



ASSESSMENT OF HEARING OUTCOME IN ENDOSCOPIC TYMPANOPLASTY BY UNDERLAY TECHNIQUE

Dr.Sravanthi Puvvada*

Department of ENT, Meenakshi Medical College & Research Institute, Enathur, Kanchipuram 631552. *Corresponding Author

Dr.V U Shanmugam

Department of ENT, Rajah Muthiah Medical College, Annamalainagar, Chidambaram - 608002

ABSTRACT

AIM: To study the hearing outcome of "Endoscopic Tympanoplasty" by underlay technique.

METHODS: This study includes 30 patients presenting with Chronic Suppurative Otitis Media-Tubotympanic type.

Preoperative assessment includes complete clinical history, thorough ENT examination, X-ray mastoids, Pure Tone Audiogram and routine investigations. Informed and written consent was obtained from all the patients.

All the patients were subjected to endoscopic transcanal tympanoplasty by underlay technique using temporalis fascia.

Patients were regularly followed up for a period of 3 months and at the end of 3 months pure tone audiogram was done to assess hearing.

RESULTS: In our study of 30 patients postoperatively, 80% of the patients had successful graft uptake. In our study, postoperative air-bone gap closure was in the range of 0-10 dB in 55% of patients, 11-20 dB in 20% of patients, 21-30 dB in 5% of patients and 31-40 dB in 20% of patients.

CONCLUSION: Transcanal Endoscopic Tympanoplasty is a minimally invasive surgical approach as the endoscope usage provides good exposure of tympanic membrane and improves the visualisation of middle ear structures without canaloplasty.

KEYWORDS : Endoscopic Tympanoplasty, pure tone audiometry, underlay technique.

INTRODUCTION

Chronic suppurative otitis media is an inflammatory process of the middle ear space that results in long-term or more often permanent changes in the tympanic membrane including atelectasis, perforation, tympanosclerosis, development of retraction pocket or cholesteatoma. Myringoplasty is a standard surgical procedure indicated in chronic suppurative otitis media. It aims to close the tympanic membrane perforation to prevent recurrent otorrhea and restore the sound-conducting mechanism. Since the 1950s, microscopic tympanoplasty has become the standard treatment of a perforated tympanic membrane⁽¹⁾ Operating microscope is widely used for myringoplasty and provides good illumination and magnified images, but in a straight line that is extending from the objective lens, therefore any deep recesses within the temporal bone cannot be visualised directly without the surgeon taking measures to increase surgical exposure.⁽²⁾

In addition to microscopic tympanoplasty, endoscopic tympanoplasty has been performed increasingly since the 1990s.⁽³⁾

The use of the endoscope in myringoplasty overcame the anatomical variation that hampers visual examination of the tympanic membrane and middle ear during surgery. It avoided post aural and endaural incisions even in stenotic or tortuous ear canals. Otoendoscopy provides a highly sharp image with high resolution.⁽³⁾

This study assesses the hearing outcome of "Endoscopic Tympanoplasty" by underlay technique.

METHODS

Source of data:

This study includes 30 patients presenting to the Department of Otorhinolaryngology at Rajah Muthiah Medical College Hospital for two years with Chronic Suppurative Otitis Media-Tubotympanic type.

Preoperative evaluation includes complete clinical history, thorough ENT examination, X-ray mastoids, Pure Tone Audiogram and routine investigations. Informed and written consent was obtained from all the patients.

Inclusion Criteria

- Chronic suppurative otitis media in the inactive stage with central perforation.
- Normal Eustachian tube function.
- Patients aged between 18-45 yrs.

Exclusion Criteria

- Chronic suppurative otitis media in the active stage.
- Chronic suppurative otitis media - Atticoantral disease with or without Cholesteatoma.
- Patients with sensorineural hearing loss
- Patients with predisposing factors like Deviated nasal septum, Sinusitis, Chronic Tonsillitis and Pharyngitis.

All the patients were subjected to endoscopic transcanal tympanoplasty by underlay technique using temporalis fascia.

Patients were regularly followed up for a period of 3 months, and at the end of 3 months pure tone audiogram was done to assess hearing.

RESULTS:

60% of the study population are females, and 40% are males. A maximum number of patients fall in the age group of 21-25, accounting for 35% of the study.



Figure. 1: Gender and Age distribution.

Medium sized perforation was seen in 40% of the patients, small perforation was seen in 25% of the patients, large perforation was seen in 25% of the patients, and subtotal perforation was seen in 10% of the patients included in the study.

Postoperatively, 80% of the patients had successful graft uptake.

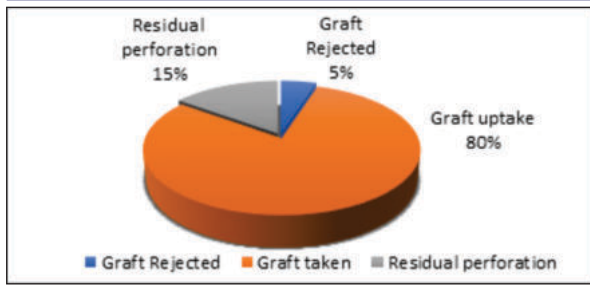


Figure.2: Graft status

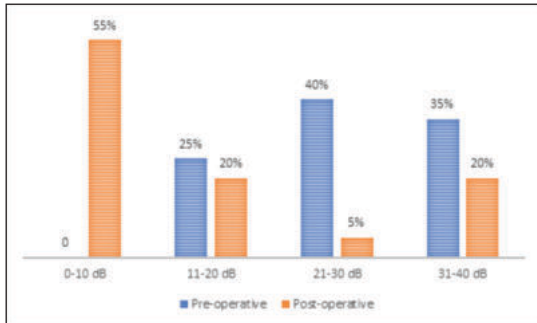


Figure.3: Hearing assessment

The postoperative air-bone gap was in the range of 0-10 dB in 55% of the patients, 11-20 dB in 20% of the patients, 21-30dB in 5% of the patients, 31-40 dB in 20% of the patients.

