Original Research Article

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20195709

A clinical study of evaluation of tympanoplasty with mastoidectomy in mucosal chronic otitis media

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Received: 22 October 2019 Revised: 11 December 2019 Accepted: 18 December 2019

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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is one of the most common ear diseases in developing countries with a varying incidence of 3% to 57%. It the disease process is further divided into mucosal type and squamosal type depending on clinical presentation. The mainstay of therapy in CSOM remains surgery which aims at eradication of disease and restoring the hearing mechanism. The main objective of our study was to evaluate the changes and impact of tympanoplasty with mastoidectomy as a surgical treatment modality in mucosal type of CSOM.

Methods: A prospective study was conducted in Rajarajeshwari Medical College and Hospital between November 2015 and June 2017, involving 50 patients with mucosal type of chronic otitis media. These patients, after complete clinical examination and hearing analysis, underwent tympanoplasty with cortical mastoidectomy. Follow-up of the patients was done at one month and three months after the surgery where the parameters recorded preoperatively were assessed.

Results: The graft uptake three months after the surgery was 94%. Patients reported a subjective improvement in symptoms of ear discharge, decreased hearing, earache and tinnitus to 94%, 70%, 86% and 78% respectively. There was hearing improvement in ears that had discharge preoperatively and those ears that did not.

Conclusions: Chronic suppurative otitis media is a very common problem and it can lead to recurrent ear discharge and hearing problems. Timely intervention is necessary as early diagnosis results in good surgical outcomes and can make an impact on patient's quality of life.

Keywords: Ear discharge, CSOM, Tinnitus, Tympanoplasty

INTRODUCTION

Chronic otitis media (COM) is a long-standing inflammatory disease of the middle ear cleft that often results in partial or total loss of the tympanic membrane and ossicles, leading to conductive hearing loss. It is a common disease encountered in ENT clinics and forms an important public health problem with significant economic costs. In India, the incidence of COM is up to 30%, with a prevalence rate of 16/1000 population in urban and 46/1000 in rural areas. Mucosal COM

(previously referred to as tubotympanic type) is associated with a central perforation in the tympanic membrane without granulations or cholesteatoma.³ It is generally a self-limiting disease, with the incidence of serious complications decreasing with the advent of antimicrobial therapy. The mainstay of therapy in chronic otitis media remains surgery which aims at restoring the hearing mechanism, eradication of disease and prevention of recurrence. The main surgical treatment modality in mucosal COM remains tympanoplasty which aims at restoration of the sound-transformer mechanism. The

need for mastoidectomy along with tympanoplasty in mucosal chronic otitis media remains controversial. Mastoidectomy has evolved from a desperate procedure done to drain post-auricular abscesses to a well-defined method to gain entry into the middle ear cavity and address pathology. There had been a lot of the debates regarding the role of mastoid exploration in tubotympanic type of chronic otitis media, there have not been many studies regarding the evaluation of outcome of such procedures. Hence this study intends to evaluate the changes in symptoms and hearing following mastoidectomy along with tympanoplasty in mucosal chronic otitis media.

METHODS

The study was carried out on patients visiting the outpatient department of ENT-HNS in Rajarajeshwari Medical College, Mysore road, Bangalore from a period of November 2015 to June 2017. A total of 50 patients were included in the study who met the inclusion criteria.

Inclusion criteria

Patients who present to the OPD of ENT-HNS with mucosal type of COM i.e., history of discharge for more than 3 months with a central perforation in the tympanic membrane, and the patients in the age group 18-60 years.

Exclusion criteria

Patients with COM with evidence of sensorineural hearing loss, patients with complicated COM

Informed written consent was taken from the patient following which a detailed history and physical examination was done. Severity of symptoms was recorded with the help of a self-assessment scale. The patient's hearing was assessed with tuning fork tests and pure tone audiometry (PTA) and data was recorded. Routine pre-operative investigations were done and the general anaesthesia tympanoplasty mastoidectomy were carried out under strict aseptic precautions. Standard post-operative care including intravenous antibiotics and mastoid dressing were given. These patients were discharged on the 5th day with instructions on self-care and medications. Sutures and aural pack were removed on the 10th day. They were followed up at 1 month and 3 months after surgery where the above mentioned parameters were assessed and recorded. Descriptive and inferential statistical analysis has been carried out in the present study and microsoft word and excel have been used to generate graphs and tables.

