



Research Article

Clinical And Radiological Evaluation of Complications of Chronic Otitis Media

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ABSTRACT

Background: Chronic Otitis Media (COM) is a long-standing infection of the middle ear that can lead to serious extracranial and intracranial complications if not diagnosed and treated early. Despite advances in antibiotic therapy and surgical management, complications of COM still pose significant challenges, particularly in resource-limited settings.

Objectives: To evaluate the clinical presentation and radiological findings in patients with complications of chronic otitis media and to analyze the correlation between the type of COM and the nature of complications.

Materials and Methods: This descriptive study was conducted in the Department of Otorhinolaryngology, Government Medical College, Kottayam, over a period of 12 months. A total of 400 patients diagnosed with COM were included. Patients presenting with complications underwent detailed clinical evaluation and radiological imaging, including High-Resolution Computed Tomography (HRCT) of the temporal bone and/or Magnetic Resonance Imaging (MRI).

Results: Among 400 patients with COM, complications were observed in 20 cases (5%). The majority of complicated cases (80%) were of the squamous type of COM. The most common complications included facial nerve palsy (35%), acute mastoiditis (20%), and labyrinthine fistula (15%). Extracranial complications (80%) were more frequent than intracranial complications (20%). Radiological findings revealed ossicular erosion (85%), facial canal erosion (30%), and intracranial abscesses in some cases. Conductive hearing loss was the predominant type (85%).

Conclusion: Squamous type COM is more frequently associated with complications. Early clinical suspicion and timely radiological evaluation are essential for accurate diagnosis and effective management. HRCT and MRI are invaluable in assessing disease extent and guiding treatment to prevent long-term morbidity and mortality.

Keywords: Chronic Otitis Media, Complications, HRCT, MRI, Facial Nerve Palsy, Temporal Bone, Intracranial Abscess, Hearing Loss.

INTRODUCTION

Chronic Otitis Media (COM) is a persistent inflammation of the middle ear cleft, commonly characterized by a perforated tympanic membrane and recurrent or persistent ear discharge. It is a significant health issue, particularly in developing countries, due to its chronicity, association with hearing loss, and potential to cause serious complications if left untreated [1].

COM can be classified into two broad categories: mucosal and squamous types. The mucosal type, often associated with central tympanic membrane perforations, is generally considered less aggressive. In contrast, the squamous type is more destructive and has a higher propensity for complications such as cholesteatoma formation, ossicular erosion, and intracranial extension [2,3].

Although the overall incidence of complications arising from COM has decreased with the widespread use of antibiotics and improved health infrastructure, these complications remain a cause for concern due to their potentially life-threatening nature [4]. Complications can be categorized as **extracranial** (e.g., mastoiditis, facial nerve palsy, labyrinthine fistula, mastoid abscess) and **intracranial** (e.g., brain abscess, meningitis, lateral sinus thrombosis) [5,6].

Radiological imaging plays a crucial role in diagnosing and delineating the extent of these complications. High-resolution computed tomography (HRCT) of the temporal bone is considered the gold standard for evaluating bony erosions, mastoid involvement, and fistulae. MRI is particularly useful in identifying intracranial complications such as abscesses or sigmoid sinus thrombosis [7,8].

Timely clinical evaluation and radiological assessment are imperative for early diagnosis and management of COM complications, which can otherwise result in significant morbidity and mortality. Hence, this study was conducted to assess the clinical presentation and radiological findings associated with complications of chronic otitis media in patients attending a tertiary care center in Kerala.

MATERIALS AND METHODS

Study Design and Setting

This was a **descriptive study** conducted in the Department of Otorhinolaryngology at Government Medical College, Kottayam. The study included all patients clinically diagnosed with **chronic otitis media (COM)** and its complications who attended the outpatient department during the 12-month study period.

Study Duration

The study was carried out over a period of **12 months**.

Study Population

The study population comprised patients attending the Department of Otorhinolaryngology, Government Medical College, Kottayam, who fulfilled the diagnostic criteria for **chronic otitis media**.

Sample Size

The sample size was calculated based on a previous study by Dubey SP on the complications of chronic otitis media and their management, which reported a complication prevalence of 9%.

Using the formula:

$$n = \frac{4pq}{d^2} = \frac{4 \times 9 \times 91}{(1.8)^2} = 1011$$

Where:

- $p = 9$ (prevalence rate)
- $q = 100 - p = 91$
- $d = 20\%$ of $p = 1.8$

$$n = \frac{4 \times 9 \times 91}{(1.8)^2} = 1011$$

Thus, the estimated **sample size was 1011**.

Inclusion Criteria

- Patients who fulfill the diagnostic criteria for chronic otitis media.
- Diagnostic criteria included:
 - Chronic inflammation of the middle ear cleft for more than 3 months.
 - Tympanic membrane perforation with persistent or recurrent ear discharge.

