



Original Article

Comparison Between Efficacy of Tympanoplasty with And Without Cortical Mastoidectomy in Active Tubo-Tympanic Otitis Media in Adults

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Received: 21-06-2026

Accepted: 15-07-2026

Available online: 27-07-2026

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Medical and Pharmaceutical Research

ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is a persistent inflammatory disease of the middle ear associated with tympanic membrane perforation, recurrent otorrhea, and conductive hearing loss. Although tympanoplasty is the standard treatment for mucosal CSOM, the additional benefit of cortical mastoidectomy, particularly in active disease, remains controversial. This study compared the efficacy of tympanoplasty with and without cortical mastoidectomy in adults with active tubo-tympanic CSOM.

Methods: A prospective comparative study was conducted among 60 adults aged 18–50 years with active mucosal CSOM and central tympanic membrane perforation. Patients were equally divided into two groups: Group A underwent tympanoplasty with cortical mastoidectomy, while Group B underwent Type I tympanoplasty alone. Patients were followed for 6 months. Outcomes included postoperative hearing improvement, air-bone gap closure, graft uptake, persistent perforation, recurrent discharge, and complications. Statistical analysis was performed using the Chi-square test and Student's t-test, with $p < 0.05$ considered statistically significant.

Results: Both groups were comparable in baseline characteristics. At 6 months, mean hearing gain was significantly greater in Group A than Group B (15.0 ± 5.0 vs. 10.0 ± 6.0 dB; $p = 0.001$). Air-bone gap closure ≤ 20 dB was achieved in 86.7% and 60.0% of patients, respectively ($p = 0.020$). Graft uptake was significantly higher with cortical mastoidectomy (93.3% vs. 73.3%; $p = 0.038$), while persistent perforation was lower (6.7% vs. 26.7%; $p = 0.038$). Recurrent discharge was less frequent but not statistically significant (3.3% vs. 13.3%; $p = 0.161$). Complication rates were comparable (3.3% vs. 6.7%; $p = 0.554$).

Conclusion: Tympanoplasty with cortical mastoidectomy demonstrated superior graft uptake and hearing outcomes compared with tympanoplasty alone in adults with active mucosal CSOM. However, mastoidectomy should be considered selectively according to disease activity and individual patient factors.

Keywords: Chronic Suppurative Otitis Media, Tympanoplasty, Cortical Mastoidectomy, Hearing Improvement, Graft Uptake, Tubotympanic CSOM.

INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is a persistent inflammatory disease of the middle ear cleft characterized by tympanic membrane perforation and recurrent or continuous otorrhea. It remains a significant health burden, particularly in developing countries, where the prevalence is high due to poor socioeconomic conditions, recurrent upper respiratory infections, and limited access to healthcare. Globally, CSOM affects millions of individuals and contributes substantially to preventable hearing loss and morbidity.¹

CSOM is broadly classified into tubotympanic (mucosal) and atticoantral (squamous) types, with the former considered the “safe type” due to the absence of complication.² However, in the active mucosal form, persistent middle ear infection and mucosal edema adversely affect surgical outcomes by interfering with graft uptake and middle ear ventilation. The

primary goal of surgical management is to eradicate infection, achieve a dry ear, close the tympanic membrane perforation, and restore hearing function.³

Tympanoplasty is the standard surgical procedure for mucosal CSOM. It aims to reconstruct the tympanic membrane and improve hearing. Despite its widespread acceptance, the role of adjunctive cortical mastoidectomy in tubotympanic disease remains controversial. The theoretical advantages of cortical mastoidectomy include removal of diseased mastoid air cells, reduction of bacterial load, and improvement in middle ear ventilation through restoration of mastoid air reservoir function.⁴

Several studies advocate the use of cortical mastoidectomy in active disease, suggesting that it improves graft uptake rates, hearing outcomes, and reduces postoperative discharge. Conversely, other authors have reported no significant additional benefit of mastoidectomy when combined with tympanoplasty in non-cholesteatomatous CSOM. Furthermore, multiple comparative studies have shown that although tympanoplasty with mastoidectomy may yield slightly better clinical outcomes, the differences are often statistically insignificant. This has led to divergent surgical philosophies—ranging from routine mastoidectomy in all active cases to selective use based on disease severity, Eustachian tube function, and mastoid pathology.

