

Association of Preoperative Audiological and Radiological Ossicular Findings with Peroperative Ossicular Findings in Patients with Chronic Otitis Media: A Prospective Observational Study

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Abstract

Background: Chronic otitis media (COM) is a common middle ear disease associated with varying degrees of conductive hearing loss and ossicular chain destruction. Accurate preoperative assessment of ossicular status is essential for surgical planning and prognostication. Audiological evaluation and radiological imaging may provide valuable information regarding ossicular pathology before surgery.

Aim: To determine the association between preoperative audiological and radiological findings and intraoperative ossicular findings in patients with chronic otitis media.

Materials & Methods: This prospective observational study. A total of 120 patients with unilateral mucosal or squamous chronic otitis media, aged 10–60 years and planned for ear surgery, were included. All patients underwent detailed otological examination, Pure Tone Audiometry (PTA), X-ray mastoid (Schüller's view), and High-Resolution Computed Tomography (HRCT) of the temporal bone. Intraoperative assessment of the ossicular chain was performed during surgery to evaluate ossicular continuity, erosion, necrosis, fixation, and discontinuity. Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 27.0. Chi-square test was used to assess associations, and $p < 0.05$ was considered statistically significant.

Results: Among the 120 study participants, 78 (65.0%) had mucosal COM and 42 (35.0%) had squamous COM. Ossicular necrosis was observed in 50.0% of patients with mucosal COM and 66.7% of patients with squamous COM. A significant association was found between the severity of hearing loss on PTA and intraoperative ossicular necrosis in both mucosal COM ($p < 0.001$) and squamous COM ($p = 0.013$). Reduced mastoid pneumatization was significantly associated with ossicular necrosis in mucosal COM ($p = 0.002$) and squamous COM ($p = 0.020$). HRCT findings of incus, malleus, and stapes erosion demonstrated strong correlations with intraoperative ossicular necrosis in both mucosal and squamous disease (all $p < 0.05$). HRCT showed high predictive value for detecting ossicular pathology, particularly in patients with squamous COM.

Conclusion: Preoperative audiological and radiological assessments are significantly associated with intraoperative ossicular findings in chronic otitis media. Increasing severity of conductive hearing loss, mastoid sclerosis, and HRCT-detected ossicular erosion are important predictors of ossicular necrosis. HRCT temporal bone serves as a reliable imaging modality for preoperative evaluation and surgical planning in patients with chronic otitis media.

Keywords: Chronic Otitis Media; Ossicular Necrosis; Ossicular Erosion; Pure Tone Audiometry; Conductive Hearing Loss.

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Introduction

Chronic otitis media (COM) remains one of the most common chronic diseases affecting the middle ear and mastoid cavity, particularly in developing countries. It is characterized by persistent

inflammation of the middle ear cleft with permanent abnormalities of the tympanic membrane, including perforation, retraction, or cholesteatoma formation. COM continues to be a

significant cause of preventable hearing impairment and morbidity worldwide, adversely affecting quality of life and socioeconomic productivity.[1]

Conductive hearing loss is the most frequent clinical manifestation of COM and results primarily from tympanic membrane perforation, ossicular chain erosion, ossicular discontinuity, middle ear fibrosis, and cholesteatoma-related destruction.[2] The severity of hearing loss often reflects the extent of middle ear pathology and ossicular involvement. Ossicular erosion is a well-recognized consequence of chronic middle ear inflammation, with the incus being the most commonly affected ossicle because of its delicate vascular supply and anatomical vulnerability.[3]

Accurate preoperative assessment of ossicular status is essential for surgical planning, prognostication, and counseling of patients undergoing tympanoplasty or mastoid surgery. Pure Tone Audiometry (PTA) remains the cornerstone of audiological evaluation and provides valuable information regarding the degree and type of hearing loss. Several investigators have reported a significant relationship between increasing conductive hearing loss and ossicular chain discontinuity in patients with COM. Jani et al. (2023) observed that greater degrees of hearing loss were associated with a higher likelihood of ossicular necrosis detected during surgery.[4]

