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Retraction

The article "Comparative study of outcomes of type-1 tympanoplasty with and without anterior tucking" is retracted by the Editor-in-Chief, on the request of corresponding author and co-author, due to violation of the policies and practices of International Journal of Otorhinolaryngology and Head and Neck Surgery.[1] The article is retracted due to dispute in authorship.

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1. Kiran GS, Priyadarshini G. Comparative study of outcomes of type-1 tympanoplasty with and without anterior tucking. Int J Otorhinolaryngol Head Neck Surg 2020;6:657-60. DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20201277.

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Original Research Article

Comparative study of outcomes of type-1 tympanoplasty with and without anterior tucking

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ABSTRACT

Background: Tympanoplasty is a surgical procedure for closing the tympanic membrane perforation and reconstructing the tympanic membrane and hearing, commonly after trauma and chronic otitis media. The aim of the study was to compare the clinical and audiological outcomes of tympanoplasty with or without anterior tucking.
Methods: In this prospective study, 50 patients with chronic otitis media (COM) were divided into two groups. Group 1 underwent type 1 tympanoplasty with anterior tucking method, and group 2 underwent type 1 tympanoplasty without anterior tucking. The result was measured on graft uptake and hearing outcome at 6 months postoperatively by performing pure tone audiometry.
Results: The hearing improvement was almost the same in both the groups. Graft uptake was good in type 1 tympanoplasty with tucking (96%) when compared to without tucking tympanoplasty (92%). Complications like residual perforation were seen in both groups equally. Anterior marginal blunting was noted (8%) in type 1 tympanoplasty with tucking.
Conclusions: The hearing improvement of type-1 tympanoplasty with anterior tucking and without anterior tucking is the same. Type-1 tympanoplasty with anterior tucking has a better graft acceptance. The only disadvantage of type-1 tympanoplasty with anterior tucking is anterior marginal blunting.

Keywords: COM, Tympanoplasty, Anterior tucking, Graft take-up

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INTRODUCTION

The tympanic membrane is a thin semitransparent membrane which forms the boundary between the outer ear and the middle ear. The entire tympanic membrane consists of three layers. The outer layer of skin is continuous with that of the external canal, the inner layer of the mucous membrane is continuous with the lining of the tympanic cavity of the middle ear and the middle layer of fibrous tissue made up of circular and radial fibers that give the membrane its stiffness and tension. The membrane is well supplied with blood vessels and sensory nerve fibers that make it acutely sensitive to pain.

Chronic otitis media (COM) is the chronic inflammation of the mucoperiosteal lining of middle ear cleft which persists for more than 3 months. Etiology for the tympanic membrane defect include infection, trauma, retraction pockets developing from chronic negative middle ear pressure, and therapeutic interventions such as ventilation tubes. The incidence of chronic otitis media is higher in developing countries because of poor socioeconomic status and poor nutritional status. It is the most common cause of hearing impairment in our country. Usually, most of the perforation heals spontaneously, but this spontaneous healing is affected by the chronicity of infection and certain permanent changes

in the margin of perforation leading to a non-healing permanent perforation. This leads to constant exposure of the middle ear for re-infection and hearing disability. Small and medium-sized perforation is more successful than subtotal perforation.[1,2] Failure rates are higher in the repair of larger perforations with graft displacement, improper placement, autolysis, infection, hemorrhage.[3]

Standard treatment of chronic otitis media is conservative management with aural toilet, topical and systemic antibiotics, and dry ear precautions. If conservative management fails, then surgical intervention like cortical mastoidectomy with tympanoplasty is done.

The term tympanoplasty was first used in 1953 by Wullstein to describe surgical techniques for reconstruction of the middle ear hearing mechanism that had been impaired or destroyed by chronic ear disease.[4] Wullstein classified tympanoplasty into five different types.[5] In 1965, the American Academy of Ophthalmology and Otolaryngology subcommittee on conservation of hearing set forth a standard classification for surgery of chronic ear infection and defined tympanoplasty as a procedure to eradicate the disease in the middle ear and to reconstruct the hearing mechanism, with or without tympanic membrane grafting.

Various techniques have been attempted to achieve better results with improved hearing. These include the overlay tympanoplasty, the underlay tympanoplasty, over underlay tympanoplasty, gel film sandwich tympanoplasty, crown cork tympanoplasty, swinging door tympanoplasty, laser-assisted spot welding technique, micro clip techniques and others like the fascial pegging, annular wedge tympanoplasty, loop tympanoplasty, which are but modifications of the basic technique.[6-11] Different materials have been used to reconstruct the tympanic membrane, most accepted of which is the temporalis fascia, because of its qualities of low metabolic rate, requiring lesser blood supply and is more resistant to infection.[3] Thus to overcome the complications this study was done to focus on the comparison of outcomes of type-1 tympanoplasty with or without anterior tucking.

