Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: www.saspublishers.com

OPEN ACCESS

Medicine

The Role of Improving Outcome Comparative Treatment between Myringoplasty and Cortical Mastoidectomy on Chronic Supportive Otitis Media: A Study in Mymensingh Medical College and Hospital, Bangladesh

Farid-Al-Hasan[1*], Md. Zahidul Islam[2]

[1]Resident Surgeon, Department of ENT, Mymensingh Medical College, Bangladesh
[2]Medical Officer, Medical Department, Power Development Board, Bangladesh

DOI: 10.36347/sjams.2019.v07i11.068 | **Received:** 28.10.2019 | **Accepted:** 04.11.2019 | **Published:** 30.11.2019

***Corresponding author:** Farid-Al-Hasan

Abstract **Original Research Article**

Background: The role of mastoidectomy performed with tympanoplasty for tympanic membrane perforations in the absence of cholesteatoma remains controversial. Many otolaryngologists continue to routinely perform mastoidectomy with tympanoplasty, others argue that performing mastoidectomy in these patients is unnecessary, does not improve surgical outcomes, and subjects patients to increased surgical risks. ***Objective:*** To assess the role of improving outcome Comparative Treatment between Myringoplasty and Cortical Mastoidectomy on Chronic Supportive Otitis Media. ***Materials and Methods:*** The Prospective study Department of ENT, Mymensingh Medical College Hospital during October 2014 to July 2019 and 50 patients Sample size. For all patients outcome Diagnostic nasal endoscopy was done and CT scan paranasal sinuses were taken for patients with sinusitis. If septic foci found patients were taken up for endoscopic sinus surgery and disease cleared. Patients were given medical treatment for 3-4 weeks, and once the evidence of response obtained patients were randomly selected by an unrelated personnel and put into either group I i.e. cortical mastoidectomy with myringoplasty or group II i.e. Myringoplasty alone. The selected cases were made to undergo appropriate investigations. Routine blood investigations like Hemoglobin, total and differential count, bleeding and clotting time, chest x-ray, ECG and urine investigations were done for all patients. ***Observations:*** In our study role of outcome total number of patients was fifty. Out of which 25 patients were in cortical mastoidectomy with tympanoplasty group (Group I), of which 13 were males and 12 were females. Most of the literature consisted of retrospective cohort studies and case series with only a few small prospective randomized trials. Retrospective studies were commonly biased by performing mastoidectomy in ears with worse disease, and methodological differences made comparisons between studies difficult to interpret. There was no evidence of improved outcomes following mastoidectomy compared to tympanoplasty alone. The other 25 patients belonged to myringoplasty only (Group II) 14 males and 11 females in that group. Maximum number of patients belonged to 18 to 30 years range. Youngest patient was 18 years and oldest patient was 56 years. The type of perforation was classified as central and subtotal perforation. The pre op mean and standard deviation of pure tone average in tympanoplasty group was higher than the mean pre op value in the cortical mastoidectomy group. ***Conclusion:*** From the results of this systematic review we concluded that tympanoplasty alone is effective in treatment of non cholestaetomatus chronic suppurative otitis media. Mastoidectomy should be favored along with Myringoplasty when there is coexistence of confounding factors such as mucosal changes, bilateralism, scleroses and contracted mastoid.

Keywords: Tympanoplasty or myringoplasty and mastoidectomy or tympa – Nomastoidectomy.

INTRODUCTION

WHO (World Health Organization) defines chronic supportive otitis media as a stage in ear disease in which there is a chronic infection of the middle ear cleft in the presence of persistent tympanic membrane. Perforation Chronic supportive otitis media is typically a persistent disease, insidious in onset, often capable of causing severe destruction and irreversible sequelae and clinically manifests with deafness and discharge. According to Mawson's textbook of Ear disease, it is persistent otorrhea through a non-intact tympanic membrane. The global burden of chronic supportive otitis media is estimated around 65-330 million of

