Postoperative Complications of Mastoid Surgery: A Hospital-Based Cross-Sectional Study

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Abstract

Background: Mastoid surgery is a common procedure in otolaryngology, but postoperative complications can occur, affecting patient outcomes. Evaluating the incidence and clinical profile of these complications is essential for improving surgical care.

Objective: This study aimed to evaluate the incidence and types of complications following mastoidectomy.

Methods: A hospital-based cross-sectional study was conducted in the Department of Otolaryngology and Head-Neck Surgery at Sylhet MAG Osmani Medical College Hospital, Sylhet, from December 2014 to May 2015. All patients undergoing mastoid surgery during the study period were included using purposive sampling, excluding those with previous mastoid surgery, pre-existing middle ear complications, or unwillingness to participate. Mastoid surgeries included cortical, modified radical and radical mastoidectomies.

Results: Postoperative complications occurred in 7 patients (14%). Complications were more frequent in younger patients, with a mean age of 16.8±10.9 years. Minor complications (71.4%) were more common than major complications (28.6%). Modified radical mastoidectomy was the most performed procedure (84%), followed by radical (12%) and cortical mastoidectomy (4%). Complications were highest after radical mastoidectomy (33.3%). Specific complications included wound infection/gap (8%), meatal stenosis (4%), and major complications such as facial nerve paralysis, meningitis, and minor dural injury (2% each). Follow-up showed that most patients were complication-free at 1 week (88%), while 3-month follow-up indicated dry cavities (14%), discharging cavities (20%), and meatal stenosis (4%), with 64% lost to follow-up.

Conclusion: Postoperative complications after mastoidectomy were relatively low and mostly minor. Younger patients and more extensive surgeries had higher complication rates, emphasizing the need for careful monitoring and follow-up.

[Shaheed Syed Nazrul Islam Med Col J 2026, Jan; 11 (1):68-74]
DOI: https://www.doi.org/10.69699/ssnimcj.2026.11.1.10

Keywords: Postoperative complications, radical mastoidectomy, modified radical mastoidectomy, Sylhet, Bangladesh.

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Introduction

Mastoidectomy remains a crucial surgical intervention for chronic middle-ear and mastoid diseases such as cholesteatoma and chronic suppurative otitis media.[1,2] Despite advances in surgical techniques, instrumentation, and postoperative care, mastoid surgery remains associated with a spectrum of complications from minor issues such as wound infection and cavity problems to serious morbidities including facial nerve injury, hearing loss, vertigo, cerebrospinal fluid (CSF) leak, and even intracranial complications.[3-5] Understanding the incidence and spectrum of these complications is critical both for surgical planning and for informed consent discussions.[6,7]

The rate and nature of postoperative complications vary widely in the literature. In a 12-year series of primary modified radical mastoidectomies involving 163 ears, complications were documented in 28.2% of cases, with residual or recurrent cholesteatoma (12.3%) and meatal stenosis (6.7%) among the most frequent issues.[6] In another center's experience, persistent otorrhea, wound dehiscence, sensorineural hearing loss (SNHL), and intracranial complications such as brain abscess and lateral-sinus thrombosis have been reported.[8-10] The complication rate is influenced by several factors extent of disease, type of surgery (e.g., canal-wall-up vs. canal-wall-down, modified versus radical mastoidectomy), surgeon experience, and follow-up duration.[11]

Particularly concerning is postoperative injury to the facial nerve. Though rare, facial nerve paralysis can lead to permanent facial weakness, significantly affecting a patient's quality of life.[1,12] The reported incidence of facial nerve palsy across otologic surgeries ranges from 0.6% to 3.6%, but may rise to 4–10% in revision procedures.[13,14] Labyrinthine fistula, resulting from cholesteatoma erosion near the lateral semicircular canal, contributes to vertigo, SNHL, and balance disorders.8 Moreover, CSF leaks, dural tears, and subsequent intracranial complications including meningitis, epidural abscess, and subdural empyema though infrequent, have grave clinical implications and require prompt management.[3,15]

In resource-limited settings such as Bangladesh, data on postoperative outcomes of mastoid surgery remain scarce. The lack of local evidence on complication rates, types, timing, and long-term cavity status limits the ability of clinicians to counsel patients adequately and may hinder optimization of surgical and follow-up protocols. A systematic review of outcomes for cholesteatoma surgery noted a broad inconsistency in how complications are reported, underscoring the need for standardized and comprehensive studies.[16]

This hospital-based cross-sectional study at the Department of Otolaryngology and Head-Neck Surgery, Sylhet MAG Osmani Medical College Hospital, Bangladesh, aimed to determine the incidence of postoperative complications following mastoidectomy included characterizing the types and timing of complications, their frequency in relation to patient age, and associations with the type of surgery (cortical, modified radical, or radical mastoidectomy). By documenting complication patterns and clinical profiles, the study provides valuable insights to guide surgical planning, risk stratification, patient counseling, and postoperative follow-up, ultimately supporting improved otologic care in tertiary settings.

