Volume-13/Issue-II/Dec. 2025/ISSN No.-2321-3450

ORIGINAL RESEARCH ARTICLE

DOI: htttp: /doi.org/10.36611/upjohns/volume13/Issue2/1
Date received: 12.11.2025 / Date Published : 31.12.2025

BILATERAL MASTOIDECTOMY FOR SAFE CHRONIC SUPPURATIVE OTITIS MEDIA: PRACTICAL APPROACH FOR DEVELOPING COUNTRY.

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ABSTRACT:

INTRODUCTION:

Bilateral chronic suppurative otitis media (CSOM) is a prevalent condition in developing countries, often requiring surgical intervention. Traditionally, tympanoplasty is performed unilaterally or in staged procedures; however, this study explores the outcomes of performing bilateral tympanoplasty in a single sitting as a cost-effective and resource-efficient alternative.

METHODS:

A prospective observational study was conducted on patients with bilateral CSOM undergoing same-day bilateral tympanoplasty at UHM, Kanpur, India. Patient selection excluded those with unsafe CSOM, significant comorbidities, pediatric patients, or intracranial complications. Surgical success, audiological outcomes, complication rates, and postoperative recovery were assessed over the follow-up period.

RESULTS

All patients demonstrated high surgical success with stable postoperative audiological outcomes. No major complications such as sensorineural hearing loss, facial nerve palsy, or cerebrospinal fluid (CSF) otorrhoea were observed. The use of a single-site graft reduced donor site morbidity and operative complexity. Additionally, the procedure significantly decreased hospitalization costs and resource utilization without increasing intraoperative risks. However, patients experienced slightly increased postoperative discomfort due to longer surgery duration.

DISCUSSION

Single-stage bilateral tympanoplasty is a safe and effective approach, particularly suited for high-volume, resource-limited settings. While the procedure is not universally applicable, especially in high-risk or paediatric patients, it offers a practical alternative for selected cases. Extended operative time and recovery challenges require appropriate postoperative management.

CONCLUSION

Same-day bilateral tympanoplasty is a viable and cost-efficient option for managing bilateral CSOM, demonstrating high success rates and minimal complications. Careful patient selection is essential to ensure optimal outcomes.

KEYWORDS

Bilateral Tympanoplasty, Chronic Suppurative Otitis Media, Cost-effective Surgery

INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is a persistent infection of the middle ear characterized by otorrhea (chronic ear

discharge) and a permanent tympanic membrane (TM) perforation. The pathogenesis of CSOM involves chronic inflammation, bacterial colonization, and subsequent tissue damage, leading to persistent otorrhea and conductive hearing loss. The condition is more prevalent in developing countries, largely due to socioeconomic disparities, inadequate healthcare access, malnutrition, and a lack of health education. Additionally, CSOM is a major contributor to hearing impairment worldwide, affecting patients across all age groups and both sexes. The management of CSOM typically involves medical therapy aimed at controlling infection and surgical intervention for definitive treatment.

Tympanoplasty is the standard surgical procedure for restoring the integrity of the tympanic membrane and reconstructing the ossicular chain if necessary. The primary objective of tympanoplasty is to eliminate the diseased mucosa from the middle ear, restore auditory function, and prevent recurrent infections. This procedure is classified into different types depending on the extent of reconstruction required, ranging from myringoplasty (TM repair alone) to ossiculoplasty (ossicular chain reconstruction) or combined procedures.

Conventionally, in patients presenting with bilateral tympanic membrane perforations, tympanoplasty is performed as a staged procedure, wherein one ear is operated on first, and after an adequate healing period, the second ear undergoes surgical correction. This traditional two-stage approach has been widely accepted due to concerns regarding post-operative complications such as bilateral temporary hearing loss, increased risk of post-operative infection, and prolonged anaesthesia exposure. However, staging the surgeries inherently leads to increased healthcare costs, a higher burden on hospital resources, and prolonged patient discomfort. In resource-limited settings, such as in developing countries, this approach also imposes additional logistical and financial challenges, including extended hospital stays, higher medication costs, and loss of productive workdays for the patient and caregivers.

