International Journal Dental and Medical Sciences Research
Volume 3, Issue 6, Nov-Dec 2021 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

A Comparitive Study of Graft Uptake in Tympanomeatal Degloving Technique Vs Conventional Underlay Technique in Type 1 Tympanoplasty for Large Central Perforation

Dr. Madhusudhan Malpani, Dr. S.N Mohan Kumar, Dr. R. Sasank Sai
Professor, HOD, Dept of ENT. Pravara Institute of Medical Sciences, Loni Maharashtra
Resident,Pravara Institute of Medical Sciences, Loni, Maharashtra
Resident, Pravara Institute of Medical Sciences, Loni, Maharashtra
Corresponding Author: Dr. R. Sasank Sai

Submitted: 15-12-2021 Revised: 27-12-2021 Accepted: 30-12-2021

ABSTRACT: This study compares graft uptake, hearing assessment and complications of two techniques of conventional underlay technique for tympanic membrane repair and Tympanomeatal degloving technique. The Non-Randomized Clinical Prospective Study included a total of 150 patients out of which 75 had undergone Tympanomeatal degloving technique surgery and 75 patients underwent conventional underlay technique. In both, the results were reliable. Tympanomeatal degloving technique has less chance of post operative tympanosclerosis and granulations and residual perforation as compared to conventional underlay technique. Tympanomeatal degloving technique has more chances of gain in hearing postoperatively. Careful technique and precise work are the keys to successful tympanoplasty. Thus, otologic surgeons should cultivate effective techniques, attempting to continuously improve their results to achieve perfection. A few studies have been conducted comparing success rate using Tympanomeatal degloving technique V/s conventional underlay technique in Type I tympanoplasty. So, the present study is being planned to compare the graft uptake rate and hearing of Tympanomeatal degloving technique V/s conventional underlay technique in Type I tympanoplasty in large central perforation.

KEYWORDS: Conventional underlay technique, tympanoplasty, large perforation, Tympanomeatal degloving technique, Full Cuff.

I. INTRODUCTION

Chronic suppurative otitis media (CSOM) still remains a major health problem in our country and is characterized by recurrent ear discharge, a permanent perforation in tympanic membrane and impairment of hearing. It is a single most common cause of hearing impairment in rural population. Incidence of CSOM is higher in developing countries because of poor socioeconomic status and poor nutritional status. A majority of these perforations eventually heal spontaneously but the remaining chronic non healing perforations result in recurrent ear discharge and decreased hearing and will subsequently need tympanoplasty. Repairing the tympanic membrane perforation by performing tympanoplasty provides considerable benefits to the patient including prevention of ear infection, improvement in hearing and elimination of need to take water precautions. Tympanoplasty is one of the most commonly done otological procedure. It was introduced by Berthold and further developed by Wullstein and Zollner.2-4 Type I tympanoplasty is surgically used to repair the tympanic membrane perforation along with improvement of hearing level in the patient. Underlay technique is considered easier and faster technique with a high graft uptake rate.Three main approaches are used in tympanoplasty: Transcanal, endaural, and postauricular, and two classic methods for reconstruction of a TM perforation have been used: the underlay or overlay graft techniques (These terms refer to the position of the graft in relation to the fibrous annulus, not to the malleus or tympanic remnant). Each of these approaches and techniques has its advantages and disadvantages. The biggest disadvantage of medial graft is its limited exposure and poor utility for larger perforations and its difficulty with repair of near-total perforations. Advantages of the lateral graft technique include wide exposure and versatility for larger perforations and for any needed ossicular reconstruction. Disadvantages include the requirement of a higher technical skill level, a longer operative time, slower healing rate, and the risk of blunting and lateralization of the graft. Marginal, subtotal, or total perforations, known to have a worse outcome whilst utilizing the standard postauricular tympanoplasty technique. Tympanomeatal degloving technique used with overlay grafting. In which the skin of the deep external auditory canal is elevated in continuity with

International Journal Dental and Medical Sciences Research
Volume 3, Issue 6, Nov-Dec 2021 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

the outer epithelial layer of the tympanic membrane and kept attached laterally and anteriorly as a flap. This expose the whole tympanic membrane remnants for proper application of the overlay graft.