Methods

This hospital-based cross-sectional study was conducted in the Department of Otolaryngology and Head-Neck Surgery at

Sylhet MAG Osmani Medical College Hospital, Sylhet from December 2014 to May 2015. All patients undergoing mastoid surgery during this period, regardless of age or sex, were included. Based on an estimated average of eight mastoid surgeries per month, a sample of about 50 patients was expected. Patients were selected through purposive sampling. Exclusion criteria included previous mastoid surgery, pre-existing middle ear complications, and unwillingness to participate.

Mastoid surgeries included cortical mastoidectomy, modified radical mastoidectomy, and radical mastoidectomy. Pure tone audiometry was performed when indicated. Cholesteatoma was defined as an epidermoid cyst containing keratin layers.

Data were collected through clinical history, examination, and relevant investigations using a structured case record form. Quality was ensured through careful examination, supervision, and regular data review. Data were processed manually and analyzed using IBM SPSS version 23. Descriptive statistics such as mean, standard deviation and percent were computed for continuous variables of the participants.

All procedures followed ethical guidelines in accordance with the Declaration of Helsinki, and consent materials were provided in the local language for clarity and voluntary participation. Written informed consent was obtained from each participant or guardian. Ethical approval was obtained from the Institutional Ethical Committee of Sylhet MAG Osmani Medical College, Bangladesh.

Results

Table I shows that among 50 patients who underwent mastoidectomy, postoperative complications occurred in 7 cases (14%), while 43 patients (86%) had no complications.

Table II demonstrates that complications were more common in younger age groups. The highest proportion (42.85%) occurred among patients aged 11–20 years, followed by 28.57% in those ≤10 years. Fewer complications were recorded in the 21–30 and 31–40-year groups (each 14.28%). The mean age of patients with complications was 16.8±10.9 years, indicating that postoperative complications were predominantly observed in children and adolescents.

Figure 1 shows that among the patients who developed postoperative complications following mastoidectomy, major complications accounted for 28.6%, while minor complications were more frequent, comprising 71.4%.

Figure 2 illustrates the types of mastoid surgeries performed among the study population. Modified radical mastoidectomy was the most commonly performed procedure (84%), followed by radical mastoidectomy (12%) and cortical mastoidectomy (4%).

Figure 3 shows the incidence of postoperative complications according to the type of mastoid surgery performed. No complications were observed following cortical mastoidectomy (0%), whereas radical mastoidectomy had the highest complication rate (33.3%). Modified radical mastoidectomy accounted for 11.9% of complications, indicating that more extensive surgical procedures were associated with a higher risk of postoperative complications.

Table III shows the distribution of specific complications following mastoidectomy among 50 patients. Wound infection/gap was the most common complication, occurring in 8% of cases, followed by meatal stenosis in

4%. Major complications such as facial nerve paralysis, meningitis, and minor dural injury were less frequent, each occurring in 2% of patients. Two patients experienced more than one complication, indicating that some patients were affected by multiple postoperative issues.

Table IV shows the follow-up outcomes after mastoidectomy. At 1 week, most patients (88%) had no complications, while minor complications such as wound infection, facial nerve paralysis, and meningitis were observed in a few cases. By 4 weeks, the proportion of patients without complications decreased to 60%, with 36% lost to follow-up. At 3 months, mastoid cavity status was assessed: dry cavities (14%), discharging cavities (20%), and meatal stenosis (4%) were recorded, while a majority of patients (64%) were lost to follow-up.

Table I: Incidence of complications of mastoidectomy (n=50)

Incidence	Frequency (n)	Percentage (%)
With complication	7	14.0
Without complication	43	86.0

Table II: Complications in relation to age (n=7)

Age (Years)	Frequency (n)	Percentage (%)
≤10	2	28.57
11–20	3	42.85
21–30	1	14.28
31–40	1	14.28
	Mean±SD	16.8±10.9

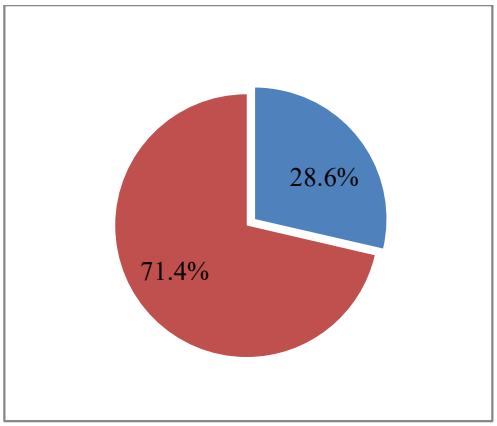

Figure 1. Incidence of the major and minor complications (n=7)

