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Original research article

HRCT findings of ossicles in patients with CSOM

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Abstract

A slender anterior ligament arises from the anterior process to insert into the petrotympanic fissure. The handle runs downwards, medially and slightly backwards between the mucosal and fibrous layers of the tympanic membrane. While it is very closely attached to the membrane at its lower end, there is a fine web of mucosa separating the membrane from the handle in the upper portion before it becomes adherent again at the lateral process. Intra operative findings of middle ear cleft in such patients was noted and compared with the pre-operative HRCT TEMPORAL BONE scan findings. Ossicular chain erosions of malleus, incus and stapes were identified with 88%, 81.7% and 69.2% sensitivity respectively.

Keywords: HRCT, ossicles, CSOM.

Introduction

The malleus is the largest of the three ossicles, measuring up to 9mm in length. It comprises a head, neck and handle or manubrium. The head lies in the epitympanum and is suspended by the superior ligament, which runs upward to the tegmen tympani. The head of the malleus has a saddle-shaped facet on its posteromedial surface to articulate with the body of the incus by way of a synovial joint [1]. Below the neck of the malleus, the bone broadens and gives rise to the lateral process, the anterior process and the handle. The lateral process is a prominent landmark on the tympanic membrane and receives the anterior and posterior malleolar folds from the tympanic annulus. The chorda tympani crosses the upper part of the malleus handle on its medial surface above the insertion of the tendon of tensor tympani, but below the neck of the malleus itself. The neck of the malleus connects the handle with the head and amputation of the head by cutting through the neck leaves chorda tympani and tensor tympani intact [2].

A slender anterior ligament arises from the anterior process to insert into the petrotympanic fissure. The handle runs downwards, medially and slightly backwards between the mucosal and fibrous layers of the tympanic membrane [3]. While it is very closely attached to the membrane at its lower end, there is a fine web of mucosa separating the membrane from the handle in the upper portion before it becomes adherent again at the lateral process. This can be opened surgically to create a slit without perforating the membrane to allow a prosthesis to be crimped around the malleus handle in certain types of ossicular reconstruction. On the deep, medial surface of the handle, near its upper end, is a small projection into which the tendon of the tensor tympani muscle inserts [4, 5].

The incus articulates with the malleus and has a body and two processes. The body lies in the epitympanum and has a cartilage-covered facet corresponding to that on the malleus. The body of the incus is suspended by the superior incudal ligament that is attached to the tegmen tympani.

The short process projects backwards from the body to lie in the fossa incudes to which it is attached by a short suspensory ligament. The long process descends into the meso tympanum behind and medial to the handle of the malleus, and at its tip is a small medially directed lenticular process [6]. This has sometimes been called the fourth ossicle because of its incomplete fusion with the tip of the long process, thereby giving the appearance of a separate bone or at least a sesamoid bone. The lenticular process articulates with head of the stapes.

The stapes is shaped like a stirrup and consists of a head, neck, the anterior and posterior crura and a footplate. The head points laterally and has a small cartilage-covered depression for a synovial articulation with the lenticular process of the incus [7]. The stapedius tendon inserts into the posterior part of the neck and upper portion of the posterior crus. The two crurae arise from the broader lower part of

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the neck and the anterior crus is thinner and less curved than the posterior one. The two crura join the footplate, which usually has a convex superior margin, and almost straight inferior margin and curved anterior and posterior ends.
The average dimensions of the footplate ~3 mm long and 1.4 mm wide, and it lies in the oval window where it is attached to the bony margins by the annular ligament. The long axis of the footplate is almost horizontal, with the posterior end being slightly lower than the anterior.
There is great variation in the shape of the two crura [8].

Methodology

Source of data

CSOM patients presenting to hospital which is a tertiary care centre and who are undergoing ear surgery.

Methods of collection of data

- CSOM patients who are planned for surgical management underwent HRCT temoral bone scan before surgery.
- Intra operative findings of middle ear cleft in such patients was noted and compared with the pre-operative HRCT temporal bone scan findings.

Design of study: Cross sectional comparative study.

Sample size: 180 patients.

Inclusion criteria

CSOM patients above 10 years who are undergoing ear surgery.

Exclusion criteria

- Patients with revision surgery.
- Patients with congenital anomalies of temporal bone.
- Patients with other temporal bone diseases.

Results and Discussion

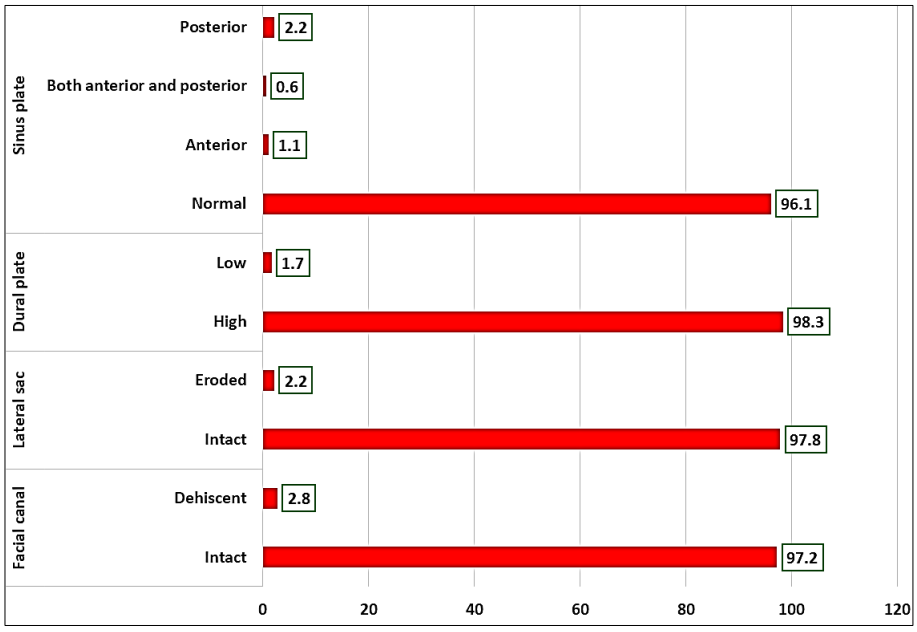

Fig 1: HRCT temporal bone scan findings

Table 1: HRCT findings of ossicles

Malleus		
Intact	118	65.6
Eroded	62	34.4
Incus		
Intact	120	66.7
Eroded	60	33.3
Stapes		
Intact	131	72.8

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Eroded	49	27.2

Conclusion

Ossicular chain erosions of malleus, incus and stapes were identified with 88%, 81.7% and 69.2% sensitivity respectively.

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