Radiological evaluation has become an indispensable component of the preoperative work-up of chronic otitis media. Conventional mastoid radiography provides information regarding mastoid pneumatization, while High-Resolution Computed Tomography (HRCT) of the temporal bone offers detailed visualization of middle ear structures, disease extent, and ossicular integrity.[5] HRCT is particularly useful in identifying ossicular erosion, cholesteatoma-related bony destruction, and anatomical variations that may influence surgical management. Recent studies have highlighted the diagnostic value of HRCT in predicting intraoperative findings. Altaf et al. (2024) demonstrated high diagnostic accuracy of temporal bone computed tomography in detecting ossicular abnormalities when compared with operative findings.[6]

Similarly, Singh et al. (2025) reported a strong correlation between preoperative HRCT findings and intraoperative ossicular erosion in patients with active squamosal disease, emphasizing its role in surgical decision-making.[7] Rajashekhar et al. (2025) further confirmed that HRCT accurately delineates ossicular involvement and disease extent, thereby facilitating preoperative planning and improving surgical outcomes.[8]

Aim & Objectives

Aim: To evaluate the association between preoperative audiological and radiological ossicular findings and peroperative ossicular findings in patients with chronic otitis media.

Objectives

Primary Objective

- To determine the association between preoperative audiological and radiological findings and peroperative ossicular necrosis in patients with chronic otitis media.

Secondary Objectives

- To assess the relationship between the degree of hearing loss on Pure Tone Audiometry (PTA) and peroperative ossicular necrosis in mucosal and squamosal chronic otitis media.
- To evaluate the association between mastoid pneumatization on X-ray mastoid (Schüller's view) and peroperative ossicular necrosis.
- To determine the correlation between HRCT temporal bone findings and intraoperative ossicular necrosis.
- To identify radiological predictors of ossicular chain destruction in chronic otitis media.
- To compare the predictive utility of audiological and radiological assessments for preoperative evaluation of ossicular status.

Materials & Methods

Study Design: This prospective observational clinical study was conducted to evaluate the association between preoperative audiological and radiological ossicular findings and peroperative ossicular findings in patients with chronic otitis media (COM).

Study Setting: The study was conducted in the Department of Otorhinolaryngology, Nalanda Medical College & Hospital, Patna, Bihar, India, a tertiary care teaching hospital.

Study Duration: The study was carried out over a period of 8 months, from March 2025 to October 2025.

Study Population: A total of 120 patients clinically diagnosed with unilateral chronic otitis media and scheduled for ear surgery were enrolled in the study after fulfilling the eligibility criteria.

Ethical Considerations: The study was conducted in accordance with the principles of the Declaration of Helsinki. Institutional Ethics Committee approval was obtained prior to commencement of the study. Written informed consent was obtained from all participants or from parents/guardians in the case of minors before enrollment.

Inclusion Criteria: Patients aged 10–60 years with unilateral chronic otitis media (mucosal or squamous type), having pure conductive hearing loss on audiological assessment and planned for surgical intervention of the affected ear, who provided written informed consent, were included in the study.

Exclusion Criteria: Patients with sensorineural or mixed hearing loss, age below 10 years or above 60 years, bilateral chronic otitis media, complications of chronic otitis media, previous ear surgery, history of temporal bone or ear trauma, and those unwilling to participate were excluded from the study.

Methodology: All enrolled patients underwent detailed history taking and comprehensive otorhinolaryngological examination. Otoscopic examination was performed to assess tympanic membrane status and middle ear pathology. Based on clinical findings and Browning's classification, patients were categorized into mucosal and squamous chronic otitis media. Baseline demographic characteristics including age, sex, residence, and duration of disease were recorded using a structured proforma.

Audiological Assessment: Pure Tone Audiometry (PTA) was performed in an acoustically treated room using a calibrated audiometer (Alps 2100). Air-conduction and bone-conduction thresholds were measured for all patients.