which 60% suffer from significant hearing impairment. It accounts for 28,000 deaths and a disease burden of more than 2 million DALYs. Incidence of CSOM is higher in developing countries because of poor socio-economic standards, poor nutrition and lack of health education. It affects both sexes and all age groups. In India, the overall prevalence rate is 46 and 16 persons per thousand in rural and urban population respectively. It is also the single most important cause of hearing impairment in rural population. A mastoid is considered to be inflammatory when purulent exudates, granulation tissue, polypoid mucosa, cholesterol granuloma or cholesteatoma are noted. It is mandatory that this diseased mastoid be cleared off the disease before undertaking any reconstruction. Otologists have long realized the importance of mastoid disease in determining the success of tympanic membrane reconstruction. It is beyond doubt that the extension of pathologic process into mastoid air cell system requires exposure and removal. It is often possible to eliminate chronic progressive inflammation of the middle ear and mastoid, and at the same time have a reasonable chance to preserve residual hearing or preferably to improve hearing. Controversy has been centered on the best surgical technique to achieve this desirable result. It is well known that chronic suppurative otitis media is a poor man's disease. Poor living conditions, overcrowding, poor nutrition and hygiene have been suggested as a basis for widespread prevalence of this disease in third world countries. Surgery plays an important role in its management and the outcome measures are closure of tympanic membrane perforation in myringoplasty, eradication of disease and achievement of a dry and safe ear in mastoidectomy and in some cases, improvement of hearing where ossicular reconstruction or ossiculoplasty is also carried out. A mastoidectomy done along with tympanoplasty may ensure clearance of disease, saves time, money, unnecessary hospital stay, and repeated Hospital visits for the patient. The aim of the work is to assess the effectiveness and safety of performing routine cortical mastoidectomy in addition to tympanoplasty in treatment of tympanic membrane perforation in cases of chronic suppurative otitis media in the absence of cholesteatoma.

REVIEW OF LITERATURE

Hippocrates, "Father of Medicine" had noticed the development of intracranial complications following ear discharge, the treatment for such a disease was not well established due to lack of better understanding of the disease and the non-availability of better technology. Although, the introduction of sulpha drugs by Doeskin 1953 and penicillin by Sir Alexander Fleming in 1942 reduced the mortality in case of safe type of CSOM, they could not cure cholesteatoma. Shambaugh in his textbook 'Surgery of the Ear' states that the first contemplation of surgery for mastoid infection occurred four centuries ago. According to him the first recorded successful mastoid operation was done by Jean Petit of Paris and shortly thereafter in 1776, a Prussian surgeon, who operated on a soldier with a draining ear. The above procedures were developed mostly to eliminate the disease from tympano mastoid area, to prevent the development of life threatening complications and to exteriorize the cavities for the purpose of inspection and cleaning of recurrent process for the rest of the patient's life and if possible to achieve a dry ear, but functional hearing was not at all a major criterion.

Grafts used in Tympanoplasty & Mastoidectomy

There are four different types of grafts now available like the auto graft, isograph, homograft or allograft and heterograft [1]. In 1640 a segment of bladder was used in an attempt to close tympanic membrane perforation by Marcus Banzer [2]. In Ringenberg's article [3], he has mentioned that artificial drum was proposed by Leschevian in 1973 and, by Authenrinth and Bohneberger in 1815. In 1878 Berthold successfully closed a perforation with a full thickness skin graft [4]. But in an article by Wullstein [5] it is said that it is Heerman in 1960 who first used auto graft temporalis fascia successfully and Wullstein first used absorbable gelatin sponge known as gel foam to promote growth of new health middle ear mucosa, to maintain a middle ear free of adhesions and to support the neotympanic membrane [5]. As an auto graft, in the repair of tympanic membrane perforation, the temporalis fascia is now preferred because it has a low metabolic rate, easy availability and good survival prospects. According to Ballenger [6] the connective tissue graft used to replace the missing fibrous element of drum is rapidly covered by proliferating squalors layer which quickly carries blood to the graft during which time it is able to survive by tissue perfusion. Calcattera [7] stated that, transplanted tissue with lower metabolic requirements such as connective tissue has been found to be much more resistant to necrosis in the early postoperative period. The use of fresh auto graft connective tissue such as vein or fascia avoids complications of storage and offers greater degree of success [6]. According to Shambaugh [8] the fascial graft may be allowed to dry before use or even compressed in a special clamp. In the dry parchment like state, it is easily cut down to size and accurately applied in the tympanic membrane defect. Drying of the temporalis fascia does not seem to impair the viability of the fascia and it makes it easier to handle. It is not advisable to dry temporalis fascia by heat, as is sometimes recommended, as the graft may be devitalized in parts leading to higher incidence of graft failure [9]. The temporal is fascia graft should not be allowed to dry but should be placed in a moist chamber if there is to be any delay in its use. The graft should not be handled with finger but should be manipulated with instruments free of fibers or lint particles [10]. It is Hough's firm belief that procedures which deliberately damages the cell or alter the chemistry of graft should be discarded. It is illogical to compromise a good result

