Comparative Evaluation of Tympanoplasty with or Without Mastoidectomy in Treatment of Chronic Suppurative Otitis Media Tubotympanic Type

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Abstract To study the role of tympanoplasty alone and tympanoplasty done along with cortical mastoidectomy in CSOM in term of graft uptake, improvement of hearing and removal of disease. This is retrospective study of patient at tertiary referral centre, conducted in between October 2015 and October 2016, study was done on 40 patients of either sex in the age group 20–50 years. Tympanoplasty alone was done in 20 cases and tympanoplasty along with cortical mastoidectomy was done in rest 20 cases. Patient were reviewed post operatively on 2, 4, 8 and 16 weeks to inspect post operative graft uptake and PTA was done at fourth month to evaluate hearing improvement. Hearing improvement was compared in both the groups in tympanoplasty group was 9.41 and in tympanoplasty combined with cortical mastoidectomy was 12.05. Graft uptake was 80% in tympanoplasty group and 95% in tympanoplasty combined with cortical mastoidectomy. Recurrence of discharge was seen in 4 cases of tympanoplasty. Though tympanoplasty combined with cortical mastoidectomy is better in hearing improvement, graft uptake and clinical improvement but the difference in 2 groups is statistically insignificant. Results of tympanoplasty alone and tympanoplasty along with cortical mastoidectomy in terms of hearing gain and graft uptake were statistically insignificant.

Keywords CSOM · Tympanoplasty · Cortical mastoidectomy · Pure tone audiometry

Introduction

CSOM is a long standing infection of middle ear cleft, characterized by ear discharge and permanent perforation of tympanic membrane. Incidence of CSOM is higher in poor socioeconomic group, poor nutrition and lack of health education in rural population.

Mastoidectomy was first described by Louis Petit in the 1700s, although the concept did not gain wider acceptance until 1958, the cortical mastoidectomy was popularized by William House [1].

On the other hand Holmquist and Bergstrom [2] first suggested that mastoidectomy improves the chance of successful tympanoplasty for patients with noncholesteatomatous chronic otitis media. They maintained that creation of an aerated mastoid enhances success in patients with poor tubal function or a small mastoid air cell system. Jackler et al. [3] in their study found that after myringoplasty alone any inflammatory disease within mastoids becomes trapped behind the tympanic membrane repair. While the disease may resolve spontaneously after closure of the middle ear, recurrent suppuration with graft loss occurred in some cases, again implying the beneficial effect from mastoidectomy in compromised mastoid. Nayak et al. [4] in his study done on 40 patients had success rate of 100% in cases for which tympanoplasty was done along with cortical mastoidectomy and 60% success rate in patients in which alone tympanoplasty was done, revealing mastoidectomy is required in all cases.

Toros et al. [5] and Mishiro et al. [6] in their study found similar results as that of Balyan et al. [7], Jackson et al. [8], Krishnan et al. [9] and Kaur et al. [10], i.e. the difference between the two groups for hearing gain and graft uptake was not statistically significant.

Surgical treatment of CSOM is still controversial. It is well accepted that the main purpose of operation is to

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obtain a permanent dry ear and close the perforation. Tympanoplasty is an established procedure for tympanic membrane perforation repair [11]. But now the quest is on to improve the result further by studying the different influencing factors. Recently many studies have been undertaken to evaluate the role of cortical mastoidectomy to improve the results of tympanoplasty [12, 13].

Mastoid plays an important role in middle ear aeration and pressure regulation. There has been a clinical impression that lack of aeration of mastoid at the time of initial tympanoplasty may be a significant source of failure in patients with chronic noncholesteatoma otitis media so cortical mastoidectomy along with tympanoplasty has for long been considered the surgical procedure of choice [14].

Materials and Methods

This retrospective study was conducted in Department of Otorhinolaryngology of RD Gardi Medical College Ujjain from October 2015 to October 2016. Total number of 40 patients were taken in study.

Inclusion Criteria

All patients having—central perforation with sclerotic bone.
Dry perforation for at least 1 month.
Mild to moderate conductive hearing loss.
Normal cochlear function.
Good ET tube function.
No evidence of infection in nose, PNS, nasopharynx, throat.

Exclusion Criteria

Wet ear.
Attic and marginal perforation.
Patient aged below 20 years.
Moderate to severe hearing loss.
Previous mastoid operation.
The patient were randomized into 2 groups and each group comprised of 20 patients.
The group A underwent tympanoplasty alone.
Group B underwent cortical mastoidectomy with tympanoplasty.
Detailed history, clinical examination including tuning fork test, PTA was done to assess the quality and quantity of hearing loss.
EUM was done to see the margin of perforation, granulation tissue, polyp and status of ossicular chain.
Routine laboratory and radiology investigations including X-ray mastoid shuller's view, X-ray PNS, X-ray nasopharynx.

