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ORIGINAL RESEARCH

The Role of Cortical Mastoidectomy in Tympanoplasty for Persistent or Intermittent Discharging Chronic Suppurative Otitis Media: A Randomized Controlled Study

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is a common condition treated with tympanoplasty, though the role of cortical mastoidectomy in improving outcomes remains unclear. The aim of the study is to evaluate the role of cortical mastoidectomy in tympanoplasty for patients with persistent or intermittent discharging chronic suppurative otitis media (CSOM) and to identify factors influencing surgical outcomes, particularly graft uptake and hearing improvement. **Methods:** This prospective was conducted at the Department of ENT, GMC Udhampur, Jammu randomized, controlled study included patients diagnosed with persistent or intermittent discharging CSOM. Patients were randomly assigned to undergo tympanoplasty alone or tympanoplasty with cortical mastoidectomy. Hearing outcomes, specifically air-bone gap closure, and graft uptake success rates were assessed and compared between the two groups. **Results:** At 12 months postoperatively, both groups showed significant improvement in air-bone gap (ABG), with no significant difference between Group A (11.93 ± 4.54 dB) and Group B (12.24 ± 3.89 dB) ($p = 0.689$). The success rate was 81.7% for Group A and 75% for Group B ($p = 0.375$). In univariate analysis, key predictors of success included a dry period of ≥3 months (87.3% vs. 65.3%, $p = 0.004$) and normal contralateral ear status (88.4% vs. 64.7%, $p = 0.001$). Smoking was associated with lower success (65.6% vs. 83%, $p = 0.041$). Multivariate analysis identified a dry period of ≥3 months as the most significant predictor (OR = 2.73, $p = 0.007$). **Conclusion:** Cortical mastoidectomy does not confer additional benefit when performed alongside tympanoplasty in cases of persistent or intermittent discharging CSOM. Satisfactory surgical outcomes can be achieved with tympanoplasty alone. Preoperative factors, particularly a dry ear period longer than three months, play a crucial role in optimizing graft uptake and surgical success.

Keywords: Chronic suppurative otitis media, tympanoplasty, cortical mastoidectomy, graft uptake, hearing outcomes, air-bone gap

INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is a long-standing infection of the middle ear and mastoid cavity characterized by persistent or intermittent ear discharge through a perforated tympanic membrane.[1] CSOM without cholesteatoma, also referred to as the "safe type," does not involve the presence of keratinizing squamous epithelium (cholesteatoma) in the middle ear, reducing the risk of complications such as bone erosion or intracranial spread.[1,2] The primary cause of CSOM is a persistent bacterial infection, often following untreated or recurrent acute otitis media. Common pathogens include *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and various gram-negative organisms.[3] Risk factors for CSOM include poor socioeconomic conditions, inadequate healthcare access, and chronic upper respiratory tract infections. Clinically, patients with

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CSOM without cholesteatoma present with painless otorrhea and conductive hearing loss, with occasional complaints of tinnitus. The condition is primarily managed medically to control infection and inflammation using topical antibiotics (frequently combined with corticosteroids) and meticulous ear cleaning.[4] Systemic antibiotics are reserved for acute exacerbations. However, persistent ear discharge or significant hearing loss necessitates surgical intervention.

The surgical approach to CSOM without cholesteatoma primarily involves myringoplasty or tympanoplasty to repair the tympanic membrane and restore hearing. In cases where the disease persists or is associated with granulation tissue in the mastoid air cells, a cortical mastoidectomy may be added to eradicate infection and improve the success rates of tympanic membrane repair.The role of cortical mastoidectomy in Type I tympanoplasty remains a subject of ongoing debate. Sheehy suggested that performing a simple cortical mastoidectomy routinely in all tympanoplasty cases, irrespective of whether the ear is dry or discharging, is beneficial.[5] He emphasized that this practice represents a proactive approach, arguing that it is "good practice" and aligns with the principle of "better safe than sorry."[5] This perspective supports the view that mastoidectomy provides a comprehensive surgical solution by addressing both the tympanic membrane perforation and potential mastoid sources of infection.Conversely, another school of thought advocates that cortical mastoidectomy should be reserved for cases of chronic otitis media that persist despite maximal medical treatment, including antibiotics.[6] Proponents of this view argue that mastoidectomy is most effective in repneumatizing the mastoid and eliminating infection only when the mastoid process is a significant source of disease.[6,7]A third perspective challenges the necessity of mastoidectomy altogether, suggesting that the repair of tympanic membrane perforations can be accomplished effectively with tympanoplasty alone, regardless of the mastoid status.[8] Studies supporting this viewpoint argue that mastoidectomydoes not provide significant clinical advantages in many cases and may introduce unnecessary risks without improving outcomes.[8] Moreover, they emphasize that mastoidectomy might not contribute to better results in either dry or discharging ears and could potentially increase procedural morbidity.

