

# Causes of Persistent Otorrhea after Mastoidectomy

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**Abstract:** Otitis media is one of the most common disease entities present since prehistoric times. Its dangers & complications have been recognized and described by Hippocrates as cited in Cawthorne “acute pain of the ear, with continued strong fever, is to be dreaded, for there is danger that the man may become delirious and die.” Since then there has been a quest to understand the underlying pathology and clinical course of the disease so that optimum treatment guidelines can be decided regarding the management of patients. **Aims & Objectives** The aim of the present study is to observe the factors responsible for this persistent ear discharge after mastoidectomy so that we can give guidelines for the future so as to avoid this problem. **Materials and methods:** In the present study, the patients were selected from those presenting in the department of SKIMS Medical College, Dept. of ENT & Head & neck Surgery for follow up after Mastoidectomy, during the period of AUG 2015 to AUG 2017. The 100 cases were examined, out of which 40 cases with persistent otorrhea were selected for the study. **Observations:** Observations were made in relation to age, sex incidence, economic status, aural discharge, type of procedure done & findings at Otomicroscopic examination. **Conclusion:** In conclusion, persistent Otorrhea after mastoid surgery was more common due to infected air cells, inadequate surgical procedure. We emphasize the importance of an adequate mastoidectomy in achieving good results when managing cholesteatoma.

**Keywords:** Mastoidectomy, Otorrhea.

## 1. Introduction

Otitis media is one of the most common disease entities present since prehistoric times. Its dangers & complications have been recognized and described by Hippocrates as cited in Cawthorne “acute pain of the ear, with continued strong fever, is to be dreaded, for there is danger that the man may become delirious and die.” Since then there has been a quest to understand the underlying pathology and clinical course of the disease so that optimum treatment guidelines can be decided regarding the management of patients.

**Chronic Otitis Media**<sup>2</sup> implies a permanent abnormality of the pars tensa or pars flaccida, most likely a result of earlier acute Otitis Media, negative Middle Ear pressure or Otitis Media with Effusion.

Now the new classification<sup>3</sup> of COM is as follows –

- 1) Healed
- 2) Inactive Mucosal
- 3) Inactive Squamous
- 4) Active Mucosal
- 5) Active Squamous

- 1) **Healed:** Also known as Tympanosclerosis or healed perforation. On otoscopy, there is thinning and/or local or general opacification of the pars tensa without perforation or retraction.
- 2) **Inactive Mucosal:** Permanent perforation of the pars tensa but the middle ear mucosa is not inflamed.
- 3) **Inactive Squamous:** Retraction of the pars flaccida or pars tensa (usually postero-superior) which has the potential to become active with retained debris.
- 4) **Active Mucosal:** Permanent defect of the pars tensa with an inflamed middle ear mucosa which produces mucopus that may discharge.
- 5) **Active Squamous:** Retraction of the pars flaccida or tensa that has retained squamous epithelial debris and is associated with inflammation & the production of pus, often from adjacent mucosa.
- 6) This classification is more clinically based on an individual ear's finding and has made redundant the previous, mainly anatomical classification between

‘tubotympanic’ and ‘atticoantral’ disease. The terms safe and unsafe are also incorrect and misleading as complications can arise from any ear with active COM irrespective of its pathology.

## Aims & Objectives

The aim of the present study is to observe the factors responsible for this persistent ear discharge after mastoidectomy so that we can give guidelines for the future so as to avoid this problem

## 2. Materials and Methods

In the present study, the patients were selected from those presenting in the SKIMS Medical College, Dept. of ENT & Head & neck Surgery for follow up after Mastoidectomy, during the period of AUG 2015 to AUG 2017. The 100 cases were examined, out of which 40 cases with persistent otorrhoea were selected for the study.

### Inclusion criteria

Patients who underwent Mastoidectomy (Cortical mastoidectomy, Canal wall up and Canal wall down mastoidectomy)

### Exclusion criteria

Patients with Tympanoplasty procedure.

## 3. Observations

In the present study, the patients were selected from those presenting in the SKIMS Medical College, Dept. of ENT & Head & neck Surgery for follow up after Mastoidectomy, during the period of AUG 2015 to AUG 2017. The 100 cases were examined, out of which 40 cases with persistent otorrhoea were selected for the study.

