

FAT MYRINGOPLASTY IN A TERTIARY CARE GOVERNMENT HOSPITALPaidi Ramesh Chandra¹, Seepana Muralidhara Rao²¹Assistant Professor, Department of ENT, Andhra Medical College, Visakhapatnam.²Associate Professor, Department of ENT, Andhra Medical College, Visakhapatnam.**ABSTRACT****BACKGROUND**

Myringoplasty is the surgical procedure performed for the closure of perforations of pars tensa of the tympanic membrane. Various graft materials are used such as temporalis fascia, periosteum, perichondrium, vein, dura and adipose tissue (fat). Fat myringoplasty is a simple, cost effective and outpatient procedure. This study is performed to evaluate the operative outcome of fat myringoplasty in patients with Chronic Suppurative Otitis Media (CSOM).

The aim of the study is to assess graft uptake to assess hearing improvement and to assess the operative outcome in relation to the site of perforation after fat myringoplasty.

MATERIALS AND METHODS

This study was performed in Government ENT Hospital, Andhra Medical College, Visakhapatnam. A total of 20 patients between the age group of 18-50 years suffering from tubotympanic type of chronic suppurative otitis media were taken up for study. The study period was for 18 months from October 2015 to March 2017.

RESULTS

Results were analysed in terms of graft uptake and hearing improvement. Average audiometric gain after 6 months was 10.58 dB. Successful closure of perforation was achieved in 90% cases. Perforations involving posterior quadrant showed 100% graft uptake, compared to anterior quadrant perforations, which showed 75% graft uptake. No major postoperative complications were noted.

CONCLUSION

Fat myringoplasty can be safely performed in dry, small central perforations of tympanic membrane especially belonging to posterior quadrant. Ear lobule constitutes convenient source of fat graft. The procedure can be performed as a day care surgery. Proper selection of cases is necessary to obtain good results.

KEYWORDS

Fat Myringoplasty, Chronic Suppurative Otitis Media, Tubotympanic Type, Graft, Perforation, Ear Lobule.

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BACKGROUND

The purpose of myringoplasty is to render the ear safe, dry and functional. The first record attempt at myringoplasty was by Marcus Benzer¹ in 1640. The first surgical closure using autograft (a full thickness free skin graft) was performed by Berthold² in 1878 and he introduced the word "myringoplasty" Wullstein and Zollner popularised the myringoplasty technique in 1951 and with improved optics and microsurgery, which is still practiced in modern days. Various graft materials used since that time are skin, amniotic membrane, mucous membrane, dura mater, cornea, periosteum, vein, adipose tissue (fat), perichondrium and temporalis fascia. Various sources of fat tissue were utilised, namely ear lobule, abdominal wall,

upper thigh, buttocks and pretragal area. The use of adipose tissue was first introduced by Ringenberg³ in 1962. Ringenberg and Fornato⁴ in 1962 reported primary closure of perforation of tympanic membrane using fat graft in 86 patients. He compared microscopically ear lobule fat, abdominal fat and buttocks fat. The comparison showed that the fat cells of ear lobule fat were found to be more compact and contain more fibrous tissue than the abdominal or buttocks fat.⁵ This according to Ringerberg should provide a stronger and denser scaffold to allow for greater retention of graft during epithelialisation. There is significant bulging on the tympanic membrane till the end of third month postoperatively and after 3 months bulging of fat graft progressively disappeared and converted into a smooth sclerotic area on the tympanic membrane by the end of fifth month.

There are two histological theories of fat grafts. 1. The host cell replacement theory of Neuhof.⁶ 2. The cell survival theory of Peer.⁷ The host replacement theory states that all the original cells die and is totally replaced by new wondering adipocytes or fibroblasts. The cell survival theory states that not all the original adipocytes die. Those fat cells

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which receive adequate blood supply survive, whereas remaining cells degenerate explaining loss of volume. The transplanted fat cells are not replaced by scar tissue; instead connective tissue capsule outside the fat graft begins three weeks after transplantation, which becomes progressively thinner over the course of a year. Fat myringoplasty is nevertheless a simple, cost effective and an outpatient procedure. Day care surgery has become an integral part of modern otolaryngology. Additional advantage of this method is that possible complications of classic technique such as iatrogenic trauma middle ear violation can be avoided. In addition, it has been suggested that fat may have a better prognosis than traditional underlay in anterior perforations as it does not require support at the level of the anterior annulus.

