

ENDOSCOPIC TRANSCANAL TRANSTYMPANIC POP THROUGH TECHNIQUE OF MYRINGOPLASTY USING TRAGAL PERICHONDRIMUM GRAFT.

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ABSTRACT

INTRODUCTION

A perforated tympanic membrane is most commonly repaired using temporalis fascia graft by microscope assisted post auricular approach and underlay technique, we present an alternative technique to repair the perforated tympanic membrane using an alternative easily accessible graft material like tragal perichondrium, by endoscope assisted trans canalicular approach, where the graft is placed medial to the tympanic membrane remnant by pop through technique.

OBJECTIVE

The usage of rigid 4mm endoscope for myringoplasty allows better visualization, magnification and reconstruction of perforated tympanic membrane using tragal perichondrium is minimally invasive. The purpose of the study is to put across our experience in 69 patients where endoscopic assisted myringoplasty was done using tragal perichondrium graft. The graft was placed medial to the tympanic membrane remnant by trans tympanic pop through technique and tympanomeatal flap was not raised.

METHOD

This study was done over a period of 3 years, 69 patients with chronic suppurative otitis media fitting into the inclusion criteria underwent endoscopic transcanal myringoplasty using tragal perichondrium as graft material by underlay pop through technique. The post operative audiological improvement in closure of air bone gap on pure tone audiometry, success in tragal

perichondrium graft uptake, and mean operative time was evaluated.

RESULTS

The study population was 69 with predominantly females, the post operative pure tone audiometry showed that 39.1% had closure of airbone gap of 10db, 17.4% showed air bone gap closure of 20db and 43.5 % showed air bone closure of 15db.

85% had success of graft uptake (i.e. complete closure of perforation) at 6 weeks post op .The mean operative time was 80 minutes.

CONCLUSION

Endoscopic assisted trans-canalicular (pop through technique) of simple underlay myringoplasty using tragal perichondrial graft is simple, minimally invasive with good post operative improvement in hearing and can be done as a day care procedure without complications.

KEYWORDS

Endoscopic myringoplasty, tragal perichondrium , pop in technique.

INTRODUCTION

Chronic suppurative otitis media is relatively common in India among both adult and pediatric population. The most common symptoms of chronic suppurative otitis media mucosal type is recurrent otorrhoea and conductive type of hearing loss. In permanent perforation syndrome the non healing rent in the tympanic membrane

causes hearing loss, the severity of which depends on the size of the perforation. Tympanoplasty was first described by Zollner and since then several people have advocated usage of various techniques to repair the perforated tympanic membrane, the most commonly used autologous grafts are the temporalis fascia and tragal perichondrium¹. The aim of surgically repairing the perforated tympanic membrane is to achieve a dry ear and to improve hearing ². In myringoplasty the perforated tympanic membrane is repaired using suitable graft material and the middle ear is not explored^{3, 4}. The success of grafting in myringoplasty dependant on several factors like size and quadrant of perforation, and functional status of Eustachian tube, middle ear and also the type of graft used and the technique.

The three common surgical approaches are post auricular, endaural and transcanal⁵. Underlay technique of myringoplasty was popularized by Austin and Shea, here the graft is placed and spread medial to the tympanic membrane remnant by elevating the tympanomeatal flap⁶. In transtympanic pop through technique graft is placed medial to tympanic membrane remnant without raising the tympanomeatal flap⁷.

Endoscopic transcanal myringoplasty has been commonly used since last two decades and this makes the procedure minimally invasive⁸. Because of histological characteristics, transparency, and malleability, temporal fascia, and tragal perichondrium are two most commonly used grafts⁹. The audiological outcome of myringoplasty is considered good if the closure in air bone gap on pure tone audiometry is > 15db, and if there is complete closure of perforation with graft postoperatively.

In this paper we put across our experience in endoscopic assisted trans tympanic pop through technique of myringoplasty using an easily accessible alternative, tragal perichondrial graft. Here, the harvested tragal perichondrium graft is

placed and spread over medial aspect of raw tympanic membrane, trans-tympanically through the perforation using rigid endoscope and the step of elevating the tympanomeatal flap is not done.

MATERIALS AND METHODS

This is a descriptive cross sectional study carried in Department of ENT. The study was approved by the institutional ethical committee of our institute. All patients participating in the study consented for the same and it also involved retrospective review of medical records of patients who underwent transcanal tran-stympanic pop through technique of myringoplasty using tragal perichondrium from Jan 2019.

