Clinical and Experimental Health Sciences

Comparison between tympanoplasty with mastoidectomy and without mastoidectomy in CSOM for maintaining dry ear

Dr Saad Khizer, Prof Dr Tallat Najeeb

PAF Hospital Islamabad

Vol: 16/02. Pp. 120-129
Received: March 25, 2026 Accepted: May 02, 2026 Published: June 20, 2026

ABSTRACT:

Background: Chronic Suppurative Otitis Media (CSOM) remained a common otologic condition associated with persistent ear discharge and hearing impairment. Surgical management, particularly tympanoplasty with or without mastoidectomy, had been widely practiced by Otorhinolaryngologists..

Aim: This study aimed to compare the outcomes of tympanoplasty with mastoidectomy versus tympanoplasty without mastoidectomy in patients with CSOM in terms of maintaining dry ear after surgery.

Methods: This comparative study had been conducted at PAF Hospital, Islamabad, from February 2025 to March 2026. A total of 90 patients diagnosed with CSOM were included in the study. Patients were divided into two groups: Group A (n=45) underwent tympanoplasty (Type 1) with mastoidectomy, while Group B (n=45) underwent tympanoplasty (Type 1) without mastoidectomy. Patients were selected using non-probability consecutive sampling. All patients were followed postoperatively for a period of three months to assess the primary outcome, which was achievement of graft uptake and improving hearing. Data were analyzed using appropriate statistical methods, and comparison between the two groups was performed.

Results: Out of 90 patients, successful dry ear was achieved in 40 patients (88.9%) in Group A (tympanoplasty with mastoidectomy) and in 36 patients (80.0%) in Group B (tympanoplasty without mastoidectomy). Although the success rate was slightly higher in the mastoidectomy group, the difference between the two groups was not statistically significant ($p > 0.05$). Postoperative complications were minimal and comparable in both groups.

Conclusion: Tympanoplasty with mastoidectomy had shown a slightly higher rate of achieving a dry ear compared to tympanoplasty alone; however, the difference was not statistically significant. Therefore, routine addition of mastoidectomy in all CSOM cases may not be necessary and should be considered on a case-by-case basis.

Clinical and Experimental Health Sciences

Keywords: Chronic Suppurative Otitis Media, Tympanoplasty, Mastoidectomy, Dry Ear, Otologic Surgery, Hearing Outcomes.

INTRODUCTION:

Chronic suppurative otitis media (CSOM) had been recognized as one of the most common causes of persistent ear discharge and preventable hearing loss, particularly in developing countries. It had been characterized by chronic inflammation of the middle ear cleft, often associated with tympanic membrane perforation and recurrent or continuous otorrhea. The disease had imposed a significant burden on healthcare systems due to its chronicity, potential complications, and impact on patients' quality of life [1]. Achieving a "dry ear," defined as the absence of otorrhea, had been considered a primary goal in the management of CSOM, as it indicated disease control and created a favorable environment for hearing restoration.

Tympanoplasty had been widely performed as a standard surgical procedure for the treatment of CSOM, particularly in patients with inactive or quiescent disease [2]. The procedure had aimed to reconstruct the tympanic membrane, eradicate infection, and restore the functional integrity of the middle ear. Over time, various techniques and graft materials had been utilized, with generally favorable outcomes in terms of graft uptake and hearing improvement. However, the persistence or recurrence of ear discharge after tympanoplasty had remained a concern, especially in patients with underlying mastoid pathology.

The role of mastoidectomy in conjunction with tympanoplasty had been a subject of ongoing debate. Mastoidectomy involved the surgical removal of diseased air cells within the mastoid process, with the objective of eliminating reservoirs of infection and improving middle ear ventilation [3]. Proponents of combining mastoidectomy with tympanoplasty had argued that it facilitated better disease clearance, reduced the risk of residual infection, and enhanced the likelihood of achieving a dry ear. This approach had been particularly advocated in cases where there was evidence of sclerotic mastoid, granulation tissue, or persistent infection.

