

# One Year Follow up Study on Audiological Profile in Chronic Otitis Media Patients, After ‘Type 1 Tympanoplasty’

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## Research Article

**Abstract: Introduction:** Chronic otitis media with or without cholesteatoma is a persistent disease, which can cause severe destruction of the middle ear and mastoid and lead to irreversible sequelae. Our study was aimed to evaluate in detail the otological and audiological profile both pre and post operatively in chronic otitis media to assess the benefit of surgery with respect to hearing and graft take up in a teaching hospital. **Materials and Methods:** Our study comprised of 30 chronic otitis media patients. The surgical benefit (Tympanoplasty, type 1) was assessed in the follow up at 3 months, 6 months and 1 year by Otoscopy and Pure tone Audiometry. **Results:** Air bone gap closure at the end of 1 year, below 10 db was achieved in 73% of patients, between 11-20 db was achieved in 27% of patients and graft was taken up in 90 % of patients. **Conclusions:** Air bone gap closure rate and graft take up rate in tympanoplasty type 1 are in accordance with other studies.

**Keywords:** Chronic Otitis Media, Puretone Audiometry, Tympanoplasty.

### Introduction

Chronic otitis media (COM) with or without cholesteatoma is a persistent disease, which can cause severe destruction of the middle ear and mastoid and lead to irreversible sequelae. In the present antibiotic era, the complications are rarely seen. Although Hippocrates, “Father of Medicine” had noticed the development of intracranial complications following ear discharge, the treatment for such a disease was not well established due to lack of better understanding of the disease and the non availability of better technology. <sup>(1)</sup> Although, the introduction of sulpham drugs by Domegk in 1935 and penicillin by Sir Alexander Fleming in 1942 reduced the mortality in case of safe type of COM, they could not cure cholesteatoma. Surgery plays an important role in its management and the outcome measures are closure of tympanic membrane perforation in Myringoplasty, eradication of disease and achievement of a dry and safe ear and improvement of hearing. Our study was aimed at to perform tympanoplasty in cases of chronic otitis media, to evaluate in detail the otological and audiological profile prior to surgery and to periodically evaluate the

post operative benefit to the patient with respect to hearing improvement and graft take up in a teaching hospital.

### Materials and Methods

Our study comprises of 30 chronic otitis media patients, who attended the department of ENT, Katuri Medical College, Guntur. The surgical benefit was assessed in the follow up at 3 month, 6 month and 1 year, by pure tone audiometry and otoscopy. Each patient was subjected to a detailed ear, nose and throat examination. Patients below 12 years age group, revision surgeries, COM with complications and sensorineural hearing loss were excluded from this study. Routine investigations like, Hemoglobin, Total leukocyte count, Differential count, Erythrocyte sedimentation rate, bleeding time, clotting time and screening was done. Specific investigations were carried out like plain radiograph of mastoid, otoscopy and pure tone audiometry. Post operative Otoscopy and pure tone audiometry were done at the end of 3months, 6months and 1year.

### Audiometry

An audiometer is an electronic device which produces pure tones, the intensity of which can be increased or decreased in 5 dB steps. Usually air conduction thresholds are measured for tones of 125, 250, 500, 1000, 2000, 4000 and 8000 Hz and bone conduction thresholds for 250, 500, 1000, 2000 and 4000 Hz. The amount of intensity that has to be raised above the normal level is a measure of the degree of hearing impairment at that frequency. It is charted in the form of a graph called Audiogram. <sup>(2)</sup> The threshold of bone conduction is a measure of cochlear function, whereas air conduction threshold is a measure of the entire auditory system. The difference in the thresholds of air bone gap (A-B gap) is a measure of the degree of conductive deafness. An air-bone gap of 20-30 dB indicates a mild conductive hearing

loss, 30-45 dB a moderate loss and 45-60 dB a severe loss. Because of a possible 10 dB variation inherent in air and bone conduction thresholds, an air-bone gap of less than 20 dB may not indicate a conductive loss unless confirmed by equal or negative Rinne test with 256 Hz tuning fork. <sup>(3)</sup> Most of the cases were done under local anaesthesia except few who were anxious and uncooperative done under general anaesthesia.

