

Hearing status after surgery in chronic middle ear infection cases

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Abstract

Background: Being ENT surgeon, one cannot avoid his/her responsibility to help the poor sufferer. Though, it is a global problem but more in the developing countries like our India. So, it is our duty to do the right things in right time so that we can arrest the disease process and restore functioning integrity of middle ear. **Methodology:** It was Comparative Interventional Study, Patients presenting to the ENT OPD at Patna Medical College, in Bihar. A total of 100 patients (50 patients with dry ear and 50 patients with wet ear) with mucosal type of CSOM, enrolled for this study, Patients aged between 15 to 60 years of both sexes. The study period was January 2019 to September 2019. **Results:** Pre-operative mean air conduction threshold measurements showed normal hearing (≤ 25 dB hearing loss) in 29 patients (16 with dry ear, 13 with wet ear), mild hearing loss (26–40 dB) in 49 patients (21 with dry ear, 28 with wet ear), moderate hearing loss (41–55 dB) in 20 patients (11 with dry ear, 9 with wet ear) and moderately severe hearing loss (56–70 dB) in only 2 patients (with dry ear). On calculating we found in all types of perforation the hearing improvement was better in dry ear group compared to wet ear group but the difference was statistically significant only in cases with small perforations. **Conclusion:** Tympanoplasty surgery results of both wet ear and dry ear groups were quite significant and satisfying in terms of both hearing improvement and graft incorporation.

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INTRODUCTION

In treating the “Chronic ear” modern otological surgery aims to produce a safe ear with improvement in hearing (Zaman *et al.* 1988). Various trials had been made to combat the disease process, to repair the drum perforation and to restore the hearing. Chronic suppurative otitis media (CSOM) or chronic otitis media is defined as the chronic infection of the middle ear cleft including the middle ear, mastoid air cell system and the Eustachian tube, in the presence of persistent tympanic membrane perforation.¹ Several techniques and different graft materials like split thickness skin graft, fascia lata, temporalis fascia, duramater, vein graft and tragal

perichondrium were used with varying success.² When surgically treating chronic ear disease (CSOM) eventually all surgical procedure for chronic ear disease are designed to attain some general goals like achieve a safe ear, eradicate disease, stabilize or improve hearing by reconstructing the tympanic membrane and ossicular chain, and to prevent further development of disease repairing the TM perforation by performing tympanoplasty provides considerable benefits to the patient including prevention of ear infection, improvement in hearing and elimination of need to take water precautions. Type 1 Tympanoplasty is one of the most common procedures among various surgeries for CSOM³.

MATERIALS AND METHODS

Study Design: Comparative Interventional Study

Duration of study: January 2019 to September 2019

Source of data: Patients presenting to the ENT OPD at Patna Medical College, Bihar

Place of study: Department of Otorhinolaryngology, Patna Medical College and Hospital, Bihar

Sample size: A total of 100 patients (50 patients with dry ear and 50 patients with wet ear) with mucosal type of CSOM

Collection of data: 100 patients (50 patients with dry ear and 50 patients with wet ear) with mucosal type of Chronic Otitis Media were enrolled for the study. These patients were chosen randomly. Patients aged between 15 to 60 years of both sexes. Patients having an infection background of COM with small, medium and subtotal central perforation mucosal CSOM.

Methodology: 100 patients (50 patients with dry ear and 50 patients with wet ear) with mucosal type of Chronic Otitis Media were enrolled for the study. These patients were chosen randomly. Dry ear group comprised of patients in which otoscopy showed a central perforation in pars tensa with healthy middle ear mucosa without any congestion or/and any discharge. Wet ear group comprised of patients in which otoscopy showed a central

perforation in pars tensa with congested middle ear mucosa which may be discharging. The selected patients were subjected to clinical, audiological and laboratory investigations. Examination of nose, throat, PNS for source of infection by nasal endoscopy and radiological investigations as per need was performed. Otological examination along with the examination of tympanic membrane and hearing evaluation by tuning fork and Pure Tone Audiometry was done. Complete laboratory investigation for surgery as per protocol was done e.g. CBC, Plasma Glucose, LFT, KFT, CT, BT, Chest X-ray and ECG of the patient. All the patients underwent Type 1 Tympanoplasty with or without cortical mastoidectomy with tympanic membrane grafting using temporalis fascia graft under general or local anaesthesia.

