

# A Study on Correlation of External Auditory Canal Dimensions and Endoscopic Tympanoplasty in a Tertiary Health Care Centre

T. Satish Chandra<sup>1</sup>, P.S.N. Murthy<sup>2</sup>, M Sreenivasulu<sup>3</sup>, A.S.L Jyothirmai<sup>4</sup>

## ABSTRACT

**Introduction:** Endoscopic tympanoplasty is a minimal invasive surgery, causing minimal trauma to healthy tissue. The other advantages are speculum which narrows canal can be avoided, there is no frequent tilting of head, no seepage of blood into graft bed and no fear of perichondritis. Current research aimed to study the advantages and disadvantages of endoscopic tympanoplasty and to study the limits and limitations of endoscopic tympanoplasty in relation to the anatomy and disease.

**Material and Methods:** This study includes evaluating 35 cases of endoscopic tympanoplasty with follow up period of 4 months study was prospective study performed. Patient of age (18-50years) and both sexes with CSOM inactive stage with conductive deafness who require surgical intervention were included in our study and patients with the External auditory canal width is less than 6 mm were excluded in this study.

**Results:** In our Study out of 35 patients, 8 (23%) patients showed Small Central Perforation, 4 cases showing perforation in antero-inferior quadrant and 4 cases showing perforation in postero-inferior quadrant, 19 (54%) patients showed large central perforation and the remaining 8 (23%) showed Sub-Total Perforation.

**Conclusion:** The Trans-canal endoscopic tympanoplasty is the procedure of choice for chronic suppurative otitis media of tubo-tympanic type in inactive stage (Inactive mucosal chronic otitis media) with Grade 2 and Grade 3 canals.

**Keywords:** Chronic Suppurative Otitis Media, Tympanoplasty,

procedures can decrease residual cholesteatoma and recurrence during surgeries for cholesteatoma removal. The advantages of rigid endoscope is ability to change rapidly from close up to wide angle and possibility of an all-round vision just by rotating angled scope.

Endoscopic tympanoplasty is a minimal invasive surgery, causing minimal trauma to healthy tissue. The other advantages are speculum which narrows canal can be avoided, there is no frequent tilting of head, no seepage of blood into graft bed and no fear of perichondritis.<sup>1,2</sup>

Disadvantages of endoscopic surgery are only one hand surgery is feasible with endoscopic technique which is less efficient. furthermore endoscopic instrument could make direct injury and thermal damage by light

There two main methods of endoscopic surgery in middle ear:

- Exclusively endoscopic transcanal tympanoplasty
- Endoscopic assisted tympanoplasty

Current research aimed to study the advantages and disadvantages of endoscopic tympanoplasty and to study the limits and limitations of endoscopic tympanoplasty in relation to the anatomy and disease.

## MATERIAL AND METHODS

Our study was prospective study performed at Dr. Pinnamaneni Siddhartha institute of medical sciences and Research foundation associated hospital, Chinnaoutpally, Gannavaram Mandal, Krishna district. It was conducted to evaluate the endoscopic tympanoplasty using sample size of thirty five cases. The study includes evaluating 35 cases of endoscopic tympanoplasty with follow-up period of 4 months. Study group constitutes of chronic suppurative otitis media, Tubo-tympanic type inactive stage (inactive mucosal

## INTRODUCTION

Tympanoplasty is descriptive term used to define the surgical procedure of not only reconstruction of tympanic membrane but also management of pathology of middle ear cleft such as chronic otitis media, cholesteatoma and ossicular chain problems.

Conventional microscopic tympanoplasty with post-auricular incision remains the most effective procedure for patients with chronic otitis media, especially in case of anterior or large TM perforation as well as anterior bony overhang. This conventional procedure results in scar and significant pain to patient.

Minimally invasive otologic surgery has recently been developed along with endoscopic techniques.

