

ENDOSCOPIC TYMpanoplasty TEMPORALIS FASCIA VERSUS CARTILAGE: COMPARATIVE STUDY

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ABSTRACT: OBJECTIVE: To compare the graft acceptance rates and auditory outcomes of endoscopic cartilage tympanoplasty operations with those of endoscopic primary tympanoplasty using temporalis fascia in a homogenous group of patients. **MATERIAL AND METHODS:** This prospective study was conducted on 64 patients between the ages of 15 to 50 years. All patients had a central tympanic membrane perforation without infection in middle ear or upper respiratory tract. **RESULTS:** Anatomical results in terms of graft uptake and intact tympanic membrane over a period of 2 years showed good results both in 26(92.85%) cases in cartilage group and in 33(91.66%) cases in temporalis fascia group. The average post-operative Air bone gap in endoscopic fascia tympanoplasty group was 14.61db and 15.65db in endoscopic cartilage tympanoplasty group. **CONCLUSION:** Endoscopic tympanoplasty is a minimally invasive, sutureless procedure with better patient compliance. Tympanoplasty with cartilage graft has a high degree of graft take up. Tympanoplasty with cartilage provides better results in terms of integrity and intactness of the graft and less percentage of postoperative discharge from the operated ear.

KEYWORDS: Cartilage, Temporalis fascia, Endoscopic tympanoplasty.

INTRODUCTION: Tympanoplasty is a procedure used to eradicate disease in the middle ear and to reconstruct the hearing mechanism.¹ although tympanoplasty is a highly successful procedure in 90–95% of well ventilated middle ears, the prognosis is poorer in cases with eustachian tube dysfunction, infection, adhesive tympanic membrane, and total perforation in tympanic membrane. Since the introduction of tympanoplasty by Wullstein in 1952,² and Zoellner in 1955,³ different types of grafts have been used to reconstruct tympanic membrane. These include temporalis fascia, periostia, perichondria, cartilage, vein, and fat.⁴

Cartilage was first used by Utech in 1959 but it was in 1963, when Salen.⁵ and Jansen.⁶ first reported the use of composite graft for tympanic membrane reconstruction.

Temporalis fascia remains the most commonly used material for tympanic membrane reconstruction, with a success rate of 93% to 97% in primary tympanoplasties.⁷ However, during the last decade, there has been a renewal of interest in the use of cartilage as an alternative to more traditionally used temporalis fascia graft.

The major advantage of cartilage is its stiffness and bradytrophic metabolism, which make it particularly suitable for difficult conditions, such as subtotal perforations, adhesive otitis, and revision cases,⁸ although there have been concerns that these may affect adversely acoustic transfer and the hearing.

There has been an increase in the use of cartilage in tympanoplasty with surgeons reporting improved outcomes when compared with temporalis fascia used alone.⁹

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But recent studies fails to show any statistical difference in post-operative hearing outcome when cartilage is compared to fascia or perichondrium as grafting material in tympanoplasty. The purpose of this study was to compare the graft acceptance rates and auditory outcomes of endoscopic cartilage tympanoplasty operations with those of endoscopic primary tympanoplasty using temporalis fascia in a homogenous group of patients.

METHODS: The present study is conducted at the department of otorhinolaryngology, Sathagiri institute of medical science & research Centre, Bangalore. There were total of 64 patients in the 15-50 year age group suffering from chronic suppurative otitis media. The inclusion criteria included were a dry and non-discharging ear at least for three weeks, a conductive hearing loss with good cochlear reserve and intact ossicular chain. The exclusion criteria were squamosal variety of chronic otitis media, sensorineural hearing loss and patients less than 15yrs.

The cases were randomly selected using a periodic random number to avoid a bias in selection of cases. All patients were operated endoscopically. Pre and post-operative PTA was performed. The air bone gap of each patient was calculated at 500 Hz, 1000 Hz, 2000 Hz both pre and postoperatively and compared Anesthesia- Local Infiltration with (2% lignocaine with 1:100000 adrenaline).