Pure tone average was calculated from hearing thresholds at:

- 500 Hz
- 1000 Hz
- 2000 Hz

The degree of hearing loss was classified according to the World Health Organization (WHO) classification as normal hearing (0–25 dB), mild hearing loss (26–40 dB), moderate hearing loss (41–55 dB), moderately severe hearing loss (56–70 dB), severe hearing loss (71–90 dB), and profound hearing loss (>90 dB). Pure Tone Audiometry (PTA) was performed to determine the type and severity of hearing loss and to exclude patients with sensorineural hearing loss from the study.

Radiological Assessment: All patients underwent radiological evaluation comprising:

X-ray Mastoid (Schüller's View): Bilateral X-ray mastoid (Schüller's view) radiographs were obtained to assess mastoid pneumatization. Based on radiological appearance, mastoids were classified as well-pneumatized, diploic, or sclerotic.

High-Resolution Computed Tomography (HRCT) Temporal Bone: HRCT temporal bone was performed to evaluate the extent of middle ear

disease, ossicular chain continuity, Middle ear pathology and ossicular erosion. Particular attention was paid to the radiological status of the malleus, incus, and stapes for assessment of ossicular involvement.

Surgical Procedure: All patients underwent surgical treatment based on disease extent and intraoperative findings. Patients underwent surgical management in the form of tympanoplasty with or without cortical mastoidectomy, cortical mastoidectomy, or modified radical mastoidectomy, depending on the type and extent of disease.

Intraoperatively, the ossicular chain was examined under microscopic visualization for continuity, erosion, necrosis, fixation, and discontinuity, and the findings were recorded for comparison with preoperative audiological and radiological assessments.

Peroperative findings were considered the reference standard for comparison with preoperative audiological and radiological findings.

Outcome Measures

Primary Outcome Measure

- Association between preoperative audiological and radiological findings and peroperative ossicular necrosis.

Secondary Outcome Measures

- Association between degree of hearing loss and ossicular necrosis.
- Association between mastoid pneumatization and ossicular necrosis.
- Correlation of HRCT temporal bone findings with intraoperative ossicular status.
- Identification of the most commonly involved ossicle.
- Assessment of the predictive value of PTA and HRCT in detecting ossicular pathology.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics for Windows, Version 27.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequency and percentage [n (%)], whereas continuous variables were presented as mean $\pm$ standard deviation (SD). Associations between preoperative audiological findings, radiological findings, and peroperative ossicular necrosis were assessed using the Chi-square (χ^2) test. A 95% confidence interval (CI) was applied, and a p-value of <0.05 was considered statistically significant.

Results

A total of 120 patients with chronic otitis media (COM) were included in the study.

Table 1: Socio-Demographic and Baseline Characteristics of the Study Participants (n = 120)

Variable	Category	n (%)
Age Group (Years)	18–30	42 (35.0)
	31–40	34 (28.3)
	41–50	24 (20.0)
	>50	20 (16.7)
Gender	Male	68 (56.7)
	Female	52 (43.3)
Residence	Rural	76 (63.3)
	Urban	44 (36.7)
Side Involved	Right Ear	64 (53.3)
	Left Ear	56 (46.7)
Type of Chronic Otitis Media	Mucosal COM	78 (65.0)
	Squamosal COM	42 (35.0)
Duration of Disease	<5 Years	48 (40.0)
	5–10 Years	46 (38.3)
	>10 Years	26 (21.7)
Mean Age (Years)	Mean $\pm$ SD	34.8 $\pm$ 11.2

Table 1 show the majority of patients belonged to the 18–30 years age group (35.0%), followed by 31–40 years (28.3%), 41–50 years (20.0%), and above 50 years (16.7%). The mean age of the study population was 34.8 $\pm$ 11.2 years. Males constituted 56.7% of the participants, while females accounted for 43.3%. Most patients were from rural areas (63.3%), with urban residents comprising

36.7% of the sample. Right ear involvement was observed in 53.3% of cases, whereas left ear involvement was noted in 46.7%. Mucosal COM was more common, affecting 65.0% of patients, while squamosal COM was present in 35.0%. Regarding disease duration, 40.0% of patients had symptoms for less than 5 years, 38.3% for 5–10 years, and 21.7% for more than 10 years.

