

# ROLE OF EUSTACHIAN TUBE FUNCTION IN TYMPANOPLASTY

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**ABSTRACT-**Eustachian tube is a dynamic conduit between middle ear and nasopharynx which helps in maintaining the normal pressure in middle ear cavity, hearing function and prevents middle ear infection. Eustachian tube dysfunction has been attributed to middle ear pathologies like chronic supportive otitis media and secretory otitis media and therefore its assessment helps in knowing the prognosis. In this study we evaluate the Eustachian tube function tests in patients undergoing tympanoplasty and we compare the outcomes.

On follow up we found that patients with Eustachian tube dysfunction had lesser chances of graft uptake compared to patients with normal Eustachian tube function.

**KEY WORDS:** *Eustachian tube function test, tympanoplasty, chronic supportive otitis media*

## INTRODUCTION

Eustachian tube is a dynamic conduit between middle ear and nasopharynx which helps in maintaining the normal pressure in middle ear cavity, hearing function and prevents middle ear infection due to its secretory, ciliary and muscular pumping actions. Eustachian tube dysfunction has been attributed to middle ear pathologies like chronic supportive otitis media and secretory otitis media and therefore its assessment helps in knowing the prognosis of the diseases.

Patients with chronic suppurative otitis media mucosal type need surgical intervention for tympanoplasty as routine treatment of choice, the aim of procedure is to have dry ear and hearing improvement. In this study we evaluate the Eustachian tube function tests in patients undergoing tympanoplasty and we compare the outcomes of graft uptake and hearing outcomes.

## MATERIAL AND METHODS

A prospective study was done in our tertiary care hospital among 50 patients with inactive mucosal type chronic otitis media who needed tympanoplasty.

### Inclusion criteria:

- Patients with inactive mucosal type COM
- Patients having only pars tensa perforation

### Exclusion criteria:

- Active COM mucosal or squamous type
- Patients with history of previous middle ear surgery
- Patients with Sensory neural hearing loss
- Patients with congenital cleft palate, systemic disease
- Patient with active URTI, nose or PNS infection

Patients underwent preoperative Pure tone audiometry and anaesthetic assessment and for Eustachian tube function assessment - Eustachian tube function impedance manometer test was done.

After the assessment patient underwent underlay type tympanoplasty procedure and post operative assessment was done for graft uptake. For hearing outcomes Pure tone audiometry were done at 1st, 2nd and 6th month after surgery.

The outcome of surgery was classified as

A) Successful- healed graft with proper middle ear aeration

B) Failure - retracted or atelectatic graft or perforation on graft

A reduction in air bone gap to < 20 dB was our criteria for hearing improvement.

## OBSERVATIONS AND RESULTS

In our study majority patients belonged to 20- 40 years of age with mean age being 33.99 year with female predominance.

**Table 1:** Eustachian tube function (ETF) based on impedance manometer test (Toynbee test)

	EUSTACHIAN TUBE FUNCTION		
	Normal	Partial dysfunction	Gross dysfunction
No of patients	10	24	16
Percentage (%)	20	48	32

In this study majority patients had Partial Eustachian tube dysfunction 48% and 32% had Gross Eustachian tube dysfunction and 20% had normal Eustachian tube function.

**Table 2:** Normal ETF associated with degree of conductive hearing loss (CHL)

Degree of CHL	Normal ETF patients (10)	Percentage (%)
Mild	4	40
Moderate	5	50
Severe	1	10

In this study among patient with normal ETF, 50% had moderate CHL, 40% had mild CHL and 10% had severe CHL.

**Table 3:** Partial dysfunction associated with degree of CHL

Degree of CHL	Partial dysfunction patients ( 24)	Percentage (%)
Mild	9	37.5
Moderate	9	37.5
Severe	6	25

In this study among patients with Partial Eustachian tube dysfunction, 37.5% had mild to moderate CHL and 25% had severe CHL

**Table 4:** Gross dysfunction associated with degree of CHL

Degree of CHL	Gross dysfunction patients (16)	Percentage (%)
Mild	4	25
Moderate	3	19
Severe	2	56

In this study among patients with Gross eustachian tube dysfunction, 56% had severe CHL, 25% had mild CHL and 19% had moderate CHL.

Overall 72% patients had successfully graft uptake in postoperative follow up.

**Table 5:** Post op tympanoplasty great uptake based on Eustachian tube function

Graft uptake	EUSTACHIAN TUBE FUNCTION		
	Normal	Partial dysfunction	Gross dysfunction
Success	8(80%)	18(75%)	10(62.5%)
Failure	2(20%)	6(25%)	6(37.5%)
Total (50)	10	24	16

In this study 76% had successful hearing improvement (<20 dB AB gap) after tympanoplasty surely.

## DISCUSSION

In our study, the mean age of the study population was 33.88 years. The study conducted by Miki Ikehata et al <sup>[1]</sup> and Jong Woo Chung et al <sup>[2]</sup> had a mean age study population higher than our study, with 58.3 years and 46.2 years respectively.

The studies conducted by Jong Woo Chung et al <sup>[2]</sup>, Prasad et al <sup>[3]</sup>, and Undavalli SB et al<sup>[4]</sup> showed a male predominance. In a study conducted by Undavalli SB et al <sup>[4]</sup> majority of the study population belonged to normal ETF (80%) ,and a study by Hemalatha et al <sup>[5]</sup> showed majority of the study population belonging to Gross ETD(56.5%) Our study showed majority belonging to Partial ETD(48%).

In a study done by Prasad et al <sup>[3]</sup> and Hemalatha et al <sup>[5]</sup>, there was a strong relationship between high success rate and Normal ETF , and poor success rate in Gross ETD patients

In a study done by Miki Ikehata et al <sup>[1]</sup> it showed that success rate in Partial ETD is lower than those patients having Gross ETD. These findings are similar to our study that is 80% success rate in normal eustachian tube function, 75% success rate in Partial dysfunction, 62.5% success rate in Gross dysfunction

The highest percentage of hearing improvement post tympanoplasty was observed in a study conducted by Vishnu Prasad et al <sup>[6]</sup> (91%) while our study showed only 76% of hearing improvement after tympanoplasty.

## CONCLUSION

A properly functioning eustachian tube is an integral part of a normal middle ear and the existence of a good mucociliary drainage constitutes a favorable prognostic factor in outcome of tympanoplasty.

Patients with normal eustachian tube function have good rate of graft uptake and has both disease eradication and hearing improvement benefits with tympanoplasty. Whereas those with Gross eustachian tube dysfunction have poor rate of success.

A preoperative test for tubal function is therefore of the greatest interest, especially if such test provides possibility of estimating the chances of achieving a satisfactory result of tympanoplasty.

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