



UNDERLAY OR OVERLAY MYRINGOPLASTY; WHICH IS THE BEST?

ENT

Dr Anjan Kumar Sahoo*

Assistant Professor, Department of ENT, Maulana Azad Medical College, New Delhi.
* Corresponding Author

Dr Karandeep Singh

Post graduate student, Department of ENT, Maulana Azad Medical College, New Delhi

ABSTRACT

Introduction The two most common type of myringoplasty technique based on the position of grafting materials in relation to the annulus are the underlay and the overlay techniques. In this study we compare the efficacy of both the common types of myringoplasty. Total seventy patients who were underwent repair of the tympanic membrane perforation for chronic otitis media were included in this study. Out of 70 cases 43 were posted for underlay and rest 27 for overlay myringoplasty. In our centre we prefer underlay technique over overlay. In our study both the techniques of myringoplasty had gratifying outcome. Underlay technique being technically simple should be preferred, but the ultimate decision about the technique to be employed depends on the surgeons preference and the site of perforation.

KEYWORDS

Underlay myringoplasty; Overlay myringoplasty; Tympanic membrane perforation

INTRODUCTION:

Perforation of the tympanic membrane primarily results from middle ear infections, trauma or iatrogenic causes. The operation performed to repair the the defect is called myringoplasty. It was introduced by Berthold1 and later modified by Wullstein2 and Zollner3. The main aim of the surgery is to get rid of otorrhea and to improve the conductive part hearing loss.

Which surgical technique to adopt is still a matter of debate. The two classical techniques that have been widely performed are the "underlay" and the "overlay" procedures. Other less performed procedures are Swinging Door technique4, Gelfilm Sandwich technique5, double breasting technique6 and laser assisted spot welding technique7. In our institute we do both underlay and overlay technique regularly. Out of the above the underlay method is widely used because of it's relatively simple technique. We prefer underlay for small perforation and overlay for total and anterior perforations. The major advantages of underlay technique are that the tympanic membrane heals at the correct position in relation to annulus and ossicle. Also lateralization of the graft and the bluntings are avoided. But the main disadvantages are that there is reduction in middle ear space and adhesion of membrane to promontory. The overlay technique is more challenging and reserved for anterior and large perforation8. Here the graft is place lateral to annulus . The main advantages are that there is no reduction in middle ear space and also the graft healing rate is very high. Blunting of the anterior meatal recess, graft lateralisation and iatrogenic cholesteatoma are some of the disturbing consequences of overlay technique9.

MATERIALS AND METHODS

Total 70 patients were enrolled for the study during the period from August 2019 to December 2019 in the department of ENT Maulana Azad Medical college and associate hospital New Delhi. Patients having dry ear for 6 weeks and central perforation were included in the study. Patients having ear discharge, upper respiratory tract infection, age less than 20 and more than 60 years, and patients having sensorineural hearing loss were excluded from the study. Each patient was examined thoroughly. Ear examination under microscope, tuning fork test and pure tone audiometry were done in each patients. Blood parameters and x ray mastoid were also done for every patient. After taking the written informed consent they were posted for myringoplasty. All the procedure were done by post auricular approach using temporalis fascia as the graft material. The underlay technique was used in 43 patients and the overlay was used for rest 27 patients.

Patients were discharge on the first post operative day with paraffin and antibiotic soaked pack kept in the external auditory canal. All of them were advised to take antibiotic and antihistamines for 7 days and asked to avoid coughing, straining and taking head bath. They were asked to follow up at 14 days ,28 days and thereafter at monthly interval for first 3 months. At every visit ear was examined through otoscope or

microscope and audiometry was done after 3 month of surgery. The hearing gain was compare at 0.5, 1, 2 and 4 kHz frequencies with that of preoperative value.

RESULTS

Age group of patients (Table-1)

Age Group (years)	Underlay	Overlay
21-30	16 (37%)	12 (44%)
31-40	9 (21%)	7 (26%)
41-50	11 (26%)	5 (19%)
51-60	7 (16%)	3 (11%)
Total	43 (100%)	27 (100%)

Graft status in both the group 3 months after surgery (Table-2)

	Underlay	Overlay
Graft Uptake	38 (88%)	25 (93%)
Graft Failure	5 (12%)	2 (7%)
Total	43 (100%)	27 (100%)

Out of the 70 patients enrolled for the study 43 underwent underlay myringoplasty and rest 23 were posted for overlay myringoplasty. In the underlay group there were total 43 patients (26 males and 17 females) whereas in the overlay group there are total 27 patients (12 males and 15 females). Right ear was involved in 24 (56%) patients while left ear was involved in the remaining 19 (44%) patients in the underlay group . In the overlay group right ear was involved in 11 (41%) patients and left ear was involved in rest 16 (59%) patients. In the age group of 21-30 years there were 37% of patients in underlay group whereas it was 44% in overlay group (Table-1).

