

Otitis Media: Comparison of outcome of underlay versus overlay myringoplasty

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ABSTRACT

Objective: To compare the outcome of underlay versus overlay myringoplasty procedure in the management of otitis media.

Methodology: This comparative study was conducted at the Department of Ear, Nose, Throat, Head & Neck Surgery, Postgraduate Medical Institute, Lady Reading Hospital, Peshawar from January 2008 to December 2009. It included eighty-six patients with dry ears for at least six weeks and no focus of infection in nose, sinuses or throat were included in the study. Forty three patients underwent underlay technique while other 43 patients were operated through onlay techniques.

Results: Myringoplasty was performed in total of 86 patients. Male were 69 (80.02%) and females were 17 (19%). Thirty-five (40.70%) of them belonged to age group of 10-25 years. Thirty (34.88%) were in the age range of 26-35 years, while 21 (24.42%) aged between 36-45 years with mean age of $27.48 \pm S.D$ 10.20 years. Overall success rate of graft uptake was noted in 70 (81.40%) out of 86 cases. All 86 cases were equally divided into two group's i.e. 43 patients in each group. Thirty-eight out of 43 perforated drums were treated with underlay techniques having success rate of 88.37% as compared to 32 out of 43 patients with only techniques where the graft uptake was 74.4%.

Conclusion: Underlay technique is more successful statistically as compared to overlay technique of myringoplasty in all age groups.

KEY WORDS: Myringoplasty, Underlay technique, Overlay technique.

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INTRODUCTION

Otitis media (OM) is a worldwide prevalent disease. Despite all the scientific developments (antibiotics, technology and knowledge), the OM is still considered an important public health problem,

since the ear pain, discomfort, hearing loss, otorrhea, psychological trauma and complications cause great personal and family suffering.¹ The tympanic membrane (TM) consists of three layers: an outer layer composed of keratinized squamous epithelium, an intermediate mesodermal fibrous layer and an inner endodermal mucosal layer. Myringoplasty refers to a procedure in which grafted tissue is used to close a perforation of the tympanic membrane.

Some authors define myringoplasty as a surgical procedure confined to the drumhead, with no instrumentation in the middle ear and without lifting the membrane from its original position.¹ It is also labeled as tympanoplasty type 1, where pre-operatively middle ear structures are exposed and checked for functional integrity.² Myringoplasty

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not only helps in enhancing the hearing but also protection of middle ear, external ear and even inner ear from suppuration.³ The two commonly grafting techniques used for the grafting of tympanic membrane perforation are onlay and underlay.⁴

While the other commonly employed techniques include through and reverse through. The prerequisites for myringoplasty are good Eustachian tube function.⁵ Dry ear, no focus of infection in nose, throat, sinuses and a functioning cochlea.⁶ No significant differences in results of the two techniques have been shown by few studies⁷⁻⁹ while some reports favour the underlay techniques because of its technical ease, better assessment of ossicular chain integrity, less time consumption, earlier healing of graft, more hearing gain and fewer minor complications.¹⁰ While inlay butterfly cartilage techniques has been shown to be safe, effective and easy in children.¹¹

Our objective was to compare the outcome of underlay versus overlay myringoplasty procedures in the management of otitis media.

METHODOLOGY

This comparative study was conducted in Ear, Nose, Throat, Head and Neck Surgery Department of Postgraduate Medical Institute, Lady Reading Hospital Peshawar. Duration of the study was two years i.e. January 2008 to December 2009. The following inclusion and exclusion criteria were employed for underlay and overlay techniques:

Inclusion criteria: 1) Dry ear for at least six weeks. 2) No disease in the mastoid.

Exclusion criteria: 1) Patients having ear with active discharge, granulations tissues or cholesteatoma. 2) Active focus found in the nose, sinuses or throat. 3) Those with sensorineural hearing loss. All these patients were randomly divided by lottery technique into two groups i.e. onlay group and underlay group and there were 43 patients in each group. Detailed history was recorded for each patient after admission in the ward. Ear, Nose and Throat were examined thoroughly of each patient. Beside ENT examination, systemic examination was carried out in each patient.

Procedure: After clinical examination pure tone audiogram and Toynbee's test were performed. All the operations were carried out under general anesthesia. Temporalis fascia graft was taken, and put on glass slide to become dry. Permeatal route was selected for all onlay techniques under microscope using proper magnification; proper size of ear speculum was fixed in the external auditory meatus.

