

Tympanoplasty using wet temporalis fascia graft at tertiary care hospital

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Abstract

Diagnosis of chronic otitis media implies a permanent abnormality of the pars tensa or flaccida, most likely result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion. It results in some degree of conductive hearing loss due to perforated tympanic membrane with or without ossicular destruction. This condition is treated by tympanoplasty in which we do the repair of tympanic membrane with the help of temporalis fascia graft. In our study we used the wet temporalis fascia graft. We did an observational study of 40 cases of COM inactive Mucosal type and found that 39 cases had the better graft placement and shorter uptake time as well as the operative time. And also there was significant improvement in the hearing post operatively which was assessed by pure tone audiometry. However, a larger sample size would help further establish the validity or relevance of our study.

Keywords: COM, Tympanoplasty, Wet Temporalis Fascia Graft.

Introduction

Chronic otitis media implies a permanent abnormality of pars tensa or pars flaccida, most likely result of earlier acute otitis media, negative middle ear pressure or otitis media with effusion¹.

There are five sub types of chronic otitis media

1. Inactive mucosal COM- In this there is permanent perforation of pars tensa but middle ear mucosa is not inflamed.
2. Active mucosal COM- Permanent defect of pars tensa with an inflamed middle ear mucosa which produces mucopus that may discharge.
3. Healed COM-Thinning and/or local or generalised opacification of pars tensa without perforation or retraction.
4. Inactive squamosal COM- Retraction of pars flaccida or pars tensa (usually posteriosuperior) which has potential to become active with retained debris.
5. Active squamosal COM (Cholesteatoma)- Retraction of pars flaccida or pars tensa that has retained squamous epithelial debris and is associated with inflammation and production of pus.¹

In mucosal type of COM, in active stage we give aural toileting, systemic and topical antibiotics, to make ear dry. As the ear becomes dry we can plan for surgery.

The term Tympanoplasty was introduced in 1953 by Wullstein. "Tympanoplasty is a procedure to eradicate disease in the middle ear cleft and to reconstruct hearing mechanism, with or without tympanic membrane grafting".²

Tympanoplasty is classified in to five different types, originally described by Wullstein.

Type 1 tympanoplasty involves repair of tympanic membrane alone, when the middle ear is normal. Type 1 tympanoplasty is synonymous to myringoplasty.

Reconstruction of tympanic membrane done using variety of graft materials like temporalis fascia, fascia lata, dura, tragal perichondrium, tragal cartilage³.

In tympanoplasty some surgeons harvest temporalis fascia at the start of procedure and use it when it becomes dry. Whereas other surgeons harvest at the time of putting the graft when it is wet or fresh graft.⁴

In 2009, Alken S, Baylancicek S, et al done the study on effect of use of dry or wet temporalis fascia graft in tympanoplasty. They found that using wet graft can shorten the operation time and graft placement time.⁵

In 2016 Singh G B, Kumar D done similar study to evaluate the success rate of dry and wet temporalis fascia graft in type 1 underlay tympanoplasty. They found that dry or wet graft, it doesn't influence the outcome of tympanoplasty.⁶

The basic aim of our study was to evaluate the success rate of wet temporalis fascia graft in type -1 tympanoplasty surgery.

Aims and Objectives

To study merits and demerits of using wet temporalis fascia graft in type – 1 tympanoplasty.

To study results of type -1 tympanoplasty using wet temporalis fascia graft in terms of graft uptake, hearing improvement and recurrence.

Materials and Methods

Type of study

Prospective observational study

Study group

Patients of COM Mucosal Inactive undergoing type-1 tympanoplasty.

Place of study

Tertiary Care Hospital.

Selection of patients

Patients with Inactive Mucosal COM.

Duration of study

9 months

Inclusion criteria

1. Patients with Inactive COM mucosal type
2. All age groups
3. Both male and female

Exclusion criteria

1. Patients with active ear discharge
2. Squamosal com
3. Revision tympanoplasty
4. Poor compliance

**Fig. 1:** Intra operative perforation of tympanic membrane.**Fig. 2:** Intra operative - After placement of graft.**Fig. 3:** Intact Tympanic Membrane post operative 24 weeks**Table 1:** Age distribution of cases studied (n=40).

Age Group (years)	No. of cases	% of cases
< 20	4	10.0
20 – 29	13	32.5
30 – 39	12	30.0
40 – 49	7	17.5
50 – 59	4	10.0
Total	40	100.0

Of 40 cases studied, 4 (10.0%) had age less than 20 years, 13 (32.5%) had age between 20 – 29 years, 12 (30.0%) had age between 30 – 39 years, 7 (17.5%) had age between 40 – 49 years and 4 (10.0%) had age above 50 years.

The mean \pm SD of age of the entire group of cases studied was 32.8 ± 11.1 years and the minimum – maximum age range was 16 – 55

Table 2: Sex distribution of cases studied (n=40).

Sex	No. of cases	% of cases
Male	21	52.5
Female	19	47.5
Total	40	100

Of 40 cases studied, 21 (52.5%) were males and 19 (47.5%) were females. In the entire study group, the male to female sex ratio was 1.10: 1.00.

Table 3: Distribution of operative side among the cases studied (n=40).

Operative side	No. of cases	% of cases
Right	21	52.5
Left	19	47.5
Total	40	100

Of 40 cases studied, 21 (52.5%) had right side operated and 19 (47.5%) had left side operated in the study group.

Table 4: Distribution of laterality of the disease among the cases studied (n=40).

Laterality	No. of cases	% of cases
Unilateral	34	85.0
Bilateral	6	15.0
Total	40	100

Of 40 cases studied, 34 (85.0%) had unilateral disease and 6 (15.0%) had bilateral disease in the study group.

