Original Research Article

Incidence of cavity problems after open cavity mastoidectomy and perioperative factors involved in the causation of cavity problems: an observational study

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Abstract

Objective: To find out the incidence of cavity problems after open cavity mastoidectomy and perioperative factors involved in the causation of cavity problems. **Methods**: This prospective observational study conducted in the Department of ENT, Nalanda Medical College and Hospital, Patna, Bihar, India for 15 months.Total 120 patients who came for open cavity mastoidectomy were included in this study and all those patients had undergone open cavity mastoidectomy. **Results**: The incidence of postoperative cavity problems in our study is 33.33%. Out of 40 patients who presented with cavity problems, 25 patients were males (62.5%) and 15 patients were females (37.5%). Maximum incidence of cavity problem was found between 31–40 years followed by 11-20 years and 41-50.Of the 40 patients with cavity problems, 72.5% were of sclerotic mastoid and 5% were of cellular mastoid and 22.5% were of diploeic mastoid. Of the 40 problem cavities, 38 had prolonged discharge from mastoid cavity as the main problem (95%). Accumulation of wax in the cavity was present in 13 cases (35.5%). Vertigo persisting beyond the immediate postoperative period was present in 9 cases (22.5%). Perichondritis of pinna was found in 2 case (5%). Persistence or/development of facial palsy in post- operative period was found in 9 cases (22.5%) and recurrent cholesteatoma was seen only in 6 cases (15%). 3 Cases had postoperative wound infection (7.5%). **Conclusion**: We conclude that the incidence of cavity problems according to the type of anaesthesia (general/local) Cavity problems was seen slightly more in sclerotic mastoids.

Keywords: Cavity, Meatoplasty, Mastoid.

Introduction

A mastoidectomy is a widely used surgical procedure, usually performed with a tympanoplasty, to eradicate disease in the middle ear cavity and mastoid.[1] It is considered to be an effective method of treatment in cases of chronic ear infections resistant to antibiotic therapy.[2] The use of a mastoidectomy as a means to establish drainage of a complicated infection of the ear has little controversy[3] ; however, the use of a mastoidectomy to treat chronic drainage or suppuration from otitis media remains an issue of debate.[4]

The rationale for a mastoidectomy combined with a tympanoplasty is that it can allow the surgical debridement of infected and devitalized tissues that can lead to persistent middle ear disease[5], as well as reconstruction of the aerated mastoid cavity. The mastoid air cell system acts primarily as a buffer to pressure changes in the middle ear[6], and the presence of an aerated mastoid greatly increases the volume of the middle ear system, which can moderate pressure changes in the middle ear cavity. Thus, in a well-aerated mastoid, significant changes in the middle ear pressure will likely have little effect on the middle ear and tympanic membrane.[6] Therefore, if surgery could increase the air volume in a poorly aerated mastoid cavity, the sequelae of chronic negative pressure, including atelectasis and cholesteatoma, could be reduced.[7] It is very rare for any surgeon to treat cholestetoma medically, making surgery the principle management of cholesteatoma. MRM is indicated in cases with unresectable disease, unreconstructable posterior canal wall, inadequate patient follow up and poor Eustachian tube function.[8] The purpose of every open cavity procedure is to

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exteriorize the mastoid cavity for future monitoring of recurrent cholesteatoma, provide drainage for unresectable temporal bone infection and occasionally, provide exposure for difficult to access areas of temporal bone. Supporters of open cavity techniques stress upon the fact that even if some disease is left behind, it can be removed in subsequent visits and also, there is better ventilation of cavity which has a drying effect.[9] Normally, the open cavity heals by secondary intention. Failure of healing and complete epithelisation leads to various cavity problems such as vertigo, otorrhoea, hearing impairment, wax/debris collection, dependency on doctor for repeated cleaning of cavity, difficulty in wearing hearing aids and residual/ recurrent disease.[10] The aimed of the study to find incidence and causes for postoperative mastoid cavity problems after MRM.

Material and Methods

This prospective observational study conducted in the Department of ENT, Nalanda Medical College and Hospital, Patna, Bihar, India for 15 months. after taking the approval of the protocol review committee and institutional ethics committee.Total 120 patients who came for open cavity mastoidectomy were included in this study and all those patients had undergone open cavity mastoidectomy. The sampling technique used was purposive sampling technique and all the patients who were included in this study had given written informed consent.

Methodology

After getting the informed consent, each patient was included in the study according to the inclusion criteria. Each patient was evaluated according to the proforma of the study. They were assessed primarily by their complaints and then by cavity examination. Each patient had a follow up upto three months at twice weekly intervals. In this study a borderline healing period of 3-4 months was given for the complete epithelialisation of an open mastoid cavity. So, any patient presenting with symptoms beyond this period was taken as a cavity problem case. The cases were studied according to the clinical symptoms. Basic clinical examinations were done. For each case, any of the proven predisposing factors, was determined by cavity examination. When required, investigations like culture and sensitivity of pus was done. Measurement of parameters like facial ridge height, size of cavity and size of meatoplasty were adopted from standard studies conducted by other authors. In this study 5 cc is taken as the volume of a large mastoid cavity, 3-5 cc, small less than 3 cc, appropriate medical treatments like topical/systemic antibiotics, aural toilet, steroids and cauterisation were given. Chemical cauterisations of granulations were attempted as an outpatient basis. Patients were followed up at intervals of 2-3 weeks after the treatment to assess the progress. Some cases were admitted in the ward for protracted symptoms and they were given parenteral medication. Rarely cases required surgical management.

