

## Comparative Evaluation between Preoperative HRCT Temporal Bone findings and Intraoperative findings in Mastoid Surgeries.

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### Abstract

**Objective:** To study the correlation of intra operative findings of chronic suppurative otitis media (atticoantral type) with high resolution computerized tomography.

**Materials and methods:** This study was conducted in E.N.T Department of S.C.L. Hospital, Ahmedabad, NHL Municipal Medical College from July 2018 to December 2020. Total 67 cases with chronic suppurative otitis media (Atticoantral type) were included in this study. The HRCT images were studied in comparison with the intra operative findings.

**Results:** Total 67 cases were included in this study. The age range was 5 to 60 years. As a result of the comparison between Preoperative HRCT temporal bone findings and Intra operative findings in mastoid surgeries, Incus appeared eroded on HRCT Scan in 60 cases & 62 cases intra operatively, malleus appeared eroded on HRCT scan in 54 cases & 60 cases intra operatively, stapes appeared eroded on HRCT scan in 50 cases & 55 cases intraoperatively.

**Conclusion:** In this study, 67 patients on intraoperative findings revealed cholesteatoma while in HRCT temporal bone findings 60 patients revealed cholesteatoma. Thus, there was good correlation between preoperative HRCT temporal bone findings and intra operative findings in diagnosing cholesteatoma. HRCT temporal bone very successfully predicts the extent of disease and ossicular erosion.

**Keywords:** High resolution computed tomography temporal bone, Cholesteatoma.

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### Introduction

It is a condition in which there is a chronic infection of middle ear cleft, which can cause severe destruction of middle ear and

mastoid, leading to various sequelae. [1-6] Chronic suppurative otitis media (atticoantral type) can be associated with lots of complications, since temporal bone

is surrounded by many vital structures (Internal carotid artery, Jugular bulb, Facial nerve etc) and its gross anatomical variation of landmarks makes the surgery difficult at times [9]. HRCT has the advantage of excellent topographic visualization devoid of artifacts from superimposition of structures [7,8]. The intent of this study is to evaluate the accuracy and the usefulness of this imaging modality in our patients undergoing surgery for chronic suppurative otitis media (atticoantral type). This study assesses the usefulness of a preoperative high resolution CT scan in depicting the status of the middle ear structures in the presence of chronic suppurative otitis media (atticoantral type). The advent of high resolution CT scans (HRCT) has brought about significant enhancement in the preoperative assessment of the temporal bone pathology and fine anatomical details. HRCT temporal bone was performed at the radiology department prior to surgery. [10] This study will be conducted to compare preoperative HRCT temporal bone findings and intra operative findings in mastoid surgeries. [11]

#### **Materials and Methods:**

This study was conducted in department of ENT, S.C.L General Hospital, Ahmedabad during the period of July 2018 to December 2020 after obtaining ethical committee clearance and by taking written informed consent. The margin of imaging was taken from external auditory meatus up to bony margin superior semicircular canal and HRCT was evaluated by radiologist. HRCT comprises the use of thin collimation, a high spatial frequency algorithm, smallest practical FOV (15 to 20 cm) and a large reconstruction matrix (512x512). A proforma was prepared, clinical findings, investigations, treatment and results were charted. After detailed history taking, proper clinical examination

was done. All patients underwent audiological and radiological investigation like Pure tone audiometry, X-ray B/L mastoid and HRCT temporal bone. 67 patients were selected according to inclusion criteria in study subject to preoperative HRCT temporal bone and then underwent for mastoid surgeries.

#### **Inclusion criteria:**

1. Patients between 5-60 years of age with history of chronic ear discharge and decreased hearing.
2. Cholesteatoma detected by otoscopy.
3. History of scanty, purulent, blood-stained, foul-smelling discharge.
4. Patients who are giving informed consent.
5. In Paediatric patients, Parents/ Guardian's consent is taken.

#### **Exclusion Criteria:**

1. Congenital anomaly
2. Tubotympanic type of CSOM.
3. Patients who are not willing to give informed consent.

#### **Statistical Analysis:**

The diagnostic efficacy of HRCT temporal bone was evaluated in terms of sensitivity, specificity, and predicative values. P-value less than 0.05 indicated statistically significant association.

