Ossicular Status in Cholesteatoma : Experience in a State Medical College of West Bengal

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ABSTRACT

Introduction

Chronic otitis media is a long standing infection of part or whole of middle ear cleft. Its active squamosal variant (cholesteatoma) is most dangerous due to its bone eroding property.

Aims & Objectives

Background knowledge of ossicular status in cholesteatoma will help us in determining the type of reconstruction needed during the surgery.

Materials And Methods

60 cases of cholesteama, irrespective of age and sex [diagnosed on the basis of clinical examination , audiological and radiological evaluation] were selected during the study period of two years and their ossicular status were recorded intra-operatively.

Result

Ossicles and their parts getting involved in cholesteatoma cases , in decreasing order are :

Lenticular process (in total 50 cases)>Long process of incus (in total 49 cases) > stapes super-structure(in total 29 cases) > body of incus(in total 26 cases)> head of malleus(in total 23 cases)> handle of malleus(in total 10 cases).

Ossicular chain defeact in decreasing order are : M-I-S- > M+I-S- > M-I-S+ > M+I-S+.

Conclusion

In our study it was found that incus is the most vulnerable ossicle to get involved in cases of active squamosal variety of chronic otitis media where as malleus appeared to be the least susceptible one.

Keywords

Otitis Media; Cholesteatoma; Ear Ossicles; Incidence

Chronic otitis media is a long standing infection of part or whole of middle ear cleft. Its active squamosal variant (cholesteatoma) is most dangerous due to its bone eroding property. In most of cases it destroys middle ear ossicles partially or completely, to a lesser extent it may also erode skull bones thus causing intracranial complications.

This bone eroding property of cholesteatoma is still not very clear though it has been suggested that the process is mediated by several factors like local pressure , inflammatory mediators i.e. TNF alpha , IL-1a & PGE2 and local enzymes i.e. collagenase and hydrolase.[1,2]

In this study we have evaluated statistically the incidence of destruction of individual ossicle and at the same time, their extent of destruction in various cases of cholesteatoma.

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Aims & Objectives

Background knowledge of ossicular status in cholesteatoma will help us in determining the type of reconstruction needed during the surgery. Therefore clear cut statistical data regarding involvement of individual ossicle and their extent of erosion in cholesteatoma is

necessary.

Material and Methods

The present study was conducted at the Department of ENT of a state medical college of West Bengal between October 2010 to September 2012. Sixty (60) consecutive cases of cholesteama (diagnosed on the basis of clinical examination , audiological and radiological evaluation) taken up for surgery during the study period, irrespective of age and sex were selected and their ossicular status were recorded intra-operatively.

Results and Analysis

Status of malleus (Table I)

Out of 60 cases 27 (45%) cases presented with malleus involvement, in which the head was found to be necrosed in 17 (27.67%) cases , handle was necrosed in 4(6.67%) cases , head and manubrium in 1(1.73%) case. Malleus was totally absent in 5(8.33%) cases and was intact in 33(55%) cases.

Therefore the head of malleus was found to be eroded

Table I: Status of Malleus

SITE INVOLVED (MALLEUS)	NO. OF CASES	PERCENTAGE (%)
Intact	33	55%
Handle necrosed	4	6.67%
Head necrosed	17	27.67%
Head+ Manubrium	1	1.73%
Total absence	5	8.33%
Total no. Of cases	60	100%

in total 23 cases(5 in case of total malleus destruction + 17 in cases of isolated head destruction +1 along with handle destruction).

Handle was necrosed in total 10 cases (5 in case of total malleus destruction +1 along with head destruction + 4 in cases of isolated handle destruction).

Status of incus (Table II)

Out of 60 cases 50 (83.33%) presented with incus involvement in which entire incus was absent in 26 (43%) cases, long process and lenticular process absent in 23(38%) cases , only lenticular process absent in 1 (2.67%) case.

Therefore lenticular process is found to be eroded in total 50 cases(26 in case of total incudal destruction + 23 along with long process destruction +1 in cases of isolated lenticular process destruction).

Long process was eroded in overall 49 cases (26 in case of total incudal destruction + 23 along with lenticular process destruction).

Body was eroded in 26 cases (26 in case of total incudal destruction).

