

An Audiological Evaluation by Using 3 Types of Graft Materials in Myringoplasty



Medical Science
KEYWORDS : Temporalis Fascia, Perichondrium, PTA, Hyringoplastic

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INTRODUCTION

In early centuries ear infection with complication was a life threatening condition. The introduction of antibiotics and use of operative microscope in surgical field were revolutionary advances in the control of disease. Chronic suppurative otitis media is still a major problem in our country. Tympanic membrane (TM) perforations lead to recurrent ear infections and hearing loss. If the perforations are bilateral, hearing handicap becomes more evident. Persistent perforations occur either due to improper treatment of recurrent middle ear infections or infected traumatic perforation. Repair of TM perforation was attempted since many years. Different techniques and different graft materials like temporalis fascia, duramater and tragal perichondrium were used.

AIMS AND OBJECTIVES:

- To Compare audiological improvements by using different graft materials in myringoplasty

MATERIALS AND METHODS

A total of 60 patients with CSOM tubo tympanic disease who underwent myringoplasty in the period of two years.

FIGURE 1: POST AURICULAR INCISION



FIGURE 2: TEMPORALIS FASCIA GRAFT



FIGURE3: COMPOSITE CARTILAGE GRAFT



FIGURE 4: CARTILAGE GRAFT IN SITU

Statistical Analysis:

Descriptive statistics such as mean, SD and percentage was used to present data. Comparison between two groups were done by unpaired t test. Comparison between the anatomical and audiological outcomes of myringoplasty performed with perichondrial graft and temporalis fascia, cartilage composite graft was done by ANOVA test followed by post hoc Tukey’s multiple comparison tests. A p-value less than 0.05 were considered as significant. Data analysis was done by using software SPSS v16.0

RESULTS AND OBSERVATIONS

In our series we studied 60 patients of myringoplasty. The age and sex incidence and various factors influencing the audiological benefit in a successful myringoplasty were analysed after 3 months and 6 months and the results were analysed based on the observations of the second follow up audiogram(after 6 months)..

AGE INCIDENCE:

TABLE 1: AGE DISTRIBUTION OF PATIENTS

Age	Frequency	Percentage
10-19	13	21.7
20-29	23	38.3
30-39	17	28.3
40-49	3	5.0
>= 50	4	6.7
Total	60	100.0

Mean (SD) age 27.4 ± 9.9

GRAPH 1: AGE DISTRIBUTION OF PATIENTS

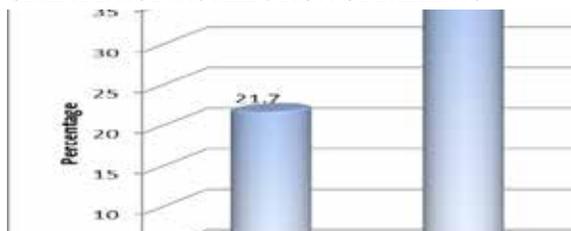
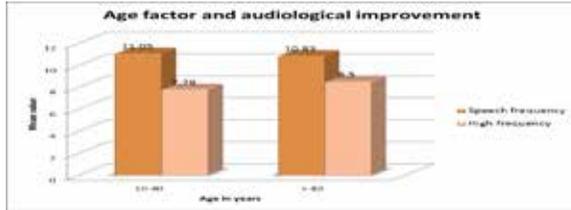


TABLE 2: AGE AND AUDIOLOGICAL BENEFIT

Age	Frequency	Audiological benefit	
		Speech frequency	High frequency
10-40	54	11.05	7.79
> 40	6	10.83	8.5
Total	60		
		p>0.05	p>0.05

GRAPH 2: AGE FACTOR AND AUDIOLOGICAL IMPROVEMENT



In our study 54 myringoplasties were performed on patients between the age group of 10-40 years and only 6 myringoplasties were performed in patients aged over 40 years. In the age group of 10-40 years the audiological benefit in speech frequency was found to be 11.05 dB and in high frequency it was found to be 7.79 dB. In patients aged over 40 years the audiological benefit was 10.83 dB in the speech frequency and 8.5 dB in the high frequency.

SEX INCIDENCE AND AUDIOLOGICAL BENEFIT:

TABLE 3: SEX INCIDENCE

Sex	Frequency	Percentage
Male	31	51.7
Female	29	48.3
Total	60	100.0

GRAPH 3: SEX DISTRIBUTION OF PATIENTS

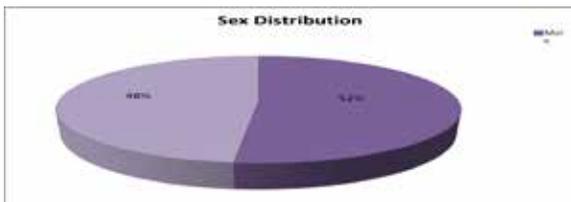
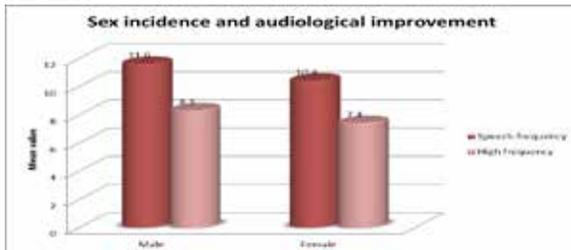