Advantages of endoscopic ear surgery compared to the conventional microscopic surgery include avoiding post-auricular or endaural vertical incision, provides better visualisation of hidden areas in middle ear cavity including anterior and posterior epitympanic spaces, sinus tympani, facial recess and hypotympanum. Endoscopic mediated

<sup>1</sup>Professor and HOD, Department of ENT, Dr PSIMS and RF, Chinnoutpalle, Gannavaram, Andhra Pradesh, <sup>2</sup>Professor, Department of ENT, Dr PSIMS and RF, Chinnoutpalle, <sup>3</sup>Post Graduate, Department of ENT, Dr PSIMS and RF, Chinnoutpalle, Gannavaram, Andhra Pradesh, <sup>4</sup>Post Graduate, Department of ENT, Dr PSIMS and RF, Chinnoutpalle, Gannavaram, Andhra Pradesh, India

**Corresponding author:** A.S.L Jyothirmai, Department of ENT, Dr Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnoutpally, Gannavaram, Andhra Pradesh, India

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chronic otitis media) who require surgical intervention Pre-Operative evaluation included investigations for hearing loss by pure tone audiometry and width of external auditory canal measured by Vernier callipers.

Intraoperatively we analyse the anatomical and pathological factors and their relation to the exposure of surgical field, and its restraints with endoscopic exposure, time taken for the surgery postoperative recovery and results.

All patients were given an explanation regarding study and informed consent was taken.

**Inclusion criteria**

Patient of age (18-50 years) and both the sexes with chronic suppurative otitis media Tubotympanic type, inactive stage (inactive mucosal Chronic otitis media) with conductive deafness who require surgical intervention.

**Exclusion criteria**

The external auditory canal width is less than 6 mm are excluded from the study

**RESULTS**

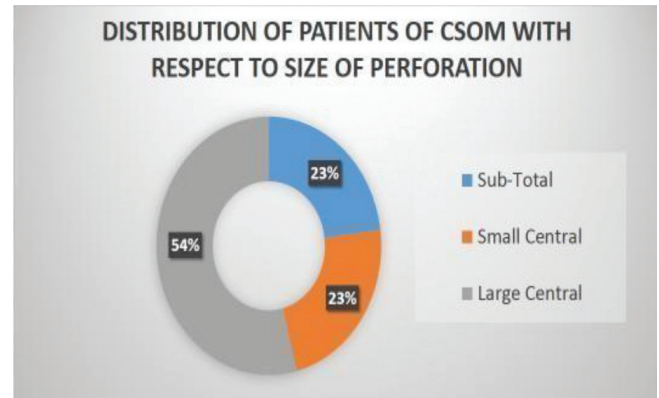
The present study was conducted on 35 patients (of both sexes) of age group 18-50 years with dry small central perforation to sub-total perforation.

Out of 35 patients 13 were males, 22 were females and among them 12 patients were between 18-24 years of age, 14 patients were between 25-34 years of age and remaining 9 patients were aged 35 and above.

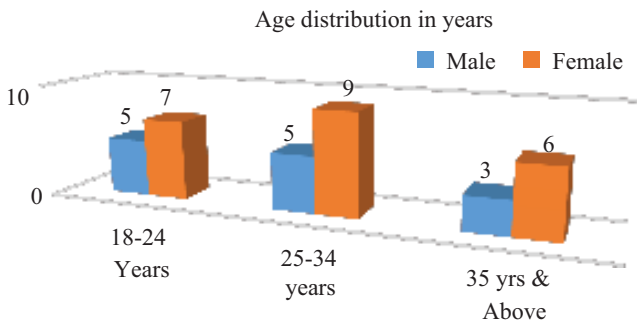
Out of 35 patients, 8 (23%) patients showed Small Central

Perforation (4 cases showing perforation in antero-inferior quadrant and 4 cases showing perforation in postero-inferior quadrant), 19 (54%) patients showed large central perforation and the remaining 8 (23%) showed Sub-Total Perforation.

