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## OSSICULAR CHAIN EROSION IN CHRONIC OTITIS MEDIA WITH CHOLESTEATOMA IN TERTIARY CARE HOSPITAL IN NEPAL

### ABSTRACT

#### Introduction:

Ossicular erosion is the common finding in chronic otitis media with cholesteatoma leading to hearing impairment.

#### Objective:

To evaluate the ossicular chain erosion in chronic otitis media patients with cholesteatoma.

#### Materials and Method:

Ossicular chain status of 140 patients who underwent surgery for chronic otitis media with cholesteatoma were evaluated retrospectively and ossicular findings were recorded.

#### Results:

Ossicular chain erosion was found in 134 (95.7%). Incus was the most commonly involved ossicle; partially necrosed in 85(60.7%) and absent in 44 (31.4%) cases. Lenticular process and long process being most frequent site of incus eroded in 72 (51.4%) and 71 (50.6%) cases respectively. Stapes suprastructure was absent in 41 (29.3%) and stapes was totally absent in 1 ( 0.7%) cases. Malleus was most resistant ossicles, partially necrosed in 34 (24.3%) and absent in 6 (4.3) cases.

#### Conclusion:

Ossicular erosion is a frequent finding in chronic otitis media with cholesteatoma. Incus is the most commonly involved ossicle, while malleus is most resistant to erosion.

**Keywords:** Cholesteatoma, Chronic Otitis Media, Ossicular erosion

## INTRODUCTION

Chronic otitis media (COM) is characterized chronic inflammatory changes of the mucoperiosteal lining of the middle ear cleft. It can be categorized into COM with and without cholesteatoma. Both types of chronic otitis media can cause erosion of ossicles.<sup>1</sup>

The pathophysiology of ossicular chain erosion is thought to be multifactorial resulting from combination of ostitis, pressure necrosis and enzyme mediated lysis.<sup>2-6</sup> The proposed mechanism for bony erosion is chronic inflammation of middle ear due to overproduction of cytokines - tumor necrosis factor (TNF) alpha, interleukin-2, fibroblast growth factor and platelet derived growth factor which promote hypervascularization, osteoclast activation and bone resorption causing ossicular erosion. TNF-

alpha also promotes neovascularization and hence granulation tissue formation.<sup>7</sup>

The incus is most frequently affected by bony erosion followed by stapes and malleus.<sup>8</sup> Multiple ossicles involvement is more common than single ossicular erosion. Destruction of ossicular chain leads to failure of middle ear mechanics and results in substantial conductive hearing loss.<sup>9</sup> The status of ossicular chain helps us to select the type of intervention and to determine the prognosis.<sup>10</sup> In this study, we aim to describe the ossicular chain defects in chronic otitis media with cholesteatoma.

## MATERIALS AND METHODS

This was a retrospective study carried out in the department of ENT -Head Neck Surgery, Tribhuvan University Teaching Hospital. Post-operative chart

of 140 patients of any age groups were done who underwent surgery for chronic otitis media with cholesteatoma between January 2012 and January 2016 was reviewed. Patients with history of previous ear surgery and malignancy were excluded. Condition of ossicular chain and site of erosion of each ossicle was studied. Data was analyzed using SPSS -18 software and results were expressed in percentage and numbers.

**RESULTS**

Out of 140 patients included in study, 94 (67.1%) were male and 46 (32.9%) were female (Table 1) and median age group was 20-40 years (45.7%) (Table 2).

**Table 1. Gender distribution (n=140)**

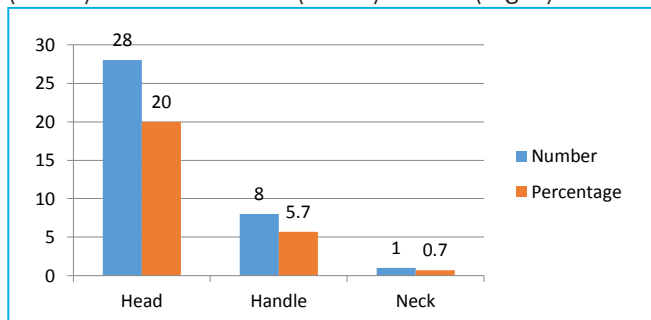
Gender	Number	Percentage (%)
Male	94	67.1
Female	46	32.9

**Table 2. Age distribution (n=140)**

Age group	≤10 years	11-20 years	21-40 years	41-60 years
Number	25	41	64	10
Percentage (%)	17.9	29.3	45.7	7.1

Among 140 patients, 4 patients had complications due to cholesteatoma preoperatively. Mastoid fistula, Bezold’s abscess, subdural abscess and grade II facial nerve palsy were the complications noted in 4 patients.

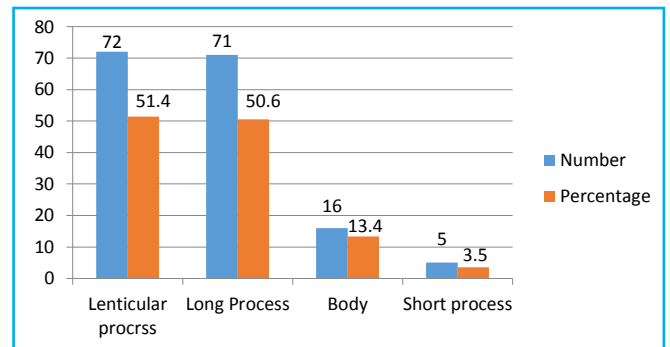
Malleus was intact in 100 (71.4%) cases, partially necrosed in 34 (24.3%) and absent in 6 (4.3) cases. Malleus head alone was found to be eroded in 25 (17.9%) cases. Malleus handle alone was eroded in 6 (4.3%) cases, both head and neck in 1 (0.7%) and head and handle in 2 (1.4%) cases. In malleus, most commonly involved part was head in 28 (20%) followed by handle in 8 (5.7%) and neck in 1 (0.7%) cases (Fig. I).



