ORIGINAL RESEARCH PAPER
Volume-6 | Issue-12 | December-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 93.98
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

# CORTICAL MASTOIDECTOMY IN NON-CHOLESTEATOMATOUS CSOM: NEED TO REDEFINE INDICATIONS

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## ABSTRACT

**Background:** Tympanoplasty is a surgical technique for the reconstruction of the middle ear hearing mechanism but lack of an aerating mastoid may be a significant source of failure.

**Aim:** To determine the success rate of healing a tympanic membrane perforation after tympanoplasty alone or with cortical mastoidectomy

**Materials and methods:**This prospective study was conducted in the department of otorhinolaryngology SKIMS medical college and hospital. Adults Patients > 20 years of age were included.Total no. of 90 patients were taken in the study. The patients were divided into 3 groups (30 patients in each). Group A <2 episodes of discharge/year over a period of 3 years , Group B 2-4 episodes of discharge/ year over a period of 3 years. Group C > 5 episodes of discharge/ year over a period of 3 years. In all 3 groups patients were divided randomly in two subgroups of 15 each,15 underwent tympanoplasty alone and 15 underwent tympanoplasty with cortical mastoidectomy. Temporalis fascia graft was used for repair of tympanic membrane perforation and all patients were followed up at regular interval. Data obtained was analysed according to Chi square test and paired t-test.

**Results:** Of the 90 cases from all the 3Groups, 45 underwent Tympanoplasty alone and 45 underwent tympanoplasty with cortical mastoidectomy. In Group A and Group B the results did not show any statistical significance, however in Group C patients resuls were statistically better when cortical mastoidectomy was done in combination with tympanoplasty.

**Conclusion:** The Cortical mastoidectomy with tympanoplasty gives statistically no significant benefit over tympanoplasty alone in majority of patients. However it should be seriously considered in the patients who have a history of repeated episodes of active disease prior to surgery

## KEYWORDS

CSOM, Tympanoplasty, Cortical Mastoidectomy

## INTRODUCTION

CSOM is characterised is the chronic inflammation of middle ear cleft which is composed of Eustachian tube, hypotympanum, mesotympanum, epitympanum, aditus and mastoid air cells which presents with recurrent ear discharge through tympanic membrane perforation (1,2). CSOM is the most common cause of hearing loss in the developing world.Standard treatment of CSOM is conservative management with aural toilet, topical antibiotics, systemic antibiotics and dry ear precautions.Patients classically present with mild to moderate conductive hearing loss with or without ear discharge. In those who do not resolve with conservative measures. surgical intervention is done(3). Tympanoplasty is a surgical technique for the reconstruction of the middle ear hearing mechanism.

The two opposing demands of tympanoplasty namely to eradicate the disease at the same time trying to maintain as much normal tissue as possible to facilitate reconstruction of hearing mechanism(4). The result of tympanoplasty depends on the pathology of the ear, the technique followed, the material used for reconstruction etc.(4)

Mastoid plays an important role in middle ear aeration and pressure regulation. As long as there is infection present in and around the middle ear cleft and antrum, any attempt at reconstruction may seem useless. There has been a clinical impression that lack of an aerating mastoid at the time of initial tympanoplasty may be a significant source of failure in patients with Chronic non cholsteatomatous otitis media. In this context cortical mastoidectomy seems to be an integral part of every tympanoplasty.(1,2)

This challenging multifaceted aspect of the procedure led us to analyze the role of cortical mastoidectomy in the surgical outcome of tympanoplasty.

## AIM AND OBJECTIVE:

To determine the success rate of healing a tympanic membrane perforation after tympanoplasty alone or with cortical mastoidectomy and achieving a dry ear with good function in the patients of chronic non cholesteatomatous otitis media.

## MATERIALS AND METHODS:

This prospective study was conducted in the department of otorhinolaryngology and head and neck surgery SKIMS medical college and hospital Srinagar J&K. The cases of Non cholestetoma CSOM attending the ENT OPD were selected for the study.All the patients who underwent surgery were explained about the details of the study and they agreed to take part in the present study.The study comprised of 90 patients of either sex ,age between 21-56 years .

The cases were proportionally divided in groups in terms of duration & frequency of discharge, size of perforation and Air –bone gap.

**Inclusion criteria:**

- Safe type of CSOM with Central perforation with radiological evidence of sclerotic mastoid
- Dry ear for one month before surgery
- Mild to moderate conductive hearing loss
- Normal cochlear & Eustachian tube function
- No evidence infection in Nose, PNS, Nasopharynx and Throat
- Without Sensorineural hearing loss

**Exclusion criteria:**

- Presence of Cholesteatoma or polyp in the ear
- Previous mastoidectomy
- Adhesive otitis media
- Multiple tympanic membrane perforations
- CSOM with intracranial and intratemporal complications
- Patients with safe CSOM with radiological evidence of pneumatised mastoid
- Total or Marginal perforation
- Patients < 20 years of age
- Mixed hearing loss

The patients were divided into 3 groups and each group comprised of 30 patients. The grouping of patients was done according to episodes of discharge per year, In Group A patients with <2 episodes of discharge/year over a period of 3 years were included, In Group B patients with 2-4 episodes of discharge/ year over a period of 3 years were included.In Group C patients with > 5 episodes of discharge/ year over a period of 3 years were included.(Table 1) The ear discharge was mucopurulent and before taking up patients for surgery discharge was treated with broad spectrum antibiotics,topical antibiotics +/_ steroids.