Table 2: Association Between Preoperative Pure Tone Audiometry (PTA) Findings and Peroperative Ossicular Necrosis in Patients with Mucosal Chronic Otitis Media (n = 78)

Degree of Hearing Loss (PTA)	Ossicular Necrosis Present n (%)	Ossicular Necrosis Absent n (%)	p value
Mild (26–40 dB)	4 (18.2)	18 (81.8)	<0.001*
Moderate (41–55 dB)	16 (48.5)	17 (51.5)	
Moderately Severe (56–70 dB)	12 (80.0)	3 (20.0)	
Severe (>70 dB)	7 (87.5)	1 (12.5)	
Total	39 (50.0)	39 (50.0)	

*Statistically significant association ($p < 0.05$).

Table 2 show that among patients with mild hearing loss, ossicular necrosis was observed in 18.2% of cases, whereas the prevalence increased progressively with increasing severity of hearing loss, reaching 48.5% in moderate, 80.0% in moderately severe, and 87.5% in severe hearing loss categories. Overall, ossicular necrosis was

present in 50.0% of patients with mucosal COM. Statistical analysis demonstrated a highly significant association between the degree of hearing loss and peroperative ossicular necrosis ($p < 0.001$), indicating that worsening hearing thresholds were strongly associated with increased ossicular damage.

Table 3: Association Between Preoperative Pure Tone Audiometry (PTA) Findings and Peroperative Ossicular Necrosis in Patients with Squamosal Chronic Otitis Media (n = 42)

Degree of Hearing Loss (PTA)	Ossicular Necrosis Present n (%)	Ossicular Necrosis Absent n (%)	p value
Mild (26–40 dB)	1 (25.0)	3 (75.0)	0.013*
Moderate (41–55 dB)	6 (50.0)	6 (50.0)	
Moderately Severe (56–70 dB)	12 (75.0)	4 (25.0)	
Severe (>70 dB)	9 (90.0)	1 (10.0)	
Total	28 (66.7)	14 (33.3)	

*Statistically significant association ($p < 0.05$).

Table 3 show the prevalence of ossicular necrosis increased with the severity of hearing loss.

Ossicular necrosis was identified in 25.0% of patients with mild hearing loss, 50.0% with

moderate hearing loss, 75.0% with moderately severe hearing loss, and 90.0% with severe hearing loss.

Overall, ossicular necrosis was observed in 66.7% of squamosal COM cases. The association between

PTA findings and peroperative ossicular necrosis was statistically significant ($p = 0.013$), suggesting that severe hearing impairment is a reliable indicator of ossicular destruction in squamosal disease.

Table 4: Association Between Mastoid Pneumatization on X-ray Mastoid (Schüller's View) and Peroperative Ossicular Necrosis in Patients with Mucosal Chronic Otitis Media (n = 78)

Mastoid Pneumatization	Ossicular Necrosis Present n (%)	Ossicular Necrosis Absent n (%)	P value
Well Pneumatized	5 (22.7)	17 (77.3)	0.002*
Diploic	12 (46.2)	14 (53.8)	
Sclerotic	22 (73.3)	8 (26.7)	
Total	39 (50.0)	39 (50.0)	

Table 4 presents the relationship between mastoid pneumatization on X-ray mastoid (Schüller's view) and peroperative ossicular necrosis in patients with mucosal COM.

Ossicular necrosis was present in only 22.7% of patients with well-pneumatized mastoids but increased to 46.2% among those with diploic

mastoids and 73.3% among patients with sclerotic mastoids.

A statistically significant association was observed between mastoid pneumatization and ossicular necrosis ($p = 0.002$). These findings indicate that reduced mastoid pneumatization is associated with a greater likelihood of ossicular erosion.

