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A STUDY ON BENEFIT OF CONCOMITANT MASTOIDECTOMY OVER TYMPANOPLASTY ALONE IN SAFE EAR TYMPANIC PERFORATION IN SOUTH INDIA

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ABSTRACT

INTRODUCTION: - The use of mastoidectomy as a means to reestablish drainage of mastoid antrum in safe or non cholesteatomatious chronic suppurativeotitis media is still controversial.The opinion regarding importance of mastoidectomy along with tympanoplasty still remains divided even among the most experienced surgeons. This is an issue of debate. The purpose of this study is to ascertain thatmastoidectomy should be combined as a standard operating procedure for closing central perforations in safe type of chronic suppurativeotitis media or not so as to achieve acceptable functional status postoperatively and hence minimize graft failure.

AIM:-The aim of this study is to contemplate the surgical outcome of Tympanoplasty alone and Tympanoplasty combined with Cortical Mastoidectomy

METHODS: -Comparativesurgical evaluation studyof 60 patientsof chronic suppurativeotitis media of safe type in dry ear.30 of these cases were selected for tympanoplasty alone (Group-I) and 30 cases were selected for cortical Mastoidectomy with Tympanoplasty (Group-II).

RESULTS: -Post operative ear discharge was seen only in 4 cases,6.6% in each group. (GROUP I-2 cases, GROUP II-2 cases) and 4 cases of Graft Failure postoperatively in (GROUP I-2 cases, GROUP II-2 cases), with the success rate of 93.33% in Group-I andGroup II.

CONCLUSION :- Mastidectomy with tympanoplasty gives no statistically significant benefit over tympanoplasty alone in safe type of CSOM in regards to post operative discharge, graft success rate and hearing gain.

KEYWORDS : Mastoidectomy,Tympanoplasty, safe ear, CSOM, Graft Intake, Post Operative Ear Discharge

INTRODUCTION

Chronic suppurativeotitis media (CSOM) is a long-standing infection of a part or whole of the middle ear cleft characterized by ear discharge and a permanent perforation. A perforation becomes permanent when its edges are covered by squamous epithelium and it does not heal spontaneously. A permanent perforation can be linked to an epithelium-lined fistulous track[1].

Chronic suppurativeotitis media (CSOM) is the result of an recurrent episodes of acute otitis media and is characterized by a persistent discharge from the middle ear through a tympanic perforation. It is an important cause of preventable hearing loss, particularly in the developing world CSOM prevalence rates of 1–2% were considered low and 3–6% were high; some racial groups had the highest CSOM rates . Prevalence amongIndians is 7.8% , a school survey in Tamil Nadu and is lower than previous estimates that ranged from 16% to 34%[2] .

CSOM,Tubotympanic Variety, Also called the SAFE OR BENIGN type. It involves anteroinferior part of middle ear cleft, i.e. eustachian tube and mesotympanum and is associated with a central perforation. There is no risk of serious complications.

AtticoAntral CSOM variety, Also called UNSAFE OR DANG EROUS Type.It involves posterosuperior part of the cleft (i.e. attic, antrum and mastoid) and is associated with an attic or a marginal perforation. The disease is often associated with a boneeroding process such as cholesteatoma, granulations or osteitis. Risk of complications is high in this variety.Diagnosis is made by examining the ear drum by Otoscopy and ideally under an operating microscope[1].

In safe ears, the aim is to eliminate discharge and possibly to assist hearing deficit. Drying is achieved by treating infection or allergy in the upper respiratory tract. Swab culture will indicate appropriate antibiotics to be given systemically. After regular gentle toilet to remove infected discharge and debris from the meatus, topical antibiotics and steroid drops should be instilled into the ear.Systemic antihistamines may also be part of the regimen, to reduce allergic swelling of the mucosa around the orifice of the Eustachian tube[3].

