

Compare the Outcomes of Underlay and Onlay Myringoplasty

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ABSTRACT

Objective: The purpose of this study is to compare the outcomes of myringoplasty patients who had underlay and onlay procedures in order to establish whether approach is superior.

Study Design: Quasi-experimental study

Place and Duration: The study was conducted at the department of ENT, Head & Neck Surgery, Lady Reading Hospital MTI Peshawar and Chaudhary Muhammad Akram Teaching and Research Hospital Lahore for the period from May 2021 to October 2021.

Methods: This study included a total of 114 patients ranging in age from 14 to 60 years. After obtaining informed written consent, patients' full details including age, gender and BMI were recorded. Chronic otitis media and/or trauma-related tympanic membrane perforation was included. M and N were the designations given to the two sets of patients. 57 patients in Group M received underlay myringoplasty and 57 patients in Group N underwent for onlay myringoplasty respectively. The success rate of grafts was evaluated for both groups. A three-month period was allotted for complete follow-up in both groups. SPSS 24.0 was used to analyze all of the data.

Results: Group M had 38 (66.7%) males, but group N had 42 (71.9%) males. There were 26.13±5.39 years and 27.10±3.42 years were the mean ages of the two groups, respectively, for group M and group N. There were 53 (93%) graft successes in group M and 49 (86%) in group N. Group M's medialization was 5.3%, but group N's medialization was 10.5%, with no evidence of lateralization in either group. Mean air bone gap closure was 8.1±4.33 dB in group M and 10.9±7.61 dB in group N.

Conclusion: After doing this research, we came to the conclusion that the underlay technique for myringoplasty was more beneficial in terms of graft success and hearing restoration. Overall, both groups had accepted success rate, which is comparable to the national average.

Keywords: Myringoplasty, Overlay technique, Underlay technique, Graft success

INTRODUCTION

The most common causes of tympanic membrane perforation are middle ear infections, trauma, and iatrogenic causes. Most of these holes heal on their own, but myringoplasty is the most common surgical procedure for those that don't. Following Berthold's introduction, myringoplasty was developed by Wullstein and Zollner. Common reasons for this surgery include recurrent otorrhea, the desire to swim without an earplug, and hearing loss caused by conductive noise exposure. Other factors, such as the location of the perforation, the type of graft used, and the surgical strategy (underlay or overlay) can all affect the surgical outcome.[1-4]

The best surgical technique is still up for debate. Underlay and overlay have been shown to be the two most widely used methods. The graft is easy to do because it is placed completely medial to the remaining drum and malleus. Using this technique to repair minor, easily visible perforations avoids the graft from being blunted or lateralized, and the drum heals at the correct level in regard to the annulus and the ossicles. For example, there are certain downsides to this procedure, such as a smaller bed size for the transplant that results in less blood flow, less exposure of the middle ear, and difficulties in grafting into the anterior annulus because of the difficulty in grafting. An overlay is frequently the only choice for procedures that have failed with underlay techniques and for full perforations. Any fibrous intermediate layer that remains after the squamous layer has been removed must be carefully removed. As long as the anterior annulus hasn't been damaged, this method is a good way to see into the anterior meatal recess before surgery. You get a new, unbroken drum, and you don't lose any of your hearing as a result of this method. In addition, the healing time is longer with this method because of blunting the anterior meatal recess and lateralization of the graft.[5]

No one knows for sure how successful myringoplasty will be in preserving a healthy tympanic membrane after the procedure, and the claimed success rates for doing so vary widely. According

to new studies, re-perforation may occur several years after the initial myringoplasty treatment. When the perforations were small and anteriorly positioned, overlay myringoplasty did not consistently generate good results. In 1960, Shea and Tabb [6–8] came up with the notion of grafting material between the drum fragments.

As indicated by Wandong She et al. [9], the graft was positioned medial to the membrane but lateral to the malleus handle in over under myringoplasty. The underlay method outperformed the methodology by a wide margin. Eoro Vantiainen et al study's shows that graft re-perforation is caused by postoperative infection and a bigger perforation size. Labatut Pesce et al. [10] used lateral, medial, and mixed approaches for myringoplasty.

Sublayer and onlay myringoplasties, two commonly used myringoplasties, were compared and contrasted in this study.

MATERIAL AND METHODS

This experimental study was conducted at the department of ENT, Head & Neck Surgery, Lady Reading Hospital MTI Peshawar and Chaudhary Muhammad Akram Teaching and Research Hospital Lahore for the period from May 2021 to October 2021. The study consisted of 100 patients. Only those patients who provided written consent were allowed to participate in this study.

This study included 114 individuals ranging in age from 14 to 60. After obtaining informed written consent, patients' demographic data, including age, gender and BMI were collected. Chronic otitis media and/or trauma-related tympanic membrane perforation was included. Groups M and N were created for the study's participants. There were 57 patients in group M and 57 patients in group N who received underlay myringoplasty and onlaymyringoplasty. The graft material was placed on top of the fibrous membrane remnant in the overlay procedure. After raising the tympanomeatal flap above the annulus, the graft material was inserted using the underlay technique under the membrane

remnant and flap. Underlay technique places the graft medial to the malleus handle; overlay technique places it lateral to the malleus handle.

The graft success rate was used to compare the two groups' results. Both groups were followed for a total of four months. SPSS 24.0 was used to analyze all of the data. The frequency and percentage of categorical variables were measured.