The temporalis fascia was harvested through a separate incision 2cm above the superior attachment of pinna in 36 no. of cases. Cartilage was harvested from the tragus in 16 cases and from conchal cartilage in 12 cases. The tympanomeatal flap is raised using circular knife and the margin of the perforation is freshened. The continuity and the mobility of ossicles are visualized subsequently.

After taking care of the ossicular continuity the graft/tragal or conchal cartilage [Fig 1] harvested is placed over the intact ossicles and the tympanomeatal flap is placed over the graft. The meatus is packed with gel foam soaked in antibiotic solution. All the steps were performed under endoscopic vision.



Fig. 1: Tragal Incision

RESULTS: The patients were in the age group of 15-50 years with mean of 31 years of age. The total no. of patients were 64 of which 24 were male and 40 females. Of the total patients 36 underwent endoscopic fascia tympanoplasty and rest 28 underwent endoscopic cartilage tympanoplasty. All cases had intact ossicular chain intraoperatively. The preoperative average ABG was 31 and 29db for fascia and cartilage groups respectively.

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Anatomical results in terms of graft uptake and intact TM over a period of 2 years showed good results both in 26(92.85%) cases in cartilage group [Fig. 2] and in 33(91.66%) cases in temporalis fascia group. Two residual perforation were seen in cartilage group with no retraction. In fascia group, there were 3 failures [Fig. 3] which included one retraction and two perforations. The average post-operative ABG in endoscopic fascia tympanoplasty group was 14.61db and 15.65db in endoscopic cartilage tympanoplasty group.

Figure 2: Endoscopic picture of good graft uptake [03 months post cartilage tympanoplasty]



Fig. 2

Figure 3: Residual perforation post tympanoplasty with temporalis fascia graft.



Fig. 3

DISCUSSION: Chronic suppurative otitis media is a very common condition in the practice of otolaryngology both in developed as well as developing countries & Tympanoplasty is one of the most common forms of surgery in otology. The cartilage is experiencing a renaissance in ear surgery because it appears to offer an extremely reliable method for reconstructing of the tympanic membrane.¹⁰

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The results are generally quantified in terms of take up of the grafts and post-operative hearing improvement, which is assessed subjectively and objectively using pure tone audiometry & speech reception threshold.

Gerber, et al.¹¹ studied the hearing results in patients who had cartilage tympanoplasty. The results were comparable to temporalis fascia. They advocated that a cartilage graft is useful to prevent recurrence or progression of postoperative retraction pockets.

Dornhoffer.¹² found the same results after comparing cartilage with fascia. Duckert.¹³ found excellent hearing results with cartilage with closure of the ABG to within 10db was achieved in 87% of the tympanoplasty. Milewski.¹⁴ reported a post-operative average ABG of <30db in 92.4% and <10db in 43.6% of 197 tympanoplasty using cartilage. Lin, et al., also observed good results and advocated that this technique be used in older patients and in patients with co-morbidities.¹⁵

In our series, the hearing improvement in audiometric parameters was comparable in both groups. On the other hand closure of the perforation with cartilage compares favourably with temporalis fascia techniques with take up rates varying from 91-96%. Cartilage tympanoplasty has many advantages in situations such as recurrent, residual, total perforations, chronic mucosal dysfunction or severely atelectatic tympanic membranes, whereas fascia and perichondrium undergo atrophy and subsequent failure.¹⁶ The cartilage tympanoplasty offers an otologist another reliable material in his armamentarium for tympanic membrane reconstruction.

In our study 7% reperforation seen in cartilage group & 8.3% reperforation in fascia group. In our present study no retraction or lateralization was observed in average follow up of 2years.

SUMMARY AND CONCLUSION: Endoscopic tympanoplasty has following advantage it's sutureless, minimally invasive & reduced operative time. The cartilage tympanoplasty offers an otologist another reliable material in his armamentarium for tympanic membrane reconstruction.

Cartilage is a reliable graft material for reconstruction of the tympanic membrane in COM with adhesive tympanic membrane, perforations especially in total and anterior perforations.

Cartilage is also recommended in recurrent perforations, older patients and in patients with co-morbidities.

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