

Comparison of tympanoplasty with temporalis fascia and tragal Perichondrium in Sarwari Hospital

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Abstract

Objective: To compare the outcome of Temporal fascia and Tragal Perichondrium in myringoplasty procedure in term graft uptake.

Methodology: This was a comparative retrospective randomized control study which was conducted at Sarwari Hospital during 17 months (from 14th july, 2019 to 15th November 2020). It included sixty (13 – 56 years with mean age of 27.48±33) patients which were divided in two groups, each one having 30 patients. Temporalis fascia and tragal perichondrium were used for graft purpose in group A and group B patients, respectively.

Results: It was a comparative retrospective randomized control study which was performed in 60 patients during 17 months (from 14th july, 2019 to 15th November 2020). The age of the patients ranged 13- 56 years with mean age of 27.48±33. Overall success rate of graft uptake was noted in 28 patients (93.3%) out of 30 cases in group A and 21 patients (70%) out of 30 cases in group B . The data were analysed in SPSS software (ver-22). The p-value less than 0.05 was considered significant

Conclusion: Temporal fascia is statistically more successful as compared to tragal perichondrium in term of graft uptake in myringoplasty, so we recommend temporal fascia graft for management of perforated tympanic membrane.

KEY WORDS: Myringoplasty, Temporal Fascia, Tragal Perichondrium, CSOM

Introduction

In all developing countries the incidence of chronic suppurative otitis media (CSOM) is very high because of poor socioeconomic standard, overcrowding, poor nutrition and lack of health education¹. Among the two types of chronic suppurative otitis media, *Tubotympanic disease* is characterized by a perforation of the pars tensa of varying size and shape but with a narrow margin of intact annulus. Patients with this form of otitis media are generally not considered to be at risk of developing complications such as intracranial sepsis. The term 'safe' otitis media is often applied to this condition.^{2,3}The patients always present with aural discharge with or without hearing loss. Aural discharge is always mucoid or mucopurulent and varies with upper respiratory tract infection. Discharge is usually intermittent recurring whenever there is a upper respiratory tract infections or water enters in to the ear⁴. Hearing loss in tubotympanic disease is usually conductive in nature but a few case of sensorineural hearing loss is also found³. Hearing loss with intact ossicular chain is approximately 10-30 dB.^{5,6} But more when ossicular chain is disrupted. Myringoplasty is the operation specially designed to repair or reconstruct the tympanic membrane. From the seventeenth to the nineteenth centuries, several attempts at closing tympanic membrane perforations using prosthetic materials were made, culminating in the "paper patch" technique developed by Blake in 1887. The use of cauterizing agents to promote healing of tympanic membrane perforations was introduced by Roosa in 1876, who used the application of silver nitrate to the rim of a perforation.⁷ The surgical repair of permanent tympanic membrane perforations was first attempted at the same time as the paper patch technique but did not produce adequate results until 1952, when Wullstein published a method of closing perforations with a split-thickness skin graft.⁸

Zöllner also described his experiences with a similar graft.⁹ After introduction of the use of the operating microscope by Wullstein and Zöllner, there was significant enhancement in the surgical results by improving the accuracy of the technique.

Zöllner first used fascia lata to close perforations.¹⁰ In 1958, Heermann began to use temporalis fascia.¹¹ In 1960, Shea first described the closure of tympanic membrane perforations by underlay technique using a vein graft.¹² In the 1960s and 1970s, homograft (cadaveric) materials, including tympanic membrane, dura, and pericardium, among others, were used with varying success. Since then, myringoplasty has gone through many changes in technique and materials. None of these materials gained universal acceptance and today pose a problem because of the potential for transmitting disease (eg, Jakob-Creutzfeldt disease and HIV infection).

Temporalis fascia continues to be the material of choice for reconstruction of the] tympanic membrane.⁷ The surgical outcome of myringoplasty is influenced by many factors. The reported success rate of myringoplasty is therefore variable, partly because of differences in the inclusion and exclusion criteria. In a study overall success rate of myringoplasty was 86%. Posterior and inferior perforations had a 98% success rate for repair compared to

only 67% of anterior perforation. The success rates of subtotal perforations closure were 92.5% 13. Regardless of the technique employed, take rates of 93 to 97% are typically reported.14, 15. A study found better success with advancing age16. This is due to lower incidence of upper airway infection and better Eustachian tube function in later age and the relative immaturity of system in younger children. At present, myringoplasty is a common operation in the Otolaryngology Department, having microsurgical facilities. This study aims to evaluate the surgical and audiological outcome of myringoplasties done in the cases of chronic otitis media, mucosal, inactive type, by underlay technique with temporalis fascia graft. Advancing ages and with the medium size and posterior perforations. The improvement in hearing was also achieved.

Material and Methods

This was a comparative retrospective randomized control study which was conducted at Sarwari Hospital during 17 months (from 14th July, 2019 to 15th November 2020). The study group consisted of 60 patients, 38 males (63.3%) and 22 females (36.7%) between the ages of 13 to 56 years (mean age of 27.48±33) with unilateral safe perforations and pure conductive hearing loss. Patients with obvious ossicular dysfunction, bilateral disease or external ear pathology were excluded from the study. Patients with ear discharge were initially treated conservatively and were included in the study when their ear became dry for at least 6 weeks. Any patient requiring ossiculoplasty was subsequently excluded from the study.