by drying the tissue until it becomes parchment like or conversely to place it in a non-physiological solution. A variety of connective tissue homologous graft materials are in use, which include fascia, dura, and homograft tympanic membrane with or without icicles while antilogous temporal is fascia also enjoys popular support. Smyth [11] demonstrated no significant difference in success rate between antilogous temporal is fascia and homologous dura when hearing results are compared after 6 months in patients with an intact ossicular chain. Wally *et al*., [12] observed the effects of surgical preparation of antilogous temporal are fascia in tissue culture. Scraping loose connective tissue from the fascia or allowing it to dehydrate caused significant reduction in fibroblast growth in tissue culture while both procedures completely abolished it [13]. Betow [14] is of opinion that, by using homografts in routine surgery of the middle ear, the structural and functional results are equivalent to those of auto grafts. We can use homograft fascia, perichondrium, dura, ossicles and cartilage in the same way as in auto grafts. He says that in cases of limited inflammation, the goals are easily fulfilled through the use of auto grafts. The most difficult problem however, remains in those cases in which a large part of the middle ear has been destroyed by infection, where the tympanic membrane and icicles are missing or where a considerable part of the middle ear has to be removed because of extensive cholesteatoma. Particularly after a radical operation, it is impossible to reconstruct a good functional transmission system just by using an auto graft. It was Betow [15] who attempted an enbloc homograft consisting of part of meatal skin, the tympanic membrane and the whole ossicular chain. Betow in this article gives an account of the evolution of homografts. In 1640, Marchius repaired an ear drum with a sheep's bladder, which was stretched over a piece of ivory. In 1894, Politzer pointed to the possibilities of homograft bone transplantation in ear surgery. In 1957 Tobeck reported successful transplantation of a stapes after removal of the patient's stapes in 7 cases of otosclerosis. In 1964, Marquet began with transplantation of tympanic membrane only. In 1966, he reported the use of preserved cadaver tympanic membrane. In 1969, Brandow and Smyth and Kerr reported on tympanic membrane homografts. Regarding the preservation of the homografts Glasscock, House and Graham (1972) reported the preservation of enbloc allograft in 70% ethyl alcohol and with this a graft take rate of 70%. Betow [14] stored them in Cialit which is 2 – (ethyl-mercurymercaptol) benzoxazole – carbonic acid sodium. He cited the advantages of cialit as its low local toxicity, strong bacteriostatic and antimycotic effect. When transplants are taken from cadavers Betow excluded as donors patients died of infectious diseases such as hepatitis, or tuberculosis.In order to stabilize the homografts Seelich, Marquest and Portman have found a combination of concentrated human fibrinogen and factor XIII with a thrombin calcium chloride apportioning solution to be a good adhesive [1]. Chiossone [16] gives an account of the establishment of an ear bank which he says have proved to be insuring a regular supply of high quality homograft's for the otologic surgeon [16]. Rafto described the tympanic membrane as a spider web like structure and a part of organ of hearing. Ambrose Pare in 16thcentury suggested surgery for mastoid infection in young king Charles of France, who was moribund with high fever and discharging ear. Berthold in 1878 did the first myringoplasty including removal of epithelium and grafting of skin.

MATERIALS AND METHODS

Study design: Prospective study
Study place: Department of ENT, Mymensingh Medical College Hospital
Study period: October 2014 to July 2019
Sample size: 50 patients

Inclusion Criteria

- Patients with chronic ear discharge (Chronic Supportive Otitis Media, safe type) attending Out Patient Department, ENT at Mymensingh Medical College Hospital.
- Age group 18 to 60 yrs of age.
- Both genders.
- Unilateral or bilate Sral disease.

Exclusion Criteria

- Patients above the age of 60 yrs or below 18 yrs.
- Chronic Suppurative Otitis media- unsafe type.
- Deblitated and Immunocompromised patients.
- Pregnant and lactating women
- Patients with external or middle ear abnormalities (congenital or acquired)

MATERIALS

In this study the procedure adopted is cortical mastoidectomy with myringoplasty for one set of patients (Group 1) and myringoplasty alone (Group 2) for another set.

The Equipments Used Are

1. Binocular Microscope
2. Karl Storz zero degree Endoscope with camera and monitor.
3. Middle ear Microsurgical instruments like Rosens, Plester,curette, picketc.

METHODOLOGY

Among patients attending the ENT OPD in Mymensingh Medical College Hospital, 50 patients of age between 18 to 60 yrs who are clinically assessed for CSOM were chosen for study.

Assessment is based on the following criteria: History of persistent otorrhea and hard of hearing. Post-Operative Tympanic Membrane

1. Otoscopic evidence of chronic suppurative otitis media with central perforation.
2. Examination on table with Microscope.
3. Audio logical evidence of conductive hearing loss.

