

Original Research Article

Closure of small perforation in tympanic membrane by use of fat plug

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ABSTRACT

Background: Chronic suppurative otitis media presents mostly with ear discharge and associated decreased hearing. Tympanoplasty is the established surgery for tympanic membrane perforation. Most commonly used graft material for tympanoplasty is temporalis fascia. Others are fascia lata, tragal perichondrium, tragal cartilage, fat. The objective of the study was to compare the graft taken up and hearing improvement following myringoplasty with use of fat.

Methods: Patients of CSOM aged 10 to 65 years old with small central perforation which is dry for at least 3 weeks with normal middle ear mucosa and intact ossicular chain with mild conductive hearing loss. The present study was carried out in Ear, neck and throat (ENT) Department of SCL hospital, Ahmedabad from July 2016 till September 2018 and 25 patients were randomly selected fulfilling the above criteria.

Result: The choice of graft affects not only the outcome of surgery, but also determines the complexity of the procedure and the time taken for the same. Study proves that fat is also a one of the good grafting material which is easily available and keep to prevent from major surgery. The results have been quite encouraging.

Conclusion: Study proves that fat is also a one of the good grafting material which is easily available and keep to prevent from major surgery. An added advantage of this technique was the excellent post-operative quality of life of the operated patients, assessed in terms of the chronic ear survey and evident by the absence of the usual post-operative complaints following a conventional myringoplasty.

Keywords: Chronic suppurative otitis media, Myringoplasty, Tympanoplasty

INTRODUCTION

Earlier, ear infections with complications were considered to be a very difficult task to manage. However now, with introduction of antibiotics for control of infections and use of operative microscope for reconstruction of hearing mechanism, has led to drastic improvement in outcome of otitis media. Chronic suppurative otitis media (CSOM) is the most commonly faced otological condition by Ear, neck and throat (ENT) surgeons.^{1,2}

It presents mostly with ear discharge and associated decreased hearing. It can be managed conservatively or with surgery. Medical management of CSOM includes use of antibiotics and decongestants with symptomatic

treatment of associated complaints.³ Tympanoplasty is the established surgery for tympanic membrane perforation routinely carried out by otolaryngologists.^{4,5} Most commonly used graft material for tympanoplasty is temporalis fascia. Other graft materials used are fascia lata, tragal perichondrium, tragal cartilage, fat.^{5,6} Each of them has got its own merits and demerits. In the present study we are using fat as a graft material for tympanic membrane perforation.

METHODS

The Prospective study was carried out in E.N.T. Department of SCL General Hospital, NHL MMC, Saraspur, Ahmedabad from July 2016 till September 2018

and 25 cases were included in the study. Patient presenting to outpatient department and fulfilling the following criteria were included in study.

Inclusion criteria

Patient within age group of 10 to 65 years with small central perforation which is dry for at least 3 weeks with normal middle ear mucosa and intact ossicular chain with mild Conductive hearing loss (CHL) of Average air conduction threshold <45 db at 0.5,1,2,4 KHz.

Exclusion criteria

Patients having perforation with otorrhoea, retraction pocket, with ossicular chain involvement suggested by moderate to severe CHL along with sensory neural hearing loss.

Data collection

25 patients were randomly selected fulfilling the above criteria. A proforma was prepared for all the cases, findings were noted and treatment and follow up was charted. After clinical examination was over, routine investigation done. All patient underwent Pure tone audiometry (PTA) and x-ray mastoids. Surgery was carried out under local anaesthesia with sedation in majority patients while few were under general anaesthesia. Graft used was fat harvested from ear lobule or thigh.

Surgical procedure of fat myringoplasty

The ear is painted with povidine iodine scrub and spirit and were draped using sterile technique. Injection 2% xylocaine with 1:100,000 adrenaline infiltrated locally in ear lobule or thigh. After giving an incision in the ear lobule or thigh, Fat graft was harvested, and the incision site was closed by 3-0 ethilon. Under an operating microscope the edges of the tympanic membrane perforation were freshen up. The harvested fat plug is then kept like a dumbbell, one part of which is in the middle ear and other lateral to tympanic membrane then it is supported by a few pieces of gel foam from outside. Cotton plug kept in the ear canal.

Follow Up

Postoperatively the patient was given antibiotics, analgesics, anti-histaminic and antacids. Patients are called for regular follow ups and advised regarding care of ear. On post-operative day 7, suture removal was done. Neosporin ointment was filled in the external canal on the 7th postoperative day and topical antibiotic ear drops were started post operatively on the 21st day. Patients were observed at their follow up visits on 1 week, 2 weeks, 4 weeks and 8 weeks from post-operative day. Pure tone audiogram was done at the end of 8 weeks.