This ongoing controversy highlights the need for further research to determine the specific circumstances under which mastoidectomy is beneficial, as well as to identify the subset of patients who would derive the most clinical advantage from the procedure.A randomized prospective study was designed to evaluate the role of mastoidectomy in improving outcomes of tympanoplasty. The objective was to compare the success rates of myringoplasty performed with and without cortical mastoidectomy in treating patients with persistent or intermittent discharging CSOM. Success was measured in terms of tympanic membrane closure, hearing improvement, and resolution of middle ear infection, providing a critical assessment of the added benefits of mastoidectomy in surgical management.

METHODOLOGY

This prospective was conducted at the Department of ENT, GMC Udhampur, Jammu randomized, controlled study included patients diagnosed with persistent or intermittent discharging CSOM. Adult patients undergoing surgical intervention for persistent tympanic membrane (TM) perforations secondary to chronic suppurative otitis media (CSOM) were included. Participants exhibited persistent or intermittent otorrhea within the preceding six months, with medical management having failed to resolve symptoms. Each patient was followed for 12 months postoperatively. Preoperative evaluation involved comprehensive otomicroscopic examination, baseline audiometry, and temporal bone computed tomography (CT) imaging.

Inclusion and Exclusion Criteria

Patients were considered eligible if they presented with unresolvingotorrhea and required surgical management of tympanic membrane perforations. The exclusion criteria included the absence of otorrhea for over one year, pediatric age group, ossicular abnormalities such as fixation, discontinuity, or malformation, presence of cholesteatoma, diagnosed adhesive otitis, and a prior history of mastoidectomy.

Surgical Procedures

A single otologic surgeon performed all procedures to maintain consistency in surgical technique. Myringoplasty was conducted under general anesthesia via a postauricular approach, with temporalis fascia harvested for use as graft material. Participants were randomized into two groups:

- Group A (Myringoplasty with Mastoidectomy): Cortical mastoidectomy was performed, including the removal of mastoid air cells and widening of the aditusadantrum. Saline irrigation was used to confirm aditus patency, and mastoid volume was expanded to create an air reservoir.
- Group B (Myringoplasty alone): Standard underlay myringoplasty was performed without additional mastoid procedures.

Randomization and Stratification

Patients were randomly assigned to treatment groups using a block randomization technique, facilitated by SAS software. Stratification was based on the Middle Ear Risk Index (MERI) as reflected in table 1, a validated tool used to quantify disease severity and predict surgical outcomes. MERI scores <4 were classified as mild disease, while scores ≥4 indicated moderate to severe pathology. Randomization

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assignments followed ascending order for mild disease and descending order for severe cases.

Table 1: Middle ear risk index 2001[9]

Risk Factor	Risk Value
Otorrhea (Bellucci)	
- I. Dry	0
- II. Occasionally wet	1
- III. Persistently wet	2
- IV. Wet, cleft palate	3
Perforation	
- None	0
- Present	1
Cholesteatoma	
- None	0
- Present	1
Ossicular Status (Austin/Kartush)	
- 0) M+I+S+	0
- A) M+S+	1
- B) M+S-	2
- C) M-S+	3
- D) M-S-	4
- E) Malleus head fixation	2
- F) Stapes fixation	3
Middle Ear: Granulations or Effusion	
- No	0
- Yes	2
Previous Surgery	
- None	0
- Staged	1
- Revision	2
Smoker	
- No	0
- Yes	2

Variables and Data Collection

Key clinical variables documented in this study included smoking status, the duration of symptom-free periods, preoperative otorrhea status, the location and size of tympanic membrane (TM) perforations, the condition of the middle ear mucosa, the status of the contralateral ear, and any history of prior otologic surgeries. The contralateral ear was classified as normal in cases where no perforation, atrophy, or atelectasis was observed.

Participants underwent structured follow-up evaluations at 6 and 12 months post-surgery. Outcomes were assessed in two main categories: morphological and audiological success. Morphological success was defined as the presence of intact grafts without recurrence of perforation, atrophy, atelectasis, or otorrhea. Audiological success involved comparing preoperative and postoperative audiometric data to assess improvements in conductive hearing. Metrics such as air conduction (AC), bone conduction (BC), and air-bone gap (ABG) thresholds were calculated in line with standards set by the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). ABG closure was determined as the difference between preoperative and postoperative ABG values. To minimize bias, an independent assessor blinded to the group allocation conducted all evaluations.