In the underlay group the preoperative AB gap was < 10 dB in 6 patients, between 11 to 20 dB in 23 patients and 21-30 dB in 14 patients. The graft take up rate was 88% (Table-2), postoperatively there was perforation in 5 patients out of them 3 had total perforation and other two had persistent upper respiratory tract infection following the surgery. On an average 3 month follow up, in 17 patients the AB gap was < 10 dB, in 18 patients it was in between 11-20dB, in 5 patients it was in between 21-30dB, in 3 patients the AB gap was >30 dB. Hearing improvement was achieved in 40 patients(93%).

Whereas in overlay group the preoperative AB gap was < 10 dB in 4 patients, 11-20 dB in 11 patients and 21-30 dB in 12patients. The graft take up rate was 93%(Table-2), postoperatively there was failure of graft uptake in 2 patients, both patients had perforation in the anteroinferior quadrant. On an average 3 month follow up; in 13 patients the AB gap was < 10dB in 8 patients the it was in between 11-20 dB, in 4 patients it was in between 21-30dB and in 2 patients the AB gap was > 30 dB. Hearing improvement was achieved in 24 patients(89%).

DISCUSSION

Myringoplasty is a basic and also one of the most common procedure in otolaryngology practice. Underlay and overlay technique; which method to be used for myringoplasty is still a matter of debate. Whatever method one may adopt but the main objective of surgery was to close the tympanic membrane perforation and improve in conductive hearing loss. In our study we compare the underlay technique with that of overlay technique. The graft uptake in our study was slightly more in overlay technique (93%) in compare to underlay technique (88%). Our results were in comparable to Rizer¹⁰, who reported a success rate of 95.6% in 554 overlay grafts and 88.9% in 158 underlay graft. Another study by Brown et al¹¹ had also having a success rate of 100% in overlay technique and 74% in underlay technique. In contrast Glasscock¹² reported a 91% success rate with the overlay technique and 96% success rate with the underlay technique in a total of 273 ears. Wang and Lin¹³ published a retrospective study in which they achieved 82.1% in overlay technique and 85% with underlay technique.

In our study both the technique had a significant improvement in hearing when the preoperative AB gap was compared to postoperative AB gap. Statistically there was insignificant correlation between the two techniques. Study by Singh et al¹⁴ have reported a 93.3% success rate for each technique with a better hearing gain with the underlay technique (92.8% vs 57.1).

Selection of patients might be the cause of high success rate in our study. Patients having upper respiratory tract infection and discharging ear were excluded from the study. Patients having mastoid and ossicular sign pathology were also excluded from the study. In our study overlay technique had better results in compare to underlay may be due to the more number of younger patients in overlay group in contrast to underlay and also may be because of smaller number of patients in the former group.

CONCLUSION

Numerous techniques are there in the literature for repair of the drum. Underlay myringoplasty is relatively simple and also take less time to perform as compared to overlay technique. Both the techniques have approximately proportionate results when compared in terms of graft uptake and hearing gain. Ultimate decision about the technique to be employed depends on the surgeon's expertise and the site of perforation.

REFERENCES:

- Berthold E. Ueber myringoplastik. Wier Med Bull. 1878;1:627-627.
- Wullstein H. Theory and practice of tympanoplasty. Laryngoscope 1956;66:1076-93
- Zollner F. The principles of plastic surgery of the sound-conducting apparatus. J Laryngol Otol 1955;69:637-52.
- Schwaber MK. Postauricular undersurface tympanic membrane grafting: Some modifications of the "swinging door" technique. Otolaryngol Head Neck Surg 1986;95:182-7.
- Karlan MS. Gelatin film sandwich in tympanoplasty. Otolaryngol Head Neck Surg (1979) 1979;87:84-6.
- Juvekar MR, Jurekar RV. The double breasting technique of tympanoplasty: A study of 200 cases. Indian J Otol 1999;5:145-8.
- Escudero LH, Castro AO, Drumond M, Porto SP, Bozinis DG, Penna AF, et al. Argon laser in human tympanoplasty. Arch Otolaryngol 1979;105:252-3.
- Kartush JM, Michaelides EM, Beevarovski Z, LaRouere MJ. Over-under tympanoplasty. Laryngoscope 2002;112:802-7.
- Sergi B, Galli J, De Corso E, Parrilla C, Paludetti G. Overlay versus underlay myringoplasty: Report of outcomes considering closure of perforation and hearing function. Acta Otorhinolaryngol Ital 2011;31:366-71.
- Rizer FM. Overlay versus underlay tympanoplasty. Part II: The study. Laryngoscope 1997;107:26-36.
- Brown CY, McCarty DJ, Briggs RJ. Success rate following myringoplasty at the Royal Victoria Eye and Ear Hospital. Aust J Otolaryngol 2002;29:606-11.
- Glasscock ME III. Tympanic membrane grafting with fascia: overlay vs undersurface technique. Laryngoscope. 1973;83:754-70.
- Wang WH, Lin YC. Minimally invasive inlay and underlay myringoplasty. Am J Otolaryngol. 2008;29:363-6.
- 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;117:444-48.