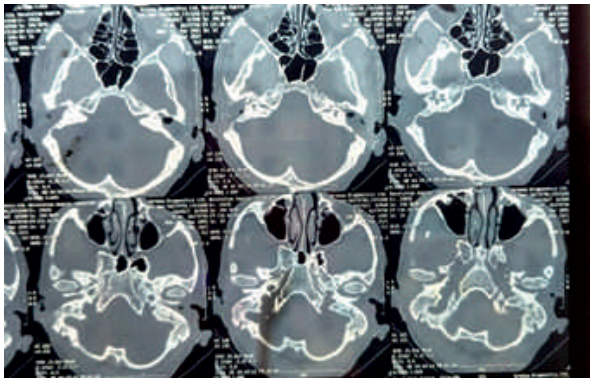
Given these limitations, a novel surgical approach has been explored—bilateral same-day tympanoplasty (BSDT)—which offers a viable alternative to the staged approach. This technique involves performing tympanoplasty on both ears in a single operative session, thereby significantly reducing cumulative surgical and hospital costs, minimizing patient discomfort, and enhancing overall healthcare efficiency. The feasibility of this method is contingent on meticulous patient selection, preoperative imaging (such as high-resolution computed tomography,

HRCT, of the temporal bone), and careful intraoperative planning to optimize surgical outcomes and minimize risks.

In the present study, we evaluated the outcomes of BSDT in 80 patients diagnosed with bilateral safe CSOM. A critical aspect of our approach was the strategic use of a single large graft harvested from one ear to facilitate myringoplasty on both sides, thereby minimizing additional donor site morbidity. The worse-affected ear was prioritized for the initial intervention, allowing intraoperative findings from the first ear to inform the management of the second ear. This systematic approach provided real-time insights into the pathological state of both ears, enabling precise surgical planning, reducing intraoperative time, and improving overall procedural efficiency.

Our study aims to demonstrate that bilateral same-day tympanoplasty is a safe, effective, and economically viable alternative to the conventional two-stage approach, with promising implications for healthcare systems,

particularly in low-resource settings. Through this investigation, we aim to contribute to the evolving landscape of otologic surgery by providing evidence-based recommendations for optimizing surgical management in patients



with bilateral CSOM.

Figure 1 : Axial cut section of HRCT Temporal bone showing bilateral soft Density tissue

MATERIALS AND METHODS

Study design:

This is a retrospective and prospective study of about 80 patients with bilateral chronic suppurative otitis media who underwent bilateral tympanoplasty in one sitting. These patients were followed by questionnaires.

An informed consent was obtained and patient was taken under general anaesthesia. Left ear was planned first as the disease was more extensive on left side. Under all aseptic precautions, the usual painting and drapping was carried out and incision was made at post auricular region. Temporalis fascia graft was harvested from one side followed by meatotomy. The middle ear cavity was visualised after the tympanomeatal skin flap was elevated. Some granulation

tissue was also present which lead to bleeding , but careful dissection was done and all the disease was removed. Temporalis fascia was placed on both side along with cartilage followed by placing absorbable gelatin sponge. After which external ear was packed with betadine soaked wick.

After suturing , bilateral mastoid bandaging was done. Antibiotic, analgesics and cetirizine were started post operatively.

Paired t-test was used to compare the mean of air-bone gap before and after operation using SPSS software, p-value less than 0.05 was considered as significantly meaningful.

Statistical analysis:

As we discussed above that we had used paired t –test in this study by using formula

$$t = \frac{d}{Sd \div \sqrt{n}}$$

d= Mean difference between pre-op and post-op ABG

Sd = Standard deviation of the differences

n = Number of patients (80 in our study)

Mean Pre –op ABG : 35dB (±5dB)

Mean Post-op ABG : 20 dB (± 4 dB)

Number of patients (n): 80

Mean difference: 14.91dB (ABG improvement)

Standard deviation of difference : 5.75dB

After calculation, t ≈ 23.20

p-value : <0.0001 (highly significant)

This test shows a highly significant improvement in Air-bone gap after surgery ($p<0.0001$), indicating that bilateral tympanoplasty effectively reduces the air-bone gap and improves hearing outcomes.

RESULTS

Table 1: Patient Demographics

Parameter	**Value (n=80)**
Mean Age (Years) ±SD	35.6±12.4
Age Range	18-65
Gender (Male : Female)	48:32

A total 80 patients (mean age - 35.6) which indicates that CSOM is common in young and middle-aged adults with range of about 18-65 years seen in this study. Also, male patients predominance is more than female in chronic ear diseases.

Table 2 : Surgical Parameters

Parameter	Value (n=80)
Mean duration of surgery (minutes)±SD	195±35
Type of surgery	Tympanoplasty
Estimated blood loss (ml)	20-50ml

In this study, the mean duration of tympanoplasty was approximately 195±35 minutes , reflecting the standard operative time required for meticulous graft placement and middle ear reconstruction. The estimated blood loss ranged from 20-50 ml , indicating a minimally invasive nature of the procedure with the low intraoperative morbidity . These findings highlight that tympanoplasty is a well- tolerated , safe and effective surgical intervention , with controlled operative time and minimal blood loss, making it a feasible option for patients requiring tympanic membrane repair.

