

# CSOM; OSSICULAR DAMAGE IN ATTICOANTRAL VARIANT

## DR. ZAFAR IQBAL GILL

Department of ENT,  
Jinnah Hospital / Allama Iqbal Medical College  
Lahore.

## DR. ZUBAIR IQBAL BHUTTA

Department of ENT,  
Jinnah Hospital / Allama Iqbal Medical College  
Lahore.

## DR. KASHIF IQBAL MALIK

Department of ENT,  
Jinnah Hospital / Allama Iqbal Medical College  
Lahore.

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**ABSTRACT ... Objective:** The current study aims to find the extent of ossicular chain damage in patients with chronic suppurative otitis media, associated with cholesteotoma and/or granulation tissue formation. **Design:** Descriptive study. **Place and Duration of Study:** The study was conducted at the department of ENT unit 1, Jinnah hospital/ Allama Iqbal Medical College Lahore from March, 2007 to March, 2008. **Patients and Methods:** A total of fifty consecutive patients presenting with atticoantral disease of different age groups were included in the study. All patients were examined clinically and under microscope. X- rays mastoids and pure tone audiometry was done in all patients. Mastoid exploration was done in all the patients and ossicular status was assessed peroperatively. Canal wall down procedure was adopted in all the patients. **Results:** Among different age groups included, majority (more than 70%) of them, were below 30 years of age, showing that atticoantral variant of CSOM is a disease of the young people. Males were more in number (70%). Duration of the symptoms was usually prolonged. On radiological examination, 39 cases (78%) had sclerotic mastoid. Audiological records of patients showed the air bone gap of more than 40 dB in most of (78%) of patients. Perforation was marginal in most of the patients (64%). In gross pathologic findings, cholesteotoma only, was seen in 21 cases (42%), granulations seen in 13(26%) cases, while cholesteotoma and granulations seen in 16 cases (32%). All cases showed erosion of the ossicles, complete or partial. Incus was a most commonly involved ossicle. **Conclusion:** Chronic suppurative otitis media, atticoantral variant do commonly damage the ossicles and routinely it is multiossicular damage. Incus, is damaged most with involvement of its long process.

**Key words:** Chronic suppurative otitis media (CSOM), Atticoantral disease, Ossicular damage.

## INTRODUCTION

Chronic suppurative otitis media (CSOM) is the inflammatory process involving the mucous membranes of the middle ear cleft, with pus formation and characterized by the history of ear discharge persisting for more than 12 weeks duration. The disease is more prevalent in areas and population with poor hygiene, poverty and lack of health education. Clinically, it's divided into two types, tubotympanic and atticoantral.

Tubotympanic or safe type involves eutachean tube and lower part of middle ear cavity with a central perforation

in pars tensa of the tympanic membrane, usually with little complications. Atticoantral or unsafe type involves posterosuperior portion of the middle ear cleft, and has an attic or marginal perforation and is associated with cholesteotoma and/or granulation tissue, leading to

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<b>Correspondence Address:</b> Dr. Zafar Iqbal Gill 27-B, Jinnah Hospital Colony, Lahore. <a href="mailto:zafariqbalgilldr@yahoo.com">zafariqbalgilldr@yahoo.com</a>	

intratemporal and intracranial complications. Cholesteotoma is defined as a bag or sac of keratinizing epithelium present in layers, having central debris of dead keratin and having an advancing margin of granulation tissue at its surface. It may be congenital arising from embryonic epithelial cell nests<sup>1</sup> or acquired.

Ossicular damage is routinely associated with atticofacial type of CSOM and this damage is attributed to inflammatory exudates containing proteases, collagenase and acid phosphatase, and also to the brim of granulation tissue at the surface of cholesteotoma or frank granulations, inducing otitis in the ossicles and damaging them.

This study aims at the intraoperative findings regarding status of the ossicles in 50 cases of CSOM, and to determine frequency and pattern of ossicular damage in our study.

## PATIENTS AND METHODS

This study was conducted at department of ENT unit 1, Jinnah Hospital Lahore, during the period of March 2007 to March, 2008. Fifty cases of atticofacial type of CSOM, in different age groups were admitted and all underwent canal wall down procedures. Each patient had essentially the similar work up as thorough history especially regarding the discharge, hearing impairment, previous trauma, headache, nausea, vomiting, vertigo and tinnitus.

The clinical examination of the ears, nose, throat and a through general physical examination and examination of the ears under microscope was done. Culture and sensitivity of the pus was carried out in all patients. Base line investigations including blood complete, urine complete, bleeding profile were done in all cases and other tests in selected cases, where ever deemed necessary. Audiological evaluations were made by tuning fork tests and pure tone audiometry. Plain radiological evaluation of the mastoids was carried out in all patients to give information regarding degree of pneumatisation, extent of disease and surgical landmarks of temporal bone.

The primary objective of the study was to find incidence of ossicular damage preoperatively, in diagnosed cases of CSOM of atticofacial variant, who underwent mastoid exploration and canal wall down procedures, without tympanoplasties. The surgical approach was postaural in all cases. After the operation, in the recovery phase, all patients were examined for facial nerve functions and in the ward also. The patients were examined for nystagmus and tuning fork tests were performed for lateralization of Weber. Antibiotics cover was given for 10 days with first 5 days intravenous route. Mastoid bandage was removed and replaced with light dressing after 48 hours. The patients were advised fortnightly follow up for two months and then at monthly interval for next four months in uncomplicated cases.

## RESULTS

Out of total 50 cases, 70% were males and 30% were females. Table I showing predominance of this disease in young adults.

