

TEMPORALIS FASCIA VERSUS TRAGAL PERICHONDRIMUM: A COMPARATIVE STUDY OF OUTCOMES AS GRAFT MATERIAL IN TYMPANOPLASTY

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ABSTRACT:Chronic suppurative otitis media is a major cause of morbidity with a large proportion of patients presenting with a tubo-tympanic type of disease. Type 1 tympanoplasty has been established as the standardized treatment of choice for such patients. Right since the early years of this century a number of grafts have been used for tympanoplasty. Still, there exists a controversy about which is the best graft material. A good graft material is one which is locally available, is easily harvested, is viable, easy to place and gives a good healing result. Both temporalis fascia and tragal perichondrium satisfy all these criteria. Our study was aimed out to find which amongst these two is a better graft material by comparing the efficacy of tragal perichondrium as graft material to that of temporalis fascia.

KEY WORDS:Chronic suppurative otitis media, tympanoplasty, temporalis fascia, tragal perichondrium

INTRODUCTION: Chronic suppurative otitis media is a major cause of morbidity with a large proportion of patients presenting with a tubo-tympanic type of disease. Type 1 tympanoplasty has been established as the standardized treatment of choice for such patients.

Right since the early years of this century a number of grafts have been used for myringoplasty. Still, there exists a controversy about which is the best graft material.

A good graft material is one which is locally available, is easily harvested, is viable and is easy to place and gives a good healing result and both temporalis fascia, and tragal perichondrium satisfy all these criteria.

OBJECTIVE: To compare the success rate of temporalis fascia versus tragal perichondrium as graft material in tympanoplasty procedure for management of patients suffering from tubotympanic type of chronic suppurative otitis media with a central perforation.

MATERIALS AND METHODS: A set of 50 patients suffering from Chronic Suppurative Otitis Media with central perforation with no discharge for at least 6 weeks were taken up and divided into two groups of 25 patients each and each group was matched for age and size of perforation. Criteria for patient selection included either sex in the age group of 18-45 years; good general physical condition; no evidence of active infection in nose, throat or paranasal sinuses; presence of central perforation of pars tensa of the tympanic membrane; no evidence of ear discharge with a dry ear for a minimum period of 3 weeks before the day of operation; normal eustachian tube function; good

ORIGINAL ARTICLE

cochlear reserve and lastly, no evidence of polyp, granulations or cholesteatoma in the operative ear. Exclusion criteria included history of any previous surgery in the same ear; patients with otogenic intra cranial complications in the past; evidence of otitis externa or otomycosis; patients with ossicular chain disruption or fixation of stapes foot plate and evidence of skin disease in the post auricular, pre-auricular or temporal region. A thorough pre-operative examination was done including ear microscopy and hearing evaluation was done by pure tone audiometry to assess the nature and degree of hearing loss as well as to assess the cochlear reserve. Written and informed consent was obtained from each patient. All patients underwent a type 1 Tympanoplasty. One group underwent tympanoplasty using temporalis fascia and the other group underwent the same operation using tragal perichondrium. All the operations were done under local anaesthesia with intravenous sedation. Postaural approach with underlay technique was used in all cases to rule out bias. The patient was followed up for 10 weeks and the state of the graft was assessed. Also, post-operative pure tone audiograms were compared with the pre-operative pure tone audiograms and the average gain in the AB gap was documented.

RESULTS: Patients in age group 18-45 years were included in the study to exclude factors interfering with graft uptake in extremes of age. Pre operative A-B Gap measured for both groups is as shown in Table 1. Majority of patients in both groups i.e. 65% in temporalis fascia group and 45% in tragal perichondrium group had pre-operative AB gap in the range of 21-30 dB. Patients were assessed for intact tympanic membrane postoperatively after 6 weeks. In the temporalis fascia group 2 patients (8%) had residual perforation as compared to only 1 patient (4%) in the perichondrium group who had residual perforation. Post operative AB gap measured at 10 weeks postoperatively is shown in Table 2. In both the groups majority of patients (60%) had a post op AB gap of 0-10dB, 40% had 11-20dB and 10% had 21-30 dB AB gap. Table 3 illustrates the gain in AB gap postoperatively. In the temporalis fascia group 60% of patients had 11-20 dB gain, 20% had 0-10dB and 18% had 21-30 dB gain in AB gap. In the tragal perichondrium group 60% of patients had 11-20dB gain, 16% had 0-10 dB and 20% had 21-30 dB gain in AB gap. The mean gain in AB gap in the temporalis fascia group is 15dB and in the tragal perichondrium group it is 16.5 dB. Standard deviation of gain in AB gap in the temporalis fascia group is + 7.07 and the same in the case of tragal perichondrium group is + 7.27. The p value was > 0.05 which was not significant statistically. The gain in AB gap expressed as Mean + Standard Deviation was 15db + 7.07 in the temporal fascia group and 16.5db + 7.27 in the perichondrium group. So it is statistically proved that there is no significant difference in the gain in AB gap attained by using either temporalis fascia or tragal perichondrium as graft material in tympanoplasty. Graft uptake in the temporalis fascia group was 92% and in the tragal perichondrium group was 96%.

