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ORIGINAL RESEARCH

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Comparison of the underlay and over-underlay tympanoplasty: A randomized, double-blind controlled trial

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Abstract

Objective: We aimed to compare the graft success rate and hearing outcomes in patients with large tympanic membrane (TM) perforation in underlay and over-underlay approaches.

Methods: This is a prospective double-blind randomized controlled clinical trial with a parallel design. Patients aged 15–75 years old with large TM perforation (more than 50% of TM) who operated at Khalili hospital affiliated with Shiraz University of Medical Science, Iran, were enrolled. Exclusion criteria were recent otorrhea, revision surgery, and pathologic intraoperative findings such as the presence of cholesteatoma, cholesterol granuloma, ear canal polyp, or damaged ossicle. In the first group, the underlay method and in the second group over-underlay method were performed. Graft success rate, atelectasis, and audiology outcomes were evaluated after 6 months.

Results: The investigation was conducted on 84 patients in the underlay and 67 patients in the over-underlay group. Although there was a higher rate of graft failure (9%) in the over-underlay group in comparison with the underlay group (4.8%), the difference was not statistically significant (p-value = .34). No atelectasis was seen in both group. Although, between-groups comparison of the preoperative and postoperative speech reception thresholds (SRT) and air-bone gaps (ABG) values showed statistically significantly lower SRT and ABG in the over-underlay technique, the difference was clinically negligible.

Conclusion: Both techniques provide the same graft success rate, but SRT and ABG were significantly lower in the over-underlay technique after the operation.

Levels of Evidence: 1b

KEYWORDS
graft success rate, over-underlay, tympanic membrane perforation, tympanoplasty, underlay method

1 | INTRODUCTION

Chronic otitis media (COM) surgery is common all over the world, especially in developing countries. The aim of COM surgery is the reconstruction of tympanic membrane (TM) perforation and the establishment of a sound-conducting structure in a well-aerated middle ear.[1–3] Surgical technique is an important factor in the graft success rate.[4,5] Different materials and techniques have been developed

follow-up, the graft success rate was 100% in the medial tympanoplasty group in comparison with 84% in the over-under group. The mean ABG closure was similar between the two groups (11.6 dB in medial tympanoplasty versus 11.9 dB for the over-under tympanoplasty, $p < .001$). Graft lateralization, anterior blunting, and hearing loss were not reported in any patients. They found this method to be an effective tympanoplasty technique. In another research, Jung and Parks[22] used the mediolateral graft technique to reconstruct subtotal and anterior perforations. They showed 97% TM healing and complications in 5% of cases.

In some studies, the over-underlay technique was performed using cartilage. In the investigation by Kazikdas et al.,[23] the graft success rate was 95.7% by over-under method with cartilage tympanoplasty, and 75% using temporal fascia in 51 patients with subtotal perforations. A retrospective study by Erbele et al.[24] investigated the over-under cartilage tympanoplasty technique. In this study, 68 patients were included. The average improvement in air conduction was 6 dB (95% CI: 4–9 dB; $p < .0001$). The overall healing rate was 97%. They concluded that over-under cartilage tympanoplasty was a good method for significant improvement of auditory outcomes with a low rate of postoperative complications. Çetin and Erdem[25] evaluated the outcome of cartilage tympanoplasty for the reconstruction of dry subtotal perforations. They performed the endaural over-underlay method. Cartilage perichondrium tympanoplasty showed a graft success rate of 96% in a total of 195 participants.

Comparing our results to related studies revealed that the overall success rate of both operations was acceptable in our center, which is comparable to similar centers around the world. The statistical analysis could not demonstrate a significant difference between the underlay and over-underlay intervention groups regarding the hearing outcomes and success rate; however, the underlay technique showed a slightly higher graft success rate.

The most important strength of this instigation was its design which was a prospective randomized clinical trial. In addition, we included a relatively large sample size and a control group. The only limitation was a quite short follow-up time.

5 | CONCLUSION

Therefore, we can conclude that both techniques are efficient and successful methods of tympanoplasty surgery. Further investigations are needed to explain the short-term and long-term advantages and disadvantages of these surgery methods.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

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