OSSICULAR CHAIN STATUS IN CHRONIC SUPPURATIVE OTITIS MEDIA SAFE TYPE UNDERGOING TYMPANOPLASTY

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ABSTRACT

BACKGROUND

The purpose of this prospective study was to evaluate ossicular chain status in safe type of chronic suppurative otitis media.

MATERIALS AND METHODS

100 patients who diagnosed and admitted with chronic suppurative otitis media safe type in Dept. of Otorhinolaryngology, CIMS, Bilaspur (CG), from Jan 2016 to Oct 2018 were scheduled for tympanoplasty and per operative findings were noted.

RESULTS

In our study, we found long process and lenticular process are eroded (8%) and most common ossicles to be eroded were lenticular process of incus and malleus. Stapes was found to be intact. Malleus was most resilient to erosion.

CONCLUSION

All patients of chronic suppurative otitis media with tubotympanic disease should be checked for ossicular chain continuity and movement of all ossicles should be evaluated to rule out any ossicular erosion and also to rule out tympano-sclerosis involving the ossicular joints.

KEYWORDS

CSOM Safe Type, Lenticular Process of Incus, Ossicular Chain.

HOW TO CITE THIS ARTICLE: Singh BR, Agrawal A, Sahu VB, et al. Ossicular chain status in chronic suppurative otitis media safe type undergoing tympanoplasty. J. Evid. Based Med. Healthc. 2018; 5(53), 3668-3671. DOI: 10.18410/jebmh/2018/747

BACKGROUND

CSOM is defined as chronic inflammation of middle ear cleft with or without discharge and perforation in tympanic membrane.[1] It is the most common condition encountered by otologist in day to day practice. Acquired hearing loss is the leading cause in children due to CSOM.[2]

According to WHO, developing countries has high prevalence of CSOM and it is due to overcrowding and poor economic status.[3] There is considerable difference in the rate of prevalence of CSOM between developing and developed countries (in India 2-15%).[4]

Traditionally, CSOM is mainly classified as atticoantral (unsafe) and tubotympanic (safe) type. In unsafe type, there is foul smelling scanty discharge, marginal perforation and associated with cholesteatoma, granulation tissue and other complications. In safe type, there is recurrent profuse ear discharge with central perforation of tympanic membrane.[5]

Ossicular chain involvement is found in both safe and unsafe type of diseases. Though the involvement of ossicular chain is less common in safe type, still significant numbers of patient have hearing deterioration due to it.

The Mechanism of ossicular erosion in tubotympanic type of Chronic Suppurative Otitis Media is overproduction of cytokines: tumour necrosis factor (TNF) alpha, interleukin-2, fibroblast growth factor and platelet - derived growth factor, which promotes hypervascularization, osteoclast activation and bone resorption causing ossicular damage.[6]

Hearing restoration surgery comprises ear drum repair and ossicular chain reconstruction in ears having defective ossicles. The ossicular chain reconstruction is associated with higher rate (up to 50%) of long-term acoustic failure.[7,8]

MATERIALS AND METHODS

This study is a time bound cross sectional study.

a) Inclusion Criteria

1. 10 to 50 years of CSOM.
2. Only tubotympanic type of disease.

b) Exclusion Criteria

1. Patients below 10 years and above 50 years of age are excluded.
2. Atticoantral type of disease.
   - Patients with Tubotympanic type of Chronic Suppurative Otitis Media admitted in Dept of Otorhinolaryngology, Chhattisgarh Institute of

Financial or Other, Competing Interest: None.
Submission 13-12-2018, Peer Review 15-12-2018,
Acceptance 20-12-2018, Published 31-12-2018.
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Medical Science, Bilaspur (Chhattisgarh), from the period of January 2016 to October 2018 was included in this study.

- Detailed history was taken, thorough clinical examination, Hearing assessment and relevant investigations were done.
- Informed written consent was taken from all the patients.
- Per operative surgical findings were recorded in a preformed Performa and evaluated.

RESULTS

Out of 100 patients studied, 60 were male and 40 were female. All the patients were in the range of 10-50 years of age. Maximum number of patients was in the age group of 20-30 years, that is, 50. Minimum number of patients was in the age group of 40-50 years, that is, 10. Youngest patient in our series is 14 year and oldest is 47 year.

Out of 100 patients studied, 92 patients were having normal ossicular chain, that is, 92%. Rest 8 cases were having some amount of ossicular defect, that is, 8%. These patients with ossicular erosion were classified into 2 categories:

Ossicular necrosis was found in 6 cases and tympanosclerosis in ossicles in 2 cases. Ossicular involvement was found more commonly in patient with subtotal perforations in comparison to small and medium central perforations (Table 1).

Out of 6 patients with ossicular necrosis, all 6 patients were having subtotal perforation. Like that out of 2 patients with tympanosclerosis in ossicles, 1 case was associated with subtotal perforation and 1 was with central type.

Out of 8 patients with ossicular involvement, commonest ossicles involved was the lenticular process of incus i.e. 6 (6%). long process of incus + lenticular involvement was found in 2 (2%) cases.

In the present study, hearing loss associated with different types of ossicular defects were evaluated (Table 2). In our study those who have ossicular necrosis, hearing loss was found to be moderate degree of conductive hearing loss (45-50 dB).

Malleus and stapes were intact in all cases and in 22 cases tympanosclerosis were found which involve only tympanic membrane.

