

OUTCOME OF TYPE-1 TYMPANOPLASTY: A SURGICAL MANAGEMENT OF CHRONIC SUPPURATIVE OTITIS MEDIA

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ABSTRACT

Background: Chronic suppurative otitis media is one of the most common otological problems in developing countries. It affects all age groups. Type-1 tympanoplasty is simple repair of tympanic membrane. The objectives of this study were to describe the outcome of type-1 tympanoplasty in terms of graft take rate, hearing improvement and complications.

Material & Methods: This quasi-experimental study was carried out in Department of ENT, Al-Noor Specialist Hospital, Makkah, Saudi Arabia from February 2005 to July 2005. Patients with dry central perforations were included in the study. Pre-operative audiogram and x-ray mastoid were performed for all the cases.

Results: Out of 40 patients, 21 (52.5%) were males and 19 (47.5%) females. The mean age was 29 (15-45) years. Out of 40 cases, 22 (55%) tympanoplasties were performed on right ear and 18 (45%) on left ear. Twelve (30%) patients had large size, 24 (60%) medium size, one (2.5%) pin hole size and 3 (7.5%) had subtotal tympanic membrane perforation. Fourteen (35%) patients had antero-inferior perforation, 22 (55%) had central, and 4 (10%) had posterior-inferior perforation of tympanic membrane. The graft was intact in 35 (87.5%) patients while it failed in 4 (10%) cases. One (2.5%) case had small residual pinhole perforation. Hearing improvement was documented in 26 (65%) patients. There were no complications.

Conclusion: Type-1 tympanoplasty has a good outcome in the management of chronic suppurative otitis media, using temporalis fascia as graft material by underlay technique.

KEY WORDS: Type-1 tympanoplasty; Temporalis fascia; Underlay technique.

This article may be cited as: Khan A, Iqbal K, Khan MI, Marwat M, Khan MN. Outcome of type-1 tympanoplasty: a surgical management of chronic suppurative otitis media. *Gomal J Med Sci* 2015; 14: 7-10.

INTRODUCTION

Chronic suppurative otitis media (CSOM) has been variously defined. The 1999 consensus panel of the American Academy of Otolaryngology and Head & Neck Surgery defined chronic suppurative otitis media as "any persistent or recurrent tympanic membrane perforation with inflammation or history of recurrent and/or persistent drainage unrelated to cholesteatoma".¹ Chronic suppurative otitis media is of two types. Tubotympanic and atticotympanic. In tubotympanic type the disease is relatively safe, characterized by long standing infection of the

anterio-inferior part of middle ear cleft associated with central perforation. Risk of complications is less in this type of CSOM. Atticotympanic type is also called unsafe or dangerous type, because it involves postero-superior part of cleft i.e. attic, antrum, and mastoid and is associated with attic or marginal perforation of the tympanic membrane. The disease is often associated with a bone eroding process such as granulations, cholesteatoma or osteitis and risk of serious complications is high.

Incidence of CSOM is more in developing countries because of poor socioeconomic standard, poor nutrition and lack of health education. It affects both sexes and all age groups. It is an important cause of hearing loss.

There are two types of treatments; conservative and surgical. In conservative management the aim is to control infection by aural toilet, ototopical antibiotic/steroids drops and systemic antibiotics.²⁻³

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The surgical management is by tympanoplasty. The aim of surgery is to eliminate the infection and render the ear safe, to prevent reinfection by closing the perforation of tympanic membrane and to improve hearing.

The term tympanoplasty was first used by Wullstein in 1953. There are five types of tympanoplasty operations. Type-1 tympanoplasty is simple repair of the tympanic membrane without reconstruction of the middle ear ossicles.⁴

Various grafting materials have been used. Glosscock and Shambaugh used full thickness skin graft, while Wullstein and Zollner used split thickness skin graft.⁵ Other grafting materials like vein, fat, cartilage, perichondrium, placental membrane and homologous dura have been used. Temporalis fascia has become the most widely used of all the grafting materials. The graft may be placed on outer surface (on-lay) or inner surface (underlay) of the tympanic membrane. In the underlay technique the graft is supported by gel foam in the middle ear.

The most commonly used approaches for tympanoplasty are; end aural, post aural and permeatal.⁶ End aural approach gives better exposure of posterior part while post aural approach gives better exposure of anterior part of the tympanic membrane. Permeatal approach is usually reserved for small perforation with wide canal.

Blunting of anterior angle, pearl formation and lateralization of graft are commonly seen problems with on-lay grafting.⁴ The underlay technique has problems of medialization and persistence of perforation. Another significant complication of tympanoplasty type-1 has been postoperative sensorineural hearing loss seen in 4.5% in one study.⁷ Fascial nerve damage can also occur with tympanoplasty.⁸

The objectives of the study were to determine the outcome of type-1 tympanoplasty in terms of graft take rate, hearing improvement and complications.

MATERIAL AND METHODS

This quasi-experimental study was carried out in Department of ENT, Al-Noor Specialist Hospital, Makkah, Saudi Arabia from February 2005 to July 2005. A sample of 40 cases was selected by consecutive non-probability technique. Patients having chronic suppurative otitis media with dry central perforations were included in the study. Patients with wet ear, marginal perforation and cholesteatoma were excluded from the study.

Pre-operative audiogram and x-ray mastoid were done for all the selected cases in out- door and patients were booked for surgery. After admission

detailed history, otological and general examination were carried out and routine investigations i.e. urinalysis, CBC, blood sugar, LFTs, urea/creatinine, and serum electrolytes were carried out. For cases above 40 years, ECG and x-ray chest were also done.

