

## Original Research Article

# Study on outcome of tympanoplasty: a two year institutional study

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### ABSTRACT

**Background:** Tympanoplasty is one of the common surgical procedure performed in CSOM (TTD), this study was undertaken to determine the outcome of tympanoplasty at a tertiary care teaching hospital.

**Methods:** This analytical observational study was conducted in the department of E.N.T, School of Medical Sciences and Research, from January 2017 to December 2018. Informed consent was taken to participate in the study pure tone audiometry (PTA) was performed before surgery and post-operatively six months. Air-bone gap (ABG) was calculated in pre- and postoperative PTA. The data were analyzed using SPSS (version 20). The p value  $\leq 0.05$  was considered statistically significant.

**Results:** Over a period of 2 years 168 patients underwent type 1 tympanoplasty 86 were male 21 (51.19%), female 82 (48.80%), age (range 15–53 years). Mean pre-operative air-conduction of 43.12 dB was significantly reduced to 16.12 dB with p value of  $<0.05$ . Similarly the pre-operative mean air bone gap on PTA of  $35.63 \pm 6.35$  dB was also reduced to statistically significant level of  $7.41 \pm 3.51$  dB on post-operative PTA with p value of  $<0.05$ . Graft was taken up well in 152 cases (90.2%).

**Conclusions:** According to our study surgical outcome of tympanoplasty is fairly good and should be done if patient gives consent.

**Keywords:** Chronic otitis media, Tympanoplasty, Air bone gap

## INTRODUCTION

Chronic otitis media (COM) is common treatable cause of hearing loss in developing world.<sup>1</sup> With the use of antibiotics management has improved which compliments surgery i.e. tympanoplasty.<sup>2,3</sup> Tympanoplasty is the surgery of reconstruction of tympanic membrane (TM) perforation and ossicular chain. Wullstien in 1952 introduced term tympanoplasty and a wide range of graft materials are available for tympanoplasty like temporalis fascia, fat, perichondrium dura mater.<sup>4,5</sup> Temporalis fascia preferred graft material used with success rate of 90–96% in primary tympanoplasties.<sup>5,6</sup> Its advantages it has that it can be harvested through same post aural incision of tympanoplasty, available in sufficient amount, its basal

metabolic rate and thickness have great resemblance with TM.<sup>6</sup> However failure of fascia graft are reported in subtotal or total perforation and eustachian tube dysfunction. The postoperative results of fascia graft is unpredictable due to its irregularly arranged elastic and fibrous tissues, in literature various techniques of cartilage tympanoplasty have been described, like palisade technique, perichondrium cartilage island, cartilage shield technique and inlay butterfly graft technique.<sup>6,7</sup> The reported success rate of cartilage tympanoplasty in literature is more than 98%, The use of cartilage and perichondrium as graft material was popularized by Goodhill with observed low rejection rate, sufficient and easy availability, best tensile strength, possessing conductive qualities similar to tympanic membrane.<sup>6,7</sup>

Moreover cartilage metabolism is slow and it receives nutrition by diffusion, cartilage remains stable in poor condition like negative pressure and eustachian tube dysfunction.<sup>8</sup> Disadvantages cartilage graft are that hearing outcome is less as compare to temporalis fascia and it can hide underlying residual cholesteatoma.<sup>8</sup> The factors resulting in failure of tympanoplasty are eustachian tube dysfunction, active suppuration, unfavorable middle ear mucosa, large and subtotal perforations and revision myringoplasty.<sup>9</sup> Mesodermal origin graft materials like fascia, vein and perichondrium are superior to all other graft material.<sup>10</sup>

The rationale this study was to look for outcome of tympanoplasty in our hospital to add on available literature.

**METHODS**

This analytical observational study was conducted in the department of E.N.T, School of Medical Sciences and Research, Sharda university from January 2017 to December 2018 in the department of E.N.T, Head and Neck Surgery sample size was 168, by after getting approval from hospital ethical board, an informed consent was taken from all the patients explaining them the procedure, and its outcomes.

**Inclusion criteria**

The study included patients of: all CSOM (TTD) with dry ear patients consenting for surgery, patients in the age range 15–53 years, COM (inactive) without discharge for at 1 months, conductive hearing loss with minimum air-bone gap (ABG) of 15 dB on PTA.

**Exclusion criteria**

Patients with COM (squamosal) disease, ossicular chain erosion, active mucosal COM and sensori-neural hearing loss were excluded from the study.

All the patients met inclusion criterion a detailed history, examination was done. On otoscopic examination side, size of perforation noted as par standard performa. Pure tone audiometry (PTA) was performed pre-operative and post-operatively six months, PTA was performed by audiotiva audiometer pre- and postoperative. The ABG was evaluated in pre- and postoperative PTA. Successful outcome was shown by graft take, closure in ABG. All the patients were followed for at least six months. The data were collected on a preformed proforma, which was analyzed using SPSS (version 20). Chi-square (X<sup>2</sup>) test of significance was used for comparison of two qualitative parameters. The p value ≤0.05 was considered significant.

Tympanoplasty was performed in every patient. After endotracheal intubation patient in supine position, with operating ear up. Aseptic dressing and draping was done. Incision site was infiltrated with 2% lidocaine with

1:100,000 adrenaline. Post auricular skin incision was given in all the cases, temporalis fascia graft was harvested, margins of perforation freshened, tympanomeatal flap elevated, graft repositioned medial to handle of malleus, abgel applied, after soft tissue and skin closure, mastoid dressing applied, mastpod dressing removed after 5 days, stitch removal done on 7<sup>th</sup> post-operative day, on follow up otoscopic, EUM done at every visit, post-operative PTA was done at 6<sup>th</sup> month.