Any infection of sinuses, tonsils or adenoids was treated. All cases were subjected to routine preanesthetic checkup.

All patients were operated under LA with Sedation. Tympanoplasty and mastoidectomy was done In all patients via postaural approach.

Result

All patients were of age 20–50 years. There are 26 females and 14 males.

Age distribution of patients

	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
20–30 years	9	10
30–40 years	8	6
40–50 years	3	4

Most common age group in our study was between 20 and 30 years of age in both the groups.

Duration of ear discharge (in years)

Duration of ear discharge (years)	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
5–6	12	11
7–10	6	7
>10	2	2

Chi square (X^2) = 0.1204, P = 0.941

Duration of dryness of ear which is to be operated (in months)

Duration of ear dry... (months)	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
1–3	13	14
4–6	5	3
>6	2	3

Chi square (X^2) = 0.737, P = 0.691

Degree of hearing loss

	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
Mild	18	15
Moderate	2	5

Chi square (X^2) = 1.558, P = 0.211

Size of perforation

	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
Medium	7	5
Large	10	11
Subtotal	3	4

Chi square (X^2) = 0.5278, P = 0.769

Graft taken up status after 3 months

	Tympanoplasty	Tympanoplasty with cortical mastoidectomy
Graft taken up	16	19
Not taken	4	1

Chi square (X^2) = 2.05, P = 0.151 (statistically insignificant)

Graft uptake was 80% in tympanoplasty group and 95% in tympanoplasty combined with cortical mastoidectomy.

Audiological assessment	Group-A		Group-B		P value
	Mean	SD	Mean	SD	
Before	38.155	4.62	38.445	5.13	0.852
After	28.745	4.82	26.395	3.539	0.087
Benefit	9.41	5.73	12.05	4.983	0.087

Hearing improvement was compared in both the groups in tympanoplasty group was 9.41 and in tympanoplasty combined with cortical mastoidectomy was 12.05.

Discussion

Chronic suppurative otitis media represents the most common disease of the middle ear cleft. Tympanoplasty with or without mastoidectomy is performed to eradicate middle ear disease and reconstruct the conductive hearing mechanism.

Mastoid factors include the extent of mastoid pneumatization and the presence of inflammatory disease in the mastoid [12]. But there are differing opinions regarding doing mastoidectomy with tympanoplasty in these patients.

In the present study, the cases selected were between 20 and 50 years. Patients aged between 20 and 30 were more in the study group i.e. 19 patients, 12 patients were found in the age group of 30–40 years, 7 in 40–50 age group. In a study conducted by Lasisi and Afolabi [15] the majority of patients were aged 21–34 years which was in concurrence with present study.

In a study done by Biswas et al. medium sized perforation was commonest one, while in our study we found large central perforation to be the commonest.

In a study by Varshney et al. [16], duration of discharge varied from 6 months to 50 years with 26 patients having duration of discharge ranging from 1 to 5 years which was comparable with the present study.

In our study, Period of dryness is 1–3 months in 27 patients, 4–6 months in 8 patients and more than 6 months in 5 patients. As per study done by Armstrong and Charlotte [17] dry ear is must in children before doing tympanoplasty.

In our study, graft uptake rate was 80% in group I and 95% in group II. Though the graft uptake was more in group II but the difference in both the groups was

statistically insignificant. In our study, ear discharge occurred only in 4 cases in group I while in group II, only 1 case on follow up was reported to have ear discharge. But as P value was less than 0.05, so difference was statistically insignificant. In our study, in group I, benefit in dB in pure tone threshold pre-operatively and 4 months after surgery was 9.41 and in group II it was 12.05. Though it was slightly more in latter but difference was statistically insignificant.

In study by Krishnan et al. (2002) post-operative hearing gain was 75% in both groups. Similarly, Balyan et al. (1997) in a study conducted on 48 patients with CSOM, treated by means of tympanoplasty with and without mastoidectomy found no significant difference in graft failure rates or hearing results. They also concurred that the addition of mastoidectomy had increased effort and risk to the surgery. Grew et al. [18] found similar success rate for both the groups.

In a study done by Toros et al. (2010) tympanic membrane perforation closure was successful in 76.1% of the 46 patients undergoing Myringoplasty and in 78.3% ($n = 36$) of the 46 patients undergoing Myringoplasty with mastoidectomy. The difference was not statistically significant ($P > 0.05$). The difference between the two groups for hearing gain was also not statistically significant ($P > 0.05$).

Conclusion

As P value is insignificant in our study, we concluded that Mastoidectomy gives no statistically significant benefit over tympanoplasty in tubotympanic type of CSOM as regards to graft success rate and hearing gain. If middle ear mucosa is not healthy then mastoidectomy can be considered as a good practice, to open the mastoid antrum and air cells and if middle ear mucosa is healthy tympanoplasty alone is sufficient.

Compliance with Ethical Standard

Conflicts of interest None.

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