SHORT COMMUNICATION

Sometimes less is more: experience with endoscopic myringoplasty

Mubeen Ali, Imran Mohib Khan, Azam Khan

Abstract

A retrospective review of the outcomes of patients who underwent endoscopic myringoplasties in our institution was conducted. The aim was to highlight our results with this procedure. The database of patient records was manually checked, and the patients who had undergone Endoscopic Myringoplasties were identified, and their demographics, admitting notes, operating notes, and discharge summaries were reviewed. Graft failure was considered if the patient had a perforation in the graft during the outpatient follow-up. The information was compiled, and basic statistics were derived. A total of 31 patients were identified who had undergone Endoscopic Myringoplasty. Patients' age ranged from 14-52 years. None of the patients developed any immediate post-operative complications. Follow-up otoscopic examination showed 28 patients with an intact graft and only one patient with graft failure. Two patients were lost to follow up. Our success rate with Endoscopic Myringoplasty is 96.6%, which is comparable to the international standard success rate of 80-95%. The results of this study encourage adopting an endoscopic approach where the expertise is available.

Keywords: Endoscopy, Myringoplasty, Tympanoplasty.

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Introduction

Surgical management has been a cornerstone for the management of multiple ear conditions, especially for chronic otitis media (COM), perhaps one of the most common middle ear conditions. The development of the first binocular otologic microscope by Carl Zeiss, in 1953, was a major milestone in shaping ear surgery into its modern microscopic technique.[1,2] Although the microscope achieved wonderful results, a new option for visualisation is emerging.

In the 1960s, the Hopkins rod endoscope was introduced. The first literature available regarding the use of this tool for ear surgery is in 1967, when Mer and his colleagues began to visualise the middle ear cavity in cadavers through an iatrogenic myringotomy or a pre-existing perforation.[3] In 1982, Nomura published a paper highlighting the use of photography of the middle ear cavity through a myringotomy (especially pre-existing).[4] Since then, more and more surgeons have attempted to use the endoscope to both visualise the middle ear and to perform parts of their surgery with it.[5] This marked the beginning of endoscopic ear surgery.

The main advantage of performing endoscopic myringoplasty can be seen in removing cholesteatoma, as better visualisation offered by endoscope means less chances of residual disease.[6]

Many countries have begun to highlight their success with the endoscope. However, only a few such papers were available from our part of the world; therefore, the results with endoscopic myringoplasty are being presented here with the hope to encourage the use of endoscopy.

Patients/Methods and Results

A retrospective review of patients who underwent Endoscopic Myringoplasty from December 17, 2019 to January 24, 2022, at Northwest General Hospital & Research Centre, Peshawar, was conducted. The database of patients' records was manually checked, and all patients whose procedure was labelled as Endoscopic Myringoplasty were identified.

All the patients had undergone Myringoplasty with the help of 0-degree endoscope. After administration of anaesthesia, the surgeon first visualised the margins (Figure 1) and checked for any residual disease. After

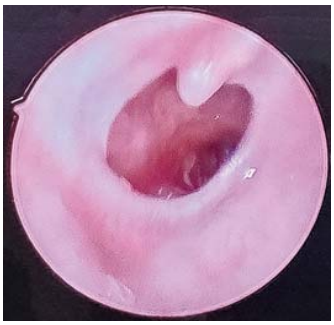

Figure-1: Endoscopic visualisation of tympanic membrane. A central subtotal perforation can be appreciated in this image.

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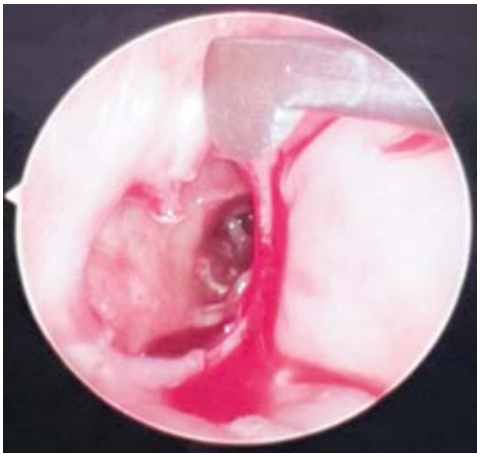

Figure-2: The perforation margins have been refreshed and local infiltration has been done. A sickle knife is being used to help cut and remove the membrane for better graft placement.

Figure-3: The tympanomeatal flap has been lifted. The middle ear can be properly visualized.

