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Original Research

To compare the outcomes of type 1 tympanoplasty with and without anterior tucking

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ABSTRACT:

Aim: To compare the outcomes of type 1 tympanoplasty with and without anterior tucking. Methods: The Department of ENT conducted this prospective comparative analysis. Only patients with tympanic membrane perforation owing to COM were included in the study. Patients with cholesteatoma with atticoantral disease, hearing impairment more than 50 dB indicating ossicular chain discontinuity, previous tympanoplasty or other otologic surgery, and sensorineural hearing loss were excluded. Age, gender, existence of contralateral perforation or otitis media with effusion, type and site of perforation, and preoperative and postoperative hearing levels were all documented for all patients. 100 Patients were separated into two groups: those who had type 1 tympanoplasty with anterior tucking and those who had type 1 tympanoplasty without anterior tucking. Results: In this research, 100 patients were enrolled, 50 of whom had type 1 tympanoplasty with tucking and 50 of whom did not. This study's participants varied in age from 12 to 52 years; more patients were found in the 20 to 30 year age group (46%), followed by the 30 to 40 year age group (31%).Out of 100 patients, 55% were men and 45% were women. When we compared pre and post-operative audiometry in type-1 tympanoplasty with and without anterior tucking in our research, the p-value was 0.61 in both groups, which was not statistically significant. Hearing improvement was almost same in both groups. Graft uptake was higher in type 1 tympanoplasty with tucking (96%) than in type 1 tympanoplasty without tucking (92%). Complications such as residual perforation occurred in both groups equally, and anterior marginal blunting (12%) was seen in type 1 tympanoplasty with tucking. Conclusion: Both doing an anterior tuck and not performing an anterior tuck during a type-1 tympanoplasty resulted in hearing improvements that were equivalent to one another. There was determined to be no statistically significant difference between either of the groups. Graft acceptability is improved with type-1 tympanoplasty procedures that include anterior tucking. The sole drawback of a type-1 tympanoplasty with anterior tucking is a blunting of the anterior border of the tympanic membrane. Keywords: Type 1 tympanoplasty, anterior tucking, otitis media

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INTRODUCTION

The TM is a pearly grey semitransparent oval-shaped membrane that forms the lateral wall of the middle ear cavity (MEC) and shields it from the external auditory canal (EAC), functioning as a middle ear protector. It makes a significant contribution to the normal hearing system. The most frequent acquired TM illness is TM perforation, which may be caused by trauma or infection due to acute or COM. Although traumatically perforated TM regenerates and heals spontaneously, COM perforation heals poorly. ¹ TM hole disrupts the conducting channel of sound, resulting in conductive hearing loss.

Tympanoplasty is a surgical technique that removes middle ear disease and restores normal middle ear hearing with or without TM repair, while myringoplasty is confined to TM repair without additional manipulation of the ossicles or middle ear. Myringoplasty and tympanoplasty have gone a long way and progressed enormously from the commencement of the surgical treatments for repair of the perforated TM in 1640 by Banzer and the description of tympanoplasty in 1951 by Wullstein.² The best approach for doing the procedure to get the best outcomes is currently being developed. There is considerable research being conducted to find a strategy to provide optimum graft uptake and maximal postoperative hearing improvement with little intervention. According to Wullstein's categorization, type 1 tympanoplasty is the functional restoration of the normal middle ear by repairing the TM. ³ Many variables influence the success of type 1 tympanoplasty, including method, perforation size and location, graft material, duration of the dry ear, related middle ear cleft pathology, condition of the contralateral ear, smoking, socioeconomic level, and history of previous ear surgery. ⁴⁻⁶

Since the 1990s, transcanal endoscopic repair of TM perforation has been used. Its advantage is that it is intrusive and enables for multi-angled less comprehensive visibility of the TM and other places that are normally out of sight or difficult to see with a microscope. 7,8 Several studies have been conducted comparing the traditional microscopic postauricular approach and the endoscopic transcanal approach for TM repair, with comparable results in terms of graft success and hearing gain, and the endoscopic method having additional advantages of anterior margin visibility, minimal invasiveness, shorter operative time, less postoperative pain, and better cosmesis. 9,10 In terms of size, big and subtotal holes had lower rates of graft uptake success, while anterior and marginal perforations have been shown to have a detrimental influence on the success of type-1 tympanoplasty.¹¹

MATERIAL AND METHODS

After receiving clearance from the protocol review committee and the institutional ethics committee, this prospective comparative research was carried out at the Department of ENT. Only patients with tympanic membrane perforation owing to COM were included in the study. Patients with cholesteatoma with atticoantral disease, hearing impairment more than 50 dB indicating ossicular chain discontinuity, previous tympanoplasty or other otologic surgery, and sensorineural hearing loss were excluded. Age, gender, existence of contralateral perforation or otitis media with effusion, type and site of perforation, and preoperative and postoperative hearing levels were all

Table 1 Demographic profile

Gender	Number of patients	%	
Male	55	55	
Female	45	45	
Age in years			
below 20	12	12	
20-30	16	16	
30-40	31	31	
Above 40	11	11	

Table 2.Pre-operative pure tone audiometry amongst the groups

	With tucking	%	Without tucking	%
Below 30	13	26	7	14
30-40	17	34	14	28
40-60	20	40	29	58

documented for all patients. 100 Patients were separated into two groups: those who had type 1 tympanoplasty with anterior tucking and those who had type 1 tympanoplasty without anterior tucking.

