

A Study of Single Stage Ossiculoplasty in The Surgical Management of Chronic Suppurative Otitis Media

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Introduction

Chronic suppurative otitis media, a common condition in otorhinolaryngology, is characterized by chronic, intermittent or persistent discharge through a perforated tympanic membrane. Both types of CSOM – tubotympanic & atticoantral have been known to cause ossicular erosion that leads to moderate to severe hearing loss.

Surgical treatment of CSOM involves exenteration of disease from middle ear cleft, followed by reconstruction of hearing mechanism, by repairing the tympanic membrane perforation and/or ossicular chain reconstruction (ossiculoplasty).

Ossiculoplasty has been done earlier as a second stage operation after a gap of six months to one year for removal of disease from the middle ear and mastoid. This second stage ossiculoplasty is performed even now in many centers in Europe, U.S and also by some surgeons in India. This involves increased morbidity, hospitalization and increased cost.

Recently it has been found that removal of diseases from middle ear cleft and repair of ossicular chain in the same

sitting gives equal results in hearing improvement, thereby reducing multiple hospital stays and cost. But there have not been enough studies evaluating the hearing results when done in a single stage. Hence, this study is undertaken to evaluate hearing results after single stage exenteration of disease and reconstruction of ossicular chain.

Materials and Methods

This prospective study was conducted at Vydehi medical college, Bengaluru from 2014 to 2016. Detailed history was taken followed by complete ENT examination and diagnosis of CSOM was made and both groups of safe and unsafe type were taken into our study. All Selected cases with preoperative air conduction > 40dB were investigated further with X-ray mastoids and examination under microscope. Informed written consent was taken for all the patients undergoing surgery. HRCT temporal bone was done for selected patients with unsafe type disease to assess the extent of disease, presence of fistula, ossicular status, etc All patients underwent tympanoplasty with cortical mastoidectomy and ossiculoplasty in a single sitting by the same surgeon.

Post aural approach was employed for all the cases by giving a postaural Wilde’s incision and the temporalis fascia graft harvested was in the same incision. Mac Ewan’s tringle identified and mastoid cortex drilled posterosuperior to spine of Henle and mastoid antrum opened and widened. 360 degree elevation of tympanomeatal flap done after freshening the perforation margins, and middle ear cavity assessed for patency and ossicular erosion. In case of canal wall down mastoidectomies, posterior canal wall was drilled. Facial bridge removed and ridge lowered to level of LSC. Exenteration and exteriorization of all the mastoid air cells done after removing the anterior and posterior buttress, followed by complete saucerisation of the cavity. Based on the intraoperative ossicular chain status and extent of disease, appropriate tympanoplasty with mastoidectomy (intact / canal wall down) with ossicular chain reconstruction were performed using sculptured autologous incus / homograft cartilage. Canal wall down mastoidectomies were exclusively done for extensive squamosal disease and, patients with limited squamosal disease underwent intact canal wall mastoidectomy.

Neotympanum and ossicular graft secured with medicated gelfoam. Mastoid bandage was removed after two days followed by postaural suture removal which was done after 1 week in cases of ICW mastoidectomy and after 10 days in CWD mastoidectomies. All patients were advised to instill antibiotic ear drops for 3 weeks thereafter and maintain aural hygiene.

After surgery all the patients were followed up for a minimum period of one year at 1st month 3rd month 6th month and at the end of one year to assess graft uptake and evaluate hearing results by PTA.

Observation and results

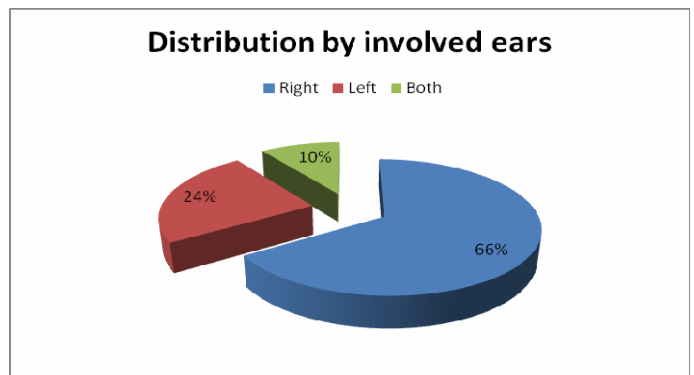
Of the 50 patients with CSOM, 27 (54%) were males and 23 (46%) were females.