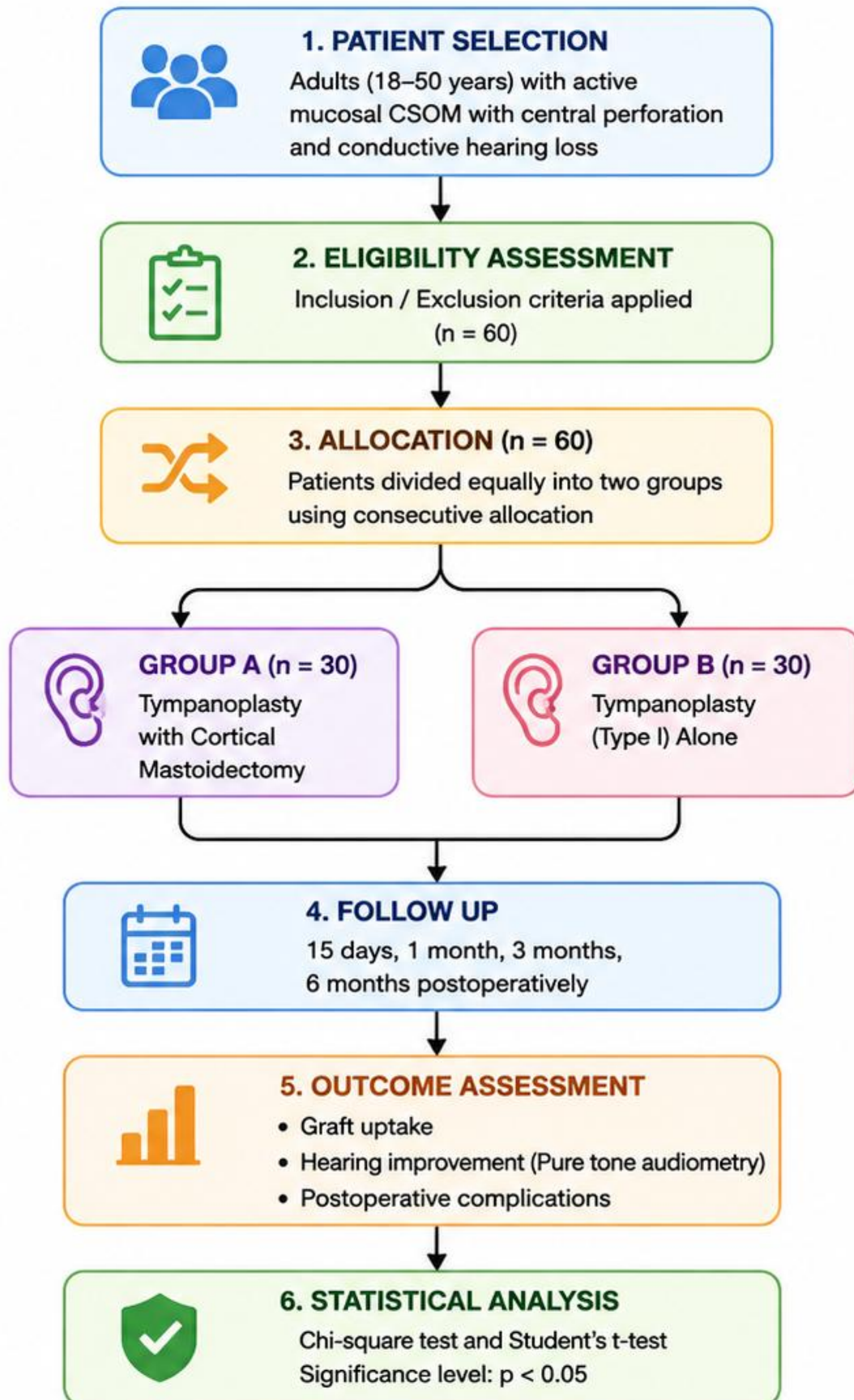
Therefore, the present study was undertaken to compare the outcomes of tympanoplasty with and without cortical mastoidectomy in adults with active tubo-tympanic chronic suppurative otitis media, with particular emphasis on graft uptake, hearing improvement, and postoperative complications. By evaluating these outcomes in patients with active mucosal disease, the study aims to clarify whether the addition of cortical mastoidectomy provides a meaningful clinical advantage over tympanoplasty alone and to support a more individualized, evidence-based approach to surgical management.