MATERIALS AND METHODS

The present study was conducted in Government ENT Hospital attached to Andhra Medical College, Visakhapatnam. A total of 20 patients between the age group of 18-50 years suffering from chronic suppurative otitis media were taken into the study. The study period was 18 months extending from October 2015 to March 2017.

Inclusion Criteria

1. Dry, small, central perforation not exceeding 25% of pars tensa of the tympanic membrane.
2. Perforation present for at least 6 months and dry for 6-8 weeks preoperatively.
3. Pure tone audiometry showing conductive hearing loss with air-bone gap not exceeding 25 dB.
4. Patients with residual perforation after previous surgery.

Exclusion Criteria

1. Ear discharge within two months prior to surgery.
2. Above 50 years of age to exclude presbycusis.
3. Patients with sensorineural hearing loss.
4. With coexisting middle ear conditions like tympanosclerosis, ossicular fixation or ossicular discontinuity.
5. Presence of mastoid pathology.

Procedure of Fat Myringoplasty and Followup- The osseocartilaginous junction is infiltrated with local anaesthesia (2% adrenaline with 1 in 1,00,000 adrenaline, the ear lobule is also infiltrated in the posterior aspect. Endomeatal approach is used. The edges of the perforation are freshened. A small incision is made in the posterior aspect of the ear lobule and a large piece of fat (approximately double the size of perforation) was harvested. The incision is closed with 4-0 chromic catgut. The middle ear is packed with a small piece of Gelfoam through the perforation. The fat graft was introduced through the perforation in a dumbbell fashion, so that it fills the depth of the middle ear with a small part lateral to the tympanic membrane. Patient is discharged within 6 hours of surgery. Patient is instructed to take oral antibiotics for 6 days and not to blow the nose postoperatively. Follow up

visits were scheduled 1, 3 and 6 months postoperatively. Clinically, patients were examined regarding graft uptake, mobility of the tympanic membrane and tuning fork tests. Audiologically, patients were subjected to pure tone audiometry 6 months postoperatively.



Figure 1. Incision Over Ear Lobule for Harvesting Fat Graft



Figure 2. Placement of Fat Graft in A Dumbbell Fashion



Figure 3. Postoperative Picture

RESULTS

Of the 20 subjects in the study, the age varied between 18-50 years, mean age being 28 years. Males were 16 (80%) and females were 4 (20%). Right ear was involved in 15 subjects (75%) and left ear in 5 subjects (25%) in the present study. In the study, the quadrants of the tympanic membrane involvement varied as follows- anterosuperior - 4, anteroinferior - 6, posterosuperior - 5 and posteroinferior

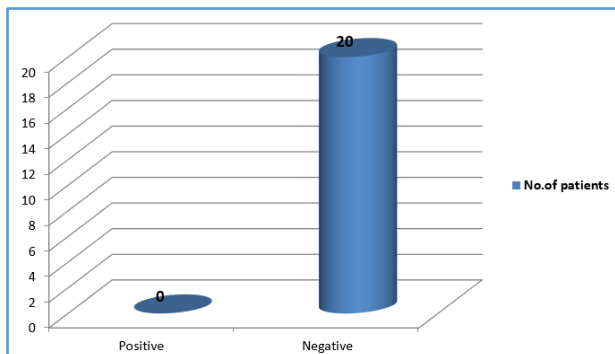
- 5. Preoperative Rinne test was negative in all 20 subjects. Postoperatively, Rinne test was positive in 18 subjects and negative in 2 subjects. Preoperative pure tone audiometry showed 2 subjects hearing loss of 16-25 dB, 17 subjects hearing loss of 26-40 dB and 1 subject hearing loss more than 40 dB. The mean hearing loss was 31.67 dB. Postoperatively, 12 patients had hearing gain <10 dB, 7 patients had hearing gain 10-20 dB and 1 patient hearing gain >20 dB. Mean audiometric gain in the present study was 10.58%. Postoperative graft uptake was seen in 18 patients (90%) and in 2 subjects (10%), the graft did not take up. Of the 10 subjects of anterior perforations, graft uptake was seen in 8 cases (80%). Of the 10 subjects of posterior perforations, graft uptake was seen in all (100%) cases. Postoperative complications, which include residual perforation and ear discharge were seen in 2 subjects, whereas in 18 subjects, there were no complications.