Exclusion Criteria

- Patients unwilling to participate in the study.
- Patients who did not meet the diagnostic criteria for chronic otitis media.

Study Tools

- A structured **proforma** was used to record the demographic and clinical details, audiometric findings, and radiological investigations of each participant.

Study Procedure

After obtaining necessary approvals from the **Scientific Research Committee (SRC)** and **Institutional Review Board (IRB)** of Government Medical College, Kottayam, informed consent was obtained from all eligible participants. All patients who fulfilled the inclusion criteria were enrolled.

Detailed clinical evaluation was performed, and relevant findings were entered in the pre-designed proforma. For patients presenting with complications of chronic otitis media, further clinical assessment and **radiological investigations (High-**

Resolution CT of the temporal bone and/or MRI) were conducted. Data regarding the type and severity of complications, associated audiological and radiological findings, and subtype of COM were collected and documented.

Data Management and Analysis

All collected data were coded and entered into **Microsoft Excel** for processing. Descriptive statistics were employed for analysis. **Categorical variables** were expressed as **percentages and proportions**. The correlation between the type of chronic otitis media and its complications was evaluated.

RESULTS AND OBSERVATIONS

A total of **400 patients** diagnosed with chronic otitis media (COM) were included in the study conducted over one year in the Department of Otorhinolaryngology, Government Medical College, Kottayam. Both **mucosal** and **squamous** types of COM were considered.

Table 1: Age Distribution of Study Subjects (n=400)

Age Group (Years)	Frequency	Percentage (%)
0–10	1	0.25
11–20	15	3.75
21–30	66	16.5
31–40	107	26.75
41–50	85	21.25
51–60	78	19.5
61–70	32	8.0
71–80	16	4.0
Total	400	100

Table 2: Age Distribution of Patients with COM Complications (n=20)

Age Group (Years)	Frequency
0–10	0
11–20	1
21–30	6
31–40	5
41–50	4
51–60	3
61–70	2
71–80	0

Table 3: Gender Distribution of Patients with Complications (n=20)

Gender	Frequency	Percentage (%)
Male	15	75%
Female	5	25%

Table 4: Incidence of Complications in Patients with COM (n=400)

Complication Status	Frequency	Percentage (%)
Present	20	5%
Absent	380	95%

Table 5: Type of COM in Patients with Complications (n=20)

Type of COM	Frequency	Percentage (%)
Squamous	16	80%
Mucosal	4	20%

Table 6: Presenting Symptoms in Patients with Complications (n=20)

Symptom	Frequency
Ear discharge	20
Hearing loss	20
Vertigo	3
Tinnitus	6
Post-auricular swelling	2
Post-auricular tenderness	2
Headache	4
Fever	4

Vomiting	4
Seizure	1

Table 7: Tympanic Membrane Findings in Complicated COM (n=20)

Tympanic Membrane Finding	Frequency
Central perforation	4
Attic perforation	6
PSRP (Posterosuperior retraction pocket)	10

Table 8: Fistula Test Result in Complicated COM (n=20)

Fistula Test	Frequency	Percentage (%)
Positive	2	10%
Negative	18	90%

Table 9: Type of Hearing Loss in Complicated COM (n=20)

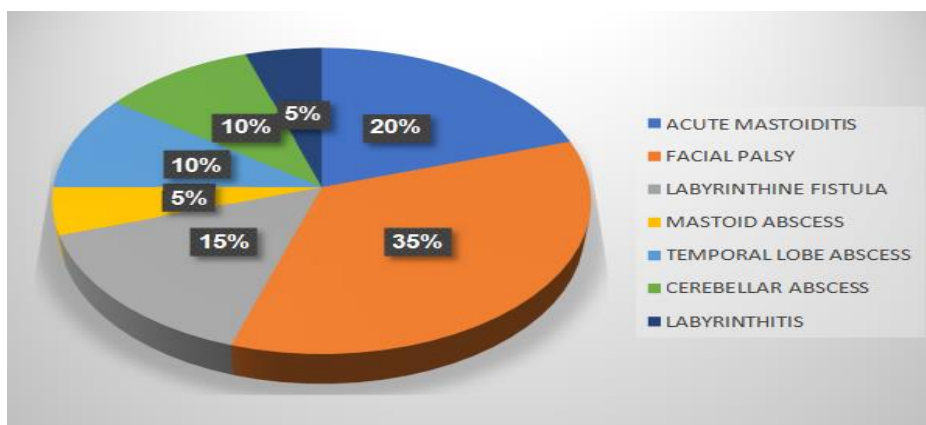
Type of Hearing Loss	Frequency
Conductive	17
Mixed	3
Sensorineural	0

Table 10: Site of Complications (n=20)