**Fig. I: Parts of Malleus involved in erosion**

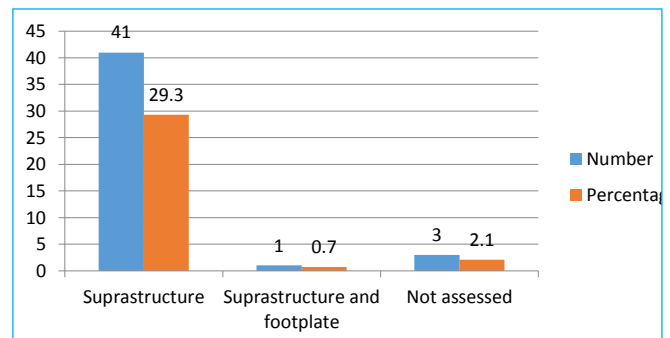
Incus was intact in 11 (7.9%) cases, partially

necrosed in 85 (60.7%) and absent in 44 (31.4%) cases. Among partially necrosed incus, commonest was long and lenticular process involvement in 56 (40%) cases. Incus body with long and lenticular process was involved in 9 (6.4%) cases. Incus body and long process were eroded in 3 (2.1%) and body and short process in 2 (1.4%). Only lenticular process was eroded in 7 (5%), body in 2 (1.4%), long process in 3 (2.1%) and short process in 3 (2.1%) cases. Overall most commonly eroded part was lenticular process in 72 (51.4%) cases followed by Long process in 71 (50.6%), incus body in 16 (13.4%) and short process in 5 (3.5%) (Fig.II).



**Fig. II: Part of the Incus eroded by the disease**

Stapes was intact in 95 (67.9%) cases, stapes suprastructure absent in 41 (29.3%) and stapes was totally absent in 1 (0.7%) case. In 3 (2.1%) cases stapes couldn’t be assessed properly due to granulation tissue (Fig.III).



**Fig. III: Part of the Stapes eroded by the disease**

Among ossicles in overall, malleus was eroded in 40 (28.6%) cases, incus in 129 (92.1%) and stapes in 42 (30%) cases (Fig. IV). Intact ossicular chain without erosion of any ossicle was present in 6 (4.3%) cases.

**DISCUSSION**

Ossicular chain erosion is the frequent finding in cholesteoma. Destruction of ossicular chain leads to impairment in sound conduction mechanism and hearing loss. So it is important to identify

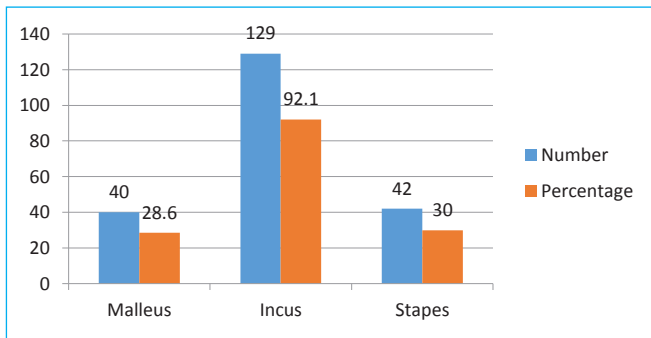


Fig. IV: Ossicular involvement in erosion

ossicular lesion during surgery for reconstruction of sound conductive mechanism.

Malleus was the most resistant ossicle in our study showing erosion in 40 (28.6%) cases and malleus head is most commonly eroded (17.9%) part of malleus. In a study from eastern part of Nepal, Thakur et al<sup>11</sup> showed malleus defect in 28.9% cases. Albera et al<sup>12</sup> in a study of 140 patients with cholesteatoma found malleus partial erosion in 13% and absent in 7% cases with head being most commonly eroded in 10% cases. Mohammadi et al<sup>13</sup> in a retrospective study of 166 patients showed erosion in 22.3% and total loss in 21.7%.

In our study, incus was most susceptible to bony erosion, partially necrosed in 85 (60.7%) and absent in 44 (31.4%) cases. Lenticular process in (51.4%) and Long process (50.6%) were most commonly eroded part of incus. In a similar study by Thakur et al<sup>11</sup> (n=52), incus was found eroded in 67.3% and absent in 21.2%. Long and lenticular process was commonly involved part (67.3%). Albera et al<sup>12</sup> also showed incus erosion in 49% and absent in 31% while long process was eroded in 45% cases. Mohammadi et al<sup>13</sup> also found incus eroded in 30.7% while absent in 55.4%. Varshney et al<sup>14</sup> in a prospective study with 150 patients in which 60 patients had unsafe chronic otitis media, found incus partially eroded in 45% and absent in 40% cases. Long and lenticular process were necrosed in 35% cases.

In this study, Stapes was intact in 95 (67.9%) cases, stapes suprastructure absent in 41 (29.3%) and footplate was also absent in 1 (0.7%) cases. However, in 3 cases stapes couldn't be properly assessed due to granulation tissue. Albera et al reported stapes intact in 71% and erosion of crura in 29% cases. Thakur et al reported stapes intact in 51.92% and suprastructure erosion in 48.08%. Mohammadi et al found stapes intact in 59% and suprastructure eroded in 41% cases.

## CONCLUSION

In this study, we found that ossicular erosion is a frequent finding in chronic otitis media with cholesteatoma. Incus is the most commonly involved ossicle while malleus is most resistant to erosion.

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