ORIGINAL RESEARCH

Comparative Assessment of tympanoplasty versus tympanomastoidectomy for the surgical outcome in tubotympanic type Chronic Suppurative Otitis Media (CSOM)

[1]Dr. Abhiniti, [2]Dr. Pawan Kumar Lal

[1]Senior Resident, Department of Otorhinolaryngology (ENT), Sri Krishna Medical College &Hospital, Muzaffarpur, Bihar, India
[2]Associate Professor & Head of Department, Department of Otorhinolaryngology (ENT), Sri Krishna Medical College &Hospital, Muzaffarpur, Bihar, India

Corresponding Author
Dr. Abhiniti
Senior Resident, Department of Otorhinolaryngology (ENT), Sri Krishna Medical College &Hospital, Muzaffarpur, Bihar, India
Email: abhiniti.sinha@gmail.com

Received Date: 12 July, 2022 Accepted Date: 17 August, 2022

ABSTRACT
Background: Chronic otitis media (COM) is a persistent inflammation of the middle ear, often characterised by repeated infections and ear discharge. The present study was conducted to compare tympanoplasty and tympanomastoidectomy for the surgical outcome in tubotympanic type CSOM. **Materials and Methods:** 94 patients with chronic suppurative otitis media of both genders were divided into two groups of 47 each. Group I patients underwent tympanoplasty, and group II patients underwent tympanoplasty with cortical mastoidectomy. **Results:** Group I had 20 males and 27 females, and Group II had 22 males and 25 females. Age group 20–40 years had 35 patients in group I and 30 in group II; 40–60 years had 12 patients in group I and 14 in group II; and >60 years had 2 patients in group I and 3 patients in group II. The difference was non-significant ($P > 0.05$). Graft acceptance was seen in 40 patients and graft rejection in 44 patients in group I and 7 patients and 3 patients in group II, respectively. The difference was significant ($P < 0.05$). **Conclusion:** When treating CSOM tubotympanic type with dry ear, cortical mastoidectomy does not provide a statistically significant advantage over simple tympanoplasty in terms of graft acceptance rate and disease elimination.

Keywords: Chronic otitis media, Cortical mastoidectomy, Tympanoplasty

INTRODUCTION
Chronic otitis media (COM) is a persistent inflammation of the middle ear, often characterised by repeated infections and ear discharge (otorrhea). It can lead to complications if not managed properly. Causes include eustachian tube dysfunction, recurrent bacterial or viral infections, allergies that can contribute to inflammation and fluid buildup, enlarged adenoids that can block the eustachian tube, and a family history of ear problems.[1] Wullstein originally used the word "tympanoplasty" in 1953 to refer to the surgical methods utilised to restore middle ear hearing mechanisms that had been harmed by middle ear illness.[2,3]

Louis Petit originally mentioned mastectomy in the 1700s, but it wasn't until William House popularised the cortical mastectomy in 1958 that this idea became widely accepted. Many elements, which can be divided into two categories—mastoid and non-mastoid factors—contribute to the success or failure of ear surgery, according to Jackler and Schindler.[4]

Non-mastoid factors include the patient's age, the function of the Eustachian tube, the location and extent of the perforation, the state of the ossicular chain, and the status of the cochlear reserve.[5]

On the other hand, mastoid factors include the degree of pneumatization and the existence of inflammatory illness within the mastoid. When treating tubotympanic type CSOM, tympanoplasty is one of the most often performed surgical treatments by ENT surgeons.[6] In the past, tympanoplasty combined with mastoidectomy was thought to be a useful surgical

procedure for treating persistent ear infections that were resistant to antibiotic treatment.[7]

AIM AND OBJECTIVES

The present study was conducted to compare tympanoplasty and tympano-mastoidectomy for the surgical outcome in tubotympanic type CSOM.

MATERIALS AND METHODS

The present comparative study was conducted on 94 patients with chronic suppurative otitis media (CSOM) tubotympanic type of both genders at the Department of Otorhinolaryngology (ENT), Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar, India. All participants gave written consent after being made aware of the study. The study was approved by the Institutional Ethics Committee. The duration of the study was from January 2022 to June 2022. A treatment chart and patient data collection form with demographic details such as name, age, gender, etc. were recorded.

Inclusion Criteria

- Patients who give written informed consent.
- Patient's age between 20 and 60 years.
- All patients having central perforation with sclerotic bone
- Mild to moderate conductive hearing loss.
- All patients having CSOM tubotympanic type
- Dry ear for 1 month.
- Normal cochlear function. Patent the Eustachian tube.
- Good ET tube function.
- There is no evidence of infection in the nose, PNS, nasopharynx, or throat.
- Available for follow-up.

