

A Study of Ossicular Anomalies and Their Management in CSOM

Dr Muralidhar Reddy B. V. N¹, Dr Sravan Kumar Ch.²

¹Asst. Professor, Dept. of ENT, Osmania medical college, Hyderabad, Telangana, India.

²Senior Resident, Dept. of ENT, Gandhi medical college, Secunderabad, Telangana, India.

Abstract: In India the incidence of Chronic Suppurative Otitis Media (CSOM) is very high. The management of CSOM had witnessed a profound change over the last 100 years. Forty Ossiculoplasties were performed over a year period i.e. from July 2014 to June 2015 at a tertiary care hospital in south India. Patients of both safe and unsafe type of CSOM with good cochlear reserve and good Eustachian tube function were selected. Both intact canal wall and canal wall down procedures were included. In our study, we achieved better results with autogenous bone as compared to homograft cartilage.

Keywords: Ossicular erosion, Ossiculoplasty, Tympanoplasty, Austins classification, Reshaped incus

I. Introduction

Hearing is one of the vital senses of man. Deafness upsets the tranquility of life. When such a great vital sensation is lost, life naturally loses its charm. In India the incidence of Chronic Suppurative Otitis Media (CSOM) is very high. The management of CSOM had witnessed a profound change over the last 100 years, from the early attempts at surgical exposure of the middle ear in 1889 to the present day techniques of tympanoplasty. Pure tone averages were compared between pre-operative and post-operative results.

Aims of the Study

1. To study commonest ossicular pathology in CSOM.
2. Reconstruction of ossicular chain using various grafts.
3. To compare pre-operative and post-operative hearing thresholds (air bone gap dB).

II. Materials And Methods

Forty Ossiculoplasties were performed over a year period i.e. from July 2014 to June 2015 at a tertiary care hospital in south India. Patients of both safe and unsafe type of CSOM with good cochlear reserve and good Eustachian tube function were selected. Both intact canal wall and canal wall down procedures were included. The operations were performed under local or general anesthesia. Post aural or Endaural incision was used. After clearing of disease from the middle ear and mastoid as necessary, the status of ossicular chain was assessed according to Austin classification¹. Ossicular reconstructive procedures were planned according to the status of the ossicular chain. In this study, we have included only the cases where autogenous cartilage (conchal), autogenous bone (incus remnant) or homograft septal cartilage were used.

All patients underwent Pure tone audiometry [PTA] assessment before surgery and three months and six months after surgery. Pure tone averages (500Hz, 1000Hz & 2000Hz) were compared between pre-operative and post-operative results.

III. Results

The present study included 40 patients, out of which Males were 28 [70%] and Females were 12 [30%] as shown in fig-1. Of the 40 cases, 30% patients had disease in the Rt. Ear, 52.5% had disease in Lt. Ear and 7 cases (17.5%) had disease in both the ears.

No. of Patients between 11-20 years age were 2, between 21-30 years age were 30, between 31-40 years age were 6, between 41-50 years age were 2 and Patients >50 years age were nil as shown in fig-2. Commonest presenting complaint was otorrhoea (100%) followed by hearing loss (92.5%) & tinnitus (10%), later earache (5%) & vertigo (2.5%) in descending order as shown in fig-3. One patient got relieved of tinnitus after making external auditory canal free of discharge. On microscopic examination of the operating ears, the presence of central perforation was the commonest finding (70%). Attic perforation was seen in 17.5% cases and Postero-Superior Marginal perforation in 12.5% as shown in fig-4. Intra-operative ossicular status was analysed and presented according to Austin classification in fig-5. Pre-op and Post-op Air-Bone gap in deciBels was calculated and analysed in fig-6.