The inclusion criteria for the study was

1. Adult patients with chronic suppurative otitis media mucosal type inactive stage, having small to moderate size perforation surrounded by at least 2mm of the tympanic membrane remnant with normal middle ear mucosa.
2. Non-healing traumatic perforation of tympanic membrane
3. Failed myringoplasty with small to moderate size central perforation
4. Mild to mildly moderate conductive hearing loss of <35db with or without sensorineural component.

Excusion criteria was active stage of chronic suppurative otitis media, Ossicular chain involvement and squamosal type of CSOM and pediatric patients. Total of 69 patients were analyzed. All patients who fit into the inclusion criteria were assessed clinically with ENT examination and pre of diagnostic nasal endoscopy to examine the Eustachian tube and pure tone audiometry.

Surgical technique

All surgeries were performed under controlled sedation using dexmeditamine intravenous infusion. Local infiltration was given over the

tragus using 2%xylocaine with adrenaline. Skin incision was placed over the inner surface of tragus 2mm away from the dome. The skin was dissected off the underlying tragal perichondrium using sharp scissors. The incision was deepened to cut the perichondrium which was dissected away from the medial surface of underlying tragal cartilage. A perichondrial graft of approximately 1x1 cm was harvested. The graft was spread and all the adhering soft tissue was scrapped. After achieving haemostasis the incision was sutured with absorbable sutures. 4mm Karl storz rigid endoscope was used and the bony cartilagenous junction of EAC was infiltrated, the margins of the perforation in the tympanic membrane was freshened using sickle knife, the undersurface of the remnant of tympanic membrane was made raw using rosens Knife. Small pieces of gel foam soaked in antibiotic ear drops were placed in the middle ear, the graft was then pushed through the perforation and placed medially to cover the perforation and part of it was tucked all around underneath the tympanic membrane remnant, (pop through technique).Gel foam placed over the graft and tympanic membrane and a wick was placed in the external auditory canal, which was removed on postoperative day 14.The patients were followed up at 2 weeks, 1 month, 3 months. Postoperatively a repeat audiogram was done at 3 months post op.

The outcome which was analyzed was the demographic details, average intraoperative time, postop hearing improvement in terms of air bone gap closure, rate of graft uptake and presence of complications. The data collected was entered in SPSS software and statistical analysis was done.



Fig1- Harvesting tragal perichondrium.



Fig 2-Pop through technique of myringoplasty

RESULT

Of the 69 sample size in this study 62.3% were females and 37.7% were males .

Table: Sex-distribution of the patients

Sex	No. of Patients	%
Female	43	62.3
Male	26	37.7
Total	69	100.0

The mean age was 39.5 with standard deviation of 9.5.

46.45% had a small size perforation (involving one quadrant of the tympanic membrane) and 53.65 had a moderate size perforation (involving two or half of third quadrant of the tympanic membrane).

Table: Size of Perforation of tympanic membrane among patients

Size of Perforation	No. of Patients	%
Moderate	37	53.6
Small	32	46.4
Total	69	100.0

The pre operative conductive component in terms of gap between air conduction and bone conduction was noted. All the patients had a air bone gap less than 35 db and the mean air bone gap was 29.7db and 14% of study population had associated sensorineural component.

The mean intra operative time taken for this procedure in the study group was 80 minutes.

Table: post operative hearing improvement interms of Air bone gap closure in patients

Air bone gap closure(db)	Number	%
10.0	27	39.1
20.0	12	17.4
15.0	30	43.5
Total	69	100.0

On post operative repeat pure tone audiometry 39.1% showed closure of air-bone gap of 10db, 17.4% showed air bone gap closure of 20db and 43.5 % showed air bone closure of 15db.

20% of the study population had associated comorbidities like diabetes mellitus and hypertension the data analysis of 69 patients showed 58 patients had successful graft uptake and complete closure of perforation at the end of 12 weeks post op at 85%.The mean improvement in air bone gap by 20db which was statistically significant. None of the patients had any perioperative complications.

DISCUSSION

Newer approaches in myringoplasty should be explored to improve the quality of patient care. Endoscopic technique of myringoplasty allows for magnified viewing of narrow spaces, short operation duration, less invasive and lower complication and using tragal perichondrium has the advantage of a sturdy material which can be easily harvested .A study done by Choin N etal show similar success rates of >95% in both endoscopic and conventional microscopic techniques¹⁰ .Total of 70 patients with chronic otitis media mucosal type with permanent perforation with conductive hearing loss with or with our sensorineural hearing loss , who fit into the inclusion criteria of the study were managed surgically with endoscopic myringoplasty using tragalperichondrial by pop through technique which did not require elevation of tympanomeatal flap. Pop through technique was popularized by SinghGB et al⁷.

