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OSSICULAR CHAIN STATUS IN CASES OF CHOLESTEATOMATOUS CHRONIC OTITIS MEDIA IN KASHMIR, J&K INDIA.

ENT

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ABSTRACT

Background: Ossicular erosion and disruption of ossicular chain is a frequent complication ofcholesteatomatous chronic otitis media leading to hearing loss.

Aims and Objectives: To find out the status of ossicles and ossicular chain in patients of choleasteatomatous chronic otitis media undergoing surgery.

Materials and Methods: This is a Prospective study conducted among 80 patients of chronic suppurative otitis media with cholesteatoma undergoing surgery at SKIMS Medical College Bemina Srinagar, Department of ENT, Head and Neck Surgery, over a period of one (03) years, 18 Feb 2016 to 17 Feb 2019. In each patient the condition and the integrity of ossicular chain was evaluated in order to determine the presence and site of lesion of each ossicles. The data was analysed and expressed in numbers and percentage.

Results: Among 80 cases, 43(53.75%) were male and 37(46.25%) were female. The age range was 17 to 60 years. The commonest age range was of 17-20 years, 29 (36.25%). The chief complaints of the patients were ear discharge seen in 80 (100%) cases and hearing loss in 67 (83.75%) cases. Malleus was found intact in 63 (78.75%) cases and absent in 06 (7.50%). Handle erosion was found in 05 (6.25%) cases. Head and handle erosion was found in 06 (7.50%) cases. Incus was found intact in only 10 (12.5%) cases and absent in 17 (21.25%) cases. Long and lenticular process was eroded in 53 (66.25%) cases. Intact suprastructure of Stapes was found in 43(53.75) cases. Suprastructure erosion was found in 37(46.25%) cases. Intact ossicular chain was found only in 10 (12.25%) cases. M+S+ was found in 27 (33.75%) cases followed by M+S- in 19 (23.75%). M-S+ was found in 07 (8.75%) cases. All the ossicles eroded were found in 17 (21.25%) cases.

Conclusion: In this study of cholesteatomatous ears, the Malleus was found to be the mostresistant ossicle to erosion, whereas, Incus was found to be the most susceptible.

KEYWORDS

INTRODUCTION

Chronic Suppurative Otitis Media (CSOM), A Common Condition In Otorhinolaryngology, Is Characterized By Chronic, Intermittent Or Persistent Discharge Through A Perforated Tympanic Membrane. Chronic Suppurative Otitis Media (CSOM) is a leading cause of conductive hearing impairment in adults secondary to the damage of the ear drum and middle ear ossicles induced by chronic inflammation present in the tympanic cavity. Ossicular erosion, a frequent complication of CSOM, may lead to total failure of middle ear mechanism resulting in substantial hearing loss.[1]

The degree of hearing loss varies with size and position of tympanic membrane defect, status of ossicular chain and presence of middle ear pathology.[2,3]Both Types Of CSOM, Tubotympanic Which Is Considered Safe, As Well As Attico-Antral Which Is Considered Unsafe, May Lead To Erosion Of The Ossicular Chain. This Propensity For Ossicular Destruction Is Much Greater In Cases Of Unsafe CSOM, Due To The Presence Of Cholesteatoma And/Or Granulations[2,3,4].

Partial or total destruction of ossicles is seen in approximately 80% of patients with cholesteatoma, whereas in chronic otitis media without cholesteatoma, ossicular chain erosion can be seen in approximately 20% cases. Cholesteatoma may cause bone erosion and result in intra temporal and intracranial complications, with high mortality and morbidity rates.[2, 5,6] Erosion of the bone is an established pathological characteristic of cholesteatoma.

The Proposed Mechanism For Erosion Is Chronic Middle Ear Inflammation As A Result Of Overproduction Of Cytokines—TNF Alpha, Interleukin-2, Fibroblast Growth Factor, And Platelet Derived Growth Factor, Which Promote Hyper Vascularisation, Osteoclast Activation And Bone Resorption Causing Ossicular Damage [1, 2]. CSOM Is Thus An Inflammatory Process With A Defective Wound Healing Mechanism. This Inflammatory Process In The Middle Ear Is More Harmful The Longer It Stays And The Nearer It Is To The Ossicular Chain [1,2]

Destruction of the ossicular chain results in large hearing losses. Complete disruption of the ossicular chain can result in a 60 dB hearing loss.[2,9,11]

Whatever may be the mechanism of bone destruction, the fact is that cholesteatoma spreads in and across the middle ear cleft with a potential to both intracranial and extra cranial complications, ranging from severe ear pain, foul smelling ear discharge, deafness to well-known complications like facial paralysis, meningitis, sigmoid sinus thrombosis, epidural abscess and brain abscess.[2]