#### **Results:**

A total of 67 patients were included in the final analysis in which 32 (48%) were male patients and 35 (52%) were female patients. There was no specific age criterion for patients selection. In this study, the youngest patient was 5 years of age and oldest was 60 years of age. Maximum no. of patients belong to 11-20 age group.

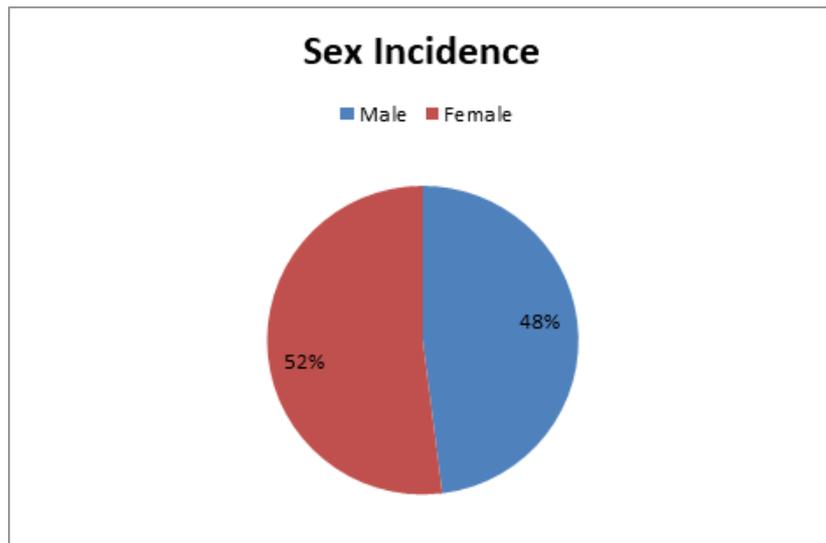


Figure 1: Sex Incidence

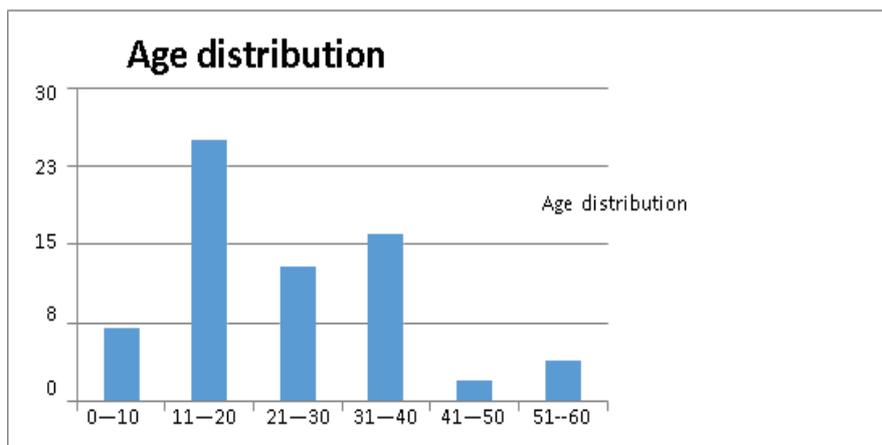


Figure 2: Age Distribution

**XRAY BILATERAL MASTOID:**

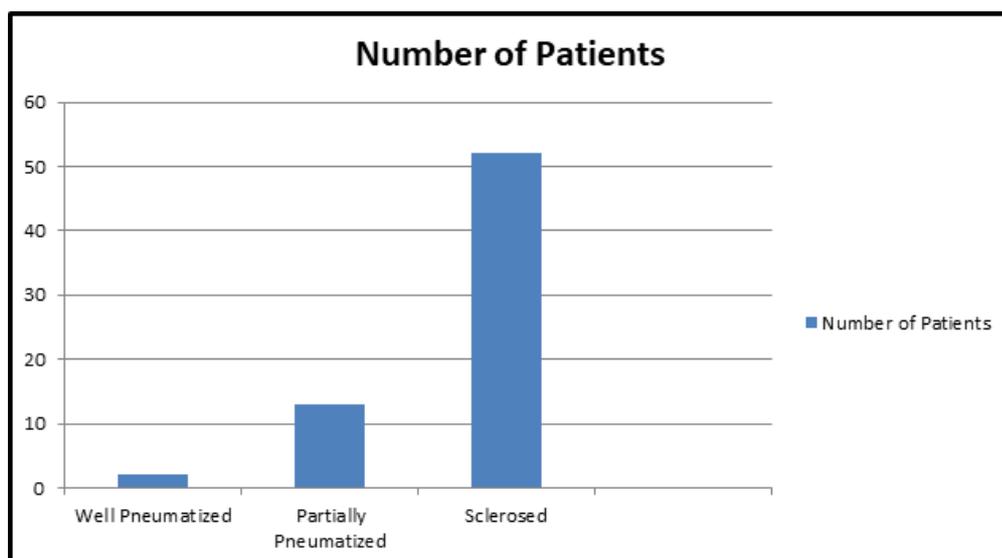


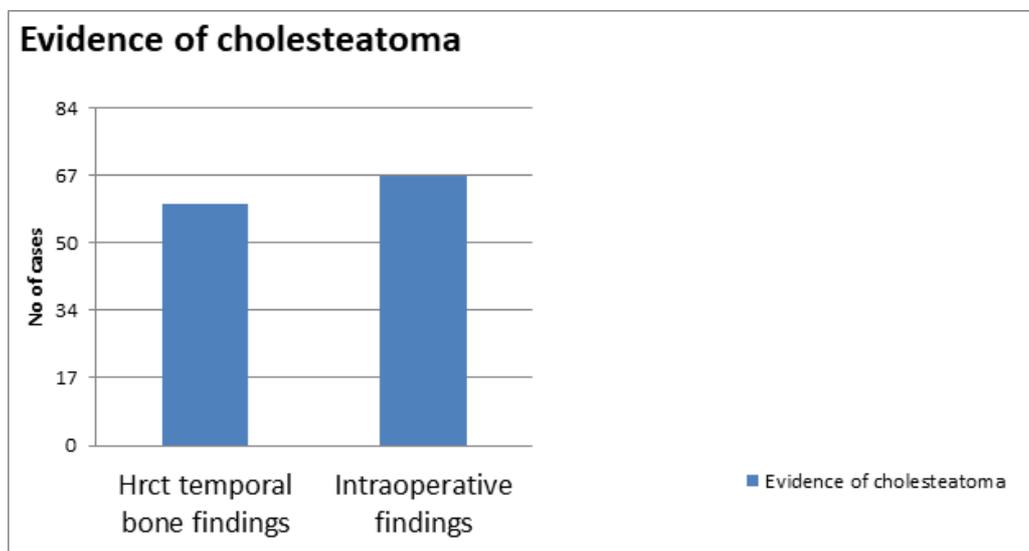
Figure 3: Status of Mastoid

STATUS OF MASTOID	NUMBER OF PATIENTS
