

To Compare the Graft Uptake in Permeatal versus Postaural Approaches in Myringoplasty

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ABSTRACT

Objective: To compare the graft uptake in permeatal versus postaural approaches in myringoplasty.

Study design: Cross sectional comparative

Place and Duration of Study: Department of ENT, Head and Neck Surgery, Pakistan Institute of Medical Sciences/Shahed Zulfiqar Ali Bhutto Medical University, Islamabad Pakistan from 1st March 2018 to 31st December 2018.

Methodology: Seventy two patients were classified into two equal groups. Thirty six patients underwent myringoplasty by permeatal approach and thirty six patients underwent postaural approach. Those patients were included who had mucosal type moderate central perforation with inactive disease with age 15-42 years and those patients were excluded who had small, subtotal, total, squamosal type atticofacial tympanic membrane perforation, with comorbidities and pregnancy.

Results: Thirty seven were (51.4 %) males and 35 (48.6%) were females. In both the groups the success of graft uptake was 52 (72.2%) patients and graft rejection in 20 (27.8%) patients. In each group there were 36 patients. The graft uptake in permeatal approach was 30 patients (83.3%), while the graft uptake in postaural approach was 22 (61.1%) patients. The overall graft uptake in permeatal approach is more as compared to postaural approach ($p=0.035$).

Conclusion: The permeatal approach is better than the postaural approach in terms of graft uptake in medium sized central perforations in myringoplasty.

Key words: Myringoplasty, Tympanoplasty, Permeatal, Postauricular

INTRODUCTION

For improvement of hearing, tympanoplasty is one of the various surgical techniques for repairing tympanic membrane perforation especially in chronic suppurative otitis media of tubotympanic type with inactive mucosal disease.¹ Tympanoplasty was introduced by Wullstein in 1953 for reconstruction of middle ear to improve conductive hearing loss due to CSOM and ear diseases.²

There are many tympanoplasty techniques for getting more attractive results with better hearing namely over lay, under lay, over under lay, gel film sandwich, crown cork, swinging door, laser assisted spot, welding procedure, micro clip, facial pegging, angular wedge, loop, lobule fate graft, paper patching, tympanic membrane self-stabilizing patches.³⁻⁵

Permeatal approach is a technically easier approach and is less traumatic.⁶ For this reason, I advocate that it is a better approach in medium sized central perforations in terms of graft uptake using tragal perichondrium graft.

MATERIALS AND METHODS

This cross sectional comparative study was conducted at Department of ENT, Head and Neck Surgery, Pakistan Institute of Medical Sciences/Shahed Zulfiqar Ali Bhutto Medical University, Islamabad Pakistan from 1st March 2018 to 31st December 2018 and comprised 72 patients. All patients having medium size central tympanic membrane perforation, CSOM, inactive mucosal disease with 3 month of dry ear, having pure conductive hearing loss with chronic suppurative otitis media measured by pure tone audiometry and age group 15 to 45 years were included. Patients with small, subtotal, and total tympanic membrane perforation, malformation of ear such as very small outer canal of ear, DNS, chronic tonsillitis, allergic rhinitis, co-morbidities like diabetes, hypertension, stroke, IHD, TB, recurrent tympanic membrane perforation, SNHL, pregnant patients and attic perforation with or without cholesteatoma were excluded. Patients were separated in two equal sub groups: **Group A:** Thirty six patients with moderate central tympanic membrane perforation with inactive mucosal disease type and operated through permeatal approach and **Group B:** Thirty six patients with central tympanic membrane perforation with moderate and inactive mucosal type, operated

through post aural approach. All the patients underwent myringoplasty through permeatal and post aural approaches. All patients were followed up after 21 days and graft uptake was seen by otoscope. All the study procedures and data collection was done by candidate under supervision to reduce the chances of selection bias and to maintain data continuity and quality. The outcome was comparison of graft uptake between the two study groups. The data was entered and analyzed through SPSS-25. To compare the two approaches such as permeatal and post-aural approach in term of graft uptake, Chi square test applied and $P \leq 0.05$ which is significant.

RESULTS

There were 37 (51.4%) males and 35 (48.6%) females with mean age 24.14 ± 6.898 years. The graft uptake was observed in 52 (72.2%) patients, graft rejection in 20 (27.8%) patients. Thirty six patients underwent surgery through permeatal approach, while 36 patients through post aural approach with mean age 24.64 year and 23.64 year respectively (Table 1).

Nineteen (52.8%) males while 17 (47.2%) females through permeatal approach and 18 (50%) males, 18 (50%) females underwent post aural approach (Table 2).

Thirty (83.3%) patients took up graft while 6 (16.7%) patients rejected graft uptake through permeatal approach and 22 (61.1%) patients took up graft while 14 (38.9%) patients rejected graft uptake in post aural approach (Table 3).

