Objective: To report our experience with 3 flap tympanoplasty, a modified over-underlay technique with 3 laterally based skin flaps, for the reconstruction of anterior, subtotal or total tympanic membrane (TM) perforations.

Methods: Prospective study of patients undergoing “Three flap tympanoplasty” from May 2005 to May 2009. Eight hundred and fifty eight patients who underwent “Three flap tympanoplasty” and then follow-up visits scheduled at intervals for a period of 1 year after surgery are included in this study. Hearing test results were reported using a four-frequency (0.5, 1, 2, and 3 kHz) pure tone average air–bone gap. The outcome was considered successful if the TM was intact without lateralization, anterior blunting the last follow-up visit.

Results: There was a 97.9 % success rate. There was no graft lateralization, neocholesteatoma, or sensorineural hearing loss. The mean preoperative to postoperative four-tone air–bone gap improved from 26.18 to 8.89 dB, with an average gain of 17.29 dB; this was statistically significant.

Conclusion: The Three flap technique is a safe and effective technique for reconstruction of anterior, subtotal or total TM perforations, with excellent graft take and significant improvement of hearing.

INTRODUCTION

The development of tympanoplasty techniques were led by incidental and inspirational contributions from surgeons over the world. The discovery of the importance of tympanic membrane and ossicles in hearing and the advent of antimicrobials added up to better understanding the diseases and their treatment subsequently. While the initial aim of tympanoplasty was to successfully repair the tympanic membrane, Wullstein in the 1950s prepared the grounds for the operation to be performed with a goal to improve hearing as well.

Since the time of Banzer when he first attempted repairing a perforated tympanic membrane, in 1640, tympanoplasty has come a long way in terms of procedures and results. Otolaryngologists have almost perfected the art, but some conditions still challenge the skills. Anterior perforations and total perforations still bother otolaryngologists, specially beginners, and threaten to give poorer results.

The objective of this study is to report our experience with a new type of tympanoplasty, a modified over-under tympanoplasty, with 3 laterally based skin flaps, for reconstruction of tympanic membrane perforations.

METHODS AND MATERIALS

Type of Study: Prospective study Place of Study: Kolkata Period of Study: May 2005 to May 2009 Inclusion criteria – Anterior, subtotal, total perforation Exclusion criteria – Chronic ear disease with complications

Surgical Procedure:

Anesthesia: Local/General Anaesthesia

Graft: Temporalis fascia

Approach: Endaural/Post aural

Steps of surgery:

* De- epithelialization of perforation margin
* 3 radial incisions from within outwards 1 o’clock, 11 o’clock, 6 o’clock positions, from the membrane remnant margin outwards till the bony cartilaginous junction
* 3 tympanomeatal flaps are thus created – Superior, anterior and posterior
* These flaps are elevated along the bony canal wall, laterally the superior and anterior flaps forming the vascular strips
* Pathology in middle ear and mastoid if necessary cleared, ossicles addressed
* Temporalis fascia graft placed lateral to handle of malleus and spread on to the walls
* The 3 flaps repositioned one by one starting with the anterior flap
* Ear packed with gel foam
* Usual post operative care

Follow up: 1wk, 3wks, 6wks, 3mths, 6mths

RESULTS

Age – 15-70yrs

Male – 505 – 58.86% Female – 353 – 41.14%

Pathology of patients pre-operative:

Anterior perforation – 510 (59.44%)
Subtotal perforation – 290 (33.80%)
Total perforation – 50 (6.76%)

Procedure:

Additional mastoectomy – 65 (7.58%)
Ossiculoplasty – 37 (4.31%)

Graft uptake with successful outcome – 840 (97.90%)

Graft failure – 11 (1.28%)
Reasons – post op infection 6 (54.55%), acute otitis 5 (45.45%)
Anterior blunting – 7 (0.82%)

Average – Pre op AB gap – 26.18 dB
Post op AB gap – 8.89 dB
Average hearing gain – 17.29dB

DISCUSSION

In this the temporalis fascia graft is placed lateral to the long process of and medial to the tympanic membrane remnant and anterior annulus. The advantages of this technique are: 1) can be performed in all types of perforations, 2) the exposure of the anterior middle ear is very good, 3) anterior blunting not present, 4) good success rate, 5) relatively simple to perform, 6) middle ear space is not reduced . The total elevation of the tympanic membrane remnant from the malleus has the following advantages: 1) the overlap between the graft and drum remnant is increased, 2) the graft bed is better prepared, 3) the graft placement is precise unhindered by the malleus and 4) a very good medial support provided by the handle of malleus. It is well suited for use in ossicular reconstruction surgeries by the virtue of its graft position.

Underlay tympanoplasty using anterior and posterior flaps have been used by Al-Sheikh et al in 1998, for subtotal perforations with success. Kartush et al in 2002 elevated a tympanomeatal flap posteriorly and dissected off the entire drum remnant from the long process of malleus anteriorly before placing the drum.

Thus the 3-flap tympanoplasty takes into consideration the technicalities of both the techniques and combines it making it simple yet retaining the advantages of the above techniques.

CONCLUSIONS

“Three Flap tympanoplasty’’ is a thus a simple and easy procedure which gives very good results in terms of hearing specially in cases of significantly big tympanic membrane perforations.

REFERENCES

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