Local anesthetic in form of Xylocaine 2% with adrenaline in a dose of 3-7 mg/Kg body weight was injected in all four quadrants of external auditory meatus for vasoconstriction locally. Underlay techniques was performed via endaural as well as transmeatal routes. Margins of the remnant of tympanic membrane were freshened. Tympanomeatal flap including the annulus was elevated and based on superior vascular pedicle. Spongoston bed was made and graft was placed over the bed and tympanomeatal flap was replaced. Meatal pack and stitches were removed on the 5th postoperative day.

All the patients were called for the follow up at two weeks, four weeks and then at monthly interval for the first six months. At each visit the ear was examined with otoscope and tuning fork test performed. Audiogram and tympanogram were performed in successful cases. All the variables were analyzed for comparative statistics by using binomial probability distribution test. Data interpretation, calculation, tabulation and various other analytical procedures were done by computer program SPSS for windows version 11.P value was calculated to find out the degree of significance i.e. <0.05.

RESULTS

A total of 86 patients were equally divided in two groups. Forty three (50%) cases were operated through onlay techniques, while 43 (50%) patients through underlay technique. Out of 86 patients, 69 (80.24%) were male patients and 17 (19.76%) were female patients with male to female ratio of 4; 1. Thirty-five (40.70%) patients belonged to age group of 15-25 years. Thirty (34.88%) were in the age range of 26-35 years, while 21 (24.42%) were between 36-45 years with mean age of $27.48 \pm \text{S.D. } 10.20$ years. Minimum age was 15 years and maximum age was 45 years in this study (Table-I).

In this study overall success rate was 81.40% (70/86 cases) where grafts were taken up successfully. Infection was the only postoperative complication, which was the main cause of failure of myringoplasties in 16 (18.60) cases. Success rate was 88.37% in patients undergoing underlay techniques

Table-I: Age-ranges of patients in years (n=86).

Age-ranges (Years)	No. of Patients	Percentage
15-25	35	40.70%
26-35	30	34.88%
36-45	21	24.42%
Total	86	100%

Table-II: Success Rate of Myringoplasty in Underlay (43) and Onlay (43).

Technique	Total no. of Cases	No. of Cases Succeeded	Percentage	Z-Value	P-Value
Underlay	43	38	88.37%	4.64	0.036
Onlay	43	32	74.41%		

i.e. 38 out of 43 had success full graft take up. While 32 patients out of the total 43 cases who underwent through onlay technique, the success rate was 74.41% (Table-II).

In our study the main cause of tympanic membrane perforation was chronic suppurative otitis media in 71 (82.55%) cases while trauma attributed to the remaining 15 (17.45%) cases. In both groups (Underlay and onlay techniques) temporalis fascia was used as a graft material. All cases 86 (100%) were done under general anesthesia.

DISCUSSION

The first surgery with the goals of closing tympanic membrane perforation dating from 1878 described by Berthold, was more consolidated after 1952 by Wullstein.² Myringoplasty is a beneficial procedure to protect the middle and inner ear from future deterioration. The improvement of hearing is obtained.⁷ In this study the success rate for underlay techniques was 88.37% and onlay techniques was 74.41%, Javaid M et al¹² have also reported success rate for underlay techniques as 85.1% and for onlay techniques as 75.7%.

While in other study by Couloigner V et al¹¹ have reported the nearest results of success rate as 83% for underlay techniques and 71% for onlay techniques respectively. Hussain A et al.⁷ have found success rate of 52.78% for underlay technique and 47.22% for onlay technique. These results are less as compared to our study and other studies result, which may be due to very small number of patients in their series. While in another study higher success of graft take up was found to be (93.3%) in both techniques; underlay and onlay technique.¹³

The graft in underlay techniques can be placed either medial to the handle of malleus or lateral to it. It is recommended that putting the graft over the handle of malleus will prevent medial prolapse of the graft and narrowing of the middle ear space.¹² Comparing the surgical outcomes when patients had unilateral or bilateral pathology found no significant difference between the results because similar values and given the relatively small number of patients.¹⁴

Temporalis fascia was used in majority of our cases in both techniques equally and gives better

results than tragal perichondrium because it is easy to take; large surface area is available, has a low metabolic rate and does not require any special preparation.¹⁵ The vast majority of operated ears had hearing improvement with reduction or closure of the air bone gap even some who persisted with residual perforation. In only three cases, the hearing remained the same, with the same gap.

CONCLUSION

From the results of this study it is concluded that underlay technique is more successful statistically as compared to overlay technique of myringoplasty both in children and adults because of its technical ease, better assessment of ossicular chain and less time consumption.

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