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Original Research Article

A retrospective study comparing post-aural versus endaural approach for myringoplasty in cases of chronic otitis media

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ABSTRACT

Background: Patients diagnosed with chronic otitis media mucosal disease with a mild degree of conductive hearing loss require myringoplasty as their treatment. Various approaches to myringoplasty are defined. The aim of the present study was to compare outcomes of the post-aural versus end aural approach for myringoplasty.
Methods: A retrospective cohort study of 26 patients operated over a period of one year at tertiary otorhinolaryngology center.
Results: Distribution of approaches among post-aural and end aural was 11 and 15 patients respectively. Otorrhea was the presenting complaint in 65% (n=17) of patients. Preoperative mean pure-tone average (PTA) of all patients was 34.8 dBHL (range 28 to 40 dBHL) while postoperatively 3 months mean PTA was 21.63 and 25.13 dBHL for patients undergoing end aural and post-aural approaches respectively (p=0.008). The success rate in terms of no re-perforation was 76.9% overall, 81.81% for the end aural approach and 73.33% for the post-aural approach with no statistically significant difference (p=0.612). Disease-free survival, as calculated with Kaplan-Meier analysis, was 9.7 and 13.9 months respectively (p=0.807). Cosmetic outcome was analyzed using the scar cosmesis assessment and rating (SCAR) scale. Mean SCAR scale score in our series was 5.36 and 6.20 for patients with end aural and post-aural approaches respectively with no statistically significant difference.
Conclusions: Both approaches, end aural and post-aural, are good approaches for the purpose of myringoplasty with no statistically significant difference between the two in terms of re-perforation rates or cosmetic outcomes. However, based on our study, the end aural approach has better hearing outcomes in terms of hearing improvement.

Keywords: End aural, Post-aural, Chronic otitis media, Myringoplasty

INTRODUCTION

In an otorhinolaryngology outpatient department, chronic suppurative otitis media (CSOM) is one of the most common aetiologies reported.[1] Patients might present with recurrent otorrhea and a degree of hearing loss.[2] If there is no sensorineural hearing loss with only a mild degree of conductive hearing loss on pure tone audiometry accompanying a central perforation, then the treatment includes myringoplasty.[3] It is defined as a surgery in which reconstruction is limited to repair of the tympanic membrane only.[4] However, various approaches to myringoplasty are defined which include post-aural, end aural and per-meatal-approaches. The aim of this study was to compare the outcomes of the post aural versus the end aural approach.

METHODS

This retrospective study was done on a prospectively collected data of patients who were treated at our tertiary care institution, Military Hospital Ahmedabad, over a

period of 1 year between 1st January 2016 to 31st December 2016. The inclusion criteria included a diagnosis of chronic otitis media mucosal disease, central perforation, no or mild degree of hearing impairment on pure tone audiometry pre-operatively and those who underwent myringoplasty using a post-aural or end aural approach during this period. Exclusion criteria consisted of all patients in whom additional bony surgical procedures were done (for example cortical mastoidectomy), who had a pre-operative moderate or higher degree of hearing loss and those with age less than 18 years at the time of surgery.

A total of 26 patients were eligible as per the inclusion and exclusion criteria and were included in the study. All reports and records of the patients were obtained and reviewed from hospital and patient medical records. All patients underwent evaluation at 3 months postoperatively for hearing assessment with pure tone audiometry (four-tone average) and surgical scar assessment with a validated scar cosmesis assessment and rating (SCAR) scale Table 1.[5] The patients have been under follow up for a period varying from 3 months to 2 years with an average of 6 months. Demographic and clinical presentation data were recorded and analyzed by IBM SPSS version 20.0.

Table 1: SCAR scale.