Age in yrs	No. of pts.	%age	Mean age in yrs
0-14	01	2%	13
15-30	35	70%	20.3
31-45	10	20%	35.2
46-above	04	8%	50

Majority of patients (90%) belonged to low socio economic status. The most common presenting symptom was foul smelling ear discharge (94%). In 90% of cases hearing impairment was noted and the other symptoms were, earache 18%, bleeding from ears 6%, post aural swelling 2%, purulent post aural discharge 2%, headache 2%, vertigo 4%, nausea/vomiting 2% and fever 10%. The duration of the symptoms and disease is shown in table II.

**Table-II. Duration of disease**

Duration of disease in years	%age
1-5	20
6-10	40
11-20	26
20 - more	14

Otoscopic and microscopic examination showed attic perforation in 11 cases (22%), posterior marginal perforation in 32 cases (64%), combined attic marginal perforation in 4 cases (8%), while aural polyps were seen in 3 cases (6%). Among 50 cases, 4(8%) were having coexisting complications as shown in table III.

**Table-III. Coexisting Complications**

Complications	No. of cases
<b>Extra cranial</b>	
Mastoid abscess	01
Mastoid fistula	01
Erosion of posterior bony meatal wall	01
<b>Intra cranial</b>	
Brain abscess	01

### COEXISTING COMPLICATIONS

Audiological findings showed the air bone gap i.e. involvement of the ossicular chain and the cochlear reserve. In 11(22%) patients mean AB gap was 25 dB, in 17cases (34%), it was 40 dB, while 22cases (44%) showed an extensive air bone gap i.e. 55 dB or above. On radiological examination, 39 cases (78%) had sclerotic mastoid, 10 cases (20%) showed poor pneumatization, while the bony erosion was seen in 1 case (2%). In gross pathologic findings, Cholesteotoma only, was found in 21 cases (42%), granulations in 13(26%) cases, while cholesteotoma and granulations in 16 cases (32%).

All cases showed erosion of the ossicles, complete or any part of the ossicle. Incus found to be disease in 21

cases (42%), malleus and incus in 9 cases (18%), incus and stapes in 10 cases (20%), while all ossicles were destroyed in 10 cases (20%) with remaining super structures of stapes. Among incus, erosion of long process was the commonest finding, similarly in malleus, handle was eroded mostly. The next erosion was head of the malleus and body of incus in combination or alone.

### DISCUSSION

Chronic otitis media is the chronic inflammatory process involving the mucous membranes and structures with in the middle ear cleft. The ossicular chain damage in this chronic inflammatory process is common. There are different reasons for damage to the ossicles. Inflammatory exudates do contain proteolytic enzymes and that causes bone damage. Acute exacerbations in this process also cause hyperemic decalcification of the bones, again resulting into bone damage.

Association of cholesteotoma with atticointral variant of CSOM causes bone erosion but this is not only due to proteolytic enzymes secreted by matrix of the cholesteotoma or any sort of pressure effects, but the granulation tissue present at the margin of the cholesteotoma do induce inflammatory process with in the matrix of the compact bones causing otitis inducing osteoblastic and osteoclastic activity with the overriding of osteoclastic activity, resulting in bone resorption and destruction.

Total number of patients in this series was 50, with male's predominance 3:1; these results are in contradiction to the study carried out by Salam A et al<sup>1</sup>, having 60% females predominance. It may be due to social importance that the male carries in the family and more privileged to get early treatment.

Most of the patients are young between the ages 15-30 years (70%), these were almost similar to the study carried by Jawaid et al<sup>2</sup>. Granulations and cholesteotoma is more destructive in children<sup>3</sup> because of connective tissue layer present in the mastoids of young children that helps to promote cholesteotoma matrix growth. This study supports other studies regarding socio economic status of the patients, as in Choudhri MA, et al<sup>4</sup> and

Mushtaque AM, et al<sup>5</sup>. that this disease is more prevalent in areas and population where has poor hygiene, poverty and lack of health education. In our study hearing loss was 40 -55dB or above in 78% of the patients and these results correlate well with that of Marfani MS et al<sup>6</sup>. Since ossicular chain damage can cause a maximum of 60dB conductive hearing loss, results clearly show that disease is extensive and had damaged the ossicular chain to a great extent<sup>7,8</sup> and greater air-bone gap is seen in patients with cholesteotoma<sup>9</sup> showing greater damage to the ossicles. In gross pathologic findings, cholesteotoma only, was seen in 21 cases (42%) in the middle ear cleft, higher than the incidence reported by Mazoor et al<sup>10</sup>, that was showing 30% of the cases. The granulations seen in 13 (26%) cases, while cholesteotoma and granulations seen in 16 cases(32%), as comparable with results of Garab JP, Dubey SP<sup>11</sup> and study is in contrast to granulation tissue in the middle ear cleft as was seen in 40% in the series of Udaipurwala IH et al<sup>12</sup>.

This study shows the frequency and the pattern of ossicular chain damage by the cholesteotoma and granulation which is similar to other studies<sup>13</sup>. The long process of the incus was the commonest portion involved as reported by the Turner NC<sup>14</sup>, Wehrs RE<sup>15</sup>, Austin<sup>16</sup> and Bizakis JG<sup>17</sup>. The early involvement of incus indicates that pathology starts at the attic and in its posterior aspect and in the Prussak's space, from where it spreads and gradually involve the ossicles. Among incus, erosion of long process, was the commonest finding, similarly in case of malleus, handle was eroded mostly. The next most common erosion seen was head of the malleus and body of incus in combination or alone. These results are almost similar to the series of Mahida et al<sup>18</sup>.

## CONCLUSION

Chronic suppurative otitis media do commonly damage the ossicles and routinely it is multiple ossicular damage. Long process of the Incus, was damaged in majority of the cases. Granulation tissue alone was less common as compare to cholesteotoma alone or in combination with granulation tissue.

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