Basically there are four major ossicular defects; the most common is the involvement of long process of incus with intact malleus and stapes. The second most common defect is erosion of stapes supra structure as well as loss of incus. Third, the cholesteatoma growing into the middle ear involving the malleus handle and stapes remain intact. Finally there may be loss of all ossicles except the stapedial foot plate. The reason of the erosion of long process of incus by cholesteatoma, being most frequently encountered defect of ossicular chain is due to its delicate structure rather than its tenuous blood supply.[2,5,8]

The tuning fork test is an indicative of conductive hearing loss. But sometimes hearing may be normal when ossicular chain is intact or when cholesteatoma bridges the gap between the destroyed ossicles.

An audiogram indicates a normal bone conduction but an air-bone gap up to 60dB when there is complete ossicular chain disruption, and a tympanometry shows a high compliance.

High resolution CT scan of temporal bone also provides good information regarding the status of ossicles. The destroyed ossicles can be seen during surgical interventions under microscope. [12,13]

MATERIALS AND METHODS

This prospective study was conducted among 80 patients diagnosed as chronic suppurative otitis media with cholesteatoma undergoing surgery at SKIMS Medical College Bemina Srinagar in Department of ENT, Head and Neck Surgery for a period of Three years from **18 Feb 2016 to 17 Feb 2019.**

Inclusion Criteria

- Patients aged 17 years or more.
- Patients diagnosed with cholesteatomatous chronic otitis media.
- Patients willing to give consent.

Exclusion Criteria

- Patients who were less than 17 years age.
- Patients having malignancy of middle ear.
- Patients suffering of otitis externa

4. Patients with previous history of ear surgery

After thorough history, preoperative otologic evaluation (otoscopy and otomicroscopy) and basic audiolological assessment such as PTA, Tympanometry was carried out. Imaging study like HRCT of the temporal bone was also carried out where necessary. They underwent tympanomastoidectomy and ossicular chain construction. Assessment of data was carried out during surgery and recorded in a standard format.

In each patient the condition and the integrity of ossicular chain was evaluated in order to determine the presence and site of lesion of each ossicles. The data was analysed and expressed in numbers and percentage.

RESULTS

From these, 80 patients were included in this study who were having CSOM withcholesteatoma and underwent tympanomastoidectomy surgery.

Among 80 cases, 43 (53.75%) were male and 37 (46.25%) were female (Table 1). The chief complaints of the patients were ear discharge, seen in 80 (100%) cases and hearing loss in 67 (83.75%) cases (Table 2).
The age range was 17 to 60 years and the mean age was 25.6 years. The largest group, 29 (36.25%) cases were of the range 17 to 20 years. The least common were those over 60 year's group, only 3 (3.75%) cases (Table 3).

Malleus was found intact in 63(78.75%) cases and absent in 06 (7.50%).Handle erosion was found in 05 (6.25%) cases. Head and handle erosion was found in 06 (7.50%) cases (Table 4).

Incus was found intact in only 10 (12.50%) cases and absent in 17 (21.25%) cases. Long and lenticular process was eroded in 53(66.25%) cases (Table 5).

Intact suprastructure of Stapes was found in 43(53.75%) cases. Suprastructure erosion was found in 37 (46.25%) cases (Table 6).

Intact ossicular chain was found only in 10 (12.50%) cases. Intact Malleus and Stapes with eroded Incus was found in 27 (33.75%) cases followed by intact malleus with eroded Incus and erode Stapes in 19 (23.75%). Absent or eroded Malleus and Incus with Intact Stapes suprastructure was found in 07 (8.75%) cases. All the ossicles eroded were found in 17 (21.25%) cases (Table 7).

TABLE I	Gender Distribution	
Gender	Number	Percentage
Male	43	53.75 %
Female	37	46.25%
Total	**80**	**100%**

TABLE 2	Chief Complaints	
Chief Complaints	Number	Percentage
Ear Discharge	80	100%
Hearing Loss	67	83.75%

TABLE 3	Age Distribution	
Age Range	Number	Percentage
17-20 years	29	36.25%
21-30 years	25	31.25%
31-40 years	18	22.50%
41-50 years	05	6.25%
51-60 years	03	3.75%
Total	**80**	**100%**

TABLE 4	Status of Malleus	
Status of malleus	Number	Percentage
Intact	63	78.75
absent	06	7.50
Handle erosion	05	6.25
Head and Handle Erosion	06	7.50
Total	**80**	**100%**

TABLE 5	Status of Incus	
Status ofIncus	Number	Percentage
Intact	10	12.50%
Absent	17	21.25%
Long and Lenticular Process erosion	53	66.25%
Total	**80**	**100%**