The patients were operated under general anesthesia, with the ear to be operated positioned as uppermost by turning the head to the opposite side. The operated area was prepared and draped. Injection lignocain (xylocain) with adrenalin 1:200,000 was given in post auricular area and in the external auditory canal. Margins of perforation were freshened. Post aural incision was given 5 mm behind the post aural crease from 12' to 6'O clock position. Muscle layers were cauterized till bone. Temporalis fascia graft was taken through the same incision. External auditory canal was entered. Intra meatal incision was given 2 mm lateral to the annulus from 12'O clock to 6'O clock position in the meatus, bringing both incisions laterally to meet each other just below the bony-cartilaginous junction. Thus an apron shaped tympano-meatal flap was created to access the middle ear adequately. The flap was elevated carefully. Middle ear was inspected. The ossicles were palpated for movements and any damage. The middle ear was packed with gelfoam and the graft was positioned by underlay technique. Tympano-meatal flap was repositioned. Silicon sheath was put over the graft in the canal, gelfoam soaked in antibiotic drops was put, followed by packing of the canal by bismuth iodide paraffin paste (BIPP) pack. Wound was repaired in layers with 2/0 vicryl and 2/0 proline. Mastoid dressing was done. All the surgeries were performed by NM.

Post operatively patient was kept fasting for 6 hours. Broad spectrum Antibiotics and adequate analgesia was given for one week. Sutures were removed after one week, BIPP pack removed after two weeks and silicon sheath removed after one month. Patients were advised not to travel by airplane for three months.

Each patient was followed for a period of two months; weekly for first month and bi-weekly for next month. Post operative audiogram was done after 2 month of surgery. At follow ups state of wounds, state of graft and complications were noted. Hearing improvement was measured by average reduction in air bone gap in decibel (dB).

Data was entered to a designed proforma. The demographic variables were sex and age in years. The research variables were site of perforation, size of perforation, laterality of operated ear, graft take rate, hearing improvement and complications. Age in

years was a numeric while the rest were categorical data. Age in years was analyzed by mean, minimum, maximum, range and SD. The categorical data was analyzed by count and percentage.

RESULTS

Out of 40 patients, 21 (52.5%) were males and 19 (47.5%) were females. The mean age was 29 ± 5.25 (15-45) with a range of 30 years. Fourteen (35%) patients had antero-inferior perforation, 22 (55%) had central, and four (10%) had postero-inferior perforation of the tympanic membrane. Three (7.5%) had subtotal, 12 (30%) patients had large size, 24 (60%) medium size and one (2.5%) had pin hole size tympanic membrane perforation. Out of 40 cases, 22 (55%) tympanoplasties were performed on right ear and 18 (45%) on left ear. The graft was intact in 35 (87.5%) patients while it was rejected/failed in four (10%) cases and one (2.5%) case had small residual pinhole perforation.

Over all hearing improvement was documented in 26 (65%) patients. Out of 26 patients, nine (22.5%) patients had hearing improvement of five dB, 10 (25%) patients had of 10 dB, four (10%) patients had of 15 dB and three (7.5%) patients had of 20 dB. Seven (17.5%) patients had complications; graft medialized in two (5%) patients, infection in three (7.5%) patients, residual pinhole perforation in one (2.5%) patient and increased tinnitus in one (2.5%) patient.

DISCUSSION

The main objectives of tympanoplasty type-1 are to eradicate the disease, to repair the tympanic membrane, to improve hearing to a serviceable level and to minimize the occurring of complications. The present study which was carried out in a teaching hospital running the residency program showed 87.5% graft take rate.

In a retrospective study of tympanoplasty with underlay technique using temporalis fascia reported 88.8% graft take rate.⁹ Seraj & Attaullah reported 82.9% graft take rate for type-1 tympanoplasty.¹⁰ Tauno¹¹ reported 97% graft take rate of tympanic membrane repair and air bone gap of less than 20 dB in 69% of cases undergoing tympanoplasty. In one study of inferior based flap in myringoplasty, the graft success rate was 97.5%. In this study 40 cases were operated using modification of fisher's inferior based flap technique, both underlay and onlay grafting were carried out.¹²

Several prognostic factors have been identified in the previous studies. Age less than 8 years was found to be a poor prognostic factor by Black et al¹³

and Macdonald et al.¹⁴ Reason cited for poor results are immaturity of the eustachian tube function,¹⁵ high incidence of upper airway infections and surgical difficulty presented by narrow external auditory canal in children.¹⁶ The size of the perforation was found to be a prognostic factor by Ophir et al.¹⁷ A status of contralateral ear was found to be a prognostic factor by Koch et al.¹⁶ A wet ear at surgery was found to be a poor prognostic factor by Lau and Tos.¹⁸ In our study a major prognostic factor was found to be infection leading to graft failure and residual perforation.

CONCLUSION

From our study it can be concluded that type-1 tympanoplasty has a good chance of success with fully developed eustachian tube function. The ear should be perfectly dry before the procedure. The underlay technique using temporalis fascia gave good anatomical and functional result. It enables the individual to take part in water activities without any restriction. The infection is a poor prognostic factor.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

None declared.

AUTHORS' CONTRIBUTION

Conception and Design:	AK
Data collection, analysis and interpretation:	AK, KI, MIK, MNK
Manuscript writing and Revision:	AK, KI, MIK, MM, MNK