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# Role of HRCT in Evaluation of Chronic Suppurative Otitis Media

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***Abstract – In these study 45 clinically diagnosed patients irrespective of age and sex were evaluated in order to determine the role of pre-operative CT scans in chronic otitis media***

***Aim and objective: The aim of this study is to evaluate the usefulness of high-resolution CT scan in depicting the status of the middle ear and surrounding structures in patients suffering from chronic suppurative otitis media and Study the radiological spectrum of chronic suppurative otitis media along with its complication.***

***Result and Conclusion: The HRCT findings showed a high level sensitivity as regards to the presence of cholesteatoma, changes of the ossicular chain, mastoid involvement and erosion of the lateral semicircular canal***

***Keywords: High Resolution Computed Tomography, Cholesteatoma, chronic Otitis Media, Scutum, Ossicular chain***

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## INTRODUCTION

Chronic Otitis Media (COM) is the term used to describe any chronic inflammatory pathology of the middle ear. The relatively poor standards of living in developing countries lead to a higher incidence of COM. Chronic otitis media has been an important cause of middle ear disease since prehistoric times. Despite the valuable contribution of antibiotics, COM remains a common disease and its complications are challenging for both otologists and radiologists.

Cholesteatoma is a non-malignant destructive lesion of the middle ear cleft who's short and long term sequelae may be devastating, the reason being the strategic location of the tympanomastoid compartment, separated from the middle and posterior cranial fossa by very thin bony partitions.

Squamous type COM has the potential for intracranial and extracranial extension. Hence, it becomes very important to know the location and extent of the disease before proceeding to surgical treatment.

Radiological examination of the temporal bone helps us to achieve this objective. It is the computed tomography (CT) which has made the most important contribution to radiology in otolaryngology. Though otitis media is essentially a clinical diagnosis but high resolution computed tomography (HRCT) is useful for showing evidence of bony erosion in acute and chronic mastoiditis, extent of pneumatization of the temporal bone and relationship of the pathology to adjacent critical neurovascular structures such as the dura, internal carotid artery, lateral sinus and facial nerve1. It is now being claimed that a cholesteatoma, as small as 3mm in size can be diagnosed much earlier by the use of HRCT and also for a cholesteatoma behind an intact eardrum, imaging is important. The main benefit of HRCT comes in cases where the cholesteatomas were combined with scarring granulation tissue or post-surgical changes in which the resulting soft tissue masses were indistinguishable. One set of conditions in which the indication of pre-operative scanning is quite clear when there are central nervous system complications of COM.

## METHOD AND MATERIAL

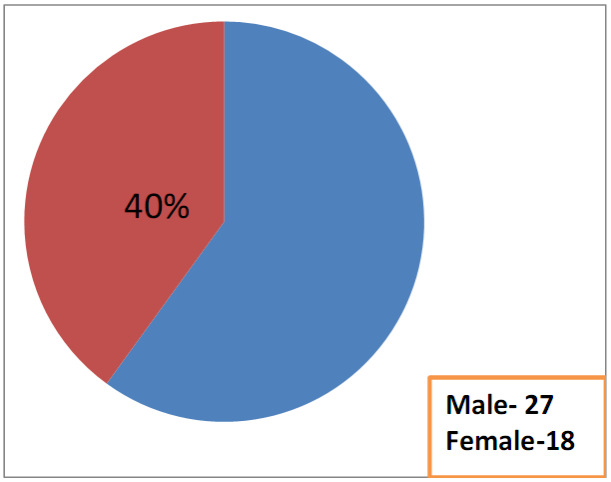
The study was conducted in 45 patients who presented in AVBRH HOSPITAL, SAWANGI (MAHARASHTRA) and clinically diagnosed as CSOM. The period of study was one year from 2016 september to 2017 july. Ethical committee clearance was obtained initially. In each patient, history was elicited; physical examination and investigation were carried out and recorded in a proforma.

## RESEARCH METHODOLOGY:-

Patients with symptoms of suppurative otitis media irrespective of age, sex and duration of history subjected to HRCT. Scans were done using 16 slice PHILIPS (brilliance) Tomoscan. Scan was performed in axial and coronal planes. Parameters applied included 768 matrix, 200 field of view,0.7 mm thick section, 120 kV and 300 mAs/slice.

