



To Study the Importance of Single Piece Composite Tragal Cartilage Graft For Type-I Tympanoplasty In Subtotal Perforation

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Abstract

Background- Hearing loss is a global problem with 275 million of the world's population suffering from moderate or greater degrees of decreased hearing acuity according to WHO survey in 2001. The disease is more commonly seen in developing countries.

Methods- This clinical study was conducted in the department of ENT, Geetanjali Medical College and Hospital, Udaipur, Rajasthan from January 2016 to June 2017, after obtaining approval from ethics committee of GMCH, Udaipur & obtaining informed consent from inpatients selected for the study.

Results- In the composite tragal graft uptake rate was 97.50% and in temporalis fascia group there was 90% uptake rate. The mean composite tragal group AB gap measured pre operatively was 36.38 ± 6.10 which improved to 18.13 ± 5.84 db post operatively. This was statistically highly significant improvement in AB gap levels. Similarly the temporalis fascia graft also improved from 28.73 ± 5.82 to 15.23 ± 8.24 db Post operatively.

Conclusion- Cartilage tympanoplasty provides excellent audiologic outcome comparable to temporalis fascia graft.

Keywords- Cartilage, Tympanoplasty, Temporalis Fascia, Graft.

Introduction

Hearing loss is a global problem with 275 million of the world's population suffering from moderate or greater degrees of decreased hearing acuity according to WHO survey in 2001. The disease is more commonly seen in developing countries.

Perforation of tympanic membrane is one of the major reasons for hearing loss associated with maximum of 40-50dB conductive hearing loss. The tympanic membrane (TM) perforation is one of the common clinical conditions encountered in ENT practice.

The Tympanic Membrane (TM) plays a significant role in the physiology of hearing as well as in the pathophysiology of chronic inflammatory middle ear diseases. The TM perforations significantly impair the quality of life for millions of patients.

Utech, in 1959, first introduced cartilage in middle ear surgery¹. The technique was then promoted by Prof. Heermann J. From Essen, Germany, who used "the cartilage palisade technique" for the reconstruction of the

TM and the auditory canal wall². In 1963, Jansen³ and Salen⁴ reported the use of cartilage-perichondrial composite graft for tympanic membrane reconstruction. It has also been described for the management of retraction pockets and more recently for the reconstruction of the tympanic membrane in cases of recurrent perforation with encouraging results.

Cartilage contributes minimally to an inflammatory tissue reaction and is well incorporated with tympanic membrane layers; it also provides firm support to prevent retraction. The greatest advantage of the cartilage graft has been thought to be its very low metabolic rate. It receives its nutrients by diffusion, is easy to work with because it is pliable, and it can resist deformation from pressure variations.

Materials and Methods

Source of Data

This clinical study was conducted in the department of ENT, Geetanjali Medical College and Hospital, Udaipur, Rajasthan from January 2016 to June 2017, after obtaining approval from ethics committee of GMCH, Udaipur & obtaining informed consent from inpatients selected for the study.

Inclusion Criteria

1. All the patients diagnosed with dry subtotal tubotympanic perforation (involving 50% or more of tympanic membrane), irrespective of age & sex, where tympanoplasty is advisable.
2. Those patients in whom the graft is taken up completely and remains intact for 3 months after surgery (considered as successful tympanoplasty).

Exclusion Criteria

1. Patients who do not follow up as stated above
2. Graft rejections-- partial or total
3. Patients who are suffering from sensory neural hearing loss
4. Patients with attico-antral type of CSOM.

5. Ossicular chain discontinuity
6. Eustachian tube dysfunction
7. Past history of tympanoplasty
8. Malignancy, Diabetes mellitus, immunocompromised state due to any cause.

Method of Collection of Data

Procedure a written informed consent was obtained from the participants. Eighty patients with dry subtotal tympanic membrane perforation due to chronic otitis media, in which ossicular chains were intact and mobile (I/M) presenting to ENT department at GMCH, Udaipur were taken up for study. The study population of 80 patients was divided into two groups of 40 patients each, who satisfy the inclusion and exclusion criteria.

A detailed clinical history and examination was recorded on specific proforma designed for the study. All patients were subjected to pre-operative audiometric evaluation i.e. Pure Tone Audiometry (PTA). Impedance Audiogram was done to assess status of ossicular chain & Eustachian tube function preoperatively. In all patients a subtotal TM perforation was detected by otoscopy. Necessary preoperative haematological, biochemical and radiological investigations were performed. Patients were taken for surgery when all parameters were within normal limits.

Observation and Results

This is a prospective randomized study design on comparison of graft used in tympanoplasty, using temporalis fascia and cartilage as graft in patients of chronic otitis media with tympanic membrane perforation. The study group consisted of 80 patients, divided randomly into two groups with equal subject count (40 cases), temporalis fascia as graft and 40 cases with tragal cartilage as graft.