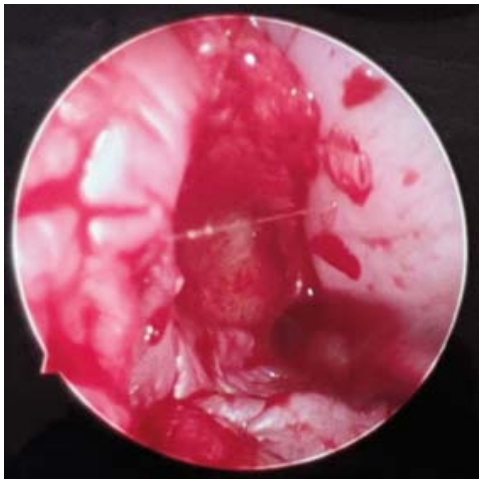

Figure-3: The tympanomeatal flap has been lifted. The middle ear can be properly visualized.

refreshing the margins with a curved needle, local infiltration was done before using a sickle knife to help form a tympanomeatal flap. (Figure 2). Once the tympanomeatal flap had been lifted (Figure 3), the graft was harvested. As per our preference, all the patients had tragal cartilage placed as the graft. Once the graft was placed (Figure 4), the flap was put back in place.

It was ensured that all patients were followed-up in the outpatient department. The identified patients were contacted via telephone and the following inquiries were made:

- On follow-up, was any perforation seen in the ear that underwent myringoplasty?
- Do they currently have any complaints in their operated ear?
- Were they satisfied with the procedure?

If, despite multiple attempts, a patient could not be contacted, they were considered "lost to follow-up".

The operating definitions were set as follows:

Successful Graft uptake: If the graft was seen to be healthy during the OPD visit.

Graft failure: If a perforation was observed in the graft with no other notable inciting events (e.g. trauma).

The information was compiled manually on Microsoft Excel version 2108, and basic analysis was done using SPSS version 24. Ethical approval was obtained from the institutional review board of Northwest General Hospital (Reference number: IRB&EC-AHL-1982-2022).

The basic demographics can be seen in Table 1. Most of

Table-1: Basic demographics of patient population

Demographic	Number (%)
Total number of patients	31
Mean Age ± S.D	Mean: 27 ± 9.9 years Range: 13-52 years
Sex	Male: 15 (48.4%) Female: 16 (51.6%)
Ear operated on	Left: 16 (51.6%) Right: 15 (48.4%)
Primary vs Revision	Primary: 29 (93.5%) Revision: 2 (6.5%)
Diagnosis	COM with inactive mucosal disease: 17 (54.8%) Perforation: 13 (41.9%) COM with active mucosal disease: 1 (3.2%)
Graft placement technique	Under-lay: 31 (100%)
Graft type used	Tragal: 31 (100%)

COM: Chronic Otitis Media

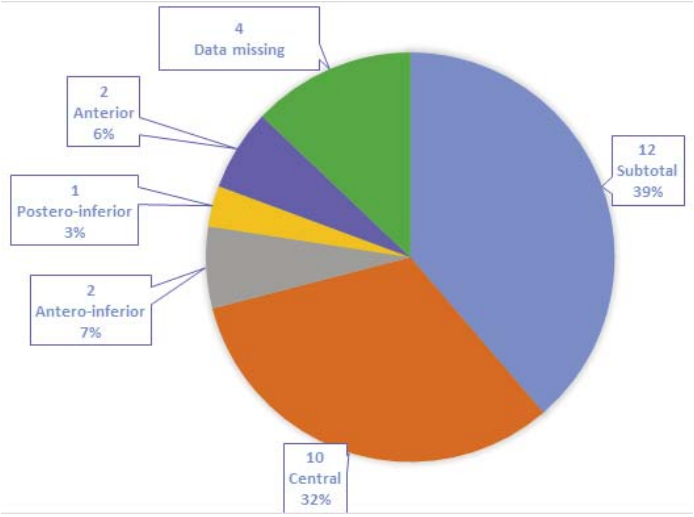

Figure-5: Information regarding details of perforation.

the patients were adults, with almost equal representation from each gender. The most common diagnosis was chronic otitis media (COM) with mucosal disease; one of the patients had active mucosal disease at the time of surgery. The remaining patients simply had perforations. Details pertaining to the perforations can be seen in Figure 5.

Of these 31 patients, two patients were considered lost to follow-up (follow through rate of 93.5%). Of the remaining 29 patients, only one patient met our definition of Graft Failure. Regarding current symptoms, two patients complained of discharge from their ear. One of the patients with discharge had Graft failure, and the other had history of trauma to the ear operated on recently, after which he had developed this discharge.

The satisfaction rate with the procedure was 26 (89.7%) out of 29 patients. Aside from the patient who experienced graft failure, the other two patients not satisfied commented that they wished their hearing had improved significantly post procedure. As no audiograms were available for comparison, no objective comparison could be made.

All the patients interviewed had reported that they had followed-up three to six months post procedure, with no changes reported.

The success rate was recorded at 96.6% in this study. The success rates reported in other studies is shown in Table 2. It is noted that the current study's success rate is comparable to the rest of the studies.