MATERIAL AND METHODS

This prospective comparative study was conducted on 60 patients aged between 18 and 50 years. The patients were divided into two groups: Group A (n=30) underwent tympanoplasty with cortical mastoidectomy, while Group B (n=30) underwent tympanoplasty (Type I) alone. Patients included in the study had active mucosal chronic suppurative otitis media (CSOM) with central tympanic membrane perforation and conductive hearing loss. Patients with cholesteatoma, marginal perforation, sensorineural hearing loss, history of previous ear surgery, multiple perforations, systemic illness were excluded from the study. All patients were followed up at 15 days, 1 month, 3 months, and 6 months postoperatively. Statistical analysis was performed using the Chi-square test and Student's t-test, with a p-value of less than 0.05 considered statistically significant.

All surgical procedures were performed under general anesthesia using a postaural approach. An underlay technique was employed in all cases, and temporalis fascia was used as the graft material. Preoperative assessment included pure tone audiometry and culture-based antibiotic therapy, mastoid x-ray. Outcome measures assessed included graft uptake, hearing improvement as evaluated by pure tone audiometry, and postoperative complications such as infection, re-perforation, and persistent or recurrent discharge. Data were analyzed using SPSS version 25.0.

STUDY FLOW DIAGRAM



RESULTS

A total of 60 patients were included in the study, with 30 patients in each group. The two groups were comparable at baseline with respect to age, sex distribution, and duration of symptoms, with no statistically significant differences observed ($p > 0.05$) (Table 1). Preoperative air-conduction thresholds were also comparable between the groups (45.0 ± 8.0 dB vs. 44.0 ± 7.5 dB; $p = 0.57$). At 6 months postoperatively, the tympanoplasty with cortical mastoidectomy (TP + CM) group demonstrated better audiological outcomes, with a lower mean air-conduction threshold (30.0 ± 7.0 dB vs. 34.0 ± 8.0 dB; $p = 0.044$) and greater mean hearing gain (15.0 ± 5.0 dB vs. 10.0 ± 6.0 dB; $p = 0.001$) compared with the tympanoplasty-alone group. Furthermore, air-bone gap closure to ≤ 20 dB was achieved in 86.7% of patients in the TP + CM group compared with 60.0% in the tympanoplasty-alone group ($p = 0.020$), indicating significantly better hearing outcomes with the addition of cortical mastoidectomy (Table 2).

Surgical outcomes were also more favorable in the TP + CM group. Successful graft uptake was achieved in 93.3% of patients compared with 73.3% in the tympanoplasty-alone group ($p = 0.038$), while persistent perforation occurred in 6.7% and 26.7% of patients, respectively ($p = 0.038$). Recurrent discharge was less frequent following TP + CM (3.3% vs. 13.3%), although the difference was not statistically significant ($p = 0.161$) (Table 3). Postoperative complications were uncommon in both groups, with chorda tympani disturbance reported in one patient in the TP + CM group and wound infection in two patients in the tympanoplasty-alone group. Overall complication rates were 3.3% and 6.7%, respectively, with no statistically significant difference between the groups ($p = 0.554$) (Table 4).

TABLE 1: BASELINE CHARACTERISTICS

Variables	TP + CM (n = 30)	TP Alone (n = 30)	p-value
Age (years), mean $\pm$ SD	32.5 $\pm$ 10.2	34.1 $\pm$ 9.8	0.56
Male: Female	18: 12	16: 14	0.60
Duration of Symptoms (months), median	18 (8–36)	16 (6–30)	0.70

TABLE 2: AUDIOLOGICAL OUTCOME

Measure	TP + CM (n = 30)	TP alone (n = 30)	p value
Pre-op AC (dB), mean $\pm$ SD	45.0 $\pm$ 8.0	44.0 $\pm$ 7.5	0.57
Post-op AC at 6 months (dB), mean $\pm$ SD	30.0 $\pm$ 7.0	34.0 $\pm$ 8.0	0.044
Mean hearing gain (dB), mean $\pm$ SD	15.0 $\pm$ 5.0	10.0 $\pm$ 6.0	0.001
ABG ≤ 20 dB at 6 months	26 (86.7%)	18 (60.0%)	0.020

TABLE 3: GRAFT UPTAKE

Outcome	TP + CM (n = 30)	TP alone (n = 30)	p value
Graft uptake (intact)	28 (93.3%)	22 (73.3%)	0.038
Persistent perforation	2 (6.7%)	8 (26.7%)	0.038
Recurrent discharge	1 (3.3%)	4 (13.3%)	0.161