Detailed history, clinical examination including otoscopic examinat ion, tuning fork test, Pure tone audiometry was done. Routine and radiological investigations including X ray both mastoids and PNS (water's view), HRCT temporal bone(in selected cases) were done. In all 3 groups patients were divided randomly in two sub - groups of 15 each,15 cases from each group underwent tympanoplasty alone and 15 underwent tympanoplasty with cortical mastoidectomy.All the patients taken up for surgery were ensured to be dry for atleast 4 weeks prior to surgery.

Temporalis fascia graft was used for repair of tympanic membrane perforation and all patients were followed up at regular interval.At follow up the parameters studied were the intactness and mobility of graft, the dryness of the ear,and improvement in hearing in terms of postoperative PTA and air bone gap closure.

Data obtained was analysed according to Chi square test and paired t-test.

**TABLE1: EPISODES OF EAR DISCHARGE**

| Group A | Group B | Group C |
|---|---|---|
| <2 episodes of discharge/yr in 3years | 2-4 episodes of discharge/yr in 3 years | >5 episodes of discharge/yr in 3 years |

**RESULTS:**

90 patients including 48 females and 42 males were selected for the study with age range between 20-59 years .Maximum patients were in the range of 30-39 years. Most of the patients ( 68.9%) had central perforation. (Table 2-5)

**TABLE 2: AGE-WISE DISTRIBUTION OF THE PATIENTS**

| AGE IN YEARS | NO. OF TOTALPATIENTS | PERCENTAGE(%) |
|---|---|---|
| 20-29 | 20 | 22.2% |
| 30-39 | 39 | 43.4% |
| 40-49 | 27 | 30% |
| 50-59 | 04 | 4.4% |

**TABLE 3 :SEX-WISE DISTRIBUTION OF PATIENTS**

| SEX | TOTAL NO. OF PATIENTS | PERCENTAGE(%) |
|---|---|---|
| Male | 42 | 46.7% |
| Female | 48 | 53.3% |

**TABLE 4 :PRESENTING SYMPTOMS OF THE PATIENTS**

| PRESENTING SYMPTOM | TOTAL NO. OF PATIENTS | PERCENTAGE(%) |
|---|---|---|
| Ear discharge | 90 | 100% |
| Hard of hearing | 75 | 83.3% |
| Earache | 26 | 28.9% |

**TABLE 5 : TYPE OF PERFORATION**

| PERFORATION | TOTAL NO. OF PATIENTS | PERCENTAGE(%) |
|---|---|---|
| Central | 62 | 68.9% |
| Subtotal | 28 | 31.1% |

Of the 90 cases from all the 3Groups, 45 (15 from each group) underwent Tympanoplasty alone and 45 (15 from each group) underwent tympanoplasty with cortical mastoidectomy. All cases in Group A showed graft uptake (which means same result in tympanoplasty only and tympanoplasty with cortical mastoidectmy cases), while in Group B, 1 case had residual perforation among tympanoplasty only cases and from Group C, 4 cases had recurrent discharge resulting in reperforation among tympanoplasty only cases. The closure of Air Bone gap was almost same (with 10db) in cases where graft uptake was successful, in all the three groups.

Analyzing the results of patients in Group A in which 15 patients underwent Tympanoplasty only and 15 underwent Tympanoplasty with cortical mastoidectomy, the graft uptake was successful in all patients (100%). Since P value is not stastically significant so, there is no significant statistical difference between two procedures (Table 6)

**TABLE 6: PERCENTAGE OF PERFORATION CLOSURE OR GRAFT SUCCESS RATE IN GROUPA**

| No. of patients | Operation | Graft Success | percentage | Z value | P value |
|---|---|---|---|---|---|
| 15 | Tympanoplasty only | 15 | 100% | _ | 0 |
| 15 | Tympanoplasty with cortical Mastoidectomy | 15 | 100% | | |

In Group B the 15 patients underwent tympanoplasy only and 15 underwent tympanoplasty with mastoidectomy.Graft uptake was 100 % in tympanoplasty with cortical mastoidectomy cases and in case of Tymapanoplasty alone cases only 1 case had residual perforation. Since P value is not stastically significant,so there is no significant statistical difference between the results of the two procedures (Table 7)

