

## Pattern of Otogenic Complications in a tertiary care teaching Hospital: A one year Experience

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### Abstract

**Introduction:** Chronic otitis media (COM) is an inflammatory process of the middle ear space with varied manifestations. Prevalence of Chronic otitis media in the world is around 65 – 330 million/year and every year around 21,000 people (33/10 million people) die due to chronic otitis media complications. After introduction of antibiotic and new surgical techniques, the rate of complications has decreased to 0.15% – 0.04 % and the mortality has reduced from 25% to 8%. India falls into countries with highest prevalence of Chronic Otitis Media, i.e. prevalence greater than 4%. There are various factors which play significant role in the causation of these complications. The study has been undertaken to see the pattern of different types of complications associated with Chronic Otitis media and the Demographic pattern associated with it. **Material and Methods:** All the patients who presented with otogenic complications were included in the study during one year period. A total of 75 patients were included in study, evaluated and statistically analysed. **Observations and Results:** The most common complication was found to be Extra cranial complication with Post-auricular abscess as the most common extra cranial complication and Meningitis was the most common intracranial complication. **Conclusion:** Incidence of otogenic complications are still there in modern era though with less in incidence as compared to pre-antibiotic era. The most common associated factor associated with it, is unaddressed disease because of ignorance and lack of healthcare facility in rural part of country.

**Keywords:** Chronic, demographic, otitis.

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### Introduction

Chronic otitis media (COM) is an inflammatory process of the middle ear space with varied manifestations including permanent changes in the tympanic membrane resulting in atelectasis of tympanic membrane, permanent perforation, formation of retraction pockets resulting with or without cholesteatoma formation and ossicular destruction. It may also result in variable healing of tympanic

membrane resulting in tympanosclerosis or dimeric tympanic membrane. Prevalence of Chronic otitis media in the world is around 65 – 330 million/year. Majority of world chronic otitis media problem is inhabited in South-East Asia, Western pacific and African countries. Moreover, every year around 21,000 people (33/10 million people) die due to chronic otitis media complications[1]. Chronic otitis media is a one of the commonest ENT health problem in India. However, there was decline in the incidence of complications but they still occur due to poor socio-economic conditions, lack of consciousness about health care and accessibility of trained specialist in rural settings[3,4]. India falls into countries with highest prevalence i.e. prevalence greater than 4%[2]. Prior to antibiotic era,

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intracranial complications occurred in 2.3% – 4 cases, while after introduction of antibiotic and new surgical techniques, the rate of complications has been decreased to 0.15% – 0.04 %. Mortality reduced from 25 to 8%[3]. The most satisfied theory of chronic otitis media (COM) is, it results from long-term eustachian tube dysfunction along with poorly aerated middle-ear space along with multiple episodes of acute otitis media resulting in persistent middle ear infections. Inactive chronic otitis media is a permanent, dry central perforation with intermittent drainage. Active chronic otitis media (Chronic or recurrent mucoid otorrhea), is provoked by exposure of the tympanic mucosa to bacteria of the external auditory canal as well as of the Eustachian tube. In squamous type of Chronic Otitis Media, there is a high chances of intra and extra cranial complications. This is due to strategic anatomical location of the ear near to brain and other important structures such as facial nerve, labyrinthine apparatus accompanied by the underlying pathology of COM which is an ongoing cycle of inflammation, ulceration, granulation and cholesteatoma formation. Meningitis may result due to direct introduction of infection intracranially as a result of inflammation and erosion of tegmen plate due to direct erosion and hyperaemic decalcification and in some cases due to hematogenous route. Acute infection of the middle ear causes irritation and inflammation of the middle ear mucosa along with oedema. Inflammation produces mucosal ulceration and breach in epithelial lining. Granuloma formation and polyps can develop. This process may continue, destroying surrounding structures and leading to the various complications of COM. Extracranial complications include Mastoiditis, Petrositis, Facial paralysis, Postauricular Abscess, Labyrinthitis/Labyrinthine fistula, Bezold's Abscess, Temporal Abscess, Encephalocele and Cerebrospinal Fluid Leakage and Intracranial complications include Extradural abscess, Subdural abscess, Meningitis, Brain Abscess, Lateral sinus thrombophlebitis, Otitic Hydrocephalus. There are various factors which play significant role in the causation of these complications. Direct extension by preformed pathways can occur either in acute exacerbations of COM or AOM these preformed pathways can be congenital dehiscence of bony facial canal, patent sutures, previous skull fractures, surgical defects, oval and round window. Other factors such as extent of mastoid pneumatization, virulence of micro-organism with its antibiotic sensitivity along with the status of host immunity. The condition may be further complicated as a result of inadequate treatment of recurrent otitis media along with lack of awareness