For all patients Diagnostic nasal endoscopy was done and CT scan paranasal sinuses were taken for patients with sinusitis. If septic foci found patients were taken up for endoscopic sinus surgery and disease cleared. Allergic symptoms were treated with steroid nasal spray and antihistamines.Culture and sensitivity of ear discharge was done and treated with appropriate antibiotics. Patients were given medical treatment for 3-4 weeks, and once the evidence of response obtained patients were randomly selected by an unrelated personnel and put into either group I i.e. cortical mastoidectomy with myringoplasty or group II i.e. Myringoplasty alone. The selected cases were made to undergo appropriate investigations. Routine blood investigations like Hemoglobin, total and differential count, bleeding and clotting time, chest x-ray, ECG and urine investigations were done for all patients. X-ray both mastoids lateral oblique view was taken for all cases to assess the pneumatisation pattern of mastoid and to know the status of legmen and sinus plate. Pure tone audiogram was done in sound proof room using Maico ma 52 clinical diagnostic two channel audiometer. Informed consent was obtained from each patient after counseling them and their relatives regarding the nature of disease and surgery. Outcome and all possible complications were also explained. All patients were admitted one day prior to the surgery.18 cases in group I and 20 cases in group II cases were operated were done under general anesthesia. And 7 cases from group I and 5 cases from group II were taken up under local anesthesia. Temporalis fascia graft was harvested in all cases. All cases were approached through the postaural route because of its definite advantage over endural route. Less skills necessary, more exposure is attained and complications such as perichondritis never occur. An area comprising 5 cm. above the upper border of pinna and 5 cm. behind pinna was shaved off hair. In this study they have concluded that, it is advisable to do cortical mastoidectomy with type I tympanoplasty especially in chronic persistent discharging years, to remove antral pathology if any. Jackler [17] assessed the mastoid cavity from x-ray mastoids by noting the cross sectional area of mastoid pneumatisation, usingplanimetric method of Diamont [18]. He divided mastoids into 3 groups according to mastoid size (1. Small 0 – 5 cm^2, 2. Medium 5 – 10 cm^2, 3. Large 7 – 10 cm^2).

OBSERVATIONS

In our study role of outcome total number of patients was fifty. Out of which 25 patients were in cortical mastoidectomy with tympanoplasty group (Group I), of which 13 were males and 12 were females. The other 25 patients belonged to myringoplasty only (Group II) 14 males and 11 females in that group. Maximum number of patients belonged to 18 to 30 years range. Youngest patient was 18 years and oldest patient was 56 years. The type of perforation was classified as central and subtotal perforation. The pre op mean and standard deviation of pure tone average in tympanoplasty group was higher than the mean pre op value in the cortical mastoidectomy group. Most of the literature consisted of retrospective cohort studies and case series with only a few small prospective randomized trials. Retrospective studies were commonly biased by performing mastoidectomy in ears with worse disease, and methodological differences made comparisons between studies difficult to interpret. There was no evidence of improved outcomes following mastoidectomy compared to tympanoplasty alone. Subgroup analysis, including actively discharging ears, extensive mucosal inflammation, large or repeat perforations, or sclerotic mastoids had overall worse outcomes. These patients showed a nonsignificant trend toward slightly improved results with mastoidectomy.

Table-1: Age and gender distribution (n=50)

Sl. No	Age	Group I (n=25)		Group II(n=25)	
		Male	Female	Male	Female
1	18-30	6 (24%)	7(28%)	7(28%)	7(28%)
2	31-40	4(16%)	4(16%)	5(20%)	4(16%)
3	41-60	3(12%)	1(4%)	2(8%)	0(0%)
		13(52%)	12(48%)	14(56%)	11(44%)

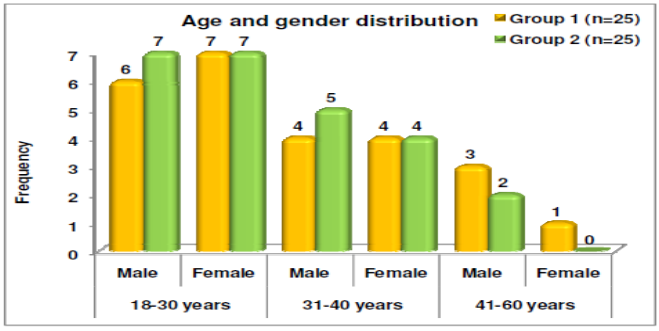

Fig-1: Age and Gender distribution

Table-2: Duration of discharge (n=50)

S. No	Duration (years)	Group I(n=25)	Group II(n=25)
1	<5 years	4(16%)	5(20%)
2	5-10years	10(40%)	9(36%)
3	Since childhood	11(44%)	11(44%)