Types of Ossicular Involvement	Central Perforations (Small/Medium /Large)	Subtotal Perforations	Total No.
Ossicular Necrosis	0	6	6
Tympanosclerosis in ossicles	1	1	2
Tympano-sclerotic patch involving only tympanic membrane	20	2	22
Total	**21**	**9**	**30**

Table 1. Ossicular Chain Involvement in Central vs. Subtotal Perforation

Ossicular Necrosis	No. of Patients	Percentage	Hearing Loss
Isolated Lenticular Process	6	6%	48
Long Process + Lenticular Process	2	2%	50
malleus	0	0	
Stapes	0	0	
All Three Ossicles	0	0	

Table 2. Type of Ossicular Necrosis and Hearing Loss in Ossicular Necrosis

Age Group (year)	No. of Patients	Percentage
10-20	25	25%
21-30	50	50%
31-40	15	15%
41-50	10	10%

Table 3. Age Distribution

Disease Duration	No. of Patients (n=100)	No. of Patients having Ossicular Pathology (n=8)	Percentage of Patients having Ossicular Pathology
Less than 1 year	25	0	0
1-5 year	15	0	0
6-10 year	20	2	10
More than 10 years	40	6	15
Total	**100**	**8**	**8**

Table 4. Comparison of Duration of Disease with Ossicular Status

Size of Tympanic Membrane Perforation	No. of Patients	Percentage (%)
Central	72	72
Subtotal	28	28

Table 5. Size of Tympanic Membrane Perforation

DISCUSSION

The Chronic suppurative otitis media Safe type usually present with perforation of tympanic membrane with normal ossicular chain. The delicate Ossicles with less blood supply (specially in lenticular process of incus) is most susceptible to be eroded by middle ear disease like chronic suppurative otitis media both in atticoantral as well as tubotympanic type as reported by various authors and in our study too.

100 patients of tubotympanic type of CSOM were included in our study. Maximum numbers of patients 50 (50%) cases were found in the age group of 21-30 years. Rout et al in their study observed that maximum number of patients 64 cases were in the age group of 20-30 years. SK Kashyap et al in their study observed that maximum number

of patients 65 cases were in the age group of 11-30 years. Saurabh Varshney et al[6] in their study observed that maximum number of patients 77 cases were in the age group of 16-25 years. Anglitoiu et al[10] in their study observed that maximum number of patients were in the age group of 16-30 years. The early presentation was due to awareness of health issues and difficulty in hearing affecting the work efficiency, leading patients and parents to seek early medical intervention. The hearing loss would be noticed only when the disease has progressed sufficiently to cause a significant impairment of hearing by perforation or ossicular destruction.

In our study, the male to female ratio was 1.50:1.00. Rout et al observed in his study that male to female ratio was 1.50:1.00. Haider et al[11] also observed in his study that there is more no. Of male patient than female. (2.00:1.00). Anglitoiu et al[10] observed in his study that male to female ratio was 1.14:1.00.

The duration of ear discharge ranged from 6 month (0.50 year) to 40 years, with 40 cases having duration in the range of more than 10 years. Saurabh Varshney et al[6] observed that duration of ear discharge ranged from 6 months (0.5 year) to 50 years, with maximum case 39 cases (26.00%) having duration between 10 and 15 years.

The most common type of perforation encountered in our study was central perforation in 72% of cases followed by subtotal perforation in 28% of cases. Sharma et al[12] observed the most common type of perforation was central with an incidence of 69.77%. Kamal et al[13] found an incidence of central perforation in CSOM of 93% in their study population of 203.

Ossicular Chain Status

In our study incus was found to be most common affected ossicles which was 8% and similar study was also done by Mathur et al.[14] in1991 observed erosion of incus in 22% of cases and Quarranta et al.[15] in1995, reported same in 27% cases, Swan et al.[16] described erosion of incus is the most common ossicular pathology and in middle ear diseases, also reported by Varshney et al.[6] in 2010 and Kashyap SK et al[17] in 2015, reported 18% erosion of ossicles.

Thomsen and others[9] in 1981 reported that bone erosion in chronic otitis media was more prevalent when cholesteatoma was present, but it still occurred in absence of cholesteatoma.

Rout MR et al.[18] in 2014 reported ossicular necrosis in 19% cases and ossicular involvement in 37% cases and G.S.N. Murthy et al.[19] found ossicular necrosis only in 8% cases of CSOM. In present study we found that ossicular chain involvement was present in 8% of the cases, 6% cases were having the various type of ossicular necrosis and 2% having tympanosclerosis in ossicle.

In our study malleus and stapes was found to be intact in all cases which is almost shown in the study of Haider et al[11] in 2015 of 279 cases of chronic otitis media found that the most frequently impaired ossicle was the incus and was found eroded in 22.2% of cases. Malleus was found to be the most resilient ossicles.

Malleus and stapes erosion involvement most commonly in unsafe type of chronic suppurative otitis media disease. These was previously shown by study of Anglitoiu et al[10] in 2011 and Haider et al[11] in 2015.

So, from the present study it was found that ossicular chain pathology may also be encountered in case of tubotympanic type of CSOM still it is less common as compared to the cholesteatoma. The lenticular process of incus was found to be most susceptible for erosion.

The delicate ossicles with less blood supply are susceptible for erosion as compared to other strong ossicles by disease process.

CONCLUSION

Ossicular chain erosion is more common feature of atticoantral type of disease but it may still be encountered in tubotympanic type of disease. As reported by present study, 8% cases were found to have ossicular chain erosion in tubotympanic type of CSOM. The lenticular process of incus was more commonly involved because it is delicate, and has less blood supply structure. Erosion of ossicular chain causes the hearing loss.

All patients of CSOM with tubotympanic disease should be checked for ossicular chain continuity and movement of all ossicles should be evaluated to rule out any ossicular erosion and tympanosclerosis involving the ossicular joints.

Due to awareness and increasing socio-economic status, now-a-days incidence of complications is decreasing as shown by our study compared to the last decade.

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