II. AIMS AND OBJECTIVES

a. To assess the success rate of Tympanomeatal degloving technique in Tympanoplasty
b. To compare the Results of Temporalis Fascia Placement with and Without Tympanomeatal degloving technique in Tympanoplasty Surgery in Terms of Hearing and Graft Uptake.

III. MATERIALS AND METHODS

Study design – simple random sampling method
Source of data- all patients attending the ENT Out patient department of tertiary centre from October 2019 to October 2021.
Sample size – All patients who met the inclusion criteria and were undergoing tympanoplasty for chronic suppurative otitis media during the study period.
The study included a total of 150patients, randomly being allocated into two groups. One group of patients underwent type I tympanoplasty with full cuff technique and underlay technique by another group for large central perforation
Sampling procedure – simple random method
Inclusion criteria:

- Patients of age 11 to 50yrs
- Both sexes
- Patients having CSOM tubotympanic type with dry ear
- Patients with pure conductive hearing loss

Exclusion criteria

- Patients having congenital hearing disorders
- Patients having CSOM with mixed or sensorineural hearing loss
- Patients having CSOM with chronic otitis externa

IV. PRE-OPERATIVE ASSESSMENT

a) Otoscopic examination of ear
b) Tuning fork tests- Rinne‘s test, Webers test, Absolute Bone Conduction test
c) Eustachian tube patency test in the form of Valsalva maneuver.
d) A microscopy examination was performed to determine the size of the perforation, the middle ear mucosa, and the perforation borders. Wherever it was necessary, aural toileting was performed to remove debris and discharge and to keep the ear as dry as possible to avoid future difficulties. For each patient, all of these observations were recorded.
e) Routine blood investigations and other anaesthetic investigation
f) X- Ray Mastoid Schuller’s View
g) Pre- operative PTA

he actual force required in the application is need to move the engine valve along with spring that must be considered.

V. SURGICAL PROCEDURE

1- The patient is positioned supine with the face turned to one side and the operated ear up, clearly showing the critical surface markers required for the surgical approach after preparation and draping.
2- It can be done under local or general anesthetic. Patients were premeditated half an hour before surgery if they were under local anesthetic.
3- Midazolam 0.03 mg/kg and Pentazocine 3-6 mg/kg injections were given. Atropine 0.6 mg is injected as a vagolytic and cardioprotective agent.
4- Infiltration was done with 2% lignocaine with 1:1, 00,000 adrenaline using a 26x 11/2 gauge needle to provide hemostasis and local anesthesia post auricularly and finish aurally at the bone cartilaginous junction at 12 o'clock, 3 o'clock, 6 o'clock, and 9 o'clock (0.3 ml in each region injected subperiosteally.)
5- The external auditory canal and tympanic membrane are inspected, irrigated, and debris is removed.
6- For the post auricular technique, Wilde's incision was used. This 1cm posterior to the post auricular sulcus incision runs from the helical rim to the mastoid tip. To facilitate closure and minimize an unattractive look due to sulcus thickening with scar maturation, incisions in the sulcus should be avoided. The inferior extent of the incision was prolonged more posteriorly in young infants to minimize injury to the facial nerve, which was more lateral in position due to insufficient mastoid tip development. (By the age of 12, Tip has grown to adult size.)
7- The temporalis fascia is collected after an incision is made through the skin, subcutaneous fat, and loose areolar tissue overlaying the true temporalis fascia (most commonly used graft material.)
8- A T-Shaped periosteum deep incision was given over mastoid area, periosteal flap was elevated and posterior meatotomy done below the level of the spine of Henle. Mastoid self retaining retractor applied.

International Journal Dental and Medical Sciences Research
Volume 3, Issue 6, Nov-Dec 2021 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

9- Refreshing the perforation's margins - The edges of the perforation are meticulously denuded with a small sickle knife or smooth curved pick under the microscope to ensure good capillary blood flow.

10- Tympanomeatal flap elevation [Full-Cuff technique]

Along the tympanosquamous and tympanomastoid suture lines, vascular strip incisions are created in the ear canal.

The vascular strip incision in the posterior canal wall is 3 to 5 mm lateral to the annulus and extends 1 to 3 mm lateral to the annulus in the anterior canal wall.

