

RADIOLOGICAL STUDY OF TEMPORAL BONE IN CHRONIC SUPPURATIVE OTITIS MEDIA AND CORRELATION WITH CLINICAL AND SURGICAL FINDINGS

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ABSTRACT

Chronic suppurative otitis media is persistent inflammation of the middle ear cleft which includes middle ear, attic, aditus, antrum, mastoid air cells & Eustachian tube.¹ The various modalities of temporal bone imaging are X-Ray mastoid schuller's view, CT scan and MRI. The aims & objectives of our study is to study the extent of the disease in the middle ear & mastoid cavity on X-ray & HRCT. Correlation with clinical & surgical findings were done. Patients clinically diagnosed as a case of chronic suppurative otitis media from age group of 4 to 60 years were selected for study. Xray mastoid schuller's view both sides & HRCT Temporal bone were done in all patients. Patients were then posted for surgery, peroperative findings were noted & correlation was done between clinical, radiological & surgical findings. 100 patients have been studied in this study. Out of which 59 were in CSOM (AAD) group & 41 were in CSOM (TTD) group. On HRCT the most common finding was erosion of handle of malleus followed by incus & soft tissue density in mastoid air cells in both types of CSOM. Peroperatively majority of patients had erosion of incus followed by handle of malleus & soft tissue density in mastoid air cells in both the groups. The present study indicates that there is good correlation between xrays & operative findings in CSOM but it fails to detect the exact extent of the disease. The study also indicates that there is excellent correlation between HRCT temporal bone & operative findings in CSOM. HRCT gives us a preoperative picture of the extent of disease & helps surgeon in planning the surgical approach.

KEY WORDS

CSOM, HRCT.

INTRODUCTION

Chronic suppurative otitis media is persistent inflammation of the middle ear cleft which includes middle ear, attic, aditus, antrum, mastoid air cells & Eustachian tube. Chronic suppurative otitis media is divided into two main clinical types: Tubotympanic (safe or benign or mucosal) & Atticoantral (unsafe or dangerous or squamosal).¹ The various modalities of temporal bone imaging are X-Ray mastoid schuller's view, CT scan and MRI. Radiology is useful for showing evidence of bony erosion in acute and chronic mastoiditis, extent 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 nerve. The advent of high resolution computed tomography (HRCT) has significantly

altered the contribution of radiological imaging in pre operative diagnosis of cholesteatoma of middle ear cleft. In our study we studied the extent of disease in middle ear & mastoid cavity with the help of xray mastoid schuller's view & HRCT & try to correlate the preoperative radiological findings with intraoperative findings so as to offer better treatment to the patient.

AIMS & OBJECTIVES

To study the radiological finding of temporal bone in chronic suppurative otitis media using X-ray mastoid schuller's view & HRCT Temporal bone. To study the extent of the disease in the middle ear & mastoid cavity on X-ray & HRCT. Correlation with clinical & surgical findings were done.

MATERIAL AND METHODS

Patients clinically diagnosed as a case of chronic suppurative otitis media from age group of 4 to 60 years

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were selected for study & were then subjected to detailed history, general physical examination, systemic examination & ENT examination. Tuning fork test & audiometry were done. Xray mastoid schuller's view both sides & HRCT Temporal bone were done in all patients. Patients were then posted for surgery, peroperative findings were noted & correlation was done between clinical, radiological & surgical findings. The inclusion criteria were patients of age groups 4 to 60 years & both sexes were included in study, Clinically diagnosed cases of unilateral chronic suppurative otitis media (Tubotympanic & Atticoantral Disease) & patient consenting for study. The criteria excluded from study were patients with bilateral chronic suppurative otitis media, patients with history of previous ear surgery & patients with past history of temporal bone trauma.

RESULT

100 patients have been studied in this study. Out of which 59 were in CSOM (AAD) group & 41 were in CSOM (TTD) group. In CSOM (AAD) group there were 43 males & 16 females where as in CSOM (TTD) group there were 30 males & 11 females. Xray mastoid both sides schuller's view was done in all patients. In CSOM (AAD) group all the patients had sclerotic mastoid both on xrays & peroperatively. In CSOM (TTD) Xray was sclerotic in 35 patients & pneumatized in 6 patients. Peroperatively mastoid was sclerotic in 33 patients. HRCT was done in all patients of both the groups & the most common finding was erosion of handle of malleus followed by incus & soft tissue density in mastoid air cells in both types of CSOM. Peroperatively majority of patients had erosion of incus followed by handle of malleus & soft tissue density in mastoid air cells in both the groups.

Disease	Xrays	Surgery	False Positive	False Negative	Sensitivity	Specificity
Sclerotic Mastoid	59	57	0	0	100	100
Dural Plate (Low lying)	39	49	0	10	79.6	100
Sinus Plate (Forward Lying)	33	47	0	14	70.2	100

Table I: Correlation of Xrays & Peroperative Findings in CSOM (AAD).

Extent of Ossicular Erosion	CT Findings	Intraop Findings	False Positive	False Negative	Sensitivity	Specificity
Ossicular Destruction-Malleus Handle	47	46	1	0	100	92.3
Malleus Head	43	44	0	1	97.7	100
Incus	46	50	0	4	92	100
Stapes Superstructure	28	30	0	2	93.3	100

Table II: HRCT & Surgical Correlation for extent of ossicular erosion in CSOM (AAD).

Extent of Disease	CT Findings	Intraop Findings	False Positive	False Negative	Sensitivity	Specificity
Protympanum	10	20	0	10	50	100
Mesotympanum	46	49	0	3	93.9	100
Post. Tympanum	49	51	0	2	96.1	100
Epitympanum	50	51	0	1	98.0	100
Hypotympanum	14	15	0	1	93.3	100
Aditus	54	54	0	0	100	100
Antrum	55	55	0	0	100	100
Mastoid Air Cells	56	56	0	0	100	100
Perilabyrinthine Cells	17	18	0	1	94.4	100

Table III: HRCT & surgical correlation of extent of disease in CSOM (AAD).



