

**Original article:**

## **A Prospective study of Tympanoplasty with cortical Mastoidectomy in patients with Mucosal type of Chronic Otitis Media**

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### **ABSTRACT:**

Tympanoplasty is commonly done in patients with tubotympanic CSOM but some surgeon prefer doing cortical Mastoidectomy with Tympanoplasty. Hence to determine the role of cortical Mastoidectomy in Mucosal type of COM a prospective study was conducted between 1 st August 2016 to 31 July 2017. This included 30 patients between age group 14 to 50 years having Mucosal type of Chronic Otitis Media. All patients (30) underwent Tympanoplasty with cortical Mastoidectomy, 1 years follow up was done for analysing its graft uptake & hearing improvement. Out of 30 patients 9 had ear discharge 21 had dry ear. Out of 9 with ear discharge all had antral disease, 6 had aditus blocked, 8 had middle ear mucosal hypertrophy and 2 had ossicular necrosis. Out of 21 patients with dry ear, 3 had antral disease, 2 aditus blocked, 1 ossicular necrosis & 2 had middle ear mucosal hypertrophy.

Out of 40, 12 were males & 18 were females. 4 had small, 11 had medium and 15 had large perforation. Average hearing loss was 32.2 dB (A-B gap) for dry ear and 38.2 do for wet ear. 4 Patients lost follow up out of which 3 had dry and 1 had wet ear. After 1 year follow up graft uptake in dry ear was 88.8% & with mucoid discharge was 87.5%. Graft rejection was present in 3 patients. Out of them 2 had dry & 1 had mucoid discharge. Average Hearing Improvement of 14db AB gap in dry & 16 db in ear with mucoid discharge.

No major complications were seen, there was no degradation of hearing. Statistical there was no significant difference in graft uptake and hearing improvement between patients with dry & those with discharge who underwent tympanoplasty with cortical mastoidectomy.

### **INTRODUCTION:**

Tympanoplasty is procedure to repair tympanic membrane and ossicles and to remove disease from middle ear cleft. It is important to study different factors which are affecting the outcome of surgery. It can be infection, technical errors, incomplete removal of disease (1,2) Mastoid plays an important role of middle ear aeration and pressure regulation. Cortical mastoidectomy is a surgical procedure performed to remove disease from mastoid antrum, air cell system, aditus and antrum without disturbing existing middle ear contents.

Despite of many studies there is no conclusive study that mastoidectomy with tympanoplasty has significant advantage in terms of graft uptake and hearing improvement in tubo tympanic CSOM with either dry or with mucoid discharge. Hence present study is carried out to determine the effectiveness of mastoidectomy with Tympanoplasty. Chronic otitis media is an inflammatory process of the mucoperiosteal lining of the middle ear cleft. It includes cholesteatomatous chronic otitis media and granulomatous chronic otitis media. Granulomatous chronic otitis media is characterized by purulent otorrhea and is associated with presence of granulation tissue in the middle ear cleft. Pathogenesis of chronic otitis media can be influenced by anatomic variants or by

pathological sites of obstruction in the middle ear cleft including protympanum, mesotympanum, isthmus tympani anticus and posticus, attic, aditus and antrum and mastoid air cells (3,4). After myringoplasty with simple mastoidectomy, however, ears with inflammatory mastoids fared well as well as those without signs of inflammatory changes. Once again, this implies a beneficial effect from mastoidectomy in the compromised mastoid. Exploration of the mastoid with removal of granulations and polypoidal tissues increases the chance of graft uptake and reduces chance of recurrence in the long run.(3)

Granulomatous chronic otitis media is more difficult to manage than cholesteatomatous chronic otitis media.

Most of the available literature lacks description of results of surgery in granulomatous chronic otitis media. Although much has been written about the pathology, treatment modality and outcome of cholesteatoma, little has been mentioned about management of noncholesteatomatous chronic otitis media (5,6).