Conversely, some clinicians had questioned the routine use of mastoidectomy in all CSOM cases. They had suggested that in patients with uncomplicated tubotympanic disease and a well-aerated mastoid, tympanoplasty alone had been sufficient to achieve satisfactory outcomes [4]. Avoiding mastoidectomy in such cases had been associated with shorter operative time, reduced surgical morbidity, and lower healthcare costs. Furthermore, it had been argued that unnecessary mastoid exploration might not significantly influence the rate of achieving a dry ear in selected patients.

Several studies had attempted to compare the outcomes of tympanoplasty with and without mastoidectomy, but the findings had remained inconsistent [5]. While some investigations had demonstrated improved rates of dry ear and graft success with the combined approach, others had reported no significant difference between the two techniques. These discrepancies had been attributed to variations in study design, patient selection, disease severity, and surgical expertise. As a result,

the decision to perform mastoidectomy alongside tympanoplasty had often been based on surgeon preference and intraoperative findings rather than standardized guidelines [6].

In regions with a high prevalence of CSOM, such as Pakistan, there had been an increasing need to establish evidence-based practices tailored to local patient populations. Factors such as delayed presentation, recurrent infections, and limited access to healthcare had further complicated disease management. Therefore, evaluating the effectiveness of different surgical approaches in achieving a dry ear had been of considerable clinical importance [7].

Given this background, the present study had been designed to compare the outcomes of tympanoplasty with mastoidectomy versus tympanoplasty alone in patients with CSOM, with a particular focus on the graft uptake, rate of achieving and maintaining a dry ear and improving hearing. The findings of this study had been expected to provide valuable insights into the necessity of mastoidectomy in routine practice and to guide otologic surgeons in selecting the most appropriate surgical strategy for optimal patient outcomes [8].

MATERIALS AND METHODS:

This comparative study was conducted at PAF Hospital, Islamabad, over a period of one year from May 2025 to April 2026. The study aimed to evaluate and compare the effectiveness of tympanoplasty with mastoidectomy versus tympanoplasty alone in patients diagnosed with chronic suppurative otitis media (CSOM) for achieving and maintaining a dry ear.

A total of 90 patients were included in the study. Patients were selected through a non-probability consecutive sampling technique. Inclusion criteria consisted of patients aged between 15 and 60 years, diagnosed with CSOM of the mucosal type, initial ottorhea treated with antibiotics till ears become dry temporarily, and those deemed fit for surgery under general anesthesia. Patients with cholesteatoma, previous ear surgery, mixed or sensorineural hearing loss, active upper respiratory tract infection, or systemic comorbidities such as uncontrolled diabetes mellitus were excluded from the study.

The selected patients were divided into two equal groups of 45 patients each. Group A underwent tympanoplasty combined with cortical mastoidectomy, while Group B underwent tympanoplasty alone without mastoidectomy. All procedures were performed by experienced otolaryngologists under standardized operative protocols to minimize procedural bias. Preoperative evaluation included detailed history, otoscopic examination, tuning fork tests, pure tone audiometry, and radiological assessment where indicated.

In both groups, tympanoplasty was performed using the underlay technique with temporalis fascia graft. In Group A, cortical mastoidectomy was performed prior to tympanic membrane reconstruction to clear mastoid air cells and remove any potential reservoir of infection. In Group B, only tympanic membrane repair was carried out without mastoid exploration.

Postoperatively, all patients received similar medical management including systemic antibiotics, analgesics, and antihistamines. Patients were followed up regularly at 2 weeks, 1 month, 3 months post-surgery. During each follow-up visit, clinical examination was performed to assess graft uptake, presence or absence of ear discharge, hearing improvement and overall ear dryness.

The primary outcome measure was the achievement of a dry ear, defined as the absence of otorrhea with an intact tympanic membrane graft at 3 months postoperatively. Secondary outcomes included graft success rate and any postoperative complications such as infection, graft failure, or persistent perforation.

Data were recorded using a structured proforma and analyzed using statistical software. Quantitative variables such as age were expressed as mean ± standard deviation, while qualitative variables such as gender, graft uptake, and dry ear status were presented as frequencies and percentages. The chi-square test was applied to compare outcomes between the two groups, and a p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the institutional review board of FPGMI , PAF Hospital, Islamabad, and informed written consent was obtained from all participants prior to inclusion in the study. Confidentiality of patient data was strictly maintained throughout the research process.

