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**Original Research Article**

# Transcanal endoscopic myringoplasty: a retrospective study

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## ABSTRACT

**Background:** Transcanal myringoplasty has the advantages of demanding lower operative time and minimal external incisions. It can be performed using the microscopic or endoscopic approach.
**Methods:** This retrospective study was conducted in the Department of ENT and Head and Neck Surgery, SMGS Hospital, Jammu from January 2018 to January 2020. Patients attending ENT OPD with central dry perforation of tympanic membrane were selected for endoscopic transcanal myringoplasty. Written and Informed consent were taken. During surgery, various parameters were noted including duration of surgery and hospitalization. These patients were followed through a period of 6 months and assessed using pure tone audiometry and graft uptake was seen.
**Results:** Out of 40 patients, male: female ratio was 1.2:1. Time taken for surgery was less than 60 minutes in 16 (40%) patients whereas in 24 (60%) patients it was between 60-120 minutes. In our study the patients with small perforation had excellent graft uptake rates (18/19 patients, 94.73%), whereas patients with medium sized perforation showed graft uptake rate of 76.47% (13/17 patients). Objective analysis of cosmetic result was done at the end of six month and revealed that none of the patient had visible scar. Mean pre-operative air bone gap was 24.38 dB whereas mean postoperative air bone gap was 8.34 dB. Mean improvement comes out to be 16.04 dB.
**Conclusions:** Endoscopic myringoplasty was found to be equally effective, less morbid and very cost effective in small central perforations.

**Keywords:** Endoscopic, Myringoplasty, Transcanal

## INTRODUCTION

The introduction of the operating microscope has significantly enhanced the outcome of myringoplasty by improving the accuracy of the technique. The operating microscope provides a magnified image in a straight line, hence the surgeon cannot visualize the deep recesses of the middle ear in a single operating field.[1] In the beginning, the microscopic tympanoplasty was a permeatal overlay; however presently, the post-aural underlay technique has become more popular as the permeatal approach has its limitations. These limitations are addressed of in endoscopic permeatal myringoplasty.[2]

Transcanal myringoplasty has advantages: it demands lower operative time and minimal external incision.[3] The transcanal procedure depends on a wide external auditory canal (EAC) and on a favorable angle for proper observation of all borders of the tympanic perforation.[4]

## METHODS

This retrospective study was conducted in the Department of ENT and Head and Neck Surgery, SMGS Hospital, Jammu from January 2018 to January 2020. Patients attending ENT OPD with central dry perforation of tympanic membrane were selected for endoscopic transcanal myringoplasty using a random number

method. Written and informed consent were taken from all the patients for all patients tuning fork tests was done with 256 Hz, 512 Hz and 1024 Hz tuning forks. Pre-operative pure tone audiometry was done and recorded. During surgery, various parameters were noted including duration of surgery and hospitalization. These patients were followed through a period of 6 months and assessed using pure tone audiometry. After selection of patient tympanic membrane status was assessed, patient was admitted a day before surgery and a detail history was recorded and the clinical evaluation of ear, nose and throat was done. Written consent taken. Puretone audiometry, X-ray mastoid and routine blood investigation done.

### *Inclusion criteria*

Inclusion criteria were adult patients who were medically fit for surgery, all the patients of safe type CSOM having dry central perforation of tympanic membrane with intact and mobile ossicular chain.

### *Exclusion criteria*

Exclusion criteria were patients with marginal and attic perforation, cholesteatoma, granulation or flakes, wet central perforation, revision myringoplasty, ossicular chain discontinuity, patients not willing for the surgery.

### *Endoscopic myringoplasty*

Supine position given to patient with head tilted 120 degree to opposite site of operating ear, cleaning, painting and draping done. Transcanal approaches used endoscopes measuring 4.0 mm with both 0- and 30-degree angles connected to a camera connector, light source and high definition monitor.

Lidocaine 2% and 1:100,000 epinephrine was infiltrated in the facial side of the tragal cartilage followed by a 1.5 cm skin incision over the dome of the tragal cartilage with a no. 15 scalpel blade. The incision was extended through the skin and cartilage with the perichondrium. The subcutaneous tissue was dissected laterally from the perichondrium and the cartilage was retracted superiorly with forceps and incised using Metzenbaum blunt scissors. A vertical incision was made with a scalpel into the inferior part of the tragus to completely mobilize the tragal graft. The harvested graft was placed in a sterile water-filled medicine cup.