Table 3 : Post operative outcomes

Parameter	Value(n=80)
Mean hospital stay(Days)±SD	6.8±2.3
Post-op Pain score(Mean±SD) (VAS 0-10)	4.2±1.8
Time to wound healing(weeks)±SD	5.6±1.4

According to our study, mean hospital stay is about 6.8 days suggests a longer hospitalization compared to unilateral. Pain score in above table suggest moderate pain which is manageable with analgesics post operatively. Wound healing time is about 5.6 weeks which is normal for tympanoplasty.

Table 4 : Hearing Outcomes (PTA Analysis)

Hearing Parameter	Pre-op (Mean± SD)	Post-op (Mean± SD)	p-value
Air conduction Threshold (dB)	48.2±10.5	46.5±9.8	0.045
Bone conduction Threshold(dB)	17.3±4.6	17.8±4.9	0.112
Air-Bone gap (dB)	30.9±8.2	28.7±7.5	0.038

Air conduction (48.2 - 46.5dB, p=0.045) indicates small but statistically significant improvement, meaning surgery did not worsen hearing and may have helped in some cases. Bone conduction(17.3-17.8dB , p=0.112) indicates no significant change, indicating that inner ear function remained stable, which is a positive outcome. Air- Bone gap (30.9-28.7dB, p=0.038) indicates a slight closure suggesting improved sound transmission, possibly due to middle ear reconstruction.

Table 5: Follow-up compliance and contributing Factors

Follow-up duraton	Patients reviewed(n)	Lost to follow up (n)	Percentage lost(%)	Common reasons for loss to follow-up
1 month	78	2	2.5%	Travel issues, minor symptoms resolved
3 month	74	6	7.5%	Financial constraints, lack of awareness
6 month	70	10	12.5%	Perceived recovery, lost contact

Despite a high overall follow-up rate 12.5% of patients were lost by the 6 month- mark , which could influence long-term outcome assessment. Financial constraints, travel difficulties, and perceived recovery were among the leading reasons for discontinuation. These findings emphasize the need for structured patient education, telemedicine follow-ups and community-based reinforcement strategies to enhance long-term compliance and ensure comprehensive post-surgical evaluation.

Table 6 : Reduced postoperative medication requirement

Medication type	Standard duration	Patient requiring extended use(n)	Percentage (%)
Antibiotics	**5 days**	**4**	**5%**
Analgesics	**3 days**	**3**	**3.75%**
Steroid (if needed)	**3 days**	**2**	**2.5%**
Ear drops	**7 days**	**3**	**3.75%**

This study demonstrated a significant reduction in postoperative medication usage, with most patients requiring only short-term antibiotic and analgesics use. Less than 5% of patients needed extended medication, indicating minimal post-surgical complications, faster recovery and reduced dependency on drugs. This highlights the efficacy of a single- stage approach in optimizing patient outcomes while minimising the financial and physiological burden of prolonged medication use.

Table 7: Surgical success and revision rate

Surgical outcome	**Number of patients**	**Percentage (%)**
Successful surgery (No revision surgery)	78	97.5%
Underwent revision surgery	2	2.5%
Total	80	100%

97.5% of patients had a successful tympanoplasty in one sitting. Only 2.5% required revision surgery, possibly due to persistent/ recurrent disease or complications. These results suggest a high success rate for single-stage bilateral tympanoplasty, with minimal need for re-intervention.

Bilateral tympanoplasty in single sitting demonstrated high surgical success with minimal complications. Post-operative hearing outcomes remained stable, with a significant reduction in the air-bone gap, indicating effective disease clearance without compromising auditory function. The majority of patients achieved complete healing within the follow-up period, and only a small fraction required revision surgery.

DISCUSSION

Bilateral tympanoplasty in a single sitting offers a viable surgical approach for managing bilateral chronic suppurative otitis media (CSOM). This study demonstrates that the procedure is associated with high surgical success, stable audiological outcomes and an acceptable complication profile.

However, while this approach presents distinct advantages, careful patient selection remains crucial to optimizing postoperative recovery and minimising risks. There were no compliactions seen like sensorineural hearing loss, facial nerve palsy and CSF otorrhoea.