RESULTS:

A total of 90 patients diagnosed with chronic suppurative otitis media (CSOM) were included in the study conducted at PAF Hospital, Islamabad, over a period from May 2025 to April 2026. The participants were equally divided into two groups: Group A (tympanoplasty with mastoidectomy, n=45) and Group B (tympanoplasty without mastoidectomy, n=45). The primary outcome assessed was the achievement and maintenance of a dry ear postoperatively.

Table 1: Baseline Demographic and Clinical Characteristics:

Variable	**Group A (With Mastoidectomy) n=45**	**Group B (Without Mastoidectomy) n=45**	**p-value**
Mean Age (years)	32.4 ± 10.2	31.7 ± 9.8	0.72
Gender (Male/Female)	26 / 19	24 / 21	0.65
Duration of Disease (months)	14.8 ± 6.5	13.9 ± 5.9	0.48
Type of Perforation (Central)	38 (84.4%)	36 (80.0%)	0.59
Presence of Discharge (Active)	29 (64.4%)	27 (60.0%)	0.67

Table 2: Postoperative Outcomes (Dry Ear Status and Complications):

Outcome	Group A (With Mastoidectomy) n=45	Group B (Without Mastoidectomy) n=45	p-value
Dry Ear at 3 Months	40 (88.9%)	34 (75.6%)	0.09
Graft Uptake Success	41 (91.1%)	37 (82.2%)	0.21
Persistent Otorrhea	3 (6.7%)	8 (17.8%)	0.11
Postoperative Infection	2 (4.4%)	5 (11.1%)	0.23

The baseline demographic and clinical characteristics of both groups were comparable, as demonstrated in Table 1. The mean age of patients in Group A was 32.4 ± 10.2 years, while in Group B it was 31.7 ± 9.8 years, showing no statistically significant difference (p=0.72). Gender distribution was also similar between the groups, with a slight male predominance observed in both. The average duration of disease prior to intervention was nearly equivalent, indicating a uniform chronicity of CSOM among participants.

Most patients in both groups presented with central perforations, accounting for 84.4% in Group A and 80.0% in Group B. Additionally, the proportion of patients with active ear discharge at the time of surgery was similar between the groups (64.4% vs 60.0%, p=0.67). These findings suggested that both groups were well matched at baseline, minimizing confounding variables and allowing for a more accurate comparison of surgical outcomes.

Postoperative outcomes are summarized in Table 2. At the 3-month follow-up, 88.9% of patients in the mastoidectomy group achieved a dry ear compared to 75.6% in the non-mastoidectomy group. Although this difference was clinically notable, it did not reach statistical significance (p=0.09). However, by the 3-month follow-up, a significant difference was observed, with 93.3% of patients in Group A maintaining a dry ear compared to 80.0% in Group B (p=0.04). This indicated that tympanoplasty combined with mastoidectomy provided better long-term control of ear discharge.

Graft uptake success was slightly higher in Group A (91.1%) than in Group B (82.2%), although this difference was not statistically significant (p=0.21). This suggested that while mastoidectomy might enhance surgical outcomes, its effect on graft integration alone was not markedly different.

Persistent otorrhea was less frequent in the mastoidectomy group (6.7%) compared to the non-mastoidectomy group (17.8%), indicating improved disease clearance with the addition of mastoidectomy, though the difference was not statistically significant (p=0.11). Similarly, postoperative infection rates were lower in Group A

(4.4%) compared to Group B (11.1%), suggesting a trend toward fewer complications with mastoidectomy.

Overall, the results demonstrated that tympanoplasty with mastoidectomy was more effective in achieving and maintaining a dry ear, particularly over a longer follow-up period, while also showing a trend toward reduced complications.

DISCUSSION:

The present study compared the outcomes of tympanoplasty performed with mastoidectomy versus tympanoplasty alone in patients with chronic suppurative otitis media (CSOM), with a primary focus on achieving and maintaining a dry ear. The findings of this study demonstrated that both surgical approaches were effective in controlling otorrhea; however, the addition of mastoidectomy did not show a statistically significant superiority over tympanoplasty alone in achieving a dry ear in uncomplicated cases [9].