RESULTS

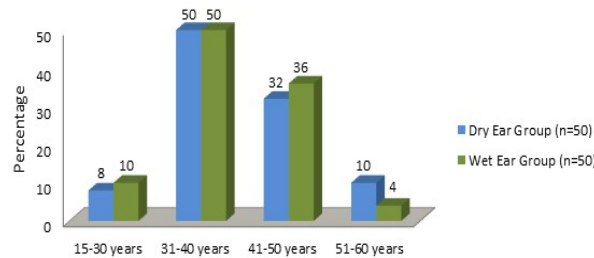


Figure 1: Age d=distribution

Patients between the age group of 15 years to 60 years were included in this study. Maximum numbers of patients were seen in the age group of 31-40 years of age group (50%). In both the groups 25 patients were between age group of 31-40 years. In dry group, 16 patients were between the age group of 41-50 years (32%), and in wet group 18 patients in 41-50 years (36%). Mean age in dry ears group was 40.8 years, whereas in wet ears group it was 39.62 years. Thus both groups were matched in age distribution (p value=0.485).

Table 1: Sex Distribution

Sex	Dry Ear Group (n=50)		Wet Ear Group (n=50)	
	Frequency	Percentage	Frequency	Percentage
Male	19	38.0	17	34.0
Female	31	62.0	33	66.0
Total	50	100.0	50	100.0
Male : Female Ratio	0.61:1		0.51:1	
Chi- Square and p value:	Chi- Square- 0.173 p Value- 0.676(NS)			

In our study, out of 100 patients, 36 were male and 64 were females. Dry group included 19 (38%) male and 31 (62%) female patients. In wet group, there were 17 (34%) males and 33 (66%) females. The sex distribution was statistically similar (p value =0.676).

Table 2: Socio-economic Status (MODIFIED KUPPUSWAMY SCALE)

Socio-economic Status	Dry Ear Group (n=50)		Wet Ear Group (n=50)	
	Frequency	Percentage	Frequency	Percentage
Upper class	08	16	06	12
Upper Middle	05	10	07	14
Lower Middle	07	14	08	08
Upper Lower	12	24	13	26
Lower	18	36	16	32
Total	50	100.0	50	100.0
Chi- Square and p value:	Chi- Square- 0.843 p Value- 0.932 (NS)			

It shows the incidence of chronic suppurative otitis media is more common in people from lower class compared to others. Above analysis we found both the groups were matched in terms of socio economic status (p value =0.932).

Table 3: Size of Perforation

Size of Perforation	Dry Ear Group (n=50)		Wet Ear Group (n=50)	
	Frequency	Percentage	Frequency	Percentage
Small	10	20.0	7	14.0
Medium	17	34.0	12	24.0
Large	16	32.0	15	30.0
Subtotal	7	14.0	16	32.0
Total	50	100.0	50	100.0
Chi- Square and p value:	Chi- Square- 4.945 p Value- 0.175(NS)			

Table 4: Bacteriology of discharge in wet ear (n=50)

Type of Discharge	Bacteria									
	Proteus		Staphylococcus		Escherichia coli		Mixed		No growth	
	No	%	No	%	No	%	No	%	No	%
Mucoid(n=39)	00	00	5	12.8	00	00	0	00	34	87.2
Mucopurulent(n=11)	4	36.4	3	27.3	01	9.0	3	27.3	0	00

Table 5: Histopathological Findings

Size of Perforation	Dry Ear Group (n=50)		Wet Ear Group (n=50)		p Value
	Mean	±SD	Mean	±SD	
Small	26.1	±4.39	21.72	±0.41	<0.001 (S)
Medium	25.17	±2.12	24.75	±1.35	0.240 (NS)
Large	23.94	±2.72	24.4	±0.95	0.261 (NS)
Subtotal	23.14	±0.66	23.19	±1.93	0.862 (NS)

