International Journal of Otorhinolaryngology and Head and Neck Surgery
Prakash MD et al. Int J Otorhinolaryngol Head Neck Surg. 2018 May;4(3):759-763
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20181867

Original Research Article

The role of anterior tucking of graft in subtotal perforation of tympanic membrane

Mylanahalli Doddarangaiah Prakash, Somashekhar Abhilasha*

Department of Otorhinolaryngology, Bangalore Medical College and Research Institute, Bangalore, Karnataka, India

Received: 12 February 2018
Accepted: 20 March 2018

***Correspondence:**
Dr. Somashekhar Abhilasha,
E-mail: abhilasha.kims@gmail.com

ABSTRACT

Background: Tympnaoplasty has been well accepted as the surgery of choice for chronic otitis media. Since the introduction of tympanoplasty, there has been many modifications in terms of technique, approach, and materials used for grafting the tympanic membrane; each with their respective advantages and disadvantages. But irrespective of procedure done, very large and subtotal perforations have always posed a problem with failure after surgery. This demands further modification of the procedure to support the graft. This study was done to know the role of Anterior tucking of graft in subtotal perforation of tympanic membrane in terms of graft uptake rate and hearing outcome.
Methods: A systemic retrospective analysis of case files was done. The case files of patient who fulfilled the inclusion criteria were selected. Detailed preoperative and postoperative clinical and audiometric findings were noted down.
Results: Total of 40 cases with 3 cases being bilateral, 43 ears were operated by cortical mastoidectomy with tympanoplasty along with anterior tucking of the graft. Our success rate was 95.3% (n=40). 40 patients had showed the improvement in hearing with average air bone gap gain of 12.7 dB HL.
Conclusions: Underlay grafting for subtotal perforations of tympanic membrane is a surgically challenging and results in poor outcome. Modification to this method by anterior tucking of the graft is an effective surgical technique with satisfactory outcomes and hence is advocated for the routine practice.

Keywords: Anterior tucking, Tympanoplasty, Subtotal perforation

INTRODUCTION

Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear and mastoid cavity which often results in long term changes in the tympanic membrane including the perforation.

Tympnaoplasty is a surgical procedure which includes eradication of disease from middle ear and reconstruction of the hearing mechanism with or without tympanic membrane repair. It has been well accepted as the surgery of choice for CSOM.

Among the different materials used for reconstruction of tympanic membrane, temporalis fascia remains the Gold standard. Its low metabolic rate with reduced oxygen requirement and good functional results with resistance to infection makes it the most popular graft.[1]

Since the introduction of tympanoplasty, there has been many modifications in terms of technique, approach, and materials used for grafting the tympanic membrane; each with their respective advantages and disadvantages. But irrespective of procedure done very large and subtotal

perforations have always posed a problem with failure after surgery.[2]

This demands further modification of the procedure to support the graft. This study was done to know the role of Anterior tucking of graft in subtotal perforation of tympanic membrane in terms of graft uptake rates and hearing outcome.

METHODS

A systemic retrospective analysis of case files from November 2016 to November 2017 was done. Patients suffering from chronic suppurative Otitis media with subtotal perforation, without any complications, within age group of 16 years to 60 years, with hearing impairment of less than 50 dB and without any history of previous ear surgery who underwent cortical mastoidectomy with tympanoplasty along with anterior tucking of the graft at our ENT Department were selected.

Exclusion criteria

Exclusion criteria were patients who were diagnosed with Squamosal type of CSOM; patients diagnosed to have associated complications; patients with sensory neural hearing loss; patients in whom the hearing loss ≥50 dB HL (suggestive of osscicular discontinuity); patients undergoing revision tympanoplasty; patients who have undergone any other otological surgeries; patients with congenital anomalies

Demographic data, detailed history of complaints and other relevant history were recorded. Complete Otorhinolaryngology examination including ear inspection, palpation, otoscopic examination and tuning fork tests for hearing assessment was noted. Preoperative pure tone audiometry (PTA) which was done for all patients were documented.

Surgical procedure

All the cases were operated under local anaesthesia. Patient's head was put in position and local infiltration with 2% lignocaine and 1 in 1,00,000 adrenaline was given. Parts were painted and draped. Post auricular William wilde's incision was placed and temporalis fascia graft was harvested by hydro dissection. Cortical mastoidectomy was performed. Posterior meatotomy was done and posterior tympanomeatal flap was raised after freshening the margins of perforation. Middle ear was examined.