IV. Discussion

Ossicular chain erosion occurs in ears both with and without cholesteatoma. In most instances the erosion is a non-specific result of the hyperemia associated with the mucosal inflammation. Granulation tissue is found more frequently around the ossicular chain than anywhere else in the middle ear cleft. This could be a result of mucosal fold directing the spread of inflammation acc. to Proctor, 1964². The reason that the long process of the incus and the stapes Superstructure are the parts of the chain which are most frequently affected is likely to be due to their delicate structure, rather than their tenuous blood supply acc. to Thomsen et al, 1974³. Osteoclasts are responsible for bone absorption in association with various enzymes acc. to Ohsaki et al, 1988, Lanntgan O'Higgins & MC Phie, 1933⁴

Homograft prosthesis was used exclusively in ossicular reconstruction from 1972 to 1986⁵. Guildford⁶ and others recommended transposing the residual autograft incus onto its side so that it lies on the stapes capitulum and beneath the manubrium. Zollner⁷ described the benefits of sculpturing the autologous incus in order to obtain a better assembly and reduce subsequent ankylosis. Wehr's⁸ and others refined this technique and advocated the use of homograft ossicles.

The use of self-stabilizing pre-sculptured cartilage homografts for middle ear reconstruction had an established track record with long term results equivalent to those of reconstruction methods using alloplastic materials^{9,10}. Austin¹ (1972) and Pennington¹¹ (1948) in their extended period of study reported good stability of hearing results With autografts. Black¹² compared the results of malleus stapes assembly with malleus footplate assembly and achieved the closure of air bone gap within 20dB in 86% of patients in the former and 80% in the later.

McGee & Hough¹³ (1999) reported excellent results of hearing i.e., air bone gap closure within 10dB with sculptured ossicles. They observed that the type of ossicular defect influenced the success of the operation. The results of malleus stapes assembly (85% patients with AB gap closure within 20dB) were better than malleus footplate assembly (73% patients with AB gap closure within 20 dB).

Bauer¹⁴ (2000) analysed his 34 years of experience of autogenous incus and Cortical bone to form a collumella between stapes head and tympanic membrane. In their study 85% showed an air bone gap closure < 20 dB and 43% showed closure < 10 dB when the tympanic membrane was normal.

We analysed our results according to the type of reconstruction and found that malleus stapes assembly gave best results i.e., 72% within 20 dB and 100% within 30 dB and followed by short collumella with 22% within 20 dB and 100% within 30 dB in Intact canal wall technique.

Kartush¹⁵ (1994) found that the results Of Incus remnants 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.

V. Conclusion

In this era, where a large variety of innovative artificial prosthetic materials are being used to replace and reconstruct the ossicular chain, autografts still play a significant role. In our study, in patients with safe chronic suppurative otitis media, we have found fairly good hearing results in patients implanted with autogenous cartilage and bone. These are easily available and cost effective. They are stable and are easily accepted by the body and never extruded out.

References

- [1]. Austin D. F; ossicular reconstruction, Otolaryngology clinics of North America, 5; 145-160, 1972.
- [2]. Proctor B (1964), The development Of the middle ear spaces and their surgical significance Journal Of laryngology and otology - 78, 631-648.
- [3]. Thomsen, J. Jorgensen, M B. Bretlaw, P 8 Kirstensen, H.K (1974), Bone resorption in chronic otitis media Journal of laryngology and otology - 88, 975-992.
- [4]. Ohsaki.K, Yomashita: S, Fujita A. Masuda Y.Ueda. Sugiura, Ohsaki et al (1988) Mechanism of bone destruction due to middle ear cholesteatoma as revealed by Laser Raman Spectrometry American Journal of Otolaryngology, 9. 117-126.
- [5]. Wehrs RF, Homograft ossicles in tympanoplasty, Laryngoscope, 92, 540-546, 1982.
- [6]. Guildford F, Repositioning Of the incus, Laryngoscope, 75: 236, 1965.
- [7]. Zollner F Ole Schalleitung'splastiken Arch Otol (Stockh) 45: 168, 1955.
- [8]. Wehr's R, Results of homografts in middle ear surgery: Laryngoscope. 88. 808-815, 1978.
- [9]. Chole RA: Ossicular replacement with self-stabilizing pre-sculptured homologous cartilage. Arch otolaryngol Head Neck surgery; 108; 560-562, 1982.
- [10]. Chole Ra: Use of presculptured, banked cartilage from plants in ossicular reconstruction. Arch otolaryngol 113, 145-148, 1987.
- [11]. Pennington CL (1983): Incus interposition - A 15-year report, Annals of Otol, Rhinol, Laryngol 92, 568-570.
- [12]. Black B (1994), Spanner malleus/footplate assembly, Laryngoscope 104, June, 775-778.
- [13]. McGee, M. Hough J. U. D. (1999) Ossiculoplasty Otolaryngologic clinics of NA, vol 32. No.3, 471-487.
- [14]. Bauer M (2000): Ossiculoplasty Autogenous bone grafts, 34 years experience, Clinical otolaryngology; 25, 257-263.
- [15]. Kartush JM (1999) Ossicular chain reconstruction, Otolaryngology clinics of N. Am. 27, 689-715.