TABLE 6	Status of Stapes	
Status of Stapes	Number	Percentage
Intact Suprastructure	43	53.75 %
Suprastructure Erosion	37	46.25%
Total	**80**	**100%**

TABLE 7	Status of Ossicular Chain	
Status of Ossicular Chain	Number	Percentage
Intact Osicular Chain (M+, I+, S+)	10	12.25%
Malleus present, Stapes suprastructure present (M+, S+)	27	33.75%
Malleus present Stapes Suprastructure Abscent,(M+, S-)	19	23.75%
Malleus Abscent, stapes suprastructure present (M-, S+)	07	8.75%
Malleus Abscent Stapes Suprastructure Abscent (M-, S-)	17	21.25%
Total	**80**	**100%**

DISCUSSION

Chronic supportive otitis media (CSOM) is a persistent disease which can cause severe destruction of middle ear and mastoid leading to irreversible sequelae.[2]

In this study, we studied a total 80 patients of CSOM with cholesteatoma to assess the intra-operative ossicular status. The presenting complaints were that of ear discharge in 80(100%) cases & hearing impairment in 67(83.75%) cases. The lesser number of hearing loss as presenting complaint, in relation to discharging ears could be attributed to the difficulty in appreciating minor degrees of hearing loss by the patient. 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.[4]

Majority of our patients 29 (36.25%) were in the age group of 17 to 20 years followed by 25 (31.25%) in the age group of 21-30 years. In present study, young adults were found to be more affected similar to other studies.[4,9]

Malleus was found to be the most resistant ossicles in our study. Malleus was found intact in 63 (78.75%) cases and absent in 06 (7.50%).Handle erosion was found in 05 (6.25%) cases. Head and handle erosion was found in 06 (7.50%) cases. Overall, 28.25% of Malleus in our study was necrosed. Sade et al found Malleus necrosis in 26.00% cases in their study similar to our study.5 However, in a study by Mohammadi G and colleagues observed Malleus erosion to be 43.9% in their study.9 In a study by Kurien and colleagues these figures were: Incus 100% and malleus 67%, with stapes involvement occurring more in children than in adults (95% vs 67%).[6]

In our study, Incus was observed as the commonest ossicle to be necrosed. Incus was found intact in only 10 (12.50%) cases and absent in 17 (21.25%) cases. The commonest part to get eroded was the long and lenticular process of the Incus, 53 (66.25%) cases.

Saurabh Varshney et al. showed intact Incus in 15% cases, eroded in 45% and absent in 40% cases.4 Austin reported the most common ossicular defect to be the erosion of Incus, with intact Malleus and Stapes, in 29.50% cases10 Kartush found erosion of long process of Incus with an intact Malleus handle and Stapes superstructure (type A) as the most common ossicular defect.[11]

In this study, Stapes was founded intact in 43 (53.75%) cases and eroded in 37 (46.25%) cases. Saurabh Varshney et al. reported erosion of Stapes in 51.67% cases and intact Stapes in 48.33% cases.[4] Sade reported Stapes involvement in 36% case.5 However, Austin reported erosion of Stapes at around 15.50% cases.[10]

Regarding the status of ossicular chain, intact ossicular chain (M+S+I) was found in only 10 (12.50%) cases. Intact Malleus and Stapes with eroded or absent Incus (M+S+) was found in 27 (33.75%) cases. Intact

malleus with eroded Incus and Stapes (M+S-) in 19 (23.75%) cases. Absent or eroded Malleus and Incus with Intact Stapes suprastructure (M-S+) was found in 07 (8.75%) cases. All the ossicles eroded (M-S-) were in 17 (21.25%) cases. Austin reported the most common ossicular defect to be the erosion of Incus, with intact Malleus and Stapes (M+S+) in 29.50% cases.10 Kartush found erosion of long process of Incus with an intact Malleus handle and Stapes superstructure as the most common ossicular defect.[11]

In unsafe CSOM, Saurabh Varshney et al found only 9 (15.00%) cases with intact ossicular chain. M+S+ was seen in 8 (13.33%) cases, M−S+ in 12 (20.00%) cases, M+S− in 16 (26.67%) cases and M−S− in 15 (25.00%) cases.[4]

CONCLUSION

Erosion of ossicles and ossicular chain is a common finding in cholesteatomatous ears. In this study, the Malleus was found to be the most resistant ossicle to erosion, whereas, Incus was found to be the most susceptible. The erosin of ossicles leading to hearing loss in cholesteatomatous chronic otitis media is a matter of concern because of its long-term effects on communication and language development. Early diagnosis and intervention by a skilled Otologist should be helpful to reduce this morbidity.

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