Table 5: Association Between Mastoid Pneumatization on X-ray Mastoid (Schüller's View) and Peroperative Ossicular Necrosis in Patients with Squamosal Chronic Otitis Media (n = 42)

Mastoid Pneumatization	Ossicular Necrosis Present n (%)	Ossicular Necrosis Absent n (%)	P value
Well Pneumatized	2 (33.3)	4 (66.7)	0.020*
Diploic	8 (61.5)	5 (38.5)	
Sclerotic	18 (78.3)	5 (21.7)	
Total	28 (66.7)	14 (33.3)	

Table 5 show that ossicular necrosis was found in 33.3% of patients with well-pneumatized mastoids, 61.5% of those with diploic mastoids, and 78.3% of those with sclerotic mastoids. The association between mastoid pneumatization and ossicular

necrosis was statistically significant ($p = 0.020$), suggesting that mastoid sclerosis may serve as a radiological marker of advanced middle ear disease and ossicular involvement.

Table 6: Association Between Preoperative HRCT Temporal Bone Findings and Peroperative Ossicular Necrosis in Patients with Mucosal Chronic Otitis Media (n = 78)

HRCT Temporal Bone Finding	Variables	Peroperative Ossicular Necrosis Present n (%)	Peroperative Ossicular Necrosis Absent n (%)	p-value
Incus Erosion	Present	24 (88.9)	3 (11.1)	<0.001*
	Absent	15 (29.4)	36 (70.6)	
Malleus Erosion	Present	10 (83.3)	2 (16.7)	0.001*
	Absent	29 (43.9)	37 (56.1)	
Stapes Erosion	Present	14 (87.5)	2 (12.5)	<0.001*
	Absent	25 (40.3)	37 (59.7)	

Table 6 demonstrate that among patients with HRCT evidence of incus erosion, 88.9% had confirmed ossicular necrosis intraoperatively, compared with only 29.4% of patients without radiological evidence of incus erosion. Similarly, HRCT-detected malleus erosion was associated with peroperative ossicular necrosis in 83.3% of cases, compared with 43.9% among those without malleus erosion. Stapes erosion on HRCT was

associated with intraoperative ossicular necrosis in 87.5% of patients, compared with 40.3% among patients without radiological stapes involvement. All three HRCT parameters demonstrated statistically significant associations with peroperative ossicular necrosis (incus erosion, $p < 0.001$; malleus erosion, $p = 0.001$; stapes erosion, $p < 0.001$), highlighting the diagnostic utility of HRCT in predicting ossicular pathology.

Table 7: Association Between Preoperative HRCT Temporal Bone Findings and Peroperative Ossicular Necrosis in Patients with Squamosal Chronic Otitis Media (n = 42)

HRCT Temporal Bone Finding	Variables	Peroperative Ossicular Necrosis Present n (%)	Peroperative Ossicular Necrosis Absent n (%)	p-value
Incus Erosion	Present	20 (90.9)	2 (9.1)	<0.001*
	Absent	8 (40.0)	12 (60.0)	
Malleus Erosion	Present	9 (90.0)	1 (10.0)	0.003*
	Absent	19 (59.4)	13 (40.6)	
Stapes Erosion	Present	12 (92.3)	1 (7.7)	0.001*
	Absent	16 (55.2)	13 (44.8)	

Abbreviations: COM = Chronic Otitis Media; PTA = Pure Tone Audiometry; HRCT = High-Resolution Computed Tomography; SD = Standard Deviation.* Statistically significant at $p < 0.05$.