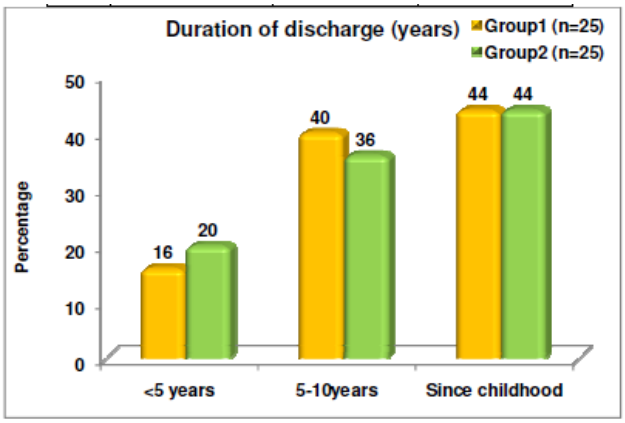

Fig-2: Duration of discharge with groups

In both groups maximum number of patients had history of otorrhea from Childhood(44% each).The number of patients in 5 to 10 years range were 10 in group I and 9 in group II.

Table-3: Duration of Hard of Hearing (n=50)

S. No	Duration (years)	Group I(n=22)	Group II(n=21)
1	<1 year	6(27.3%)	5(23.8%)
2	1-5years	10(45.5%)	7(33.3%)
3	5-10yrs	6(27.3%)	9(42.9%)

Though maximum number of patients with ear discharge belonged to since childhood period, hard of hearing was maximum in the 1 to 5 years range.

Table-4: Laterality of the disease (n=50)

S. No	Laterality	Group I (n=25)	Group II (n=25)
1	Bilateral	11(44%)	9(36%)
2	Right ear alone	9(36%)	8(32%)
3	Left ear alone	5(20%)	8(32%)

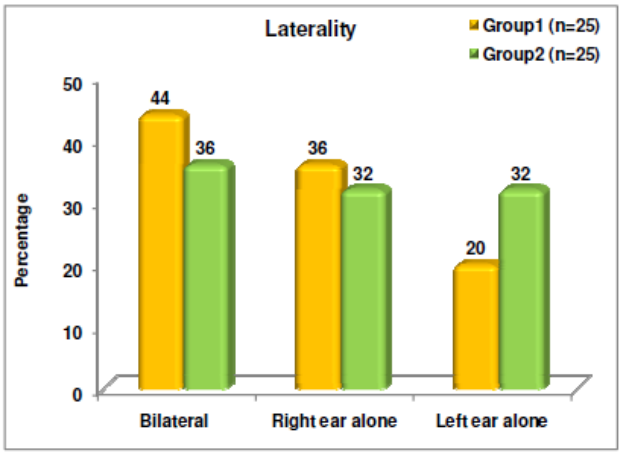

Fig-3: Patients had bilateral disease with groups

In group I 11 patients had bilateral disease and 14 patients had unilateral disease of which 9 patients had right ear disease and 5 patients had left ear disease. In Group II 9 patients had bilateral disease and 16 patients had unilateral disease.

Table-5: Size of perforation (n=50)

S. No	Size of perforation	Group I(n=25)	Group II(n=25)
1	Small	7(28%)	8(32%)
2	Medium	9(36%)	10(40%)
3	Large	9(36%)	7(28%)

In group I 36% each had medium to large perforation.Only28% had small size perforation. In group II 40% had medium sized and 32% had small size perforation. Only 28% had large perforation. Among the cases that failed in group II 2 cases had large perforation.

Table-6: Status of Middle Ear (ME) Mucosa (n=50)

S. No	Status of ME mucosa	Group I(n=25)	Group II(n=25)
1	Normal	13(52%)	12(48%)
2	Congested	7(28%)	8(32%)
3	Polypoidal	5(20%)	5(20%)

In both the groups maximum patients had normal mucosa. 20% of patients in either group had polypoidal middle ear mucosa. 28% in group I and 32% in group II had congested mucosa. This is the recorded finding of the patient at their first visit. All patients with abnormal mucosa was treated with culture sensitive local antibiotics. A few who were refractory to outpatient treatment was admitted and given intravenous antibiotics. Treatment was given for a period of 3-4 weeks and after obtaining evidence of response patients were taken up for surgery.