RESULTS

Age and gender distribution

Out of the 50 patients in this study, maximum patients were in the age group of 20 to 30 years (30%). After that,

the most frequently populated group was 31 to 40 years (26%). Mean age was 31.92 years. In the study population, 27 (54%) were females while the remaining 23 patients were males (46%).

Clinical examination

On examination of the affected ear, 24 patients (48%) had perforation involving the anterior quadrants. 17 patients (34%) had posterior quadrant perforations while 9 patients (18%) had perforations involving both quadrants. In this study, 23 study subjects (40%) had oedematous middle ear mucosa. 27 patients (54%) had normal middle ear mucosa on examination. In this study, 35 patients (70%) had a 'dry' ear at the time of clinical examination preoperatively. 15 patients (30%) had active COM. In the present study, 26 patients (52%) had apparently normal contralateral tympanic membrane. Whereas 24 patients had evidence of middle ear pathology in the past or present in the opposite ear. 13 patients had healed perforations and 11 had perforations.

Evaluation of symptoms in preoperative, at 1 month and at 3 months phases

Ear discharge and earache

In this study, ear discharge was the most common symptom reported pre-operatively with 98% patients complaining of it. After surgery, there was a subjective improvement with 86% patients having no complaints of ear discharge at 1 month. This increased to 94% three months after surgery. Out of 50 patients, 30 (60%) complained of earache preoperatively. There was a decrease in patients having earache in the post-operative period, 48% at one month and 14% at the end of three months.

Tinnitus and hearing evaluation

Tinnitus was reported in a total of 21 patients (42%) preoperatively. There was a subjective improvement after surgery, decreasing to 17 (34%) at the end of one month. At the end of three months, 11 patients (22%) had tinnitus. Decreased hearing was as frequent a complaint as ear discharge in this study with 49 patients (98%) reporting it. This number decreased post-operatively, with only 15 patients (30%) reporting of decreased hearing at the end of three months.

On analysing the X-rays of both ears in the study population, it was found that sclerotic mastoids were more common (70% in right ear and 76% in left ear) than pneumatised mastoids. 54% of the study population were operated on their right ear and the remaining 46% were operated on the left side.

Post-operative clinical assessment

At the end of 1 month after surgery, clinical examination revealed signs of graft uptake in 48 patients (96%). One

of these patients showed a residual perforation on examining at 3 months, bringing the percentage of residual perforations to 6% (3 patients). In our study, the air-bone gap (ABG) was assessed pre-operatively, at the end of 1 month and 3 months after surgery. ABG closure of <20 dB was taken as significant following surgery. On the right side, the ABG was found to decrease in both groups (those without discharge and with discharge respectively) in the postoperative period. improvement was strongly significant (p value ≤0.01) in the group with non-discharging ears. In the group with discharging ears, the improvement in ABG was found to be moderately significant (p value ≤ 0.05) at the end of one month. At the end of three months, the ABG closure was found to be strongly significant. On the left side, the ABG was also found to decrease in both groups in the postoperative period. The improvement was strongly significant (p value ≤0.01) in the group with nondischarging ears. In the group with discharging ears, the improvement in ABG was found to be moderately significant (p value ≤ 0.05) at the end of one month. At the end of three months, the ABG closure was found to be strongly significant in discharging ears.

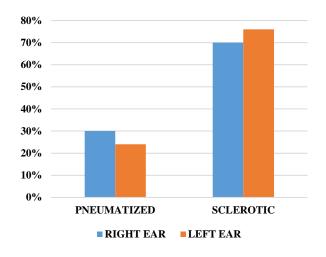


Figure 1: Radiological assessment of mastoid.

