



## A STUDY OF GRAFT TAKE-UP IN TYPE-1 TYMpanoplasty WITH ANTERIOR TUCKING TECHNIQUE

**Dr. H. Ravi Kishore**

Associate professor, Department of ENT, Vijayanagar Institute of medical sciences, Ballari, Karnataka, India. 583104

**Dr. Malige Rajkamal\***

Postgraduate in ENT, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India. 583104. \*Corresponding author

**Dr. Avinash Padmashali**

Postgraduate in ENT, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka, India. 583104.

**ABSTRACT** Tympanoplasty is an operation performed to eradicate the disease in the middle ear and to reconstruct the hearing mechanism with tympanic membrane grafting. Wullstein[1953] introduced the tympanoplasty procedure. Type-1 tympanoplasty technique is of two types viz overlay and underlay [Shea1960]. Anterior tucking is a useful step in tympanoplasty, done mainly when anterior margin is very thin as in large and subtotal central perforations. A retrospective study of 30 patients of mucosal type of COM, between the age group of 14 and 45 years was undertaken to analyze the results of Type-1 tympanoplasty [underlay technique] with anterior tucking in mucosal type of COM, in terms of graft take-up and associated complications. The graft take-up success rate was 96.96% in large and subtotal perforations. Anterior tucking method in Type-1 tympanoplasty (underlay technique) had better results with respect to graft take-up. The post-operative outcome was encouraging in terms of graft take-up and the post-operative complications.

**KEYWORDS :** COM, tympanoplasty, anterior tucking, graft take-up.

### INTRODUCTION

Chronic otitis media (COM) or chronic suppurative otitis media is defined as the chronic inflammation of the mucoperiosteal lining of middle ear cleft. The prevalence is very high in developing countries like India due to the predisposing factors like low socioeconomic status, poor hygiene, overcrowding and lack of health education<sup>1</sup>.

Chronic otitis media is of two types viz Mucosal/ Tubotympanic and Squamosal/Attico-antral. Mucosal type is relatively safe, characterized by long standing infection of the antero-inferior part of middle ear cleft associated with central perforation with lesser risk of complications. Squamosal type involves postero-superior part of cleft i.e. attic, antrum, and mastoid and is associated with attic or marginal perforation of the tympanic membrane. The disease has a bone eroding process such as granulations, cholesteatoma or osteitis and risk of serious complications is high<sup>2</sup>.

There are two types of treatments; conservative and surgical. In conservative management the aim is to control infection by aural toilet, ototopical antibiotic/steroids drops and systemic antibiotics.<sup>3,4</sup>

The surgical management is by tympanoplasty. The aim of surgery is to eliminate the infection and render the ear safe, to prevent reinfection by closing the perforation of tympanic membrane and to improve hearing.

The use of oto-microscopy helped in better understanding of the disease process and its eradication from the middle ear and mastoid. The secondary goal is restoration of hearing. The use of antibiotics also helped in prevention of complications.

Various surgical techniques evolved and various tympanoplastic procedures were carried out. Among the grafting techniques usually underlay and overlay methods are followed.

Blunting of the graft, lateralization and pearl formation are encountered in onlay technique of tympanoplasty. The problems of medialization and persistent perforation are commonly seen in underlay technique.<sup>5</sup> To overcome these deficiencies various methods like anterior hitch, window shade, and hammock, anterior tucking are employed. Among these anterior tucking method which involves placing the graft all around the remnant of the tympanic membrane, a part of the graft is tucked into and pulled out through a small window created in the anterior part of the external auditory canal skin.

This study is conducted to analyse the procedure of Type-1 tympanoplasty with anterior tucking of graft material in underlay technique for mucosal type of chronic otitis media, with respect to graft take-up and complications encountered.

### METHODS

This is a retrospective study done at Department of ENT and HNS, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka during the time period from November 2016 and October 2017.

Our study included 30 patients between 14-45 years of both sexes diagnosed as chronic otitis media of mucosal type with large anterior and subtotal perforation of tympanic membrane. The patients having sensorineural hearing loss, comorbidities like diabetes mellitus, hypertension and recurrent disease were excluded from the study.

All the selected patients had undergone the procedure of type I tympanoplasty with cortical mastoidectomy under local/general anaesthesia accordingly. In all the cases autologous temporalis fascia graft was used for tympanoplasty. These patients were followed up post-operatively once in a week during first month and at 3 months. The documented complications and post-operative clinical findings were noted and statistically analyzed.