Table-7: Post-operative dry ear status (n=50)

Dry ear status	Group I		GroupII	
	No.	Percent	No.	Percent
Discharge+	-	0	3	12
Discharge-	25	100	22	88
Total	25	100	25	100

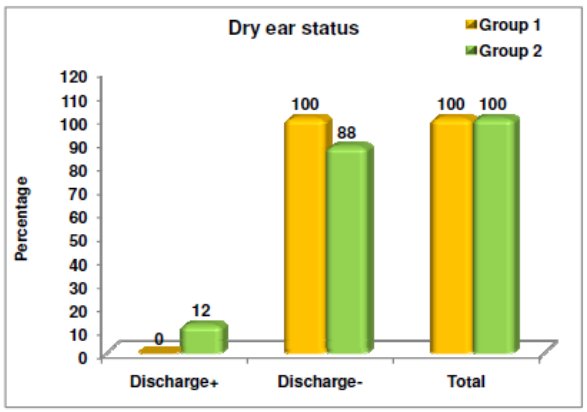

Fig-4: Dry ear status of two groups

In our study 100% of patients in group I had post-operative dry ear. In group II there were 4 failures of which 3 patients had discharging ears post operatively and one remained dry.

Table-8: Pre-operative hearing assessment (n=50)

Hearing threshold	Pre op PTA(dB)	
	Group I	Group II
Mean BCT	9.4	10.8
Mean ACT	37.8	36.4
Mean ABG	32.4	30.6

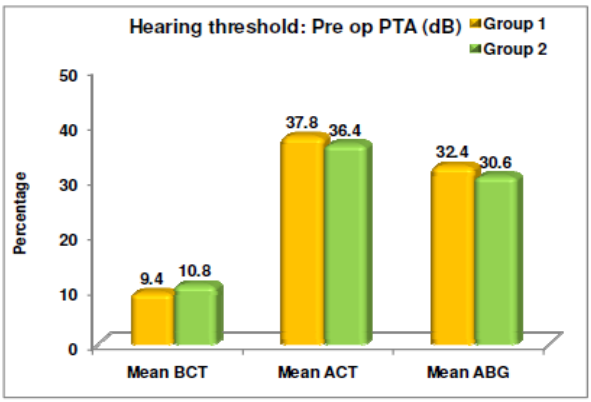

Fig-5: Hearing threshold (BCT)

Pre-operative audiogram was done for all patients. Bone conduction threshold (BCT) remained within normal range. Mean air conduction threshold (ACT) in group I was 37.8dB (obtained by taking average of all 25 patients air conduction), and the same in group II was 36.4dB.

Table-9: Post-operative hearing assessment (n=50)

Hearing threshold	Post op PTA(dB)	
	Group I	Group II
Mean BCT	9.4	10.8
Mean ACT	23.4	22.6
Mean ABG	18.4	17.8

Table-10: Hearing improvement (n=50)

Post op hearing	Group I	Group II
Improved	21(84%)	21(84%)
Remained same	4(16%)	4(16%)
Decreased	0(0%)	0(0%)

In both groups hearing improvement was comparable.

Table-11: Level of improvement of hearing threshold and graft Relation to ear involved (n=50)

Laterality	Group I (Mean AB closure)	Group II (Mean AB closure)
B/L	13.1Db	12.6dB(3 cases failed)
U/L	13.2dB	13.0dB(1 case failed)

Table-12: Post-operative Graft Take Up (6 months) (n=50)

	GroupI(n=25)	GroupII(n=25)
Graft taken up	25(100%)	21(84%)
Graft failure	0(0%)	4(16%)

The indication for performing mastoidectomy was particularly important in the cohort and case-control studies, as it represented a potentially large source of bias between study arms. Collectively, mastoidectomies were generally performed with worse disease, as suggested by the presence of infection, extensive inflammation, or a sclerotic middle ear or mastoid. Rates of persistent otorrhea were very similar regardless of whether a mastoidectomy was performed, suggesting that cleaning out the middle ear space and establishing an intact tympanic membrane may be sufficient to eradicate most chronic infection, and that directly removing the disease in the mastoid air cells is often unnecessary.

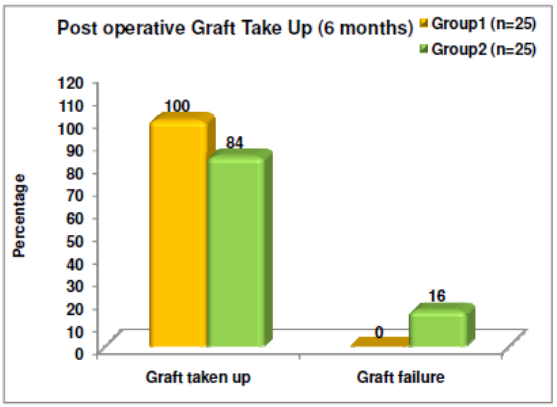

Fig-6: Post-operative graft take up

Table-13: Post-operative complications (n=50)