Table II: Status of Incus

SITE INVOLVED (INCUS)	NO. OF CASES	PERCENTAGE (%)
Intact	10	16.66%
Total absent	26	43%
Long precess + lenticular process	23	38%
Only lenticular process	1	2.67%
Total no. of cases	60	100%

Status of stapes (Table III)

Stapes superstructure was found to be eroded in 29 (48.3%) cases.

Table III: Status of Stapes

SITE INVOLVED (INCUS)	NO. OF CASES	PERCENTAGE (%)
Intact	31	51.7%
Superstructure eroded	29	48.3%
Total no. of cases	60	100%

Status of ossicular chain continuty (Table IV)

In 10 (16.67%) cases, ossicular status was M+ I+ S+; In 9 (15%) cases, ossicular status was M+ I- S+; In 14 (23.33%) cases, ossicular status was M+ I- S-; In 12 (20%) cases, ossicular status was M- I- S+; In 15 (25%) cases ossicular status was M- I- S-.

Table IV: Status of ossicular chain continuity

OSSICULAR CHAIN STATUS	NO. OF CASES	PERCENTAGE (%)
M+ I+ S+	10	16.67%
M+ I- S+	9	15%
M+ I- S-	14	23.33%
M- I- S+	12	20%
M- I- S-	15	25%
Total	60	100%

Ossicles and their parts getting involved in cholesteatoma cases, in decreasing order were :

Lenticular process (in total 50 cases)>Long process of incus (in total 49 cases) > stapes superstructure (in total 29 cases) > body of incus(in total 26 cases) (Fig. 1) > head of malleus(in total 23 cases)> handle of malleus(in total 10 cases).

Ossicular chain defects in decreasing order were :

M-I-S- > M+I-S- > M-I-S+ > M+I-S+.

Discussion

Out of 60 cases, 27 (45%) cases presented with malleus involvement. Head necrosed in 17 (27.67%) cases, totally absent in 5(8.33%) cases, handle necrosed in 4(6.67%) cases, head and manubrium in 1(1.73%) case. These findings were consistent with those of Udaipurwala et al.[3] though Sade et al.[4] found malleus necrosis in 26.00% cases.

Incus was found to be totally absent in 26(43%) cases, Udaipurwala et al.[3] had a very similar incidence of necrosis of the incus at 41.00%; long process with lenticular process were eroded in 23(38%) cases, isolated lenticular process erosion in 1(1.73%) case. Incus was found to be intact in 10(16.66%) cases. However the long process appeared to be the most affected part alone (Fig. 2) or as a part of total necrosis (49cases)(81%).

Stapes superstructure found to be eroded in 29 (48.3%) cases. Sade et al.[4] reported stapes involvement in unsafe CSOM to be 36.00% . Shreshtha et al.[5] found involvement of stapes superstructure in 15.00% cases

