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ORIGINAL ARTICLE

COMPARATIVE EVALUATION OF OUTCOME OF TYPE I TYMPANOPLASTY WITH AND WITHOUT CORTICAL MASTOIDECTOMY IN TREATMENT OF INACTIVE MUCOSAL TYPE OF CHRONIC OTITIS MEDIA

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ABSTRACT: OBJECTIVE: To evaluate the result of tympanoplasty type I in inactive mucosal type of chronic suppurative otitis media with and without cortical mastoidectomy. **METHODS:** This prospective study was carried out in the department of ENT & HNS in a tertiary care hospital of western U.P, where 80 patients with inactive mucosal type of chronic suppurative otitis media (CSOM) were included. The period of study was from Aug. 2013 to July 2014. The age and sex matched patients were divided into two groups of 40 each. Half of the patients underwent tympanoplasty type I and rest tympanoplasty type I with cortical mastoidectomy. All the patients underwent underlay technique tympanoplasty with temporalis fascia graft. Patients were Followed-up after six weeks, six months and one year. **RESULTS:** Hearing improvement was comparable in both groups. There was no significant difference in graft uptake between group I and group II cases. **CONCLUSION:** Cortical Mastoidectomy performed in inactive mucosal type of CSOM shows no statistically significant difference over tympanoplasty type I done without mastoidectomy.
KEYWORDS: Inactive mucosal type of CSOM, tympanoplasty type I, cortical mastoidectomy.

INTRODUCTION: Chronic suppurative otitis media (CSOM) is an inflammatory process of the mucoperiosteal lining of the middle ear cleft and this problem has been encountered in the human race, and is as old as humanity itself.

The surgical treatment of CSOM has undergone vast changes from gouge and hammer to electric burrs and microscope and endoscopes. It is well accepted that the main purpose of surgery is to obtain a dry ear with good hearing. Tympano-mastoidectomy has been found to be an effective method of treatment of chronic ear infection, but the effect of mastoidectomy on patients without evidence of active infectious disease in mastoid remains highly debated and unproven.[1]

Apart from mastoid factors there are different factors which have bearing on outcomes of the surgery. Mastoid factors include the extent of mastoid pneumatization and the presence of inflammatory disease in the mastoid. Diamont, Flisberg and Zigmont documented in their studies that clinical ear disease is associated with small air cell systems.[2] It is possible that mastoid pneumatization might play a role in middle ear infections and aeration.

This study was undertaken with a view to evaluate the results of type I tympanoplasty with and without cortical mastoidectomy in terms of closure of air–bone gap and graft uptake in cases of inactive mucosal type of CSOM.

MATERIAL & METHODS: The study was conducted in the department of ENT & HNS in a tertiary care hospital of western U. P.

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In this study, 80 patients of inactive mucosal type of CSOM were included and randomly divided into two equal age and sex matched groups. The age of the patients ranged between 20 to 50 years. All the patients had a moderate size of central perforation with healthy middle ear mucosa, normal Eustachian tube functions and dry ear for over 2 months. Group I included 40 patients who underwent type I tympanoplasty and Group II included 40 patients who underwent type I tympanoplasty with cortical mastoidectomy.

Inclusion and Exclusion Criteria: Patients aged more than 20 years with inactive mucosal disease and conductive deafness were included in the study. Patients with attico-antral disease, revision surgery, discharging ear, sensorineural hearing loss and systemic diseases like diabetes mellitus were excluded from this study.

A thorough general, physical and ENT examination was done and all findings were recorded. Informed consent was taken and the patients were given pre-operative antibiotics, oral decongestants and nasal drops which were continued one week post operatively also.

All the patients were operated under local anesthesia via postauricular approach. Temporalis fascia graft was used by underlay technique. Patients were operated upon by the same surgeon.

After removal of the dressing, the patients were instructed to keep the ear dry. Soframycin was applied by the patients to the post-auricular incision twice a day for 1 week post operatively.

Assessment of graft uptake and dryness was assessed using the microscope and suction if required for cleaning. Surgery was considered successful if there was graft uptake with no residual perforation at the end of one year.

RESULTS: The patients were followed up at 6 weeks, 6 months and at 1 year post operatively. A successful graft uptake was defined as the closure of the tympanic membrane perforation either fully or partially (Including cases with small residual perforations). The status of the tympanic membrane at the end of one year was taken as the final outcome of the surgery.

In Group A, of the 40 cases, the grafts was successfully taken up in 36 cases (90.3%) of which 1 case had a small residual perforation, which healed subsequently and the graft failed to take up in 4 cases (9.7%).

In Group B, the graft was successfully taken up in 37 cases (92%) of the total 40 patients and failed in 3 cases (8%). One patient in Group A and two patients in Group B, in whom the graft had failed, had postoperative infection in the middle ear. A Fisher's exact test was employed to analyze the result for statistical significance. The p value obtained was 1, which showed that the differences in the results were not statistically significant. Alternatively, a chi-square test also showed the results to be insignificant ($p=0.82$) with the p value being >0.05.

