

Incidence of the Incus Erosion in Chronic Suppurative Otitis Media with Cholesteatoma

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ABSTRACT

In this study, 50 patients are included to analyze the incidence of incus erosion in chronic Suppurative otitis media with cholesteatoma. Of these patients 64% were male and 36% were female. Young patients most commonly reported to E.N.T Out Patient Department. The majority of these patients were in between 10 to 30 years and 2% beyond 50 years. Most common presentation was hearing loss, ear discharge or combined symptoms. Among chronic Suppurative otitis media, the cholesteatoma/atticoantral variety was studied. The factors responsible for this are discussed in details. Diagnosis was made on comprehensive history, clinical examination, routine investigations, audiological and radiological assessments; microscopic findings, operative treatment is given according to extent and site of cholesteatoma. The condition of each of ossicles was assessed under magnification. The incus was most commonly eroded by cholesteatoma of middle ear.

Keywords: Suppurative otitis media, cholesteatoma, incus, malleus, stapes

INTRODUCTION

Hearing is the last sense to develop in the process of evolution. It is very delicate and gets out of order with minimal insult. Deafness is the most common symptom of ear disease. It may be conductive or sensorineural hearing loss. Chronic Suppurative otitis media is well known cause of conductive deafness. The middle ear cholesteatoma is common variety of chronic Suppurative otitis media, which causes erosion of ossicular chain. Chemical process leads to lytic effect on bones and also enzymes are responsible for ossicular destruction. The diagnosis of ossicular chain defects in the middle ear disease are made by pure tone audiometry and high definition CT scan. A simple drum head perforation can cause 15 to 20 dB conductive hearing loss, damage of ossicular chain cause 30 to 50 dB and discontinuity of ossicular chain cause flat 55 to 60 dB conductive hearing loss on pure tone audiometry. The CT scan of ossicular chain shows the complete defects of head of malleus, body and long process of incus in all cases but the handle of malleus superstructure of the stapes can be made in 33% and 60% of cases respectively.

The objective of the study was to detect incidence of erosion of incus of ossicular chain in CSOM with cholesteatoma on mastoid exploration

MATERIALS AND METHODS

The clinical material in this study consists of 50 cases of CSOM with cholesteatoma of different age groups admitted at Mayo Hospital and Services Hospital Lahore in ENT department. 2013-2016. Same work up

was done on each patient i.e. History, ENT examination, otoscopic and microscopic examinations C/S of aural discharge. The audiological evaluation was made by tuning fork tests and pure tone audiometry.

These cases are operated under operating microscope with two techniques, modified radical mastoidectomy, with preservation of ossicles and tympanic membrane remnants and radical mastoidectomy for extensive disease with wise spread destruction and impending complications. Follow up all the patients was done at an interval of three months and six months' time.

RESULTS

All patients selected were between 10 to 50 years. In age group 10 to 20 years, there were 24 patients. In age group 20 to 30 years 16 patients were selected, 6 patients belong to 30 to 40 years group and above 40 years, group only 4 patients were noted. Out of 50 cases 33 were male and 17 were female ratio 1.9:1. 94% had H/O purulent foul smelling thick scanty discharge. In 90% cases there was decreased hearing. 20(40%) cases had their duration ranging from 6 to 10 years, 12(24%) had their duration between 1 to 5 years. 11(22%) had 10 to 20 years and 14% (7) had more than 20 years. On the OTOSCOPIC examination, Attic perforation was seen in 4 cases, Posterior marginal perforation in 13 cases, combined Attic and posterior marginal perforation in 18 cases and anterior perforation with attic involvement was seen in 4 cases. The cholesteatoma was seen in 23 cases, granulations in 8 cases and both cholesteatoma and

granulations in 19 cases. During audiological assessment, in 11 cases air-bone gap was 25dB, in 17 cases it was 40dB, while 22 cases it was above 55dB. The ossicular status on mastoid exploration was studied under microscope; all cases showed erosion of each ossicle either complete destruction or part of ossicles. Incus erosion was found in 21 cases, incus and malleus in 10 cases, incus and stapes in 09 cases while all three destroyed in 10 cases except footplate of stapes. Among incus, long process of incus was most commonly necrosed, in the stapes the superstructure were eroded along with long process of incus. Similarly in the malleus the handle of malleus was eroded most commonly. The next erosion was head of malleus and body of incus in combination or alone. Foot plate of incus was found intact in all cases

DISCUSSION

Deafness is one of the cardinal symptoms of chronic suppurative otitis media. Basic dysfunctions in chronic suppurative otitis media with cholesteatoma, which cause deafness are; impairment of tympano-ossicular impedance matching mechanism, loss or impairment of round window 'baffle'-effect; mucosal edema, cholesteatoma, granulations ossicular necrosis and osteitis which impair the impedance matching system¹. Regarding the age, the peak numbers of patients i.e. 24 were seen in 10-20 years age group, 16 in 20-30 years, 6 between 30- 40 and 4 above 40 years. This shows the disease is more common in younger age group. These results coincide with the study at civil hospital Karachi in which mean age was 24 years². The majority of the patients seen were male's ratio being about 2:1. It may be due to their importance in society as earning members of the family who has initial privilege for treatment. It was also revealed that the majority of the patients belonged to poor communities living in rural and slum areas of the cities where infections are more common along with unsatisfactory diet and hygiene. In this study it was seen that most of the patient belonged to lower class. Regarding duration or disease, many Patients were stated that they had discharging ear for as long as could be recalled. It means that disease started in their first five Years of life. In my series or cases 40% had their duration ranging from 6 to 10 years, 23% cases 1-5 years, 22% cases 11-20 years and 14% cases had more than 20 year. It indicates that disease process runs silently with a prolonged course and is manifested by impending severity of symptoms. The commonest presenting features, in the study was discharge from ear in 94% of cases and 90% had decreased hearing sensation. The discharge from the ear was purulent,

