Research Article

Temporalis Fascia Grafting in Large/Subtotal Perforation: A Review of 60 Cases

Pradeep Pradhan¹*, Priti Lal², and V P Venkatachalam²
¹Department of Otorhinolaryngology, All India Institute of Medical Sciences, India
²Department of Otorhinolaryngology, Safdarjung Hospital & Vardhmann Mahavir Medical College, India

Abstract

Objective: To demonstrate the surgical techniques and to compare the anatomical and functional outcomes of type I underlay tympanoplasty using temporalis fascia graft in patients with large/subtotal perforation.

Material method: Temporalis fascia grafting has been done in 60 patients having large/subtotal perforations. Pure tone audiogram (PTA) and speech reception thresholds (SRT) were carried out preoperatively and each postoperative visit i.e. at the end of 1, 3 6 and 24 months. 10 dB closure of air bone gap and 10 dB improvement in SRT were considered significant.

Results: The graft uptake rates were 92% the end of 24 months. 90% of patients had significant improvement in hearing (ABG ≥10 dB). The mean improvement of the SRT was 10 dB and 75% of the patients had significant gains in SRT.

Conclusion: Repair of large or subtotal perforation has been always a challenge to the otologist and temporalis fascia graft is an ideal autograft for the above purpose. Circumferential elevation of tympanomeatal flap can be effectively performed to have a better anatomical and functional outcome in patients undergoing type I tympanoplasty for large and subtotal perforation.

INTRODUCTION

Although temporalis fascia grafts is the considered as the gold standard for the repair of tympanic membrane defect in chronic otitis media (COM), it is challenging for subtotal/large perforation due to its poor graft uptake rate. It could be due to the presence of minimal residual tympanic membrane (TM) left for the lateral support of the graft. Although anatomical outcome has been satisfactorily documented using autologous cartilage graft, the variable hearing outcome has been documented by past literatures in the postoperative period [1,2]. Our aim is to demonstrate the long term anatomical and functional outcomes of type I underlay tympanoplasty using temporalis fascia graft in patients with COM with large/subtotal central perforations.

MATERIALS AND METHODS

This is a prospective study conducted in the department of Otolaryngology at Safdarjung hospital from July 2012 to June 2015. A total of 60 patients with COM with large/subtotal perforations were included in the study. All of them underwent type I tympanoplasty using temporalis fascia graft. Patients with ossicular chain discontinuity, conductive hearing loss due to acquired and congenital conditions other than tympanic membrane perforation, sensorineural deafness and revision surgeries were excluded. Pure tone audiogram and speech reception thresholds were done preoperatively in each patient.

Surgical technique

Patients were operated under local anaesthesia through post aur al/endaural approach. Temporalis fascia graft was harvested in each patient. Temporalis fascia grafting has been done in 60 patients having large/subtotal perforations. Pure tone audiogram (PTA) and speech reception thresholds (SRT) were carried out preoperatively and each postoperative visit i.e. at the end of 1, 3 6 and 24 months. 10 dB closure of air bone gap and 10 dB improvement in SRT were considered significant.

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The first postoperative visit was advised after one week for the removal of aural pack and the sutures. Afterwards, patients were advised to visit the outpatient department at the end of 1, 3, 6 months and 24 months after operation. Pure tone audiogram (PTA) and speech reception threshold (SRT) were carried out in each patient postoperatively at each follow-up visit. Air conduction and bone conduction threshold were calculated at 500, 1000, 2000 and 4000 Hz frequency. The preoperative audiogram was compared with the final postoperative audiogram and ≥ 10 dB improvement in both air gaps (ABG) in air conduction threshold and SRT were considered significant. Otomicroscopic examination of the operated ears were carried out in each follow-up visit to assess the graft uptake and complications that would have been occurred in the follow-up periods.

RESULTS

Of 60 patients 38 (63.33%) were males and 22 (36.67%) were females. Type I tympanoplasty using temporalis fascia graft and cartilage palisades were performed in all patients. Demographic data and the results were described in the Table (1). The graft uptake rate in the patients with temporalis fascia was found to be 93.33% (56) and 4 had residual perforation noticed after 1 months of surgery. At the end of 06 months graft uptake rate was 92%, i.e. 5 patients had residual perforation. The mean preoperative and postoperative air conduction hearing threshold in temporalis fascia group were found to be 30.23 ± 7.77 dB and 14.60 ± 4.6 dB respectively, with 15.63 dB closure of the air bone gap (AB gap). 60% (36) of the patients had presented with ≥ 15 dB closure of ABG. In 30% (18) of the patients, ABG closure was found between 10 and 15 dB and in 10% (3) patients improvement in hearing was insignificant (ABG<10 dB). Considering the hearing gain at individual frequencies (i.e. 500Hz, 1000Hz, 2000Hz and 4000Hz), ABG was found to be improved at each frequency level. The mean preoperative ABGs with the corresponding frequencies were found to be 25dB, 20dB, 35dB and 40 dB and the mean improvement in ABGs were found to be 11 dB, 5 dB, 15 dB and 22 dB. Again the mean preoperative and postoperative SRT were found to be 25dB and 15 dB. The mean improvement of the SRT was found to be 10 dB. 75% (45) of patients had significant improvement in the SRT (≥ 10 dB). There was no significant intraoperative complication noted and no patient was found with lateralisation of the graft or blunting of anterior angle.
DISCUSSION

Type I tympanoplasty is one of the commonest surgical procedures performed in any otologic clinic for the reconstruction of the tympanic membrane defect. Although temporalis fasciagraft can be effectively used for small and medium size perforations, it is always challenging for large/subtotal perforation where the poor success rate is often anticipated. Looking into the literature, there are different studies conducted in the past demonstrating the effectiveness of temporalis fascia graft in tympanic membrane grafting [3-10]. In the present study also, we have obtained encouraging postoperative results of the temporalis fascia in type I tympanoplasty. The graft uptake rate in patients with cartilage palisades was 92% and the mean closure of the AB gap in the fascia group was 15 dB which was supported by Kalcioglu MT et al. [11]. According to Gerber et al. [12] and also in the present study, there was comparable improvement in the SRT in between patients undergoing tympanoplasty using cartilage palisade and temporalis fascia graft. The mean gain in SRT was found to be 10 dB and 75% of patients had significant improvement in the SRT (≥10 dB). When it was considered at individual frequency, it has been found that patients had ABG frequency level and was maximum towards the higher frequency. Again, as described by Jalali MM et al. [13], both the cartilage and temporalis fascia had the similar graft uptake rate and the hearing outcome which was supported by Övet G et al. [14], and Yang T et al. [15]. The encouraging anatomical and functional results may be due to the circumferential flap elevation from the bony annulus. In our cases the anatomical and functional outcome was better than the previous studies and that could be due to the flap technique applied in the tympanoplasty. We have elevated the tympanomeatal flap all around the bony annulus which was pedicled at the 12 ‘o’ clock position and later allowed to rest closely over the temporalis fascia graft. Due to the close approximation between the graft and the flap, the graft displacement and lateralisation had been significantly decreased leading to significantly better anatomical results.

CONCLUSION

Repair of large or subtotal perforation has been always a challenge to the otologist and temporalis fascia graft is an ideal autograft for the above purpose. Circumferential elevation of tympanomeatal flap can be effectively performed to have a better anatomical and functional outcome in patients undergoing type I tympanoplasty for large and subtotal perforation.

REFERENCES