### ETHICS

This study was approved by the Ethical committee and institution review board of Vijayanagar Institute of Medical Sciences, Ballari under Rajiv Gandhi University of Health Sciences, Bengaluru, Karnataka.

### STATISTICAL ANALYSIS

The data was collected and tabulated as per the various variants and simple percentages were calculated.

### RESULTS

Among the 30 selected patients, the age distribution was in the range of 14-45 years, as mentioned in table-1.

**Table-1; Age distribution**

Age in years	Number of patients	Percentage
14-24	12	40
25-34	10	33.33
35-45	08	26.67
Total	30	

Sex distribution as per the table-2. Males 56.67% females 43.33% with a M:F ratio of 1.3:1.

**Table-2; Sex distribution**

Sex	Number of patients
Male	17
Female	13
Total	30

Laterality in this study indicated equal distribution among right side, left side and bilateral cases. Distribution of Perforation size of tympanic membrane is indicated as below.

**Table-3; Distribution of size of perforation**

Type of perforation	Number of patients	Percentage
Large central	15	50
Subtotal	15	50
Total	30	

The mastoid x-ray indicated the following types of distribution. 10 patients had bilateral disease.

**Table-4; Types of mastoid**

Type of mastoid	Number of patients
Sclerotic	23
Cellular	03
Diploic	13

In all the cases post aural route was employed for the proposed surgery. 28 patients underwent type 1 tympanoplasty (underlay technique) with anterior tucking of graft along with cortical mastoidectomy and 2 patients without mastoid exploration due to inactive disease. All the patients were discharged on 3rd post-operative day.

The graft take-up outcome was assessed by otoscopic examination in the follow up period. 29 patients had good graft take-up without any complications in the post-operative follow up period. Only one patient had retraction/medialization of graft. The success rate of graft take-up was 96.96% and associated complication in the form of graft retraction is 3.04%.

**Table-5; Distribution of results/outcomes**

Follow up period	Graft take up		Complication	
	Number	percentage	Number	Percentage
1 <sup>st</sup> month	30	100	Nil	Nil
3 <sup>rd</sup> month	29	96.96	01	3.04

## DISCUSSION

Tympanoplasty has undergone changes with the use of different graft materials<sup>7</sup> and the techniques of onlay, underlay and their modifications. The underlay technique is the widely accepted and many surgeons have improvised this technique to improve hearing, for better acceptance of graft and prevention of complications.

There are several factors which influence the success of tympanoplasty viz status of middle ear, site & size of perforation, surgical technique and graft material<sup>6</sup>. Medialization of graft and adherence to promontory are the drawbacks of underlay technique<sup>7</sup>.

The anterior part of the graft is a challenge to stabilize in cases of anterior, large central and subtotal perforations due to the acute angulation of the tympanic membrane, limited anterior margin, poor visualisation of the ear canal and prominent anterior canal wall bulge. A variety of surgical techniques have been developed to increase the success in treating anterior perforations, including sandwich graft tympanoplasty, over-under tympanoplasty, mediolateral graft tympanoplasty, "anterior hitch" technique, "window shade" technique and "hammock tympanoplasty"<sup>8</sup>.

A comparative study conducted by K S Burse et al<sup>9</sup>, between anterior tucking and cartilage support tympanoplasty, achieved 96% of graft uptake in both groups. Pradeep pradhan et al, in a prospective study obtained 93% success in subtotal perforations and 84% in anterior perforations in Type-I tympanoplasty by circumferential elevation of tympanomeatal flap technique<sup>10</sup>.

A retrospective study by Timothy. T. K. Jung et al reported 97% graft take-up success rates in anterior/subtotal perforations using medio-

lateral graft tympanoplasty method<sup>11</sup>. R.K.Mundra et al achieved 98.94% of success in terms of graft uptake by using a slice of cartilage support in subtotal perforations, by underlay technique of tympanoplasty<sup>12</sup>.

A study by Hosamani et al showed graft uptake rate of 95.45% in anterior and subtotal perforations by anterior tagging myringoplasty using temporalis fascia graft<sup>13</sup>. Amit kumar et al attained healing in 86.67% in large, subtotal and anterior central perforations by anteriorly anchoring flap technique tympanoplasty<sup>14</sup>.