Results

120 patients had undergone open cavity mastoidectomy in the department of ENT, Medical College, bihar during the study period. 5 patients were lost to follow up before 3 months, 40 patients had postoperative cavity problems. Hence according to this study, the incidence of postoperative cavity problems in our set up is 33.33 %

Table 1: Distribution of patients on the basis of Gender and Age

Gender	No. of cases	%
Male	25	62.5
Female	15	37.5
Age groups (years)		
0-10	1	2.5
11-20	9	22.5
21-30	4	10
31-40	11	27.5
41-50	10	25
Above 50	5	12.5

Youngest patient to undergo mastoidectomy was a 6 year old boy. The youngest patient who presented with cavity problem was of 9 years. The oldest patient who presented with cavity problems was a 61-year-old female. Of the 120 cases, 82 patients were males and 38 patients were female. Of the 40 patients who presented with cavity

problems, 25 patients were males (62.5%) and 15 patients were females (37.5%). Maximum incidence of cavity problem was found between 31–40 years followed by 11-20 years and 41-50.

Table 2: Pneumatisation of mastoid, type of surgery and type of anesthesia during the procedure

Mastoid Pneumatisation	No. of Cases	Cases with cavity problem	%
Sclerotic	86	29	33.72
Cellular	18	2	11.11
Diploeic	16	9	56.25

Of the 120 cases, 86 (71.67%) had sclerotic mastoid and 18 (15%) had cellular mastoid and 16 (13.33%) had diploeic mastoid. Of the 86 sclerotic mastoids, 29(33.72%) had post mastoidectomy cavity problems. Of the 16 diploeic mastoid, 9 (56.25%) had postoperative cavity problems and of the 18 cellular mastoids, 2 (11.11%) had postoperative cavity problems. i.e., Of the 40 patients with cavity problems, 72.5% were of sclerotic mastoid and 5% were of cellular mastoid and 22.5% were of diploeic mastoid. 34 surgeries were done under general anaesthesia. All the 120 patients underwent modified radical mastoidectomy.

Of the 40 problem cavities, 38 had prolonged discharge from mastoid cavity as the main problem (95%). Accumulation of wax in the cavity was present in 13 cases (35.5%). Vertigo persisting beyond the immediate postoperative period was present in 9 cases (22.5%). Perichondritis of pinna was found in 2 case (5%). Persistence or/development of facial palsy in post- operative period was found in 9 cases (22.5%) and recurrent cholesteatoma was seen only in 6 cases (15%). 3 Cases had postoperative wound infection (7.5%)

Table 3: Post-operative problems

Cavity problems	Number	%
Discharge	38	95
Wax	13	35.5
Vertigo	9	22.5
Perichondritis	2	5
Facial palsy	9	22.5
Recurrent cholesteatoma	6	15
Post-operative wound infection	3	7.5

Table 4: Post-operative analysis

Post-operative analysis	Number
Larger cavity	9
High facial ridge	30
Meatoplasty sterosis	4
Exposed middle ear and eustachian tube	27
Post-operative granuloma	27

According to Table 4, of the 120 cases, 19 cases had a large post-operative cavity. Hence out of the 40 postoperative mastoid cavity problems, 9 cases had large postoperative cavity, 30 cases had high facial ridge, 4 case had stenosis of meatoplasty, 27 cases had exposed middle ear and eustachian tube and 27 had postoperative granulations.

Discussion

In the present study 40 patients had post-operative mastoid cavity problems. Hence 33.33% of the total had cavity problems, according to this study. Sade et al had 28% post mastoidectomy cavity problems and Kos et al had 30% cavity problems.[11,12] Khan et al had 26.6% problem mastoid cavities.[13] Hence, this study has almost comparable incidence of cavity problems to previous studies.[13] Maximum incidence of cavity problem was found between 31–40 years followed by 11-20 years and 41-50, according to this study. Vaid et al got the same findings in their study.[14] But Vartianen had different observations. Vartianen had maximum incidence between 20 and 30 years.[15] In the study 75% of patients with high facial ridge had cavity problems. A study conducted by Sade et al this was 80%.10 Almost same value was obtained by Vaid et.al also.[14] This finding points to the need of lowering the facial ridge upto the level of floor of external auditory canal. On doing so adequate care

should be taken to avoid injury to facial nerve, especially in cellular mastoids, where one can expect extensive pneumatisation onto the perifacial and retrofacial cell tracts with a deep mastoid tip. Exposed middle ear and eustachian tube areas were found to be a significant factor causing postoperative discharge from the cavity. This was proven by all the previous studies conducted by Sade et al and Castrellion et al, only 18.18% grafted cases had cavity problems whereas 30.35% cases had cavity problems when grafting was not done.[11,16], Meatoplasty stenosis was found only in 10% cases. According to Sade et al, only 30% of their patients with meatoplasty stenosis attained dry cavity.[11] Vartianen et al had 27.8% cases of meatoplasty stenosis.[15]

Conclusion

We conclude that the incidence of cavity problems according to the type of anaesthesia (general/local) Cavity problems was seen slightly more in sclerotic mastoids. Persistent discharge from the cavity was found to be the main cavity problem in this study. There should be complete exenteration of disease from the middle ear and mastoid. An adequately lowered facial ridge is an essential step to attain a dry cavity.

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