e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 979-983

Original Research Article

Tympanoplasty Type I Evaluation of the surgical results and its impact as the treatment modality in Chronic Otitis Media at tertiary care hospital

Amar Nath Prasad[1], Novelesh Bachchan[2]

[1]Associate Professor, Department of ENT, Sri Krishna Medical College, Muzaffarpur, Bihar, India
[2]Senior Resident, Department of ENT, Sri Krishna Medical College, Muzaffarpur, Bihar, India

Received: 02-12-2025 / Revised: 04-01-2026 / Accepted: 07-02-2026
Corresponding Author: Novelesh Bachchan
Conflict of interest: Nil

Abstract:

Objectives: The present study was to evaluate the surgical outcome of tympanoplasty type I and its impact as the treatment modality in patients with chronic otitis media.

Methods: Otoscopic examination and pure tone audiometry were performed to all CSOM patients. The surgery tympanoplasty type I was performed under local anaesthesia except for apprehensive and anxious patients who desired general anaesthesia. The postoperative assessment of the patients was done at 3, 6 and 12 months after the surgery wherein otoscopic evaluation and pure tone audiometry was repeated.

Results: A total of 60 patients of CSOM were included. The mean age was 36.5 years. 34(56.67%) cases were males and 26(43.33%) cases were females. 80% of the patients had a small-to-moderate size perforation and 2% had a large to subtotal perforation. 51.67% patients had perforations in the anterior half, 11.66% had perforations in both anterior and posterior half and 36.67% patients had the perforation in the posterior half. 33.33% patients had an oedematous middle ear mucosa and 66.67% patients had a normal middle ear mucosa. The improvement in hearing was significant on assessment after one year of surgery of patients having an ABG <20 dB. Following tympanoplasty at 3 months, 94% patients had AB gap <20 dB and at one year 88.33% patients had AB gap <20 dB, respectively.

Conclusions: Small to medium size perforation are the most common. Anterior quadrant perforation is commonly seen in most of the CSOM patients. Result of surgery is not influenced by size of the perforation and the location of the perforation. Status of the middle ear mucosa and the status of the opposite ear are statistically significant factors influencing the success of tympanoplasty. Hence, tympanoplasty is one of the best procedures as a treatment modality in patients with chronic otitis media.

Keywords: Chronic Otitis Media, Tympanoplasty Type I, Treatment modality.

DOI: 10.25258/ijcpr.18.2.161

Introduction

Chronic Otitis Media is clinically characterized as an inflammatory condition associated to broad and persistent tympanic membrane perforations and otorrhea. Histologically it may be defined as an inflammatory process of the middle ear associated to irreversible tissue alterations. It may be further broken down into non-cholesteatomatous chronic otitis media (NCCOM) and cholesteatomatous chronic otitis media (CCOM). The difference between these two groups is the presence or absence of a cholesteatoma [1].

The major symptom the NCCOM patients present is intermittent otorrhea, usually associated to upper airway infections or a past history of extrinsic contamination (swimming in pools or ocean), painless, without giving off foul smell, together with hearing loss. By doing otoscopy we usually find a perforation in the pars tensa of the tympanic membrane of varied size and shape, the middle ear mucosa has an almost normal appearance, except for some degrees of hyperemia [1]. In India, the incidence of COM is up to 30%, with a prevalence rate of 16/1000 population in urban and 46/1000 in rural areas [2].

Type 1 Tympanoplasty refers to any operation involving reconstruction of the tympanic membrane defect along with elimination of disease, if any, from the middle ear. A perforation in the tympanic membrane can result from either trauma or infective process; out of which the infective or suppurative process is the most common cause. Most of these perforations usually heal spontaneously. But this spontaneous healing is affected by chronicity of infection and certain patho-physiological changes at the perforation margins, leading to a non-healing permanent perforation. This leads to constant

exposure of middle ear for reinfection and hearing disability [3].

The mainstay of therapy in chronic otitis media remains surgery which aims at restoring the hearing mechanism, eradication of disease and prevention of recurrence. The main surgical treatment modality in mucosal COM remains tympanoplasty which aims at restoration of the sound-transformer mechanism. The need for mastoidectomy along with tympanoplasty in mucosal chronic otitis media remains controversial. Mastoidectomy has evolved from a desperate procedure done to drain post-auricular abscesses to a well-defined method to gain entry into the middle ear cavity and address pathology [3]. Objectives of our study was to evaluate the surgical outcome of tympanoplasty type I and its impact as the treatment modality in patients with chronic otitis media.

Material & Methods

The present study was conducted in the Department of ENT, Sri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India during a period from January 225 to June 2025.