Well pneumatized	2
Partially pneumatized	13
sclerosed	52

**Correlation of HRCT findings with Surgical findings.**

**Table 1: Ossicular Status (Total Number of patients -67)**

Ossicular Erosion	Hrct temporal bone findings	Intra operative findings	Sensitivity (%)	Specificity (%)	Positive Predicative value
Malleus erosion	54	60	90%	100%	100%
Incus erosion	60	62	97%	100%	100%
Stapes erosion	50	55	91%	100%	100%



**Figure 4: Evidence of Cholesteatoma. (Total patients-67)**

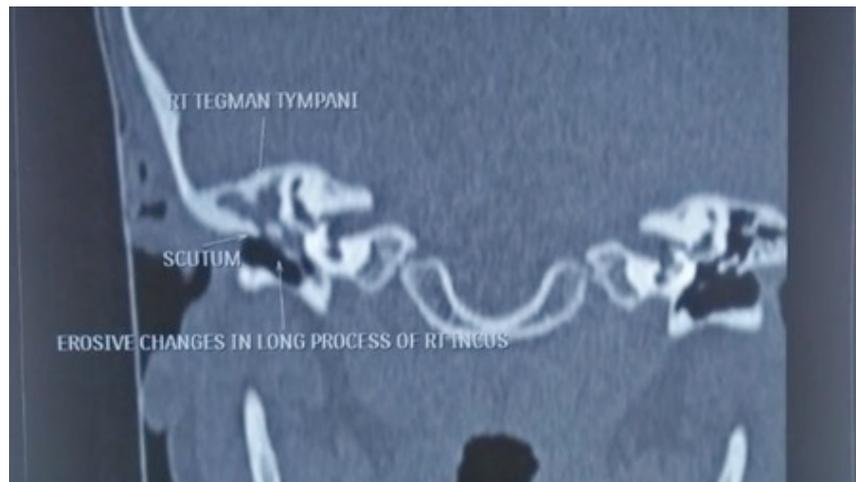
In our study, 67 cases showed evidence of cholesteatoma on surgical exploration & 60 cases showed evidence of cholesteatoma on preoperative HRCT scan.