The hearing improvement after the surgery was assessed in terms of closure of the air bone gap based on the pure tone audiometry done at 6 months and 1 year. The hearing improvement was considered successful if the air bone gap closure was better than or equal to 10dB. In Group A, an air bone gap closure >10dB was noted in 31 cases (77%) with the average air-bone gap closure being 15.1dB. In Group B, a successful hearing improvement was noted in 32 (81%) out of 40 cases with an average air-bone gap closure of 15.3dB. The graft had not taken up in the 8 cases (19%) that did not show any hearing improvement after tympanoplasty with cortical mastoidectomy. A statistical analysis of the results using the Fisher's exact test and a Chi-square test ($p=0.79$) showed the

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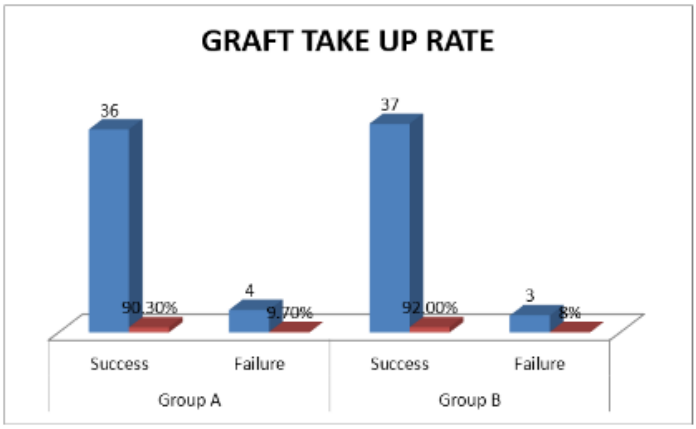
difference to be insignificant. Regarding the symptoms relief, all the patients in whom the graft had taken up, had a subjective symptoms relief both in terms of cessation of ear discharge and hearing improvement.

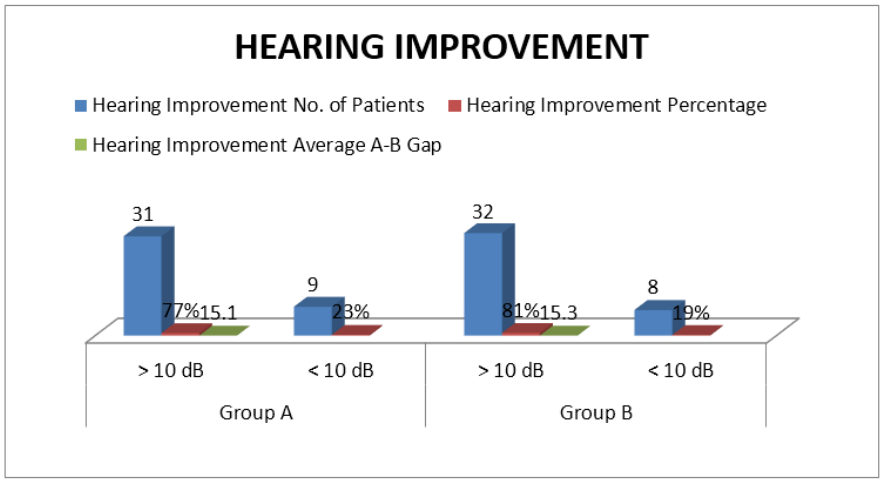
	Graft Take up	No. of Patients	Percentage
Group A	Success	36	90.30%
	Failure	4	9.70%
Group B	Success	37	92.00%
	Failure	3	8%

Table 1: Graft Take up Rate



GROUPS	A-B Gap	No. of Patients	Percentage	Average A-B Gap
Group A	> 10 dB	31	77%	15.1 dB
	< 10 dB	9	23%	
Group B	> 10 dB	32	81%	15.3 dB
	< 10 dB	8	19%	

Table 2: Hearing Improvement



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The improvement in hearing and graft take up is almost identical in both the groups. There is no statistical difference. It is evident that doing cortical mastoidectomy in cases of dry central perforations with healthy middle ear mucosa and good Eustachian tube function does not offer any additional benefit over tympanoplasty type I alone.

DISCUSSION: Tympano-Mastoidectomy is one of the most common otological operations performed which may be used as an approach for various neurotological procedures. 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. This procedure attempted to avoid the common problems with radical mastoidectomy.[3]

In Tympanoplasty type I, the reconstructive procedure is limited to repair of tympanic membrane perforation in patient with intact and mobile ossicular chain with disease free middle ear. There are a number of studies in the literature highlighting the advantages and disadvantages of performing mastoidectomy in the surgical treatment of inactive mucosal type of chronic otitis media.