A total of 60 patients of chronic otitis media were enrolled in the present study. All patients included in the study had a benign central perforation in the pars tensa of the tympanic membrane and were treated sufficiently to ensure a dry ear at least 8 weeks prior to the surgery.

Inclusion Criteria

1. Patients who were visited OPD with complaint of COM, tubotympanic disease, i.e. having discharge from the ear for more than 3 months and with a benign central perforation in pars tensa of the tympanic membrane.
2. Patients treated sufficiently to ensure a dry ear at least 8 weeks prior to the surgery.
3. Patients in the age group 18 to 60 years.

Exclusion Criteria

1. Patients with an acute exacerbation of chronic otitis media, i.e. actively discharging ears.
2. Patients with central perforation due to other causes like trauma.
3. Patients with bilateral chronic otitis media where the ear to be operated is the only hearing ear.
4. Patients <18 years & >60 years.

Methods

All patients underwent complete evaluation, which included otoscopic examination and pure tone audiometry. The otoscopic evaluation included assessment of size of the perforation, location of the perforation, status of middle ear mucosa and status of the opposite ear. The size of perforation was graded as small (less than 25%), medium (25% to 50%), large (more than 50%) and subtotal (more than 75% or whole of pars tensa except the annulus) and the location of the perforation was noted whether in the anterior half or posterior half or both. The status of the middle ear mucosa was assessed and recorded as normal or oedematous wherein oedematous included patients who continued to have hyperaemic or polypoid middle ear mucosa status, despite 3-4 weeks therapy with systemic antibiotics and decongestants. The status of the opposite ear was recorded as normal, scarred, operated or with evidence of disease. All the patients underwent pre-anaesthetic checkup prior to surgery. The surgery tympanoplasty type I was performed under local anaesthesia except for apprehensive and anxious patients who desired general anaesthesia. The material used for the graft was the autologous temporalis fascia and was placed by underlay technique. Thus, the surgical technique used remained more or less uniform. The postoperative assessment of the patients was done at 3, 6 and 12 months after the surgery wherein otoscopic evaluation and pure tone audiometry was repeated.

Statistical Analysis: Data was analysed by using latest version of SPSS software. Independent T-test and Chi-Sqaure were used. P-value was taken less than or equal to 0.05 ($p \leq 0.05$) for significant differences.

Results

A total of 60 patients were enrolled in the present study. The mean age of the patients who underwent tympanoplasty type I was 36.5 years. 34(56.67%) cases were males and 26(43.33%) cases were females. All the patients underwent tympanoplasty type I, 93% under local anaesthesia and 7% under general anaesthesia. The approach was post aural in 82% patients and endaural in 18% patients. The endaural approach was taken for patients who had a wide external auditory canal and for perforations in both quadrants predominantly anterior. It was the right ear operated in 46% patients and left ear in 54% patients.

Table 1: Preop Otoscopic Examination showing the size of perforation

Size of perforation	No. of patients (N=60)	Percentage
Large	8	13.33%
Medium	35	58.33%
Small	13	21.66%
Sub total	4	6.67%

In this study, 80% of the patients had a small-to-moderate size perforation and 2% had a large to subtotal perforation.

Table 2: Preop Otoscopic Examination showing the location of perforation (LP)

Location of perforation	No. of cases (N=60)	Percentage
Anterior quadrant	31	51.67%
Posterior quadrant	22	36.67%
Both anterior and posterior quadrant	7	11.66%

In terms of location of the perforation, 51.67% patients had perforations in the anterior half, 11.66% had perforations in both anterior and posterior half and 36.67% patients had the perforation in the posterior half.

Table 3: Preop Otoscopic Examination showing the status of middle ear mucosa (MEM)

Status of middle ear mucosa (MEM)	No. of cases (N=60)	Percentage
Oedamatous	20	33.33%
Normal	40	66.67%

In the present study, 33.33% patients had an oedematous middle ear mucosa and 66.67% patients had a normal middle ear mucosa.

The status of the opposite ear was normal in 62% and 38% had either an old healed, scarred tympanic membrane or presence of a bilateral disease. The size of the perforation and the location of the perforation was not influenced the results of surgery.

In the present study, the status of the middle ear mucosa (p=0.0002) and the status of the opposite ear (p=0.245) were found to be statistically significant factors influencing the success following tympanoplasty.

