



Efficacy of Fat Graft Myringoplasty in Small Central Perforation of Tympanic Membrane

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Introduction: Many office procedures are done for small size tympanic membrane perforation. The purpose of this study is to assess the usefulness and efficacy of fat as a graft material for the closure of small-sized tympanic membrane perforations.

Materials and Methods: Study is conducted among the patients coming to ENT OPD who suffer from non-healing small central perforation of Tympanic membrane at Rajah Muthiah Medical College and Hospital, Chidambaram during the study period between November 2020 to October 2022. All patients were evaluated preoperatively using audiometry for the type and degree of hearing loss and compared with postoperative audiometry to know the hearing improvement. Fat graft from the ear lobule is used for the closure of Tympanic membrane perforation.

Results: Among 30 patients in a age group of 18-60 years 21 were females and 9 were males. Among 30 patients, 15 had perforation in right ear and 15 in left ear. Antero-inferior quadrant (n=15) was most commonly involved quadrant. Success rate was found to be 90%.

Conclusion: Fat graft Myringoplasty is a simple and cost effective procedure which can be done as a outpatient procedure with high success rate.

Keywords: Fat graft, small central perforation, audiometry

Introduction

Tympanic membrane perforations occurs as a result of infection, trauma, or the sequelae of tympanostomy tube insertion. Without closure morbidity may include hearing loss, chronic otorrhea and cholesteatoma formation. Myringoplasty, the most common otologic surgical procedure, involves the use of graft to repair a TM perforation. RINGENBERG was first to report Fat Myringoplasty. Several other authors have also reported their experiences with FM, and most of those investigators noted that the success rate of closure of perforation ranged between 76% and 100%. FM is an easy, quick and cost effective

method of TM perforation closure with minimal morbidity. It can be done as an outpatient department or office procedure. The fat is readily available from ear lobule.

Aims

To study the effectiveness of Fat graft myringoplasty in small central perforation of tympanic membrane.

Objectives

1. To find out the success rate of closure of Tympanic membrane perforation by FM.
2. To measure the hearing gain in successful cases.

Materials And Methods

This is a single group interventional study conducted among the patients coming to ENT OPD who suffer from non-healing small central perforation of Tympanic membrane at Rajah Muthiah Medical College and Hospital, Chidambaram during the study period between November 2020 to October 2022. Sample size of the patients taken into consideration for the study is 30.

Inclusion Criteria

1. Age more than 18 years
2. Patients with central perforation of Tympanic membrane
3. Ear must be dry for atleast 4 weeks.
4. No significant pathology in tympanic cavity.

Exclusion Criteria

1. Patients with active discharge
2. Patients with margins of Perforations are epithelialized
3. Patients with evidence of mastoid diseases on X-ray
4. Patients with ossicular pathology who have more than 40dB hearing loss.
5. Pure sensorineural hearing loss.

Materials

1. 4mm-wide angled zero degree Hopkin's endoscopes.
2. Video equipment consisting of three chip camera
3. Ear microscope
4. Middle ear micro-surgical instruments such as sickle knife, Rosen's knife, pick, alligator, cup forceps, micro-suction.
5. Gelfoam
6. High definition LED monitor placed opposite to the surgeon
7. Tuning fork and Pure Tone Audiometry.

8. Pure Tone Audiometry for audiological examination of the patient pre-and post-operatively.

Methodology

After considering all this criteria, detailed history and clinical examination of ear, nose and throat will be carried out. Appropriate antibiotics will be given to patients to maintain the ear dry for 4 weeks. Patient will be examined for size of perforation, location of perforation according to quadrant and status of middle ear mucosa. The size of the perforation will be assessed with an endoscope and perforations smaller than 4mm will be included in the study. Pure tone audiogram will be done in every selected patient who are considered for the study to access the degree and type of hearing loss. Only the patients with pure conductive type of hearing loss will be taken up for study. The pre-treatment audiogram will be compared with post-treatment audiogram (after Fat Myringoplasty) to know the hearing improvement.

Procedure

The patient is made to lie in supine position with head turned towards the opposite side. The procedure is done under local anaesthesia. Fat graft, about 2 times the size of the perforation is harvested from the posterior aspect of the lobule of the affected ear. The approach is through trans-canal under microscopic guidance. The margins of the perforation are freshened using a sickle knife. The fat graft is introduced into the perforation and made to fit snugly like a dumbbell after filling the middle ear with gelfoam for support. The fat graft is overlaid with gelfoam in the external auditory canal. After ensuring complete hemostasis, dressing applied. On the next day patient is discharged. The patients are followed up regularly and pure tone audiometry is performed at 2 months.