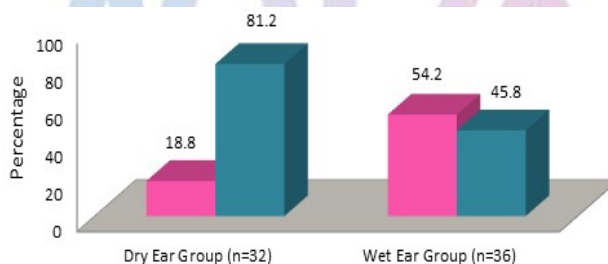


Figure 2: Histopathological Findings

Table shows the distribution according to the post-operative histopathological reports. There was a significant difference observed regarding histopathological findings between two groups (p value = 0.001).

Comparison of Hearing Improvement based on Air Bone Gap according to Perforation Size

On calculating we found in all types of perforation the hearing improvement was better in dry ear group compared to wet ear group but the difference was statistically significant only in cases with small perforations.

DISCUSSION

In our study, we have compared two groups of patients with dry and wet ear in terms of graft uptake,

histopathological changes and post operative hearing improvement in the Department of Otorhinolaryngology, Patna Medical College and Hospital. The present study included a total of 100 patients (50 patients with dry ear and 50 patients with wet ear) with an infection background of COM with small, moderate, subtotal central perforation and mucosal type of CSOM.

Mean age in dry ears group was 40.8 years, whereas in wet ears group it was 39.62 years. Thus both groups were matched in age distribution (p value=0.485). Maximum numbers of patients were seen in the age group of 31-40 years of age group (50%). In both the groups 25 patients were between age group of 31-40 years. In a study of 87 cases ortergren, maximum numbers of patients were in the age group of >40 years, also they divided the patients in to two groups based on their age^[4].

In our study, out of 100 patients, 36 were male and 64 were females. Dry group included 19 (38%) male and 31 (62%) female patients. In wet group, there were 17 (34%) males and 33 (66%) females. The sex distribution was statistically similar (p value =0.676). In our study slightly female predominance is observed in the ratio of 1.77:1. Although Booth reported higher failure rates in females compared to males⁵. Our study also showed similar results, out of 3 graft failure patients all 3 were females. It may be a coincidence as no particular reason for this detected. Vijendra and colleagues (2007)⁶ performed histopathological examinations on the remaining tympanic membranes of the patients. They observed that in completely dry and atrophic membranes blood vessels are quite marginalized, while the membranes were either absent or as small as possible. In contrast, there were lots of inflammatory cells and blood vessels in the remaining membranes of wet ears. Therefore, they concluded that these types of changes in blood vessels are the main causes of failure in completely dry and atrophic membranes with central perforations. Hence, they recommended taking the following steps while operating on these types of ears and membranes: resection of the margins of perforations and converting central perforations to subtotal; raising large tympanomeatal flaps; temporal fascia graft placement between the bony wall of the canal and the large bloody flap. They believe that these measurements increase the chance of a successful operation. In our study there was a significant difference observed regarding histopathological findings was observed between two groups (p value = 0.001). Similarly another study done by Shankar *et al.*⁷, showed that the success rate of tympanoplasty in dry ear was 88% and in wet ear was 80% with p value of 0.5 which showed no significant statistical difference in outcome of tympanoplasty in wet and dry ear. A meta-analysis done by Vrabcet *al.*⁸, considering the effect of otorrhea on closure rate, indicates that tympanoplasty on a discharging ear is as successful as in a dry ear. Onalet *al.*⁹ reported that tympanoplasty is more likely to be successful if the ear has been dry for at least 1 month. This study has also included all types of tympanoplasties

which explains the low graft up take rate of 71%. They have also considered other factors affecting outcome of tympanoplasty such as smoking, size and site of perforation, experience of surgeon, patient's socio-economic status etc. which have not been included in this study.

CONCLUSION

Tympanoplasty surgery results of both wet ear and dry ear groups were quite significant and satisfying in terms of both hearing improvement and graft incorporation. There was also no statistically significant difference between the two groups.

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