There are many reasons for the high success rate seen with endoscopic myringoplasty. Due to the nature of the

Table-2: Reported success rates for endoscopic myringoplasty.

Study	Year of publication	Country of Study	Success rate % (number)
Garcia et al[13].	2016	Brazil	86.4% (19/22)
Tseng et al[10].	2017	Taiwan	75% initially* 95% later (Total 221 patients)
Choi et al[14].	2017	Korea	100% (25/25)
Jain et al[11].	2018	India	92.31% (24/26)
Maran et al[8].	2019	India	90% (27/30)
Daneshi et al[15].	2020	Iran	97.3% (73/75)
Lou et al[16].	2021	China	100% (39/39)** 95.1% (39/41)

* This paper had followed the success rates overtime to assess the improvement as surgeons became more familiar with the procedure

** This paper had divided its patient population into two groups (one for tragal cartilage graft, one for temporalis muscle fascia graft), both underwent endoscopic myringoplasty.

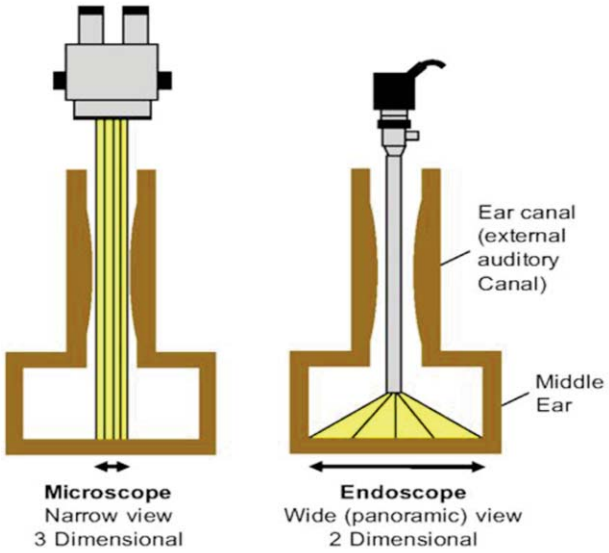

Figure-6: The difference between light in middle ear surgery during microscopy vs endoscopy. Image taken from: https://www.entcolumbia.org/our-services/otology-neurotology/endoscopic-ear-surgery

endoscope, as previously mentioned, it is possible to visualise the middle ear structures better. This is illustrated in Figure 6.[7] There is an ability to see structures from multiple angles using an endoscope, which is limited to a single plane with the microscope. With the recent advances in fibre optics and screens, high resolution images, that are also useful for academics, can be produced.[8]

In experienced hands, the duration of surgery can be reduced. In the study by Tseng in 2017, all procedures after the 150th were performed consistently in under 60 minutes.[9,10] In another study by Maran, the procedure time was seen to be faster endoscopically (65.5 vs 85.7 minutes).[8] Decreased operative time means decreased

anaesthesia time for the patient and can lead to faster recovery time as well.[8,9,11]

The main disadvantage of this approach depends on how different it is from the microscopic approach. A one-handed surgical technique is necessary as one hand will always be occupied in holding the endoscope, which leads to an initial learning curve. The study by Tseng displays a remarkable improvement over time (both with the success rate shooting up from 75% to 95% rapidly and the operative time reducing).[10]

There are some other possible limitations of the endoscopic approach, including potential thermal damage due to the light source and visualisation being limited if excessive bleeding occurs, although no evidence has been noted of these being significant problems.[12]

The main strength of our study is that it is one of the first of its kind in our part of the world, looking into the results achieved with an endoscopic approach to myringoplasty. The results are very encouraging. The study lays the foundation for future studies, where the results are compared to microscopic myringoplasties, as well as other aspects in our set up (including operating time and analgesic requirement).

The main limitation of our study is the small sample size. Collaborating with other institutes or recruiting more patients over a larger timeline could address this. The retrospective nature and the need for conducting telephonic interviews regarding past events opens the study to recall bias. Information was cross checked with the primary consultant to minimise this effect. The ethical clearance was obtained retroactively; however, the methodology and manuscript has been reviewed by our institution.

Conclusion

Our success rate with Endoscopic Myringoplasty is 96.6%, which is comparable to the international standard success rate of 80-95%. The results encourage adopting an endoscopic approach where expertise is available. More use of this technique can increase the sample size to help directly compare the outcomes to the microscopic approach.

Disclaimer: The results of this study have been presented at the 30th National Conference of Otolaryngology Head and Neck Surgery, Peshawar.
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Authors' Contributions
MA: Data collection, analysis, manuscript writing, review, final approval.
IMK: Supervision, designing study, manuscript writing, review, final approval.
AK: Data collection, manuscript review, final approval.