International Journal of Otorhinolaryngology and Head and Neck Surgery
Sisodia SS et al. Int J Otorhinolaryngol Head Neck Surg. 2020 Jan;6(1):56-59
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: http://dx.doi.org/10.18203/issn.2454-5929.ijohns20195608

Original Research Article

Impact of cortical mastoidectomy on tympanoplasty for recurrent suppurative otitis media: a prospective study

Shalini Singh Sisodia, Vinnakota Sriprakash*

Department of ENT, Mallareddy Medical College for Women, Suraram, Hyderabad, Telangana, India

Received: 16 November 2019
Accepted: 03 December 2019

***Correspondence:**
Dr. Vinnakota Sriprakash,
E-mail: drsriprakash@gmail.com

ABSTRACT

Background: Chronic suppurative otitis media condition is characterized by an ear discharge and a perforation in the tympanic membrane. Tympanoplasty and tympanoplasty with mastoidectomy are the two common surgeries performed to manage this condition.
Methods: 50 patients were divided into two groups of 25 each. On Group I, tympanoplasty alone was done and on Group II tympanoplasty along with mastoidectomy was performed and outcome was noted.
Results: The most common age group to be affected was 21-30 years. Discharge of 1-3 years was observed in 32% in Group I and 36% in Group II. 84% in Group I and 72% in Group II had mild hearing loss, and in both the groups, moderate perforations were more common. 84% of the patients in Group I and 88% in group II showed acceptance to the surgeries and the hearing gain in both the groups was around 10.
Conclusions: This study shows that tympanoplasty with mastoidectomy has no added advantage over tympanoplasty alone in the patients with chronic suppurative otitis media.

Keywords: Tympanoplasty, Cortical mastoidectomy, Chronic suppurative otitis media

INTRODUCTION

One of the most common diseases all over the world is chronic suppurative otitis media.[1] It is a chronic infection of the middle ear cleft. This condition is characterized by an ear discharge and a perforation in the tympanic membrane. It has been seen more often among the patients from the lower economic background and poor nutrition especially in the rural areas where there is a lack of health education.[2]

Chronic suppurative otitis media (CSOM) includes granulomatous otitis media and cholesteatomatous chronic otitis media. Granulomatous consists of purulent discharge along with the presence of granulomatous tissue in the middle ear. The exact cause is still unknown though it is estimated to be influenced by the obstruction like protympanum, isthmus tympani anticus, mesotympanum or anatomical variants.[3,4] This condition is quite common throughout the world. In India, especially in rural India, the prevalence is 2-15%.[5]

Different surgeries are usually performed to manage this condition. One of the most common types and preferred surgeries is the tympanoplasty. This is done in order to eradicate the disease from the middle ear cleft itself and to close the perforations. It can also involve the reconstruction of the mechanism of hearing either with or without grafting of the tympanic membrane.[6] This method is sometimes combined with cortical mastoidectomy. This may be based on factors such as the extent of the infection, dysfunction as well as the variations in the operative techniques. Mastoidectomies are generally done in very severe cases especially with very severe infections, extensive inflammation, or in patients with sclerotic mastoid or middle ear.[7]

Mastoidectomy was for the very first time, described by Louis Petit way back in the 1700s itself, but it gained its acceptance in the year 1958, when William House popularized it.[8] The fact that it may help in the improvement of tympanoplasty in patients with noncholesteatomatous CSOM was suggested by Holmquist and Bergstrom.[9] They reported that this was due to the aeratedmastoid which is created with the mastoidectomy, increases the success in cases of low tubal function or in the cases of small air cell system.[10]

This present study was conducted to assess the impact of corticomastoidectomy on tympanoplasty in cases of recurrent otitis media.

METHODS

This prospective study was done by the Department of Ear Nose and Throat Mallareddy Medical College for Women between July 2018 to September 2019 over a period of 15 months. 50 patients with recurrent suppurative otitis media, which came to our department, were included into the study. These patients presented with symptoms of CSOM such as whistling during sneezing and blowing of the nose, reduced hearing, infection during cold and when water enters the ear canal. Patients with discharge through the ear, prior tympanoplasty, with no active infection were also included in the study. Patients with primary perforations were excluded from the study.