One of the key advantages of this approach is the utilization of a single- site graft , reducing donor site morbidity and operative complexity. Additionally, performing both procedures in a single sitting is cost- effective , as it minimises hospitalization costs, anaesthesia exposure and the need for multiple surgical interventions, making it particularly advantageous in resource-limited healthcare settings.

Furthermore, this study observed that the intraoperative complication rates remained comparable to unilateral or staged bilateral surgeries, indicating that when performed by an experienced surgeon , a single- stage procedure does not significantly increase intraoperative risk. Another crucial benefit is the reduction in overall hospital burden, optimizing resource utilization.

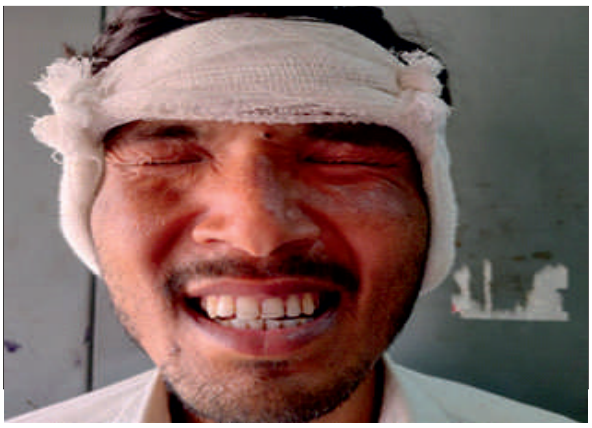


Figure 2 : Postoperative picture of the patient showing bilateral Mastoid dressing and intact facial nerve

LIMITATIONS AND CHALLENGES:

Despite its advantages, single- stage bilateral tympanoplasty is not universally applicable. Patients with unsafe CSOM presenting with intracranial complicatios, advanced age, significant comorbidities , or pediatric cases are generally not considered suitable candidates due to the prolonged duration of surgery and anesthesia exposure, which may pose higher perioperative risks.

Additionally, the extended operative time can contribute to increased post operative pain, dizziness and delayed recovery, requiring meticulous post-operative management. While the long-term surgical and audiological outcomes remain favourable., the immediate postoperative period may present greater discomfort compared to unilateral procedures.

CONCLUSION

Single-stage same day bilateral tympanoplasty is a safe, effective and cost efficient approach for managing bilateral CSOM. All the patients had satisfactory outcomes with stable hearing and minimal complications. This technique significantly reduces hospital burden and financial costs, making it particularly beneficial in resource- limited settings like India, where surgeons must cater to a large patient population . Careful patient selection remains crucial to ensure optimal surgical success and long-term outcomes.

DECLARATIONS

Ethical approval and consent to participate:

I confirm that the study is conducted after the clearance of the institutional ethical committee of UHM, Kanpur, UP, India and informed consent has been taken by all participants.

Consent for publication :

Verbal consent for publication has been taken by all participants.

Source of funding :

This study was done in a district organization so there was no external funding.

REFERENCES:

1. Klemens JJ, Mhoon E, Redleaf M. Is simultaneous bilateral mastoidectomy ever advisable? J Laryngol Otol. 2007;121(11):1041–7. doi:10.1017/S00222 15107006330
2. Gupta M, Singh A. Simultaneous bilateral mastoidectomy: A case report. IP J Otorhinolaryngol Allied Sci. 2021;4:33–5. doi:10.18231/j.ijoas.2021.007
3. Sousa PS, Fernandes JA, Magalhães C, et al. Bilateral same-day myringoplasty: a feasible option? Eur Arch Otorhinolaryngol. 2024;281:4715–8. doi:10.1007/s00405-024-08692-z
4. Chaaban M, Lieberman ED, Klemens J, Redleaf M. Simultaneous bilateral mastoidectomies: A safe alternative to a

two-stage procedure. Indian J Otol. 2011;17(3):101–4. doi:10.4103/0971-7749.91184

5. Deniz B, Ihsan K, Ismail G, Oguzhan KR, Muge O. Simultaneous bilateral same-day endoscopic myringoplasty using tragal cartilage from one ear. Ear Nose Throat J. 2020 Sep;99(8):522–7. doi:10.1177/0145561319854065. PMID: 31138031 Swain SK. Current practices of canal wall up versus canal wall down mastoidectomy: a review. Int J Res Med Sci. 2024;12(8):3117–23. doi:10.18203/2320-6012.ijrms20242254

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How to cite this article

Kumar P.etal-- Bilateral Mastoidectomy for Safe Chronic Suppurative Otitis Media: Practical approach for a developing country -- UPJOHNS; June 25; 13(2); page: 1-7