Exclusion Criteria

- Patients who don't give written informed consent.
- Patient aged below 20 years.
- Wet ear.
- Attic and marginal perforation.
- Moderate to severe hearing loss.
- Previous mastoid operations
- Uncontrolled systemic disorder DM, Hypertension,Sepsis.
- Not available for follow-up.

The patients were randomised and divided into 2 groups, and each group included 47 patients:

- **Group I**: Patients underwent tympanoplasty and
- **Group II:** Patients underwent tympanoplasty with cortical mastoidectomy.

ENT examination with a tuning fork test, middle ear examination, and examination under a microscope were performed. A PTA was then used to determine the kind and extent of hearing loss. Every standard laboratory and radiological test was performed, such as X-rays of the PNS and nasopharynx, as well as X-rays of the mastoid's view.

In cases of any infection of tonsils, sinuses, or adenoids, they were first treated. All patients were subjected to a routine preanesthetic checkup. Tympanoplasty and mastoidectomy Surgeries were performed under local anaesthesia and general anaesthesia, depending on the patient's age and general condition, via a postaural approach. Clinico-audiological assessment of the operated ear with respect to graft status, ear discharge, and hearing improvement was done in both groups.

Statistical Analysis

The data thus obtained were subjected to statistical analysis. The Chi-square test with Yates continuity correction was used to assess categorical data, whereas the Analysis of Variance (ANOVA) was used to examine means. The findings were obtained by using suitable statistical tests utilising Microsoft Excel and the Statistical Package for Social Sciences (SPSS). A P value < 0.05 was considered significant.

RESULTS

Table I: Gender wise distribution

Parameters	Group I(n=47)	Group II(n=47)
Method	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
M:F	20:27	22:25

Table I shows that group I had 20 males and 27 females and group II had 22 males and 25 females.

Table II: Age wise distribution

Age group (years)	Group I (n=47)	Group II(n=47)	P value
20-40	35	30	0.85
40-60	12	14	
>60	2	3	

Table II shows that age group 20-40 years had 35 patients in group I and 30 in group II, 40-60 years had 12 patients in group I and 14 in group II and >60 years had 2 in group I and 3 patients in group II. The difference was non- significant (P> 0.05).

Table III: Assessment of the duration of ear discharge in both groups

Duration of ear discharge (in years)	Group I(n=47)	Group II(n=47)	P value
5-6	30	25	0.70
7-10	14	17	
>10	03	05	

Table IV: Assessment of the duration of dryness of ear which is to be operated in both groups

Duration of ear dryness (in months)	Group I(n=47)	Group II(n=47)	P value
1-3	32	33	0.63
4-6	12	08	
>6	03	06	

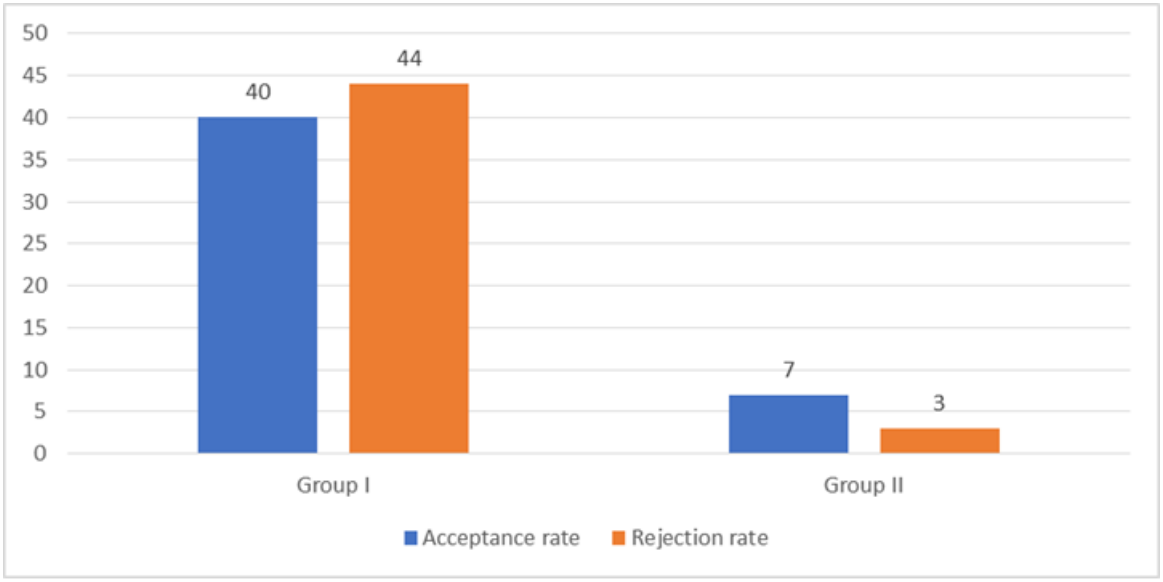
Table V: Assessment of the degree of hearing loss