Many factors contribute to the success or failure of surgery to correct tympanic membrane perforations. These may be conveniently divided into 'mastoid' and 'non-mastoid' factors. Mastoid factors include: extent of mastoid pneumatisation, and presence of inflammatory disease. The non- mastoid causes of graft failure include general debility, technical error, and most importantly- Eustachian tube dysfunction (7). The pneumatic space within the mastoid represents the "air reservoir" which can be drawn upon during periods of Eustachian tube dysfunction and buffer the middle ear against the development of detrimental negative pressure. With this view in mind, simple Mastoidectomy is combined with tympanoplasty in selected cases of chronic otitis media in hopes of surgically creating an air reservoir and removing the sequestered mastoid disease.

Working on this theory, Jackler and Schindler (7) found that simple Mastoidectomy when combined with tympanoplasty and myringoplasty may negate the ill effects of a small mastoid volume. Holmquist (8) reported that the results of tympanoplasty increased from 22% in individuals with cell system below 5 sq. cm. to 71% in those with cell system above 10 sq. cm. Individuals having a cell system of a size between 5-10 sq. cm. healed in 57% of the cases. In this study, an attempt has been made to analyze the results of various tympanoplastic procedures with cortical Mastoidectomy in ears without cholesteatoma.

#### **MATERIALS AND METHODS :**

A prospective observational study was conducted in the Department of ENT, RCSM GMC and CPR HOSPITAL KOLHAPUR.

Duration :- 1<sup>st</sup> August 2016 -31<sup>st</sup> July 2017.

Sample size :- 30 patients (males 12, females 18)

Age group :-14 to 50 years ,average age 36 years.

#### **INCLUSION CRITERIA :**

Patients with tubotympanic CSOM with or without mucoid discharge.

#### **EXCLUSION CRITERIA :**

Patients with atticointral disease(squamous type of Chronic Otitis media), cholestatoma, intra and extra cranial complications.

Patients with sensory neural deafness.

Patients with diabetes and hypertension.

Patients with previous history of surgery.

Patients with active ENT infections and patient without consent.

**PREOPERATIVE :**

Detailed history, general, local and systemic examination was done in each and every patient. Examination under microscope was done to confirm the finding of otoscope. Tuning fork test were done.

Following investigation was done in each and every patients. Pure tone Audiometry, X ray mastoid schullers view. Routine lab investigation. Pre anaesthetic check up was done after counselling the patient for surgery. Consent was taken for surgery. Preoperative antibiotics, 2% Xylocaine sensitivity test. Injection Tetanus toxoid were given Intramuscular. Mastoid shaving of operative ear were done.

**INTRAOPERATIVE:**

Under local anaesthesia ( 2% lignocaine with adrenaline), postaural incision (Wildes incision) was taken and temporalis fascia harvested. Periosteal flap was elevated box shaped incision over periosteum was taken and flap elevated till spine of henle was visualised, 2-3 mm below the level of spine of henle posterior meatotomy was done. Mastoid retractor was applied, perforation visualised, margins of perforation freshened tympanomeatal circular incision taken (Lempert's incision) tympanomeatal flap elevated till annulus was seen then annulus was elevated to enter the middle ear. Middle ear as examined thoroughly then ossicular integrity was checked.

Mastoid drilling was done in Macewans triangle, cortical mastoidectomy is done, mastoid antrum is opened and mastoid cavity examined. Atticoantral patency is checked.

Underlay graft was placed, tympanomeatal flap was repositioned, Gealfoam placed suturing was done in layers, Haemostasis is achieved and mastoid dressing is given, patient is shifted to wards.

**POSTOPERATIVE:**

Antibiotics were continued for 2 weeks, Anti-histaminics, Anti-inflammatory and ear drops continued for 2 weeks. Dressing was done daily for 1 week, Suturing removed after 8 days, patient was kept on follow up every week for one month, Every month for 3 months and then 6 monthly. Patients were advised to keep ear dry, avoid weight lifting, sneezing, and straining.

**RESULTS:**

Out of 30 patients, Males were 12 (40%) and Females were 18 (60%)

Average age of patients was 36 years

PERFORATION : Small (4), Medium (11) and Large (15)

All patients with conductive hearing loss were included.