RESULTS

Group M had 38 (66.7%) males, but group N had 42 (71.9%) males. There were 26.13±5.39 years and 27.10±3.42 years were the mean ages of the two groups, respectively, for group M and group N.(table 1)

Table 1: Baseline provided demographics of enrolled cases

Variables	M	N
Mean age (years)	26.13±5.39	27.10±3.42
Mean BMI (kg/m ²)	23.15±4.35	23.11±5.32
Gender		
Male	38 (66.7%)	42 (71.9%)
Female	19 (33.3%)	15 (28.1%)
Total	57 (100)	57 (100)

There were 53 (93%) graft successes in group M and 49 (86%) in group N.(Fig 1)

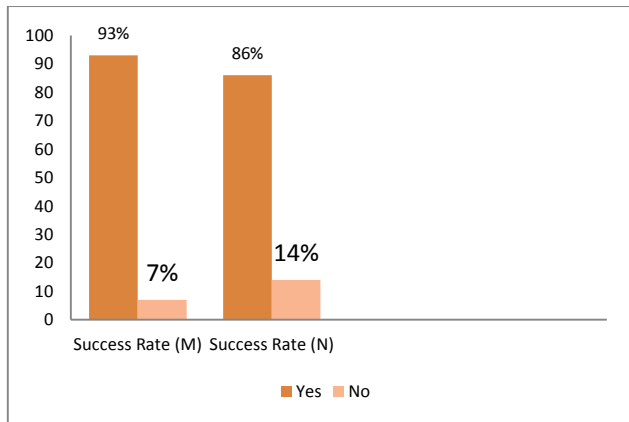


Figure 1: Comparison of graft success rate among both groups

Group M's medialization was 5.3%, but group N's medialization was 10.5%, with no evidence of lateralization in either group. (table 2)

Table 2: Both groups compared to see their results

Variables	Underlay	Onlay
Medialization		
Yes	3 (5.3%)	6 (10.5%)
No	54 (94.7%)	51 (89.5%)
Lateralization	0	0

Mean air bone gap closure was 8.1±4.33 dB in group M and 10.9±7.61 dB in group N. (table 3)

Table 3: Results of hearing improvement among both groups

Variables	Underlay	Onlay
Mean air bone gap closure (dB)	8.1±4.33	10.9±7.61

DISCUSSION

Reconstructive surgery is confined to the healing of tympanic membrane hole in myringoplasty. Ossicular chain mobility and absence of illness are implied in this definition. [11] Tympanic membrane restoration techniques have improved greatly over the years.. read more The anterior or subtotal tympanic membrane perforation is difficult to heal due to a lack of vascularity, as well as

the anterior bony overhang that inhibits visibility. Grafts may fall into the middle ear, resulting in reperforation and complete destruction of the anterior portion. [12]Medical procedures such as William's microclip and sandwich tympanoplasty have all been utilised to treat these issues, as has the loop overlay myringoplasty and over-underlay approach for myringoplasty.[13,14]

In this experimental study 114 patients with ages 14-60 years were presented. Patients were equally divided into two groups. Group M had 38 (66.7%) males, but group N had 42 (71.9%) males. There were 26.13±5.39 years and 27.10±3.42 years were the mean ages of the two groups, respectively, for group M and group N. [15,16] Onlay and underlay are the most commonly used procedures. My study group learned about the underlay technique, whereas group II learned about the onlay technique. Underlay technology is becoming increasingly popular among otologic surgeons since it is both simple and effective. Each strategy has its advantages and disadvantages. Due to the ongoing malfunction of the Eustachian tube in children, recurring respiratory tract infections with otorrhoea, and a lack of immune system development, the success of graft integration in children is slightly lower than in adults. According to previous study b Masoud et al, a person's age has no bearing on the rate at which their tympanic membranes close and the improvement in their hearing.[15]

In our study there were 53 (93%) graft successes in group M and 49 (86%) in group N (onlay technique). Overall success rate among both groups was 89.5%. Underlay tympanoplasty is recommended for posterior TM perforation, according to the Jung study, whereas the Over-underlay graft approach is ideal for big anterior or subtotal TM perforations. [17] There have been numerous studies comparing the results of an underlay versus an overlay procedure. They found that underlay technique graft take rates were between 90% and 92%, with failure rates ranging between 8% and 10%. [18,19] They also found a 95%-97% graft take rate and a 3%-5% failure rate in the over-underlay approach. [20] Graft take rate was higher in the over-underlay technique (5%), compared to the underlay method (4%). Our findings were almost exactly in line with those found in the previous investigations.

Between underlay and overlay, the A-B gap often increased by 14.5 dB-16.55 dB and by 16.96 dB18.75 dB. Somewhat improved post-operative hearing gain was seen in the over-underlay method. [21] We got to the same result in our investigation as well. Mean gap closure in group M was 8.1 dB and in group N was 10.9 dB. Group double layer tragal cartilage-perichondrium graft (66/67) and Group temporal muscle fascia (63/67) both had 98.5 percent (66/67) success rates at six months in the prior trial, but there was no statistically significant difference between the two groups. [22]Improve the quality of life of patients by providing them with adequate hearing and eliminating the constant infections, thereby protecting the middle ear from further damage through myringoplasty. Short-term results from the two methods are not significantly different, according to the current study (underlay and over-underlay). In our research, we discovered that both myringoplasty procedures were straightforward to perform, safe, and resulted in considerable gains in hearing. In terms of graft uptake and hearing gain, however, we discovered that the over-underlay technique performed better than the underlay method. Over-underlay method has a lower graft uptake failure rate. If we could do a large-scale investigation, the findings would be substantial. As a result, we advise that research of this nature be carried out over an extended period of time at many specialised institutions.

CONCLUSION

After doing this research, we came to the conclusion that the underlay technique for myringoplasty was more beneficial in terms of graft success and hearing restoration. Overall, both groups had accepted success rate, which is comparable to the national average.

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