Maximum number of patients 25 (31.25%) were between 31-40 years, followed by 21-30 year age group 40 (25.00%), while patients aged above 50 years encountered

least, only 2 (2.50%). The female to male ratio was 1 : 1.96.

Table no.1. Graft uptake at 3 months.

Status of graft	COMPOSITE TRAGAL CARTILAGE	Temporalis fascia	Total
Accepted	39 (97.50%)	36 (90.00%)	75
Rejected	1 (2.50%)	4 (10%)	5
Total	40	40	80

In the composite tragal graft uptake rate was 97.50% and in temporalis fascia group there was 90% uptake rate.

Table no. 2 Comparison of pre & post operative hearing results

Hearing result(AB GAP)	Pre operative (Meant ± SD)	Post operative (Meant ± SD)	p-value
COMPOSITE TRAGAL CARTILAGE	36.38± 6.10	18.13± 5.84	<0.001(HS)
Temporalis fascia	28.73± 5.82	15.23± 8.24	<0.001(HS)

The mean composite tragal group AB gap measured pre operatively was 36.38 ± 6.10 which improved to 18.13±5.84 db post operatively. This was statistically highly significant improvement in AB gap levels. Similarly the temporalis fascia graft also improved from 28.73± 5.82 to 15.23± 8.24 db Post operatively. This too was statistically highly significant which showed both techniques are equally effective.

Discussion

This is the prospective study of 80 tympanoplasties on patients between the age of 9 to 65 years, who were admitted in the Department Of E.N.T. at Geetanjali Medical College & Hospital, Udaipur. This entire study

group of patients suffered from Chronic Suppurative Otitis Media. Patients in this study were from all socioeconomic groups, including patients referred from other practitioners also. 40 patients were subjected to tympanoplasty with temporalis fascia remaining 40 with composite tragal cartilage (CTC).

Chronic suppurative otitis media is one of the major illnesses in our country. A large majority of the CSOM cases belong to the safe or tubo - tympanic variety in which central perforation is present in the tympanic membrane. It leads to loss of hearing and recurrent ear discharge which contributes to the morbidity in the population. The patient also suffers socially due to deafness and faces embarrassment due to aural discharge. These patients come to ENT surgeons in order to be relieved of these symptoms. Tympanoplasty is one of the operation employed by ENT surgeons for these patients. It not only gives the patient a dry ear but also improves hearing in most of the patients. Lot of graft materials have been used by various surgeons for covering the perforation in the ear drum. The most commonly used graft material is temporalis fascia.

Cartilage is a reliable graft for tympanic membrane reconstruction as it is nourished by diffusion and becomes well incorporated in the tympanic membrane. The advantage of the cartilage over temporalis fascia cannot be overlooked as its toughness prevents the retraction of the neotympanic membrane, but there have been concerns regarding hearing results after the use of the cartilage. Two main reasons why many otologists prefer fascia rather than cartilage are the easier technique of fascia harvesting and the postoperative hearing improvement.

Tragal cartilage can serve as a means to reconstruct the ossicular chain in cases with an absent incus and a reduced space between the malleus and superstructure of the stapes. In these cases, the cartilage not only repairs the eardrum but adheres to the stapes and also serves as a

means of performing an ossiculoplasty. A cartilage graft is required, if atticotomy is performed for pars flaccida retraction pocket or cholesteatoma.

In our study the composite tragal cartilage graft group there was 97.50% uptake rate and in temporalis fascia group there was 90% uptake rate. The overall result of study shows that out of 80 patients, the successful graft uptake was seen in 75 patients (93.75%) at the end of third post-operative month without any postoperative complication, while in 5 patients (6.25%) rejection of graft was observed.

In a study by Verma R. et al⁵ (2017) reported that after 3 months of follow up in 27 (90%) patients the tympanic membrane graft was intact and in 3 (10%) patients residual perforations was present. In the tragal cartilage group, after 3 months follow up, it was found that in 29 (96.67%) patients the tympanic membrane was intact and residual perforation was seen in one (3.33%) patient. They showed the overall graft acceptance rate with the cartilage graft was 96.67%.

In our study the mean composite tragal cartilage group AB gap measured preoperatively was 36.38 ± 6.10 which improved to 18.13 ± 5.84 dB post operatively. This was statistically highly significant improvement in AB gap levels. Similarly the temporalis fascia graft also improved from 28.73 ± 5.82 to 15.23 ± 8.14 dB postoperatively. This too was statistically highly significant which showed both techniques are equally effective. Our results compare well with Yetiser and Hidir⁶ (2009) postoperative airbone gap, 14.2 ± 7.7 dB cartilages versus 19.7 ± 12.0 dB fascia. Air-bone gap was significantly better in cartilage group,

Conclusion

Cartilage tympanoplasty provides excellent audiologic outcome comparable to temporalis fascia graft.

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