Statistical Design and Sample Size

Sample size calculations targeted a 15% difference in the primary outcome (morphological success), with success rates projected at 85% for Group A and 65% for Group B. Using a significance level of 5% and a power of 80%, 140 patients per group were required. To account for potential dropouts, the target enrollment was increased to 160 patients per group. The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. The Shapiro-Wilk test was applied to test the normality of data. Student's independent t-test or Mann-Whitney U-test, whichever feasible, was used for comparing continuous variables between two groups. Chi-square test or Fisher's exact test, whichever appropriate, was applied for comparing categorical variables. Multivariate logistic regression analysis was

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employed to determine the prognostic factors associated with success of myringoplasty. A P-value of less than 0.05 was considered statistically significant.

RESULTS

In this section, the results of the study will be described

Table 1: Baseline characteristics between the two treatment groups

Character		Group A	Group B	P-value
Age	Mean±SD	26.8±5.63	27.3±6.42	0.651
Gender	Male	34 (56.7)	36 (59.9)	0.711
	Female	26 (43.3)	24 (40.1)	
Perforation size	< 50%	23 (38.3)	27 (45)	0.459
	≥ 50%	37 (61.7)	33 (55)	
Location of perforation	Anterior	19 (32.1)	15 (24.6)	0.647
	Central	23 (38.3)	23 (38.3)	
	Posterior	18 (30)	22 (36.7)	
Middle ear exudate	Present	45 (75)	42 (70)	0.539
	Absent	15 (25)	18 (30)	
Middle ear mucosa	Normal	34 (57.1)	38 (62.7)	0.456
	Fibrosis or inflammation	26 (42.9)	22 (37.3)	
Status of the opposite ear	Normal	36 (60)	33 (54.9)	0.579
	Abnormal	24 (40)	27 (45.1)	
Duration of dry period	< 3 Months	26 (43.3)	23 (38)	0.577
	≥ 3 Months	34 (56.7)	37 (62)	
Smoker	Yes	15 (25)	17 (28.3)	0.679
	No	45 (75)	43 (71.7)	
Revision surgery	Yes	19 (32.1)	22 (36.6)	0.564
	No	41 (67.9)	38 (63.4)	

Table 1 compares the baseline characteristics between two treatment groups (Group A and Group B). The groups were similar in terms of age, gender distribution, perforation size, perforation location, and status of the opposite ear, with no statistically significant differences (p-values > 0.05). For both groups, most participants had perforations larger than 50%, with Group A showing 38.3% and Group B showing 45% of participants having a perforation size of less than 50%. Regarding perforation location, the majority in both groups had central perforations. The presence of middle ear exudate, abnormal middle ear mucosa, and smoking status were also similar between groups. Additionally, the duration of the dry period and revision surgery history were comparable across both groups, with no significant differences (p-values > 0.05). These findings suggest that the groups had comparable baseline characteristics, ensuring a balanced comparison for further analysis.

Table 2: Preoperative hearing levels

Parameter	Group A	Group B	P-value
PTA-air (dB)	38.43±8.72	37.93±7.94	0.743
PTA-bone (dB)	12.72±6.49	13.51±5.19	0.463
ABG (dB)	25.71±7.32	24.42±6.15	0.298

Table 2 shows the preoperative hearing levels for both groups (Group A and Group B). The mean pure-tone average (PTA) for air conduction (dB) was 38.43 ± 8.72 dB for Group A and 37.93 ± 7.94 dB for Group B, with no significant difference between the two groups (p = 0.743). The PTA for bone conduction was 12.72 ± 6.49 dB for Group A and 13.51 ± 5.19 dB for Group B, again showing no statistically significant difference (p = 0.463). The air-bone gap (ABG) was 25.71 ± 7.32 dB for Group A and 24.42 ± 6.15 dB for Group B, with no significant difference observed (p = 0.298). These findings indicate similar preoperative hearing levels in both groups, ensuring a balanced comparison in terms of hearing function before surgery.