The aim of the study was to compare the clinical and audiological outcomes of type-1 tympanoplasty with or without anterior tucking.

METHODS

This prospective comparative study was conducted in the Department of ENT, Aarupadai Veedu medical college and Hospital, Pondicherry from September 2017 to January 2019. Ethical committee approval obtained. Patients with only tympanic membrane perforation due to COM were included. Patients with cholesteatoma with atticoantral disease, hearing impairment more than 50 dB which indicates ossicular chain discontinuity, already undergone tympanoplasty or any other otologic surgery, sensorineural hearing loss were excluded. For all patients; age, sex, presence of contralateral perforation or otitis media with effusion, type and location of perforation, preoperative and postoperative hearing levels were recorded. Patients were divided into 2 groups and group 1 underwent type 1 tympanoplasty with anterior tucking and group 2 underwent type-1 tympanoplasty without anterior tucking.

All cases were done by using the postauricular approach. After the postauricular incision was made, temporalis fascia graft was harvested and anteriorly based palva flap was elevated. Weitlaner self-retaining retractor was used to avoid the hanging of the flap. The middle ear was examined for the status of the mucosa, ossicular chain continuity and mobility assessed. Anterior tucking was done using a small horizontal incision (approximately 3 mm) placed lateral to the annulus in the superior part of the anterior wall of the external auditory canal. Through this incision, the annulus is raised, and a small part of temporalis fascia is pulled up, to rest between the canal skin and the bone of anterior external auditory canal. Pure-tone audiometry (PTA) was measured before the surgery and at a postoperative period of 6 months.

Data were collected and analyzed used using independent student t test and Pearson chi square test.

RESULTS

In this study 50 patients were included, 25 patients under type 1 tympanoplasty with tucking and 25 patients underwent without tucking. The age group of this study patients ranged from 11 to 50 years, more patients were noted in 21 to 30 years 44%, followed by 31 to 40 years 30% (Figure 1). Out of 50 patients, 52% were male and 48% were female patients (Figure 2).

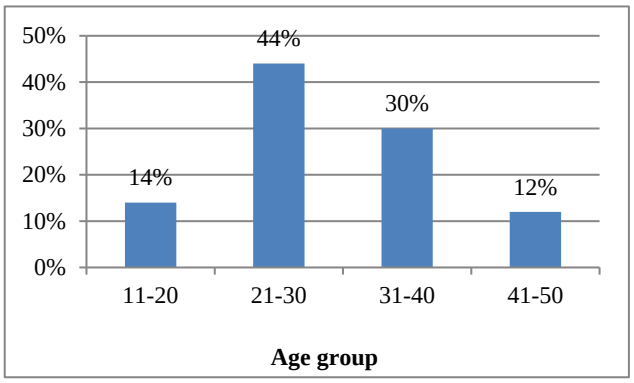

Figure 1: Distribution of age group.

In our study when we compare pre and post-operative audiometry in type-1 tympanoplasty with and without anterior tucking, the p-value was 0.544 in both the groups which were statistically not significant. The hearing improvement was almost the same in both the groups (Figure 3 and 4).

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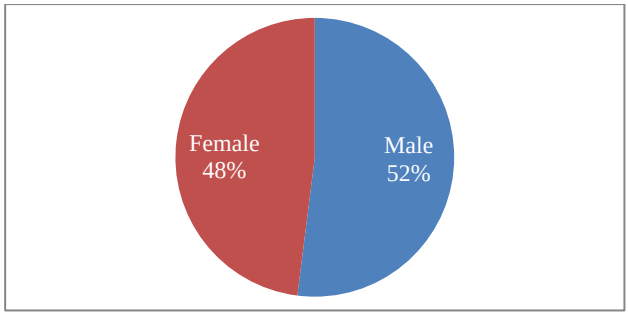

Figure 2: Distribution of gender.

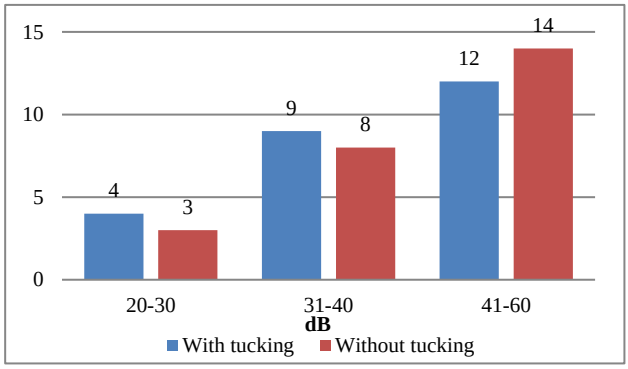

Figure 3: Pre-operative pure tone audiometry amongst the groups.

