

Original article:

Analysis of hearing improvement post operatively by using grafting materials

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Abstract:

INTRODUCTION: Hearing is a sense that enables man to establish contact with his fellows via speech to experience life more fully. Deafness in varying degrees of severity is a big impediment to the integration of a person into the social structure.

MATERIALS AND METHODS : This prospective study was carried out from July 2010 to September 2012 on the patients attending the ENT Outpatient Department of our institution.

All patients with the complaint of discharging ear and decreased hearing were screened. Those patients, in whom tubotympanic type of chronic suppurative Otitis Media was found, were taken for this prospective study with randomization.

RESULTS: Hearing at 6 months, 40 of 50 patients showed improvement in hearing (80%). Out of these patients, 20 out of 25 patients were operated using temporalis fascia showed improvement in hearing i.e. (80%) and 20 out of 25 patients were operated using tragal perichondrium showed improvement in hearing i.e. (80%).

There is no statistical significant difference in hearing improvement, using temporalis fascia or perichondrium for tympanoplasty.

CONCLUSIONS: Tympanoplasty is the most effective method for control of the disease and hearing improvement. Both temporalis fascia and tragal perichondrium are excellent graft materials for closure of perforation of tympanic membrane and hearing improvement. Graft uptake rate is good for both with slightly better take rates for temporalis fascia, than tragal perichondrium.

INTRODUCTION

Hearing is a sense that enables man to establish contact with his fellows via speech to experience life more fully. Deafness in varying degrees of severity is a big impediment to the integration of a person into the social structure. The otologist in the past had not much to offer to hearing handicapped people with chronic middle ear disease. With recent times the advent of the antibiotic era, the operating microscope and modern anesthetic techniques aimed at producing a dry, magnified operating field, have radically altered the outlook.

Permanent perforation of the tympanic membrane resulting as sequelae of chronic suppurative otitis media is a major cause of deafness. Stalwarts from past as far back as Hippocrates have asserted the same.

Controversies range about every step of the operation from the incision to the material used for packing.^{1,2}

A great deal of experimental work is being done often with contradictory results. We aimed **analysis of**

hearing improvement post operatively by using grafting materials

MATERIALS AND METHODS

This prospective study was carried out from July 2010 to September 2012 on the patients attending the ENT Outpatient Department of our institution.

All patients with the complaint of discharging ear and decreased hearing were screened. Those patients, in whom tubotympanic type of chronic suppurative Otitis Media was found, were taken for this prospective study with randomization.

This study comprises of patients who were subjected to tympanoplasty for the treatment of chronic suppurative otitis media. Each patient was subjected to a detail examination of nose, paranasal sinuses and throat to rule out any focus of infection, which could influence the result of tympanoplasty. Patients were subjected to tympanoplasty with temporalis fascia while the remaining underwent with tragal perichondrium.

CRITERIA FOR SELECTION

INCLUSION CRITERIA

Cases of safe type of chronic suppurative otitis media.

The ear should be dry minimum for 3 months with intact ossicular chain.

Patent Eustachian Tube.

EXCLUSION CRITERIA

Unsafe CSOM

Safe CSOM with sensorineural hearing loss.

Patient <15years >50years.

Wet ear.

METHOD OF COLLECTION OF DATA

Cases selected for the study were subjected a detailed history taking and clinical examination of ear, nose and throat and special reference to the ear.

The method of study was carried out under the following heading.

PERATIVE PROCEDURE

Patients will be randomized and subjected to myringoplasty by using tragal perichondrium or temporalis fascia

POSITIONING AND PERPERATION

Patient is put in reserved Trendelenberg position with a head ring. Antiseptic dressing was done with betadine and draping was done.

OBSERVATIONS AND RESULTS

TABLE-1: SEX DISTRIBUTION

Sex	No. of Patients	Percentage
Male	22	44%
Female	28	56%
Total	50	100%

The above table indicates that there were 22 (44%) males and 28 (56%) females. The male to female ratio is 1:1.27.

TABLE-2: AGE DISTRIBUTION

Age in years	No of Patients	Percentage
< 20	09	18%
21 - 30	17	34%
31- 40	16	32%
>40	08	16%
Total	50	100%

The above table indicates that maximum number of patients belonged between the age group of 21-40 years.

TABLE-3: PREOPERATIVE HEARING LEVELS.

Preoperative Air- Bone Gap	No. of Patients			Percentage
	Temporalis Fascia	Tragal Perichondrium	Total	
<20	10	13	23	46%
20-40	13	11	24	48%
> 40	2	1	3	06%

Majority of the patients shows mild to moderate hearing loss.

46% of them had air-bone gap up to 20 db.

48% of them had air-bone gap 20-40 db.

Only 6% of them had air-bone gap above 40 db.

TABLE-4: POSTOPERATIVE HEARING LEVELS.

Postoperative Air- Bone Gap	No. of Patients			Percentage
	Temporalis Fascia	Tragal Perichondrium	Total	
<20	21	23	44	88%
20-40	3	2	5	10%
>40	1	0	1	02%

In the postoperative hearing analysis,

88% of the patients showed air- bone gap upto 20db

10% of the patients showed air- bone gap in the range of 20-40db

84% of the patients operated with temporalis fascia showed air bone gap upto 20db.