Clinician items		
Scar spread	0	None to near-invisible
	1	Pencil-thin line
	2	Mild spread, noticeable on close inspection
	3	Moderate spread, obvious scarring
	4	Severe spread
Erythema	0	None
	1	Light pink, some telangiectasias may be present
	2	Red, many telangiectasias may be present
	3	Deep red or purple
Dyspigmentation (includes hyperpigmentation and hypopigmentation)	0	Absent
	1	Present
Track marks or suture marks	0	Absent
	1	Present
Hypertrophy or atrophy	0	None
	1	Mild: palpable, barely visible hypertrophy or atrophy
	2	Moderate: clearly visible hypertrophy or atrophy
	3	Severe: marked hypertrophy or atrophy or keloid formation
Overall impression	0	Desirable scar
	1	Undesirable scar
Patient items		
Have you been bothered by any itch from the scar in the past 24 hours?		0: No, 1: Yes
Have you been bothered by any pain from the scar in the past 24 hours?		0: No, 1: Yes
Total score range 0 (best possible scar) to 15 (worst possible scar)		

RESULTS

Among the 26 patients included in the study, 11 patients underwent myringoplasty by an end aural approach while for 15 patients, the post-aural approach was utilized (Figure 1). The mean age at presentation was 49 years with a range between 19 to 73 years (Figure 2). Male to female ratio was almost similar with 57.7% of patients being male (Figure 3).

The most common presentation was related to otorrhea in 65% (n=17) of patients (Figure 4). All such patients gave a history of intermittent otorrhea increasing during episodes of "cold". Patients presenting with hearing loss as the chief presenting complaint included 26.9% of the cases (n=7) while two patients were asymptomatic with incidental detection of tympanic membrane perforation during evaluation for other unrelated pathologies.

All the patients included in the study had mild conductive hearing loss preoperatively with a mean (four frequency) pure-tone average (PTA) of 34.8 dBHL (range 28 to 40 dBHL). Postoperatively mean PTA for the complete series was 23.8 dBHL (range 18.5 to 29.25 dBHL). However, individually patients who underwent end aural myringoplasty had a PTA at 3 months of 21.63 dBHL while patients who underwent post-aural myringoplasty had a PTA 25.13 dBHL. All patients with the endaural

approach had a normal hearing at 3 months i.e., PTA less than 25 dBHL. 7 of the patients who underwent the post-aural approach had a hearing level of more than 25 dBHL. Using a Pearson Chi-square test, there was a significant difference between 3-month PTA results among the two groups (p=0.008).

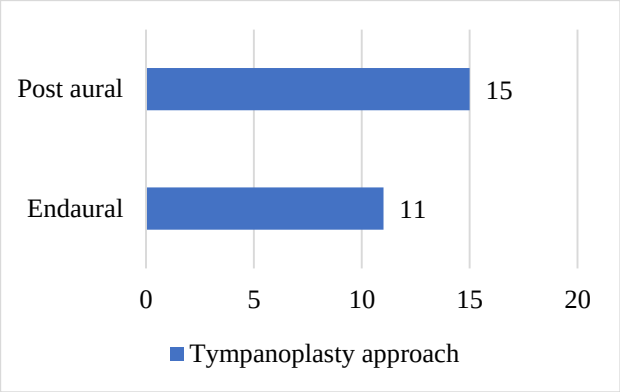

Figure 1: Distribution of approaches of myringoplasty (end aural versus post-aural).

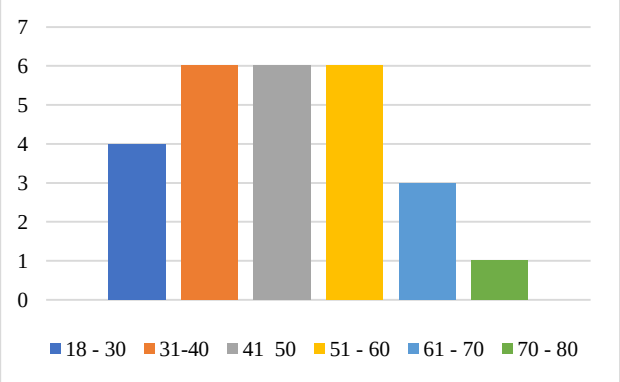

Figure 2: Age distribution.