Table 3: Hearing results 12 months postoperatively

Parameter	Group A	Group B	P-value
Preoperative ABG (dB)	25.71±7.32	24.42±6.15	0.298
Postoperative ABG (dB)	11.93±4.54	12.24±3.89	0.689
P-value (Intra-group comparison)	<0.001*	<0.001*	

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Table 3 presents the hearing results 12 months postoperatively for both groups (Group A and Group B). The preoperative air-bone gap (ABG) for Group A was 25.71 ± 7.32 dB and for Group B was 24.42 ± 6.15 dB, showing no significant difference between the two groups (p = 0.298). Postoperatively, the ABG for Group A decreased to 11.93 ± 4.54 dB, while Group B's ABG was 12.24 ± 3.89 dB, with no significant difference between the two groups (p = 0.689). However, within-group comparisons revealed a significant reduction in ABG for both groups (p < 0.001 for both), indicating a marked improvement in hearing for both treatment groups after surgery. These results highlight the effectiveness of the surgical intervention in improving ABG in both groups.

Table 4: Predictors of success in Myringoplasty

		N	Success rate	P-value
Group	A	60	49 (81.7)	0.375
	B	60	45 (75)	
Perforation size	< 50%	50	40 (80)	0.708
	≥ 50%	70	54 (77.1)	
Location of perforation	Anterior	34	25 (73.5)	0.439
	Central	46	35 (76.1)	
	Posterior	40	34 (85)	
Middle ear exudate	Present	87	71 (81.6)	0.157
	Absent	33	23 (69.7)	
Middle ear mucosa	Normal	72	59 (81.9)	0.239
	Fibrosis or inflammation	48	35 (72.9)	
Status of the opposite ear	Normal	69	61 (88.4)	0.001*
	Abnormal	51	33 (64.7)	
Duration of dry period	< 3 Months	49	32 (65.3)	0.004*
	≥ 3 Months	71	62 (87.3)	
Smoker	Yes	32	21 (65.6)	0.041*
	No	88	73 (83)	
Revision Surgery	Yes	41	29 (70.7)	0.145
	No	79	65 (82.3)	

Table 4 presents the predictors of success in myringoplasty, showing the success rates for various factors. The success rate for Group A was 81.7%, while Group B had a success rate of 75%, with no significant difference between the two groups (p = 0.375). Perforation size did not significantly affect success, with both smaller (<50%) and larger (≥50%) perforations showing similar success rates (80% vs. 77.1%, p = 0.708). The location of the perforation also did not have a significant impact, though posterior perforations had the highest success rate (85%).Middle ear exudate and middle ear mucosa condition (normal vs. fibrosis/inflammation) were not significantly associated with success rates, although exudate absence was associated with a slightly lower success rate (69.7%, p = 0.157). The status of the opposite ear was a significant predictor, with normal contralateral ears showing a higher success rate (88.4% vs. 64.7%, p = 0.001). Duration of the dry period was also significant, with a greater success rate seen in those with a dry period of ≥3 months (87.3% vs. 65.3%, p = 0.004). Smoking was associated with a lower success rate in smokers (65.6% vs. 83%, p = 0.041), while revision surgery did not significantly affect outcomes (p = 0.145). These findings indicate that factors such as contralateral ear status, duration of the dry period, and smoking are important predictors of success in myringoplasty.

Table 5: Multivariate analysis of the prognostic factors associated with success of myringoplasty

Variable	Odds Ratio	95% CI	P-value
Normal opposite ear	1.87	0.97-2.78	0.083
Duration of dry period ≥ 3 Months	2.73	1.41-4.05	0.007*
Nonsmoker	1.14	0.64-2.29	0.329

CI: Confidence Interval, *Statistically Significant (P-value<0.05)

The multivariate analysis revealed that a dry period of ≥ 3 months before surgery is a significant predictor of success, with an odds ratio of 2.73 (p = 0.007). This highlights the importance of a sufficient dry period. The status of the opposite ear also appears to influence success, with an odds ratio of 1.87, though it is not statistically significant (p = 0.083). Smoking status did not show a significant impact, with an odds ratio of 1.14 (p = 0.329). Thus, the duration of the dry period was found to be the most significant factor in predicting myringoplasty success.

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DISCUSSION

The present study was aimed to compare the success rates of myringoplasty performed with and without cortical mastoidectomy in treating patients with persistent or intermittent discharging CSOM. The baseline characteristics between the two treatment groups (Group A and Group B) were comparable in terms of age, gender, perforation size, perforation location, middle ear exudate, and middle ear mucosa condition. Statistical tests showed no significant differences between the groups for these variables, with p-values greater than 0.05 for all comparisons. These findings align with similar studies where preoperative factors like age, gender, and perforation size are not commonly predictive of treatment success in myringoplasty (Albu S et al., 2012; Mangia LRL et al., 2023).[10,11] Both groups had similar distributions of perforation sizes and locations, with the majority having perforations larger than 50% and central or posterior in location. This supports the notion that the size and location of the perforation alone may not significantly influence surgical outcomes, as has been reported in other studies (Albu S et al., 2012;Tahiri I et al., 2023).[10,12]

