OSSICULAR CHAIN ABNORMALITIES IN CHRONIC SUPPURATIVE OTITIS MEDIA AND ITS MANAGEMENT

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ABSTRACT: OBJECTIVE: To study the commonest ossicular pathology in CSOM (Chronic suppurative otitis media) and how the results vary with various techniques and graft materials used for ossicular reconstruction. **Design:** Prospective study **Setting:** Department of E.N.T, Vinayaka Missions Medical College and Hospital, Karaikal, Puducherry (U.T). **METHODS:** A total of 80 patients, between 11 – 50 years of age group with CSOM requiring surgical treatment who were treated in the Vinayaka Missions Medical College., Hospital, Karaikal within a period of 18 months from July 2011 to December 2012 were taken into study. **RESULTS:** The Commonest ossicular pathology is necrosis of incus. (95%). A closure of air bone gap within 20dB was achieved in 72.2% patients, where, malleus stapes assembly was done. Better results were obtained by using autogenous incus remnant. **CONCLUSION:** In this era where a large variety of artificial prosthetic materials are being used to replace and to reconstruct the ossicular chain, autograft still plays significant role.

KEYWORDS: Chronic Suppurative Otitis Media [CSOM], ossicular Chain abnormalities, Ossicular reconstruction.

INTRODUCTION: Hearing is one of the vital senses of human beings, deafness upsets tranquility of life. In India, especially in Karaikal, and surrounding areas of Tamil Nadu, the incidence of CSOM is very high. About 30% of patients who attend the ENT OPD suffer from CSOM.

The management of CSOM has witnessed a profound change over the last 110 years from the early attempts at surgical exposure of Middle ear in 1889 to the present day technique of tympanoplasty. Middle ear reconstruction can be done after successful removal of disease. For a successful ossicular reconstruction an air filled middle ear and a functioning eustachian tube are important pre requisites. The tympanic membrane must be intact, healthy and mobile. The ossicular reconstruction must be secure and safe.

Grafts and biomaterials chosen for use in middle ear reconstruction should not induce a sustained foreign body reaction, neither should they extrude (or) biodegrade. Most ear surgeons prefer to use healthy, fresh autologous tissues and with these materials success rate is high. The preferred second choices are allogeneic tissues.

The purpose of this study was to find the age, sex related distribution, the commonest ossicular pathology, results of ossicular reconstruction by using various techniques, graft materials and to compare pre and post – operative hearing thresholds in patients with CSOM in Karaikal, as the CSOM incidence is very high in and around this place.

MATERIALS AND METHODS: 80 ossiculoplasties were performed over a period of 18 months from July. 2011 to December 2012 at Vinayaka Missions Medical College, Karaikal. These Patients falling under the age group of 11- 50 years. Both safe and unsafe type of CSOM with good cochlear reserve

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and good Eustachian tube function were selected. Both intact canal wall and canal wall down procedures were included.

After clearing of disease from middle ear and mastoid, the status of ossicular chain was assessed. Ossicular reconstructive procedure was planned according to the status of ossicular chain. Temporalis fascia was used to close the perforation.

In this study, we have included only those cases where autogenous cartilage (conchal), autogenous bone (incus remnant) and homograft cartilage (septal cartilage) was used between

1. Malleus and head of stapes (Malleus – stapes assembly)
2. Malleus and foot plate (Malleus – foot plate assembly)
3. Stapes head and newly constructed tympanic membrane (short columella)
4. Foot plate and newly constructed TM (Long columella)

All patients underwent audiometry assessment, pure tone averages 500, 1000, 2000 Hz were compared between preoperative and post operative results.

RESULTS:

1. Majority of patients (95%) were more than 20 years of age with male predominance [male: female; 2.3:1] and left ear (52.5%) was involved more frequently compared to the right ear.
2. Commonest complaints were otorrhoea (100%) and hearing loss (92.5%) with average duration of hearing impairment and otorrhoea being 2.8 years and 7.25 years respectively.
3. We in our study, observed that 87.5% patients had hearing threshold of more than 30dB.

S.No	Ossicular status	No. of Patients	Percentage
1	Necrosed malleus	22	27.5
2	Necrosed incus	76	95
3	Absent stapes super structure	22	27.5

Table 1: Intra operative ossicular status (n=80)

* Commonest ossicular pathology is necrosis of incus. (95%)

Preoperative		Post operative (ICW technique)		
AB gap (dB)	No. of patients	Reconstruction technique	Closure within 20 dB (no. of patients)	Closure within 30 dB (no. of patients)
0-10		Malleus – stapes assembly	32	44
11-20		Malleus – foot plate		4
21-30	6	Short columella	4	14
>30	58	Long columella		2

Table 2: Pre - operative and post operative air bone gap findings with ICW Technique (n=64)

ICW = Intact Canal Wall; AB – Air bone

* As per the above table, closure of air bone gap within 20dB was achieved in 72.2% patients, where, malleus stapes assembly was done.

Preoperative		Post operative (CWD technique)		
AB gap (dB)	No. of patients	Reconstruction technique	Closure within 20 dB (no. of patients)	Closure within 30 dB (no. of patients)
0-10		Short columella	-	-
11-20	2			
21-30	2	Long columella	2	4
>30	12			
Table 3: Pre and post operative air bone gap findings with CWD technique (n=16)				

CWD = Canal Wall Down; AB – Air bone

*As per the above table in patients with long columella air bone gap of less than 20dB was seen in 12.5%, with CWD technique.

4. In intact Canal Wall Technique air bone gap of less than 20dB in patients using incus remnant was 74.07%.
5. In canal wall down technique closure within 20dB using septal cartilage is 14.28%.

DISCUSSION: This study was conducted to know the commonest ossicular pathology in CSOM and how the results vary with various materials used for ossicular reconstruction there by comparing the pre operative and post operative air bone gap findings.

The commonest type of ossicular chain erosion encountered in CSOM is necrosis of long process Of incus because of its anatomical position and the course of its blood supply¹

Zollhner² described the benefits of sculpturing the autologous incus in order to obtain a better assembly. Wehrs³ and others refined this technique and advocated the use of homograft ossicles.

Austin⁴(1972), Fisch (1994) and Penington⁵ (1983) in their extended period of study reported good stability of hearing results with autografts. Black⁶ compared the results of malleus stapes assembly with malleus foot plate assembly and achieved the closure of air bone gap within 20dB in 86% of patients in the former and 80% in the later.

Al-Qudah M ⁷(2006) concluded that AB gap closure within 20dBHL was achieved in 77% of patients postoperatively with auto graft incus by malleus –stapes assembly.

Bauer⁸ (2000) analysed his 34 years of experience with autogenous incus and cortical bone to form a columella between stapes and tympanic membrane. In their study 85% showed an AB gap closure ≤ 20dB and 43% showed closure ≤ 10dB when TM was normal.

We analysed our results according to the type of reconstruction and found that malleus stapes assembly gave the best results i.e., 72.72% within 20dB and 100% within 30dB and followed by short columella with 22.22% within 20dB in intact canal wall technique.

Naragund Al ⁹(2011) concluded that results after ossiculoplasty with autologous incus were significantly better compared with those after other prostheses.

Kartush¹⁰ (1999) found that the results of incus remnant and cortical bone were similar. They also found that the autogenous bone provides better sound transmission than cartilage. In our study also, we achieved better results with autogenous bone as compared to homograft cartilage.

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CONCLUSION: In this era where a large variety of artificial prosthetic materials are being used to replace and to reconstruct the ossicular chain, autograft still plays significant role. Moreover, they are stable and easily accepted by the body and not extruded.

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