Degree of hearing loss	Group I(n=47)	Group II(n=47)
Mild	42	36
Moderate	05	11

Table VI: Comparison of the graft acceptance rate

Groups	Graft acceptance rate (n=47)	Graft rejection rate (n=47)	P value
Group I	40	44	0.05
Group II	7	3	

Table III, graph I shows that graft acceptance rate was seen in 40 patients and graft rejection in 44 patients in group I and 7 patients and 3 patients in group II respectively. The difference was significant (P< 0.05). In our study of 94 patients treated for CSOM tubotympanic type with dry year we have found that in Group I (Tympanoplasty) out of 47 patients 35 (87.5%) had good graft acceptance rate after 3 month follow up whereas 05 (12.5%) cases Graft was rejected. whereas In Group B (Tympanoplasty with cortical mastoidectomy) Graft acceptance rate was 36 (90%) and graft rejection rate was 04 (10%). Hence out of 80 patients Graft acceptance rate was 71 (88.75%) and rejection rate was 09 (22.5%) inclusive of both Group A and Group B. hence in our study we have found that there was no significant difference in the graft uptake rates between the two groups. There was no statistical significance between the two groups as p>0.05, suggesting that mastoidectomy when combined with tympanoplasty offers no added benefit over tympanoplasty alone. Also it mastoidectomy requires a well-trained otologists to do the surgery, under General anesthesia



Graph I: Comparison of acceptance rate

DISCUSSION

Chronic otitis media is an inflammation of the middle ear cleft. The main purpose of surgical intervention in CSOM is to have a permanently dry ear and to facilitate the facilitate the closure of the perforation along with improvements in hearing. [8,9] The

tympanoplasty It is possible to successfully close tympanic membrane perforations and remove chronic ear draining without undergoing a mastoidectomy.[10] Moreover, mastoidectomy has little to no meaningful clinical benefit and may raise the risk of squamous epithelium in growths that could harm the facial nerve and inner ear components. [11,12] The present study was conducted to compare tympanoplasty and tympanomastoidectomy for the surgical outcome in tubotympanic type CSOM.

In a study by Varshney et al.[3] the duration of discharge varied from 6 months to 50 years, with 26 patients having a duration of discharge ranging from 1 to 5 years, which was comparable to the present study.

We found that group I had 20 males and 27 females, and group II had 22 males and 25 females. Gargava et al.[11] studied 80 patients with chronic suppurative otitis of a safe type. All the cases were operated on, and 40 of these cases were selected for tympanoplasty alone (Group A), and 40 cases were selected for tympanoplasty along with cortical mastoidectomy (Group B). They have found that in Group A (tympanoplasty), out of 40 cases, 35 (87.5%) had a good graft acceptance rate after 3 months of follow-up, whereas in 5 (12.5%) cases, the graft was rejected. whereas in Group B (tympanoplasty with cortical mastoidectomy), the graft acceptance rate was 36 (90%), and the graft rejection rate was 4 (10%). Hence, out of 80 patients, the graft acceptance rate was 71 (88.75%) and the rejection rate was 9 (22.5%), inclusive of both Group A and Group B.

In the present study, we found that there was no significant difference ($p = 0.05$) in the graft uptake rates between the two groups, suggesting that mastoidectomy when combined with tympanoplasty offers no added benefit over tympanoplasty alone.

In the study in Group A (tympanoplasty), out of 40 cases, 35 (87.5%) had a good graft acceptance rate after 3 months of follow-up, whereas in 5 (12.5%) cases, grafts were rejected. In Group B (tympanoplasty with cortical mastoidectomy), the graft acceptance rate was 36 (90%), and the graft rejection rate was 4 (10%).

We found that the age group of 20–40 years had 35 patients in group I and 30 in group II; 40–60 years had 12 patients in group I and 14 in group II; and >60 years had 2 patients in group I and 3 patients in group II. Agrawal A et al.[12] studied the role of tympanoplasty alone and tympanoplasty done along with cortical mastoidectomy in CSOM in terms of graft uptake, improvement of hearing, and removal of disease. Tympanoplasty alone was done in 20 cases, and tympanoplasty along with cortical mastoidectomy was done in the remaining 20 cases. Patients were reviewed postoperatively at 2, 4, 8, and 16 weeks to inspect postoperative graft uptake, and PTA was done at the fourth month to evaluate hearing improvement. Hearing improvement was compared in both groups; in the tympanoplasty group, it was 9.41, and in the tympanoplasty combined with cortical mastoidectomy group, it was 12.05. Graft uptake was 80% in the tympanoplasty group and 95% in tympanoplasty combined with cortical mastoidectomy. A recurrence of discharge was seen in four cases of tympanoplasty. Though tympanoplasty combined with cortical mastoidectomy is better for hearing improvement, graft uptake, and clinical improvement, the difference between the two groups is statistically insignificant. The results of tympanoplasty alone and tympanoplasty along with cortical mastoidectomy in terms of hearing gain and graft uptake were statistically insignificant.