TABLE 4: SEX INCIDENCE AND AUDIOLOGICAL BENEFIT

Sex	Frequency	Audiological benefit	
		Speech frequency	High frequency
Male	31	11.6	8.3
Female	29	10.4	7.4
Total	60		
		p>0.05	p>0.05

GRAPH 4: SEX INCIDENCE AND AUDIOLOGICAL BENEFIT



DURATION OF EAR DISCHARGE AND AUDIOLOGICAL BENEFIT:

TABLE 5: DURATION OF EAR DISCHARGE AND AUDIOLOGICAL BENEFIT

Duration(years)	Frequency	Audiological benefit	
		Speech frequency	High frequency
< 10	35	10.3	6.8
11 – 20	13	11.5	8.9
> 20	2	5.5	11.5
Total	60		
		p>0.05	p>0.05

Mean (SD) duration 8.7 ± 5.6

GRAPH 5: DURATION OF EAR DISCHARGE AND AUDIOLOGICAL BENEFIT

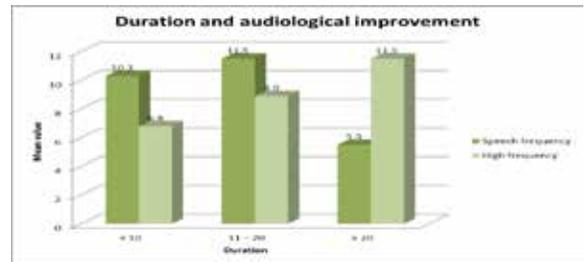


TABLE 6: SIZE OF PERFORATION AND AUDIOLOGICAL BENEFIT:

Size	Frequency	Audiological benefit	
		Speech frequency	High frequency
Small	10	4.1	-1
Medium	20	9.7	7.5
Large	30	14.2	11.03
Total	60		
		P<0.007	P<0.05

GRAPH 6: SIZE OF PERFORATION AND AUDIOLOGICAL BENEFIT

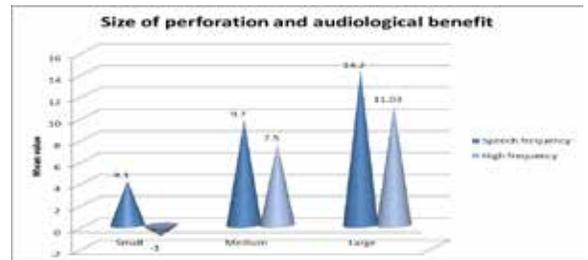


TABLE 7: AUDIOLOGICAL ASSESSMENT IN TYMPANOPLASTY

Hearing results	Audiological benefit	
	Speech frequency	High frequency
Improvement	56 (93.3%)	49 (81.6%)
No change	3 (5%)	6 (10%)
Worsened	1 (1.6%)	7 (11.6%)
Total cases	60	60

TABLE 8: EFFECT OF DIFFERENT GRAFTS ON AUDIOLOGICAL IMPROVEMENT:

Type of graft	Frequency	Audiological benefit	
		Speech frequency	High frequency

Composite cartilage	13	11.2	7.1
Temporal fascia	34	14.3	8.5
Tragal perichondrium	13	11.7	7.3
Total	60		
		P>0.05	p>0.05

GRAPH 7: TYPES OF GRAFT AND AUDIOLOGICAL BENEFIT

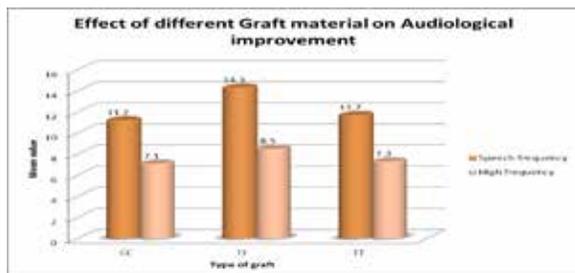


TABLE 9: LATERALITY AND AUDIOLOGICAL OUTCOME:

U/B	Frequency	Audiological benefit	
		Speech frequency	High frequency
U	41	11.2	7.7
B	19	10.6	8.3
Total	60		
		P>0.05	p>0.05