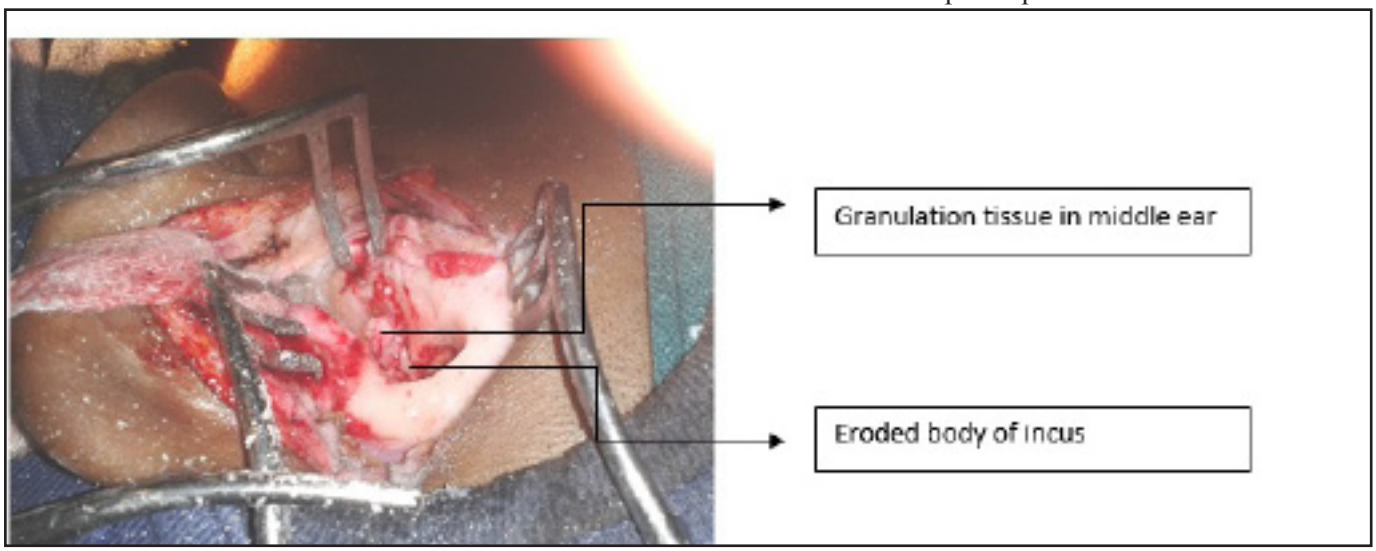

Fig. 1 Modified radical mastoidectomy showing eroded body of incus with granulation tissue in middle ear

Fig. 2 Incus, removed during mastoidectomy. Its long process got eroded by cholesteatoma

of unsafe CSOM . Motwani et al.[6] reported stapes arch necrosis in 30.00% cases of COM.

In 10(16.67%) cases ossicular status was M+ I+ S+ . In 9(15%) cases ossicular status was M+ I- S+ . In 14(23.33%) cases ossicular status was M+ I- S- . In 12(20%) cases ossicular status was M- I- S+ . In 15(25%) cases ossicular status was M- I- S-. Therefore, the commonest ossicular chain status was M- I- S- followed by M+ I- S- & M- I- S+. These findings were in tandem with those of Dasgupta et al.[7] in two studies on unsafe CSOM. Toran et al.[8] reported similar findings of ossicular chain in M- I- S- category. Austin reported the most common ossicular defect to be the erosion of incus, with intact malleus and stapes, in 29.5% cases . Kartush[9] found erosion of long process of incus with an intact malleus handle and stapes superstructure as the most common ossicular defect. Shreshtha et al.[5] and Mathur et al.[10] also reported similar findings in unsafe COM .

Conclusion

In our study it was found that incus is the most vulnerable ossicle to get involved in cases of active squamosal variety of chronic otitis media where as malleus appeared to be the least susceptible one.

References

1. Abramson M, Huang CC. Localization of collagenase in human middle ear cholesteatoma. Laryngoscope 1976; 85:204-9.
2. Ferlito O, Devaney KO, Rinaldo A, Milroy C, Wenig B, Iurato, S, et al. Clinicopathological consultation: ear cholesteatoma versus cholesterol granuloma. Ann Otol Rhinol Laryngol. 1997;106:79-85.
3. Udaipurwala IH, Iqbal K, Saqulain G, Jalisi M. Pathlogical profile in chronic suppurative otitis media—the regional experience. J Pak Med Assoc. 1994;44(10):235–237.
4. Sade J, Berco E, Buyanover D, Brown M. Ossicular damage in chronic middle ear inflammation. Acta Otolaryngol. 1981; 92:273-283. doi: 10.3109/00016488109133263.
5. Shrestha S, Kafle P, Toran KC, Singh RK. Operative findings during canal wall mastoidectomy. Gujarat J Otorhinolaryngol Head Neck Surg. 2006; 3(2):7-9.
6. Motwani G, Batra K, Dravid CS. Hydroxylapatite versus teflon ossicular prosthesis: our experience. Indian J Otol. 2005;11:12-16.
7. Dasgupta KS, Joshi SV, Lanjewar KY, Murkey NN. Pars tensa and attic cholesteatoma: Are these the two sides of a same coin? Indian J Otol. 2005; 11:22-26.
8. Toran KC, Shrestha S, Kafle P, Deyasi SK. Surgical management of Sinus tympani cholesteatoma. Kathmandu Univ Med J. 2004; 2(4):297-300.
9. Kartush JM. Ossicular chain reconstruction. Capitulum to malleus. Otolaryngol Clin North Am.1995; 27:689-715.
10. Mathur NN, Kakar P, Singh T, Sawhney KL. Ossicular pathology in unsafe chronic otitis media. Indian J Otolaryngol. 1991; 43(1):9-12.