Once the ear is dry for more than 3 months, the state may be described as inactive chronic otitis media, and recurrent discharge may often be prevented by protecting the ear from water and by promptly treating upper respiratory tract infection, or by closing the defect in the ear drum surgically by performing tympanoplasty. Hearing defects are treated by reconstructing the drum and the ossicular chain by tympanoplasty[3]

Reconstructive surgeries used in this scenario are, TYMPA NOPLASTY WITHOUT MASTOIDECTOMY (TYMPANUM = MIDDLE EAR) It is an operation to eradicate disease in the middle ear and to reconstruct the hearing mechanism without mastoid surgery, with or without tympanic membrane grafting. This means ossicular reconstruction only or ossicular reconstruction with myringoplasty .TYMPANOPLASTY WITH MASTOIDECTOMY It is an operation to eradicate disease in both the mastoid and middle ear cavity, and to reconstruct the hearing mechanism with or without tympanic membrane grafting[3].

The use of mastoidectomy as a means to reestablish drainage of mastoid antrum in safe or non cholesteatomatous chronic suppurativeotitis media is still controversial. The opinion regarding importance of mastoidectomy along with tympanoplasty still remains divided even among the most experienced surgeons.This is an issue of debate. Some surgeons state that mastoidectomy is required only in cases which are refractory to repeat and adequate antibiotic therapy.

Mastoidectomy and/or tympanoplasty are fre-quently necessary to permanentlycure CSOM. Mastoidectomy and tympanoplasty are two procedures that may or may not beperformed together in order to eradicateCSOM, particularly if cholesteatoma isabsent.In both procedures, the middle ear is inspected and, if complete removal of infection warrants it, the middle ear ossicles and mucosa may be removed. Because of the considerable resources that each procedure entails and the factorsthat influence their effectiveness, it is important to determine the appropriate indications for performing each procedure among patients with CSOMand the performance conditions in which they are most effective in terms of complications and recovery.

The purpose of this study is to ascertain the mastoidectomy should be combined as a standard operating procedure for closing central perforations in safe type of chronic suppurativeotitis media or not so as to achieve acceptable functional status postoperatively and hence minimize graft failure.

AIMS AND OBJECTIVES

The aim of this study is to contemplate the surgical outcome of Tympanoplasty alone and Tympanoplasty combined with Cortical Mastoidectomy.

Objectives of the study are to compare the outcome of surgeries,tympanoplasty alone versusCorticalmastoidectomy with tympanopasty in safe type of chronic suppurativeotitis media in terms of post operative complications, graft success and audiological improvement.

MATERIALS AND METHODS

STUDY DESIGN & ANALYSIS: - A Experimental Study More of a Clinical Trial In which, there are two groups assigned, of the cases itself GROUP-I and GROUP-II Which are each subjected to different type surgeries /different experimentation, and unpaired t- test was applied in which the results obtained, which do not reveal a significant difference.IBM SPSS Software, unpaired t-Test, chi-square test were used (p value <0.05 considered as significant).

STUDY SAMPLE: - Sample consisting of 60 patientsof chronic suppurativeotitis media safe type in dry ear. 30 of total 60 cases were selected for tympanoplasty alone (Group-I) and 30 cases were selected for cortical mastoidectomy with tympanoplasty (Group-II) by Simple Random Technique.

STUDY PERIOD:- All these cases were operated during a period of two and a half years between 5thJune 2012 to Oct 2014 in the Department of E.N.T. in Kakatiya Medical College / M.G.M. Hospital, Warangal performed by a single surgeon. 30 of these cases were selected for tympanoplasty alone (Group-I) and 30 cases were selected for cortical Mastoidectomy with Tympanoplasty (Group-II).

The work up for these cases consists of a detailed history and complete general, physical, systemic and ear nose and throat examination. In all the patients a routine blood and urine examination, X-Ray mastoids, Audiometry and examination under microscope was done. Eustachian tube function was assessed clinically and

INCLUSION CRITERIA

- All patients having- CSOM without cholesteatoma, no otorrhea for ≥3 months(dry ear)
- Willing to participate
- Age ranging from 20 to 60 years (both males and females).
- Healthy middle ear mucosa and central perforation(upon micro scopic examination in the operating room)
- Mild to moderate conductive hearing loss.
- Normal cochlear function.
- Functioning Eustachian tube status
- Noevidence of infection in nose, PNS, nasopharynx, throat