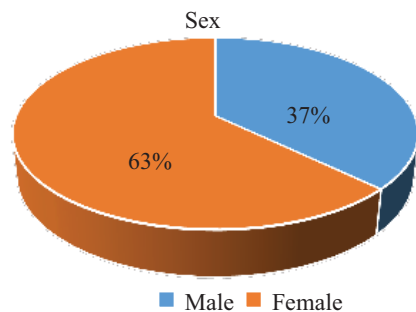
Out of 35 cases, erosion of long process of incus is seen in 7 cases and all of these were treated with type II type of tympanoplasty and the remaining 28 cases showed intact



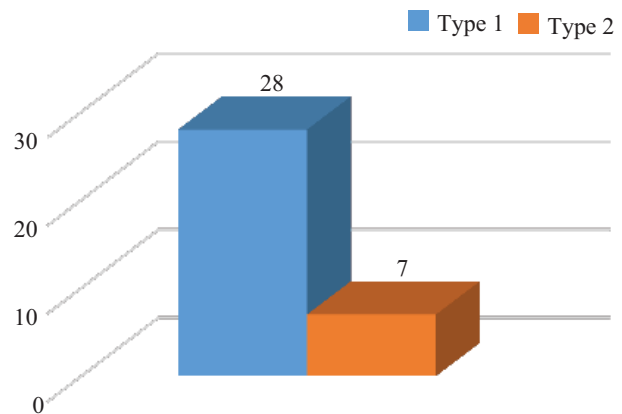
**Graph-3:** Distribution of patients of CSOM with respect to size of perforation



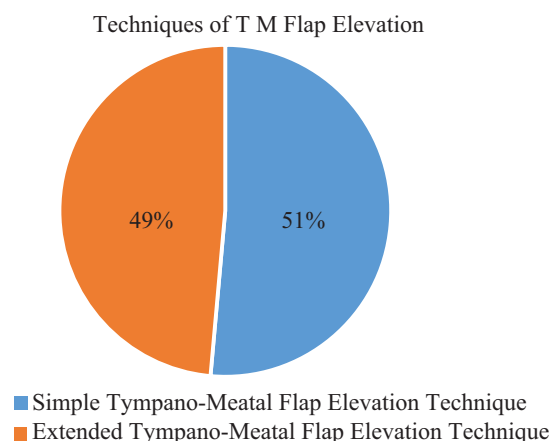
**Graph-1:** Age Distribution



**Graph-2:** Sex Distribution



**Graph-4:** Types of Tympanoplasty



**Graph-5:** Technique of Flap Elevation

	No of patients	No. of Successfully Healed	No. of Graft Failures
Males	13	92%	08%
Females	22	82%	18%
Total	35	86%	14%

**Table-1:** No. of cases with successful healing and graft failures

ossicular chain and treated with type I tympanoplasty.

In this study two types of techniques were used to elevate the tympano-meatal flap

1. Simple tympano-meatal flap elevation technique.
2. Extended tympano-meatal flap elevation technique.

In our Study 18 patients were treated with simple tympano-meatal flap elevation technique and residual perforations were found in 17 patients due to graft retraction. So we opted for extended tympano-meatal flap elevation technique and have given good results with no residual perforations.

## DISCUSSION

The present study was undertaken on 35 patients who had chronic suppurative otitis media of tubo tympanic type in inactive stage (Inactive mucosal chronic otitis media). Tympanic membrane was visualised using a bull's eye lamp after pulling the pinna and width of the external auditory canal measured by usage of Vernier callipers.

The following external auditory canal grading was proposed:

- Grade 1: Visualisation of upto 50% tympanic membrane (Narrow canals with width of <6 mm)
- Grade 2: Visualisation of upto 50 to 75% tympanic membrane (Moderate canals with width of 6-9 mm)
- Grade 3: Visualisation of 75-100% tympanic membrane with annulus (Wide canals with width of >9 mm)

Patients were in the age group of 18-50 years. Similar age group was selected in a study conducted by Yadav et al<sup>3</sup>

All patients underwent transcanal endoscope assisted tympanoplasty by underlay technique. Similar technique was adopted in studies done previously by Balasubramanyam Thiagarajan<sup>4</sup> and Harugop A.S et al<sup>5</sup>

In Grade1 canals transcanal endoscopic tympanoplasty was attempted in three patients. It was difficult to perform the transcanal endoscopic tympanoplasty and these cases were converted into post auricular approach by using either endoscope or microscope. So patients with Grade 1 canals have been excluded from the study. In Grade 2 canals the time taken for transcanal endoscopic tympanoplasty was relatively less (40-60 mins).