In this study we observed that air–bone gap closure in decibel in Group A was 15.1dB, while it was 15.3dB in Group B. This closure of A-B gap has no relation with mastoidectomy, nor it is statistically significant.

Mishiro et al (2001) reviewed 251 cases of non-cholesteatomatous chronic otitis media, in which 147 patients were treated by tympanoplasty with mastoidectomy and 104 were operated on without mastoidectomy. There was no statistically significant difference between the two groups.[4]

Bhat et al in 2008 concluded that Mastoidotympanoplasty was not found to be superior to tympanoplasty alone over a short-term follow-up period at 3 and 6 months postoperatively.[5]

Albu et al (2012) presented a paper of 320 consecutive adult patients treated by either tympanoplasty with cortical mastoidectomy or tympanoplasty only. They found that three factors were significant in predicting success rate, that is, healthy opposite ear, a long dry period preceding the operation, and non-smoker status. The only factor attaining significance in the multivariate analysis was a dry period longer than 3 months. They concluded that cortical mastoidectomy offers no additional benefit in tympanoplasty performed on patients with persistent or intermittent discharging CSOM and no evidence of cholesteatoma or mucosal blockage within the antrum.[6]

Role of mastoidectomy in the repair of tympanic membrane perforation has long been debated. Mastoidectomy was regarded as a means of surgically creating an air reservoir and eradicating sequestered mastoid disease.

Holmquist and Bergstrom were the first to suggest that mastoidectomy improves the chances of successful tympanoplasty for patients with non-cholesteatomatous CSOM. They maintained that creation of an aerated mastoid increases success in patients with poor tubal function and small mastoid air cell system.[7] Several authors supported the theory but none prove it. Many suggested that tympanoplasty alone is equally beneficial.[8-9]

Our study revealed that graft success rates were comparable in both the groups. There was no statistically significant difference between the two groups. In terms of air-bone gap closure also, there was no significant difference between the two groups.

CONCLUSION: Mastoidectomy gives no significant benefit over tympanoplasty type I in the treatment of CSOM as regards graft success rate and hearing improvement and the healing is similar in both the groups.

Our study suggests that satisfactory graft take up & hearing outcome with adequate air–bone closure can be achieved in inactive mucosal CSOM even without mastoidectomy.

It appears that cortical mastoidectomy should only be attempted in cases of tympanoplasty if there is any evidence of mastoid disease. If a dry ear can be achieved in inactive mucosal disease, it may be evidence enough to suggest that mastoid is disease free. Radiological investigations may also give a clue about the status of mastoid. However, it is suggested that type I tympanoplasty without mastoidectomy should be carried out in all central perforation with dry ear, healthy middle ear mucosa and good Eustachian tube function.

REFERENCES:

1. Kamath MP, Suja S, Raghavendra R, Vinay R, Krishnam R. Success of tympanoplasty: Our experience. Indian J Otolaryngol Head Neck Surg. 2013; 65(4): 358–362.
2. Vikas Kakkar, Chandni Sharma, Sunil Garg, S. Bishnoi, A. Gulati, P. Malik. Role of cortical mastoidectomy on the results of tympanoplasty in tubotympanic type of chronic suppurative otitis media. National Journal of Otorhinolaryngology and Head & Neck Surgery. 2014; Vol.2 (11) No. 3.
3. Martin MS. Mastoid Surgery, in Myers Otolaryngology Head and Neck Surgery, Ch 115. 2nd ed. Elsevier, ISPN-13: 9781416024453. 2008: 7–30.
4. Mishiro Y, Sakagami M, Takahashi Y. Tympanoplasty with and without mastoidectomy for non-cholesteatomatous chronic otitis media. Eur Arch Otorhinolaryngol. 2001; 258: 13–15.
5. Bhat KV, Naseeruddin K, Nagalotimath US, Kumar PR, Hegde JS. Cortical mastoidectomy in quiescent, tubotympanic, chronic otitis media: is it routinely necessary? J Laryngol Otol. 2008; 10: 1–8.
6. Albu S, Trabalzini F, Amadori M. Usefulness of cortical mastoidectomy in tympanoplasty. Otol Neurotol. 2012; 33(4): 604–609.
7. Holmquist J, Bergstrom B. The mastoid air cell system in ear surgery. Arch Otolaryngol 1978; 104: 127-9.
8. Balyan FR, Cellikanat S, Aslan T, Taibah A, Russo A, Sanna M. Mastoidecomy in non-cholesteatomatous chronic suppurative otitis media: is it necessary? Otolaryngol Head Neck Surg 1997; 117: 592-5.
9. Jackson CG, Glasscock ME, Nissen AJ, Schwaber MK, Borjab DI. Open mastoid procedures: contemporary indications and surgical technique. Laryngoscope 1985; 95: 1037-43.

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