A COMPARATIVE STUDY TO ASSESS THE GRAFT UPTAKE IN PATIENTS UNDERGOING POSTAURICULAR TYMPANOPLASTY USING TEMPORALIS FASCIA VS SLICED TRAGAL CARTILAGE

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ABSTRACT Context: Tympanoplasty is a surgical procedure to repair tympanic membrane perforation and reconstruct the tympanic membrane and hearing, commonly done after chronic suppurative otitis media and trauma. Aims: To comparatively study the graft uptake in patients undergoing type 1 tympanoplasty using temporalis fascia vs sliced tragal cartilage. Settings and Design: The study was a prospective case-control study carried out in the department of ENT, D.Y.Patil medical college, Pimpri Methods and Material: 50 patients undergoing tympanoplasty were divided into 2 groups randomly and operated on using Temporalis fascia(TF) in 25 patients and Sliced tragal cartilage(STC) graft in the rest 25 patients. All cases were operated on under local anaesthesia. A post aural approach was implemented for the surgery. 25 patients were subjected to tympanic membrane repair with temporalis fascia graft and the remaining 25 with Tragal cartilage graft. For tragal cartilage, a graft incision was taken over the undersurface of the tragus, and the obtained tragal cartilage was sliced to a thickness of 0.5 to 1.0 mm. Results: The mean duration of symptoms was 12.72 and 15.84 months in groups A and B, respectively. A successful graft uptake was noted in 21(84%) patients in the TF group, whereas it was noted in 24 patients in the STC group (96%). There was permanent perforation noted in 4 (16%) patients in the TF group and 1 (4%) patient in the STC group. The difference was non-significant, with a P-value of 0.157 Conclusions: In the clinical study performed, postauricular tympanoplasty using the Sliced tragal cartilage was associated with better graft uptake and hence can be regularly employed for tympanic membrane repair compared to Temporalis fascia.

KEYWORDS Tympanoplasty, Tragal Cartilage, Temporalis Fascia, Tympanic Membrane, graft uptake

Introduction

Surgical closure is opted for when the perforation of TM does not heal spontaneously or by conservative management. The repaired portion of the tympanic membrane restores the area of vibration of the tympanic membrane, thus, improving the hearing. Some commonly used autologous graft materials are tensor fascia lata, temporalis fascia, perichondrium and cartilage. Temporalis fascia and tragal cartilage are the two most commonly used grafting materials over the other options due to their proximity to the operative field.

Myringoplasty can be defined as the surgical repair of only the tympanic membrane, whereas reconstruction of the tympanic membrane and the ossicular chain is the main aim of tympanoplasty. Although this procedure was introduced in the 1950s by Zoellner and Wullstein, a variety of graft materials and several techniques of graft placement have been described for the reconstruction in tympanoplasty.

Temporalis fascia: The chances of recurrent perforation us-
Sliced tragal cartilage: Harvesting the graft from the same endaural incision and slicing it to the correct required size to obtain acoustic benefits is the innovation in the technique. After harvesting tragal cartilage, stainless steel cartilage slicer was used to thin and slice the cartilage to desired thickness. Then, the sliced piece of cartilage was trimmed with scissors according to the size of perforation to obtain desired shape and size. Many different techniques such as composite shield graft, cartilage palisade graft, cartilage perichondrium island flap, butterfly inlay graft, Crowncork technique, cartilage mosaic graft and cartilage reinforcement have been used.

Due to its thickness, concerns are raised about cartilage tympanoplasty. Zahna et al. suggested that by thinning the cartilage to 0.5 mm, the acoustic benefit could be obtained, but the unacceptable curling of the graft nullifies this advantage. It is occurring when the cartilage is thinned and perichondrium is left attached to one side. Status of ossicles was normal in all cases, and malleus was present.

Subjects and Methods

This prospective study was conducted with 50 patients between the age group 16 to 60 years with tubotympanic type of chronic suppurative otitis media who were selected from outpatient department in the otolaryngology department of Dr. D. Y. Patil Medical College and Research Centre Pimpri, Pune; between September 2018- June 2021. Patients were randomized into 2 groups, i.e., 25 patients were subjected to myringoplasty with temporalis fascia, and 25 patients were subjected to myringoplasty with sliced tragal cartilage. Both the groups were compared for postoperative graft uptake.

Inclusion criteria

- Chronic suppurative otitis media
- Inactive mucosal type with central perforation
- The ear to be operated on should be dry for at least 2 weeks prior to the surgery
- Eustachian tube function normal
- Normal middle ear mucosa and intact ossicular chain.

