provide a unique view of middle ear anatomy and is being utilised to facilitate ever more surgical procedures. We aim to report our experience with use of the endoscope in stapedectomy.

Methods: Data was collected prospectively for all stapectomy operations carried out in NHS Lanarkshire by a single surgeon from August 2009 to December 2015, using the Common Otology Audit, a UK wide data collection tool. Outcome measures were pure tone audiometry pre- and post-operatively at 0 and 3 months; and complication rates at 3 month follow up.

Results: 83 operations were carried out for otosclerosis with stapes fixation during this time period. 78 of these were primary operations, and 5 were revision procedures. 27 of these were carried out endoscopically or endoscopic-assisted, and 56 were performed using an operating microscope. Average total pre-operative air-bone gap was 29 dBHL; 28 dBHL for endoscopic operations; and 29 dBHL for open operations. 70 patients were followed up in clinic at 3 months. Two were lost to follow-up from the endoscopic group and 11 from the open group. Average post-operative air-bone gap was 7.9 dBHL in the open group and 7.6 dBHL in the endoscopic group. 84% of patients achieved reduction in air-bone gap to less than 10dBHL in the open group and 88% in the endsocopic group. 100% of both groups achieved less than 20 dBHL. No patients had a facial nerve palsy, vertigo or complained of taste dysfunction. One patient complained of tinnitus at 3 months from the endoscopic ear surgery group.

Conclusions: Our results demonstrate that the endoscopic approach to ear surgery has comparable outcomes to microscopic approaches, both in respect to our own unit, and to published literature, in terms of hearing gain and complication rates. Our experience suggests that endoscopic approach to ear surgery is safe and effective.

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Free Papers (F862)

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Surgery for cholesteatoma of the facial recess and sinus tympani: retrotympanotomy from anterior, mobilizing and using chorda tympani for guidance - Farrior's principle rediscovered and modified

Presenting Author: **James Loock**

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University of Stellenbosch

Learning Objectives: To describe an operation to access the retrotympanum using the operating microscope and removing bone over the facial recess and sinus tympani safely by mobilizing and utilizing the chorda tympani as an indicator of the position of the facial nerve.

Introduction: The retrotympanum (facial recess and sinus tympani) is involved in a high percentage (48%) of cases of cholesteatoma. This subsite of the mesotympanum presents particular challenges in terms of access for removal of disease. Approaches suggested have included posterior tympanotomy (Janssen) and endoscopic transcanal (Tarabichi).

Method: The operation is described in detail using photography, diagrams and video material. The surgical principles are to use:

- visualization of the facial nerve at the 2nd genu.
- skeletonization and mobilization of chorda in its course through the bone down towards its branching off facial nerve above the stylomastoid foramen.
- the principle that chorda is always superficial and anterior to facial nerve.
- that if bone is removal only superficial and anterior to chorda, the facial nerve cannot be injured.

We report the use of this technique in a series of 247 cholesteatomas involving the facial recess and sinus tympani. A literature search shows that Farrior (1968) described some aspects of this approach.

Results: This surgical approach provides adequate access to this difficult anatomic area for cholesteatoma visualization and removal – far better than posterior tympanotomy. It provides binocular vision and the possibility of using both hands, unlike the endoscopic approach. In our series, adequate access was provided in 99% of cases – in only 2 cases was there any doubt about complete removal of the invasive sac. In no case was there injury to the facial nerve.

Conclusion: Retrotympanotomy from anterior, mobilizing and using chorda tympani for guidance, is a safe and reliable way of removing cholesteatoma from the facial recess and sinus tympani.

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Free Papers (F862)

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Can we reduce rates of residual cholesteatoma by improving the clarity of the operative field? A multivariate analysis

Presenting Author: **Gavin le Nobel**

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Learning Objectives: 1) to demonstrate the influence of impaired surgical field clarity due to intraoperative bleeding on development of residual cholesteatoma. 2) To emphasize the importance of implementing methods to minimize surgical site bleeding, such as hypotensive general anesthesia.

Introduction: Sites within the middle ear and mastoid with limited visualization are more frequently implicated in residual cholesteatoma. We hypothesize that other factors leading to compromised surgical field visualisation may similarly affect rates of residual cholesteatoma. The objective of this study was to evaluate whether impairment of surgical site visualisation from intra-operative bleeding contributes to the risk of residual cholesteatoma.

Methods: Data were collected prospectively on a consecutive series of children having intact canal wall surgery for cholesteatoma at an academic pediatric hospital. Clarity of surgical field was assessed intra-operatively on a six-point rating scale and categorized as minimally compromised (grades 0-I) or significantly compromised (grades II-V). Presence of residual cholesteatoma was assessed at follow up clinical encounters, second stage procedures, and with MRI.

Results: Surgery was completed on 224 ears, during which 82 (37%) had minimal visual field compromise from bleeding. Residual cholesteatoma was identified in 38 (17%) of ears, with only 8 (9.8%) in cases with minimal bleeding at first surgery, and 30 (21%) in cases with significant bleeding. Predictors of residual disease on univariate regression analysis included severity of bleeding ($p = 0.029$), extent of cholesteatoma ($p < 0.001$), years of surgeon's experience ($p = 0.0045$). Age and type of cholesteatoma were not found to be significant. Multivariate regression analysis demonstrated that the most robust predictor was extent of cholesteatoma ($p < 0.001$).

Conclusions: Impairment of surgical field visualization from intraoperative bleeding is one factor that contributes to the presence of residual cholesteatoma. These findings support the use of techniques, such as hypotensive general anesthesia, that minimize surgical site bleeding and improve surgical field visualization.

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Free Papers (F862)

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Over a hundred endoscopic ear surgery cases; surgical outcomes of a starting practice

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Learning Objectives:

- Basic principles of endoscopic ear surgery.
- Surgical results from a starting endoscopic ear surgery practice including cholesteatoma and tympanoplasty.

Introduction: Endoscopic ear surgery offers an unparalleled view of the middle ear thanks to the wide-angle field of view and is increasingly gaining popularity amongst ENT-surgeons worldwide. However, the transition from operating with the microscope to the endoscope is challenging,