A period of 24 months was taken into study.

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**Table 1:** Showing the incidence of Post-Mastoidectomy Otorrhoea.

Total number of cases – 100		
Post-operative cases (with or without otorrhoea)	No. of cases	Percentage
Cases with dry ears	60	60%
Cases with discharging ears	40	40%

Out of 100 post mastoidectomy cases reported to ENT Department, 60 cases (60%) had dry ears and 40 cases (40%) had still discharging ears.

**Table 2:** Showing the age incidence (out of 40 cases)

Age Group (in years)	No. of cases	Percentage
0 – 10	6	15
11 – 20	11	27.5
21 – 30	12	30
31 – 40	8	20
41 and above	3	7.5

It was observed that the youngest case reported was that of a child of 10 years and the oldest was of 60 years of age. It would appear that the commonest age groups during which patients were attending the hospital for aural discharge after mastoidectomy falls under the age group of 21 to 30 years of age.

**Table 3:** Showing the sex incidence

Sex	No. of cases	Percentage
Males	24	60
Females	16	40

The observations made on sex incidence showed that male patients predominated over their female counterparts in this series, the exact number being 24 (i.e. 60%) male while female patients were only 16 (40%) in number.

**Table 4:** Showing the quantity, character and smell of the aural discharge

Discharge	No. of cases	Percentage
<b>Quantity</b>		
Scanty	27	67.5
Moderate	11	27.5
Copious	2	5
<b>Character</b>		
Mucoid	2	5
Mucopurulent	14	35
Purulent	24	60
<b>Smell</b>		
Foetid	22	55
Non-foetid	18	45

It was observed that in this series, the quantity of discharge in 27 cases was scanty (67.5%), in 11 cases (27.5%) it was moderate and in only 2 (5%) cases the discharge was copious.

Regarding character, purulent discharge was present in 24 (60%) of cases, followed by mucopurulent discharge in 14 (35%) cases and in least number of cases discharge was mucoid i.e. in 2 (5%) cases. Regarding smell, foetid discharge was seen in 22 (55%) cases and non-foetid discharge in 18 (45%) of the cases.

**Table 5:** Showing culture report of aural swab

Culture	No. of cases	Percentage
Staph aureus	8	20
Proteus	4	10
Ps. Aeruginosa	5	12.5
E. Coli	3	7.5
Mixed	7	17.5
Mycoses	4	10
Anaerobes	1	2.5
No growth	8	20

It was observed after culture & sensitivity test of aural swab that only 32 cases showed some growth. Out of these positive cases, Staphylococcus aureus was reported to be the commonest organism isolated in 8 cases (20%). In 7 cases (17.5%) the growth was mixed and Pseudomonas aeruginosa was found in 5 cases (12.5%) while Proteus in 4 cases and E. Coli in 3. Mycoses were found in 4 cases (10%). Anaerobes were cultured only from 1 case (2.5%). 8 cases did not show any growth

**Table 6:** Showing type of procedure done

Type of operation	No. of cases	Percentage
Cortical mastoidectomy	25	62.5
CWD Mastoidectomy (with cholesteatoma)	5	12.5
ICW Mastoidectomy	10	25

Out of the 40 cases, maximum number of patients (25) had undergone cortical mastoidectomy, 5 patients had canal wall down procedure and 10 patients an ICW mastoidectomy was done.

**Table 7:** Showing findings at microscopic examination

Finding	No. of cases	Percentage
Residual disease	27	67.5
Residual TM perforation	32	80
Large cavity with granulations	21	52.5
Inadequate meatoplasty	20	50
Open ME space	4	10

The most common finding as such was residual TM perforation, 32 cases. The next common observation was that of residual disease in 27 patients, followed by large cavity filled with granulations in 21 and inadequate meatoplasty in 20 cases. In 4 cases, tympanic membrane grafting had not been done and the middle ear space was open.

## 4. Discussion

The present work comprises the study of the causes of persistent aural discharge after mastoid surgery.

### Incidence:

In the present study on the causes of persistent discharge after Mastoidectomy, the incidence of the condition has been found to be 40 % (40 of 100 cases).

