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

Dr. Venus Rawat*, Dr. A.K. Saxena**, Dr. Sanjay Kumar***, Dr. Prashant K Gupta****

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. 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. X-ray mastoid schuller’s view both sides & HRCT Temporal bone were done in all patients. Patients were then posted for surgery, preoperative 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 x-rays & 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 (sale of bengin or mucosal) & Antroantral (unsafe or dangerous or squamous). 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 x-ray 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 & examination was done. Audiometry was done. X-ray mastoid, Schuller's view both sides & HRCT temporal bone were done in all patients. Patients were then posted for surgery, postoperative findings were noted & correlation was done between clinical, radiological & surgical findings. The inclusion criteria were patients of age group 4 to 60 years & both sexes were included in study. Clinically diagnosed cases of unilateral chronic supplicative otitis media (Tubotympanic & Attecentral Disease) & patient consenting for surgery. The criteria excluded from study were patients with bilateral chronic supplicative 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. X-ray mastoid & Schuller's view was done in all patients. In CSOM (AAD) group all the patients had scoliotic mastoid both on X-rays & postoperatively. In CSOM (TTD) X-ray was scoliotic in 35 patients & preamised in 6 patients. Preoperatively mastoid was scoliotic in 33 patients. HRCT was done in all patients of both 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. Perioperatively majority of patients had erosion of incus followed by handle of malleus & soft tissue density in mastoid air cells in both the groups.

<table>
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<tr>
<th>Extent of Ossicular Erosion</th>
<th>CT Findings</th>
<th>Intrapp Findings</th>
<th>False Positive</th>
<th>False Negative</th>
<th>Sensitivity</th>
<th>Specificity</th>
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<td>93.3</td>
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<tr>
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<td>97.7</td>
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<tr>
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<td>50</td>
<td>0</td>
<td>4</td>
<td>92</td>
<td>100</td>
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<tr>
<td>Incus</td>
<td>28</td>
<td>30</td>
<td>0</td>
<td>2</td>
<td>93.3</td>
<td>100</td>
</tr>
</tbody>
</table>

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

<table>
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<th>Extent of Disease</th>
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<th>Intrapp Findings</th>
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<th>False Negative</th>
<th>Sensitivity</th>
<th>Specificity</th>
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**Table III: HRCT & surgical correlation of extent of disease in CSOM (AAD).**

**Fig. 1: HRCT showing dehiscence of lateral semicircular canal 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 Papparella 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 4.1 times higher in men compared to women6. 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 disease4. 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 Sade et al who found that discharge was the first symptom in 52.0% of cases & hypacusis was present in 11.0% of cases4. 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. X-rays were sclerotic in all patients of CSOM (AAD) 100%. These are comparable with findings of Mahesh et al10 and Henry & Gans et al11 where as in CSOM (TTD) in majority of patients x-ray was found to be sclerotic 85% & pneumatization was seen in 15% of patients. Dural plate was lowlying 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 scanned12 and Jacker et al were able to predict the state of ossicular chain in 83% of their cases13, while O’Killey could predict an intact ossicular chain correctly in only 50% of the cases14. 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%, mastoid 77%, perilaobrithine cells 28%, hypotympanum 29% & 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 Joselillo L. Gavarno 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 extent of disease (cholesteatoma & granulations) in mastoid air cells 96% 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 0.0961 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 intraoperative 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 x-rays & 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.

REFERENCES


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