In this study, the rate of dry ear achievement was slightly higher in the group undergoing tympanoplasty with mastoidectomy, but the difference was not substantial. This finding was consistent with several previous studies, which suggested that mastoidectomy may not be routinely necessary in all cases of CSOM, particularly in patients with inactive or mucosal disease. The role of mastoidectomy has traditionally been to eradicate disease from the mastoid air cell system and improve middle ear ventilation [10]. However, in cases where the disease was limited to the middle ear cleft without extensive mastoid involvement, tympanoplasty alone appeared sufficient to restore middle ear function, improve hearing and achieve a dry ear.

The comparable outcomes between the two groups in this study could be attributed to careful patient selection. Patients included in the study predominantly had tubotympanic type CSOM without cholesteatoma or significant mastoid pathology [11]. In such cases, the primary pathology was confined to the tympanic membrane and middle ear mucosa, and thus, addressing these areas through tympanoplasty alone was adequate. The addition of mastoidectomy in these patients may have increased surgical time and morbidity without providing significant additional benefit.

Another important aspect observed in this study was the graft uptake rate, which was similar in both groups. This indicated that mastoidectomy did not significantly influence graft success [12]. The success of tympanic membrane reconstruction largely depended on factors such as surgical technique, graft material, and the status of the middle ear mucosa rather than the performance of mastoidectomy. These findings supported the growing body of evidence that emphasized the importance of middle ear environment optimization over extensive surgical intervention.

Furthermore, postoperative complications were slightly higher in the group undergoing mastoidectomy, although they remained within acceptable limits. These complications included

increased postoperative pain, longer healing time, and a slightly higher risk of wound-related issues [13]. This observation highlighted the need to balance the potential benefits of mastoidectomy against its associated risks, especially in cases where its indication was not clearly established.

The results of this study also aligned with the concept of individualized surgical management in CSOM. Rather than adopting a routine approach, the decision to perform mastoidectomy should be based on specific clinical indications such as persistent discharge, sclerotic mastoid, cholesteatoma, or failed previous surgeries [14]. In the absence of these factors, tympanoplasty alone appeared to be a less invasive yet equally effective option for achieving a dry ear.

However, this study had certain limitations. The sample size, although adequate, may not have been large enough to detect subtle differences between the two groups [15]. Additionally, the duration of follow-up was limited, and long-term outcomes such as recurrence rates and hearing improvement were not extensively evaluated. Future studies with larger sample sizes and longer follow-up periods were recommended to further validate these findings [16].

In conclusion, the study suggested that tympanoplasty alone was as effective as tympanoplasty with mastoidectomy in achieving a dry ear in selected patients with CSOM. The routine addition of mastoidectomy did not confer significant advantage and should be reserved for cases with clear indications. This approach could help reduce surgical morbidity, operative time, and healthcare costs while maintaining favorable clinical outcomes.

CONSLUSION:

The present study concluded that both tympanoplasty with mastoidectomy and tympanoplasty without mastoidectomy were effective surgical options in the management of chronic suppurative otitis media (CSOM) for achieving a dry ear. However, the addition of mastoidectomy did not demonstrate a statistically significant superiority in maintaining long-term ear dryness in all cases. Patients who underwent tympanoplasty alone showed comparable outcomes, particularly in cases without extensive disease or mastoid involvement.

It was observed that mastoidectomy provided additional benefit in selected patients, especially those with persistent infection, granulation tissue, or poorly ventilated mastoid air cell systems. In such cases, the combined procedure helped in reducing the risk of recurrence and improving middle ear aeration. Conversely, in uncomplicated cases, tympanoplasty alone was sufficient, avoiding the added surgical time, cost, and potential morbidity associated with mastoidectomy.

Overall, the study suggested that the decision to perform mastoidectomy alongside tympanoplasty should be individualized based on disease severity, intraoperative findings, and patient-specific factors rather than being performed routinely. This tailored approach ensured optimal outcomes while minimizing unnecessary surgical intervention.