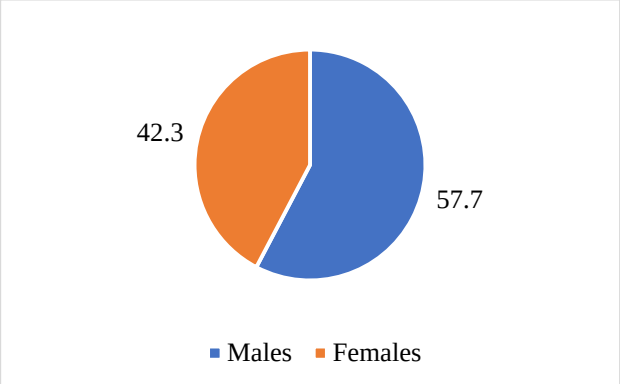

Figure 3: Gender distribution (percentage).

During the study period, 6 patients developed a recurrence of tympanic membrane perforation (2 in cases of end aural myringoplasty, 4 in cases of post-aural myringoplasty) at time periods varying from 4 to 18 months post-surgery (Figure 5). On analysis with the Pearson Chi-square test for the development of recurrence between the two groups, a p-value of 0.612 was obtained suggesting a non-significant difference between the two groups. Kaplan-Meier analysis was done for both the groups for calculation of disease-free survival. While for the group with end aural myringoplasty, the mean disease-free survival (DFS) was 9.7 months, for the group with post aural myringoplasty was 13.9 months (Figure 6). However, the difference between the DFS of the two groups was not significant (p=0.807 Log Rank test).

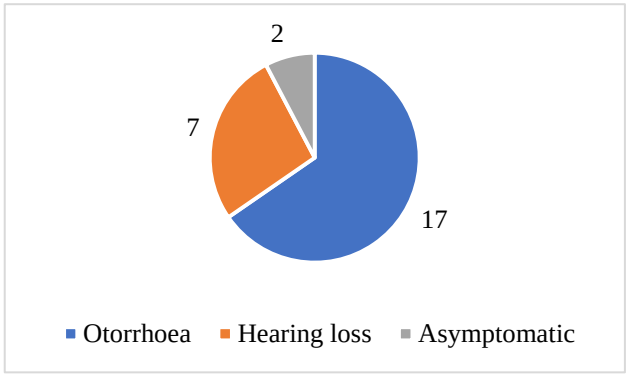

Figure 4: Distribution of presenting complaints.

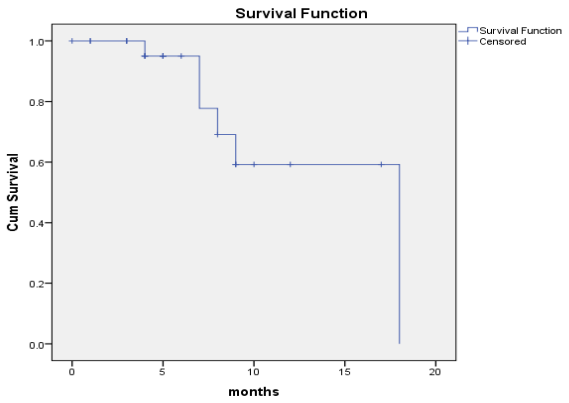

Figure 5: Kaplan-Meier plot for all recurrences combined.

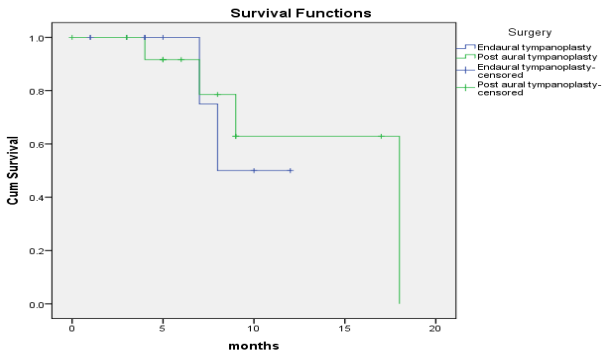

Figure 6: Kaplan-Meier plot for DFS.