This study was cleared by the institutional ethical committee. The procedure was explained in detail to the patients and the relatives and informed consent was taken from all of them. Prior to the surgeries, detailed demographic data was collected from all the patients. Blood was sent for routine biochemical, hematological and viral marker testing. The patients were randomly divided into 2 groups. Group I consisted of the patients who underwent tympanoplasty and Group II consisted of those who underwent tympanoplasty with cortical mastoidectomy.

The surgeries performed under these patients were under general anaesthesia. For the tympanoplasty surgery, underlay technique was done with the post aural incision. Ear canal was opened at the 3, 6 and 12 o'clock position by subperiosteal injection. With a no 10 scalpel, the intercartillaginous incision was done to the bony external ear canal. This incision was extended upto the anterior portion of helix. Another medial circumferential incision was done in a lateral position to the tympanic annulus. The tympanomeatal flap is elevated with a Plester's knife till it can be seen both posteriorly and circumferentially. The membrane is cut to allow the bleeding for the improvement of the graft attachment. The perforation is thus closed in the underlay method and covered with a gauze soaked in the antibiotic.

Corticomastoidectomey along with tympanoplasty was done for the other group of patients. This was done form the external auditory meatus (EAM) posterior end, to the superior end of EAM and the temporal line to the posterosuperior margin of the EAM.

The statistical analysis was done on Microsoft excel using charts and tables. Chi square tests were done for comparison and the significant difference was attained of the two groups.

RESULTS

Most of the patients in Group I in this study belonged to the 21-30 years age group (44%), followed by 6 patients (24%) in the 41-50 years age group. 4 (16%) belonged to the 31-40 year group and 3 (12%) to the 11-20 years age group. In Group II, the most common age group was 21-30 years with 9 patients (36%), followed by 41-50 years with 5 (20%) patients (Table 1).

Table 1: Age wise distribution (n=100).

Age group (years)	Group I	Group II
	N (%)	N (%)
≤10	0 (0)	1 (4)
11-20	3 (12)	2 (8)
21-30	11(44)	9 (36)
31-40	4 (16)	4 (16)
41-50	6 (24)	5 (20)
51-60	1 (4)	3 (12)
>60	0 (0)	1 (4)

Table 2: Ear morbidities.

Morbidity	Group I	Group II
	N (%)	N (%)
Duration of discharge (years)		
<1	3 (12)	4 (16)
1-3	8 (32)	9 (36)
4-6	6 (24)	7 (28)
7-9	5 (20)	3 (12)
>10	3 (12)	2 (8)
Hearing loss		
Mild	21 (84)	18 (72)
Moderate	4 (16)	7 (28)
Ear perforation size		
Small	9 (36)	11 (44)
Medium	9 (36)	11 (44)
Large	4 (16)	3 (12)

In Group I, the duration of discharge seen for 1-3 years duration among the 8 (32%) of the patients and 6 (24%) of the patients had discharge for 4-6 years. In Group II, 9 patients (36%) had a discharge for 1-3 years and 7 (28%) patients had for 4-6 years. 21 of the 25 patients (84%) had mild hearing loss and 4 (16%) had moderate hearing

loss in Group I. In Group II, 18 (72%) of the patients had mild hearing loss and 7 (28%) had moderate hearing loss. 12 (48%) in Group I had medium perforations, 9 (36%) had small perforations and 4 (16%) had large ear perforations. In Group II, 11 patients had small perforations, 11 (44%) had medium perforations and 3 (12%) had large perforations (Table 2).

21 (84%) patients were able to successfully accept the graft while 4 (16%) rejected in group I, while in Group II, 22 (88%) patients had accepted the graft successfully, while 3 (12%) of them rejected the graft (Table 3).

