

COMPARATIVE STUDY BETWEEN TEMPORALIS FASCIA AND TRAGAL PERICHONDRIMUM GRAFT BY UNDERLAY MYRINGOPLASTY VIA TRANSCANAL APPROACH

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ABSTRACT

BACKGROUND

Myringoplasty is the surgical method of repairing perforated tympanic membrane. Among the different techniques used, onlay and underlay are widely practised. Autologous graft materials temporalis fascia, tragal perichondrium, cartilages, fascia lata are useful.

Aims and Objectives- To compare temporalis fascia and tragal perichondrium graft in term of graft uptake rate and improvement of hearing.

MATERIALS AND METHODS

This is a prospective study conducted at Agartala Government Medical College, Tripura during 2016 July-2017 December on 60 patients having dry central tympanic membrane perforation in tubotympanic type of CSOM. Myringoplasty was done via transcanal approach by inlay technique in all the cases using temporalis fascia in 30 cases and tragal perichondrium in 30 cases after random selection of the samples.

RESULTS

The graft uptake rate was 93.33% in temporalis fascia and 86.66% in tragal perichondrium. The graft uptake rate was slightly better for temporalis fascia however there was no significant difference ($P > 0.05$). 83.33% of the patients who underwent myringoplasty with temporalis fascia grafting had post-operative A-B gap of less than 15 db and 76.66% of the patients who underwent myringoplasty with tragal perichondrium grafting had post-operative A-B gap of less than 15 db. Based on post-operative A-B gap, the results were better with temporal fascia but with no significant difference.

CONCLUSION

Both the temporalis fascia and tragal perichondrium are excellent graft materials for myringoplasty. Temporalis fascia has shown better uptake (93.33%) and hearing improvement (83.33%) than tragal perichondrium where it 86.66% and 76.66% respectively but there is no statistical significant difference ($P > 0.05$).

KEYWORDS

Myringoplasty, Temporalis Fascia, Tragal Perichondrium, Inlay Technique.

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BACKGROUND

Chronic otitis media (COM) is a long-standing infection of a part or whole of the middle ear cleft characterized by ear discharge and permanent perforation leading to hearing impairment of different magnitudes. The incidence of COM is higher in developing countries. In India, the overall prevalence rate is 46 and 16 persons per thousand in rural and urban population respectively.¹ Rural population is affected more due to poor socio-economic standard, poor nutrition, poor hygiene, lack of healthcare facilities and lack

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of health education. The disease usually a sequel of acute otitis media which may manifest as early as in children following acute upper respiratory tract infection. It affects both the sexes and all age groups. COM contributes single most leading cause of hearing impairment in rural population.

Clinically COM is divided into Tubotympanic or safe type and Attico-antral or dangerous type. Tubotympanic type involves antero-inferior part of middle ear cleft and is associated with permanent central perforation. It is usually characterized by intermittent, odourless, profuse mucoid ear discharge, mild to moderate conductive hearing loss with less risk of serious complications than squamous variety. Control of infection and repair of perforated tympanic membrane are the mainstay of treatment.

In attico-antral type, there is involvement of postero-superior part of the middle ear cleft. Bone eroding process like cholesteatoma, granulation or osteitis resulting in high risk of complication with attic or marginal perforation. It is

usually characterized by scanty, foul smelling, persistent purulent ear discharge. Removal of disease by tympanomastoid surgery with or without reconstruction of hearing is the mainstay of treatment.

Myringoplasty is the repair of perforated pars tensa of tympanic membrane without middle ear intervention and done in safe variety COM. Two techniques are used for myringoplasty - inlay technique where graft is placed medial to tympanic membrane and onlay technique where graft is placed on outer surface of tympanic membrane after removing its superficial layer.²

Various autografts have been used for repair of the tympanic membrane perforation like full thickness skin graft, Pedicled skin grafts (Frenckner 1955).³, split skin graft (Wullestein 1952.⁴ and Zollner.⁵ 1953), vein graft (Shea 1960).⁶, Fascia grafts (Heermann 1960).⁷ and Perichondrium (Jansen 1963.⁸ and Goodhill 1967.⁹). Each one of these graft materials has its advantages and disadvantages over each other. Graft materials like temporal fascia, tragal perichondrium are most commonly used in myringoplasty.

Aims and Objectives-

This study aims at comparing temporal fascia and tragal perichondrium graft in term of uptake of the graft and improvement of hearing impairment.

MATERIALS AND METHODS

This prospective hospital-based study was conducted on 60 patients at Agartala Government Medical College, during July 2016 – December 2017. A detailed history and clinical examination of the patients of chronic otitis media was done according to the proforma and case selection was done randomly. The cases were subjected to microscopic examination and pre-operative audiological test (Pure tone audiometry) was performed in each case. Routine blood tests including bleeding time and clotting time, sugar estimation, renal function test, viral serology for HIV, HCV, HBsAg, X-rays for mastoid and paranasal sinuses were done.

Inclusion Criteria

1. Age between 15 to 60 years.
2. Dry central perforation at least for 3 weeks.
3. Both males and females were included.
4. Pure conductive hearing loss of up to 40 db.

Exclusion Criteria

1. Total, subtotal or marginal perforation of tympanic membrane.
2. Mixed or sensorineural hearing loss.
3. Narrow ear canal, otitis externa, sinonasal diseases like rhinitis, sinusitis, deviated nasal septum, eustachian tube dysfunction.
4. Systemic illnesses like uncontrolled diabetes mellitus, hypertension, bleeding and coagulation disorders, heart diseases, chronic kidney diseases.

