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Original Research Article

A comparative study of temporalis fascia versus tragal perichondrium graft in myringoplasty

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ABSTRACT

Background: This study aimed to compare the efficacy of temporalis fascia and tragal perichondrium grafts in myringoplasty and to assess the hearing improvement following surgery.
Methods: This was a clinical prospective study involving 50 patients of chronic suppurative otitis media inactive mucosal disease who were assigned to two groups. Group I was temporalis fascia group and group II was tragal perichondrium group and subsequently underwent myringoplasty. Patients were followed up at 3 and 6 months.
Results: There was a preponderance of ear disease among children, with a male to female ratio of 1:1.63. Preoperative dry ear for 1-6 months was associated with 82.9% success rate (group I 76.5%, group II 87.5%). Patients with cellular mastoids were associated with 100% success rate.
Conclusions: In this study we found that patients with cellular mastoids and dry ear for 1-6 months were associated with higher success rates. The study also revealed that in terms of hearing gain postoperatively, the temporalis fascia graft fared slightly better than the tragal perichondrium graft. Tragal perichondrium and temporalis fascia grafts appear to have almost similar graft take rates.

Keywords: Myringoplasty, Temporalis fascia, Tragal perichondrium, Graft take rate

INTRODUCTION

Chronic suppurative otitis media is one of the common otological conditions in India and is defined as chronic inflammation of the mucoperiosteal lining of the middle ear cleft, causing persistent ear discharge, progressive deafness and the patient is prone to develop complications. The perforations of the tympanic membrane are either of traumatic origin or due to chronic suppurative otitis media. If the perforations fail to heal spontaneously or by conservative therapy, they require surgical closure. The repaired perforation restores the vibratory area of the tympanic membrane and affords round window protection, thus improving hearing. It also prevents exposure of the middle ear to external infection and allergens.[1,2]

Myringoplasty is defined as surgical closure of tympanic membrane in which no ossicular reconstruction is involved. Various graft materials have been tried to

reconstruct the tympanic membrane. The two most preferred grafting materials for the contemporary otologist are temporalis fascia and tragal perichondrium, due to their anatomic proximity, translucency and suppleness.[3,4] In this study, an attempt was made to compare temporalis fascia and tragal perichondrium in the closure of tympanic membrane perforations, to study the effectiveness of both as graft materials and to assess hearing improvement following myringoplasty.

METHODS

This was a prospective comparative clinical study conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth University, Pondicherry. After obtaining the institutional human ethical committee approval from January 2018 until December 2019, 50 patients attending the outpatient department with a diagnosis of chronic suppurative otitis media with dry perforation were included by convenience sampling in this study due to the limited period of study. The inclusion criteria were patients with chronic suppurative otitis media tubotympanic disease with dry ear for at least three months and age above 14 years and below 60 years with no evidence of active focus of infection in the nose or throat. Patients with chronic suppurative otitis media with attico-antral disease and discharging ear, patients with contraindications to surgery or anaesthesia and patients with mixed and sensorineural hearing loss were excluded from the study.

After obtaining informed and written consent from the patients and in the case of children less than 18 years of age, informed and written consent from the guardians and assent from the patients, they were assigned to two groups, 25 patients in each group, by a process of sequential allocation. Group I was tragal perichondrium myringoplasty and group II was temporalis fascia myringoplasty. The patients were subjected to preoperative investigations as per the study parameters and subsequently underwent myringoplasty under general anaesthesia.

Postoperatively antibiotics were given for one week along with analgesics and antihistaminics. In cases of suspected postoperative infections, antibiotics and antihistaminics were continued up to 2 weeks based on pus culture report. Patients were discharged on the fifth postoperative day. All patients were asked to follow up weekly for one month. All patients were examined by otoscope and microscope at 4 weeks to determine the condition of the graft (Figure 1). Follow up was then done at monthly intervals for 6 months. Pure tone audiogram was done at 3 months and 6 months post operatively. At follow up, the graft was inspected for medialization and any infection. If any infection was found appropriate antibiotics were given.

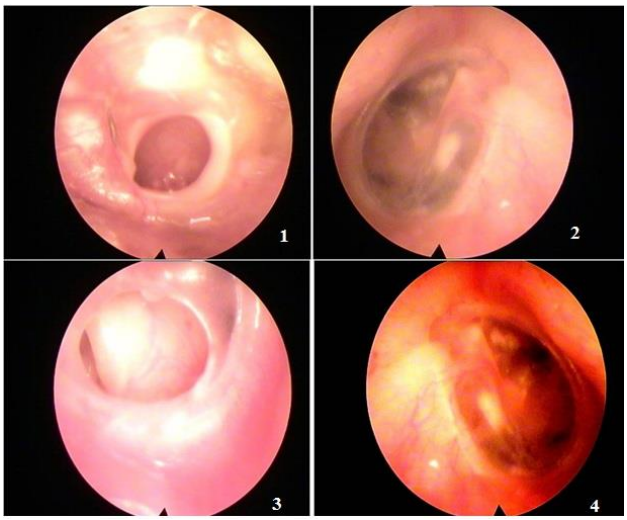

Figure 1: 1 and 3 showing otoendoscopic images of preoperative tympanic membrane status with perforation and 2 and 4 showing postoperative healed tympanic membrane, seen at 6th month follow up.

Statistical analysis was carried out using SPSS version 19.0 (IBM SPSS, US) software with regression modules installed. Data was analyzed using percentage and ratio analysis with suitable diagrams and Chi square test.

RESULTS

In this study, out of 50 patients, 38% were males and 62% were females. The male to female ratio was 1:1.63. The mean age in group I was 29.7±0.7 years while that of group II was 28.4±0.9 years. No statistically significant correlation was found between age, gender and graft success rate.