Table 3: Graft take up after surgery.

Take up	Group I	Group II
	N (%)	N (%)
Accepted	21 (84)	22 (88)
Not accepted	4 (16)	3 (12)

The mean hearing tone of the patients in Group I preoperatively was 44.06±7.93, while post operatively it was 33.54±4.64, with a hearing gain of 10.72±3.88. In Group II, the mean preoperative hearing tone was 4.17±6.48, post operatively it was 32.39±5.13, with an improvement of 10.37±2.95. In both the cases, the difference between the pre and postoperative hearing tone was significant (Table 4).

Table 4: Pure tone audiology.

Pure tone status	Group I	Group II
Pre-operative	44.06±7.93	44.17±6.48
Post-operative	33.54±4.64	32.39±5.13
Hearing gain	10.72±3.88	10.37±2.95
P value	<0.001	<0.001

DISCUSSION

According to the literature, the mastoid pneumatic system is basically a buffer to relieve the pressure changes which occur in the middle ear.[9,11] Removal of the mastoid can help in surgical debridement of tissues thus to relieve the middle ear diseases. There are studies which oppose this theory and consider this mastoidectomy to be unnecessary as it does not improve the outcome in comparison to tympanoplasty.[12]

In the present study, the more number of patients were between 21-30 years of age groups in both Group I and Group II. This was followed by patients in the 41-50 years age group. This was corroborated in a similar study by Agarwal et al, where more number of patients were between 20–30 years. This was followed by 30-40 years and 40-50 years.[2] Another study by Lasisi et al also reported a majority of the patients being between 20-34 years.[13] Methwani et al also found the third decade to be the predominant age group to be affected.[14]

More number of patients in our study has an ear discharge for more than 1 year to 3 years followed by discharge for 4-6 years. The hearing loss in most of the patients was mild and the number of perforation was moderate in the present study. In a study by Biswas et al also, the medium sized perforation were more common than the other types.[15] However, in a study by Agarwal et al, large central perforation was the most common type[2]. A study by Varshney et al reported the presence of discharge for 1-5 years to be the most common, though the range was from 6 months to 50 years.[16] In another study by Methwani et al, more number of patients had discharge for 1-5 years.[14]

84% of the surgeries in group I, i.e., patients who underwent only tympanoplasty, was successful while 88% of the patients in Group II, i.e., tympanoplasty with cortical mastoidectomy, the surgery was successful with the graft being completely accepted. However, there was no significant difference of the rate of acceptance between the two groups. This was corroborated by a study by Agarwal et al, where there was a positive uptake of the surgery in 80% of the cases undergoing tympanoplasty and 95% successful results with mastoidectomy. However, in this study too, the difference was insignificant.[2] This insignificant difference was also reported by Eliades et al in their study.[17] In another study by Mishiro et al, the success rates of tympanoplasty alone was 93.3% and with mastoidectomy, it was 90.5%.[7]

The mean hearing tone of the patients in Group I preoperatively was 44.06±7.93, while post operatively it was 33.54±4.64, with a hearing gain of 10.72±3.88. In Group II, the mean preoperative hearing tone was 4.17±6.48, post operatively it was 32.39±5.13, with an improvement of 10.37±2.95. In both the cases, the difference between the pre and postoperative hearing tone was significant. A study by Krishnan et al reported a hearing gain of 75% after the tympanoplasty and in patients with mastoidectomy also.[18] Another study by McGrew et al reported no significant difference in the hearing tone levels between the two groups.[19]