**TABLE 7: PERCENTAGE OF PERFORATION CLOSURE OR GRAFT SUCCESS RATE IN GROUP B**

| No. of patients | Operation | Graft Success | Percentage | Z value | P value |
|---|---|---|---|---|---|
| 15 | Tympanoplasty only | 14 | 93.33% | 1.017 | 0.307 |
| 15 | Tympanoplasty with cortical Mastoidectmy | 15 | 100% | | |

In Group C the 15 patients underwent tympanoplasy only and 15 underwent tympanoplasty with cortical mastoidectomy.Graft uptake was 100 % in tympanoplasty with cortical mastoidectomy cases and in case of Tymapanoplasty alone cases 4 patients had residual perforation with recurrent discharge. Since P value is stastically significant so,there is significant statistical difference between the results of the two procedures (Table 8)

**TABLE 8: PERCENTAGE OF PERFORATION CLOSURE OR GRAFT SUCCESS RATE IN GROUP C**

| No. of paients | Operation | Graft Success | Percentage | Z value | P value |
|---|---|---|---|---|---|
| 15 | Tympanoplast y only | 11 | 73.33% | 2.148 | 0.031 |
| 15 | Tympanoplast y with cortical Mastoidectmy | 15 | 100% | | |

**DISCUSSSION:**

Chronic suppurative otitis media is a common otological disease in the country.Whether Cortical mastoidectomy is a useful procedure in combination with tympanoplasty remains controversial.

The controversies surround three issues in the surgical management of such patients. Firstly whether mastoidectomy as an adjunctive procedure s useful in both infected and dry ears, secondly whether mastoidectomy is useful in infected ears only and thirdly whether mastoidectomy is useful in none of the two catogeries.(5)

The primary argument in favour of mastoidectomy has been an improvement in middle ear and mastoid environment through clearance of diseased mucosa and through the ventilatory mechanism of an open mastoid system(6). Opponents of mastoidectomy argue that mastoid air cell system is thought to function atleast in part as a buffer to change in the pressure within the middle ear. The functional advantage of a large aerated mastoid was first suggested by Holmuquist and Bergstrom (7)and later was substantiated by Sade et al.(8,9)

In the recent literature most of the studies (5,6,7,8,9)refute the claim that the mastoidectomy improves the otological outcome following perforation repair. However close observation of these studies clearly shows that frequency of acute attacks was not given desired attention.

In the present study this short come of other studies was given prime importance and the patients were grouped as per the number of acute attacks of discharge per year over the past 3 years.

The result of surgery in terms of dry ear,graft uptake, and closure of AB gap in our two groups ( Group A & Group B) are in accordance with the various studies in the literature(5,6,7,8,9)

However results in our Group C vary not only with the Group A & Group B of our study but most of the studies in the literature.The success rate in terms of both graft uptake and closure of AB gap are statistically significantly better in the group where cortical mastoidectomy was done.The results of Group C in our study are similar to the studies of Holmquist and Bergstorm(7) who suggested that mastoidectomy improves the chances of successful tympanoplasty for patients with non- cholesteatomatous COM and Nayak et al(10) who achieved a success rate of 100% in patients of Mastoidectomy with tympanoplasty and 60% in tympanoplasty alone revealing that mastoidectomy is required in all cases.

Our study emphasizes the fact that overall satisfactory hearing outcome with adequate air bone closure can be achieved irrespective of cortical mastoidectomy in majority of patients and mastoidectomy helps in patients who have frequent attacks of active disease.Similar to our results in Group A & Group B, Balyan et al in 1997 did a retrospective study of 323 patients to evaluate the role of mastoidectomy in non cholesteatomatous CSOM.They observed statistically insignificant difference in hearing outcome when mastoidectomy was done.(11)

Going in accordance with our results in Group C, Sheehy in 1985 recommended performing simple cortical mastoidectomy routinely for all tympanoplasties because it is 'good practice' and because "it's better to be safe than sorry".(12)

McGrew et al in 2004 conducted a retrospective study of patients at a tertiary referral centre, where 484 patients who underwent surgical repair of simple tympanic membrane perforations were identified and reviewed. Surgical outcome and clinical course were assessed to compare results of tympanic membrane perforation repair with and without canal wall up mastoidectomy. They found that tympanic membrane repair was equally effective in both groups at 91%.(13)

Similar to our two Groups A & B in or study, Chavan SS et al, also reported that four month postoperatively there was no significant difference in graft uptake with tympanoplasty alone(93.33%) as compared to tympanoplasty with cortical mastoidectomy (97.33%). (14)

However we consciously acknowledge the small sample size of the study and will follow up with more cases in future.

## CONCLUSION:

The Cortical mastoidectomy with tympanoplasty gives statistically no significant benefit over tympanoplasty alone in majority of patients. However it should be seriously considered in the patients who have a history of repeated episodes of active disease prior to surgery.

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