Preoperative Rinne Test	Number of Patients (%)
Positive	0 (0%)
Negative	20 (100%)

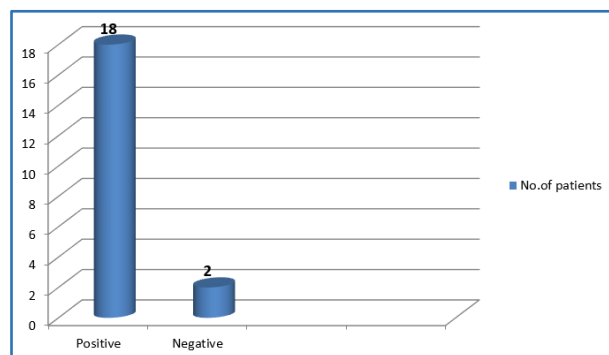
Table 1. Preoperative Rinne's Test

Postoperative Rinne Test	Number of Patients (%)
Positive	18 (90%)
Negative	2 (10%)

Table 2. Postoperative Rinne's Test



Graph 1. Preoperative Rinne's Test



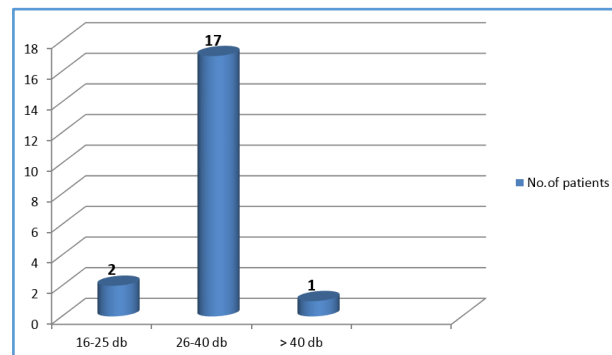
Graph 2. Postoperative Rinne's Test

Hearing Loss in dB	Number of Patients (%)
16-25 dB	2 (10%)
26-40 dB	17 (85%)
>40 dB	1 (5%)

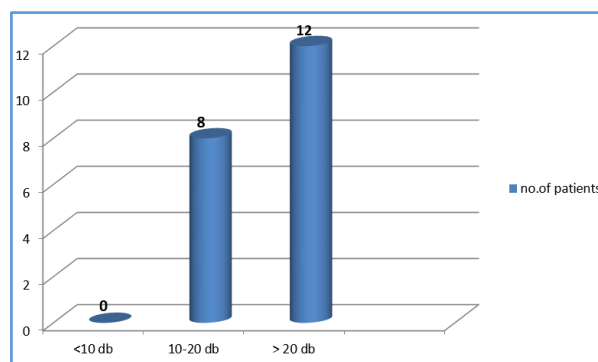
Table 3. Preoperative Hearing Loss

Hearing Loss (dB)	Number of patients (%)
<10 dB	0 (0%)
10-20 dB	8 (40%)
>20 dB	12 (60%)

Table 4. Postoperative Hearing loss



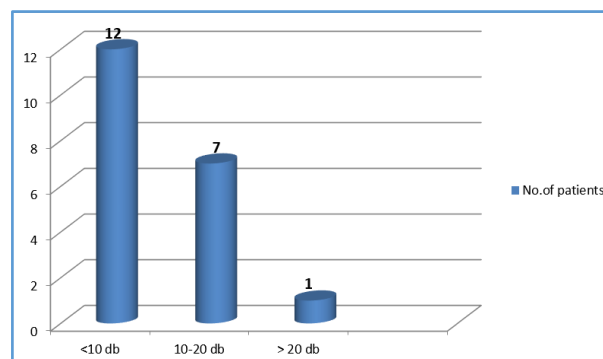
Graph 3. Preoperative Hearing Loss



Graph 4. Postoperative Hearing Loss

Hearing Gain in dB	Number of Patients (%)
<10 dB	12 (60%)
10-20 dB	7 (35%)
>20 dB	1 (5%)

