

## Incidence and perioperative factors of cavity complications following open cavity mastoidectomy

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### Abstract

*Objective:* The objective of this study is to examine the prevalence of postoperative cavity complications after open cavity mastoidectomy, as well as identify the perioperative variables that may contribute to the occurrence of such complications.

*Methods:* This study was a prospective observational inquiry that lasted for a full year. There were 110 patients in the group who received open cavity mastoidectomy and were included in the study.

*Results:* Postoperative cavity problems were more common in our study. Of the thirty patients with cavities, ten were female and twenty were male. The age distribution showed that the age group with the highest incidence of cavities was between 30 and 41 years old, followed by 10 to 21 and 40 to 51 years old. Thirty patients with cavities had diploic mastoid in twenty-one percent, cellular mastoid in four, and sclerotic mastoid in seventy-one percent. Furthermore, wax accumulation was found in 12 instances. Eight cases had vertigo that lasted past the initial postoperative period. In 4% of cases, perichondritis of the pinna was seen. In the postoperative phase, 21.5% of patients had persistent facial palsy, and 14% had recurrent cholesteatoma. 6.5% of patients had a postoperative wound infection.

*Conclusion:* Based on our analysis, it can be inferred that individuals with sclerotic mastoids exhibited a slightly higher propensity for encountering complications related to cavity functioning when compared to patients undergoing alternative forms of anesthesia.

*Keywords:* Mastoidectomy, perichondritis, cholesteatoma, cellular mastoid

### Introduction

A frequently employed surgical intervention for the management of pathologies impacting the middle ear cavity and mastoid region is known as mastoidectomy. It commonly occurs

concomitantly with a tympanoplasty procedure [1]. When treating patients with recurrent ear infections that do not improve with antibiotics, this kind of treatment is thought to be a good and practical choice for persistent otitis media. The utilization of mastoidectomy as a therapeutic intervention for the management of chronic drainage or suppuration arising from otitis media remains a subject of ongoing evaluation [2, 3]. However, it is widely acknowledged as a viable approach for establishing effective drainage in intricate cases of otitis media. The rationale behind the concurrent performance of tympanoplasty and mastoidectomy lies in its potential to reinstate adequate air circulation within the mastoid cavity and eliminate pathological and necrotic tissues, thereby facilitating the resolution of middle ear disease [4]. The presence of an aerated mastoid significantly augments the volume of the middle ear system, thereby facilitating the regulation of pressure fluctuations within the middle ear cavity. The mastoid air cell system functions primarily as a protective mechanism against fluctuations in pressure within the middle ear [5].

Henceforth, it is anticipated that substantial fluctuations in middle ear pressure within a properly aerated mastoid will exert minimal influence on the middle ear and tympanic membrane. Hence, it is postulated that surgical intervention has the potential to augment the air volume within a mastoid cavity characterized by inadequate aeration [6]. This, in turn, may lead to a decrease in the subsequent complications associated with chronic negative pressure, such as atelectasis and cholesteatoma. Surgical intervention represents the primary modality for the management of cholesteatoma, as medical treatment of this condition is infrequently pursued by surgeons [7]. Mastoidectomy with reconstruction of the posterior canal wall is indicated in cases of incurable illness, irreparable damage to the posterior canal wall, inadequate patient monitoring, and impaired Eustachian tube function.

The objective of each open cavity procedure is to externalize the mastoid cavity for subsequent surveillance of recurrent cholesteatoma, establish drainage for unresectable temporal bone infection, and on occasion, facilitate exposure of challenging-to-reach regions of the temporal bone [8]. Advocates of open cavity techniques emphasize the potential for subsequent removal of any residual disease and the improved ventilation of the cavity, resulting in a desiccating effect. Typically, the open cavity undergoes healing via the process of secondary intention [9].

The lack of successful wound healing and full epithelialization can result in a range of complications involving cavities, including vertigo, otorrhea, hearing loss, accumulation of wax and debris, reliance on medical professionals for frequent cavity cleaning, challenges in

using hearing aids, and the persistence or recurrence of disease [10]. The objective of this study is to determine the incidence and etiology of postoperative mastoid cavity complications following mastoidectomy with reconstruction of the middle ear.

### **Methodology**

Every participant was enrolled in the clinical trial after obtaining their informed consent and satisfying the inclusion criteria. Every participant underwent evaluation by the predetermined proforma of the study. The patients underwent an evaluation primarily focused on their presenting symptoms, followed by a thorough examination of their oral cavities. Each patient underwent regular follow-up visits at biweekly intervals over three months.

The study revealed that the complete epithelialization of an open mastoid cavity typically requires a duration of 3 to 4 months, indicating the imminent progression toward healing. Any individual who commenced displaying symptoms after this period was deemed to be afflicted with dental caries. The evaluation of the clinical symptoms was done regarding the instances that were given. A thorough evaluation of clinical exams was carried out. In all cases, a complete examination of the cavity was utilized to determine the presence of any known predisposing variables. Laboratory tests, including sensitivity testing and culture of purulent material, were carried out when judged required. Measurements about the height of the facial ridge, the dimensions of the hollow, and the extent of the meatoplasty were derived from previously conducted studies by established researchers.