The postauricular technique was used in all instances. The temporalis fascia graft was extracted and the anteriorly based palva flap was raised after the postauricular incision. To prevent the flap from hanging, a Weitlaner self-retaining retractor was employed. The health of the mucosa, ossicular chain continuity, and mobility were all tested in the middle ear. Anterior tucking was performed by a tiny horizontal incision (about 3 mm) in the superior section of the anterior wall of the external auditory canal, lateral to the annulus. The annulus is elevated via this incision, and a little portion of the temporalis fascia is pushed up to lie between the canal skin and the bone of the anterior external auditory canal. Puretone audiometry (PTA) was measured before surgery and again six months afterwards.

The independent student t test and the Pearson chi square test were used to gather and evaluate data.

RESULTS

In this research, 100 patients were enrolled, 50 of whom had type 1 tympanoplasty with tucking and 50 of whom did not. This study's participants varied in age from 12 to 52 years; more patients were found in the 20 to 30 year age group (46%), followed by the 30 to 40 year age group (31%). (Table 1). Out of 100 patients, 55% were men and 45% were women. When we compared pre and post-operative audiometry in type-1 tympanoplasty with and without anterior tucking in our research, the p-value was 0.61 in both groups, which was not statistically significant. Hearing improvement was almost same in both groups. Graft uptake was higher in type 1 tympanoplasty with tucking (96%) than in type 1 tympanoplasty without tucking (92%). Complications such as residual perforation occurred in both groups equally, and anterior marginal blunting (12%) was seen in type 1 tympanoplasty with tucking.

Table 3 Postoperative audiometry between 10-30 dB

Postoperative audiometry	With tucking	%	Without tucking	%
	40	80	32	64

Table 4.Distribution of graft uptake

Distribution of graft uptake	With tucking	%	Without tucking	%
	48	96	46	92

DISCUSSION

There have been numerous studies on the problematic repair of subtotal and large perforations involving the anterior quadrant, for which several modified techniques and methods have been tried and are evolving that can be incorporated for optimal results and to minimise failure. Several studies have been conducted to evaluate the function of anterior tucking in T1Tand to compare it to other TM repair procedures.

Tympanoplasty in children is frequently regarded to be ineffective owing to a poor immune system, recurrent upper respiratory tract infections, the shorter and more unpredictable function of the eustachian tube, and challenges in postoperative care in children.^{12,13} Various experts have made suggestions concerning the best age for paediatric surgery, such as 8, 10, and 12 years old.^{14,15} On the other side, several papers claim that there is no link between age and surgical success.^{16,17} A recent research comparing the anatomic and hearing results of tympanoplasty in 136 individuals discovered that children tympanoplasty success rates are comparable to adults.¹⁸

Because to the acute angulation of the tympanic membrane, restricted anterior border, low vision of the ear canal, and noticeable anterior canal wall bulge, the anterior half of the graft is difficult to maintain in instances with anterior, large central, and subtotal perforations. Sandwich graft tympanoplasty, overunder tympanoplasty, mediolateral graft tympanoplasty, "anterior hitch" method, "window shade" technique 8, and "hammock tympanoplasty" are some of the surgical procedures used to correct anterior perforations.

Burse et al. performed a research in which 50 clinically diagnosed patients were randomly split into two groups of 25 each to undergo anterior tucking and cartilage support tympanoplasty.¹⁹ Graft uptake was successful in 96% of patients in both groups, however it was not statistically significant. In a prospective research, Pradhan et colleagues got 93% success in subtotal perforations and 84% success in anterior perforations in type-I tympanoplasty using the circumferential elevation of 10 tympanometry flap approach. ²⁰ Jung et al. observed 97% graft take-up success rates in anterior/subtotal perforations utilising the mediolateral graft tympanoplasty technique in a retrospective investigation.²¹ Mundra et al. obtained 98.94% graft uptake success employing an underlay approach with a slice of cartilage support in subtotal perforations.²²

CONCLUSION

Both doing an anterior tuck and not performing an anterior tuck during a type-1 tympanoplasty resulted in hearing improvements that were equivalent to one another. There was determined to be no statistically significant difference between either of the groups. Graft acceptability is improved with type-1 tympanoplasty procedures that include anterior tucking. The sole drawback of a type-1 tympanoplasty with anterior tucking is a blunting of the anterior border of the tympanic membrane.

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