Table 1: Demographic information of the patients (n=72)

Variable	No.	%
Gender		
Male	37	51.4
Female	35	46.6
Graft uptake and graft rejection		
Yes	52	72.2
No	20	27.8
Age (years)	24.14±6.89	
Approach		
Permeatal	24.64±6.56	
Post aural	23.64±7.27	

So, 30 patients accepted graft uptake and 6 patients rejected graft uptake in permeatal approach while 22 patients took up graft while 14 patients rejected graft uptake in post-aural approach. Statistically significant ($p=0.035$) results were better with permeatal approach (Table 4).

Table 2: Frequency of awareness about various diagnostic tools for PAD (n=292)

Diagnostic Tool	No.	%
Clinical examination	230	78.8
Pulse examination	203	69.5
Ankle brachial index	80	27.4
MRI	75	25.7
Angiography	85	29.1

Table 2: Comparison of approaches according to gender

Gender	Approach	
	Permeatal	Postaural
Male	19 (52.8%)	18 (50%)
Female	17 (47.2%)	18 (50%)

Table 3: Comparison of approaches according to terms graft uptake and graft rejection

Graft uptake and graft rejection	Approach	
	Permeatal	Postaural
Yes	30 (83.3%)	22 (61.1%)
No	6 (16.7%)	14 (38.9%)

Table 4: Comparison of outcome of both groups

Outcome	Approaches		P value
	Permeatal	Postaural	
Yes	30	22	0.035
No	6	14	

DISCUSSION

Tympanoplasty is a major surgery in which ossicular reconstruction as well as the repair of perforated tympanic membrane is performed.³ First description regarding myringoplasty and tympanoplasty was done in 1878 than its actual foundation established in 1952, Germanshave major contribution in the development of tympanoplasty. After that Horst Wullstein in 1958 worked on classification of middle ear repair.⁷ Myringoplasty is done for repairing tympanic membrane perforation, which gets perforation due to trauma or COM, if it does not heal in three months.

The placement of graft, lateral to TM is known as on-lay procedure in case of placement medial to TM is called under lay procedure. In under lay procedure, tympanomeatal flap is elevated and then graft is pushed under it, bed is formed by sponge stone, graft is placed either lateral to handle of malleus or medial to handle of malleus.^{8,9}

It has already been recorded that multiple graft materials have been used to reconstruct tympanic membrane including skin, fascia, vein, perichondrium, dura and cartilage. Presently the most easily available graft material is tragal perichondrium.¹⁰

Tragal perichondrium is used in permeatal because it is less traumatic, less time consuming with less wound dehiscence and no scar. In case of small tympanic perforation fat is used, taken from pinna. Permeatal approach can be done 30 to 60 minutes while postaural and endaural approaches required about two to three hours. In our setup, patients' ear kept dry at least three months, given oral antibiotics and topical antibiotics with anti-allergic, anti-inflammatory, nasal sprays for three months. Patient remains admitted for three days and kept on intra venous antibiotics, I/V painkiller.⁷

There are many factors which affect graft uptake in myringoplasty. First through post aural approach more tissue trauma occurs, resulting in graft rejection as compared to permeatal approach where less trauma occurs, resulting in graft uptake. Second through post aural approach raising of tympanomeatal flap from external auditory canal develops swelling post operatively, while in permeatal approach it can be prevented. Preservation of vascular strip is not affected through permeatal approach which also results in graft uptake while in post aural approach it is greatly affected which results in graft rejection and

delayed wound healing. These are some factors which have major role in graft rejection as well as wound dehiscence.³

Fibrin net is formed by blood clot from freshened margin of TM, helps in holding graft at specific place, during early post of period. After that epithelization and vascularization of graft materials occur post operatively. In permeatal approach, blood supply of tympanic membrane is preserved during entire process, while in post aural approach blood supply from tympanic membrane is compromised which results in graft rejection in case of post aural approach and graft uptake in case of permeatal approach.³

The advantages of microscope in post aural approach is that it is bimanual and binocular visualization of field but its disadvantages is that, its field of vision changed frequently due to patient's head manipulation for a better vision and microscope has to be repeatedly mobilized.¹¹

In our study, uptake of graft was 83.3% in case of permeatal approach as compared to post aural which was 61.1%. A comparative study done by Thirumaran¹² showed that permeatal approach is better than post aural approach, graft uptake through permeatal was 93% while in post aural approach graft uptake was 91%. According to Mohindra et al¹¹, in ossiculoplasty through permeatal approach, graft uptake with rigid microscope was 91.5%.

Das et al¹³ did a on the impact of size of perforation. According to them success rate according to size of perforation was, in pinpoint it was 100%, in small TM perforation 100%, medium size 80%, large perforation 69.2%, subtotal perforation 42.9% and for total perforation 80%.

CONCLUSION

Permeatal approach is better than post aural approach in term of graft uptake in central medium sized perforations. The graft material being tragal perichondrium with all procedures done by underlay technique.

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