DISCUSSION: One of the major illnesses prevalent in our country is that of chronic suppurative otitis media. A large majority of these cases belong to the safe or tubotympanic variety in which there is a central perforation present in the tympanic membrane. It leads to loss of hearing and recurrent ear discharge which contributes to the morbidity in the population. Tympanoplasty is the treatment of choice employed by otologists for these patients.

A wide range of graft materials have been used by various surgeons for repairing the perforation in the ear drum, the most commonly used in recent times being the temporalis fascia.

ORIGINAL ARTICLE

This can be harvested through the same post aural incision used for tympanoplasty. In revision cases where the temporalis fascia has already been harvested, it is sometimes difficult to obtain it again without extending the incision above the ear. Tragal perichondrium another popular choice, is also available locally, is tough and easily harvestable with just a small incision which is given on the inner surface of the tragus with an inconspicuous scar. In revision cases where temporalis fascia has already been harvested in the earlier surgery, tragal perichondrium provides a good source of graft material. With this in mind, our study was carried out to compare the efficacy of tragal perichondrium as compared to that of temporalis fascia.

It was seen that there was a 96% take up rate of tragal perichondrium as compared to 92% in case of temporalis fascia. Also the mean gain in A-B gap in patients who had undergone tympanoplasty using tragal perichondrium as graft material was 16.5 + 7.27 dB as compared to 15 + 7.07 dB in patients in whom temporalis fascia was used as a graft material. It was further seen that the p value was > 0.05 and so there was no significant difference between the gain in AB gap in either group from the discussion it can be concluded that both temporalis fascia & tragal perichondrium have shown equal resulting graft uptake and A-B Gap closure. Our study which shows almost similar results with tragal perichondrium and temporalis fascia is in accordance with other studies which show that tragal perichondrium is a viable alternative to temporalis fascia as graft material. Also, there is no statistically significant difference either in graft uptake rate or healing gain in the two graft materials. These results were consistent with earlier studies.

The surgical repair of permanent perforations of the tympanic membrane was first described as myringoplasty by Berthold in 1878.¹ The remarkable rebirth of interest in surgical closure of perforations has continued with a veritable flood of articles describing different methods.

Goodhill et al² did 19 cases of tympanoplasty using tragal perichondrium graft and in their preliminary report they have 100% take up rate in all cases and a dry ear was obtained in a short period of time. In a study conducted by Mikaelian³ in 1986, one stage reconstruction of the tympanic membrane and the ossicular chain using a composite graft of tragal perichondrium with cartilage was done. The results indicated total closure of drum perforation in all cases, and closure of air-bone gap to within 0 to 10dB in 72% of the cases. In 1995 Quraishi et al⁴ used tragal perichondrium as graft material in day care myringoplasty with a success rate of 94% in the perichondrium group as compared with 84% in the control group (no significant difference p value > 0.05), in whom temporalis fascia was grafted.

Perichondrium was used as a graft material for the first time by Goodhill¹ in 1964. According to his study he felt that mesodermal tissue was preferable for two reasons. Firstly, it gave complete freedom from possibility of post operative graft keratoma (cholesteatoma) and it proved to have a greater possibility of survival and avoidance of operative perforations. He further concluded that tragus was a very satisfactory tissue for reasons such as, accessibility in the operative site, availability in adequate amount, excellent contour, excellent survival capacity, freedom from osteogenic or chondrogenic tendencies. In his study of 19 cases of primary one stage tympanoplasties in which tragal perichondrium was used as graft material, Goodhill found that in every case a dry ear was obtained in a short period of time without graft complications.

The advantages of temporalis fascia as a graft material are that fascia has a lower metabolic rate and thus requires less blood supply and is more resistant to infection. This conclusion has been verified by Patterson et al in 1967.⁵ Also, it is the most accessible tissue and produces no deformity

ORIGINAL ARTICLE

or loss of function at the donor site; the quantity available is almost unlimited; it may be cut into any size, shape or thickness and does not have a tendency to contract and pull away from the margins of the perforation.(Farrior, 1962)⁶

CONCLUSION:

- Both, the temporalis fascia and tragal perichondrium are excellent graft materials for tympanic membrane reconstruction
- They are locally available and easily harvested
- Tragal perichondrium offers excellent graft uptake rate and closure of Air-Bone Gap comparable to temporalis fascia.

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Per operative AB gap (dB)	No. of patients	
	Temporalis fascia group	Tragal perichondrium group
1-10	0	1
11-20	5	3
21-30	15	12
31-40	5	9
Total	25	25

Table 1: Pre-operative Air Bone Gap

Post operative AB gap (Db)	No. of patients	
	Temporalis fascia group	Tragal perichondrium group
1-10	15	10
11-20	9	10
21-30	1	5
31-40	0	0
Total	25	25

Table 2: Air Bone Gap measured at Post-operative 10 weeks

ORIGINAL ARTICLE

Gain in AB gap	Temporalis fascia group		Tragal perichondrium group	
	No of Patients	Percentage	No of Patients	Percentage
0-10	5	20%	4	16%
11-20	15	60%	15	60%
21-30	4	16%	5	20%
31-40	1	4%	1	4%
	25		25	

Table 3: Post-operative gain in Air Bone Gap

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