

HEARING IMPROVEMENT POST TYPE I TYMPANOPLASTY- RETROSPECTIVE STUDYAnil H. T,¹ Shriitha Shree S²¹Professor and HOD, Department of ENT, Kempegowda Institute of Medical Sciences and Hospital, K.R. Road, V.V. Puram, Bangalore.²Postgraduate Student, Department of ENT, Kempegowda Institute of Medical Sciences and Hospital, K. R. Road, V.V. Puram, Bangalore.**ABSTRACT****BACKGROUND**

Chronic Suppurative Otitis Media (CSOM) is often associated with varying degree of hearing loss. Tympanoplasty is mainly aimed at restoring the hearing loss and eradication of middle ear disease.

MATERIALS AND METHODS

A retrospective study was done on 100 cases of tubotympanic type of CSOM. Patients were assessed after 6 months and 1 year for graft status and hearing outcome by pure tone audiometry.

RESULTS

In 100 cases of type 1 tympanoplasty performed, overall success rate of 88% of graft uptake was found. Majority of patients have been benefited by gaining 15.1-20 dB of hearing.

CONCLUSION

Tympanoplasty is effective in improving hearing results in patients with chronic suppurative otitis media and temporalis fascia yields good take up rates and acceptable hearing results.

KEYWORDS

Chronic Suppurative Otitis Media, Type 1 Tympanoplasty, Pure Tone Audiometry.

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BACKGROUND

Chronic Suppurative Otitis Media (CSOM) is the chronic inflammation of the middle ear cleft and mastoid cavity, which presents with recurrent ear discharge or otorrhoea through tympanic membrane perforation.¹

CSOM is still prevalent in many countries of the world. In India, incidence of CSOM ranges up to 30% with prevalence rate of 16/1000 population in urban and 46/1000 in rural area.^{2,3} It affects 0.5-30% of any community and also over 20 million people worldwide are affected by the disease.^{4,5}

Chronic suppurative otitis media is one of the major cause of tympanic membrane perforation. Small perforations due to infections or trauma heal spontaneously. Persistence of perforation can lead to recurrent infection of middle ear and a hearing loss of 30-40 dB.⁶ Hearing impairment is the most common sequelae of CSOM,⁷ which can cause

drawbacks in learning, communication and social adjustment.

Tympanomastoid surgery is considered the main treatment of this disease and is effective in controlling infection and preventing recurrence.

Researchers have reported success rate in excess of 80-90%.^{8,9} Type I tympanoplasty is performed when there is tympanic membrane perforation without ossicular damage. It is a procedure of simple repair of tympanic membrane, its ultimate goals being permanent restoration of hearing and prevention of recurrent attacks of otorrhoea and its complications.

This retrospective study deals with functional outcome in terms of improvement in hearing postoperatively in a series of patients who underwent type I tympanoplasty with underlay technique using temporalis fascia graft.

MATERIALS AND METHODS

This study is a retrospective study involving all patients who underwent type 1 tympanoplasty in ENT Department, KIMS, Bengaluru, during period from January 2015 to January 2017.

All patients were assessed preoperatively by detailed history and clinical examination. Patients with tubotympanic disease and dry central perforation were selected. Condition of middle ear mucosa was noted and cholesteatoma cases were excluded from study.

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Type, size and location of the perforation was recorded. Eustachian tube patency was assessed. Hearing assessment was done by pure tone audiometry. X-ray of both mastoids was done in all patients.

All cases were operated through postaural approach using Zeiss operation microscope with temporalis fascia by underlay technique.

Patients were followed at regular interval at 6 months and 1 year postoperatively. Status of the graft along with any complications were noted. Hearing assessment was made with pure tone audiometry and compared with preoperative state.

An intact graft at the end of 1 year postoperatively was considered a success and minimum hearing improvement by 10 dB was regarded as audiological success.

Inclusion Criteria

Patients with safe type of chronic suppurative otitis media with hearing loss who undergo type I tympanoplasty using temporalis fascia graft.

Exclusion Criteria

Patients with unsafe type of chronic suppurative otitis media. Patients who undergo other than type I tympanoplasty. Patients with eustachian tube occlusion. Patients who fail to give consent.

RESULTS

A total of 100 cases were included. Of these, 62 were males and 38 were females. The age range was from 12 to 70 years.

Age	Male	Female	Total
12-20	8	3	11
21-30	15	16	31
31-40	22	11	33
41-50	11	4	15
51-60	5	4	9
61-70	1	0	1
Total	62	38	100

Table 1. Age and Sex Distribution in Study Population

*Figure in parenthesis indicate percentage.

Our study showed overall success rate of 88% as far as graft uptake was concerned, i.e. out of 100 cases, in 88 cases, perforation was closed on examination at interval of 1 year. Overall residual perforation was seen in 4% cases, tympanosclerotic patch in 6% and retraction pocket in 2%.

Normal	88
Tympanosclerotic patch	6
Retraction pocket	2
Pin hole perforation	4

Table 2. Graft Outcome after One Year

In the study, 12 cases showed small perforation, 77 cases showed medium-sized perforation and 11 cases showed subtotal to large perforation.