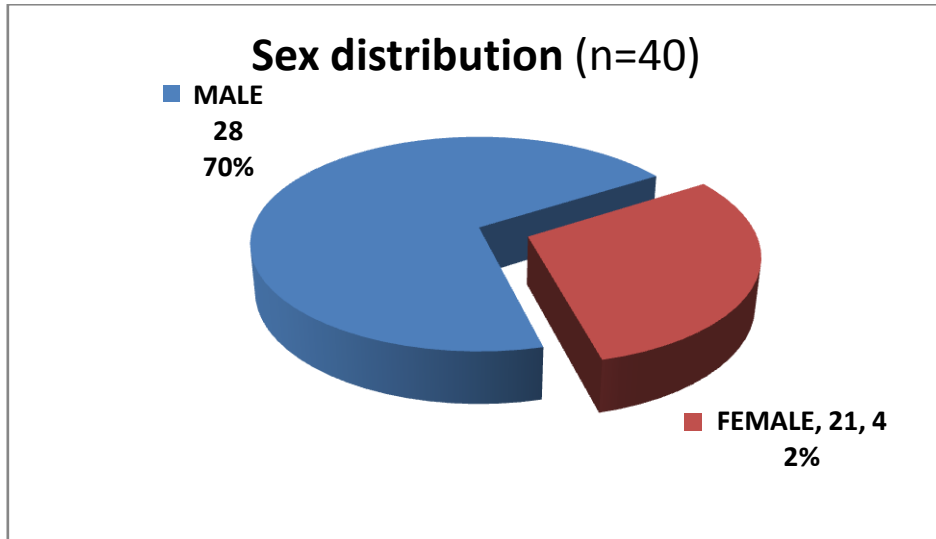


Figure 1- showing sex distribution

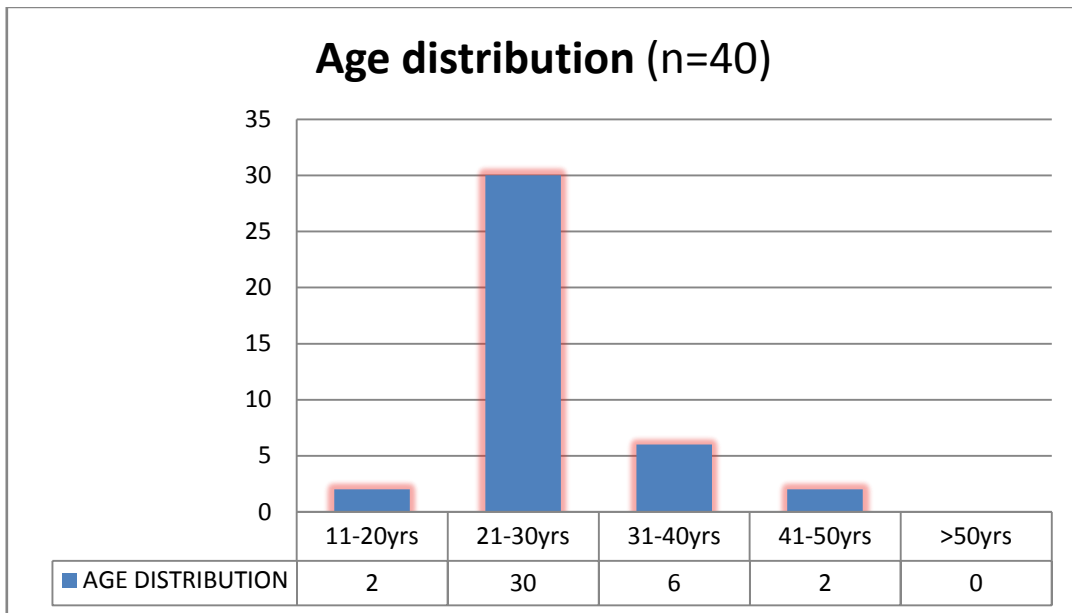


Figure 2- showing age distribution

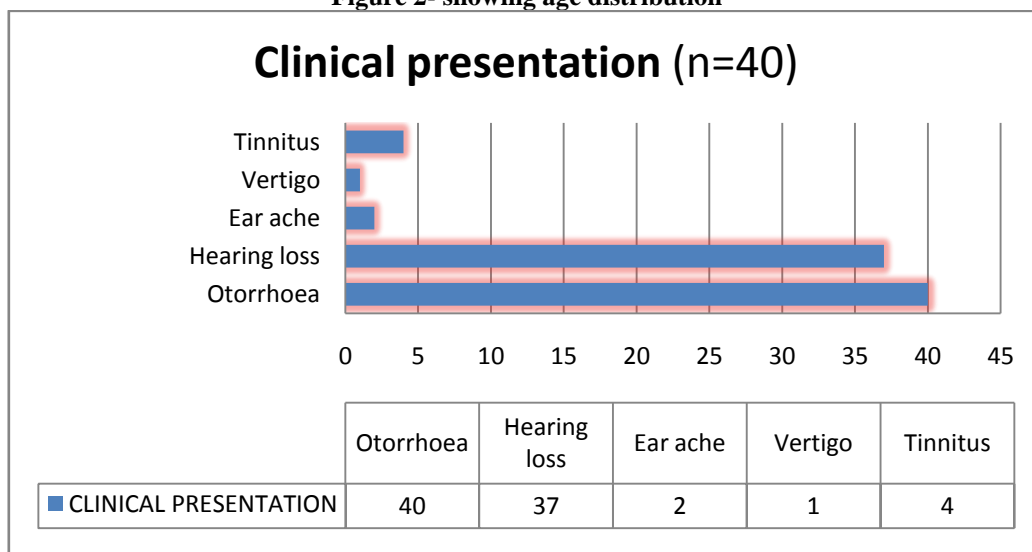