In our study we attained a success rate of 96.96% in terms of graft take up and 3.04% complications as only one patient developed retraction of graft in post-operative period. There are various methods of stabilizing the graft in anterior, large and subtotal perforations in underlay technique of Type-1 tympanoplasty used by different surgeons with varied outcomes. However, the procedure of anterior tucking is recommended being simple, good outcome of results in terms of graft take-up and lesser complications.

## CONCLUSIONS

The procedure of anterior tucking of graft, in Type-1 tympanoplasty (underlay technique) in mucosal COM, especially with large anterior and subtotal perforations, is recommended for better graft take-up rates and lesser complications. Our study has the limitations of being a retrospective, non-randomized, non-controlled and small size with lesser follow up period. Even though our results are encouraging, a proper planned study with bigger sample size and longer follow up will go in a long way to scientifically validate the outcome.

## REFERENCE

- Smrutirekha Sahu, Radhakanta Pattnaik, Soubhagini Acharya, Satyajit Mishra; Clinical And Audiological Assessment of Patients Undergoing Various Types of Tympanomastoid Surgeries; IOSR Journal of Dental and Medical Sciences. Volume 16, Issue 11 Ver. XII (Nov. 2017), pp 10-15.
- Ali Khan, Kamran Iqbal, Muhammad Ismail Khan, Muhammad Marwat, Muhammad Naseem Khan; Outcome of type-1 tympanoplasty: a surgical management of chronic suppurative otitis media; gomajmedsci 2015; 14, pp 7-10.
- Browning GG et al. Medical management of chronic mucosal otitis media; Clin Otolaryngol 1984; 9, pp 141-4.
- Fairbranks DNF. Anti-microbial therapy for chronic otitis media; Ann Otol Rhinol Laryngol 1981; 90, pp58-62.
- Glasscock ME, Shambaugh GE Jr. Closure of tympanic membrane perforation; In: Mitchell J, Editor. Surgery of the ear. 4th ed. Philadelphia: WB Saunders 1990, pp 334-49.
- Saeed A. Al-Ghamdi; Tympanoplasty: Factors Influencing Surgical Outcome Annals of Saudi Medicine, Vol 14 No. 6; 1994
- G. Shankar, Narendranath A.; Button Hole Tympanoplasty Research in Otolaryngology 2014, 3(5), pp 81-83
- Robert Peng, Anil K. Lalwani; Efficacy of "Hammock" Tympanoplasty in the Treatment of Anterior Perforations Laryngoscope 123: May 2013, pp1236-1240.
- K S Burse, S. V. Kulkarni, C. C. Bharadwaj, S. Shaikh, G. S. Roy; Anterior tucking vs cartilage support tympanoplasty, Odisha journal of Otorhinolaryngology and Head & Neck surgery, vol-8, issue-2, July-Dec-2014, pp18-23.
- Pradeep P, Abhimanyu A, Priti L (2015) Circumferential Elevation of Tympanomeatal Flap: A Novel Technique for subtotal and Anterior Perforation Closure. Ann Otolaryngol Rhinol 2(7), 1052.
- Timothy t. k. jung, Seong kook park, Loma Linda, California, and Pusan, Korea; Medioloateral graft tympanoplasty for anterior or subtotal tympanic membrane perforation, Otolaryngology-Head and Neck Surgery Volume 132 Number 4, pp532-536.
- R. K. Mundra, Richi Sinha, Richa Agrawal; Tympanoplasty in Subtotal Perforation with Graft Supported by a Slice of Cartilage: A Study with Near 100% Results, Indian J Otolaryngol Head Neck Surg, December 2013, 65(Suppl 3), ppS631-S635
- Hosmani P, Ananth L, Medikeri SB; Comparative study of efficacy of graft placement with and without anterior tagging in type one tympanoplasty for mucosal-type chronic otitis media. J Laryngol Otol. 2012; 126(2), pp 125-30.
- Amit kumar Rathi, Vinod Gite, Sameer Bhargava, Neeraj Shetty; A comparative study of superiorly based circumferential tympanomeatal flap tympanoplasty with anteriorly anchoring flap tympanoplasty in large, subtotal, and anterior tympanic membrane central perforations in chronic suppurative otitis media of mucosal type. Int J Otorhinolaryngol Head Neck Surg. 2017; 4(2), pp 432-439.