Karmarkar et al in their study on 433 cases reported an incidence of persistent discharge after Mastoidectomy as 12.38 % for CWD mastoidectomy and 42.4 % for ICW Mastoidectomy. Vartiainen reported an incidence of 8.6% in 1993 in a cohort controlled study of 431. Zorita reported

the surgical failure rate as 17.5 %, Brackmann as 3 %, Tos as 10% and Parisier as 11%.

So, our finding of incidence of post-mastoidectomy persistent otorrhoea of 13.8 % is very near to that of Karmarkar et al and Vartianen.

#### **Age Incidence:**

As far as the age incidence in cases of post-mastoidectomy discharge is concerned, the commonest age group in the present study was 21 to 30 years (30%), followed immediately by the 11 to 20 years age group (27.5%). In the age group of 31 to 40 years it was 20% and in the age group of 0 to 10 years it was 15%.

M. Sadoghi & P. Dabirmoghaddam reported mean age of patients submitting for revision MRM as 30.1 years. Other studies also indicate more number of adult patients suffering from persistent discharge. Therefore, our finding is in accordance with these studies.

#### **Sex Incidence:**

In the present series of 40 cases, males were 24 (60%) in number while females were only 16 (40%). In a study carried out by Bercin & Kutluhan A et al (2009) the females (22) outnumbered the males (13) while Cliff AM et al (2002) reported 62.5% incidence in males while 37.5% in females. This is perhaps because males have to lead outdoor life, hence they are more exposed to drenching in the rain, exposure to climatic variations, swimming, diving etc. Thus they are more prone to get ear, nose and throat infections.

#### **Aural Discharge:**

In the present series of 40 cases observed for persistent discharge after mastoidectomy, the aural discharge has been studied for its quantity, character and smell.

#### **Quantity:**

In the present series which was observed for the persistence of discharge after mastoid operation the quantity of discharge was scanty in 27 (67.5%) cases. It was moderate in 11 (27.5%) cases and copious in only 2 (5%) cases.

It has been observed that the quantity of discharge in all cases of post-mastoidectomy otorrhoea was scanty where the basic pathology was thought to be in attic-antral region. Regarding quantity of aural discharge in chronic suppurative otitis media, the authors like John Ballantine and John Groves and Harold Ludman share similar views.

#### **Character and Smell:**

Regarding character it was observed in this series that discharge was mucoid in only 2 (5%) cases while it was mucopurulent in 14 (35%) cases and purulent in 24 (60%) cases.

As far as the smell is concerned, it was foetid in 22 (55%) cases, and in 18 (45%) cases non-foetid. According to Shambaugh, after operation for chronic suppurative otitis media, presenting infections in mucosal cells and osteitis could cause persistence of wet mastoid cavities. In such cases discharge may be scanty and foul smelling.

It has been observed by a number of authors that purulent, foul smelling & scanty discharge was associated with attic-antral disease. In these cases, granulations or cholesteatoma was found either in the middle ear or in the mastoid cavity. The purulent, foul smelling discharge in these cases has been attributed to the presence of cholesteatoma, bony necrosis and presence of saprophytic gram negative bacteria in such infections.

According to John Ballantine and John Groves, when infecting organisms are more virulent, or the patient is debilitated, infection may progress and discharge becomes more and more creamy yellow in colour and foul smelling.

Harold Ludman also attributed foul smelling discharge in unsafe type of chronic suppurative otitis media to bony necrosis.

This view is shared by Harold Ludman. He attributed that in chronic suppurative otitis media where the infection is coming through the Eustachian tube, the discharge is mucoid or mucopurulent, may be profuse but never foetid.

#### **Aural Swab Examination**

In all 40 cases of post mastoidectomy otorrhoea aural swab was sent for microscopic and culture examination.

#### **Gram Negative Organisms:**

The gram negative organism isolated in the present work series were *B. Proteus* (10%), *Ps. Aeruginosa* (12.5%) and *E. coli* (7.5%)..