Site	Frequency	Percentage (%)
Extracranial	16	80%
Intracranial	4	20%

Table 11: Types of Complications in COM (n=20)

Complication	Frequency	Percentage (%)
Facial palsy	7	35%
Acute mastoiditis	4	20%
Labyrinthine fistula	3	15%
Mastoid abscess	1	5%
Temporal lobe abscess	2	10%
Cerebellar abscess	2	10%
Labyrinthitis	1	5%



Figure; 1 Various Types of Complications

Table 12: Radiological Findings in Patients with Complications (n=20)

Radiological Finding	Frequency	Percentage (%)
Ossicular erosion	17	85%
Tegmen tympani erosion	4	20%
Facial canal erosion	6	30%
Labyrinthine fistula	3	15%
Cerebellar abscess	2	10%
Temporal lobe abscess	2	10%
Mastoiditis	4	20%
Mastoid abscess	1	5%

DISCUSSION

Chronic Otitis Media (COM) remains a prevalent condition, especially in developing countries, where overcrowding, poor hygiene, malnutrition, and limited access to healthcare contribute to its high incidence and associated complications [1]. In this study, we evaluated 400 patients diagnosed with COM over one year, of whom 5% developed complications. This is slightly lower than the 9% complication rate reported by Dubey and Larawin [4], possibly due to improved antibiotic use and early surgical interventions.

The most affected age group in our study was 31–40 years, accounting for 26.75% of cases. Among patients with complications, the 21–30 and 31–40-year age groups were predominant, reflecting the active adult population more prone to neglected infections due to busy schedules or delayed healthcare access. Male predominance (75%) among complicated cases aligns with previous findings, suggesting males may be more exposed to environmental risk factors or less likely to seek early treatment [2,5].

Regarding the type of COM, 80% of the complicated cases were of the squamous variety. This finding is consistent with other studies, which report squamous COM (especially with cholesteatoma) as more likely to cause complications due to its destructive nature [3,6]. Cholesteatomas can erode bone structures, leading to complications such as facial nerve palsy, labyrinthine fistula, and intracranial spread [7].

Among the clinical manifestations, ear discharge and hearing loss were universal symptoms, whereas vertigo, fever, vomiting, and neurological symptoms like seizures were seen in patients with more advanced disease or intracranial extension. This clinical pattern supports the importance of recognizing “red flag” symptoms for early detection of complications [8].

Radiological evaluation played a pivotal role in confirming complications. HRCT was instrumental in detecting ossicular erosion (85%), tegmen tympani erosion (20%), and labyrinthine fistula (15%). These findings mirror those reported by Mafee et al., who emphasized the value of HRCT in preoperative assessment and detection of bony destruction [9]. MRI was particularly helpful in identifying intracranial complications such as cerebellar and temporal lobe abscesses, seen in 10% of our cases, which aligns with the utility of MRI in soft tissue delineation and intracranial pathology reported by Swartz [10].

Extracranial complications were more frequent (80%) than intracranial (20%), a trend consistent with most published literature [4,6]. Facial nerve palsy (35%) was the most common complication, underscoring the proximity of the facial canal to the middle ear and the risk of its dehiscence in chronic infections. Acute mastoiditis (20%) and labyrinthine fistula (15%) were other notable extracranial complications. These findings highlight the need for vigilant otologic assessment and early radiological imaging when complications are suspected.

The type of hearing loss also followed the expected pattern—majority had conductive hearing loss (85%), with a small percentage presenting with mixed loss. No patients exhibited pure sensorineural hearing loss, reinforcing that most complications in COM involve conductive pathways unless the inner ear is directly affected [7,9].

Overall, this study emphasizes the importance of early recognition, appropriate clinical evaluation, and timely imaging in managing complications of COM. It also reinforces the more aggressive nature of squamous COM and the crucial role of HRCT and MRI in detecting and delineating complications.

CONCLUSION

Chronic Otitis Media (COM) continues to be a significant cause of morbidity, particularly in developing regions. Although complications have become less frequent with early antibiotic use and better healthcare access, they remain potentially life-threatening when they do occur.

In this study, complications were observed in 5% of patients with COM, with the squamous type accounting for the majority of these cases. Facial nerve palsy, acute mastoiditis, and intracranial abscesses were among the most commonly encountered complications. Radiological evaluation, especially high-resolution computed tomography (HRCT) and magnetic resonance imaging (MRI), proved to be invaluable tools for accurate diagnosis, assessing disease extent, and guiding appropriate management.

The findings highlight the importance of early clinical suspicion, prompt radiological assessment, and aggressive management of complicated COM to prevent severe morbidity and mortality. Special attention should be given to patients with squamous COM, as they are at a higher risk for developing complications.

Early referral, appropriate imaging, and timely surgical or medical intervention can significantly reduce the burden of COM-related complications and improve patient outcomes.

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