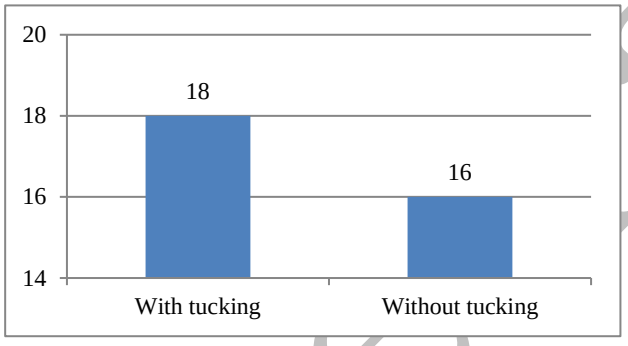

Figure 4: Postoperative audiometry between 10-30 dB.

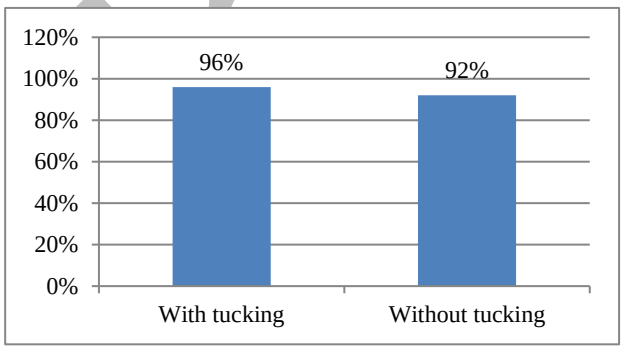

Figure 5: Distribution of graft uptake.

Graft uptake was good in type 1 tympanoplasty with tucking (96%) when compared to without tucking tympanoplasty (92%). Complications like residual perforation were seen in both groups equally, anterior marginal blunting was noted (8%) in type 1 tympanoplasty with tucking (Figure 5 and 6).

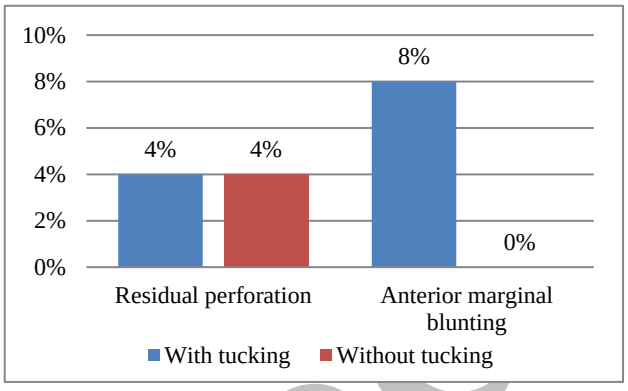

Figure 6: Distribution of complications.

DISCUSSION

Several factors influence the success of tympanoplasty such as status of the middle ear, site and size of perforation, surgical technique and graft material. Medialization of graft and adherence to promontories are the drawbacks of the underlying technique.

Tympanoplasty performed in childhood is sometimes thought to be unsuccessful due to weak immune system, recurrent upper respiratory tract infections, the shorter and unpredictable function of the eustachian tube and difficulties in postoperative care in children.[12,13] Various recommendations have been made about the ideal age for the surgery of children by different authors, such as 8, 10, 12 years old.[14,15] On the other hand, in some articles, it is stated that there has been no correlation between age and surgical success.[16,17] In a recent study, which compares the anatomic and hearing outcomes of tympanoplasty in 136 patients, the pediatric tympanoplasty success rate was found similar to adults.[18]

The anterior part of the graft is a challenge to stabilize in cases of anterior, large central and subtotal perforations due to the acute angulation of the tympanic membrane, limited anterior margin, poor visualization of the ear canal and prominent anterior canal wall bulge. A variety of surgical techniques have been developed to increase the success in treating anterior perforations, including sandwich graft tympanoplasty, over-under tympanoplasty, mediolateral graft tympanoplasty, "anterior hitch" technique, "window shade" technique 8 and “hammock tympanoplasty”.

In a study conducted by Burse et al, 50 clinically diagnosed cases were randomly divided into two groups of 25 each to be operated by anterior tucking method and cartilage support method of tympanoplasty.[19] Successful graft uptake was observed in 96% of patients in both the groups but it was not statistically significant. Pradhan et

al, in a prospective study, obtained 93% success in subtotal perforations and 84% in anterior perforations in type-I tympanoplasty by circumferential elevation of 10 tympanometry flap technique.[20] A retrospective study by Jung et al, reported 97% graft take-up success rates in anterior/subtotal perforations using the mediolateral graft tympanoplasty method.[21] Mundra et al, achieved 98.94% of success in terms of graft uptake by using a slice of cartilage support in subtotal perforations, by underlay technique.[22]

CONCLUSION

The hearing improvement following type-1 tympanoplasty with anterior tucking and without anterior tucking were comparable. No statistical difference was found in either of the groups. Type-1 tympanoplasty with anterior tucking has a better graft acceptance. The only disadvantage of type-1 tympanoplasty with anterior tucking is anterior marginal blunting.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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