Using standard micro-otologic ear surgical instruments freshening of margins of perforation done. Incision taken over posterior canal wall in 12 and 6 o' clock position and tympanomeatal flap elevated. Placement of graft under freshened margin of perforation around 360 degree done and tympanomeatal flap deposited and secured with gel foam packing. Patient discharge the following day. Follow up taken at the end of 1st week then 1st, 3rd and 6th months and post-operative audiometry done after 3rd and 6th months. The patients were studied for the following parameters-visualization of tympanic membrane and middle ear structures, operability of endoscopic approach, graft acceptance at 6 months - healed tympanic membrane, graft failure, post-operative hearing assessment at 6 months. Post-operative air bone gap was considered as the objective method to assess the improvement in hearing threshold, time taken for surgery, duration of hospitalization, cosmetic results at 6 months. Post-operative complications were looked for and treated.

### *Statistical analysis*

Data was analysed with a statistical software program (SPSS statistics for windows version 20, Chicago, IL). All p values were calculated with one tail. P values below 0.05 were considered significant.

## RESULTS

Forty patients were included in the study after getting written informed consent.

### *Age and sex distribution of patients*

Out of 40 patients included in our study, 22 were male patients and 18 were females. The male: female ratio was 1.2: 1 (Figure 1).

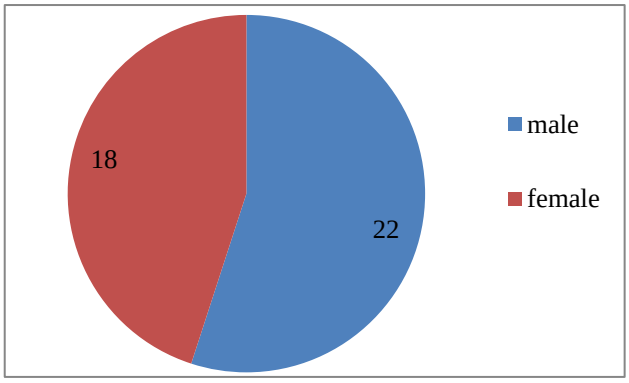


**Figure 1: Gender wise distribution of patients.**

### *Duration of surgery*

Out of 40 patients the time taken for surgery was less than 60 minutes in 16 (40%) patients whereas in 24 (60%) patients it was between 60-120 minutes.

### *Size of perforation and graft uptake rates*

In our study the patients with small perforation had excellent graft uptake rates (18/19 patients, 94.73%), whereas patients with medium sized perforation showed graft uptake rate of 76.47% (13/17 patients). The graft uptake rate was 50% in patients with large central perforation (2/4 patients). Cases with successful healing after six months of follow up, out of 40 patients, 34 patients showed healed tympanic membrane 85%.

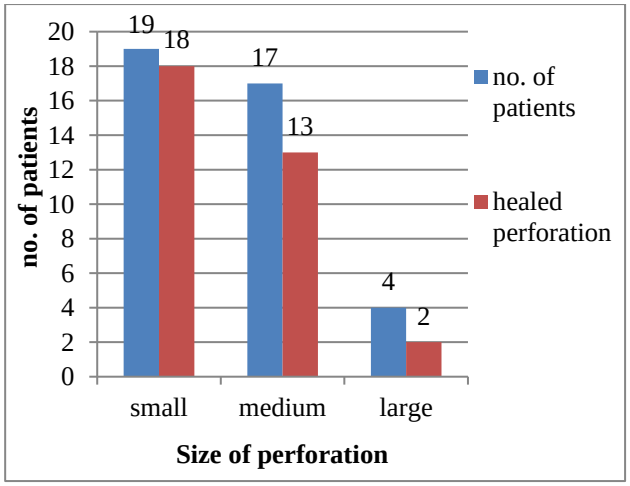


**Figure 2: Distribution of patients according to size of perforation and graft uptake rates.**

Subjective cosmetic result was recorded at the end of six month. All 50 (100%) patients in the study group rated their cosmetic result are excellent. Objective analysis of cosmetic result was done at the end of six month and revealed that none of the patient had visible scar.