GRAPH 8: LATERALITY AND AUDIOLOGICAL BENEFIT

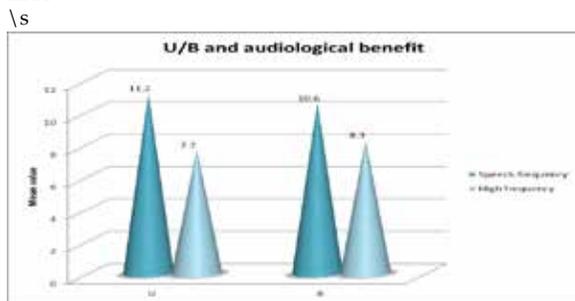
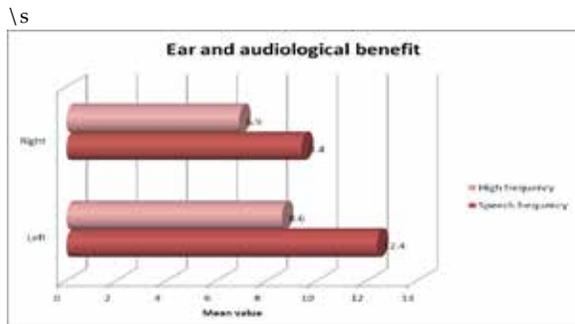


TABLE 10: SIDE INVOLVEMENT AND AUDIOLOGICAL OUTCOME

EAR	Frequency	Audiological benefit	
		Speech frequency	High frequency
L	33	12.4	8.6
R	27	9.4	6.9
Total	60	p>0.05	p>0.05

GRAPH 9: EAR AND AUDIOLOGICAL BENEFIT



DISCUSSION:

Myringoplasty is an operation in which the reconstruction procedure is limited to the repair of tympanic membrane perforation alone. Implicit in the definition is that the ossicular chain is intact and mobile, and that there is no middle ear disease such as infected mucosa or in growth of skin. The present study describes various parameters in assessing the hearing improvement after myringoplasty and the advantage of using different graft materials. Post-operative audiological evaluations were done after 3 months and 6 months following myringoplasty.

EFFECT OF DIFFERENT GRAFTS ON AUDIOLOGICAL IMPROVEMENT IN MYRINGOPLASTY

In our study, in thirty four patients temporalis fascia was used as the graft material, in thirteen patients tragal perichondrium was used as the graft material and in thirteen patients cartilage was used as the graft material. The audiological benefit seen with temporalis fascia was 14.3 dB for speech frequency and 8.5 dB for high frequency. The audiological benefit seen with tragal perichondrium was 11.7 dB for speech frequency and 7.3 dB for high frequency. The audiological benefit seen with cartilage graft was 11.2 dB for speech frequency and 7.1 dB for high frequency.

The audiological improvement in both speech and high frequency is more with temporalis fascia (14.3 and 8.5 dB respectively)..

In our study the maximum hearing improvement is seen in temporalis fascia graft group which is similar to results seen by various studies

LATERALITY AND AUDIOLOGICAL OUTCOME

In our study forty one patients had unilateral involvement and nineteen patients had bilateral involvement. In patients with unilateral disease the audiological benefit was 11.2 dB for speech frequency and 7.7 dB for high frequency. In patients with bilateral disease the audiological benefit was 10.6 dB for speech frequency and 8.3 dB for high frequency.

CONCLUSION

Tympanoplasty provides the patient with chronic suppurative otitis media of tubotympanic type with a dry ear as well as improvement in hearing. To achieve these dual purposes, a proper selection of cases is essential. The anticipated audiological benefit can be hampered by a number of factors, namely middle ear pathologies which can interfere with ossicular function and middle ear ventilation. However it is to be noted that careful evaluation of middle ear in all cases during surgery may give better hearing results ,because any ossicular pathology or fibrous adhesions or Tympanosclerotic patches can be corrected during surgery. In this series,we have achieved considerable improvement in hearing in majority of cases. The maximum improvement in hearing was seen in patients in whom temporalis fascia was used as graft material compared to tragal perichondrium and cartilage.

SUMMARY

This study was done to evaluate the audiological findings using various grafts materials. We studied a series of 60 patients of chronic suppurative otitis media tubotympanic disease over period of 2 years . Out of 60 patients there were 31 males and 29 females with a mean age of 27.4 years. In 34 patients temporalis fascia was used as the graft material, in 13 patients tragal perichondrium was used and in 13 patients composite cartilage was used as the graft material for myringoplasty. Audiological evaluation was done preoperatively and postoperatively after 3 months and 6

months of myringoplasty and various parameters analysed based on the observations of the second follow-up audiogram.

In our study older age group showed less audiological benefit in speech frequency as well as in high frequencies as compared to younger age group. We found that as the size of perforation increases the hearing gain was found to improve more, post operatively. In our study, of 93.3% cases showed audiological improvement in the speech frequency range postoperatively. There was no change in the hearing level in 5.1% of cases and worsening of hearing seen in 1.6% of cases in the speech frequencies.

Maximum improvement was seen in temporalis fascia graft compared to cartilage and tragal perichondrium and out of the three grafts least benefit was seen with cartilage graft. However these differences were not statistically significant.

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