Figure 3- showing clinical presentation

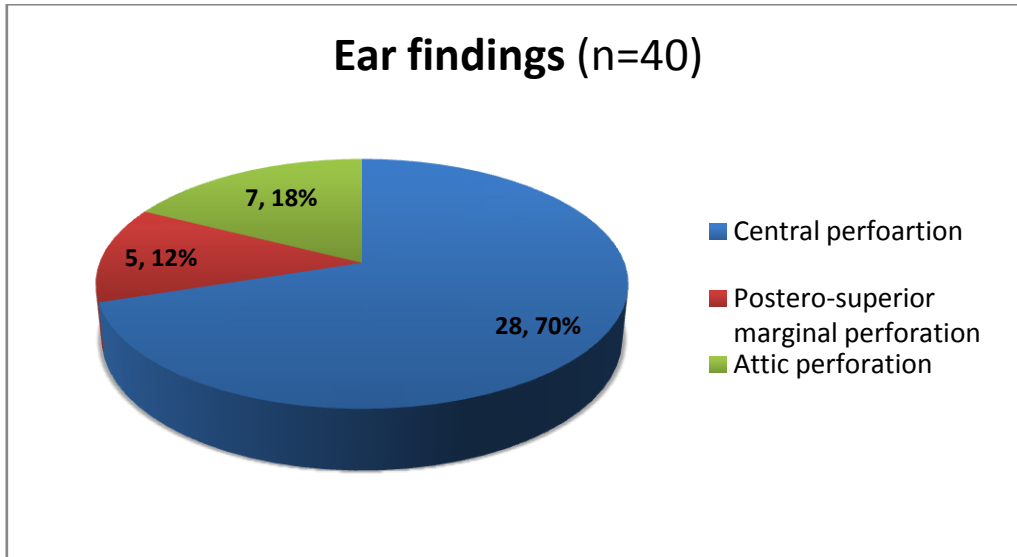


Figure 4- showing Ear findings

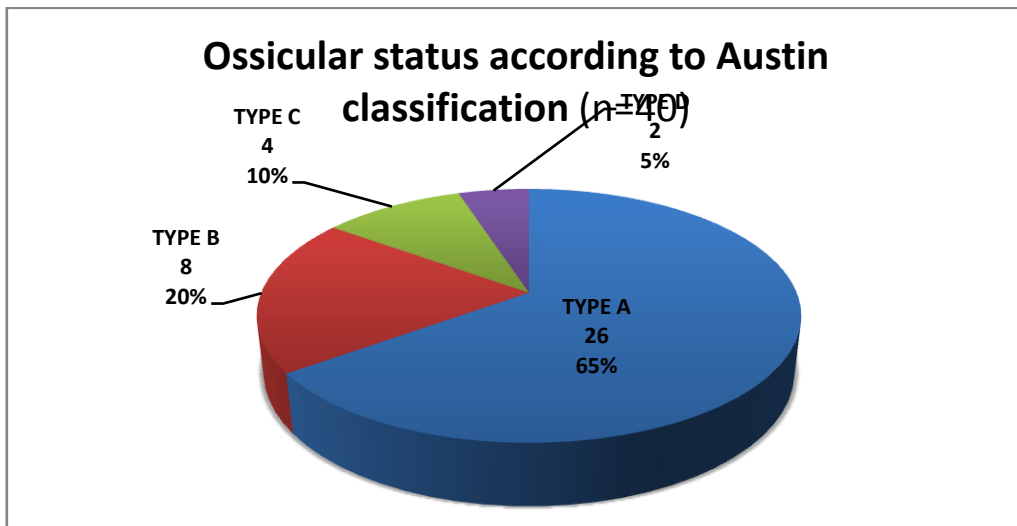