Graft Used	Hearing Improvement (Post-op A-B gap <15 db)	Hearing not Improved (Post-op A-B gap >15 db)	P value
Temporal fascia (n=30) Group-A	25 (83.33%)	5 (16.66%)	0.5186
Tragal perichondrium (n=30) Group-B	23 (76.66%)	7 (23.33%)	

Table 1. Graft Uptake

Myringoplasty was done under local anaesthesia by inlay technique via trans-canal approach using temporalis fascia in 30 patients and tragal perichondrium in 30 patients. Pre-operative Pure tone audiometry (PTA) was done for all the patients. Post-operatively, all patients had a pure tone audiogram with a four frequency average (0.5/1/2/4 kHz) calculated for both air conduction and bone conduction and examination under microscope done at 3 month and 6 month interval. Adequate coverage of antibiotics, anti-histaminics, nasal decongestions and aural care were prescribed. Aural pack was removed on post-operative day-7.

Statistical Analysis- Graft uptake and difference of degree of hearing improvement were compared in both the groups and level of significant difference was calculated using chi-square test.

RESULTS

In this study 30 patients who underwent myringoplasty using temporal fascia designated as group-A and other 30 patients using tragal perichondrium as group-B. There are 34 males and 26 females. Thus, male to female ratio stands at 1.3:1. The mean age in group-A and group-B was 32.6 year and 29.4 year respectively. Graft uptake in group-A is 28 patients while it was 26 patients in group-B. Pre-operative mean hearing loss in group-A was 30 db and 32.4 db in group-B. Improvement of hearing observed in group-A and group-B are 18.20 db and 16.80 db respectively.

Graft Material Used	Graft Uptake	Residual Perforation	P value
Temporalis Fascia (n=30) Group-A	28 (93.33%)	2 (6.66%)	0.3894
Tragal perichondrium (n=30) Group-B	26 (86.66%)	4 (13.33%)	

Table 2. Hearing Improvement

DISCUSSION

In this study all the patients underwent myringoplasty by trans-canal approach by inlay technique by a single surgical team. In harvesting the temporal fascia, graft shaving of

hair, and slightly longer incision was needed but not so while harvesting tragal perichondrium. The graft uptake rate was 93.33% in temporalis fascia and 86.66% in tragal perichondrium. The graft uptake rate was slightly better for temporalis fascia. However, there was no significant difference ($P>0.05$).

In the study conducted by Gibbs (1982).¹⁰ using temporalis fascia as graft material by the underlay technique, the percentage of uptake rate was 87.5% and similarly Strahan (1971).¹¹ also achieved graft uptake success rate for temporalis fascia graft of 87% by underlay technique. He noted 86% graft uptake rate using tragal perichondrium. A study by Dhabolkar et al (2007).¹² graft uptake achieved by temporalis fascia was 84% and 80% by using tragal perichondrium. Eviator (1978).¹³ found that the graft uptake rate with tragal perichondrium was 90.47% by underlay technique.

Jain CM (1968).¹⁴ who reported 83.33% success rate with temporalis fascia, Ahad SA (1986).¹⁵ found 83.30% success with homologous temporalis fascia, Blanshard JD (1990).¹⁶ reported 78% take-rate with temporalis fascia in paediatric tympanoplasty. P.K Parida, S.K Nochikattil (2012).¹⁷ in their study, found 80% uptake rate with temporalis fascia. Quraishi et al (1985).¹⁸ reported success rate of 94% in 32 cases of primary myringoplasty with tragal perichondrium. Goodhill (1967). reported a success rate of 100% in cases of primary myringoplasty with tragal perichondrium.

Regarding hearing improvement assessment, 83.33% patients who underwent with temporalis fascia grafting had post-operative A-B gap of less than 15 dB and 76.66% patients who underwent with tragal perichondrium grafting had post-operative A-B gap of less than 15 dB. Based on post-operative A-B gap, the results were better with temporal fascia but with no significant difference. Strahan.¹¹ achieved 82% in restoration hearing using temporalis fascia by inlay technique. John L. Dornhoffer (1997).¹⁹ studied the hearing results using perichondrial grafts the average A-B gap was 6.8 dB in the post-operative period. Hartwein (1992).²⁰ claims reduction of air bone gap of around 15 dB with tragal perichondrium graft. Jyoti P. Dabhalkar (2007).¹² reported hearing results in total 50 patients, temporalis fascia group improved in 76% while tragal perichondrium group achieved 75% hearing gain. Zingade et al (2009).²¹ opined that myringoplasty using tragal perichondrium grafts by the endomeatal approach, had better results (88%) when compared to the conventional method using temporalis fascia (84%).

CONCLUSION

Myringoplasty by inlay technique via trans-canal approach is an effective operative intervention in perforated tympanic membrane in chronic otitis media as it controls ear discharge and improves hearings. Both the temporalis fascia and tragal perichondrium are excellent graft materials for myringoplasty. Temporalis fascia has shown better uptake (93.33%) and hearing improvement (83.33%) than tragal perichondrium where it has shown 86.66% and 80%

improvement respectively but there was no statistically significant difference ($P>0.05$). Though in harvesting temporalis fascia graft, shaving of hair and slightly longer incision have psychologically impacted patient's preference for tragal perichondrium.

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