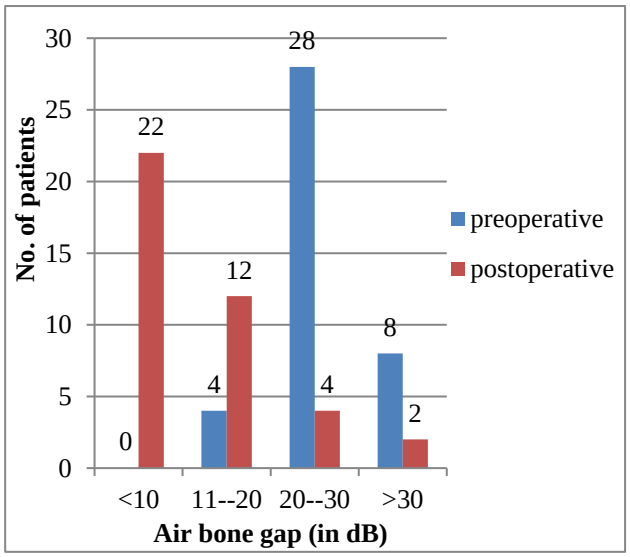


**Figure 3: Distribution of patients according to pre-operative and post-operative air bone gap.**

***Comparison between preoperative and postoperative air bone gap***

In our study of 40 patients, none of the patients had preoperative AB gap of less than 10dB whereas 22 (55%) patients had post-operative AB gap of less than 10 dB. 28 (70%) had preoperative air bone gap of 20-30 dB whereas only 4 (10%) patients had air bone gap of 20-30 dB. Mean preoperative air bone gap was 24.38 dB whereas mean postoperative air bone gap was 8.34 dB. Mean improvement comes out to be 16.04 dB, standard deviation was calculated to be 7.35 and its p value came out to be less than 0.0001 using paired t test. It was significant.

## DISCUSSION

Myringoplasty is one of the most common forms of surgery in otology. It yields very satisfying results for both to the patient and the surgeon. The results are usually expressed in terms of the take-up rate of the graft and hearing improvement, which is assessed subjectively as well as objectively. Out of 40 patients included in our study, 22 were male patients and 18 were females. The male: female ratio was 1.2:1. Out of 40 patients the time taken for surgery was less than 60 minutes in 16 (40%) patients whereas in 24 (60%) patients it was between 60-120 minutes. In a study by Harugop et al the mean operative time was 62.85 minutes among 34 patients who underwent endoscopic tympanoplasty.[5] In a study by Raj et al the mean operative time of endoscopic approach was 50.4 minutes.[6]

In our study the patients with small perforation had excellent graft uptake rates (18/19 patients, 94.73%), whereas patients with medium sized perforation showed graft uptake rate of 76.47% (13/17 patients). The graft uptake rate was 50% in patients with large central perforation (2/4 patients). Cases with successful healing after six months of follow up, out of 40 patients, 34 patients showed healed tympanic membrane 85%. The published rates of endoscope-assisted myringoplasty range between 80 and 91.7% Yadav et al, El-Guindy and Apaches et al.[7-9]

In our study of 40 patients, none of the patients had preoperative AB gap of less than 10 dB whereas 22 (55%) patients had postoperative AB gap of less than 10 dB. 28 (70%) had preoperative air bone gap of 20-30 dB whereas only 4 (10%) patients had air bone gap of 20-3dB. Mean preoperative air bone gap was 24.38 dB whereas mean postoperative air bone gap was 8.34 dB. Mean improvement comes out to be 16.04 dB, standard deviation was calculated to be 7.35 and its p value came out to be less than 0.0001 using paired t test. Its significant. Similar observations were made by studies done by Ayache et al and Karkuheto et al.[9,10] Subjective cosmetic result at the end of six month, all 50 (100%) patients in the study group rated their cosmetic result are excellent. Objective analysis of cosmetic result was done at the end of six month and revealed that none of the patient had visible scar.

## CONCLUSION

According to present study endoscopic approach is less invasive and has best cosmetic results, minimal damage to healthy structures so minimize post-operative complications. It has good access to visualize middle ear spaces or structures, safe and feasible procedure, with good success rate for tympanic membrane perforation closure and recovery of hearing thresholds.

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*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

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