Table 4: Complications recorded in the cohort

Complication	TP + CM	TP alone	p-value
Chorda tympani disturbance	1 (3.3%)	0 (0%)	—
Wound infection	0 (0%)	2 (6.7%)	—
Any complication	1 (3.3%)	2 (6.7%)	0.554

DISCUSSION:

The present study compared the anatomical and functional outcomes of tympanoplasty with cortical mastoidectomy and tympanoplasty alone in adults with active mucosal chronic suppurative otitis media. Both groups were comparable with respect to age, sex, and duration of symptoms, minimizing the influence of baseline differences on postoperative outcomes (Table 1). The addition of cortical mastoidectomy was associated with significantly better audiological outcomes. At 6 months, patients undergoing tympanoplasty with cortical mastoidectomy had a greater mean hearing gain than those undergoing tympanoplasty alone (15.0 ± 5.0 dB vs. 10.0 ± 6.0 dB, $p = 0.001$). Similarly, a significantly greater proportion achieved an air-bone gap of ≤ 20 dB (86.7% vs. 60.0%, $p = 0.020$) (Table 2). These findings suggest that, in actively

discharging mucosal disease, mastoidectomy may provide additional benefit by facilitating disease clearance and improving the overall middle-ear environment.

The anatomical results also favored the combined procedure. Graft uptake was significantly higher in the tympanoplasty with cortical mastoidectomy group (93.3% vs. 73.3%, $p = 0.038$), while persistent perforation was significantly less frequent (6.7% vs. 26.7%, $p = 0.038$) (Table 3). Recurrent discharge was also lower in the combined group, although this difference did not reach statistical significance.

Several previous studies have reported variable outcomes regarding the additional benefit of cortical mastoidectomy. Munjal et al. studied 60 patients with wet ears and found a higher mean hearing gain in patients undergoing cortical mastoidectomy with tympanoplasty (16.85 dB) compared with those undergoing tympanoplasty alone (13.05 dB), although graft uptake was similar between the groups.⁵ These findings are comparable with the present study, in which significantly greater hearing gain was observed in the tympanoplasty with cortical mastoidectomy group. In contrast, Nambiar et al., in patients with tubotympanic CSOM, reported no significant additional benefit of mastoidectomy with respect to graft uptake or hearing outcomes.⁶ Similarly, Aggarwal et al. conducted a prospective randomized comparative study in patients with inactive mucosal chronic otitis media and found no significant difference in graft uptake or hearing gain between tympanoplasty alone and tympanoplasty with cortical mastoidectomy.⁷ Naik and Ravi also reported comparable graft uptake and postoperative hearing improvement between the two procedures in patients with inactive or quiescent tubotympanic CSOM, concluding that mastoidectomy did not provide additional benefit when the middle-ear mucosa was healthy.⁸ The comparatively better outcomes observed in the present study may therefore be related to the inclusion of patients with **active mucosal disease**, in whom persistent infection and mucosal inflammation may make disease clearance and optimization of the middle-ear environment more important. Thus, the available evidence suggests that the benefit of cortical mastoidectomy may depend on disease activity and middle-ear status rather than being universally applicable to all patients undergoing tympanoplasty.

The difference between these findings and the present study may partly be explained by the disease status of the patients. Most studies reporting limited benefit from mastoidectomy evaluated dry, inactive, or quiescent ears, whereas the present study specifically included patients with active mucosal disease. In an actively infected ear, removal of diseased mastoid air cells may contribute to better disease control and create a more favorable environment for graft healing. Importantly, postoperative complications were uncommon and comparable between groups in the present study (Table 4), suggesting that the additional procedure did not result in a substantial increase in morbidity. Overall, the findings support selective use of cortical mastoidectomy in active mucosal CSOM, particularly when persistent discharge or mastoid disease is present, rather than considering it mandatory for every patient.

LIMITATIONS

The present study has certain limitations. The sample size was relatively small, and the follow-up period was limited to six months. Long-term outcomes, including recurrence rates and sustained hearing improvement, were not assessed. Additionally, radiological evaluation of mastoid pneumatization with CT scan and Eustachian tube function was not included, which could have provided further insight into patient selection.

CONCLUSION

Within the limitations of this study, tympanoplasty with cortical mastoidectomy appears to offer better graft uptake and hearing improvement compared to tympanoplasty alone in active mucosal CSOM. However, the decision to perform mastoidectomy should be individualized rather than routine.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest..

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