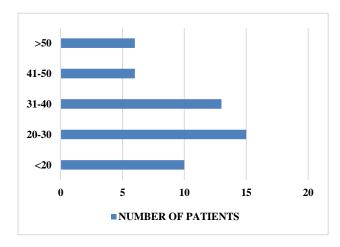


Figure 2: Age distribution of patients.

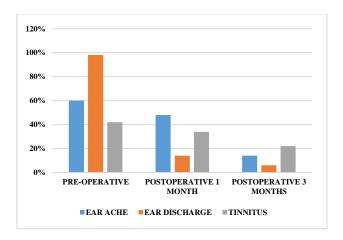


Figure 3: Evaluation of ear ache, ear discharge and tinnitus.

DISCUSSION

Demographic profile

In our study involving 50 patients, the most frequently populated age group was 20 to 30 years (30%) and mean age was 31.92 years. 27 patients (54%) were females while the remaining 23 patients were males (46%). In a prospective study by Browning et al, they came to the conclusion that there was no gender preponderance in COM. Individuals in 41-80 year-old age group were twice as likely to have COM as those in the 18-40 year age group. In our study, younger individuals were more commonly affected. This is similar to a study by Nahata et al, where it was found that COM was more commonly seen in younger individuals (15-24 years). Age and gender are factors that do not affect the success of middle ear surgeries.

Clinical presentation

The most common symptoms reported by patients in this study were ear discharge and decreased hearing (98%). 60% of patients reported of earache and 42% complained of tinnitus. Vertigo was not reported by any patient in this study. These correlated well with other studies, for example, the study by Kumar et al showed otorrhoea was the most common complaint (81.25%) with which patients came to the department, followed by hearing impairment (62.50%) and tinnitus (18.75%).

Preoperative assessment

In our study, assessment of each patient included otoscopic examination, hearing assessment and radiological evaluation. On otoscopy, 48% of perforations were seen in the anterior quadrant, the middle ear mucosa appeared normal in a majority (54%) and oedematous in 40% of patients. 70% of patients had no discharge in the affected ear, contralateral ear was normal in a majority of patients (52%). On PTA, 48% patients had mild conductive hearing loss, 32% had

moderate and 20% had moderately severe conductive hearing loss. Sclerosed mastoids were noted in a majority of patients (70% and 76% on right and left sides respectively) irrespective of the affected side. In a study by Pinar et al, they concluded that a healthy contralateral ear, smaller perforations and ears that were dry for more than 3 months were found to be significant independent prognostic factors.8 In a study done by Pignataro et al to determine the factors influencing post myringoplasty results in children, surgical outcome was not affected by the site and size of the perforation, previous adenoidectomy or the status of the contralateral ear. In a study by Jurado et al, they found that contralateral ear pathology and the perforation size was associated with poor prognosis after myringoplasty. 10 In our study the right ear was operated upon in 54% and the left ear was operated upon in 46% of the patients. It should be emphasised that in one patient with dry central perforation, cholesteatoma sac was noted (which was later confirmed by histopathological examination). Hence, tympanoplasty with modified radical mastoidectomy had to be done. In a study by Rout et al, 3.4% of patients having COM with central perforation were found to have cholesteatoma, which was confirmed by biopsy. 11 Thakur et al found 5.23% patients having COM with central perforations had cholesteatoma which was confirmed by histopathological study.¹²