92% of the patients operated with tragal perichondrium showed air-bone gap upto 20db.

TABLE-5: POSTOPERATIVE HEARING LEVELS WITH RESPECTIVE TO SEX.

Postoperative Air- Bone Gap	No. of Patients			Percentage
	Male	Female	Total	
<20	19	26	45	90%
20-40	2	2	4	08%
>40	1	0	1	02%

In the postoperative hearing analysis,

86.36% male patients showed air bone gap upto 20db

92.86% female patients showed air bone gap upto 20db

TABLE 6: POST OPERATIVE HEARING IMPROVEMENT LEVEL

Mean change in hearing levels in dB	No of patients			Percentage
	Temporalis fascia	Tragal perichondrium	Total	
No change or worsen	5	5	10	20%
1-15	10	10	20	40%
16-30	7	8	15	30%
>30	3	2	5	10%

Hearing at 6 months, 40 of 50 patients showed improvement in hearing (80%). Out of these patients, 20 out of 25 patients were operated using temporalis fascia showed improvement in hearing i.e. (80%) and 20 out of 25 patients were operated using tragal perichondrium showed improvement in hearing i.e. (80%). There is no statistical significant difference in hearing improvement, using temporalis fascia or perichondrium for tympanoplasty.

TABLE 7: MEAN HEARING LEVEL IN TYMPANOPLASTY USING FASCIA AND PERICHONDRIMUM

Type of graft	Mean levels of hearing		
	Preoperative hearing levels	Post operative hearing levels	Post operative change in hearing
Temporalis fascia	$641.25/25 = 25.65$	$275.45/25 = 11.02$	$365.8/25 = 14.63$
Tragal perichondrium	$578.8/25 = 23.15$	$216.25/25 = 8.65$	$362.55/25 = 14.5$
Total	$1220.05/50 = 24.4$	$491.7/50 = 9.83$	$728.35/50 = 14.57$

- Mean improvement in hearing temporalis fascia is 14.63 db.
- Mean improvement in hearing using tragal perichondrium is 14.5 db.
- On applying Student ‘t’ test, $t = 0.19$, $P > 0.05$, we found that there was no statistically difference in mean improvement in hearing using either temporalis fascia or tragal perichondrium.

DISCUSSION

This is the prospective study of 50 Tympanoplasties on patients between the age of 16 to 50 years, who were admitted in the Department Of E.N.T and Head and Neck Surgery at Dr D.Y Patil medical college, Pimpri, between July 2010 to September 2012. This entire study group of patient suffered from Chronic Suppurative Otis Media. Patients in this study were from all socioeconomic groups, including patients referred from other practitioners also.

Conservative measures were first tried in all cases, particularly for small to moderately sized perforations. These included systemic antibiotics, trichloro-acetic acid cauterly, repeated aural toilet in ears with active infections. Cases with bilateral ear diseases with suspected central septic focus were operated with tonsillectomy, adenoidectomy, septoplasty, etc. as needed. 25 patients were subjected to tympanoplasty with temporalis fascia remaining 25 with tragal perichondrium. Follow up of postoperative cases was for 6months.

The youngest patient in our study was 16 years old while the oldest patient was 50 years old. The mean age of the patients was 30.36 years. A study conducted by Jyoti Dhabolkar (2007)⁶⁵ corresponded with same age group.

Caye – Thomas et al (2007)in their study found male to female ratio 1:1.36.

John Mathai(1999)in his study of 200 cases male to female ratio was 1:1.85.^{3,4}

In our study we had 28 female and 22 male, who underwent tympanoplasty with male to female ratio 1:1.27, which is similar to existing literature.

Palva et al (1987) in their study of 165 cases of myringoplasties, which was carried out only when the ear was dry for atleast 3 months success rate was 96%.

Gibb AG, Chang SK (1982)³⁰ in their study of 206 cases of underlay myringoplasty found the uptake rate of 91.4% for dry ear and 80.9% for wet ear.

Gersdoff M et al. (1995) long term result of myringoplasty in adult and children and found the state of middle ear at the time of operation influences surgical outcome; wet ear have higher rate of perforation.^{5,6,7}

In our study of 50 cases of tympanoplasty all cases had dry ear preoperatively atleast for 3months hence overall graft uptake rate was 82%, which correlates well with the quoted literature.

Tympanoplasty is technically more difficult in patients having a narrow canal, undergoing revision surgery, by transcanal approach and in anterior perforations.

Post-auricular approach is commonly used in our institution; end-aural route was used in some of the cases with wide external auditory canals and tragal perichondrium cases.

It was technically easier in end aural cases to harvest the tragal perichondrium graft from same incision.

The contour of tragus was found to be satisfactory in postoperative period without any cosmetic deformity.

CONCLUSIONS

Tympanoplasty is the most effective method for control of the disease and hearing improvement. Both temporalis fascia and tragal perichondrium are excellent graft materials for closure of perforation of tympanic membrane and hearing improvement. Graft uptake rate is good for both with slightly better take rates for temporalis fascia, than tragal perichondrium.

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