S. No	Post-operative complications	Group1(n=25)	Group2(n=25)
1	Post op otorrhea	0(0%)	4(16%)
2	Wound infection	1(4%)	0(0%)
3	Perichondritis	1(4%)	0(0%)
4	Immediate VII N palsy	0(0%)	0(0%)
5	Delayed VII N palsy	0(0%)	0(0%)
6	Profound SNHL	0(0%)	0(0%)
7	Meningitis	0(0%)	0(0%)
8	CSF leak	0(0%)	0(0%)
9	Death	0(0%)	0(0%)

Table 14: Size of perforation and Graft take up (n=50)

Size	Total	Group-I	Group-II
Small	15	7/7	8/8
Medium	19	9/9	8/10
Large	16	9/9	5/7
Total	50	25/25	21/25

In group II out of 4 failures, 2 occurred in large perforations and one each in small and medium sized perforations.

Table-15: Status of middle ear mucosa and graft take up (n=50)

Middle Ear Mucosa	Total	Group I	GROUP II
Normal	25	13/13(100%)	11/12(91.6%)
Edematous	16	7/7(100%)	6/8(75%)
Polypoidal	9	5/5(100%)	4/5(80%)
Total	50	25/25(100%)	21/25(84%)

In Group II inspire of the ear being inactive at the time of surgery one case failed, and among the diseased mucosa cases, three of them failed. Whereas in Group I, since a mastoid disease clearance was done, all cases including the ones with diseased mucosa were taken up. In our study bilateral diseases were taken up as important criteria that influence the surgical outcome as for other two studies, the influence was on the Myringoplasty only group with three failures and it did not influence Mastoidectomy group. In our study under

group II, graft take-up in bilateral disease had a success rate of 85% and in unilateral disease it was 96%. In cortical Mastoidectomy with Myringoplasty group the success rate was 100% for both set of patients. Hence it could be deduced that bilateralism plays a role in surgical success of Myringoplasty alone patients because of lack of complete clearance of disease from Mastoid. This finding is comparable to similar findings from a study by Saha et al., [19]. Their result was 92.85% for unilateral disease and 66.6% for bilateral group.

DISCUSSION

Chronic suppurative otitis media owing to poor socio economic status and poor environmental conditions account for morbidity in about 5 % of the total population. ENT surgeons by performing a corrective surgery for chronic otitis media can change the lifestyles of the patient profoundly. The medical line of management only can lessen the severity of the symptoms. The age and sex of the patients in both the groups were comparable and bore no statistical significance. Pearson's chisquared test was applied to compare the symptoms in both the groups and were found to be comparable i.e. were statistically insignificant. Chronic Supportive Otitis media is a disease of developing countries like India, Bangladesh, Nepal, Pakisthan etc. Various factors such as poor living conditions, illiteracy, low socioeconomic status and pollution play a major role in the prevalence of the disease, and hence improvement in these basic parameters of life will help the society to lower the prevalence of this chronic ear disease. In our study the population we cater mostly belong to the low socioeconomic status who hardly turn up for routine follow-up so in these patients mere reconstruction of the tympanic membrane without complete removal of the disease from the mastoid antrum will not be sufficient to attain surgical success in terms of graft uptake and attainment of dry ear. Mastoid air cells acts as a continuous source of ventilation to the middle ear, whereas the Eustachian tube supply is intermittent, this important fact is stressed upon by many of the studies that favor Mastoidectomy with Tympanoplasty. Various Studies found that the disease lurking behind, in the mastoid air cells may have granulations harboring Infective agents that act a constant source of infection. According to literatures chance occurrence of cholesteatoma is 2% in the antrum of safe type of disease. According to Mc Grew *et al*., [20] an aerated mastoid acts as a buffering system to bring down the effects of aerodynamic changes in middle ear. While the 'Mastoid reservoir of infection theory' holds good for actively discharging ear the same may not be true in the quiescent or dry ear. When active discharge is absent the question thus arises whether to routinely address mastoid surgically or not. Even though it is desirable to explore Mastoid Antrum in order to confirm the absence of the disease the procedure itself is not without disadvantages. Addition of Mastoidectomy with Myringoplasty carries several disadvantages such as increased risk of damage to the Incas, Dura, Sigmoid Sinus and Facial nerve, prolongation of surgery and higher morbidity due to bone drilling in inexperienced surgeon's hands. Thus the advantage and disadvantage of adding Mastoidectomy to Myringoplasty in non cholesteatomatous Mastoiditis have been the focus of much controversy and debate. Previous research findings provided evidences both for and against the use of Mastoidectomy in non Cholesteatomous otitis media. Most of these studies used retrospective case series, whereas ours is Prospective case study. In our study two groups of patients were studied group I underwent Mastoidectomy with Myringoplasty whereas group II underwent Myringoplasty alone and two parameters were analyzed in the postoperative follow-up viz. the graft uptake rate and the hearing improvement. The sample in this group was 50 that was divided between the two groups were equally, so only approximate statistical disparity could be obtained. Analysis of the observations shows that chance of graft giving away was more with Myringoplasty alone group though the percentage is not statistically very significant because of small number analyzed. However there is no gross difference in the hearing improvement between the two groups. This helps those patients with intermittent Eustachian tube dysfunction to better tolerate the negative pressure. They also concluded that lack of aeration and disease progression and need for subsequent procedures in myringoplasty group shows the functional impact of aeration by doing a mastoidectomy on the repair of perforation.In our study we achieved the result that, doing a cortical mastoidectomy improves graft success rate, especially in cases of persistent mucosal Disease, which was the case for us. As supported by a retrospective study by Ruhl *et al*., [21] who gave similar results, we assume by opening up the mastoid, thereby creating a connection between the mastoid and middle ear, we are able to re-create a physiological pressure buffer. Quality of the evidence: The five studies had different grades of risk of bias concerning the different domains of assessment of bias but with overall judgment of 'Unclear' risk of bias in the five trials. However, there was no noticeable heterogeneity detected in cases where we could perform pooling of data and meta-analysis. Two of the included studies were carried out in tertiary referral centre and the remeaning studies were carried out in specialized department of a central hospital. Potential biases in the review process: We attempted to identify every relevant trial using a rigorous search strategy. Two authors independently applied the same search methodology and resolved disagreement by consensus. Publication Bias is unlikely to be considered a potential threat to the validity of results of this review. Albert et al conducted study on 40 patients out of which there were 27 males and 13 females. Out of all cases 33 patients had aditusblock, inspire of the fact that 8 cases were inactive during the study. They found aerobic and anaerobic cultures from mastoid antral granulation