Fig. I: HRCT showing dehiscence of lateral semicircular canal along with erosion of sigmoid sinus plate on right side.

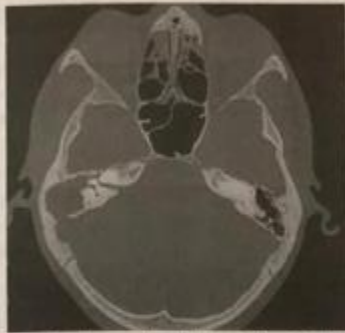


Fig. II: HRCT showing erosion of horizontal part of facial nerve along with erosion of sigmoid sinus plate on right side.

DISCUSSION

In our study in CSOM (AAD) the age group ranged from 4 to 60 years with mean age of 20.86 years with maximum number of patients in age group 11-20 years & in CSOM (TTD) the age group ranged from 4 to 60 years with mean age of 21.87 years which is similar to study done by Gerami et al² & lower as compared to Paparella et al who claim mean age of 35.1 years³. In our study in CSOM AAD & TTD types both showed male preponderance with male to female ratio of 3:1. This is in accordance with the study done by Nelson et al who reported that the incidence was 1.4 times higher in men compared to women⁴. In a study done by Jose et al males predominated (64.7%) compared to females (35.3%) in both adults & children⁵. Sade et al found male (55.7%) predominance over female (44.3%) for this disease⁶. In our study the most common complaint was discharge from ear which was present in all the patients 100%. This is in accordance with study done by Sadé et al who found that discharge was the first symptom in 62.0% of cases & hypoacusis was present in 11.0% of cases⁶. In CSOM (AAD) on examination of T.M 68% patients had granulations, followed by retraction pocket in 35% & cholesteatoma in 32 % patients. 5% of patients had marginal perforation whereas in CSOM (TTD) all 41 patients had central perforation (100%) & 19% had granulations. Xrays were sclerotic in all patients of CSOM (AAD) 100%. These are comparable with findings of Mahesh et al⁷ and Henry k Gans et al⁸ where as in CSOM (TTD) in majority of patients xray was found to be sclerotic 85% &

pneumatisation was seen in 15% of patients. Dural plate was low lying in 76% followed by forward lying sinus plate in 72% & mastoid cortex dehiscence in 23% of patients. Majority of the patients had erosion of handle of malleus 79%, followed by erosion of incus seen in 77%, head of malleus erosion in 72% & stapes superstructure erosion in 47% of patients. Mafee et al were able to define the state of the ossicular chain in 89% of cases scanned⁹ and Jackler et al were able to predict the state of ossicular chain in 83% of their cases¹⁰, while O'Riley could predict an intact ossicular chain correctly in only 50% of the cases¹¹. Soft tissue density suspicious of cholesteatoma was seen in mastoid air cells 94% followed by densities in antrum seen in 93%, aditus 91%, epitympanum 84%, post tympanum 83%, mesotympanum 77%, perilyabyrinthine cells 28%, hypotympanum 23% & protympanum 16% of patients. In CSOM (TTD) group HRCT revealed majority of patients had erosion of handle of malleus 44% followed by erosion of incus seen in 41%. There was no erosion of head of malleus & stapes superstructure. In CSOM (AAD) peroperatively majority of the patients had sclerotic mastoid 97% followed by low lying dural plate in 86% & forward lying sinus plate in 82% of patients. Majority of the patients had erosion of incus 88% followed by handle of malleus in 81%, head of malleus in 77% & stapes superstructure in 53%. Thus our findings are similar to that of Joselito L. Gaurano et al they had 59 (92.19%) cases with ossicular erosions, the incus was mostly affected (n=48, 75%)¹². Majority of the patients had the extent of disease (cholesteatoma & granulations) in mastoid air cells 98% followed by antrum 96% & aditus 95%. In CSOM (TTD) peroperatively majority of the patients had sclerotic mastoid 88%. Dural plate was low lying & sinus plate was forward lying in 3% of patients. Majority of the patients had erosion of incus 68% followed by erosion of handle of malleus 45%. Majority of the patients had extent of disease (granulations) in mastoid air cells 83% followed by mesotympanum 63% & post. tympanum 58%. Disease was equally seen in aditus & antrum 50% (n=20).

For correlation of HRCT & peroperative findings P value was calculated which equals to 0.9961 which is statistically not significant. Thus, the analysis of pre operative HRCT scans correlated with the intra operative findings and reports with a high degree of accuracy. We found excellent correlation with the use of HRCT and

subsequent intra operative findings.

CONCLUSION:

With the advent of HRCT and improvements in radiological technology, it has definitely improved the pre operative diagnosis of cholesteatoma and assessment of extent of spread. But high levels of false positive and false negative prevent wholesome reliability on HRCT. The variations in findings in different studies suggest that surgeon should not totally rely on HRCT findings & be cautious during surgery. A skillful, aware and alert surgeon still remains the key of successful diagnosis and surgical

management of CSOM.

The present study indicates that there is good correlation between xrays & operative findings in CSOM but it fails to detect the exact extent of the disease. The study also indicates that there is excellent correlation between HRCT temporal bone & operative findings in CSOM. HRCT gives us a preoperative picture of the extent of disease & helps surgeon in planning the surgical approach. However, due to certain variations in HRCT & operative findings & due to lack of 100% accuracy, a surgeon should always be cautious during surgery & not totally rely on HRCT.

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