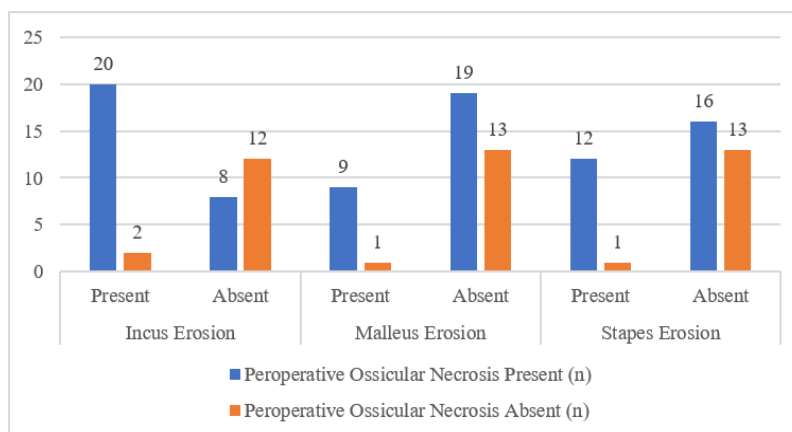
**Figure 1: Association Between Preoperative HRCT Temporal Bone Findings and Peroperative Ossicular Necrosis in Patients with Squamosal Chronic Otitis Media (n = 42)**

Table 7 and figure 1, show that HRCT findings also showed a strong correlation with intraoperative ossicular necrosis. Among patients with radiological evidence of incus erosion, 90.9% had peroperative ossicular necrosis, whereas only 40.0% of patients without incus erosion demonstrated ossicular involvement intraoperatively ($p < 0.001$). Similarly, malleus erosion detected on HRCT was associated with peroperative ossicular necrosis in 90.0% of cases compared with 59.4% among those without radiological malleus erosion ($p = 0.003$). Stapes erosion on HRCT corresponded to intraoperative ossicular necrosis in 92.3% of patients, significantly higher than the 55.2% observed among patients without stapes erosion ($p = 0.001$). These findings indicate that HRCT temporal bone is highly predictive of ossicular necrosis in squamosal COM and demonstrates excellent correlation with surgical findings.

Discussion

In the present study, the majority of patients belonged to the 18–30-year age group, with a mean age of 34.8 ± 11.2 years. Male patients predominated over females, and most participants were from rural areas. Mucosal COM constituted nearly two-thirds of cases, whereas squamosal COM accounted for approximately one-third. These findings are comparable to those reported by

Verma et al. (2024), who observed that COM predominantly affects young and middle-aged adults and remains more prevalent among rural populations because of socioeconomic factors, limited healthcare access, and recurrent upper respiratory tract infections.[9] Similar demographic trends were also reported by Khan et al. (2024), who noted a higher prevalence of chronic middle ear disease among younger adults and rural residents.[10]

The predominance of mucosal disease observed in the present study is consistent with the established epidemiological pattern of COM, where mucosal disease is more common than squamosal disease in patients presenting for elective ear surgery.[9]

The present study demonstrated a progressive increase in the prevalence of ossicular necrosis with increasing severity of conductive hearing loss in mucosal COM. Ossicular necrosis increased from 18.2% among patients with mild hearing loss to 87.5% among those with severe hearing loss. The association was highly significant ($p < 0.001$). These findings support the concept that increasing conductive hearing loss reflects progressive ossicular chain damage. Verma et al. (2024) reported that ossicular destruction was significantly associated with greater hearing impairment and that increasing air-bone gaps frequently corresponded to ossicular discontinuity identified

intraoperatively.[9] Similar observations were reported by Kumar et al. (2024), who demonstrated that severe conductive hearing loss was associated with advanced ossicular involvement and poorer middle ear status.[11]

Among patients with squamosal COM, the prevalence of ossicular necrosis increased from 25.0% in mild hearing loss to 90.0% in severe hearing loss. A statistically significant association was observed between hearing loss severity and ossicular necrosis ($p = 0.013$). Squamosal disease is characteristically associated with cholesteatoma and more aggressive bony destruction. Consequently, a stronger relationship between hearing impairment and ossicular erosion is expected. Verma et al. (2024) reported significantly higher rates of ossicular destruction in squamosal COM compared with mucosal disease, with the incus being the most frequently affected ossicle.[9] Similar findings have been documented in several surgical series where severe hearing loss was associated with extensive cholesteatomatous ossicular damage.[12]