Average Air-Bone Gap – 38.2 dB

**INTRAOPERATIVE FINDINGS:**

Pathology	DRY EAR(21)		WET EAR(9)		TOTAL(30)	
	Number	%	Number	%	Number	%
Antral	3	14.2%	9	100%	14	46%
Aditus	2	9.5%	6	66.6 %	8	26%
Middle ear mucosal inflammation	2	9.5%	8	88.8%	13	43.3%
Ossicle Necrosis	1	4.7 %	2	22.2%	11	36.6%

Follow up for 6 months was undertaken. 4 patients Lost follow up 3 had dry ear & 1 had mucoid discharge.

	TOTAL	LOST FOLLOW UP	TOTAL RECIEVED
DRY	21	3	18
WET	9	1	8
	30	4	26

Out of 26 patients there were 3 patients with graft rejection in which revision surgery was done. 2 had dry ear and 1 had mucoid discharge.

After one year of follow up Graft uptake rate for procedure in Dry ear was 16 out of 18( 88.8%) and Wet ear was 7 out of 8 (87.5%)

TOTAL(26)	GRAFT UPTAKE	UPTAKE RATE
DRY	16	88.8%
WET	7	87.5%

Average improvement in Air-Bone gap after 1 year of follow up was 14 dB in dry ear(18) and 16 dB in wet ear(8)

	PREOPERATIVE AIR BONE GAP	IMPROVED
DRY	32.2 dB	14dB
WET	38.2dB	16dB

On follow up no degradation of Hearing and no complications were seen.

**DISCUSSION:**

In a study conducted by Holmquist and Bergstrom [8] first suggested that mastoidectomy improves the chance of successful tympanoplasty for patients with tubotympanic type of chronic otitis media. They maintained that creation of an aerated mastoid which enhances success in patients with poor tubal function or a small mastoid air cell system. Aeration of middle ear cleft has a vital role in the functioning of middle ear mechanics.

Jackler et al. (9) 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, however recurrent infection with graft loss occurred in some cases, again implying the beneficial effect from mastoidectomy in compromised mastoid which in turn increases the aeration in middle ear cleft

Nayak et al. (10) 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 has an advantage over tympanoplasty alone. Also patients with wet ear had significant success in terms of graft uptake and hearing gain who underwent tympanoplasty with cortical mastoidectomy

Surgical treatment of CSOM is still controversial. It is well accepted that the main purpose of operation is to 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) Mastoid factors include the extent of mastoid pneumatisation and the presence of inflammatory disease in the mastoid (12) But there are differing opinions regarding doing mastoidectomy with tympanoplasty in these patients.

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. (15) found similar success rate for both the groups.

According to Sonkhya et al. (16) aerating mastoidectomy is beneficial in patients with granulomatous chronic otitis media as it restores the connection between the middle ear and mastoid and creates a physiological buffer.

212 patients of granulomatous chronic otitis media were managed by tympanoplasty with aerating mastoidectomy using modified intact canal wall technique and were followed for a minimum period of 12 months. Krishnan et al (2002)(17) recorded that in 'dry' ears (n= 76), who underwent tympanoplasty with cortical mastoidectomy (n= 40), 32 (80%) had dry, intact, mobile graft and 8 (20%) had dry retracted drum which is immobile. No perforation was found in this group. In patients with 'dry' ears, in whom tympanoplasty alone (n= 36) was performed, 20(55%) had dry, intact, mobile graft and 8(22%) had retracted, immobile, dry graft and 8(22%) had perforations. In Quiescent ears (n=40), patients who underwent tympanoplasty with cortical mastoidectomy (n=36), 32 (89%) had intact, mobile, dry drum, 4 (11%) had residual perforation and none of the ears had retracted drum in this category. These results matched our results.

Eliades and Limb (18) conducted a study on 26 patients to review surgical outcomes for patients with perforations resulting from CSOM without cholesteatoma and concluded that there was no additional benefit to performing mastoidectomy with tympanoplasty for uncomplicated tympanic membrane perforations. Patients with more complicated disease benefitted from addition of a mastoidectomy

### **CONCLUSION:**

In the current study it is quiet evident that tympanoplasty with cortical mastoidectomy have similar graft uptake and hearing outcomes in patient with tubotympanic COM irrespective of whether ear is dry or wet.

Cortical Mastoidectomy has additional advantage of removing the disease from mastoid and increasing air reservoir in middle ear.

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