Post-operative assessment

At one month after surgery, the same parameters were assessed in patients. 14% patients reported of otorrhoea, 62% had decreased hearing, 48% had earache and 34%

had tinnitus. Signs of graft uptake were present in 96% patients at one month. 2 patients (4%) had residual perforation. Analysis of the air-bone gap (ABG) in nondischarging ears showed an improvement with 18.71 dB and 14.29 dB, on the right and left sides respectively. On follow-up three months after surgery, there was a marked subjective improvement in symptoms reported with only 4% patients reporting of otorrhoea. 14% patients had earache, 30% had decreased hearing. 22% patients reported tinnitus. One patient presented with a residual perforation, increasing the failure rate to 6%. AB gap in non-discharging ears was 16.14 dB and 14.57 dB, on the right and left sides respectively. In the group with discharging ears, the AB gap also showed closure, with 19.67 dB and 19 dB, in the right and left ears respectively. Yurtass et al evaluated various factors that could affect graft uptake in patients who underwent tympanoplasty with mastoidectomy. The presence of preoperative otorrhoea and granulation tissue in the middle ear mucosa, presence of preoperative myringosclerosis and lack of epitympanic patency were significantly associated with graft failure after tympanoplasty with mastoidectomy. 13 Conventionally, closure of ABG or improvement in air conduction threshold are the criteria used to say there is improvement in hearing.14 In our study, closure of ABG was taken as the criterion and the result was considered successful if the postoperative ABG was within 20 dB. 15 The results show a statistically significant closure of ABG in both groups of operated. Studies by Pignataro et al and Onal et al have found a statistically significant association between presence of a preoperative dry ear and good surgical results.9,16

Table 1: Postoperative otoscopic findings.

Status of graft	N (%)	
At 1 month		
Taken up (healed)	48 (96)	
Perforated	2 (4)	
At 3 months		
Taken up	47 (94)	
Perforated	3 (6)	

Table 2: Analysis of ABG in right and left ear.

ABG right ear	Presence of discharge in pre-operative phase		ABG left ear	Presence of discharge in pre-operative phase	
	Negative	Positive		Negative	Positive
Pre-op	25.71±15.30	27.67±15.45	Pre-op	20.29±14.14	29.33±15.22
1 month	18.71±10.31	21.67±10.80	1 month	14.29±8.41	23.33±11.90
3 months	16.14±9.24	19.67±8.55	3 months	14.57±9.02	19.00±9.67
Difference (from p	ore-op)		Difference (from pre-op)		
1 month	7.0	6	1 month	6.0	6.0
3 months	9.57	8	3 months	5.71	10.33

Our study shows the group with discharging ears to have comparable hearing improvement in the early follow-up period to the group with non-discharging ears which was statistically significant. This can be explained by the choice of surgical technique of tympanoplasty with a cortical mastoidectomy. However, after having

understood the role of the mastoid air cell system as a physiological buffer, certain studies offered an explanation as to why mastoidectomy may be beneficial in cases of non-cholesteatomatous chronic otitis media. McGrew et al concluded that the addition of a mastoidectomy, even in the absence of evidence of active infection, had an impact on the clinical course as it reduced disease progression and the possibility of revision surgery.¹⁷ Another study by Jackler et al where underwent myringoplasty with patients mastoidectomy when there was a chance of increased risk of failure with myringoplasty alone (chronic discharge, sclerotic mastoid, previous failed myringoplasty). Graft uptake rate was 86.6% and the air-bone gap was closed to within 20 dB in 85%. Hence, they concluded that simple mastoidectomy is a safe and useful adjunct to myringoplasty in selected cases of COM.¹⁸ In a study by Garg et al, patients with mucosal COM underwent cortical mastoidectomy with tympanoplasty and were followed up for graft acceptance and hearing impairment for 5 years to see the long-term results. In dry ears, graft uptake rate was 89% and in ears with mucoid discharge it was 92%. After 5 years, 83.5% patients had >10 dB improvement in hearing. They recommended mastoid exploration in mucosal chronic otitis media.¹⁹

CONCLUSION

COM is a very common entity in our country and most of the patients at some stage require surgery to eradicate the disease process, the choice of surgery however depends on various factors. The review of literature and the findings of our study helps us to conclude that tympanoplasty with mastoidectomy is a procedure if choice for COM.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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Cite this article as: Mahajan R, Abraham N, Nagaraj TM. A clinical study of evaluation of tympanoplasty with mastoidectomy in mucosal chronic otitis media. Int J Otorhinolaryngol Head Neck Surg 2020;6:163-8.