Exclusion criteria

- Re-perforation
- Bilateral squamosal ear disease
- Associated factors like uncontrolled hypertension, diabetes and severe anaemia.

Results

This is a prospective study with 50 done in 2 groups. Group A underwent type-1 tympanoplasty using temporalis fascia, whereas group B underwent type-1 tympanoplasty using sliced tragal cartilage. Group A included 12 males and 13 females, whereas group B included 14 males and 11 females. Below are the baseline characteristics and graft uptake between both groups, suggesting that graft uptake was better in patients with sliced tragal cartilage reconstruction. (Table 1)

| Group          | Gender Distribution | Graft Uptake Rate | Mean AB Gain |
|----------------|---------------------|------------------|--------------|
| A              | 12M, 13F            | 77.1%             | 9.71dB       |
| B              | 14M, 11F            | 68%              | 9.78dB       |

Discussion

The current study compared the graft uptake in patients undergoing type-1 tympanoplasty with temporalis fascia vs sliced tragal cartilage. The difference in age groups was non-significant between both the groups, with a P-value of 0.73. In addition, the gender difference was non-significant, with a P-value of 0.571.

A successful graft uptake was noted in 21(84%) patients in the TF group, whereas it was noted in 24 patients in STC group (96%). There was permanent perforation noted in 4 (16%) patients in the TF group and 1 (4%) patient in STC group. The difference was non-significant, with a P-value of 0.157. Mild improvement was noted in 7 (28%) patients each in either group. Significant improvement was noted in 15 (60%) patients in the TF group and 17 (68%) patients in the STC group. No improvement was observed in 3 (12%) patients in the TF group and 1 (4%) patient in the STC group.

The findings showed that the graft uptake status postoperatively was better in the Sliced tragal cartilage group. Hence, Sliced tragal cartilage can be considered superior to temporalis fascia utilizing type-1 tympanoplasty.

Yang T et al. compared cartilage graft and fascia in type 1 tympanoplasty; concluded that Tympanoplasty using cartilage grafts has a better graft take rate than that using temporalis fascia grafts. There are no significant differences between cartilage grafts and temporalis fascia grafts for hearing outcomes. Contrary to the sliced cartilage sub-group, full-thickness cartilage grafts generate better hearing outcomes than temporalis fascia grafts.

In A STUDY, Kim JY et al. evaluated using sliced cartilage and temporalis fascia in type 1 tympanoplasty. There was successful graft uptake in 77.1% in the cartilage group with a mean AB gain of 9.78dB, whereas in the temporalis fascia group graft uptake rate was 70.9% with a mean AB gain of 9.71dB.

In middle-ear pathology, retraction pockets and atelectatic ears, temporalis fascia grafts are prone to undergo post-operative atrophy leading to poor hearing outcomes. On the other hand, cartilage grafts are more resistant to infections, resorption and retraction when compared to temporalis fascia grafts. Hence, cartilage grafts were superior when compared to temporalis fascia grafts.

Limitations: tympanoplasty is not recommended in patients with ages less than 16 years and more than 60 years. Tympanoplasty is also avoided in patients with active disease and discharging ears.
Table 1

|                        | Temporalis fascia (TC) | Sliced tragal cartilage (STC) | P Value | Significance  |
|------------------------|------------------------|-------------------------------|---------|--------------|
| Mean Age               | 32.08±7.64             | 31.16±10.59                   | 0.73    | Non significant |
| Male                   | 12                     | 14                            | 0.571   | Non significant |
| Female                 | 13                     | 11                            | 0.571   | Non significant |
| Mean duration of symp-  | 12.72±6.47             | 15.84±13.0406                 | 0.29    | Non significant |
| toms in months         |                        |                               |         |               |
| Reduced hearing        | 21                     | 24                            | 0.157   | Non significant |
| Ear discharge          | 21                     | 21                            | 1       | Non significant |
| Giddiness              | 2                      | 4                             | 0.384   | Non significant |
| Pre-operative AB gap   | 29.2±5.53              | 27.4                          | 0.288   | Non significant |
| Post-operative AB gap  | 15±5.59                | 10.4±5.18                     | 0.0041  | Significantly better in STC group |
| Graft uptake           | 21                     | 24                            | 0.157   | Significantly better in STC group |
| Improvement in AB gap  | 14.2±4.93              | 17±4.93                       | 0.042   | Significantly better in STC group |

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Conflict of interest
There are no conflicts of interest to declare by any of the authors of this study.

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