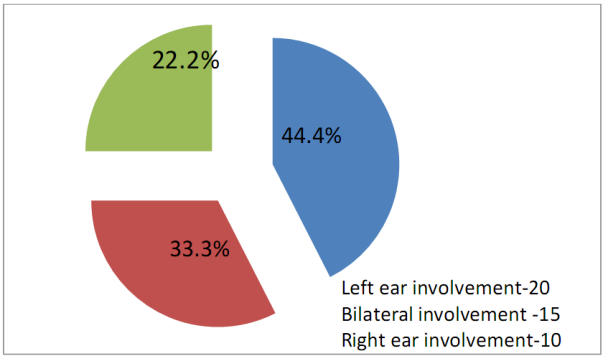
## RESULT:

In the present study, 45 cases of CSOM Unsafe ear were included. Of the 45 patients, 18 (40%) were females and 27(60%) males. The male to female ratio was 1.5.




10 patients (22.2%) were in the pediatric age group (<14years), 8 (17.8%) were adolescents (14 – 25 years) and 27 (60%) were adults (> 25 years). The ages ranged from 6 to 67 years with mean age of 29.6 years.

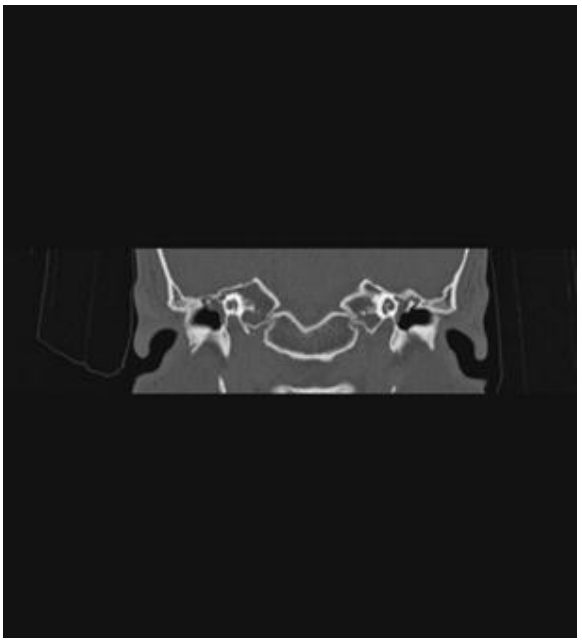
Bilateral ear involvement is seen in 15 patients (33.3%), left ear involvement was seen in 20(44.4%) and right ear involvement in 10 patient (22.2%).