**RESULTS**

In this study 168 patients underwent type 1 tympanoplasty 86 were male (51.19%) and female 82 (48.80%).

Age group range was from 15-53 years and most patients were from 21-30 age group 79 947% (Table 1).

**Table 1: Age distribution with numbers and percentage.**

Age groups (years)	Numbers	Percentage (%)
<20	21	12
21-30	79	47
31-40	58	34
41-50	8	5
>50	2	2

On otoscopy tympanic membrane perforation was found on right side 98 (58.33%) and on left side 70 (41.66%).

Mean pre-operative air-conduction threshold of 43.12 dB was significantly reduced to 16.12 dB with p-value of <0.05. Similarly the pre-operative mean air bone gap on PTA of 35.63±6.35 dB was also reduced to statistically significant level of 7.41±3.51 dB on post-operative PTA with p value of <0.05 (Table 2). Graft was taken up well in 152 cases (90.2%).

**Table 2: Pre-operative and post-operative A.C. threshold and A-B gap.**

Parameter	Pre-operative	Post-operative	P value
Air conduction threshold	43.2	16.2	<0.05
A-B gap	35.63±6.35 dB	7.41±3.51 dB	<0.05

**DISCUSSION**

In our study conducted on 168 patients 86 were male patients (51.19%) were male and 82 (48.80%) were female that is consistent with results of Subramania et al with 42 (52.55%) males, 38 (47.5%) females, and Dhanapala with 57 (57%) males, 43 (43%) female.<sup>11</sup> However this study results regarding gender distribution differs from Vaishali, Hasaballah and Gupta having female predominance as female 55% male 45%, females 66.6% males 33.4%, and

females 70% males 30% respectively.<sup>12</sup> In current study age range was 15–53 years and patients presented commonly in 2<sup>nd</sup> and 3<sup>rd</sup> decade of life i.e. 79 (47%). Similarly in Pareek's study mean±SD age of the patient was 26.23±12.46 years with age range of 10 to 60 years.<sup>13</sup> Hasaballah observed that mean±SD age was 24.9±9.5 years with age range 15–51 years. Vaishali also reported that mean age of patients was 29.12 years (range, 15–45 years) and majority of patients (40%) were in 3<sup>rd</sup> decade of life. In this study the mean pre-op air-conduction of 43.12 dB was significantly reduced to 16.12 dB. Similarly the pre-op mean air bone gap on PTA of 35.63±6.35 dB was also reduced to statistically significant level of 7.41±3.51 dB on post-op PTA, which is in conformity with result of

Pareek, where mean±SD preoperative air conduction of 43.21±7.17 dB was reduced to mean±SD postoperative air conduction of 36.49±6.60 dB, which was statistically significant ( $p=0.00004$ ), while mean±SD preoperative ABG of 25.45±8.44 dB was reduced to mean±SD postoperative ABG of 19.31±8.18 dB, that was also statistically significant ( $p=0.0014$ ).<sup>13-15</sup> In our study and graft taken up was in 152 patients 90%, which in accordance with Hodzic-Redzic' with graft success rate was 92.5%.<sup>16</sup> The results our study are compared to other studies tabulated in comparison of changes in ABG, p values and graft success rate of current study with other studies (Table 3).

**Table 3: Various studies on outcome of tympanoplasty.**

Author	Year of study	No. of patients	Pre-operative ABG	Post-operative ABG	Success rate (%)
Subramania et al <sup>2</sup>	2017	40	22.4±6.14	14.8±10.2	77
Vaishali et al <sup>3</sup>	2017	40	22.6	13.6	77.5
Fattah et al <sup>4</sup>	2014	30	21±7	9.4±8.9	80
Gupta et al <sup>5</sup>	2015	28	33.27±4.29	12.67±5.68	90
Khan et al <sup>6</sup>	2011	40	32.464±5.02	9.21±3.28	100
Kumar et al <sup>7</sup>	2014	28	22.6	13.6	75
Aydin et al <sup>8</sup>	2015	40	21.1±9.7	13.0±8.4	96.7
Sahan et al <sup>9</sup>	2014	60	24.5±7.2	12.8±5.6	94
Dhanapala et al <sup>11</sup>	2015	33	33.59±3.8	26.87±3.87	94
Hasaballah et al <sup>12</sup>	2014	100	26.0±4.4	13.8±5	100
Pareek et al <sup>13</sup>	2017	40	25.54±8.44	19.31±8.18	100
Shrikrishna et al <sup>14</sup>	2014	40	22	10	90
Patil et al <sup>15</sup>	2017	30	21.54±6.36	10.97±3.68	75
Hodzic-Redzic <sup>16</sup>	2015	120	47.35±18.93	28.94±2.5	95
Ocak et al <sup>17</sup>	2010	243	22.43±8.07	15.27±8.69	86.5
Khan et al <sup>18</sup>	2016	179	39.89±7.914	10.03±1.74	100
Our study	2018	168	35.63±7.914	10.03±1.74	90

### Limitation

Our study comprise of 168 participants over a period of two years, more studies are required of longer duration in future.

### CONCLUSION

Our study shows that success rate of tympanoplasty are very good in respect to graft uptake and hearing outcome and should always be the option if patient consents for surgery.

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