In this study, the graft take up success rate of using tragal perichondrium using the pop through technique to close small to moderate size perforation was 85 % which correlates with a study done by Ai Bayram et al who concluded that although temporalis fascia is the most commonly

used graft material for myringoplasty surgeries it may fail due to poor stability and hence tragal perichondrium can be used as an alternative material¹¹. Pandey et al reported tympanic membrane closure and graft success rate of 83.72% by pop through technique using temporalis fascia graft⁵. Fazal L Wahid et al reported that tragal perichondrium is an effective grafting material which can be used in tympanoplasty surgeries due to its possessing qualities¹². Singh GB et al reported a success rate of 84% in transtympanic myringoplasty⁷.

MS Quareshi et al reported graft success rate of 94% using tragal perichondrium graft which was placed percutaneously as a day care procedure, which is similar to the success rate of 85% in our study¹³, and el-Guindy et reported a graft success rate of 91% with endoscopic trans-tympanic myringoplasty in adult using perichondrium¹⁴.

Pre operative and 3rd month postoperative pure tone audiometry was done in the study subjects, the minimum and maximum preop AB gap was 20dB and 34db and post-op air bone gap closure was >15db in 60.9% and <10 db in 39.1%, an improvement in >15db is considered as an audiological success which is comparable to study done by Firaz Q et al who reported significant hearing improvement in trans-tympanic method¹⁵. The mean duration of intraoperative time in our study is 80 minutes.

CONCLUSION

Our institutional experience of using tragal perichondrium for endoscopic myringoplasty by trans canal pop in technique showed good graft uptake and success in patients fitting strictly to the selection criteria. It has the advantage of being minimal invasive, shorter intra operative time with good improvement in hearing.

REFERENCES

1. Dornhoffer JL. Hearing results with cartilage tympanoplasty. *Laryngoscope*. 1997 Aug;107(8):1094-9.
2. House WF. Myringoplasty. *AMA Arch Otolaryngol* 1960;71:399-404
3. Maran RK, Jain AK, HariPriya GR, Jain S. Microscopic Versus Endoscopic Myringoplasty: A comparative study. *Indian J Otolaryngol Head Neck Surg*. 2019 Nov;71(Suppl 2):1287-1291..
4. Sheehy J. L(1984) Surgery of chronic otitis media. In *Otolaryngology(English G Med)Volume 1.Ch 20,pp.1-86*
5. Bhuwan R P, Poonam KC. Prevalence of Perforated Graft in Underlay and Pop-in Technique Myringoplasty. *J Nepal Med Assoc* 2019;57(220):416-419.
6. Austin DF, Shea JJ Jr. A new system of tympanoplasty using vein graft. *Laryngoscope*. 1961 Jun;71:596-611.
7. Singh GB, Sharma A, Singh N. Role of transtympanic myringoplasty in modern otology. *J Otolaryngol*. 2006 Dec;35(6):408-12.
8. Tarabichi M, Ayache s, Nogueira JF, Al Qahatani M, Pothair DD. Endoscopic management of chronic otitis media and myringoplasty. *Otolaryngol clinic Nort Am* 2013;46:155-63)
9. Dabholkar JP, Vora K, Sikdar A. Comparative study of underlay tympanoplasty with temporalis fascia and tragal perichondrium. *Indian J Otolaryngol Head Neck Surg* 2007;59:116-9.
10. Choi N, Noh Y, Park W, Lee JJ, Yook S, Chai JE et al. Comparison of endoscopic tympanoplasty to microscopic tympanoplasty. *Clinical experimental otolaryngology* 2017;10:44-9.
11. Ali Bayram, Nuray Bayer Muluk, Cemal Cingi, Sameer Ali Bafaqeeh. Success rate for various graft materials in

-
- tympanoplasty –A review journal otol
2020 Sep :15(3) ;107-111.
12. Wahid FL, Nagra SR. Tympanoplasty type 1 using tragal perichondrial graft: our experience. Pak J Med Sci .2019;35(4):1076-1080.
 13. Quraishi MS, Jones NS. Day case myringoplasty using tragal perichondrium. Clin Otolaryngol Allied Sci. 1995 Feb;20(1):12-4.
 14. el-Guindy A. Endoscopic transcanal myringoplasty. J Laryngol Otol. 1992 Jun;106(6):493-5.
 15. Alzoubi FQ, Tarifi AA, Khader Y, de Carpentier J. Comparison between transtympanic and elevation of tympanomeatal flap approaches in tympanoplasty. Otol Neurotol. 2010 Jul;31(5):773-5. doi: 10.1097

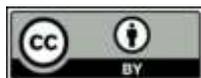
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