Table 4: Comparison of Otoscopic Findings

Parameters	p-value
Size of the perforation	0.196
Location of the perforation	0.362
Status of middle ear mucosa	0.0002
Status of the opposite ear	0.0245

Improvement in hearing was analysed using an ABG closure of less than; <20 dB as significant following surgery. On PTA done preoperatively, 43.33% (26) patients had an AB gap >20 dB. after tympanoplasty at one year 7.69% (2) had an ABG >20 dB and there was an improvement in 35.64% (24) patients. The improvement in hearing was significant on assessment after one year of surgery of patients having an ABG <20 dB.

Following tympanoplasty at 3 months, 94% patients had AB gap <20 dB and at one year 88.33% patients had AB gap <20 dB, respectively. The improvement in hearing following tympanoplasty was statistically significant at six months and one year following surgery (p <0.05).

Table 5: Comparison of the Hearing Results before and after Surgery

Category	Rt. (P-value)	Lt. (p-vaue)
Preop vs. 3 months	0.264	0.237
Preop vs. 6 months	0.014	0.0265
Preop vs. 1 year	0.0174	0.0245

Discussions

Chronic Otitis Media is clinically characterized as an inflammatory condition associated to broad and persistent tympanic membrane perforations and otorrhea. The hearing loss associated to this pathology is conductive and may vary considerably. Some co-factors that influence the severity of such hearing loss are the size and position of the tympanic perforation, the degree of membrane and ossicles fixation, ossicle erosions, ossicular chain disruption and the degree of repercussion in the inner ear [1].

Pre-operative clinical treatment is based on the removal of all epithelial residues as well as all secretions from the middle and outer ear, use topical drops with acidifying agents and antibiotics; ear protection; control allergic rhinitis and control the factors that may prevent the proper functioning of the Eustachian tube1. Surgery is based on tympanoplasty with middle ear and ossicular chain exploration, and tympanic membrane reconstruction. It aims at reestablishing sound protection protection obtaining a cavity filled with

air and restoring the mechanisms that transmit sound, improving hearing and stopping otohrea [4].

Tympanomastoid surgery is quite successful in controlling infection and preventing recurrent disease with reported success rate in excess of 80-90% [2].

In our present study, the success rate was found to be 89%. Functional success after tympanoplasty surgery is only partly determined by the surgeon's technical skill. Other factors can also play a significant role such as the ability of the middle ear mucosa to heal appropriately and the ability of the ear to aerate itself at normal static pressure. The latter can change over the course of months or years, which in turn can significantly affect the acoustic transmission properties of the reconstructed ear. Vartiainen E and his colleagues in their results of 404 primary myringoplasty operations that were critically analysed found an overall success rate of 88 percent with a mean follow up period of 5.5 years [5]. There are various factors that interfere in the success following tympanoplasty and attempts have been made each time to ascertain these, so as to improve the final result following surgery. In this study, the improvement in otoscopic findings and hearing results following tympanoplasty were assessed with analysis of the statistically significant factors that affect the success of tympanoplasty.

The role of the prognostic factors and middle ear risk index on the success of tympanoplasty has been studied [6]. The overall success rate was 74.4% and size of the perforation (<50%), healthy opposite ear, absence of myringosclerosis, more than 3 months dry period and low middle ear risk index were found to be significant independent prognostic factors. 6 Many authors believe that the perforation location plays a more important role in surgery success than perforation size [7,8]. Perforations in the anterior quadrant of the tympanic membrane represent a worse surgical access in order to reach the anterior border and they are also less vascularised owing to which they are considered an important success factor for surgery. Hallik JJ et al in their long-term results of tympanic membrane repair found that the anterior perforations healed more poorly [9].

The middle ear mucosal status suggests disease activity. Thus, if there is mucosal hyperplasia, this may mean poor aeration of the middle ear suggesting disease activity. Therefore, studies show that with a minimum interval of three months without otorrhoea, the surgery success rate increases to more than 30% when compared to the cases that underwent surgery in an infected site [10]. Recurrent infection poses a greater problem in the subgroup of patients with active COM with granulation tissue, but without cholesteatoma when compared to COM with cholesteatoma [11]. The hypothesis that has been forwarded is that this subset of cases of COM with granulation tissue maybe the result of an inherent problem in the mucous membrane and hence more difficult to eradicate by surgical means.

Postoperative hearing outcomes were considered successful, if the postoperative air-bone gap was within 20 dB. In the present study, prior to surgery, 43.33% patients had an ABG >20 dB and following tympanoplasty at one year, it was noted that 88.33% patients had an ABG <20 dB. There was an improvement in hearing postsurgery with no significant worsening in symptoms noted even with persistent small perforation. In the study by Ilana Fukuchi et al, the audiometric gain was found in most of the patients after the first surgery and in 100% of the patients after reoperations. They believed that this hearing improvement is due to the fact that there was a reduction in perforation size in most of the patients' studied [12]. Hearing restoration is a key aspect of COM surgery. Tympanic membrane and ossicular chain repair with mastoidectomy or tympanoplasty alone restore hearing [13].