foul smelling thick and scanty. Of these two were associated with other symptoms like earache in 18%, bleeding from ear 14%, fever 12% of cases. Predominant bacteria seen in this study were pseudomonas aeruginosa in 50% cases, staphylococcus aureus in 18%, mixed infection in 12%, proteus in 4%, no growth in 8% while Escherichia Coli and enterococci in 2% each and anaerobes in 4% cases. According to Azhar.Het al(1995) in chronic suppurative otitis media, atticointral type, the most common organisms were pseudomonas aeruginosa (45.3%) staphylococcus aureus in 12.1%; Proteus in 12.2% and Escherichia Coli 3.6% cases³. Farooqi et al (1990) reported Pseudomonas in 54% of cases, staph. Aureus in 17% .cases while proteus in 5% and mixed flora in 12% cases⁴. Now it is accepted that bacteria might play role in destructive process of cholesteatoma⁵. On otoscopic and microscopic examination, in 8% cases the perforation; were seen in attic, 26% cases perforations were in posterior pars tense and combined (attic and posterior marginal) were seen in 36% cases while 22% showed near total or subtotal perforations and 8% showed anterior perforation along with attic. These findings correspond with the theories of cholesteatoma i.e. migration and less frequently metaplasia theory. Radiographic evaluation is unreliable in diagnosis of ossicular defects and cholesteatoma⁶ because of overlapping of the structures making interpretation difficult. Most of the X-Rays done are comparative views of temporal bone to assess the degree of pneumatization, state of translucency of air cells and position of sigmoid sinus, tegmen tympani. Erosion of atticointral region and bridge, cavitation in the mastoid is also visible in extensive cholesteatoma⁷. Similarly in my study mostly the X-ray showed sclerotic mastoid in 48% while erosion in 18% and cavitation in only 4% cases, the hypo cellularity in 22% and cellular mastoids were seen in 8% cases. After audiological evaluation for the status of ossicular chain, the degree of hearing loss and the cochlear reserve, the patients were grouped according to their mean air-bone (A-B) gap in decibels (dB). 22% cases had A-B gap of 25 dB, 34% showed A-B gap of 40 dB and 44% showed d A-B gap of 55 dB This study also correlates with the status of the ossicular involvement by cholesteatoma and granulations seen during surgical procedures. Majority of the cases showed ossicular erosion, the long process of incus and lenticular process of incus were the commonest part involved then the superstructure of stapes. The cholesteatoma was found mostly in the Posterior compartment of the attic, so the incus was involved completely or partially in 19 cases. The stapes and incus both in 14 cases while the malleus with or without incus in 11 cases

and loss of all three in 6 cases. The early involvement of the Incus indicates that the Pathology starts at the attic compartment in its posterior aspect and in the Prussak's space from where it spreads and gradually involves the ossicles. The severe ossicular damage was seen in infective cholesteatoma rather than ineffective cases and the findings were in the form of necrosis, erosion with fragments of small sequestrum in the purulent granulations and cholesteatoma. This also indicates that it is probably the infection along with cholesteatoma pressure which gives rise to bony destruction⁸. This study correlates with the study of Davis F Austin (1996) which shows long process of incus in 36.4%, and arch of stapes 18%, entire incus 17% and handle of malleus 4.3% stapes cases⁸. Udaipur Wala et al (1995) study showed that the majority of Cases involved more than one ossicles were seen in 40% and frequency of damage of malleus long with incus was higher.

CONCLUSION

Cholesteatoma is a malignant destructive lesion, of the middle ear⁹ is defined as a three dimensional epidermal and connective tissue structure in the form of a sac, but in my view it is a multidirectional epidermal tissue in the middle ear cleft, which grows at the expense of the underlying bones, consists of keratin mass enclosed by stratified squamous epithelium, where keratin loses the property of self-cleaning and its continuous collection become harmful. So it is the confined middle ear spaces which halts and arrests the keratin extrusion by the mucosal folds and spaces and when this keratin becomes infected it leads to destruction of underlying bones and ossicles. The mechanism of ossicles destruction is still debatable as whether the destruction is from the pressure by expanding cholesteatoma, which hinders the blood supply of the ossicles, by chemical or enzymatic processes which cause erosion of ossicles. Audiological assessment shows that there is conductive hearing loss up to 55 dB which results from loss of matching mechanism. C-T Scan with high resolving power made possible to assess the part of ossicles necrosed. The state of ossicles on mastoid exploration in chronic

suppurative otitis media (CSOM) with cholesteatoma shows that there were are four major ossicular defects that may result from erosion by cholesteatoma, giving rise to loss of hearing. The most common is the involvement of the incus with intact malleus and stapes. The second most common defect is erosion of the superstructure of stapes as well as loss of incus. Third, the handle of malleus which may necessitate its removal along with incus, however the stapes remains intact. Finally, there was loss of all three ossicles except the footplate of stapes. The erosion of the long process of incus by the cholesteatoma is the most frequently encountered defects of the ossicular chain. This is probably due to its tenuous blood supply and its location in an area that is invaded early by cholesteatoma arising from an attic or posterosuperior marginal perforation.

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