CONCLUSION

This study shows that tympanoplasty with mastoidectomy has no added advantage over tympanoplasty alone in the patients with chronic suppurative otitis media. Moreover, the added mastoidectomy would only increase the number of hospital days thereby increasing the cost of treatment, along with a further chance of complications.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kadah SS, Mokhemar SM, Ibrahim HA, Ibrahim HE. Impact of mastoidectomy on tympanoplasty for

recurrent suppurative otitis media. Egypt J Otolaryngol. 2019;35:168-72.
2. Agrawal A, Bhargava P. Comparative Evaluation of Tympanoplasty with or Without Mastoidectomy in Treatment of Chronic Suppurative Otitis Media Tubotympanic Type. Indian J Otolaryngol Head Neck Surg. 2017;69(2):172–5.
3. Alleva M, Paparella MM, Morris MS, da Costa SS. The flexible / intact bridge tympanomastoidectomy technique. Otolaryngol Clin North Am. 1989:22;41-9.
4. Paperella MM, Schachern PA, Yoon TH. Otopathologic correlates of the continuum of otitis media. Ann Otol Rhinol Laryngol. 1990:99;17-22.
5. World Health Organization. Child and Adolescent Health and Development. Prevention of Blindness and Deafness [Press Release]. Geneva, Switzerland: World Health Organization; 2004.
6. Athanasiadis-Sismanis A. Tympanoplasty: Tympanic Membrane Repair. Glasscock Shambaugh Surgery of the Ear. 6th edition. China: PMPH-USA; 2010: 465-85.
7. Mishiro Y, Sakagami M, Takahashi Y, Kitahara T, Kajikawa H, Kubo T. Tympanoplasty with and without mastoidectomy for non-cholesteatomatous chronic otitis media. Eur Arch Otorhinolaryngol. 2001;258:13–5.
8. Martin MS, Raz Y. Mastoid surgery. In: Myers EN (ed). Operative otolaryngology head and neck surgery, Chapter 115, 2nd edition. Elsevier: Amsterdam; 2008: 1163–1177.
9. Holmquist J, Bergström B. The mastoid air cell system in ear surgery. Arch Otolaryngol. 1978;104(3):127-9.
10. Jackler RK, Schindler RA. Role of the mastoid in tympanic membrane reconstruction. Laryngoscope. 1984;94(4):495-500.
11. Flisberg K, Ingelstedt S, Ortegren U. The relationship of middle ear disease to mastoid hypocellularity. A working hypothesis. Acta Otolaryngol Suppl. 1963;182:69-72.
12. Balyan FR, Celikkanat S, Aslan A, Taibah A, Russo A, Sanna M. Mastoidectomyin non cholesteatomatous chronic suppurative otitis media: is it necessary? Otolaryngol Head Neck Surg. 1997;117:592–5.
13. Lasisi AO, Afolabi OA. Mastoid surgery for chronic ear: a ten year review. Internet J Head Neck Surg. 2008;2(2):13.
14. Methwani DA, Deshmukh PT. Comparative study of type I tympanoplasty with or without mastoidectomy in tubotympanic type of chronic suppurative otitis media patients. J Datta Meghe Inst Med Sci Univ. 2017;12:85-8.
15. Biswas SS, Al-Amin Z. Hearing evaluation after myringoplasty. Bangladesh J Otorhinolaryngology. 2010;16(1):23-8.
16. Varshney S, Nangia A, Bist SS, Singh RK, Gupta N, Bhagat S. Ossicular chain status in chronic suppurative otitis media in adults. Indian J Otolaryngol Head Neck Surg. 2010;62(4):421-6.
17. Eliades SJ, Limb CJ. The role of mastoidectomy in outcomes following tympanic membrane repair: a review. Laryngoscope. 2013;123:1787–802.
18. Krishnan A, Reddy EK, Nalinesha KM, Jagannath PM. Tympanoplasty with or without cortical mastoidectomy-a comparative study. Indian J Otolaryngol Head Neck Surg. 2002;54(3):195–8.
19. McGrew BM, Jackson CG, Glasscock ME. Impact of mastoidectomy on simple tympanic membrane perforation. Laryngoscope. 2004;114(3):506–11.

Cite this article as: Sisodia SS, Sriprakash V. Impact of cortical mastoidectomy on tympanoplasty for recurrent suppurative otitis media: a prospective study. Int J Otorhinolaryngol Head Neck Surg 2020;6:56-9.