Bhat e Ranit (2000) reported that the factors that may influence surgery success rates are: age, perforation location and size, Eustachian tube conditions, status of the middle ear mucosa, type of graft used and surgeon experience [14]. Age is not a factor that alters tympanoplasties success rates. The most important step for indicating surgery in the elderly population is a preoperative care, assessing nutritional status, cardiovascular condition, metabolic status and mental condition [15], and also a more rigorous anesthetic evaluation. As far as children are concerned, the restrictions are the same as those for adults, with special attention given to the children psychological profile, which should follow rigorously the advices of rest and ear protection, parents' consent, enough age for proper mastoid bone, Eustachian tube and immune system development [16].

The population of the present study varied in age from 18 to 60 years; therefore, in this sample we had no representatives from the geriatric and paediatric populations, thus not being possible to correlate age as a significant success factor for surgery.

Conclusion

The present study concluded that the small to medium size perforation are the most common. Anterior quadrant perforation is commonly seen in most of the CSOM patients. Result of surgery is not influenced by size of the perforation and the location of the perforation. Status of the middle ear mucosa and the status of the opposite ear are statistically significant factors influencing the success of tympanoplasty. Hence, tympanoplasty is one of the best procedures as a treatment modality in patients with chronic otitis media.

References

1. Costa SS, Sousa LCA. Otite média crônica não-colesteatomatosa. In: Campos CAH, Costa HOO. Tratado de Otorrinolaringologia. São Paulo: Roca; 2002; 72-92.
2. Gupta A, Gupta. A study of prevalence of complications of suppurative otitis media in rural area of Loni. Ind J Otol. 1996; 2:177-83.
3. C. Ravishankar et al.: A Review of Results of Type I Tympanoplasty in Active and Inactive Tubotympanic Chronic Suppurative Otitis Media. Research in Otolaryngology 2014; 3(5): 77-80.
4. Cruz OLM, Costa SS, Kluwe LH, Smith MM. Timpanoplastias. In: Cruz OLM, Costa SS. Otologia Clínica e Cirúrgica. Rio de Janeiro: Revinter; 2000; 245-70.
5. Vartiainen E, Nuutinen J. Success and pitfalls in myringoplasty: follow up study of 404 cases. Am J Otol 1993;14(3):301-305.
6. Gersdorff M, Garin P, Decat M, et al. Myringoplasty: long-term results in adults and children. Am J Otol 1995;16(4):532-535.
7. Pinar E, Sadullahoglu K, Calli C, et al. Evaluation of prognostic factors and middle ear risk index in tympanoplasty. Otolaryngol Head Neck Surg2008;139(3):386-390.
8. Gross ND, McMenomey SO. Aural complications of Otitis media. In: Glasscock ME, Gulya AJ, eds. Glasscock-Shambaugh surgery of the ear. 5th edn. Ontario: BC Decker Inc 2003:435-441.
9. Halik JJ, Smyth GD. Long-term results of tympanic membrane repair. Otolaryngol Head Neck Surg 1988;98(2):162-169.
10. Merchant SN, Wang PC, Jang CH, et al. Efficacy of tympanomastoid surgery for control of infection in active chronic otitis media. Laryngoscope 1997;107(7):872-877.
11. Jurado AFJ, Gil MJL, Secall TM, et al. Myringoplasty: auditory follow-up & study of prognostic factors. Acta Otorrinolaringol Esp 2009;60(3):169-175.
12. Iliana F, Dafne PC, Eduardo G, et al Tympanoplasty: surgical results and a comparison of the factors that may interfere in their success. Braz J Otorhinolaryngol. 2006;72(2):267-71.
13. Kumar R et al. Retrospective Analysis of the Outcomes of Patients with Chronic Otitis Media Treated with Different Surgical Techniques. International Journal of Current Pharmaceutical Review and Research 2025; 17(8); 1470-1476.
14. Bhat NA, Ranit De. Retrospective Analysis of Surgical Outcome, Symptom Changes, and Hearing Improvement Following Myringoplasty. J Otol 2000; 29(4):229-32.
15. Emmett JR. Age as a factor in the success of tympanoplasty: A comparison of outcomes in the young and old. Am J Otol 1996;28:285- 6.
16. Berger G, Berger S. Paediatric revision myringoplasty: outcomes and prospects. J Laryngol Otol 2002;116:690-4.