As a result, the incision is prolonged from 11 o'clock to 1 o'clock.

Along the external auditory canal, an incision is made at the 5 o'clock and 2 o'clock positions.

Rosen's circular knife was used to elevate the Tympanomeatal flap to the fibrous annulus. The periosteum elevator was used to penetrate the middle ear from below the annulus.

11- The malleus handle is skeletonized, with any fibrous threads or adhesions removed. Along the anterior canal wall, the annulus and tympanomeatal flap are also raised. The integrity and continuity of the ossicles were examined, as well as their motions. Round window reflex was visualized in all the cases. If there is any pathology in the middle ear, it is cleaned. gel foam soaked in the antibiotic solution kept in middle ear. Temporalis fascia graft was placed medial to the handle of malleus and over the posterior bony canal and anteriorly the fascia should come over the anterior bony wall under the fibrous annulus and the tympanomeatal flap is reflected and repositioned back. The graft with the flap was stabilised by packing with gel foam in the external auditory canal

12- Tympanomeatal flap elevation [Underlay technique]

In the skin of the bone canal, a U-shaped incision was made. At 12 o'clock, the superior incision was started, and at 6 o'clock, the lower incision was commenced. The fibrous annulus was reached by elevating the tympanomeatal flap. A sickle knife was used to enter the middle ear.

 # Underlay temporalis fascia grafting:

Temporalis fascia was placed under the remnant of tympanic membrane with fibrous annulus and under the handle of malleus, medial to it. The graft was pulled on anterior canal wall and tucked below annulus. The tympanomeatal flap was reposited back. Gelfoam soaked in betadine solution was placed for support of graft all around and canal was also packed with same gelfoam.

13- Wound closure— A 3-0 vicryl suture was used to close the periosteal flap. With or 3-0 vicryl, the post-aural wound is closed in two layers.

14- Apply a firm pressure mastoid dressing.

VI. OBSERVATION AND RESULTS

Table No.1: Age and sex wise distribution of Tympanomeatal degloving technique V/s Conventional underlay technique in Type I tympanoplasty for large central perforation:

Age in years	**Conventional underlay technique**			**Tympanombeatal degloving technique**		
	Males	**Females**	**Total**	**Males**	**Females**	**Total**
<20yrs.	6	4	**10**	6	4	**10**
21-30 yrs.	13	14	**27**	7	9	**16**
31-40 yrs.	9	14	**23**	11	20	**31**
41-50 yrs.	5	8	**13**	7	8	**15**
51-60 yrs.	2	0	**2**	0	3	**3**
Total	**35**	**40**	**75**	**31**	**44**	**75**
Mean ± SD	**31.91±11.57 yrs.**			**33.07±12.66yrs.**		

International Journal Dental and Medical Sciences Research
Volume 3, Issue 6, Nov-Dec 2021 pp 640-644 www.ijdmsrjournal.com ISSN: 2582-6018

Table No.2: Graft uptake in Tympanomeatal degloving technique V/s Conventional underlay technique in Type I tympanoplasty for large central perforation:

Graft uptake	Conventional underlay technique	Tympanomeatal degloving technique
	No. (%)	No. (%)
Positive	65(86.67%)	74(98.67%)
Residual	10(13.33%)	1(1.33%)
Total	**75**	**75**

VII. DISCUSSION

Chronic otitis media is a chronic inflammation of the middle ear cleft that causes otorrhea through a perforated tympanic membrane for more than three months. Perforations in the tympanic membrane have a substantial impact on the quality of life of millions of individuals Otologists provide a variety of surgical techniques to improve hearing and to successfully close a tympanic membrane perforation. One such procedure is tympanoplasty. Repair of the tympanic membrane has been done using a variety of materials, and several technological advancements have improved surgical outcomes to a high level of precision. Tympanoplasty is defined as surgical procedure to eradicate disease in the middle ear cleft and to reconstruct hearing mechanism, with or without mastoid surgery. Large perforations of tympanic membrane have always been more difficult repair and require modification in technique. There are different techniques in which canal wall incisions are taken during tympanoplasty. For large central perforation it's necessary to provide support for the graft by adding canal incisions so as to avoid any residual perforations. There is still no consensus about the proper technique which is often employed on the basis of surgeons preference and skills.