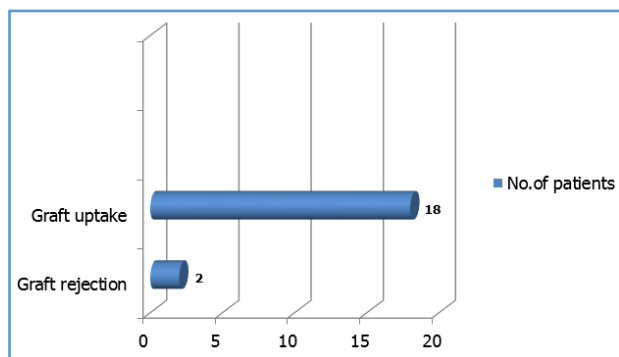
Table 5. Audiometric Gain



Graph 5. Audiometric Gain

Result	Number of Patients (%)
Graft taken	18 (90%)
Graft not taken	2 (10%)

Table 6. Postoperative Graft Status



Graph 6. Postoperative Graft Status

DISCUSSION

In the present study, the age of the patient varied between 18-50 years. In this age group, there is less chance of upper respiratory infections and presbycusis. Michael and Glasscock et al (1982)⁸ reported in their study that there is no difference in the take rate of graft based upon the age of the patient. In the present study, the take up rate of the graft for different age groups were the same. Male:female ratio is 4:1 in the present study. Patients with only small perforations not exceeding 1/5th of the tympanic membrane were included. John B Booth (1973)⁹ in a large series of myringoplasties demonstrated that higher closure rates were achieved with perforations of less than 50%. Halik, Smith (1988)¹⁰ in their study found higher risk of failure of graft in anteroinferior quadrant. Gian Antonio Bertoli et al¹¹ in their study noted a low closure rate of anterior perforations (67.77%) compared to that of posterior perforations (90.5%). In our study, the graft take up rate was lower for anterior perforations (80%); for posterior perforations, the take up rate was 100%. In the present study, in all the 20 subjects, fat was harvested from ear lobule. Microscopic comparison of fat from 3 sources (ear lobule, abdomen, buttocks) showed that fat cells from ear lobule were more compact and contains fibrous tissue. Hani GI Garem et al in their study of fat myringoplasty using different types of fat noted the success rate for ear lobule fat was 80%, whereas for abdominal fat was 73.3%.

In the present study, the results are expressed in terms of graft uptake and hearing improvement. 18 out of 20 patients (90%) showed good graft uptake. The take up rates were comparable to the studies by Ozgursoy and Yorulmaz et al,¹² Landsberg et al,¹³ Ringenberg et al^{3,4,5} and Kaddour et al.¹⁴ Preoperatively, the mean hearing loss was 31.67%. The postoperative pure tone audiometry was done after 6 months of surgery, which showed that average gain in hearing was 10 dB. Postoperative pure tone audiometry, the mean was 21.08 dB, the mean hearing gain being 10.58%. Caye-Thomsasen et al (2007)¹⁵ in their study of 26 cases, the mean preoperative pure tone average was 20.1 dB, the mean postoperative pure tone average was 11.5 dB and thus a hearing gain of 8.6 dB. Brown C et al (2002)¹⁶ in their study of 193 patients, myringoplasty, the mean preoperative air conduction average was 35 dB, while the mean postoperative average was 25 dB, thus average air conduction improvement was 10 dB.

CONCLUSION

Myringoplasty, which is one of the most commonly performed otological surgeries uses a variety of graft materials like temporalis fascia, perichondrium, periosteum, cartilage, fat, etc. have been used. Fat myringoplasty is a technique, although known for over 40 years is becoming popularly recently due to its advantages. Fat can be easily harvested in a very short time and there is no visible scar and minimum donor site morbidity. It is a simple procedure that does not need much expertise. As there is virtually no manipulation of the middle ear structures, the risk of iatrogenic otological trauma is low. It avoids general anaesthesia. It can be performed as an outpatient procedure and the patient can be discharged on the same day. It causes minimal discomfort and high success rate after proper case selection. Bilateral procedures can be done quite safely. There is very limited postoperative care. It is simple and cost-effective technique in managing small, dry and central perforations of the tympanic membrane. The success rate of fat myringoplasty is very high and comparable to the results of temporalis fascia myringoplasty. In conclusion, fat myringoplasty can safely be performed in cases with dry, small central perforations of the tympanic membrane. The ear lobule constitutes convenient source of the fat plug. Proper selection of cases is the key for achieving the best results.

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