Underlay technique was used for placement of graft. Anterior tucking was done using a small horizontal incision (approximately 3 mm) placed lateral to annulus in the superior part of the anterior wall of the external auditory canal (EAC). Through this incision, the annulus is raised, and a small part of temporalis fascia is pulled up, to rest between the canal skin and the bone of anterior EAC.

The middle ear and EAC was packed with gelfoams after repositioning the flaps. Medicated wick was placed in EAC. Haemostasis achieved and wound closed.

Postoperative care

Patients were given antibiotics, analgesia (if required) and oral antihistamines for 3 weeks until the pack removal. Suture removal was done after one week. Postoperative follow up was done every week for one month, followed by every 15 days for next 2 months.

Graft uptake and complications were evaluated in each visit with the help of otoscopy.

Intact tympanic membrane with mobility on clinical examination was considered to be a good outcome of surgery. Hearing assessment was done by repeating the PTA at 6th week whose findings were recorded. The pre and postoperative PTA values were analysed.

RESULTS

Of total 40 cases operated ears were 43 with 3 cases being bilateral. Age varied from 15 to 59yrs with average of 32 yrs (Figure 1).

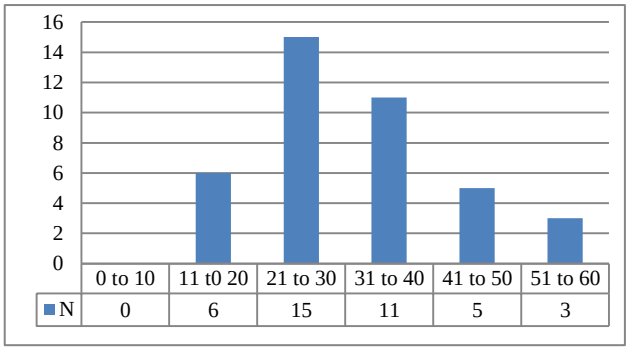

Figure 1: Distribution according to age.

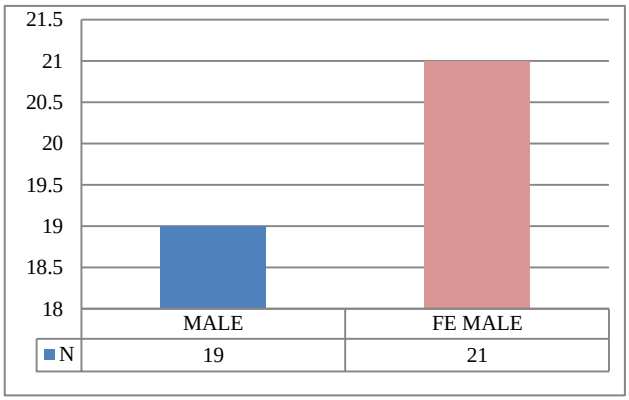

Figure 2: Distribution according to gender.

Females constituted maximum percentage of 52.5% (21 cases), whereas males were 47.5% (19 cases) (Figure 2).

Left ear with 18 (45%) cases was affected more followed by bilateral ear involvement in 12 (30%) cases and right ear was seen in only 10 (25%) cases (Figure 3).

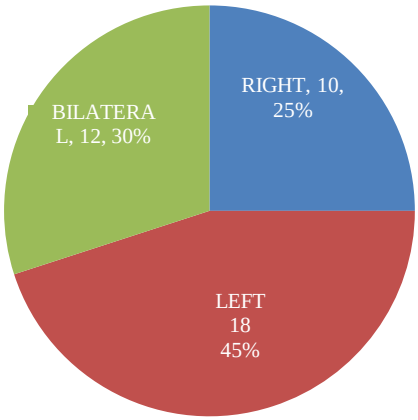

Figure 3: Distribution according to the site of involvement.

The preoperative pure tone audiometry showed an average air bone gap of 36.3 dB HL with minimum being 27dbhl and maximum being 48.3 dB HL.

The postoperative pure tone audiometry showed an average air bone gap of 23.6 dB HL with minimum being 17.9 dB HL and maximum being 36 dbhl. Here we can see the average air bone gap gain of 12.7 dB HL.

Table 1: Preoperative and postoperative findings of air bone gap in PTA.

	Preop air bone gap (dB HL)	Postop air bone gap (dB HL)
Minimum	27	17.9
Maximum	48.3	36
Average	36.3	23.6

Table 2: Pre operative and post operative hearing loss.