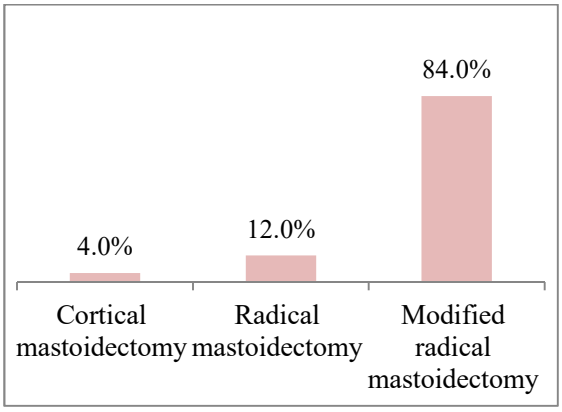

Figure 2. Distribution of the various types of surgery performed (n=7)

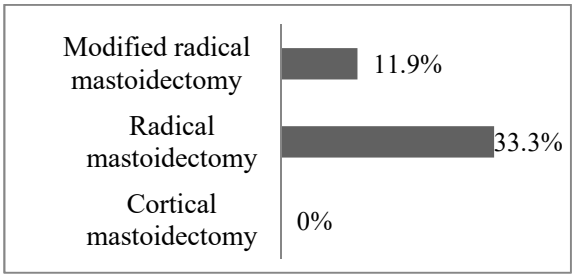

Figure 3. Distribution of various complications in relation to specific type of surgery **(n=50)**

Table III: Specific complications of mastoidectomy (n=50)

Complication	Frequency (n)	Percentage (%)
Facial nerve paralysis	1	2.0
Meningitis	1	2.0
Minor dural injury	1	2.0
Meatal stenosis	2	4.0
Wound infection/gap	4	8.0

*Multiple responses

Table IV: Follow-up complications and state of mastoid cavity (n=50)

Follow-up period	Complication	Frequency (n)	Percentage (%)
1 week	Facial nerve paralysis	1	2.0
	Meningitis	1	2.0
	Wound infection/gap	4	8.0
	No apparent complications	44	88.0
4 weeks	Facial nerve paralysis	1	2.0
	Wound infection/gap	1	2.0
	No apparent complications	30	60.0
	Lost to follow-up	18	36.0
3 months	Dry cavity	7	14.0
	Discharging cavity	10	20.0
	Meatal stenosis	2	4.0
	Lost to follow-up	32	64.0

Discussion

This study found a postoperative complication rate of 14% following mastoidectomy, which falls within the reported in recent literature. Contemporary studies have documented complication rates between 10% and 20%, depending on disease severity and surgical approach. In a study, reported an overall complication rate of 12.5% after mastoid surgery, comparable to the present findings.[17] Similarly, in another study observed that complications in 15% of cases, emphasizing that most were minor and manageable.[18]

Complications in this study were more frequent among younger patients, particularly those aged ≤20 years. This aligns with findings from pediatric and adolescent otologic studies showing more advanced middle ear disease and higher complication risk in younger populations. A study highlighted that aggressive cholesteatoma and challenging anatomy in children may increase postoperative morbidity.[19]

Regarding surgical type, radical mastoidectomy showed the highest complication rate (33.3%), while cortical mastoidectomy showed none. This pattern is consistent with recent evidence indicating that more extensive canal wall–down procedures result in higher risks. A study reported that radical mastoidectomy is associated with increased rates of wound issues and cavity problems compared with less extensive surgeries.[20]

Wound infection was the most common complication (8%), similar to the 5–10% incidences reported in recent series. Meatal

stenosis and major complications such as facial nerve palsy and meningitis were uncommon, each around 2%. Major complications occurred in fewer than 3% of mastoidectomy cases in the studies, a pattern consistent with the low incidence observed in this study.[21,22]

Follow-up outcomes showed declining complication rates over time but a high loss-to-follow-up rate at 3 months (64%), a challenge frequently noted in low-resource settings. Recent studies from South Asia and similar regions have documented follow-up attrition of 40–70%, often related to cost, travel distance, and limited awareness.[23]

The findings demonstrate that postoperative complications were infrequent and predominantly minor, consistent with global data from the past two decades. The relationship between complication rates, surgical extent, and patient age reinforces the need for careful preoperative assessment and structured follow-up to minimize morbidity.

Conclusion

The study revealed that postoperative complications following mastoidectomy were identified in a minority of patients, with most being minor and manageable. Complications occurred more frequently among younger individuals, particularly adolescents, and were more common after extensive procedures such as radical mastoidectomy. Wound infection was the most frequent postoperative issue, while major complications such as facial nerve paralysis and meningitis were rare. Although the early postoperative outcomes were generally favorable, subsequent follow-up revealed persistent issues, including discharging cavities and meatal stenosis, which were further compounded by a substantial loss to follow-up. Strengthening postoperative surveillance, improving wound care practices, enhancing patient counseling, and ensuring adequate training and resources for complex mastoid surgeries may help reduce complications and improve long-term outcomes in similar clinical settings.

*Conflict of interest***:** The authors declare no conflicts of interest.

Funding: This research did not receive any specific funding or grant.

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