Preoperatively, 41 (82%) patients had dry ear for 3-6 months, of which, 24 (48%) patients were in group I, having a success rate of 87.5% and 17 (34%) patients were in group II, having a success rate of 76.5%. The overall success rate of patients who had dry ear for 1-6 months preoperatively was 82.9%, while that for patients who had dry ear for more than 6 months was 100%.

Radiological findings of X-ray both mastoids Law's view were grouped into 3 groups: sclerotic, diploeic and cellular. Sclerotic mastoids were found in 44% patients and were associated with an overall success rate of 90.9%, whereas diploeic mastoids were found in 50% patients, the overall success rate being 92%. Cellular mastoids were found in 6% of patients and was associated with 100% success rate in both groups.

Postoperative complications were seen in 7 (14%) patients. Postoperative infection/otitis externa and granulation tissue was seen slightly more in group I patients, but there was no statistically significant difference between the two groups.

The outcome of surgery was studied in view of graft take rate. The study showed a take rate of 84% for group I and a failure rate of 16 %, as compared to a take rate of 88% and a failure rate of 12% for group II. The overall success rate was 86% while the overall failure rate was 14%. This was found to be a statistically significant difference (p=0.0099), implying temporalis fascia is associated with better surgical outcomes than tragal perichondrium (Table 1). Postoperatively, dry ear was achieved in 90% patients (group I 44%, group II 46%).

Another measured outcome of the study was the postoperative hearing gain. 42% of patients in both groups attained postoperative hearing gain in the range of 10-20 dB. In group I, the mean hearing gain of 11.1 dB as compared to a mean hearing gain of 13 dB for group II. These results were found to be statistically very significant (p=0.0006) and hence implying again that temporalis fascia has an advantage over tragal perichondrium in terms of postoperative hearing gain (Table 2).

Table 1: Comparison of graft take rates and failure rates between the two groups.

Groups	Grafts taken	Take rate (%)	Grafts failed	Failure rate (%)
Group I	21	84	4	16
Group II	22	88	3	12
Total	43	86	7	14
χ^2=6.6396				
P=0.0099				

Table 2: Comparison of postoperative hearing gain between the two groups.

Mean pure tone average					
Group I			**Group II**		
Preoperative PTA (in dB)	Postoperative PTA (in dB)	Hearing gain (in dB)	Preoperative PTA (in dB)	Postoperative PTA (in dB)	Hearing gain (in dB)
32.2	21.1	11.1	37.4	24.4	13
χ^2=14.4886					
P=0.0006					

DISCUSSION

In a study of 200 cases by Mathai, females made up 35% of his study group, whereas males made up 65%.[3] In the present study, we found a female preponderance, with females making up 62% of the population and males making up 38% of the population, with a male to female ratio of 1:1.63. This is in contrast to existing literature which may be due to women becoming more conscious regarding hearing loss.

Glasscock in his study of 180 cases, reported 7 cases of graft failure (3.9%), in which 4 were due to postoperative infection and 2 were due to technical error at the time of graft placement.[5] In his other study in 1982 involving 1556 cases of tympanic membrane grafting, Glasscock reported that complications were more related to the disease process than the grafting technique per se.[6] In our study, postoperative complications were seen in 14% patients. The higher incidence of complications in this study may be related to the smaller sample size.

Albera et al in their study of 212 patients found a graft take rate of 86% which is similar to the results obtained in our study.[7] Brown et al conducted a retrospective review of 193 patients to assess the success rate of myringoplasty and to determine what factors played a role in achieving a successful outcome and found an overall success rate following myringoplasty of 74%, while the success rates varied significantly by type of material used, temporalis fascia grafts having a success rate of 77%, composite grafts having a success rate of 50% and fat grafts having a success rate of 56%.[8] In a study by Sharma et al the overall success rate was 81.1%.[9] Our study showed a significant difference in graft take rates between the two groups, implying temporalis fascia grafts may be associated with better take rates.

A study by Dabholkar et al involving 50 patients showed graft take rates with temporalis fascia and tragal perichondrium to be 84% and 80% respectively, there was no statistically significant difference in hearing gain between the two groups.[1] Thomas et al noted the mean hearing gain to be 8.6 dB.[10] Brown et al found the average air conduction improvement to be 10 dB.[8] Gupta conducted a study to evaluate the results of autograft temporalis fascia myringoplasty compared to a superiorly based meatal skin and tympanic membrane epithelium flap involving 148 patients and found the air-bone gap improved by atleast 10 dB postoperatively.[11] In this study, the tragal perichondrium group achieving a hearing gain of 11.1 dB as compared to 13 dB for the temporalis fascia group. These results are in line with the quoted

literature and our results show temporalis fascia to have a slightly better hearing gain than tragal perichondrium.

Various grafts have been used in myringoplasty with varying outcomes, the standard workhorse graft being temporalis fascia, it having the most favourable outcomes in the most number of studies. The study revealed that in terms of hearing gain postoperatively, the temporalis fascia graft fared slightly better than the tragal perichondrium graft. This study showed that tragal perichondrium and temporalis fascia grafts have almost similar graft uptake rates. The study also showed that postoperative infection is the most common cause of graft failure.

The major limitations of this study included limited period of study and follow up, use of convenience sampling due to limited study period and limited sample size. Further large multi-centre randomized controlled trials would help eliminate these limitations.

CONCLUSION

Various grafts have been used in myringoplasty with varying outcomes, the standard workhorse graft being temporalis fascia, it having the most favourable outcomes in the most number of studies. The study revealed that in terms of hearing gain postoperatively, the temporalis fascia graft fares slightly better than the tragal perichondrium graft. This study also showed that tragal perichondrium and temporalis fascia grafts have almost similar graft uptake rates and that postoperative infection is the most common cause of graft failure.

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