Pre-Operative Assessment

A thorough clinical examination of ear, nose and throat was done with special reference to the ear. An otoscopic examination was done to record the site and size of perforation. All findings were confirmed with examination of the ear under a microscope. Hearing status was assessed with tuning fork tests and pure tone audiometry. Antibiotics and decongestants were started 24 hours prior to surgery.

After premedicating with atropine and promethazine, patients were operated under local anesthesia using 2% lignocaine and 1:80,000 adrenaline. Younger patients were operated under general anesthesia.

Surgical Procedure

All patients were operated using a postaural incision. The temporalis fascia graft was harvested through the same incision. For the tragal perichondrial graft, an incision was made 2mm medial from the tragal crest line. The tragal cartilage was removed by cutting through the areolar tissue. The perichondrium was dissected in continuity from both surfaces of the excised cartilage. The cartilage was replaced in its skin pocket and the incision closed. The graft was spread out and the redundant tissue shaved.

It was subsequently dried over a bowl of hot water. The edges and undersurface of the perforation were freshened. The handle of malleus was de-epithelialised. The tympanomeatal flap was elevated from 6 o'clock to 12 o'clock position to enter the middle ear. Ossicular intactness and mobility was confirmed. After putting antibiotic steroid soaked gel foam in the middle ear near the Eustachian orifice, the graft was placed medial to the handle of malleus and carefully tucked below the perforation. Tympanomeatal flap was repositioned. The final graft position was checked and readjusted if required. External auditory meatus was filled with antibiotic steroid soaked gel foam to stabilize the graft.

Incision was closed and pressure dressing given.

Post-Operative Care

Antibiotics, analgesics and decongestants were given for 3 weeks. Patients were advised not to cough, strain or sneeze. Dressing was changed after 24 hours and suture removal was done on the 7th postoperative day. All patients were called for regular follow up. The gel foam in the external auditory canal was not disturbed for 3 weeks. Antibiotic ear drops were started after that to facilitate dissolution of gel foam and to promote healing. On the 8th week, status of the healed neotympanum was recorded and pure tone audiometry was done to assess the auditory status. The same was done after 3 months to see if there were any changes.

Result

It was a comparative retrospective randomized control study which was performed in 60 patients during 17 months (from 14th July, 2019 to 15th November 2020). The age of the patients ranged 13- 56 years with mean age of 27.48±33.

Sex	No of Patients	Percentage
Male	38	63.3%
Female	22	36.7%
Total	60	100%

Overall success rate of graft uptake was noted in 28 patients (93.3%) out of 30 cases in group A and 21 patients (70%) out of 30 cases in group B .

Type of graft	Graft uptake	Graft rejected	Total	Percentage of success
Temporal fascia	28	2	30	93.3%
Tragal perichondrium	21	9	30	70%

The data were analysed in SPSS software (ver-22). The p-value less than 0.05 was considered significant.

Discussion

Otitis media¹⁷ is a general term used to describe any inflammatory disease of the mucous membrane lining the middle ear cleft. It is an important disease of children and adults and is caused by multiple interrelated factors including infections, Eustachian tube dysfunction, allergy and barotrauma. Chronic otitis media is the most advanced disease state in the spectrum of otitis media and is associated with some form of irreversible pathologic condition in the middle ear such as granulation tissue, ossicular changes, tympanosclerosis, tympanic membrane perforation and cholesteatoma. Traditionally chronic otitis media is classified into tubotympanic disease characterized by the presence of a central perforation and atticofacial disease characterized by the presence of a cholesteatoma.

Tympanoplasty is the main surgical treatment for tubotympanic disease. It is defined¹⁸ as an operation performed to eradicate disease in the middle ear and to reconstruct the hearing mechanism without mastoid surgery, with or without tympanic membrane grafting. The ideal tympanoplasty restores sound protection for the round window by constructing a closed, air containing middle ear against the round window membrane and restores sound pressure transformation for the oval window by connecting a large tympanic membrane or substitute membrane with the stapes footplate via either an intact or a reconstructed ossicular chain.

To accomplish the two physiologic principles of tympanoplasty, sound protection for the round window must first be provided by means of a tissue graft to repair the tympanic membrane defect, and the middle ear must be lined with mucosa and must contain air to the protected window. Then sound pressure transformation for the oval window must be provided by mobile ossicular continuity between the large tympanic membrane and the small oval window.

Raine and Singh¹⁹ in a retrospective analysis of 114 tympanoplasties in children in the age group of 7 to 16 demonstrated a significant higher rate of failure between 8 and 12 years. The probable explanation of high incidence of failure in younger children is due to increased incidence of upper respiratory tract infection and immature Eustachian tube function. They advocate deferring surgery till 12 years for achieving better results. In our study the youngest patient was 13 years of age.

Conclusion

Temporal fascia is statistically more successful as compared to tragal perichondrium in term of graft uptake in myringoplasty, So we recommend temporal fascia graft for management of perforated tympanic membrane.

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