DISCUSSION:

Transcanal Endoscopic Tympanoplasty offers the advantage of providing an excellent magnified image with a good resolution. It facilitates the complete extirpation of disease without the need for a postauricular approach. In transcanal procedures, the hidden structures under the microscope like anterior tympanic membrane perforation, posterior pocket, facial recess and hypotympanum, can be visualised utilising the endoscope and the broad view provided of the operative field enables access to all those hidden areas.

Graft Uptake:

Table.1: Comparison of graft uptake.

STUDY	GRAFT UPTAKE
Ahmed Amin Omran ⁽⁴⁾	73.3%
Anoop Raj et al. ⁽⁵⁾	90%
Takatoshi Furukawa et al ⁽⁶⁾	84%
Yadav S P S et al. ⁽⁷⁾	80%
OUR STUDY	80%

In a study of endoscopic bivalve inlay cartilage myringoplasty for central perforations by Ahmed Amin Omran⁽⁴⁾, graft uptake was successful in 73.3%.

In a study by Anoop Raj et al.⁽⁵⁾, the results of endoscopic transcanal myringoplasty were compared with that of conventional myringoplasty. There was 90% graft uptake in the endoscopic group and 85% graft uptake in the microscopic group.

In a study by Takatoshi Furukawa et al.⁽⁶⁾, the feasibility and advantages of transcanal endoscopic myringoplasty were studied. The success rate was 84%.

In a study by Yadav S P S et al.⁽⁷⁾, there was an 80% success rate regarding graft uptake in endoscope assisted myringoplasty.

In our study, the success rate of endoscopic tympanoplasty by underlay technique was 80% regarding graft uptake, and this result was comparable with the graft uptake of other studies.

Hearing Assessment:

Table.2: Hearing assessment in the post-operative period.

STUDY	POSTOPERATIVE AIR-BONE GAP			
	0-10 dB	11-20dB	21-30dB	31-40dB
Ahmed Amin Omran ⁽⁴⁾	72.2%	22.7%		
Anoop Raj et al. ⁽⁵⁾	60%			
A.S.Harugop et al ⁽⁸⁾	46%	44%	10%	
Takatoshi Furukawa et al ⁽⁶⁾	88%			
Yadav S P S et al. ⁽⁷⁾	80%	16%	4%	
OUR STUDY	55%	20%	5%	20%

In a study by Ahmed Amin Omran⁽⁴⁾, postoperatively the closure of air-bone gap to less than or equal to 10 dB was seen in 72.2% and from 11-15 dB in 22.7%.

In a study by Anoop Raj et al.⁽⁵⁾, the postoperative air-bone gap was less than 10 dB in 60% of the patients in the endoscopic group.

In a study by A.S. Harugop et al.⁽⁸⁾, postoperatively the average conductive hearing loss was in the range of 0-10 dB in 46% patients, 11-20 dB in 44% and 21-30 dB in 10% of endoscope group.

In a study by Takatoshi Furukawa et al.⁽⁶⁾, the postoperative air-bone gap was within 10 dB in 88% of the cases.

In a study by Yadav S P S et al.⁽⁷⁾, 80% showed an air-bone gap below 10 dB, 16% had an air-bone gap in the range of 11-20 dB, and 4% had an air-bone gap in the range of 21-30 dB.

In our study, postoperative air-bone gap closure was in the range of 0-10 dB in 55% of patients, 11-20 dB in 20% of patients, 21-30 dB in 5% of patients and 31-40 dB in 20% of patients.

CONCLUSION

Transcanal Endoscopic Tympanoplasty is a minimally invasive surgical approach as the endoscope usage provides good exposure of tympanic membrane and improves the visualisation of middle ear structures without canaloplasty.

REFERENCES

- Zollner F. The principles of plastic surgery of the sound-conducting apparatus. J Laryngol Otol. 1955; 69(10):637-652.
- Dennis SP Endoscopic assisted middle ear surgery In: Glasscock ME III, Gulya AJ, editors. Surgery of the ear. 5th ed. Hamilton: Elsevier; 2003: 325-334.
- El Guidy A. Endoscopic transcanal myringoplasty. J Laryngol Otol. 1992;106:493-5.
- Ahmed Amin Omran. Endoscopic bivalve inlay cartilage myringoplasty for central perforations: Preliminary report. Egyptian Journal of Ear, Nose, Throat and Allied Sciences (2012) 13, 37-42.
- Anoop Raj, Ravi Meher. Endoscopic Transcanal Myringoplasty – A Study. Indian Journal Of Otolaryngology and Head and Neck Surgery Vol.53 No. 1 January – March 2001.
- Takatoshi Furukawa, Tomoo Watanabe, Tsukasa Ito, Toshinori Kubota, and Seiji Kakehata. Feasibility and Advantages of Transcanal Endoscopic Myringoplasty. Otology & Neurotology 35:e140Ye145 2014, Otology & Neurotology, Inc.
- Yadav S P S, Aggarwal N, Julaha M, Goel A. Endoscope-assisted myringoplasty. Singapore Med J 2009; 50(5): 510.
- S. Hanugop R. S. Mudhol R. A. Godhi. A comparative study of endoscope assisted myringoplasty and microscope assisted myringoplasty. Indian J. Otolaryngol. Head Neck Surg. (October–December 2008) 60:298–302 DOI: 10.1007/s12070-008-0099-5.