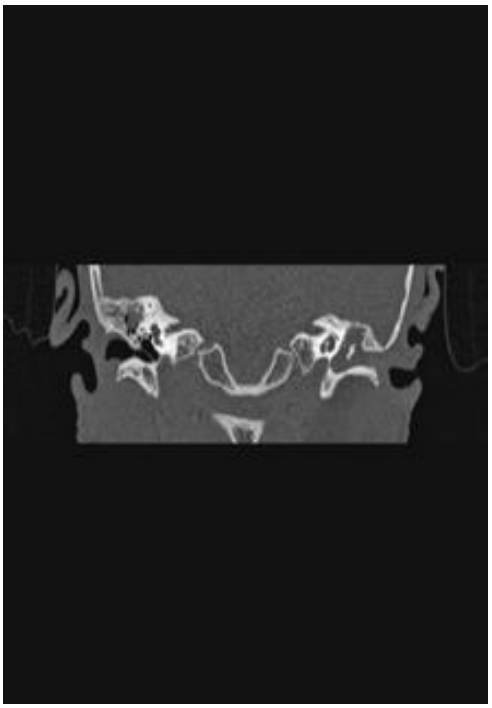


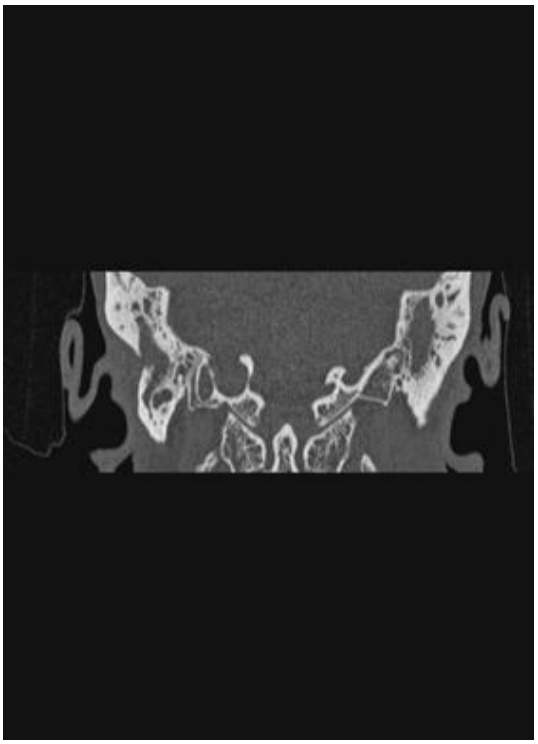

Complete erosion of ossicular chain was seen in 15pateints (33.3%), partial erosion seen in 13 patients (28.8%) and intact chain was seen in 17 pateints. Scutum erosion seen in 40 patients (88.8%). Loss of pneumatisation with Mastoid collection in 22 patients, mastoid sclerosis in 18patients and mastoid wall erosion seen in 5 patients. Cholesteatoma was identified in HRCT scan in 20 patients.

| FINDINGS | NO of patients |
|---|---|
| DURAL/SINUS PLATE EROSION | 2 |
| FACIAL CANAL EROSION | 8 |
| POST AURICULAR ABSCESS | 3 |
| EROSION OF SEMICIRCULAR CANAL | 2 |

Most common complication was erosion of tympanic part of facial canal which was seen in 8 patients. Two patients who were previously diagnosed with CSOM presented with severe headache and loss of consciousness, on HRCT sinus plate erosion with dural venous sinus thrombosis was detected which was confirmed on MRI.







**DISCUSSION:**

The purpose of this study is to evaluate HRCT's role in CSOM. The major role of HRCT scans in CSOM is to detect the middle ear structures condition as well as to know the extent of disease. CT scans can help otologist by providing a lot of information. The condition of the ossicles (mainly the malleus and incus) can be very well depicted by CT scans however erosion of the stapes is not well demonstrated by CT(especially in the presence of

soft tissue).The malleus-incus complex is clearly seen in both axial and coronal and erosion can be very well demonstrated with high sensitivity and specificity. When evaluating the sensitivity and specificity toward erosion of the facial nerve canal, a study by Yu et al. (2011) dedicated to studying the facial nerve canal found favorable results.

The extension of soft tissue can be detected by HRCT which help the surgeon to plan further management and decreases the risk of recurrent disease (such as in the case of cholesteatoma).Examination of the tegmen tympani and dural height can also detect complication thus change otologist surgical method and plan. The surgeon may plan mastoidectomy depending on that information. Therefore, it is always useful to get the information on hand before surgery. When looking at the recent studies, there is an increase in number of physicians who routinely advice pre-operative CT scans.

In summary, CT in the case of CSOM and before the determination of any complications provides valuable information. CT imaging can provide the physician information regarding the extent of disease and complication and can be further helpful in planning management. In the end, there is need of more studies that should be conducted to provide the full extent of both the benefits and drawbacks of HRCT.

## CONCLUSION

HRCT was helpful in determining the anatomy of the middle ear and mastoid, and accurately predicted the extent of the disease process of CSOM. Its use by otologists is encouraged, especially in patients who have or are suspected of having complications. HRCT is useful as an adjunct to better preoperative assessment, and thus the surgical outcome. Its accuracy is likely to improve with larger studies and better experience, wherein its routine use may become justifiable.

Overall, the results of the present study showed HRCT temporal bone is an efficacious modality for accurate delineation of the anatomy and pathological involvement of temporal bone. We can hence conclude HRCT is useful for diagnosis, surgical planning of temporal bone pathologies.

HRCT is an important armamentarium for the Otorhinolaryngology's for the diagnosis and management of cholesteatoma. With its high sensitivity and extreme specificity, HRCT can pinpoint the damage to the middle ear structures with extreme precision and high accuracy. HRCT also alerts the surgeon about the complications and warrants an immediate intervention. This gives a scanner view for planning surgery and guides the surgeon with necessary precaution to prevent per operative complications. Even though not foolproof, HRCT remains the gold standard investigation for handling CSOM Unsafe ear."

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