**Discussion**

In this study a total number of 67 patients were randomly selected for the study.

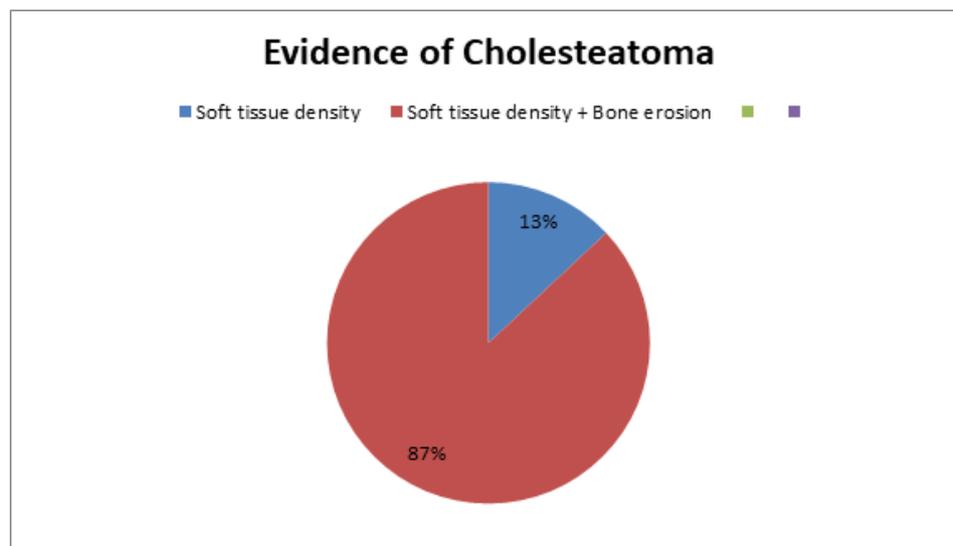
Table-1 shows that based on our observations the most common eroded ossicle was the incus. Incus erosion could be visualized by HRCT in 60 cases & 62 cases intra operatively, malleus erosion could be visualised by HRCT in 54 cases & 60 intra operatively, stapes erosion could be visualised by HRCT in 50 cases & 55 cases

intra operatively. In case of Incus there were 2 false negative cases giving sensitivity of 97%, specificity of 100%, positive predicative value of 100%. In case of Malleus there were 6 false negative cases giving sensitivity of 90%, specificity of 100%, positive predicative value 100%, In case of stapes, there were 5 false negative cases giving sensitivity of 91%, specificity of 100%, positive predicative value 100%. The value of Z test is 2.87 with P value 0.01 at significance level 0.05. It indicate that evidence of CT scan & surgical for diagnosis of cholesteatoma are statistically significant with p value less than 0.05. HRCT has 89.55% sensitivity in detecting cholesteatoma.



**Figure 5: High Resolution Coronal Ct Scan Shows Erosive Destruction of Right Incus.**

Most of the patients (57%) had conductive hearing loss. Only 1 patient had sensorineural hearing loss. These results are comparable to the studies done by glasscocketal.



**Figure 6: Pre-Operative Hrct Findings**

The advent of high resolution CT scans (HRCT) has brought about significant enhancement in the preoperative assessment of the temporal bone pathology and fine anatomical details.

### Conclusion

In this study, correlation between pre operative HRCT temporal bone findings and intra operative findings were analysed. It was observed from data that there is strong association between preoperative HRCT temporal bone and intra operative findings. In this study, 67 patients on

intraoperative findings revealed cholesteatoma while in HRCT temporal bone findings 60 patients revealed cholesteatoma. Thus there was good correlation between preoperative HRCT temporal bone findings and intra operative findings in diagnosing cholesteatoma.

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