



A COMPARITIVE STUDY BETWEEN CARTILAGE AND INCUS AUTOGRAFT IN TYPE III TYMPANOPLASTY

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ABSTRACT The present study is a prospective study conducted in Government ENT hospital Visakhapatnam for a duration of 2 years from December 2018 to November 2020 where 60 patients who are satisfying the inclusion criteria were selected through random sampling.

Aim: Aim of our study is to determine which is the most suitable material among cartilage and incus autograft in type III tympanoplasty.

Conclusion: Though hearing improvement is seen post operatively in both autograft and cartilage group but long term improvement is observed with incus autograft.

KEYWORDS : Autograft, Allograft, COM, Tympanoplasty.

INTRODUCTION:

Ossiculoplasty is a reconstructive surgical procedure of ossicular chain by using autograft or allograft as an interposition device which helps to restore the original mechanics of sound transmission. The aim of reconstructing the ossicular chain is to optimize the middle ear transformer mechanism.

COM is a chronic inflammatory disease of middle ear and mastoid which results in 80% of ossicular damage and causes moderately severe conductive hearing loss. Unsafe type of COM can also cause erosion of ossicles , incus being the most common ossicle to be eroded due to its delicate anatomy and inadequate blood supply.

In our study type III tympanoplasty is performed by placing ossicular prosthesis on stapes supra structure (myringostapedolexy IIIa) or on mobile stapes foot plate (myringoplatinoplexy IIIb) along with graft (neotympanum).

Homograft materials which are derived from human donor tissue like bone graft and allografts like a dense form of hydroxyapatite , titanium and Teflon prosthesis are available for ossicular reconstruction.

Aim:

The aim of the present study is to determine which is the most suitable material among the cartilage and incus autograft in type III tympanoplasty for long term hearing improvement.

Objectives:

1. To compare the hearing improvement after 6 months by measuring preoperative AC thresholds with post operative AC thresholds between the two groups.
2. To compare the graft uptake between the two groups.

MATERIALS AND METHODS:

Our present study is a prospective study which is conducted in Government ENT hospital for a period of 2 years . Among them 60 patients who are satisfying our inclusion criteria were selected by random sampling.

Inclusion Criteria:

1. Patients of age group between 16-55years which chronic otitis media with conductive hearing loss having Austin type A ossicular discontinuity (i.e intact malleus and stapes superstructure with eroded long process of incus.
2. Patients who gave valid consent and willing to come for regular follow up.

Exclusion Criteria:

Patients with sensorineural or mixed hearing loss and with complications of COM are excluded from our study.

A thorough evaluation of patients is done and investigations like pure tone audiogram ,otoendoscopy ,examination under microscope and HRCT temporal bones are done.

60 patients are randomly assigned into 2 groups of 30 each. Group A patients ossiculoplasty is done by using cartilage and in Group B ossiculoplasty is done by using incus autograft.

OBSERVATIONS AND RESULTS:

1. In our study there is no sex bias among the selected subjects 30 are male and 30 are female.
2. In both the groups majority of patients fall in between the age group of 31 to 40 years (as the p value is .72, there is no bias between the groups)

Table 1: Operating Procedure Among Groups

Surgery	Group-1		Group-2	
	Count	%	Count	%
Type 3 Tympanoplasty	20	67%	22	73%
Type 3 Tympanoplasty with Cortical Mastoidectomy	10	33%	8	27%
Total	30	100%	30	100%

P=0.78

In group A among 30 patients 20 underwent type III tympanoplasty and 10 patients underwent type III tympanoplasty along with cortical mastoidectomy.

Where as in group B 22 patients underwent type III tympanoplasty and 8 underwent type III tympanoplasty along with cortical mastoidectomy.

Table No.2 Difference In Preoperative And Postoperative Thresholds In Both Groups

Difference	Group-1		Group-2	
	Count	%	Count	%
10--15	14	46.7%	6	20.0%
16--20	15	50.0%	16	53.3%
21--25	1	3.3%	8	26.7%
Total	30	100.0%	30	100.0%

P=0.013

In group A and B maximum threshold difference off 16 to 20db is seen among maximum number of patients.

Table No.3 Showing Minimum And Maximum Pre-op And Post Op PTA Values In Cartilage Group

Group	PTA	N	Minimum	Maximum	Mean	SD	P-value
Group-1	Pre-OP	30	41	56	48.60	4.39	<0.001
	Post OP	30	27	45	33.57	4.58	

Table No. 4 Showing Minimum And Maximum Pre-op And Post Op PTA Values In Incus Group

Group	PTA	N	Minimum	Maximum	Mean	SD	P-value
Group-2	Pre-OP	30	44	59	51.73	4.87	<0.001
	Post OP	30	26	47	33.53	5.39	

In both the groups P value is <0.001 which concludes that there is significant hearing improvement after surgery.

Table No.5 Showing Minimum And Maximum Difference In Pre-op And Post Op PTA Among Both The Groups

Diff PTA						P-value
Group	N	Minimum	Maximum	Mean	SD	
Group-1	30	10.00	24.00	15.03	3.15	<0.001
Group-2	30	10.00	25.00	18.20	3.60	

P value is <0.001, shows there is significant difference among the groups and better postoperative hearing is observed in the incus autograft group.

Graft uptake was good in 93% of cases.

DISCUSSION:

The most debated topic in middle ear surgery is reconstruction of sound conduction mechanism. The term ossiculoplasty refers to surgery performed in middle ear to restore hearing mechanism by ossicular reconstruction. In 1957 Hall and Rytzner performed the first ossicular reconstruction. They used autologous incus for the ossiculoplasty. Incudostapedial joint and lenticular process of incus are the most common sites of ossicular chain discontinuity resulting in air bone gap of about 60 db.

Theoretically stapes suprastructure contribute a little to acoustic gain whereas malleus contribute significantly. In a study conducted by Mishiro et al malleus handle and stapes suprastructure contributed in the hearing outcome, whereas as results of study conducted by Yung et al contradict this finding saying only malleus plays a significant role. In another study conducted by Brackmann and Goldenberg there is no contribution from malleus in restoration of hearing mechanism.

The proposed mechanism of erosion is a result of over production of cytokines, which promote hypervascularisation, osteoclast activation and bone resorption. In our study group A mean preoperative AC threshold was 48.60 and mean postoperative threshold was 33.57db and calculated p value was <0.001 hence there is significant outcome with cartilage tympanoplasty. Similarly in group B also mean preoperative AC threshold is 51.73 and post operative mean AC threshold is 33.53db with p value <0.001 inferring significant hearing outcome in incus autograft tympanoplasty also.

CONCLUSION:

Though both group A and B have shown significant hearing outcomes post operatively but in long term follow up of 6 months incus autograft have shown better hearing outcome.

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