Size	Frequency
Small	12
Medium	77
Subtotal to large	11
Total	100

Table 3. Size of Perforation (n=100)

In the present study, we observed that 40% of patients had hearing loss ranged from 30.1-40 dB, i.e. 40 out of 100 patients. 32 patients had hearing loss ranged 20.1-30 dB. 21 patients had hearing loss 40.1-50 dB and 7 patients had hearing loss of more than 50 dB.

Air-Bone Gap (db)	
20.1-30	32
30.1-40	40
40.1-50	21
>50	7

Table 4. Preoperative Hearing Threshold

Hearing (dB)	
0-10	11
10.1-15	19
15.1-20	35
20.1-25	26
25.1-28	9

Table 5. Postoperative Hearing Gain

Majority of patients have been benefited by gaining 15.1-20 dB of hearing, i.e. 35 out of 100. 11 patients have benefited 0-10 dB, 19 patients have benefited 10.1-15 dB, 25 patients have benefited 20.1-25 dB, 9 patients have benefited 25.1-28 dB.

DISCUSSION

In the present study, 100 cases of tubotympanic type of chronic suppurative otitis media were analysed for postoperative improvement in hearing.

The age distribution was analysed. In our present study, age of patient who underwent surgery varied from 12-70 years, i.e. minimum being 12 years and the maximum age was 70 years. The average age of patient was about 33.5 years. In J. B. Booth's series, the youngest was 8 years old and oldest 67 years with an average of 33.7 years.¹⁰ Similarly, Maharajan M. et al in their study reported mean age of 34 years in their patients.¹¹ This may be due to increased awareness of the disease.

Males distinguished females in our study. There were 62 males (62%) and 38 females (38%) with a male-to-female ratio of 1.4:1.0, which can be compared to Chandra and Mishra¹² and Hossain MM et al.¹³ The predominance in males maybe due to their outdoor working habits exposing them for contamination and contagion.

Our study included 12 small, 77 medium and 11 subtotal to large-sized perforations. According to Carr¹⁴ MM and Uyar¹⁵ Y size does not have a bearing on the success of surgery. The A-B gap closure of medium, large and subtotal perforation are 4-7, 11-7 and 6-6, respectively. The closure rates are higher in small perforation (74%).^{16,17}

Many studies have been carried out in the past regarding structural and functional outcome following type I tympanoplasty utilising temporalis fascia graft with underlay technique. In our study of 100 cases of type I tympanoplasty, 88 cases showed successful graft uptake. The percentage of graft uptake is 88%. Gibb et al in their study of 206 cases of type I tympanoplasty employing underlay technique with temporalis fascia reported a graft take rate of 89.3%.¹⁸ Jackler and Schindler in their study of 48 cases reported a graft take rate of 85.4%.¹⁹ John Mathai in his study of 200 cases of myringoplasty used temporalis fascia and underlay technique for all cases. He concluded temporalis fascia is an excellent graft material, which gives a high success rate as far as closure of tympanic membrane perforation and improvement in hearing is concerned,²⁰ which correlates with our study result. Temporalis fascia graft is most widely used because of easy availability. Good postoperative results and morphological similarity with the tympanic membrane.

Amongst the various complications, post type I tympanoplasty mentioned in literature infection, residual perforation, dislodgement of the graft, retraction pockets and damage to chorda tympani are the common ones.²¹ In our study, residual pinhole perforation was seen in 4% and retraction pocket in 2% of cases. Postoperative infections, poor hygiene and faulty technique can lead to graft failure. Other complications like vertigo, damage to facial nerve, chondritis and meatal stenosis were not seen.

In our study, we found good improvement in postoperative hearing gain after type I tympanoplasty, least was 9.5 dB and maximum was 28 dB and maximum patients benefited by gaining 15-20 db, which is 35 out of 100 patients (35%). Kolo and Ramalingam²² in their study found significant hearing gain after primary tympanoplasty least was 8.8 dB and maximum was 13.7 dB. Shetty²³ reported mean preoperative hearing threshold of 42.5 db as compared with postoperative threshold of 20.41 with hearing gain of 22.09 db. Jung TT, Park²⁴ reported a hearing gain of 0-40 db in 70% cases (0-10 db in 19% of ears, 11-20 db in 44%, 21-30 db in 7% and 31-40 db in 4%) without ossiculoplasty, which was similar as in this study.

CONCLUSION

1. WHO in 2004 mentioned, the worldwide prevalence of CSOM as 65-330 million people and 39-200 million (60%) suffer from clinically significant hearing impairment.
2. In this study, we observed that type I tympanoplasty is effective in improving hearing in patients with tubotympanic type of chronic suppurative otitis media and is a preferred procedure because of less complications.
3. Our study has shown that the hearing outcome of type I tympanoplasty does not depend on age, sex and size perforation of the patient.
4. Temporalis fascia graft placed by underlay technique yields good take up rates and acceptable hearing gains as in this study.

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