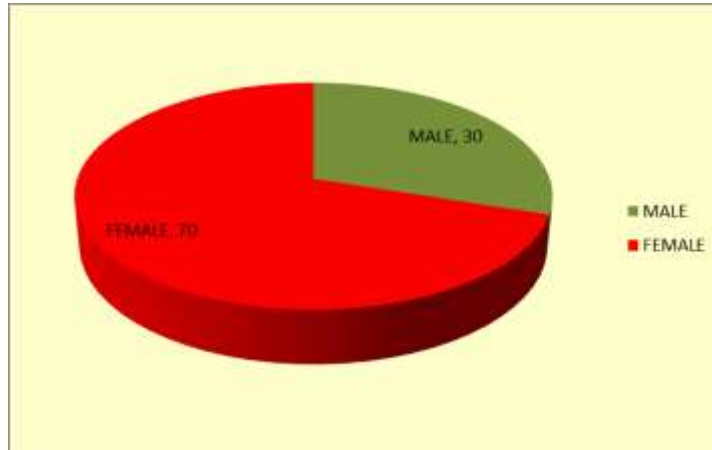
Observations And Results

Among 40 patients taken into study 21 were females and 9 were males in the age group of 18- 60 years. Most of the patients, around 12 cases (40%) were in the age group of 31-40 years.

Table 1: Gender Distribution

Gender	N	%
Male	9	30
Female	21	70
Total	30	100

Fig 1: Gender Distribution

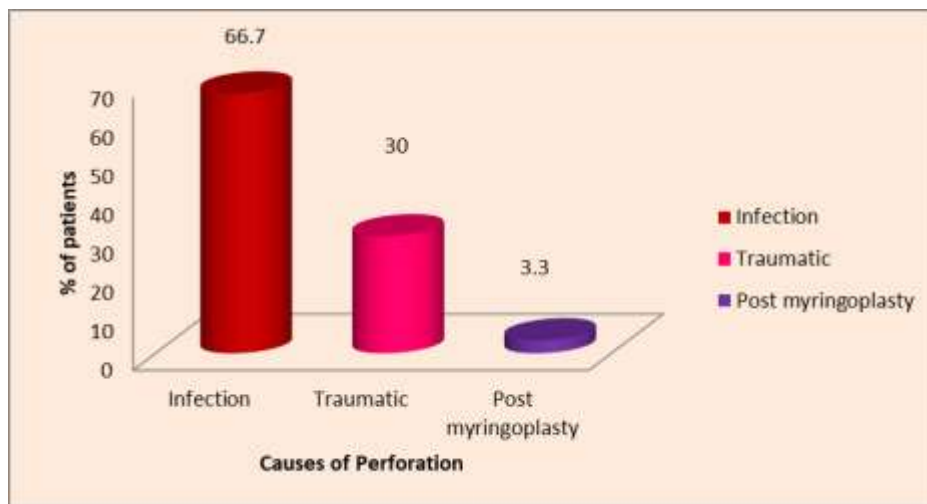


Among 30 patients 15 cases (50%) had right ear perforation and 15 cases (50%) had left ear perforation, and the most common cause of perforation was infection around 20 cases (66.7%) followed by trauma 9 cases (30%) and post myringoplasty was 1 case (3.3%)