RESULTS

The present study included 25 patients of CSOM who underwent fat tympanoplasty at SCL Hospital from July 2016 till September 2018. The following observations were made in the study.

Table 1: Age distribution (n=25).

Age group (years)	Number of patients
10-25	10
26-40	13
>40	02

There was no specific age criterion for patient selection. In our study, the youngest patient was 13 years of age, and oldest was above 60 years.

Table 2: Chief complaints (n=25).

Chief complaints	Present study (%)
Ear discharge	23 (92)
Decrease hearing	14 (56)
Earache	03 (12)

Almost 56 % of patients complain of some degree of deafness. Remaining was not aware of their deafness due to minimum deafness, though it was evident on audiometry. 92% of patients complaint of ear discharge. All patients when taken in surgery are in dry state.

Table 3: Hearing loss (n=25).

Hearing level	No. of patients
<25 db	11 (44)
26-40 db	08 (32)
>40 db	06 (24)

All patient in our study having mild to moderate hearing loss because of involvement of tympanic membrane only and normal ossicular chain.

The overall success rate in the study, as per the previously defined criteria was 80% (i.e. 20 of the 25 cases), which in turn means that the failure rate was 20% (i.e. 05 of the 25 cases).

The average pre-operative air conduction threshold was 34 db. The average air conduction threshold after the procedure was 26.8. Thus, the air conduction threshold improved by 7.2 db after the procedure.

Table 4: Status of graft.

Status of graft	No. of cases (%)
Taken up	20 (80)
Rejected	05 (20)
Total	25

Table 5: Total hearing gain (ac) in successful fat graft taken up case.

	Pre-operative (db) hearing level (AC)	Post-operative (db) hearing level (AC)	Hearing gain (dB)
Fat graft	34	26.8	7.2

Table 6: Factors behind failure of fat grafting among the operated ears.

Underlying factors	No. of subjects (%)
Graft necrosis (due to postoperative infection)	1 (20)
Graft detachment (due to failure to follow postoperative instruction)	2 (40)
Undersized fat graft	2 (40)
Total	5 (100)

DISCUSSION

In our study of 25 cases, there was no specific age criterion for patient selection.⁷⁻⁹ The youngest patient was 13 years of age, and oldest was above 60 years with mild to moderate hearing loss because of involvement of tympanic membrane only and normal ossicular chain.

In our study, almost 56% of patients complain of some degree of deafness, remaining was not aware of their deafness due to minimum deafness, though it was evident on audiometry, and 92% of patients complaint of ear discharge. All patients when taken in surgery were in dry state.

Though at the onset of the study, the plan had been to use ear lobule fat only, we had to resort to thigh fat harvested through a lateral aspect of thigh in two of the patients.

The overall success rate in the study, as per the previously defined criteria was 80% (i.e. 20 of the 25 cases), which in turn means that the failure rate was 20% (i.e. 05 of the 25 cases). The average pre-operative air conduction threshold was 34 db. The average air conduction threshold after the procedure was 26.8 db. Thus, the air conduction threshold improved by 7.2 db after the procedure. Since this surgery addresses only the conductive component of hearing and the sensorineural component is left untouched, there was absolutely no difference in the bone conduction threshold of the patients pre and post-operatively.

Several literatures are available regarding the study of tympanic membrane repair by fat plug. The study by Mitchell et al, who used fat in 342 children to close small tympanic membrane perforation, achieved 92% success rate.¹⁰ The study conducted by Liew et al who used adipose tissue in the persistent perforation following tympanostomy tube removal, there was 100% success rate in his series of 15 children in which he harvested fat by placing horizontal incision along the inferior aspect of the lobe.¹¹ The study by Hagemann et al found a 91% success rate in their large study.¹² Ayache et al harvested fat from the abdomen, making a separate skin incision close to the

center of the umbilicus in 91% of the cases and from the pre-tragal area in 9% of the cases.¹³ They also affixed the fat with biologic glue achieving 91.9% success rate. The overall success in our study is 80% which is comparable with the study of Ozgursoy et al in which success rate was 82.4% of 18 patients.¹⁴

CONCLUSION

Various grafting materials are used for myringoplasty with varying outcomes. The choice of graft affects outcome of surgery, but also determines the complexity and time of the procedure along with excellent post-operative quality of life of operated patients, assessed in terms of the chronic ear survey and also evident by the absence of the usual post-operative complaints following a conventional myringoplasty. This study proves that fat is also one of the good grafting materials due to its easy availability. This technique can be used as a day-care procedure which is an easy, simple, fast and minimally invasive for the repair of small tympanic membrane perforations with better and quite encouraging outcomes in terms of improvement in air conduction threshold as well as graft taken up rate. Good fat placement technique, selection of patients, consideration of anatomical factors and proper post-operative care are being the responsible factors for success of surgery.

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