

Graft Uptake in Type 1 Tympanoplasty by Elevation of Circumferential Tympanomeatal Flap: Our Experience

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Conflict of interest: Nil

Abstract

A prospective cohort study was done at NIMS Jaipur from Jan 2021 to Jan 2022 with the aim to assess the graft uptake by circumferential tympanomeatal flap elevation in type 1 tympanoplasty. 100 cases of inactive mucosal type of chronic otitis media with central perforation were operated for type 1 tympanoplasty after detailed history, clinical examination, examination under microscope, pure tone audiometry, x ray mastoids and routine preoperative investigations. Temporalis fascia graft was placed medial to handle of malleus after elevation of circumferential tympanomeatal flap. Examination of ear under microscope was done for the postoperative patients coming to follow up at the end of first week and later after one month. Graft uptake was assessed and complications if any were noted. Graft was taken up successfully in 98 (98%) cases. From this study, we conclude that type 1 tympanoplasty done by elevation of circumferential tympanomeatal flap results in high rate of graft uptake.

Keywords: Circumferential Tympanomeatal flap, Type 1 tympanoplasty

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Introduction

The term tympanoplasty was introduced 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. [1] In type 1 tympanoplasty, the ossicular chain is intact and mobile, so graft is placed medial to the handle of malleus. The common tympanoplasty grafting techniques are underlay and overlay. Graft placement in the underlay technique is medial to the tympanic membrane remnant (or annulus) and manubrium of the malleus whereas in the overlay technique, graft placement is lateral to the tympanic

membrane remnant and medial to the manubrium. The overlay technique has been associated with a higher incidence of blunting of the anterior sulcus, graft lateralization and formation of epithelial pearls. These potential complications are avoided in the majority of cases performed with the underlay technique. [2]

Different techniques of elevation of tympanomeatal flap have been practiced to increase the rate of graft uptake in tympanoplasty. The aim of our study is to assess the graft uptake by circumferential tympanomeatal flap elevation in type 1 tympanoplasty.

Material and methods:

A prospective cohort study comprising 100 cases of chronic otitis media inactive mucosal type with central perforation who underwent tympanoplasty type 1 was conducted at NIMS Jaipur from Jan 2021 to Jan 2022. Patients underwent detailed scrutiny of history and clinical examination. Examination under microscope was done and the clinical examination findings were co-related. Pure tone audiogram, x ray mastoids and routine blood investigations were obtained. Local anaesthesia was employed for all the cases. Postaural incision was given. Temporalis fascia graft was harvested. Posterior meatotomy was done. Tympanic membrane perforation margins were freshened. Posterior tympanomeatal flap was thinned

as and when required. Horizontal incision made in anterior canal wall at 5-7mm lateral to fibrous annulus (fig 1). Circumferential flap was elevated all around except superiorly till the notch of rivinus (fig 2,3,4). Fibrous annulus separated from the mucosal layer(fig 5). Ossicular chain continuity assessed and round window reflex was checked. Graft was placed by interlay technique over the mucosal layer medial to the handle of malleus(fig 6). Medicated gel foams were placed and closure was done in layers. Examination of ear under microscope after sutures removal was done for the postoperative patients coming to follow up at the end of first week and later after one month. Graft uptake was assessed (fig 7), and complications if any were noted.