about disease among patients. Complications are commonly caused by progressive erosion of the bone thus raising the risk of damage to facial nerve, labyrinth and the dura. Progressive retrograde thrombophlebitis is the common route for the formation of a brain abscess. Infection spreads through veins contiguous with either the infected pneumatized spaces of the temporal bone or the previously thrombosed Dural venous sinus and direct communication with the extracranial, intracranial, and cranial diploic veins. Thus, sigmoid sinus thrombosis can lead to thrombophlebitis of other sinuses as well. The management of complications of chronic otitis media can be facilitated by recognizing patterns of extension within the temporal bone and pattern of neurovascular involvement. Current study was planned to evaluate the complications of chronic otitis media along with demographic profiles of patients in a tertiary care teaching hospital of Western Uttar Pradesh.

#### Material and methods

The proposed Cross sectional observational study was carried out in Department of Otorhinolaryngology and Head & Neck surgery, Rohilkhand Medical College and Hospital, Bareilly, a tertiary Care hospital in western Uttar Pradesh. The study included all Patients who presented with Complications of CSOM and satisfied the exclusion and inclusion criteria during one year period from 1<sup>st</sup> November 2018 to 31<sup>st</sup> October 2019.

**Inclusion Criteria:** All patients of complications of chronic otitis media were included in this study.

**Exclusion Criteria:** All those patients not willing to participate in this study were excluded.

A written informed consent was obtained from all patients after explaining them about the study in local language along with the planned procedure. All the cases of complications of chronic otitis media fulfilling the inclusion criteria were evaluated for the study. All patients were thoroughly examined and detailed Ear, Nose, Throat examination along with audiological assessment was done along with Pure Tone Audiometry, CT Scan of Temporal Bone with Brain cuts and other relevant blood investigations as required for pre anaesthesia fitness. The results obtained were analysed statistically using Statistical Package for the Social Sciences (SPSS) version 22.0.

## Observations and Results

A total of 75 patients were included in the study and following results were observed which were evaluated and analyzed.

**Age group distribution:** In the study, mean age of the patients was found to be  $26.03 \pm 10.8$  years. The

youngest subject was of 5 years and oldest 56 years. Age group of 21-30 years was the most commonly affected accounting for 37.3% and the age group least affected was 41 – 50 years old which were only 2.7% of the study participants.(Table 1)

**Table 1: Age wise distribution**

Age group (Years)	Percentage (%)
5 – 10	6.7
11 – 20	26.7
21 – 30	37.3
31 – 40	22.7
41 – 50	2.7
51 – 60	4.0
Total	100

**Gender Distribution:** A total of 60% patients were Males and remaining were females and the study showed a Male Female ratio of 3:2.

**Geographical Distribution:** A total of 89.3 % of patients who landed with otogenic complications in the study belonged to rural population and rest 10.7% were from urban area.

**Education Qualification of the study subjects:** The study showed high incidence of otogenic complications among illiterate group with a value of 62.7%.

**Socio-economic status:** The study showed a much higher prevalence of otogenic complications (58.7%) among subjects belonging to lower socioeconomic status and only 1.3% cases represented from upper middle class and none of the cases were from upper class of society.

**Duration of Ear Discharge:** The study showed that 64% of cases presented with otogenic complication

after 3 years from the onset of ear discharge whereas rest 36% presented with complications within 3 years of onset of ear discharge.

**Pattern of different otogenic complications among study subjects in terms of gender and age group:**

Extra cranial complication was the most common complication seen in 96% of total cases with only 4% presented with intracranial complication. The study showed post-auricular abscess as the commonest extracranial complication occurring in 32% of subjects followed by postauricular fistula (30.7%), Mastoid abscess (18.7%), Facial paralysis (10.7%), Zygomatic Abscess (1.3%), Labyrinthitis/Labyrinthine fistula (1.3%) and Promontory Fistula (1.3%). Meningitis was the commonest intracranial complications seen in 2.7% of subjects followed by and Brain Abscess in 1.3%. none of other intracranial complications were seen in our study

**Table 2: Distribution of all patients gender and different complication**

Complication	Gender			P value
	Male n=45 (%)	Female n=30 (%)	Total n=75 (%)	
Post-auricular abscess	17 (70.8)	7 (29.2)	24 (100.0)	0.189
Post-auricular Fistula	10 (43.5)	13 (56.5)	23 (100.0)	0.052
Mastoid abscess	9 (64.3)	5 (35.7)	14 (100.0)	0.717
Facial paralysis	3 (37.5)	5 (62.5)	8 (100.0)	0.169
Zygomatic Abscess	1 (100.0)	0	1 (100.0)	-
Labyrinthitis/Labyrinthine fistula	1 (100.0)	0	1 (100.0)	-
Promontory Fistula	0	1 (100.0)	1 (100.0)	
Brain Abscess	1 (100.0)	0	1 (100.0)	-
Meningitis	2 (100.0)	0	2 (100.0)	-