Hearing loss (dB HL)	Preoperative	Postoperative
0-15	0	0
16-25	0	29
26-40	34	14
41-55	9	0

We can see that pre operatively all the cases had hearing loss more than 25 dB HL whereas post operatively 29 cases (67.44%) have been restored to normal hearing range.

As depicted in Figure 4 and 5 where preoperative PTA findings of a female patient with right ear 48.3 dB HL and left ear 31.6 dB HL has improved to postoperative PTA findings 31.6 dB HL and 18.3 dB HL in respective ear.

3 cases of failure, that is reperforation was noted. One case had postoperative infection which was initially controlled by antibiotics but later presented with reperforation. Other two cases the cause remains unknown.

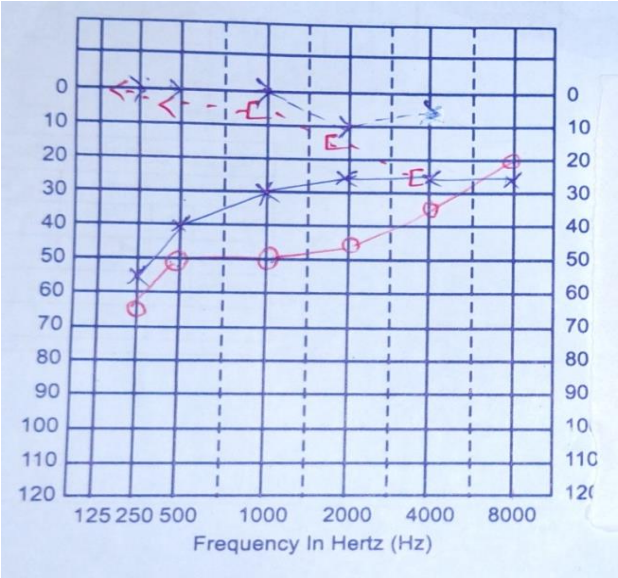

Figure 4: Preoperative PTA finding in a bilateral CSOM case.

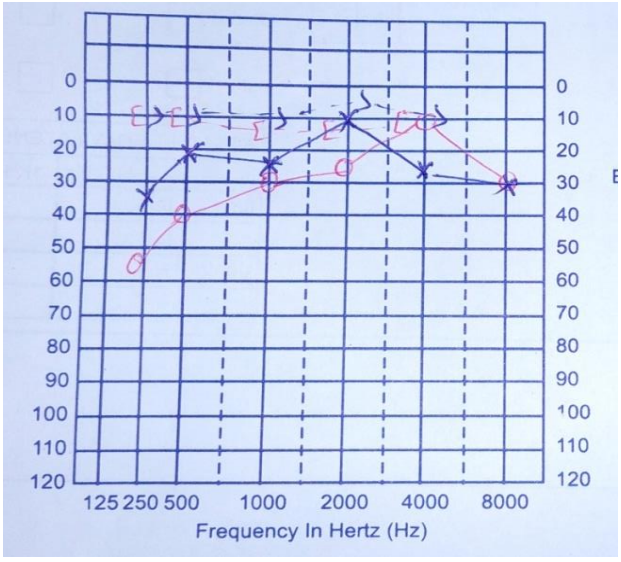

Figure 5: Postoperative PTA finding in a bilateral CSOM case.

DISCUSSION

Tympnaoplasty is a surgical procedure which includes eradication of disease from middle ear and reconstruction of the hearing mechanism with or without tympanic

membrane repair. It has been well accepted as the surgery of choice for CSOM.

Among the different materials used for reconstruction of tympanic membrane, temporalis Fascia remains the Gold standard. Its low metabolic rate with reduced oxygen requirement and good functional results with resistant to infection makes it most popular graft.

Since the introduction of tympanoplasty, there has been many modifications in terms of technique, approach, and materials used for grafting the tympanic membrane; each with their respective advantages and disadvantages.

The two traditional methods used are underlay (medial) and overlay (lateral) techniques. Among these two techniques, underlay is preferred by most of the otologists since its is less time consuming and easier.[3-5] This method includes the placing of graft medial to both tympanic membrane remnant and handle of malleus.[3] While using underlay technique, inadequate blood supply, lack of residual TM as a source of epithelium, and poor exposure, may pose as challenge.[6]

In addition to these, decreased mesotympanic space and a lesser success rate in anterior and subtotal perforations are some of the disadvantages.[7]

On the other hand, overlay technique involves elevation of epithelial layer and placement of graft lateral to fibrous layer of TM remnant and annulus. This is suitable for subtotal and anterior perforation.[8] Even though this technique gives high success rate, it does come at the cost of few possible disadvantages like graft lateralization, anterior blunting, delayed healing, stenosis of the external canal, epithelial pearls, iatrogenic cholesteatoma and is more technically challenging.[9] Largely the outcome of TM grafting is bad in case of anterior and subtotal perforations.[6] So several modifications of surgery was tried.