Figure 1 : Horizontal incision on anterior canal wall using Plester's knife



Figure 2 : Raising anterior tympanomeatal flap

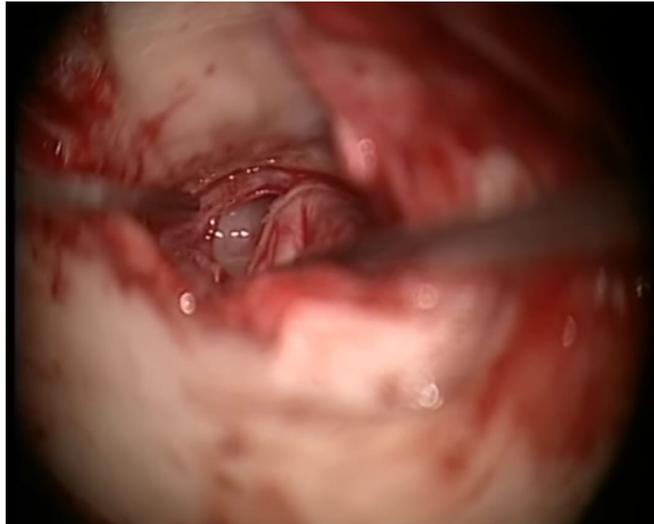


Figure 3: Separating fibrous annulus from underlying mucosal layer



Figure 4: Separating fibrous annulus from underlying mucosal layer posteriorly



Figure 5: Reassessment of flaps after circumferential flap elevation



Figure 6: Graft placement by interlay technique

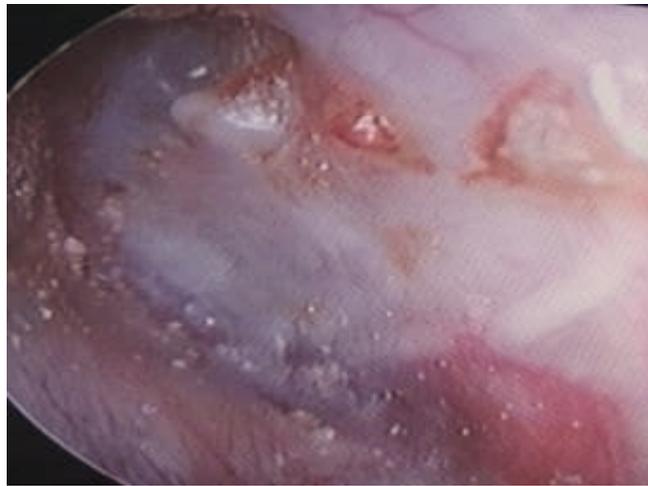


Figure 7: Neo tympanum after 1 month of surgery

Results:

In our study, maximum patients were in the age group of 20-30 years. Out of 100 cases, 57 were females and 43 were males. The graft uptake was successful in 98 (98%) cases. Residual perforation was noted in 2 (2%) cases.

Table 1: Age distribution:

Age distribution	No. of cases (100)
20 yrs – 30 yrs	46
31 yrs – 40 yrs	37
41 yrs – 50 yrs	17

Table 2: Sex distribution

Sex distribution	
Females	57
Males	43

Table 3: Uptake of graft

Graft taken up	No. of cases (100)	Percentage %
Graft uptake successful	98	98%
Residual perforation	2	2%

Discussion:

The underlay technique of type 1 tympanoplasty is commonly practiced by most of the otolaryngologists. The main disadvantages of this technique are medialization of graft resulting in decreased closure of air bone gap in post operative period and residual perforation. Overlay technique involves risk of lateralization of graft, anterior blunting and epithelial pearl formation. To overcome these problems, circumferential elevation of tympanomeatal flap and placement of the graft by interlay technique is employed nowadays.

In our study success rate of graft uptake is 98% which is in concordance with the study done by Patilet.al showing 96% successful graft uptake and 4% with residual perforation.[3] In our study, residual perforation was noted in 2 patients (2%) after 1 month postoperatively. Subsequent upper respiratory tract infection might be the cause in those patients.

In the study done by Venkatesha et. al successful graft uptake (including anterior blunting 4% and medialization of graft in 4%) was 92% and residual perforation in 8%. Tympanomeatal flap was elevated circumferentially but underlay tympanoplasty was the method of choice for graft placement in this study. [4]

Pradhan et.al found in their study that medial or lateral placement of temporalis fascia graft to the handle of malleus after circumferential elevation of tympanomeatal flap did not cause any significant difference in graft uptake rate. In their study the graft uptake in patients of group A and group B were found to be 84% and 93% respectively. [5,6]

Conclusion:

From this study, we conclude that circumferential flap elevation technique in type 1 tympanoplasty provides wide exposure and graft can be anchored well all around, resulting in high rate of graft uptake. Hence, it is an effective technique for tympanoplasty.

References:

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