We found that graft acceptance was seen in 40 patients and graft rejection in 44 patients in group I and 7 patients and 3 patients in group II, respectively.

The study done by Kaur et al.[6] also states that the graft acceptance rate of myringoplasty with or without mastoidectomy was 88% and 76%, respectively.

Mishiro et al.[13] examined the prognostic factors predicting long-term outcomes of tympanoplasty for perforated chronic otitis media (COM) and determined whether mastoidectomy can be avoided during tympanoplasty for perforated COM. 213 patients with perforated COM underwent tympanoplasty by the same surgeon and were followed for more than 5 years. Postoperative hearing outcomes were considered successful if the postoperative air-bone gap was within 20 dB. Closure of perforation by a single surgery was considered a successful graft. The normal ossicular chain was the only factor that showed a significantly favourable relationship to long-term hearing outcomes. There were no significant predictors of long-term successful graft outcomes. Mastoidectomy was not a significant factor in predicting long-term outcomes.

Albu et al.[14] also concluded that combining cortical mastoidectomy with tympanoplasty would not give any additional benefits in hearing improvement, disease clearance, or graft acceptance rate.

Limitation(s): The shortcoming of the study is the small sample size.

CONCLUSION

The authors found that when treating CSOM tubotympanic type with dry ear, cortical mastoidectomy does not provide a statistically significant advantage over simple tympanoplasty in terms of graft acceptance rate and disease elimination.

Acknowledgement

I am immensely grateful to all faculties and co-workers of the Department of Otorhinolaryngology (ENT), Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar, India, for their support and valuable suggestions. I am especially thankful to Dr. (Associate Prof.) Pawan Kumar Lal, Head of Department, Department of Otorhinolaryngology (ENT), Sri Krishna Medical College & Hospital, Muzaffarpur, Bihar India, for their support and

valuable suggestions.

REFERENCES

1. Alper CM, Kitsko DJ, Swarts JD, et al. Role of the mastoid in middle ear pressure regulation. Laryngoscope. 2011;121(2):404–408.
2. Lasisi AO, Afolabi OA. Mastoid surgery for chronic ear: a ten years review. Internet J Head Neck Surg. 2008;2(2):13.
3. Varshney S, Nangia A, Bist SS, Singh RK, Guptha N. Ossicular chain status in chronic suppurative otitis media in adults. Indian J Otolaryngol Head Neck Surg. 2010;62(4):421–426.
4. Armstrong BW, Charlotte NC. Tympanoplasty in children. The Laryngoscope. 1965;75:1062–1069.
5. McGrew BM, Jackson CG, Glasscock ME. Impact of mastoidectomy on simple tympanic membrane perforation. Laryngoscope. 2004;114(3):506–511.
6. Kaur M, Singh B, Verma BS, et al. Comparative evaluation between tympanoplasty alone and tympanoplasty combined with cortical mastoidectomy in non cholesteatomatous chronic suppurative otitis media in patients with sclerotic bone. ISORJDMS 2014;13(6): 40-5.
7. Martin MS, Raz Y. Mastoid surgery. In: Myers EN (ed) Operative otolaryngology head and neck surgery, Chap 115, 2nd edn. Elsevier, Amsterdam, pp 2008;1163–1177.
8. Jackler RK and Schindler RA. Role of mastoid in tympanic membrane reconstruction. Laryngoscope, 1984; 94:495-500.
9. Gruening E. On the indications of opening the mastoid process in cases of otitis media purulent acute with implication of the mastoid cells. Arch Otolaryngol., 1879; 3:84-8.
10. Holmquist J, Bergstrom B. The mastoid air cell system in ear surgery. Arch Otolaryngol. 1978;104:127–129.
11. Aditya Gargava, Priyanka Verma, Abhinav Gupta, Smriti Saxena. Comparative Study between Tympanoplasty vs. Tympanomastoidectomy for the surgical outcome in tubotympanic Type CSOM. International Journal of Health and Clinical Research, 2021;4(11):179-181.
12. Agrawal A, Bhargava P. Comparative evaluation of tympanoplasty with or without mastoidectomy in treatment of chronic suppurative otitis media tubotympanic type. Indian Journal of Otolaryngology and Head & Neck Surgery. 2017 Jun;69:172-5.
13. Mishiro Y, Sakagami M, Takahashi Y, et al. Long term outcomes after tympanoplasty with or without mastoidectomy for perforation in CSOM. Eur Arch Otorhinolaryngol. 2009;266(6):819–822.
14. Albu S, Trabalzini F, Amadori M. Usefulness of cortical mastoidectomy in myringoplasty. Otology and Neurotology 2012;33(4):604-9.