Silverstein described a method where in, tympanomeatal flap was elevated along with fibrous annulus anterosuperiorly over the Eustachian tube. Here a tunnel was made (2-4 mm) through which the graft was pulled out and between the anterior meatal skin and the bone canal.[10]

Whereas, Schraff et al in his study did a modification by elevating the fibrous annulus from bony sulcus first and later the canal skin over the anterosuperior quadrant in a retrograde fashion.[11] This was followed by an underlay grafting where he graft was situated between the raw bone and the anterior meatal skin. This study showed 94.5% success rate.

In study by Hosmani et al, it was seen that overall incidence of successful graft uptake was 96.96 per cent in group one who underwent additional anterior tagging of graft and 81.5 per cent in group two who did not undergo any modification.[12]

In our study the results are comparable with above mentioned studies. All 43 ears were operated by cortical mastoidectomy with tympanoplasty along with anterior tucking of the graft. Our success rate was 95.3% (n=40). 40 patients showed the improvement in the hearing with the average air bone gap gain of 12.7 dB HL.

The major limitation of this study was it was not matched with control group, and further such studies are require to prove the efficacy of this method.

CONCLUSION

Underlay grafting for subtotal perforations is a surgical challenge because of its poor success rate. Tympanoplasty with anterior tucking of the graft is an effective surgical technique with satisfactory outcomes. Caution should be exercised with regard to maintaining the integrity of the annular ring anteriorly.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Singh BJ, Sengupta A, Sudipkumar Das, Ghosh D, Basak B. A comparative study of different graft materials used in myringoplasty. Indian J Otolaryngol Head Neck Surg. 2009;61:131-4.
2. Vadiya SI, Shah SK, Chaudhary M. Comparison of canal wall incisions for tympanoplasty for large central perforations. Indian J Otol. 2015;21:186-9.
3. Jackson CG, Kaylie DM, Glasscock ME, III, Strasnick B. Chapter 12- Tympanoplasty—Undersurface Graft Technique: Postauricular Approach. In: Derald EB, Clough S, Arriaga MA, editors. Otologic Surgery (Third Edition). Philadelphia: W.B. Saunders; 2010: 149–160.
4. Kartush JM, Michaelides EM, Becvarovski Z, LaRouere MJ. Overunder tympanoplasty. Laryngoscope. 2002;112:802–7.
5. Singh M, Rai A, Bandyopadhyay S, Gupta SC. Comparative study of the underlay and overlay techniques of myringoplasty in large and subtotal perforations of the tympanic membrane. J Laryngol Otol. 2003;117:444–8.
6. Faramarzi A, Hashemi SB, Rajaee A. "Mucosal pocket" myringoplasty: a modification of underlay technique for anterior or subtotal perforations. Am J Otolaryngol. 2012;33(6):708-13.
7. Gerlinger I, Rath G, Szanyi I, Pytel J. Myringoplasty for anterior and subtotal perforations using KTP-532 laser. Eur Arch Otorhinolaryngol. 2006;263:816–9.

8. Lee HY, Auo HJ, Kang JM. Loop overlay tympanoplasty for anterior or subtotal perforations. Auris Nasus Larynx. 2010;37:162-6.
9. Gersdorff M, Gerard J, Thill M. Overlay versus underlay tympanoplasty: comparative study of 122 cases. Rev Laryngol Otol Rhinol. 2003;24:15-22.
10. Pradeep P, Abhimanyu A, Priti L. Circumferential Elevation of Tympanomeatal Flap: A Novel Technique for subtotal and Anterior Perforation Closure. Ann Otolaryngol Rhinol. 2015;2(7):1052.
11. Schraff S, Dash N, Strasnick B. "Window shade" tympanoplasty for anterior marginal perforations. Laryngoscope. 2005;115:1655-9.
12. Hosamani P, Ananth L, Medikeri SB. Comparative study of efficacy of graft placement with and without anterior tagging in type one tympanoplasty for mucosal-type chronic otitis media. J Laryngol Otol. 2012;126(2):125-30.

Cite this article as: Prakash MD, Abhilasha S. The role of anterior tucking of graft in subtotal perforation of tympanic membrane. Int J Otorhinolaryngol Head Neck Surg 2018;4:759-63.