A volume of 5 cc was used in this study to approximate the size of a large mastoid cavity. The use of topical/systemic antibiotics, aural toilets, steroids, and cauterization were among the recommended medical procedures used for smaller cavities, defined as those measuring between 3 and 5 cc, and those less than 3 cc. The granulations underwent chemical cauterizations in an outpatient environment. After the medication was administered, the patients had routine follow-up exams every two to three weeks to assess and track their development. Parenteral medication was required in several cases because of their protracted symptoms, which led to their admission to the medical ward. In these circumstances, surgical intervention is rarely necessary.

### **Results**

During the designated study period, a total of 110 patients underwent open cavity mastoidectomy procedures. A total of 30 patients presented with postoperative cavity

complications. Hence, based on the findings of this study, it has been determined that a total of 33.23% of postoperative cavity complications manifest within our healthcare system. The youngest patient to undergo a mastoidectomy procedure was a 7-year-old child. The patient, a 60-year-old female, presented as the eldest individual among those seeking dental care, exhibiting concerns related to cavities. Among the total group of 110 cases, a majority of 80 individuals were identified as males, while the remaining 30 individuals were identified as females. Among the group of 30 individuals who sought medical attention for dental caries, 20 were of the male gender, while the remaining 10 were of the female gender. The highest recorded prevalence of dental caries was observed among individuals aged 30 to 41 years, followed by those aged 10 to 21 years and 40 to 51 years.

Out of the total 110 occurrences, 85 cases were identified with sclerotic mastoid, while 17 cases exhibited cellular mastoid, and 15 cases displayed diploic mastoid. Among the cohort of 30 patients presenting with dental caries, 71.5% exhibited sclerotic mastoid, 4% displayed cellular mastoid, and 21.5% manifested diploic mastoid. A total of 32 surgical procedures were performed utilizing general anaesthesia. A total of 110 patients underwent modified radical mastoidectomy.

Out of the 110 instances that were analyzed for this study, a total of 18 cases showed evidence of a significant post-operative cavity. Considering the aforementioned, it was observed that among the thirty patients comprising the cohort who underwent mastoid surgery, a total of eight occurrences exhibited a notable postoperative cavity, while twenty cases presented with a distinct facial ridge. Moreover, a total of 26 occurrences were identified wherein the middle ears and eustachian tubes were exposed. Additionally, 3 cases exhibited stenosis of the meatoplasty, while 26 cases presented with postoperative granulations.

**Table 1: Patient distribution based on Gender and Age**

<b>Gender</b>	<b>No. of cases</b>
Male	20
Female	10
<b>Age groups (years)</b>	
0-10	2
11-20	6
21-30	3

31-40	9
41-50	8
More than 50	2

**Discussion**

A total of thirty participants in the present study were found to have encountered post-operative complications related to the mastoid cavity. As a result, the present study revealed that a notable proportion of the population, specifically 33.23%, exhibited dental caries-related concerns. Sade et al [11] reported a prevalence of 28% cavity problems in their study population. Similarly, in the study conducted by Kos et al [12], it was observed that 30% of the patients experienced cavity difficulties after mastoidectomy. In the study conducted by Khan et al, it was observed that 26.6% of the mastoid cavities exhibited pathological conditions [13]. Consequently, the prevalence of dental caries in this study is nearly equivalent to that observed in previous investigations. Based on the findings of this study, it was observed that individuals within the age bracket of 30 to 41 years exhibited the most prevalent occurrence of dental caries. Subsequently, the age groups spanning from 10 to 20 years and 40 to 50 years demonstrated a subsequent frequency of cavities. In the study conducted by Vaid et al., similar conclusions were reached [14].

Vartianen, however, made opposing observations. Vartianen showed a peak incidence between 20 and 30 years of age [15]. It was found in this study that a sizable fraction of patients (75%) who had a prominent facial ridge also had dental caries. An 80% prevalence rate was observed in research by Sade et al [11]. Vaid et al. also found a comparable value [14].

This finding suggests that the facial ridge's prominence needs to be lowered for it to line up with the external auditory canal floor. It is important to be very careful throughout the treatment to avoid damaging the facial nerve, especially if you have cellular mastoids. Significant pneumatization in the perifacial and retrofacial cell tracts, which extend deep into the mastoid tip, is frequently seen in these mastoids.

Postoperative discharge from the cavity was found to be significantly influenced by the presence of exposed middle ear and eustachian tube areas. The results of the combined analyses of earlier studies by Sade et al. [11] and Castrillion et al. [16] support this claim. In particular, the prevalence of cavity issues was found in 18.18% of cases undergoing grafting, but it

increased to 30.35% of cases in cases in which grafting was not done. Meatoplasty is a surgical treatment that aims to enlarge the external aperture of the ear canal; in just 10% of cases, this discloses stenosis [17]. Only thirty of the patients in Sade et al.'s [11] cohort who were identified with meatoplasty stenosis were able to attain the intended result of a dry cavity. A prevalence of 27.8% was noted in cases of meatoplasty stenosis in the Vartianen et al. [15] investigation.

### **Conclusion**

The results of the current investigation indicate that the frequency of dental caries can vary depending on whether a general or local anesthetic was used. Sclerotic mastoids were associated with a marginally increased risk of dental problems in their patients. The main pathological problem that has been successfully recognized by this inquiry is persistent cavity discharge. Ensuring the absence of infection is imperative in order to ascertain the complete absence of infection within the middle ear and mastoid regions. Adequate depression of the facial ridge is imperative in order to attain a desiccated concavity.

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