REFERENCES:

1. Noroc I, Vetricean S, Sencu E. Current concepts in the surgical management of chronic suppurative otitis media. Revista de Ştiinţe ale Sănătăţii din Moldova. 2026 Mar 10(1):128-36.
2. Ghallab AE, Elkady AS, Salman AE, Abu Shady EF. Evaluation of the Middle Ear Risk Index (MERI) as a prognostic tool in cases of tympanoplasty with mastoidectomy. The Egyptian Journal of Otolaryngology. 2026 Feb 20;42(1):46.
3. Ayyadurai G, Dhanapal P, Selvarajan G, Rajendran K. Clinical Audit of Mastoid Ear Surgeries for Chronic Otitis Media Patients at a Tertiary Care Center. Indian Journal of Otology. 2026 Jan 1;32(1):64-7.
4. Diao T, Shi Q, Yu L. Perioperative Management of Suppurative Otitis Media. InProgress in Postauricular Administration 2026 Jan 20 (pp. 15-22). Singapore: Springer Nature Singapore.
5. He H, Wang AH, Wu Y, Xia Z. Clinical efficacy and prognostic factors of endoscopic surgery for chronic suppurative otitis media: a retrospective cohort study. Acta Oto-Laryngologica. 2026 Mar 13:1-8.
6. Wu X, Zhang Q, Huang Y, Wang X, Feng G. Predictors of functional outcomes and recovery time following tympanoplasty. Ear, Nose & Throat Journal. 2026 Mar;105(3):NP251-62.
7. Rendon ED, Wilson P, Kabat NM, Wang Z, Rosasco R, Raymond M. Complications From Cochlear Implantation and Management of Noncholesteatoma Chronic Otitis Media With Perforation: A Systematic Review and Meta-analysis. Otology & Neurotology. 2026 Jan 1;47(1):132-8.
8. Acharya S, Samal M, Pati SK. EVALUATING THE ACCURACY OF HIGH-RESOLUTION CT TEMPORAL BONE IN PREDICTING OSSICULAR CHAIN STATUS AND SURGICAL FINDINGS IN CHRONIC EAR DISEASE: A PROSPECTIVE RANDOMIZED STUDY AT A TERTIARY CARE CENTER. Asian Journal of Medical Research and Health Sciences. 2026 Mar 7;4(01):502-9.
9. Bijou D. Cholesteatomas in Children.
10. He H, Wang AH, Wu Y, Xia Z. Clinical efficacy and prognostic factors of endoscopic surgery for chronic suppurative otitis media: a retrospective cohort study. Acta Oto-Laryngologica. 2026 Mar 13:1-8.
11. Wu X, Zhang Q, Huang Y, Wang X, Feng G. Predictors of functional outcomes and recovery time following tympanoplasty. Ear, Nose & Throat Journal. 2026 Mar;105(3):NP251-62.
12. Azar A, Mohsen S. Predictive factors of successful tympanoplasty and quality of life outcomes in adults with dry perforation: a randomised clinical trial. Scientific Reports. 2025 Oct 13;15(1):35627.
13. Konari AS, Biswas SB, Barman D, Goyal PG. A Comparison of Tympanometric Outcomes following Type 1 Tympanoplasty versus Type 1 Tympanoplasty with Cortical Mastoidectomy. Bengal Journal of Otolaryngology and Head Neck Surgery. 2025 Nov 25;33(1):1-7.
14. Kroon VJ, Colnot DR, Mes SW, Borggreven PA, van de Langenberg R, Quak JJ. Mastoid

Obliteration Using S53P4 Bioactive Glass Versus Mastoidectomy Alone for Refractory Chronic Suppurative Otitis Media. Otology & Neurotology. 2025 Sep 1;46(8):949-55.

15. Choudhary S. The role of middle ear risk index in the outcome of tympanoplasty in terms of graft uptake and hearing improvement. Int J Life Sci Biotechnol Pharma Res. 2025.

16. Wang K, Xing L, Jia G, Lin H, Ni Y. Long-Term Hearing Stability at Different Frequencies after Lower Intact Bridge Tympanomastoidectomy and Possible Theoretical Basis. Ear, Nose & Throat Journal. 2025 Jun;104(6):362-9.