The present study demonstrated a significant association between mastoid pneumatization and ossicular necrosis in mucosal COM. Ossicular necrosis was most frequent among patients with sclerotic mastoids and least common among those with well-pneumatized mastoids ($p = 0.002$). Reduced mastoid pneumatization is generally regarded as a marker of chronic middle ear inflammation and impaired middle ear ventilation. Azmat et al. (2025) demonstrated that chronic otitis media was significantly associated with reduced mastoid pneumatization and hypopneumatized mastoid air-cell systems.[13] Similarly, Khan et al. (2022) concluded that sclerotic mastoids are frequently associated with long-standing middle ear disease and poor middle ear aeration.[14]

In squamosal COM, ossicular necrosis was observed in 78.3% of patients with sclerotic mastoids compared with only 33.3% among those with well-pneumatized mastoids. The association was statistically significant ($p = 0.020$). These findings are consistent with previous studies demonstrating that poor mastoid pneumatization is associated with extensive cholesteatomatous disease and increased ossicular involvement. Azmat et al. (2025) reported that hypopneumatized mastoids were significantly more common in ears affected by chronic otitis media than in normal ears.[13] Likewise, Khan et al. (2024) found that mastoid sclerosis frequently coexisted with advanced middle ear pathology and retraction pocket disease.[10]

The present study demonstrated strong associations between HRCT-detected ossicular erosion and intraoperative ossicular necrosis in mucosal COM.

Patients with radiological evidence of incus, malleus, or stapes erosion showed significantly higher rates of confirmed ossicular necrosis during surgery. These findings are in agreement with recent studies evaluating the diagnostic performance of HRCT. Rajashekhar et al. (2025) reported high concordance between HRCT findings and operative findings for ossicular erosion and concluded that HRCT is highly reliable for preoperative assessment of ossicular integrity.8 Similar results were reported by Aljehani and Alhussini (2019), who observed excellent radiological-surgical correlation for ossicular abnormalities.[5] Among patients with squamosal COM, HRCT findings showed an even stronger correlation with intraoperative ossicular necrosis. More than 90% of patients with radiological evidence of incus, malleus, or stapes erosion demonstrated corresponding ossicular necrosis during surgery. These results are consistent with the findings of Rajashekhar et al. (2025), who reported high sensitivity and specificity of HRCT in identifying ossicular erosion in cholesteatomatous disease.[8] The higher predictive value observed in squamosal COM may be attributable to the greater extent of bony destruction associated with cholesteatoma. Previous investigators have similarly noted that HRCT is particularly effective in detecting ossicular chain involvement in squamosal disease because of the pronounced erosive changes produced by cholesteatoma.[12]

Limitations of the Study

- The study was conducted at a single tertiary care centre, which may limit the generalizability of the findings to other populations.
- The sample size, although adequate for statistical analysis, may not represent all clinical variations of chronic otitis media.
- HRCT findings were interpreted based on preoperative imaging and may be subject to inter-observer variability.
- Only ossicular necrosis was evaluated; other middle ear pathologies that may influence hearing outcomes were not analyzed separately.
- Long-term postoperative hearing outcomes and graft success rates were not assessed.
- The cross-sectional observational design limits the ability to establish causal relationships between preoperative findings and ossicular pathology.

Conclusion

The present study demonstrated a significant association between preoperative audiological and radiological findings and peroperative ossicular necrosis in patients with chronic otitis media.

Increasing severity of hearing loss on Pure Tone Audiometry was significantly associated with a higher prevalence of ossicular necrosis in both mucosal and squamosal chronic otitis media. Reduced mastoid pneumatization, particularly sclerotic mastoids, showed a significant correlation with ossicular destruction. HRCT temporal bone findings, including incus, malleus, and stapes erosion, exhibited strong agreement with intraoperative findings and were highly predictive of ossicular necrosis. Among the evaluated parameters, HRCT temporal bone proved to be the most reliable preoperative tool for assessing ossicular chain status. These findings emphasize the importance of comprehensive preoperative audiological and radiological evaluation for accurate surgical planning and improved management of patients with chronic otitis media.

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