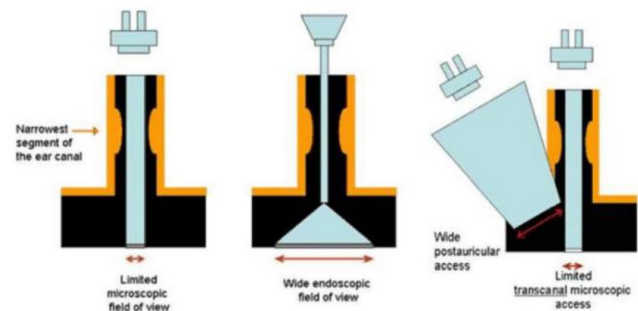
In Grade 3 the time taken for the procedure was much less (<40 min) and the transcanal Endoscopic approach could be performed with ease.

For all the 35 cases, the integrity of ossicular chain was tested, mucosal disease was cleared. Eroded long process of incus was found in 07 cases and reconstruction with Type II tympanoplasty was done for all of them. Out of these 07 cases ossiculoplasty was performed by incudoversion in 5 cases and with spur cartilage in cases. Greater

Number of incus erosions was observed than in the study proposed by Saurabh Varshney et al<sup>6</sup>

Graft take up was seen in 30 patients (86%) of the 35 patients operated. The take up rates are less than those described by T S Karhuketo<sup>7</sup> (90%), Anoopraj<sup>8</sup> (90%) but better than those reported by Harugop and Mudhol<sup>9</sup> (82%), Yadav and Aggarwal et al<sup>3</sup> (80%). Males had a success rate of 92%

whereas Females of 2%. The rate of healing does not seem to be significantly affected by the sex of the patient. Out of 35 patients evaluated tympano-sclerosis was found in 4 cases intraoperatively. It was found to be less when compared with the study done by Kamaljit Kaur et al.<sup>10</sup>



## CONCLUSION

We conclude that Trans-canal endoscopic tympanoplasty is the procedure of choice for chronic suppurative otitis media of tubo-tympanic type in inactive stage (Inactive mucosal chronic otitis media) with Grade 2 and Grade 3 canals.

## REFERENCES

1. Muazz Tarabichi, Endoscopic transcanal middle ear surgery, Indian Journal of otolaryngology and head and neck surgery 2010;62:6-24.
2. Balasubramanian Thiagarajan, Venkatesan Ulaganathan, Endoscopic Otolaryngology A Supplement. Otolaryngology online journal 2012;2:50-57.
3. Yadav S P S, Aggarwal N, Julaha M, Goel A, Endoscope - assisted myringoplasty, Singapore Med J 2009;50: 510-15.
4. Balasubramanian Thiagarajan, Venkatesan Ulaganathan, otoendoscopy, Otolaryngology online journal 2012;2:23-30.
5. Harugop A.S., Mudhol R.S., Godhi R.A.A, Comparative study of endoscopic assisted myringoplasty and microscope assisted myringoplasty. Indian Journal of Laryngology. 2008; 60:298-302.
6. Saurabh varshney, ashutoshnangia. Ossicular chain status in chronic suppurative otitis media in adults, Indian j Otolaryngology and head and neck surgery, 2010;23:29-38.
7. T S Karhuketo, J H Ilomaki, H J Puhakka. Tympanoscope assisted myringoplasty. Journal for Otorhinolaryngology 2010;63:353 -358.
8. Anoop raj, Ravi mehera, Medialization Laryngoplasty-A Study of 15 Cases Indian journal of otolaryngology and head and neck surgery 2001;53:23-29.
9. A. S. Harugop R. S. Mudhol R. A. Godhi. A comparative study of endoscope assisted myringoplasty and microscope assisted myringoplasty. Indian J. Otolaryngol. Head Neck Surg. 2008;60:298-302.
10. Kamaljit Kaur, Nishi sankhya, Chronic Suppurative Otitis Media and Sensorineural Hearing Loss is there a Correlation? Indian Journal of Otolaryngology and head and neck surgery, 2006;4: 21-24.

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