

PROSPECTIVE STUDY OF TRAGAL PERICHONDRIUM VERSUS TEMPORALIS FASCIA AS GRAFT FOR TYMPANOPLASTY

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ABSTRACT

Objective: Relative merit of materials and associated techniques for myringoplasty makes important study perspective of clinical relevance and evidence-based practice.

Methods: Prospective study of outcomes in myringoplasty using either temporalis fascia (TF) or tragal perichondrium in 23 adult patients of tympanic perforation is reported. 2 months after surgery, survival and uptake of graft and hearing improvement in terms of the average air-bone gap were compared.

Results and Conclusion: TF graft is marginally superior to tragal perichondrium graft and is, therefore, choice option for cases with Eustachian tube dysfunction and large perforations. Cartilage is more robust.

Keywords: Atelectatic ear, Myringoplasty, Tragal perichondrium, Tympanic perforation.

INTRODUCTION

Perforated tympanic membrane following chronic suppurative otitis media (CSOM) requires correction to restore vibratory area and to protect the round window and hearing function. Autologous materials used for graft differ depending on convenience of obtaining, ease in placing, ability to sustain through procedure and final take up to yield improvement in hearing. Temporalis fascia (TF) is, therefore, conventionally preferred and next tragus perichondrium (TP). Here, findings of comparative outcomes with use of TF and tragal perichondrium as graft material are presented. This modest endeavor is also expected to provide practical evidence base for regional practice [1,2].

METHODS

The study was carried out in otorhinolaryngology indoor patients at BJ Medical College Hospital, Ahmedabad, during the period from November 2009 to December 2010. Tympanoplasty was performed with perichondrium of tragus cartilage in 14 adult patients and with TF in 9 patients. All was between 25 and 48 year age. Inclusion criteria were unilateral CSOM of safe type with central perforation and pure conductive hearing loss. Exclusion criteria were atticofacial type CSOM, obvious ossicular damage, bilateral CSOM, and pathology of the external ear.

Parameters observed were survival and uptake of graft and hearing improvement in terms of average air-bone gap (ABG). A good take up of graft is indicated by the absence of perforation, tympanic membrane retraction or lateralization. Post-operative ABG for each audiogram was evaluated by computing mean ABG at 500, 1000, 2000, and 4000 Hz. Pre- and post-operation pure tone ABG were compared for two graft types.

Surgical procedure

Postauricular approach was used under local anesthesia + adrenaline infiltration. Edges of tympanic perforation were debrided fresh for good capillary circulation. Sclerosed parts of tympanic membrane were removed. Any pathological collection within middle ear was cleaned. Cut on medial aspect of tragus cartilage was made and piece of

1.5 cm×1 cm cartilage was removed together with perichondrium. The perichondrium was dissected from both sides, and cartilage was shaped to replace tympanic membrane altogether. A V-shaped piece was cut out to make room for handle of malleus on grafting. The cartilage graft was placed in the plane of the manubrium of malleus, medial to the remnant of tympanic membrane.

No space was left between posterior canal wall and the reconstructed tympanic membrane to avoid nidation of cholesteatoma or retraction pocket formation. TP is placed lateral to the cartilage and medial to edges of perforation and extended posteriorly to canal wall. Gel foam pledges were then placed over to stabilize graft. Besides routine postsurgical care, after 3 weeks, gel foam was suctioned from the ear canal. Antibiotic + steroid containing drops were prescribed for abundant use over next 2 weeks to clear all gel foam from the tympanic membrane.

2 months after surgery, pure tone audiometry and fine examination of tympanic membrane were done. Any sight of effusion led to adding of nasal steroid drops and regular weekly ear exam.

OBSERVATIONS AND RESULTS

Age profile, complaints and perforation size in the patients allocated to different transplant groups are presented in Tables 1-3.

The outcome: Graft take up occurred successfully in all 9 cases of tympanic fascia graft. The cases of tragal perichondrium graft resulted in successful take up in 11 of the 14 cases at 2 months following surgery.

There were no failures of graft take up in TF grafts. 3 (22%) take up failures occurred in tragal perichondrium graft. No immediate post-surgical complication, viz., facial nerve injury, bleeding, wound infection or sensorineural hearing loss, in either group.

Overall mean pre-operative pure tone audiogram indicated 31-40 dB hearing the loss in 3 patients in either group, 41-50 dB loss in 2 patients in TF and 6 patients in TP group; and 51-60 dB losses in 4 and 5 patients, respectively, in TF and TP. Pre-operative ABG between 21 and 30 is seen in 6 cases in TF group and 8 in TP group. Post-operative gains in air

Table 1: Age distribution of patients in the TF and the TP

Age group (years)	TF (n)	TP (n)
20-30	3	6
31-40	4	5
41-50	2	2

TF: Temporalis fascia, TP: Tragus perichondrium

Table 2: Presenting complaints prevalent in the two groups

Complaints	TF	TP
Hearing loss only	7	12
Hearing loss with ear discharge	2	2

TF: Temporalis fascia, TP: Tragus perichondrium

Table 3: Size distribution of tympanic perforation in compared groups

Perforation Size	TF	TP
Small	3	6
Large	4	7
Subtotal	2	1

TF: Temporalis fascia, TP: Tragus perichondrium

conduction up to 21-30 dB was attained in 17 cases total. Pure tone audiogram ABG closure up to 21-30 dB is seen in 14 patients at 1 year after surgery.

DISCUSSION

While temporal fascia graft was most successful, even tragal perichondrium grafts had quite high uptake rate. TF is readily available around the ear. It is thin and strong as well as sturdy in survival. Tragal perichondrium is quite close alternative available in plenty, draws its nutrition by diffusion and can be made into shape. Hearing outcomes were good for full thickness grafting of cartilage in the reconstruction

of the tympanic membrane. Negative middle ear pressure in cases of Eustachian tube dysfunction and large perforation can be better countered using cartilage in perichondrium graft [3].

Cartilage, vein, fascia, and perichondrium are mesenchymal tissues devoid of organelles as in skin. Their use as tympanic graft should not pose risk of inducing cholesteatoma. Cartilage grafts nourish through diffusion from surrounding fluids and get fast incorporated in the tympanic membrane [4-6]. Cartilage is more robust and less prone to resorption or retraction. In the atelectatic ear reconstitution with tragal perichondrium has better anatomic outcome than fascia. Cartilage may be used to construct posterior canal wall. Post-operative gain in air conduction, ABG closure is inferior to fascia group as perichondrium is more resistant to vibration than the human tympanic membrane.

CONCLUSION

TF graft is marginally superior to tragal perichondrium graft and is, therefore, choice option for cases with Eustachian tube dysfunction and large perforations. Cartilage is more robust.

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