These observations are almost similar to that of Mishra et al (1990) who had isolated 10.8% of proteus species from the cases of post-mastoidectomy otorrhoea. This finding is almost similar to that of I. Friedman's figure (*Ps. Aeruginosa* in 12.83% and *E. coli* 8.1%) and only slightly more than that of Mishra et al. (1990) who isolated *Ps. Aeruginosa* in 9.2% cases and *E. Coli* from 9.2% of post-mastoidectomy otorrhoea. Therefore, the findings in the present series are close to that of previous observers.

#### **Gram Positive Organisms**

In the present series of post-mastoidectomy otorrhoea, Gram positive organisms were isolated in 8 cases (20%). Among Gram positive organisms only *Staphylococcus aureus* was present. Their incidence in the present series is slightly less than in the series of E. Vatriainen et al, who isolated Gram positive organisms in 22% of cases of post-mastoidectomy otorrhoea.

In the present series Gram positive organisms isolated were only *Staphylococci*. This is similar to the series of E. Vatriainen et al. in which all gram positive organism were *staphylococci*.

#### **No Growth**

In the present series of 40 cases which was observed for post-mastoidectomy otorrhoea, in 8 cases (20%), no organism was isolated from aural swab culture. E. Vatriainen et al in the study of 190 cases of re-operation following failure of surgery from chronic ears found that there was no growth in

19% of cases. So the finding in the present series are not much more than in theirs.

In the present series, the probable explanation for negative swab could be the prolonged use of systemic antibiotics due to chronic nature of the disease.

#### **Anaerobes and Mycoses**

In the present series of 40 cases 1 case (2.5%) had anaerobes in the post-mastoidectomy otorrhea. Papastavros et al (1986) isolated 1.68% of anaerobes from the ear discharge from the cases of chronic suppurative otitis media. In the study of Mishra et al (1990) of the post-mastoidectomy otorrhea, mycoses were isolated in 13% of cases, which is slightly more than the observation in the present series figure (10%).

Anaerobes and mycosis contamination were found most commonly during the early post-operative period. Perhaps, dampness of dressing due to secretions in addition to contamination during dressing are the factors responsible for it.

#### **Type of Procedure Done**

In this study, the percentage distribution of Cortical mastoidectomy, Canal Wall Down & Intact Canal Wall procedures is 62.5%, 12.5% and 25% respectively.

Jose Evandro et al reported 33% ICW and 67% CWD mastoidectomies in their study on 200 patients while A.O. Lasisi et al gave the distribution as 16%, 28% and 56% for atticotomy, ICW and CWD Mastoidectomy respectively. Oswaldo Cruz et al also showed more frequency of Canal wall down procedures (66%) over Intact canal wall procedures (44%) in their study. Therefore, our finding of predominance of canal wall down Mastoidectomy percentage being less, as our centre is a tertiary referral centre and most of the cases come late with extensive and advanced disease.

### **5. Findings at Otomicroscopy**

In our study, the most common finding as such was an residual TM perforation (80%). The next most common observation was that of residual disease, found in 67.5%. Large cavity filled with granulations were present in 52.5% of cases while an inadequate meatoplasty was present in 50% cases. In 10% cases, tympanic membrane grafting had not been done and the middle ear space was open.

In a recent study (2009) done by Bercin and Kutluhan et al, the most common causes of persistent discharge after mastoidectomy were reported to be residual disease and a narrow meatoplasty in 80.9% cases, closed supratubal recess in 71.4 % and tympanic membrane perforation in 57.1% cases. Our finding of narrow meatoplasty is similar to this but the incidence of residual disease and tympanic membrane perforation is lower than this. This is probably because a canal wall down approach was used in most of the cases so better clearance of disease was achieved.

Palva T has quoted the main reason of failure after primary surgery to be inadequate mastoid and epitympanic bone work

and failure to obliterate the medial parts of the cavity thoroughly. This is probably the reason for patients with large cavity which is by nature full of pockets and sockets to continue discharge because of lack of good epithelialization.

### **6. Conclusion**

In our study, persistent Otorrhea after mastoid surgery was more common due to infected air cells, inadequate exenteration of mastoid air cells and/or inadequate meatoplasty. Bone work is generally taught well in all temporal bone workshops but no emphasis is laid on soft tissue work. We emphasize the importance of an adequate meatoplasty in achieving good results when managing cholesteatoma.

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