IMPORTANCE OF PRE-OPERATIVE HRCT TEMPORAL BONE IN CHRONIC SUPPURATIVE OTITIS MEDIA

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ABSTRACT

Aim: The role of pre-operative HRCT temporal bone in evaluating the extent and severity of disease in patients with chronic suppurative otitis media.

Setting and design: A prospective study in a tertiary care centre

Materials and methods: Study done on 50 patients of chronic suppurative otitis media with pre-operative HRCT temporal bone and the results analyzed.

Results: HRCT is useful in detecting the extent of soft tissue involvement in the middle ear and mastoid, ossicular chain involvement, tegmen, scutum and lateral semicircular canal erosion, and facial canal dehiscence.

Conclusion: HRCT is useful prior to surgical approach in patients with actively discharging tubotympanic and atticoantral type of CSOM.

Keywords: HRCT temporal bone, CSOM tubotympanic type, CSOM atticoantral type, Surgery.

INTRODUCTION

Diagnostic imaging to know the extent of disease in chronic suppurative otitis media whether it is tubotympanic type or atticoantral type was only x-ray of the mastoids, routinely. After the advent of CT scan, high resolution computed tomography of the temporal bone has become very valuable in identifying the extent of the disease. HRCT temporal bone is not regularly recommended for routine CSOM patients.1,2 However they are recommended in those patients with cholesteatoma.3-5 This study highlights the importance of HRCT in both tubotympanic and atticoantral type of CSOM.

MATERIALS AND METHODS:

This is a prospective study in which pre-operative HRCT temporal bone with 0.6mm cuts was done on 50 patients with chronic suppurative otitis media both tubotympanic and atticoantral type.

The parameters studied are:

1. Presence of mastoid pneumatisation
2. Soft tissue density
3. Erosion of scutum, tegmen, lateral semicircular canal, sinus plate, mastoid cortex
4. Facial canal dehiscence
5. Ossicular chain status

The patients were evaluated with clinical history and thorough examination including otoscopy, otoendoscopy or examination under microscope, diagnostic nasal endoscopy and pure tone audiometry.

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The patients were subjected for x-ray both mastoids and HRCT temporal bone. These patients underwent surgery accordingly.

OBSERVATIONS:

In this study 31 patients (62%) were in the age group 20-30 years and the mean age group was 27 years. The youngest was 11 years and the oldest was 59 years.

Male: Female ratio was 0.9:1.

Based on clinical diagnosis, tubotympanic type of CSOM was seen in 31 cases, of which 25 cases were inactive type and 6 were active type. Atticoantral type of CSOM was seen in 19 cases.

On x-ray mastoids, pneumatisation was seen in 30%, diploeic in 8%, sclerosed mastoid in 54% and cavity in 8% of the cases. On HRCT temporal bone, pneumatisation was seen in 38%, diploeic in 4%, sclerosed in 50% and cavity in 8% of the cases.

Soft tissue density was seen in 6 cases in actively discharging tubotympanic type of CSOM and in all the 19 cases of atticoantral type of CSOM. The extent of involvement of the disease in this tubotympanic type of CSOM was more in the antrum followed by epitympanum, aditus, mastoid air cells and middle ear.

Table I. HRCT findings of site and extent of soft tissue density in the middle ear and mastoid in TT type and AA type.

Scutum, tegmen, lateral semicircular canal, mastoid cortex and sinus plate erosion was seen in atticoantral type of CSOM, but not in tubotympanic type of CSOM.

Facial canal dehiscence was seen in 1 case in tubotympanic type and in 4 cases in atticoantral type of CSOM.

DISCUSSION:

The ossicular destruction was more common with incus, followed by stapes in actively discharging tubotympanic type of CSOM. In atticoantral type of CSOM, incus was most commonly eroded, followed by stapes and malleus.

In inactive tubotympanic type of CSOM, there was no soft tissue opacity in the middle ear and mastoid, and the ossicular chain was intact in all the 25 cases.

Table II: Other HRCT findings in TT type and AA type.

Whereas in atticoantral type of CSOM, the extent of involvement was more in the epitympanum, followed by antrum, aditus, posterior tympanum, rest of middle ear and mastoid air cells.
(2010), who found strong agreement for mastoid cell aeration.6

On HRCT, soft tissue opacity was noted in 6 cases out of the 31 cases of tubotympanic type of CSOM. Intra-operatively there were granulations in 3 cases and edematous mucosa in 3 cases of tubotympanic type of CSOM.

On HRCT, soft tissue opacity was noted in all 19 cases in atticoantral type of CSOM. Mafee et al, O’Reilly et al and Tripti had similar results.7-9 Intra-operatively there was cholesteatoma in 10 cases and granulations in 9 cases of atticoantral type of CSOM. HRCT could not differentiate the soft tissue density. Mafee, O’Reilly, Jackler and Garber et al are in agreement with this finding.7,8,10,11

Erosion of scutum was seen in 42.1%, tegmen erosion in 31.6% of cases with atticoantral type of CSOM. This finding was similar to Gaurano and Joharjy.12 HRCT could detect erosion of ossicular chain which were similar to study by Tatlipinar et al.13

Lateral semicircular canal erosion was noted in 15.8% of the cases of atticoantral type of CSOM on HRCT. These findings were similar to Chee and Tan.14

Mastoid cortex erosion was seen in 5.3% of the cases with atticoantral type. These findings were similar to Suat Keskin et al.15 Sinus plate erosion was seen in 5.3% the cases with atticoantral type of CSOM. These findings were similar to a study by Tripti.9 Facial canal dehiscence was seen in 4 cases of atticoantral type of CSOM which was similar to a study by Sirigiri and Dwarkanath.16

6 patients of tubotympanic type of CSOM underwent cortical mastoidectomy and 25 patients underwent tympanoplasty. In atticoantral type of CSOM, 2 cases underwent atticotomy, 2 cases underwent atticoantrostomy, 3 cases underwent canal up mastoidectomy and the remaining canal wall down mastoidectomy depending on the HRCT findings. These findings were similar to Payal et al.17

When comparing the HRCT findings with surgical correlation in CSOM, HRCT could detect soft tissue density and extent of spread with 98% sensitivity and 89% specificity. These findings were similar to O’Reilly et al and Tripti.8,9 HRCT could detect ossicular destruction with sensitivity of 100% in malleus erosion, 86% in incus erosion and 82% in stapes superstructure erosion. However the specificity was 100%. These findings were similar to Alzoubi et al.18

HRCT was 100% sensitive and specific to detect lateral semicircular canal erosion and tegmen erosion, but 83% sensitive to detect facial canal dehiscence with 100% specificity. CT failed to identify facial canal dehiscence in one case. These findings were similar to Alzoubi et al.18 HRCT was found to be 100% sensitive and specific to detect mastoid cortex erosion and sinus plate dehiscence. These findings were similar to Sirigiri and Dwarkanath.16

Table III: Correlation between HRCT and surgical findings.

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<th>HRCT</th>
<th>Surgery</th>
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<td>Ossicular destruction</td>
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<td>Tegmen erosion</td>
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<td>Sinus plate dehiscence</td>
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CONCLUSION:

HRCT temporal bone could detect bony erosion accurately and also the extent of soft tissue involvement with ossicular chain status. This was very much useful in planning the surgical approach not only in atticoantral but also in tubotympanic type of CSOM. We emphasize the need for HRCT temporal bone study pre-operatively not only in atticoantral but also in tubotympanic of CSOM with actively discharging ears.
DISCLOSURES

(a) Competing interests/Interests of Conflict- None
(b) Sponsorships - None
(c) Funding - None

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