

Original article :

Study of graft uptake rate of temporalis fascia and tragal perichondrium in Myringoplasty and Type- Tympanoplasty

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ABSTRACT:

INTRODUCTION: The healing of tympanic membrane perforation is preceded by ingrowths of connective tissue edges over which the epithelium migrates to close the perforation, keeping this physiological principle in consideration it follows that connective tissue grafts, that is grafts of mesodermal origin like vein, perichondrium or fascia, prove superior to all other graft materials

MATERIALS AND METHODS: All patients with the complaint of discharging ear and decreased hearing were screened. Those patients, in whom tubotympanic type of chronic suppurative Otitis Media was found, were taken for this prospective study with randomization.

The necessary permission and approval from ethics committee and authority, prior to starting the study was taken. Informed written consents were obtained from the patients involved in the study according to the protocol approved by the Ethics Committee of our institution.

RESULTS: The graft take rate after 6 months was 82%. Long term studies were not possible due patient's noncompliance. Similar report was given by Palva T et al (1995)⁵² with graft take rate were 97%.

CONCLUSIONS: Hearing improvement does not depend on type of graft (No statistically significant difference – $p > 0.5$).

INTRODUCTION

The healing of tympanic membrane perforation is preceded by ingrowths of connective tissue edges over which the epithelium migrates to close the perforation, keeping this physiological principle in consideration it follows that connective tissue grafts, that is grafts of mesodermal origin like vein, perichondrium or fascia, prove superior to all other graft materials. Clinical investigations and animal experiments have shown that these connective tissues replace the missing fibrous element of the tympanic membrane and allow squamous epithelium and mucosal tissue to cover is medial and lateral surface.^{1,2}

Taking the above mentioned facts in consideration, this study was taken up to compare the results of the two connective tissue graft materials, viz temporalis fascia and the tragal perichondrium and to [Study of graft uptake rate of temporalis fascia and tragal perichondrium in Myringoplasty and Type-I Tympanoplasty](#).

MATERIALS AND METHODS

All patients with the complaint of discharging ear and decreased hearing were screened. Those patients, in whom tubotympanic type of chronic suppurative Otitis Media was found, were taken for this prospective study with randomization.

The necessary permission and approval from ethics committee and authority, prior to starting the study was taken. Informed written consents were obtained from the patients involved in the study according to the protocol approved by the Ethics Committee of our institution.

This study comprises of patients who were subjected to tympanoplasty for the treatment of chronic suppurative otitis media. Each patient was subjected to a detail examination of nose, paranasal sinuses and throat to rule out any focus of infection, which could influence the result of tympanoplasty. Patients were subjected to tympanoplasty with temporalis fascia while the remaining underwent with tragal perichondrium.

CRITERIA FOR SELECTION

INCLUSION CRITERIA

Cases of safe type of chronic suppurative otitis media.

The ear should be dry minimum for 3 months with intact ossicular chain.

Patent Eustachian Tube.

EXCLUSION CRITERIA

Unsafe CSOM

Safe CSOM with sensorineural hearing loss.

Patient <15years >50years.

Wet ear.

Tragal perichondrium can be obtained as a partial graft (hemi graft), either from the posterior (canal) tragal surface, or from the anterior (facial) tragal surface, or the entire tragal cartilage may be removed and both perichondrial surfaces used in continuity as a total graft. The size of the drum perforation to be covered decides whether a hemi graft or a total graft should be used. A 1.5 cm long incision on the dome of the tragal cartilage is performed with scalpel blade no. 15. To avoid retraction of the tragal skin and a visible scar, the skin incision can be made 2mm inside the ear canal. Using a pair of small blunt curved scissors the subcutaneous tissue from the posterior surface of the Tagus is dissected away and the entire posterior surface of the tragal cartilage is exposed. The perichondrium is incised along the entire dome, and the posterior plate of the perichondrium is elevated from the cartilage with a Freer elevator. When the entire posterior perichondrium is maximally elevated and cleaned on both sides, it can be cut out by scalpel blade no. 11, first at the inferior margin, then by a cut as medially as possible without damaging the canal skin, and finally with an outward directed cut along the superior margin. The perichondrium is gently held by a non toothed tissue forceps during the cutting. About 1.5 cm² of the already cleaned perichondrium can be obtained. The perichondrium is covered with gauze during the operation, and is generally not used as a dry graft, because its consistency is somewhat more solid than the consistency of the temporalis fascia. The wet graft of the perichondrium is stiff enough to be placed as an underlay graft. The cartilage is reinserted in the same place, and in the same position, as before. Reinsertion to some extent will prevent retraction of the tragus skin.

Micro elevator is used to elevate the tympanomeatal flap and also the annulus inferiorly up to 6 o'clock and superiorly up to the neck of malleus. Chorda tympani nerve is identified and preserved.

PLACEMENT OF THE GRAFT:

Handle of malleus is skeletonised. Medial surface of tympanic membrane remnant made raw with circular knife avoiding injury to Eustachian tube orifice. The graft along with posterior annulus is then retracted anterior lay and

small pieces of wet gel foam are placed in the middle ear cavity. Graft is placed carefully under the handle of malleus and tympanic membrane remnant, taking care to evert the edge. Tympanomeatal flap is replaced taking care again to evert its edge to prevent canal wall cholesteatoma. External auditory canal is packed with gel foam pieces followed by antibiotic soaked ribbon gauze. Post aural incision is closed in layers. Mastoid dressing is applied. Facial nerve function is tested clinically.