All cases were analysed at 3-month postoperatively for evaluation of scar outcomes between the two groups. SCAR scale was used for the purpose (Table 1). The mean SCAR scale score for patients with end aural myringoplasty was 5.36 while the mean scar scale score for patients with post aural myringoplasty was 6.20 (Table 2). On performing statistical analysis with a Kruskal-Wallis H test (one-way ANOVA on ranks test) on the scores between the two groups, the difference was not significant (p=0.23).

Table 2: Mean scar scale scores of the study group.

Study groups	Mean SCAR scale score
Patients with end aural myringoplasty (n=11)	5.36
Patients with post aural myringoplasty (n=15)	6.20
Overall mean score	5.84

DISCUSSION

Of the three types of incision mentioned in the literature for myringoplasty, the post-aural approach and end aural approach are the ones used at our institute.[6] While the post auricular incision is generally employed to expose the mastoid process for mastoidectomy in addition to myringoplasty, the end aural incision provides direct access to the tympanic membrane and middle meatus with a much smaller scar, although more visible as compared to post-aural approach and also with more difficult access to the mastoid area.[7] Hence, arises the dilemma that which of the approaches to use when cortical mastoidectomy is not required; which is usually the case in patients with a dry ear at the time of surgery and mild conductive hearing loss.

Similar to other studies in the literature, our study did not find any association between age or gender with surgical outcomes in either the end aural approach or post-aural approach.[8] While one of the studies on chronic otitis media in developing countries had found otorrhoea as the chief presenting complaint in 86.9% of the patients, our study found the most common presentation related to otorrhea in 65% (n=17) of patients.[9] While almost all the rest of the patients presented with hearing loss as the chief complaint. We believe that increasing awareness in the general population regarding hearing loss as a disease is responsible for this change.

While different studies in the literature have quoted a different amount of hearing loss associated with chronic otitis media, in our series, as per the inclusion criteria, all the patients had mild conductive hearing loss preoperatively with a mean (four frequency) PTA of 34.8 dBHL (range 28 to 40 dBHL).[10] Postoperatively mean pure tone average was calculated for all patients at three months from the date of surgery. We found a much better hearing improvement in patients who underwent end aural myringoplasty (mean PTA 21.63 dBHL) as compared to patients who underwent post-aural myringoplasty (mean PTA 25.13 dBHL) with a significant p-value (0.008). This is in contrast to studies available in literature which mention no difference in hearing outcomes with different approaches.[11,12]

In our study, the success rate in terms of no re-perforation was 76.9% which is in concordance with other studies in the literature.[11] However, on comparison of individual groups, the success rate with end aural myringoplasty was 81.81% while post aural myringoplasty was 73.33% with no statistically significant difference (p=0.612). DFS, as calculated with Kaplan-Meier analysis, was 9.7 months with end aural myringoplasty and 13.9 months with post-aural myringoplasty. However, as seen from the Kaplan Meier chart in Figure 6, the follow-up period for end aural patients was much lesser and therefore resulting in early censoring. As a likely result of this, the difference between the DFS of the two groups was not significant (p=0.807 by Log Rank test).

We had a secondary objective of comparison of cosmetic outcomes between the two groups as analysed by the SCAR scale (Table 1). To our knowledge, such a comparison has not been done earlier between the two approaches in the literature. The SCAR scale was originally developed and validated as a tool to assess the quality of postoperative scars in clinical and research settings with a possible score for each patient between 0 to 15.[5] Mean SCAR scale score in our series was 5.36 and 6.20 for patients with end aural and post-aural myringoplasty respectively with no statistically significant difference between the two groups.

CONCLUSION

Both approaches of end aural and post-aural myringoplasty are good approaches for the purpose of myringoplasty with no statistically significant difference between the two in terms of re perforation rates or cosmetic outcomes. However, based on our study, the end aural approach has better hearing outcomes in terms of hearing improvement.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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