Figure 5- showing ossicular status according to Austin classification

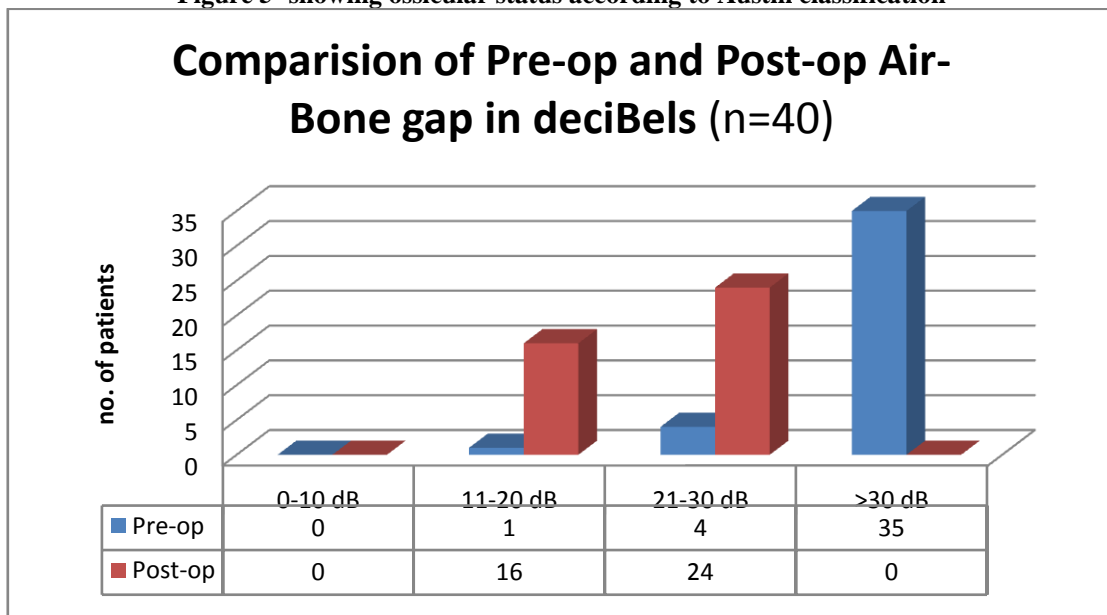


Figure 6- showing Comparison of Pre-op and Post-op Air-Bone gap in deciBels