Table 5: Distribution of mean graft harvesting time, graft placement time and total operating time among the cases studied (n=40).

	Time (Mins)		
	Mean	SD	Min – Max
Graft harvesting time	4.72	0.90	4 – 7
Graft placement time	4.72	1.36	3 – 8
Total operating time	49.28	4.58	40 – 60

The mean \pm SD of graft harvesting time was 4.72 ± 0.90 mins and the min – max time range was 4 – 7 mins.

The mean \pm SD of graft placement time was 4.72 ± 1.36 mins and the min – max time range was 3 – 8 mins.

The mean \pm SD of total operating time was 49.28 ± 4.58 mins and the min – max time range was 40 – 60 mins.

Table 6: Distribution of mean pre-op and post-op hearing score (AB GAP) among the cases studied (n=40).

	AB GAP (dB)	
	Mean	SD
Pre-op	38.63	6.09
Post-op 3-Months	28.75	6.67
Post-op 6-Months	22.00	7.49
% Improvement at 3-Months	24.82%	
% Improvement at 6-Months	42.84%	
P-value (Paired data)		
Pre-op v Post-op 3-Months	0.001***	
Pre-op v Post-op 6-Months	0.001***	
P-value by paired t test. P-value<0.05 is considered to be statistically significant. ***P-value<0.001.		

The mean \pm SD pre-op and post-op 3-months AB GAP was 38.63 ± 6.09 dB and 28.75 ± 6.67 dB. Distribution of mean post-op 3-months AB GAP is significantly lower (improved) compared to mean pre-op AB GAP (P-value<0.00). The % improvement in the AB GAP at 3-months from the pre-op stage was 24.82%.

The mean \pm SD pre-op and post-op 6-months AB GAP was 38.63 ± 6.09 dB and 22.00 ± 7.49 dB. Distribution of mean post-op 6-months AB GAP is significantly lower (improved) compared to mean pre-op AB GAP (P-value<0.00). The % improvement in the AB GAP at 6-months from the pre-op stage was 42.84%.

Table 7: Distribution of pre-op and post-op outcome of Rinne's test among the cases studied (n=40).

	Post-op (Rinne's test)				Total		P-value
	Positive		Negative		n	%	
Pre-op (Rinne's test)	n	%	n	%	n	%	
Positive	1	100.0	0	0.0	1	100.0	0.736 ^{NS}
Negative	35	89.7	4	10.3	39	100.0	
Total	36	90.0	4	10.0	40	100.0	

P-value by Wilcoxon's signed rank test. P-value<0.05 is considered to be statistically significant. NS-Statistically non-significant.

Of 1 Positive case pre-operatively, 1 (100.0%) had positive post-op Rinne's test and none had negative post-op Rinne's test. Of 39 Negative cases pre-operatively, 35 (89.7%) had positive post-op Rinne's test and 4 (10.3%) had negative post-op Rinne's test. The overall Post-op % improvement in Rinne's test was 89.7%.

Distribution of Post-op Rinne's test improved significantly compared to Pre-op Rinne's test (P-value<0.001).

Table 8: Distribution of uptake of graft among the cases studied (n=40).

	Uptake of graft				Total	
	Yes		No		n	%
Follow-up	n	%	n	%	n	%
4-Weeks	14	35.0	26	65.0	40	100.0
12-Weeks	36	90.0	4	10.0	40	100.0
24-Weeks	39	97.5	1	2.5	40	100.0

Of 40 cases studied, 14 (35.0%) had uptake of graft and 26 (65.0%) did not have it at 4-weeks.

Of 40 cases studied, 36 (90.0%) had uptake of graft and 4 (10.0%) did not have it at 12-weeks.

Of 40 cases studied, 39 (97.5%) had uptake of graft and 1 (2.5%) did not have it at 24-weeks.

Discussion

This study mainly focuses on surgical outcome and audiological improvement in the patients undergoing type 1 tympanoplasty using wet temporalis fascia graft.

In our study, we used wet temporalis fascia graft i.e. we harvested the graft just before putting it. Although initially it is a little difficult to put wet temporalis fascia graft as it gets

rolled. Using an operating microscope, harvesting graft becomes easy and comfortable, as you can take only the temporalis fascia without any muscle or soft tissue.

In 2009, Alkan S et al studied the effects of use of dry vs wet temporalis fascia graft on tympanoplasty they found that using wet graft can shorten the operative time and result in a high number of fibroblast nuclei histologically.⁵

In our study, among 40 cases studied, total mean operative time was 49.28 ± 4.58 min. graft harvesting time was 4.72 ± 0.97 min and graft placement time was 4.72 ± 1.36 min.

In our study, of the 40 cases studied, 36 cases (90%) had uptake of graft at 12 weeks and at the end of 24 weeks 39 cases (97.5%) had graft uptake.

Regarding the audiological result, the mean \pm SD pre-operative and post-operative 6 months AB gap was 38.63 ± 6.09 dB and 22.00 ± 7.49 dB.

We found statistically significant improvement in hearing i.e. percentage improvement in the AB gap at 6 months from the pre-operative stage was 42.84% (p < 0.001). Also post operative Rinne's test improved significantly (p < 0.001).

Conclusion

Our study suggests that using wet temporalis fascia graft can improve the results of type-1 tympanoplasty in terms of hearing outcome and graft uptake. Also using wet graft we can shorten the operative time.

Though the present study does not have a large number of cases, evidence is provided that using wet temporalis fascia graft is of valid consideration in tympanoplasty.

Source of funding

None.

Conflict of interest

None.

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