The preoperative hearing levels, as shown in Table 2, indicate that both groups (Group A and Group B) had similar hearing function before surgery. The mean pure-tone average (PTA) for air conduction was 38.43 ± 8.72 dB in Group A and 37.93 ± 7.94 dB in Group B, with no statistically significant difference between the two groups ($p = 0.743$). Similarly, the PTA for bone conduction was 12.72 ± 6.49 dB for Group A and 13.51 ± 5.19 dB for Group B, which also showed no significant difference ($p = 0.463$). The air-bone gap (ABG), which is a key indicator of conductive hearing loss, was 25.71 ± 7.32 dB for Group A and 24.42 ± 6.15 dB for Group B, with no significant difference ($p = 0.298$). These results indicate that both groups had comparable hearing levels prior to the surgical intervention, ensuring that the baseline hearing status was equivalent between the groups, thus eliminating potential biases in the preoperative hearing function.These preoperative findings are consistent with existing literature on myringoplasty, where baseline PTA and ABG values are often similar across different treatment groups before surgery. In studies by Albu S et al., (2012) and Immordino A et al., (2018), no significant differences in PTA or ABG were reported between groups, reinforcing the idea that preoperative hearing status does not significantly impact the treatment outcomes of myringoplasty.[10,13] The balanced comparison in terms of hearing function before surgery strengthens the validity of the postoperative results.

Postoperatively, the ABG for Group A decreased to 11.93 ± 4.54 dB, while Group B's ABG decreased to 12.24 ± 3.89 dB. Both groups showed a marked improvement in ABG, although the difference between the groups postoperatively was not statistically significant ($p = 0.689$). Importantly, within-group comparisons revealed a significant reduction in ABG for both groups ($p < 0.001$ for both), indicating that the surgical intervention led to significant improvements in hearing function for both groups. The significant postoperative improvement in ABG is in line with previous studies, where myringoplasty has been shown to effectively reduce the ABG and improve hearing outcomes. According to research by Albu S et al., (2012); Gamra O et al. (2015) and Dawood M et al. (2017), myringoplasty can lead to substantial improvements in ABG, with most patients showing a reduction in the gap postoperatively.[10,14,15]The improvement in hearing function in both groups is a positive reflection of the efficacy of the surgical intervention. Additionally, the absence of a significant difference between groups postoperatively suggests that the type of surgical approach or treatment applied to the groups in this study may not have differentially impacted the improvement in ABG, which further supports the general effectiveness of myringoplasty in addressing conductive hearing loss caused by tympanic membrane perforations.The findings from the studies by Balyan et al., (1997) and Mishiro et al., (2001) align closely with the results presented in this study, particularly regarding the lack of significant differences between the groups in hearing improvement post-surgery.[16,17] Both studies emphasize that additional procedures such as mastoidectomy do not necessarily lead to better outcomes in terms of graft success or postoperative air-bone gap (ABG) reduction. Specifically, Balyan et al., (2001) reported that, in their series of 323 tympanoplasties, no significant differences were found for graft success or ABG improvements, whether or not mastoidectomy was performed.[16] This finding supports the idea that mastoidectomy, often considered an adjunct procedure in tympanoplasty for chronic suppurative otitis media (CSOM), may not provide added benefit regarding hearing restoration, similar to the results of this study, which showed significant improvement in ABG in both groups without distinguishing the added effect of a mastoidectomy. Similarly, Mishiro et al., (2001) found that when mastoidectomy was combined with tympanoplasty, there was no significant improvement in graft success rates or postoperative ABG when compared to tympanoplasty alone.[17] This reflects the results in our study, where significant improvements in ABG were seen postoperatively in both groups without a statistically significant difference between the two groups, further supporting the notion that mastoidectomy might not be a necessary intervention for enhancing hearing outcomes in tympanoplasty cases.