**Tympanoplasty**

Procedure done was tympanoplasty type 1. Surgical procedure was post aural tympanoplasty, <sup>(4)</sup> temporalis fascia graft harvested, scraping of mucosa under the remnant tympanic membrane and freshening the margins of perforation, anterior window was made in anterior perforations ,superior and inferior tympanomeatal incisions given. Elevation of anterior based tm flap done by skeletonising handle of malleus ,

preparing graft bed ,underlay grafting and double breasting done by covering the fascia to malleus handle, gel foam kept and wound closure done. Post operative instructions and care were common to all.

**Results**

Age group of the subjects was 12 to 50 years and the highest numbers of patients were less than 35 years age group (62%). The youngest patient in this series was 12 years. In our study 16 patients were male and 14 were female. 14 patients presented with the history onset of COM since childhood, 14 gave history of up to 10 years duration and only 2 had less than 10 years duration. Maximum numbers of patients have 21 - 40dB AB gap closure having moderate to large central perforation (Table 1).

**Table 1:** Ooscopic and Otomicroscopic findings

Status of Tympanic Membrane	Number of Patients	Percentage
Small Perforation	8	27
Moderate Perforation	14	46
Large perforation	8	27

The post operative AB gap closure in type 1 tympanoplasty at the end of 1 year follow up ,below 10 dB was achieved in 73%,between 11- 20dB was achieved in 27%.For the missed cases the previous follow up status was taken for calculations (Table 2).

**Table 2:** Post-operative AB gap closure (Pure tone - Audiometry)

AB gap closure (dB)	Pre-operative		Post operative follow up					
			3 months		6 months		1 year	
	Number of Cases	%	Number of cases	%	Number of cases	%	Number of cases	%
0 – 10	8	27	9	30	13	44	22	73
11 – 20	16	53	18	60	17	56	8	27
21 – 30	6	20	3	10	0	0	0	0
> 30	0	0	0	0	0	0	0	0

The graft taken up rate at the end of 1 year in type 1, Tympanoplasty case was 90% (Table 3) and not taken up due to re-perforation or displacement was observed in 10% of the cases.

**Table 3:** Status of the graft.

Graft	3months	%	6months	%	1 year	%
Taken up	28	93	27	90	27	90
Not taken up	2	7	3	10	3	10

**Discussion**

In our study of 30 patients with chronic otitis media of tubotympanic type was operated by tympanoplasty type 1. The graft take up rate was 90% at the end of 1 year follow up.

The closure rate is reported to be higher in small perforation 74% than large perforation 56%.<sup>(7)</sup> Numerous authors have reported that failure rate in anterior perforation is higher. This failure rate can be greatly reduced by anchoring the anterior margin of the graft between the annulus. In our study failure rate can be

attributed to duration of disease, personal hygiene, post operative care after hospital stay and inadequate elimination of septic foci.

Percentage of graft taken up in our study, when compared to other studies, <sup>(5-8)</sup> was shown table 4.

**Table 4:** Successful graft taken up in our study when compared to others.

Reference study	Number of cases	Percentage of AB gap closure
Kotecha <i>et al.</i>	1070	82
Wieliga <i>et al.</i>	555	88

Lee et al	423	64
Black and Wormold	211	78
Our study	30	90

Regarding hearing after tympanoplasty 1, the post operative AB gap closure less than 10db was achieved in 73% and less than 20 db was achieved in 27% of cases after one year follow up. It was uncommon to get total AB gap closure in type 1 tympanoplasty as there may be erosion or fixation of ossicles which needs ossiculoplasty. Success rate was shown in Table 5.

**Table 5:** Hearing after successful tympanoplasty, type 1

Reference study	Number of cases	Residual Ab gap
Lee <i>et al.</i> <sup>(7)</sup>	261	-
Palva and Ramsay <sup>(9)</sup>	281	9.3

### Conclusions

1. Tympanoplasty 1 can be safely done in cases of COM with dry central perforation with intact ossicular chain (conductive deafness < 40dB).
2. Our closure rate in tympanoplasty 1 was in accordance with various studies.

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