		Percentage (%)
Male	27	54
Female	23	46
Total	50	100

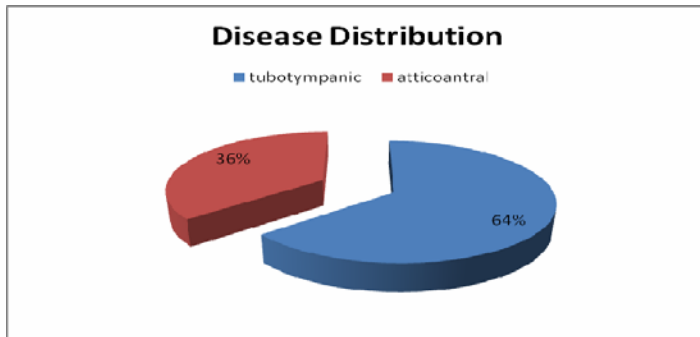
All the patients were divided into 6 groups, Group I: 0 – 10years of age, Group II: 11- 20 years of age, Group III: 21-30 years of age, Group VI: 31-40 years of age, Group V: 41-50 years of age, Group VI: 51-60 yeas of age. 48% of the patients belonged to group-IV, 30 % in group-III, 12% in group-V, 8% in group-II, 2% in group VI.

				Percentage (%)
	Male	Female		
Group I: 0 - 10 years	0	0	0	0
Group II: 11-20 years	0	4	4	8
Group III: 21-30 years	10	5	15	30
Group IV: 31-40 years	11	13	24	48
Group V: 41-50 years	5	1	6	12
Group VI: 51-60 years	1	0	1	2

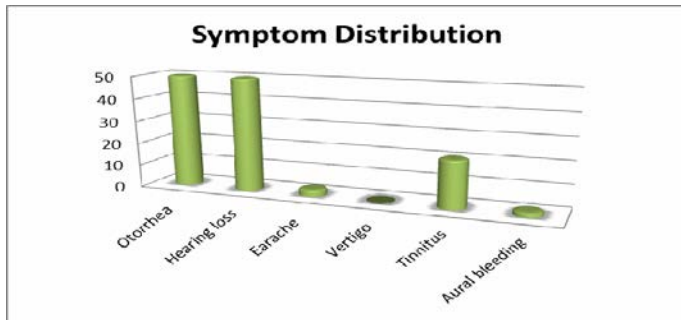
Out of the 50 patients, 33 (66%) patients had only right ear disease, 12 (24%) had only left ear disease and the remaining 5 (10%) patients had bilateral disease.



Out of 50 patients diagnosed with CSOM, 32 (64%) patients had a tubotympanic type and 18 (36%) had atticoantral type of CSOM.



Commonest presenting complaint was otorrhea and hearing loss in all our patients (100%), followed by tinnitus in 21 (42%) patients and earache in 3 (6%) patients and 2 patients (4%) had aural bleeding.



Among all the patients who presented with ear discharge and hearing loss (PTA >40 dB), 34 % of patients had a subtotal perforation, followed by 26% of large central perforation and posterosuperior quadrant perforation, attic perforation in 10% and total perforation in 2%.

Perforation	No. of Patients	Percentage (%)
Total	2	4
Subtotal	17	34
Large Central	13	26
Posterosuperior	13	26
Anterosuperior	0	0
Attic	5	10

Among the total 50 patients, all patients had incus necrosis (100%), followed by stapes suprastructure in 17 (34%) patients and malleus necrosis in 6 (12%) patients.

Out of 36 patients, who had a tubotympanic disease, all patients (100%) had incus necrosis (partially or completely), followed by necrosis of stapes suprastructure in 7 (21.8%) patients and 2 (6.25%) patients with malleus necrosis.

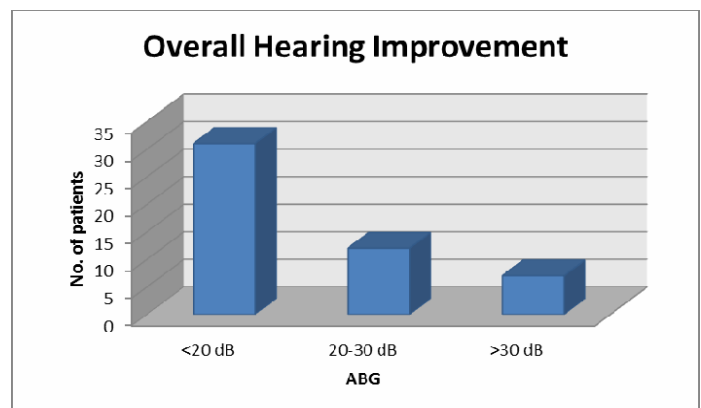
Ossicular involvement (Tubotympanic type) (n=32)