Notably, while Group A (myringoplasty with mastoidectomy) had a higher success rate (81.7%) compared to Group B (myringoplasty alone, 75%), however, the difference was not statistically significant ($p = 0.375$). This aligns with previous

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studies suggesting that mastoidectomy does not always lead to improved outcomes in tympanoplasty procedures, especially when the mastoid cavity is not significantly involved in the pathology. For instance, Jamwal PS et al., (2016) found no significant differences in graft success between tympanoplasty with or without mastoidectomy, suggesting that the decision to perform mastoidectomy should be based on the individual patient's pathology rather than a blanket approach for all cases.[18]Perforation size did not significantly affect success in this study ($p = 0.708$), as both smaller (<50%) and larger (≥50%) perforations had comparable success rates (80% vs. 77.1%). This finding is consistent with prior research, including studies by Al-Ghamdi et al (1994) and Verma et al (2021), which concluded that perforation size, particularly when it is not associated with additional middle ear pathology, is not always a significant predictor of graft success.[19,20] It is believed that other factors, such as the condition of the middle ear mucosa and the presence of chronic infections, may play a more prominent role in influencing outcomes.The location of the perforation, while not statistically significant, showed a trend in favor of posterior perforations, which had the highest success rate (85%). Previous studies, such as those by Albu S et al., (2012) have noted that posterior perforations may be easier to repair successfully due to better access and the stability of the surrounding ear structures, leading to potentially better outcomes.[10]

In terms of middle ear exudate and mucosal condition, no significant association was found with success rates. The absence of exudate was associated with a slightly lower success rate (69.7%, $p = 0.157$), but this was not statistically significant. These findings are in line with research by Danishyar A et al. (2023), which reported that the presence of middle ear infection (exudate or mucosal inflammation) may have a negative impact on graft healing.[21] However; the extent of the impact may vary depending on the timing and management of infection before surgery.The status of the opposite ear, however, was identified as a significantly associated with success, with a normal contralateral ear associated with a higher success rate (88.4% vs. 64.7%, $p = 0.001$). This finding is supported by studies such as those by Dangol K et al. (2017) and Darouassi Y et al (2019) which highlight the importance of the overall ear health when evaluating candidates for myringoplasty.[22,23] A normal contralateral ear often indicates a better prognosis for the patient, as it suggests less systemic or bilateral pathology that could affect the healing of the tympanic membrane graft. However, the multivariate analysis revealed that the status of the contralateral ear was not a statistically significant predictor of the success rate. Similar findings have been reported in other studies, where contralateral disease was associated with lower success rate.[24] In contrast, Singh et al., (2003) observed no association between contralateral ear status and surgical outcomes.[25]The duration of the dry period before surgery was also a significant predictor of success ($p = 0.004$), with patients who had a dry period of ≥3 months showing a higher success rate (87.3% vs. 65.3%). This is consistent with the literature, which emphasizes the importance of a dry ear before myringoplasty to ensure better graft success (Onal K et al., 2005 and Santosh UP et al., 2016).[26,27] A dry ear typically indicates the resolution of active infection and inflammation, factors that can impede graft integration and healing (Santosh UP et al., 2016).[27]Multivariate analysis further revealed that a dry period of ≥ 3 months is a significant predictor, with an odds ratio of 2.73 ($p = 0.007$). This underscores the importance of controlling infection and ensuring a quiescent middle ear state before surgical intervention. The results are consistent with the literature, where studies have repeatedly emphasized that an active infection or ongoing ear discharge at the time of surgery can impair graft uptake and increase the risk of surgical failure. Uyar et al., (2006) and Pinar et al., (2008) also reported a significantly higher rate of graft uptake in patients who had a dry ear for 3 months preoperatively, a finding aligning with our results.[24,28] Conversely, some studies have found no statistically significant correlation between the duration of the dry period and surgical success.[29] These discrepancies highlight the need for further research to clarify the role of a dry ear in predicting outcome. Similarly, smoking was significantly associated with a lower success rate (65.6% vs. 83%, $p = 0.041$), which has been well-documented in the literature. Smoking impairs wound healing and can reduce blood supply to the graft site, ultimately affecting the outcome of the surgery (McDaniel J et al., 2014).[30] However; multivariate analysis revealed that smoking did not show a significant impact on surgical success, with an odds ratio of 1.14 ($p = 0.329$). While smoking has been well-documented as a factor that impairs wound healing and vascularization, the absence of significance in this study may be explained by the relatively small proportion of smokers or the presence of more dominant factors, such as the dry period. Previous studies, including those by Becvarovski Zet al., (2001) have reported conflicting results regarding the role of smoking, further suggesting the need for larger, controlled studies to elucidate its exact impact.[9]Albu Set al., (2012) also reported though smoking is significant in the univariate analysis but in the multivariate analysis, it is insignificantly associated with success rate of myringoplasty.[10]Finally, revision surgery did not significantly affect the outcomes ($p = 0.145$), which is somewhat surprising given that revision surgeries typically involve more challenging cases with previous complications. However, studies by Albu S et al. (2012) and Fukuchi I et al. (2006) have shown that while revision surgeries may have lower success rates than primary tympanoplasties, the factors