In our study we compared two techniques of raising Tympanomeatal flap in Type I Tympanoplasty for large central perforations by conventional underlay technique Vs Tympanomeatal degloving technique. It also highlights the indications for tympanoplasty, post-operative outcome related to hearing and graft uptake.

VIII. CONCLUSION

After a detailed discussion and comparison of present study results with other studies, we conclude that

1- Tympanomeatal degloving technique needs expertise as it is a skilled technique.

2- It ensures proper graft implantation beneath the annulus from all sides, which prevents graft medialization.

3- All of the individuals in this trial improved their hearing. There was no evidence of hearing loss or change in any of the patients.

4- After 3 months, the average gain in air conduction in conventional underlay and full cuff technique was similar.

5- Graft uptake was better in patients undergoing full cuff technique as compared to those undergoing conventional underlay technique for large central perforation .

6- This strategy is gradually gaining attraction. Post-operative care, pre-operative evaluation, surgeon expertise, and patient compliance are all key variables in the success of this method.

7- The most prevalent causes of graft failure are post-operative infections and poor technique.

REFERENCES

[1]. Christopher Muller, Tympanoplasty: Grand Rounds Presentation, The University of Texas Medical Branch (UTMB) , Dept. of Otolaryngology : Jan 15, 2013.

[2]. Merchant SN, Mckenna MJ, Rosowski JJ. Current Status and future challenges of tympanoplasty. Ear Arch Otorhinolaryngology 1998: 225:221- 28.

[3]. Adkins wy (1990) composite autograft for Tympanoplasty & Tympanomastoid surgery. Laryngoscope 100, 244-247

[4]. Luetje CM. Reconstruction of the tympanic membrane and ossicular chain. In: Bailey B, Johnson J, Newlands S, editors. Head & neck surgery otolaryngology. 4. Lippincott: Williams & Wilkins; 2006.

[5]. Lee P, Kelly G, Mills RP. Myringoplasty: does the size of the perforation matter? Clin Otolaryngol Allied Sci. 2002 Oct;27(5):331-4.

[6]. Zahnert T, Huttenbrink KB, Murbe D, Bornitz M. Experimental investigation of the use of cartilage in tympanic membrane

reconstruction. Am J Neurotol. 2000;21:322–328.
[7]. Glasscock ME, Shambaugh GE, Aristides sismani, Tympanoplasty: Surgery of the ear, 5th Edition, chapter 24, page no.463.
[8]. Rizer FM. Overlay versus underlay tympanoplasty. Part I historical review of the literature. Laryngoscope. 1997;107:1–25.; Wehrs RE. Grafting techniques. Otolaryngol Clin N Am. 1999;30(3):443–455.
[9]. Erkan Kulduk, Rıza Dundar, Fatih Kemal Soy, Osman Kadir Guler, Ahmet Yukkaldiran, Ismail Iynen, and Ferhat Bozkus ; Treatment of Large Tympanic Membrane Perforations: Medial to Malleus Versus Lateral to Malleus; Indian J Otolaryngol Head Neck Surg. 2015 Jun; 67(2): 173–179.
[10]. Vadiya S L,Chaudhary M, Shah S; Comparison of canal wall incisions for tympanoplasty for large central perforations; Indian Journal of Otology, vol 21, issue 3, pg 186-189
[11]. Banzer M. Disputatio de Auditione Laesa. Wittenbergae: Jo-hannis Rohrerei: 1651.
[12]. Ortegren., Myringoplasty, actaotolaryn, 1961: Suppl: 193, 1-41.
[13]. Yearsley J. Deafness Practically Illustrated. edn 2. London: J Churchill & Sons; 1863
[14]. Blake CJ. Transactions of the First Congress of the International Otological Society. New York: D. Appleton & Company; 1887.
[15]. Berthold E. Ueber myringoplastik. Wier Med Bull 1878; 1:627
[16]. Wullstein H. The restoration of the function of the middle ear in chronic otitis media. Ann Otol Rhinol Laryngol. 1971; 80(2):210-7