The pattern of otogenic complications was not significant among male and female in the present study.(Table 2)

**Table 3: Distribution of all patients age group and different complication**

Complication	Age group (Years)			Total n=75 (%)	P value
	5 – 20 n=25 (%)	21 - 40 n=45 (%)	> 40 n=5 (%)		
Post-auricular abscess	7 (29.1)	17 (70.9)	0	24 (100.0)	0.199
Post-auricular Fistula	12 (52.2)	10 (43.5)	1 (4.3)	23 (100.0)	0.070
Mastoid abscess	5 (35.7)	9 (64.3)	0	14 (100.0)	0.541
Facial paralysis	1 (12.5)	7 (87.5)	0	8 (100.0)	0.236
Zygomatic Abscess	1 (100.0)	0	0	1 (100.0)	-
Labyrinthitis/Labyrinthine fistula	0	1 (100.0)	0	1 (100.0)	-
Promontory Fistula	0	1 (100.0)	0	1 (100.0)	-
Brain Abscess	0	1 (100.0)	0	1 (100.0)	-
Meningitis	2 (100.0)	0	0	2 (100.0)	-

The present study didn't found any significant difference of presentation of otogenic complications among different age groups. (Table 3)

### Discussion

Pawar et al[2], Sharma et al[3], Kulkarni et al[4], Chandrashekharayya et al[5], Yagiz et al[6] had found majority of patients who presented with otogenic complications were in the age group of 11 – 30 years (38.5%), 5 – 10 years (28.9%), 21 – 30 years (36.6%), 31 – 40 years (23.8%) and 31 – 40 years of age (33.3%) respectively. This variation can be due to various demographic pattern of the geography. The pattern of otogenic complications was not significant among male and female in the present study. (Table 2) Our study shows Male Female ratio of 3: 2 and similar result were also reported in the studies done by Sharma et al[3], Chandrashekharayya et al[5] and Mustafa et al[7]. Studies by Pawar et al[2] and Vikram et al [8] has also found that majority of the patients encountering otogenic complications belonged to rural part of country and represented the lower socioeconomic strata of society and mostly were illiterate. Though wide variability in the percentages of the above domain were seen but inference of the outcomes were similar with our study, this could be explained by variability in the density of population in different part of country. Studies done by Sharma et al[3], Chandra-shekharayya et al[5] had found that majority of patients belongs to lower socio-economic status. Mostafa et al[7] has seen that complications were commonly found in young patients from a lower socioeconomic class and equally affected patients of both gender. Wahid et al[9] had found in their study that most of the patients belonged to lower

socioeconomic status(59.1%). In current study, majority of the patients (61.3%) had ear discharge for 6 – 10 years, while 28% patients had ear discharge 2 – 3 years, 21.3% patients had ear discharge 4 – 5 years, 10.7% patients had more than 10 years and 8% patients had ear discharge for less than or equal to 1 year. Study done by Sharma et al[3] found higher incidence of otogenic complications in patients who presented with history of ear discharge for more than 5 years in 60% of cases and this matched with our study where more 60% had history of ear discharge for more than 3 years. Age group wise relationship of complications shows that Post-auricular abscess, mastoid abscess and facial paralysis were more common in 21 – 40 years age group comparing to other age group but this was statistically non-significant ( $p>0.05$ ). While Post-auricular fistula was more common in 5 – 20 years age group comparing to other age group and this was also statistically non-significant ( $p>0.05$ ). Gender wise relationship of complications shows that Post-auricular abscess and Mastoid abscess were more common in males and this was statistically non-significant ( $p>0.05$ ). While Post-auricular fistula and facial paralysis were more common in females and this was statistically non-significant ( $p>0.05$ ). This conclude that pattern of otogenic complications doesn't follow any preference for gender or age group. Yorgancilar et al had also found mastoid abscess as the commonest extracranial complication whereas commonest intracranial complications were lateral sinus thrombophlebitis whereas in our study we had limited number of patients with intracranial complications and meningitis was the most common amongst them.[10].

### Conclusion

Incidence of otogenic complications are still there in modern era though with less in incidence as compared to pre-antibiotic era. The most common associated factor associated with it, is unaddressed disease because of ignorance and lack of healthcare facility in rural part of country. The incidence of complications is more prevalent among patients belonging to lower socioeconomic status where illiteracy is prevalent and contributing to ignorance with lack of health awareness. The study has high incidence of extracranial complications in comparison to intracranial complications which though has reduced mortality but morbidity and hearing disability is still prevalent in our society and is a matter of future study.

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