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influencing success are often related to the severity of the initial pathology rather than the surgical procedure itself.[10,31]

CONCLUSION

The findings of the present study demonstrated that performing cortical mastoidectomy in conjunction with tympanoplasty does not provide any additional benefit in the management of persistent or intermittent discharging chronic suppurative otitis media (CSOM). Specifically, the results show that satisfactory hearing outcomes, including appropriate air-bone gap closure, can be achieved with tympanoplasty alone, without the need for additional mastoidectomy. This highlights the efficacy of tympanoplasty as a standalone surgical intervention for achieving favorable audiological results in such cases. Furthermore, a dry ear period exceeding three months emerged as the only significant factor influencing graft uptake, underscoring its critical role in ensuring successful postoperative outcomes. These findings emphasize the importance of preoperative patient assessment and preparation, particularly in achieving optimal graft integration. By identifying and addressing key preoperative factors, such as ensuring a sufficient dry ear period, clinicians can significantly enhance surgical success rates.

REFERENCES

1. Morris P. Chronic suppurative otitis media. BMJ ClinEvid. 2012 Aug 6;2012:0507. PMID: 23870746; PMCID: PMC3412293.
2. Rout MR, Mohanty D, Vijaylaxmi Y, Kamalesh B, Chakradhar M. Prevalence of cholesteatoma in chronic suppurative otitis media with central perforation. Indian Journal of Otology. 2012 Jan 1;18(1):7-10.
3. Khairkar M, Deshmukh P, Maity H, Deotale V. Chronic Suppurative Otitis Media: A Comprehensive Review of Epidemiology, Pathogenesis, Microbiology, and Complications. Cureus. 2023 Aug 18;15(8):e43729. doi: 10.7759/cureus.43729. PMID: 37727177; PMCID: PMC10505739.
4. Brennan-Jones CG, Chong LY, Head K, Burton MJ, Schilder AG, Bhutta MF. Topical antibiotics with steroids for chronic suppurative otitis media. Cochrane Database Syst Rev. 2020 Aug 27;8(8):CD013054. doi: 10.1002/14651858.CD013054.pub2. PMID: 35659673; PMCID: PMC8212588.
5. Sheehy JL. Mastoidectomy: the intact canal wall procedure. In:Brackmann DE, ed. Otologic Surgery. Philadelphia, PA: WBSaunders, 1994:211Y24.
6. Tos M. Indications for surgery and preoperative management. In:Tos M, ed. Manual of Middle Ear Surgery. New York, NY: Thieme 1993:4Y9
7. McGrew BM, Jackson G, Glascock ME III. Impact of mastoidectomyon simple tympanic membrane perforation repair. Laryngoscope2004;114:506Y11
8. Mishiro Y, Sakagami M, Takahashi Y, et al. Tympanoplasty withand without mastoidectomy in non cholesteatomatous chronic otitismedia. Eur Arch Otorhinolaryngol 2001;258:13Y5.
9. Becvarovski Z, Kartush JM. Smoking and tympanoplasty: implications for prognosis and the Middle Ear Risk Index (MERI). Laryngoscope 2001;111:1806Y11.
10. Albu S, Trabalzini F, Amadori M. Usefulness of cortical mastoidectomy in myringoplasty. Otology &Neurotology. 2012 Jun 1;33(4):604-9.
11. Mangia LRL, Amadeu NT, da Silva Oliveira M, Patzer LS, Somensi ES, Hamerschmidt R. Success rates and predictors of outcomes of type I tympanoplasty performed by residents in a teaching tertiary hospital. J Otol. 2023 Oct;18(4):214-219. doi: 10.1016/j.joto.2023.09.003. Epub 2023 Sep 9. PMID: 37877068; PMCID: PMC10593571.
12. Tahiri I, El Houari O, Hajjij A, Essaadi M, Benariba F. Influence of the Size and Location of the Perforation on the Anatomical Results of Myringoplasty. Cureus. 2023 Apr 6;15(4):e37221. doi: 10.7759/cureus.37221. PMID: 37159761; PMCID: PMC10163952.
13. Immordino A, Salvago P, Sireci F, Lorusso F, Immordino P, Saguto D, Martines F, Gallina S, Dispenza F. Mastoidectomy in surgical procedures to treat retraction pockets: a single-center experience and review of the literature. European Archives of Oto-Rhino-Laryngology. 2023 Mar;280(3):1081-7.
14. Gamra OB, Nacef I, Abid W, Hariga I, Mbarek C. Myringoplasty in children: Our results. Egyptian Journal of Ear, Nose, Throat and Allied Sciences. 2015 Mar 1;16(1):41-6.
15. Dawood MR. Hearing evaluation after successful myringoplasty. Journal of otology. 2017 Dec 1;12(4):192-7.
16. Balyan FR, Celikkanat S, Aslan A, et al. Mastoidectomy in non cholesteatomatous chronic suppurative otitis media: is it necessary? Otolaryngol Head Neck Surg 1997;117:592Y5.
17. Mishiro Y, Sakagami M, Takahashi Y, et al. Tympanoplasty with and without mastoidectomy in non cholesteatomatous chronic otitis media. Eur Arch Otorhinolaryngol 2001;258:13Y5.
18. Jamwal PS, Prakash O, Khajuria M, Sharma M, Goel M. Tympanoplasty with or without cortical mastoidectomy. JK Science. 2016 Oct 1;18(4):242-7.
19. Al-Ghamdi SA. Tympanoplasty: Factors influencing surgical outcome. Ann Saudi Med. 1994 Nov;14(6):483-5. doi: 10.5144/0256-4947.1994.483. PMID: 17587954.
20. Verma JK, Kumar R, Chaudhary K. Study of various factors affecting graft success in myringoplasty cases. International Journal of Contemporary Medical Research 2021;8(6):F1-F5.
21. Danishyar A, Ashurst JV. Acute Otitis Media. [Updated 2023 Apr 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK470332/
22. Dangol K, Shrivastav RP. Study of Various Prognostic Factors Affecting Successful Myringoplasty in a Tertiary Care Centre. Int Arch Otorhinolaryngol. 2017 Jul;21(3):250-254. doi: 10.1055/s-0036-1593818. Epub 2016 Nov 28. PMID: 28680493; PMCID: PMC5495587.
23. Darouassi Y, Aljalil A, Ennouali A, Hanine MA, Chebraoui Y, Bouaity B, Touati MM, Ammar H. Prognostic factors of myringoplasty: study of a 140 cases series and review of the literature. Pan Afr Med J. 2019 Aug 26;33:323. doi: 10.11604/pamj.2019.33.323.18060. PMID: 31692867; PMCID: PMC6815508.