tissue. Out of 40 cases 23 turned out positive for aerobic culture and 1 turned positive for anaerobic. Culture reports surprisingly showed that 6 out of 8 inactive ears were culture positive, and out of the 8 inactive groups, 5 ears were dry for more than one and half years, yet three of these grew aerobes of which two had two organisms each. The conclusion was – inspection of mastoid antrum, in all cases of CSOM, irrespective of duration of disease should form an integral part of the surgery because of the mastoid granulations blocking aditus is not always sterile. In study conducted by Ashok k saha type I Tympanoplasty was done in 30 patients and cortical mastoidectomy with tympanoplasty was done in 10 patients(male -24 and female -16). Bilateral disease was seen in 30% right ear disease was seen in 8 cases (20%) and left ear disease in 20 cases (50%). bilateral disease in 12 cases (30%). Right ear operated in 12 cases and left ear in 28cases. Youngest patient was 14 years and oldest was 56 years. Out of total 40 patients,30 patients underwent type I tympanoplasty alone whereas 10 patients with discharging year were taken up for cortical mastoidectomy with type I tympanoplasty. Overall graft take-up was found to be 85%, in males it was 83.3% and females it was 87.55%. A poorly pneumatised mastoid air cell system has defective pressure buffering capacity and is therefore prone to develop chronic inflammatory conditions and tympanic membrane retractions. According to Boyle's law the pressure buffering system of mastoid is recreated by the additional volume obtained by doing a Mastoidectomy. In their study radiological studies showed 73% scleroses mastoid air cells, which would have contributed to development of chronic otitis media. Thus Cortical Mastoidectomy should be routinely performed in all cases of Chronic Supportive Otitis media safe type irrespective of the duration of discharge. In our series, Myringoplasty combined with Mastoidectomy offered significant improvement in the rate of closure of simple tympanic membrane perforations and reduction in the number of patients requiring subsequent procedures, but no significant improvement in hearing result.

CONCLUSION

From the results of this systematic review we concluded that tympanoplasty alone is effective in treatment of non cholestaetomatus chronic suppurative otitis media. Mastoidectomy should be favored along with Myringoplasty when there is coexistence of confounding factors such as mucosal changes, bilateralism, scleroses and contracted mastoid. The available literature shows no additional benefit to performing mastoidectomy with tympanoplasty for uncomplicated tympanic membrane perforations. Patients with more complicated disease may benefit from the addition of a mastoidectomy, but there is insufficient evidence to make a recommendation for this population.

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