POST OPERATIVE:

Antibiotics, analgesics and decongestant were given for 3 weeks. Patients were advised not to cough, strain or sneeze. Dressing was changed after 24 hours. External auditory canal pack is removed on the 2nd post operative day. Gel foam placed in the ear canal during surgery is not disturbed and suture removal was done on 7th postoperative day. All patients were called for regular follow up. Antibiotic ear drops were started after that to facilitate dissolution of gel foam and to promote healing. On the 8th week, status of the healed neotympanum was recorded and pure tone audiometry was done to assess the auditory status. The same was done after 6 months to see if there were any changes.

FOLLOW UP:

Patients will be followed up after one month, third month and sixth month after surgery. At follow up patients will be evaluated by otoscopic examination to determine the condition of the graft, pure tone audiometry is done to calculate air bone gap closure will be assessed.

Data Analysis – Observations were tabulated on a spread sheet by using Microsoft excel. Statistical analysis of the patients was carried out with Student ‘t’ test and “Z” test. A ‘P value’ <0.05 was considered statistically significant.

OBSERVATIONS AND RESULTS

TABLE NO 1: GRAFT UPTAKE RATE

Type of graft	Graft uptake	Percentage
Temporalis fascia	21/25	84 %
Tragal perichondrium	20/25	80%
Overall	41/50	82 %

The above table indicates that 21 (84%) out of 25 ears operated using temporalis fascia graft healed completely at the end of 6months with well taken graft. 20 (80%) out of 25 ears operated using tragal perichondrium were dry with graft in place at the end of 6 months. No statistical significant association was found in graft uptake with respect to type of graft ($P > 0.05$).

Most revision patients were not included in the study as these patients were subjected to more extensive surgery including atticotomy and mastoidectomy to detect and treat hidden pathologies.

$Z = 0.36$, $P > 0.05$

TABLE NO 2: TYPE OF PERFORATIONWISE GRAFT UPTAKE IN STUDY GROUP

QUADRANT	GRAFT UPTAKE		TOTAL
	+	-	
Anterior	11	3	14
Posterior	14	1	15
Subtotal	16	5	21
TOTAL	41	9	50

- 16 out of 21 subtotal perforations were successful
- 11 out of 14 anterior perforations were successful.
- 14 out of 15 posterior perforations were successful.

Most of the smaller perforations here were taken for tympanoplasty when they failed to respond to medical treatment of weekly trichloro – acetic acid cautery or when patient cannot come for repeated sittings.

FACTORS AFFECTING GRAFT TAKE RATE

Age and sex of the patients were also compared with graft take rate:

TABLE 3: GRAFT UPTAKE RATE WITH RESPECT TO AGE OF THE PATIENTS (n = 50).

Age in years	No of patients	Percentage %
≤ 20	7/9	77.77
21 – 30	14/17	82.35
31 – 40	12/16	75
>40	6/8	75

From the above table it is seen that maximum graft uptake rate observed in the age group 21-30 years (82.35%).

TABLE 4: GRAFT UPTAKE RATE WITH RESPECT TO SEX (n = 50).

Sex	Graft uptake	Percentage %
Male	17/22	77.27
Female	24/28	85.71

The above table shows that graft uptake rate was 77.27 %(17 out of 22 ears) in males and 85.71 %(24 out of 28 ears) in female.

Z=0.77, P>0.005

There is no statistical significant difference seen in graft uptake rate in sex.

DISCUSSION

This is the prospective study of 50 Tympanoplasties on patients between the age of 16 to 50 years, who were admitted in the Department Of E.N.T and Head and Neck Surgery at Dr D.Y Patil medical college, Pimpri, between July 2010 to September 2012. This entire study group of patient suffered from Chronic Suppurative Otits Media. Patients in this study were from all socioeconomic groups, including patients referred from other practitioners also.³

Conservative measures were first tried in all cases, particularly for small to moderately sized perforations. These included systemic antibiotics, trichloro-acetic acid cautery, repeated aural toilet in ears with active infections. Cases with bilateral ear diseases with suspected central septic focus were operated with tonsillectomy, adenoidectomy, septoplasty, etc. as needed. 25 patients were subjected to tympanoplasty with temporalis fascia remaining 25 with tragal perichondrium. Follow up of postoperative cases was for 6months.

The graft take rate after 6 months was 82%. Long term studies were not possible due patient's noncompliance. Similar report was given by Palva T et al (1995) with graft take rate were 97%.

In our study, graft uptake rate for temporalis fascia was 84% as compared to tragal perichondrium was 80%. Graft take-rate was slightly better for temporalis fascia than for tragal perichondrium (not significant $p > 0.005$). This marginal difference however, is not significant. Various studies showed the grafts uptake was in the ratio of 80 to 90%, for either temporalis fascia or tragal perichondrium.^{4,5,6}

HEARING RESULT

80% of cases showed improvement in hearing, while 20% of them showed no improvement, at 6 month follow-up period. About 80% cases operated with temporalis fascia showed hearing improvement, while same percentage (80%) of cases who were operated using tragal perichondrium showed improvement in hearing (statistically not significant $p > 0.05$)

CONCLUSIONS : Hearing improvement does not depend on type of graft (No statistically significant difference – $p > 0.5$).

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