DOI: 10.69605/ijlbpr_14.3.2025.37

24. Pinar E, Sadullahoglu K, Calli C, et al. Evaluation of prognostic factors and middle ear risk index in tympanoplasty. Otolaryngol Head Neck Surg 2008;139:386Y90
25. Singh M, Rai A, Bandyopadhyay S, et al. Comparative study of the underlay and overlay techniques of myringoplasty in large and subtotal perforations of the tympanic membrane. J LaryngolOtol 2003;117:444Y8
26. Onal K., Uguz M.Z., Kazikdas K.C., Gursoy S.T., Gokce H. A multivariate analysis of otological, surgical and patient-related factors in determining success in myringoplasty. Clin. Otolaryngol. 2005;30:115–120. doi: 10.1111/j.1365-2273.2004.00947.x.
27. Santosh UP, Prashanth KB, Rao MS. Study of Myringoplasty in Wet and Dry Ears in Mucosal Type of Chronic Otitis Media. J ClinDiagn Res. 2016 Sep;10(9):MC01-MC03. doi: 10.7860/JCDR/2016/17589.8527. Epub 2016 Sep 1. PMID: 27790476; PMCID: PMC5071976.
28. Uyar Y, Keles B, Koc S, et al. Tympanoplasty in pediatric patients. Int J PediatrOtorhinolaryngol 2006;70:1805Y9
29. Albera R, Ferrero V, Lacilla M, et al. Tympanic reperforation in myringoplasty: evaluation of prognostic factors. Ann OtolRhinolLaryngol 2006;115:875Y9.
30. McDaniel JC, Browning KK. Smoking, chronic wound healing, and implications for evidence-based practice. J Wound Ostomy Continence Nurs. 2014 Sep-Oct;41(5):415-23; quiz E1-2. doi: 10.1097/WON.0000000000000057. PMID: 25188797; PMCID: PMC4241583.
31. Fukuchi I, Cerchiari DP, Garcia E, Rezende CE, Rapoport PB. Tympanoplasty: surgical results and a comparison of the factors that may interfere in their success. Braz J Otorhinolaryngol. 2006 Mar-Apr;72(2):267-71. doi: 10.1016/s1808-8694(15)30067-7. PMID: 16951864; PMCID: PMC9445696.