Table 2: Aetiology of Perforation

Aetiology	N	%
Infection	20	66.7
Trauma	9	30
Post Myringoplasty	1	3.3

Fig 2: Aetiology of Perforation



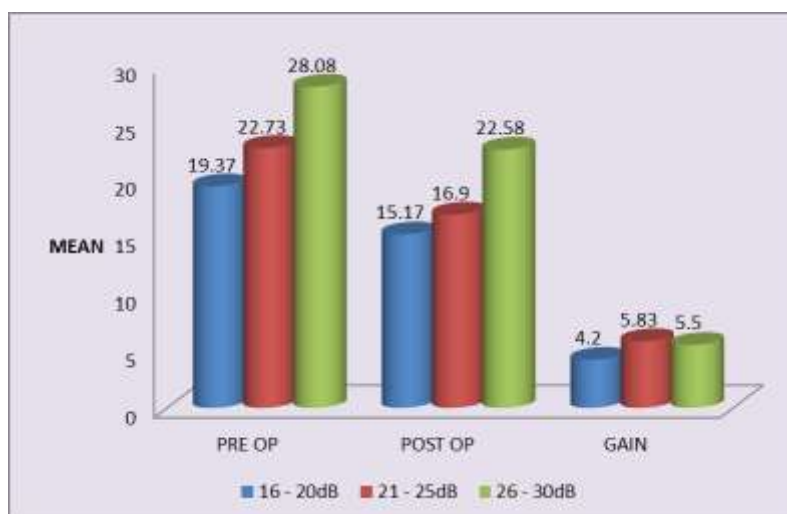
Among 30 patients, anteroinferior quadrant was most commonly involved 15 cases (50%) followed by posteroinferior quadrant 11 cases (36.7%) and anterosuperior quadrant 4 cases (13.3%).

Among 30 patients, patients in the range of 16-20dB the mean pre PTA was 19.37 and it was improved to 15.17 after operation with hearing gain of 4.20dB. In the hearing decibel range of 21-25dB, the mean pre-operative PTA was 22.73 and it was improved to 16.90 post-operatively with a hearing gain of 5.83dB. In the hearing range of 25-30dB, the mean pre-operative PTA was 28.08 and it was improved to 22.58 post-operatively with a hearing gain of 5.50dB.

Table 3: Hearing improvement

Hearing Loss	Pre op PTA	Post op PTA	Hearing gain
16-20dB	19.37	15.17	4.20
21-25dB	22.73	16.90	5.83
25-30dB	28.08	22.58	5.50

Fig 3: Hearing improvement



Among 30 patients, 27 cases (90%) had successful closure and only 3 cases (10%) had failure. Most of the patients had complete closure of the perforation at 4th week (80%), and at third week (10%).

Discussion

The first recorded attempt at Myringoplasty was by Marcus Banzer¹ in 1640, who tried to repair the tympanic membrane perforation by using a small ivory tube. The first successful surgical closure using auto graft with a full thickness free skin graft was performed by Berthold in 1878 and he introduced the word 'Myringoplasty'. The Fat Graft Myringoplasty was 1st introduced by Ringerberg² in 1962 as an office based procedure for adult patients. The study by Kaddour HS³ in 1992 recommends that fat graft myringoplasty can be done as a day-care procedure with 80% closure rate with 11dB hearing gain. U Chalishazar⁴ advises that this procedure can be done in the out-patient department with minimum morbidity and reported 90% success rate. A study by Konstatidinis *et al*⁵ recommended fat myringoplasty as a cost effective alternative to conventional temporalis fascia graft myringoplasty and reported 81.8% success rate. In a study by R B Mitchell *et al*⁶ said fat myringoplasty can be done as a day-care procedure for children with good results. They reported a 92% success rate. In a study by Manoj Mukherjee *et al*⁷, hearing gain was 7.2dB and achieved 92% success rate. In a study by Priti Rakesh *et al*⁸ to compare the effectiveness of fat plug myringoplasty and chemical cauterization with 50% TCA and the success rate was 96.7% in fat myringoplasty and 90.62% in chemical cauterization.⁹⁻¹⁰

The following analysis was obtained from our study:

Majority of the patients in our study belonged to the age group of 31-40years (40%). The youngest patient was 18 years old and the oldest patient was 60 years old. In our study there were 21 females and 9 males. Infection (n=20) (66.7%) was the most common cause for small size perforation. Most of the patients had small sized central perforation. Right ear (n=15) (50%) disease and left ear (n=15) (50%) disease. Antero-inferior quadrant (n=15) (50%) was involved most among four quadrants. There was hearing improvement in almost all patients who had complete closure of perforation. Infection (n=2) and Otomycosis (n=1) was the most common factor for failure. The effectiveness of Fat Myringoplasty was found to be 90% where 27 patients out of 30 patients had successful closure and failure was found to be 10%, 3 patients out of 30 patients.

Conclusion

Fat Myringoplasty is effective in closing small tympanic membrane perforations. The technique is simple to perform, is less time consuming, cost effective with minimal patient morbidity and significant hearing improvement. Hence, we recommend Fat Myringoplasty for small tympanic membrane perforation.

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