Ossicle	No. of Patients	Percentage (%)
Malleus: Handle	2	6.25
Head	0	0
Incus	32	100
Stapes	7	21.8

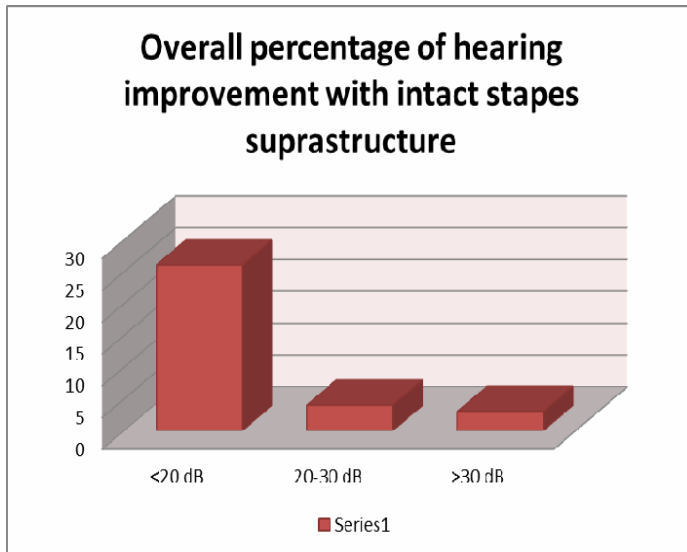
Ossicular involvement (Atticoantral type) (n=17)

Ossicle	No. of Patients	Percentage (%)
Malleus: Handle	2	11.7
Head	2	11.7
Incus	17	100
Stapes	10	25

Of the 18 patients with atticoantral disease, incus necrosis was seen in all the patients (100%), followed by stapes suprastructure seen in 10 (58.8 %) patients and malleus necrosis in 4 (23.5%) patients.



Among all our patients, 31 (62%) patients had a successful hearing of <20 dB ABG closure, and 12 (24%) of patients improved with an ABG of 20-30 dB.



41 patients underwent tympanoplasty with intact canal wall mastoidectomy of which 27 (66%) patients had <20 dB ABG and 10 (24%) had an ABG between 20 -30 dB.

ABG	No. of Patients	Percentage (%)
<20 dB	27	66
20-30 dB	10	24
>30 dB	4	10

There was statistically significant hearing outcome where ABG <20dB in patients with intact stapes suprastructure as compared to patients with necrosed stapes suprastructure.

ABG	Intact Stapes Suprastructure (%)	Absent Stapes Suprastructure (%)	P-Value
<20 dB	79	29	0.0006
<30 dB	91	76	0.16

Presence of malleus contributed significantly for achieving successful hearing outcome (ABG < 20dB)

ABG	Intact Malleus (%)	Absent Malleus (%)	P-Value
<20 dB	68	17	0.014
<30 dB	91	50	0.006

Discussion & Conclusion

Even though clearance of disease remains the primary goal in tympanoplasty, restoration of hearing mechanism by reconstruction of ossicular chain and repair of tympanic membrane defects remains the critical steps in tympanoplasties. This study was conducted in 50 patients diagnosed with chronic suppurative otitis media clinically and with a pre-operative PTA of > 40dB conductive hearing loss who underwent tympanoplasty with mastoidectomy and ossiculoplasty using sculpted autograft incus / homograft cartilage at Vydehi Institute of Medical Sciences and Research Centre, Whitefield, Bangalore.

Among the patients diagnosed with CSOM, majority of patients (64%) had a safe disease and a male preponderance. The mean age is 33.5 years with the commonest age group being 31-40 years. On presentation, otorrhea and hearing loss was the most common presentation followed by tinnitus and earache. Clinically, majority of the patients had a subtotal perforation followed by posterosuperior quadrant and large central, attic perforation and total perforation with predominant mastoid sclerosis. Bacteriological examination revealed Streptococci and Staphylococcus aureus were commonest organisms isolated followed by P. aeruginosa. All patients had incus necrosis followed by stapes suprastructure and malleus necrosis in that order. Higher percentage of ossicular chain necrosis/erosion was seen in unsafe ears. The presence of both stapes suprastructure and malleus had a significant improvement in the hearing outcome as compared to necrosed / eroded malleus and stapes

suprastructure. ABG of <20 dB was achieved in majority of cases with intact stapes and an ABG of < 30dB with absent stapes suprastructure.

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