Exclusion Criteria

- Wet ear.
- Not willing to participate
- Age below 20 years and above 60 years.
- Attic and marginal perforation.
- Moderate to severe hearing loss.
- Previous mastoid operation.
- Predisposing foci of infection in nose and paranasal sinus.
- Concomitant Morbidities like Diabetes, Hypertensions, Tuberculosis Cardiac Problems, Psychiatry Disturbance, Bleeding Diathesis, Active Discharge, Nasal Allergy, OtitisExterna.
- All the patients prone to graft rejection, with revision tympanoplasties
- Immunocompromised status

The patients were randomized into 2 groups and each group compromised of 30 patients.

Group-I Tympanoplasty alone.
Group-IIt Cortical Mastoidectomy withTympanoplasty.

ETHICAL CLEARENCE: -

Ethical committee permission of Kakatiya medical college was started before starting te research study. Information and written consent from all the cases was taken prior to the surgery.

All the cases were treated initially by medical line of treatment, which consist of antibiotics. Oral anti-histaminics and decongestants. Culture and sensitivity of the pathogens from discharging ears was not done as a routine. Preoperatively all the patients had a discharge free period of minimum 4 weeks and conductive loss with in 45dB. Post operatively subjects were followed up for 6 weeks,3 weeks for evaluation of Graft , 6 weeks for discharge evaluation.(Ear pack was kept for 3 weeks)

CONFLICT OF INTEREST: -

No potential conflict of interest relevant to this article was reported.

RESULTS

PATIENT CHARACTERISTICS

In TABLE 1, two groups were analyzed for similarity, in age height, weight, distribution according to gender. Mean Age (in years) of Group-I is 43.8+ 6.99,and4.06±5.877 in Group-II. Height 150.60± 4.43 in Group-I,149.30± 4.40 in Group-II.Weight 54.23±5.685 in Group-I, 52.60± 3.979 in Group-II.

Both the groups were comparable as there was there was No significant statistical difference between them, in Age, Height, and Weight.

Distribution Male Female ratio is almost equal in both the groups.

TABLE-1PATIENTCHARACTERISTICS

PATIENT CHARACTERISTICS	GROUP I	GROUP II	"p" VALUE	SIGNIFICANCE
	MEAN ±S.D	MEAN ±S.D		
1.AGE(YRS)	43.80±6.99	44.06±5.877	0.875	Not Significant
2. HEIGHT (CMS)	150.60± 4.43	149.30± 4.40	0.259	Not Significant
3.WEIGHT(KGS)	54.23±5.685	52.60± 3.979	0.202	Not Significant
SEX DISTRIBUTION	**GROUP I**	**GROUP II**	**"p"VALUE**	**SIGNIFICANCE**
MALE	16(53.3%)	17(56.7%)	**0.795**	Not Significant
FEMALE	14(46.7%)	13(43.3%)		

CLINICAL IMPROVEMENT

TABLE-2CLINICAL IMPROVEMENTPOST OPERATIVELY

CLINICAL IMPROVEMENT		GROUP I (Tympanoplasty)	GROUP II (Mastoidectomy with Tympanoplasty)	"p" VALUE	SIGNIFICANCE
POST-OP EAR DISCHARGE	Discharge +	2(6.6%)	2(6.6%)	0.268	Not Significant
	Discharge –	28(93.3%)	28(93.3%)		
GRAFT STATUS	Graft taken up	28(93.3%)	28(93.3%)	0.268	Not Significant
	Graft failure	2(6.6%)	2(6.6%)		

In Present study (TABLE-2) post op ear discharge was seen only in 4 cases, That is 6.6% in each group. (GROUP I-2 cases, GROUP II-2 cases) and 4 cases of Graft Failure postoperatively in (GROUP I-2 cases, GROUP II-2 cases), with the success rate of 93.33% in Group-I andGroup II. Both the groups are comparable in relation with post operative ear discharge, and graft intake success as the comparison was not statistically significant.

TABLE-3 AUDIOLOGICALASSESSMENT

OUTCOME BY AUDIOLOGICAL ASSEMENT	GROUP-I (TYMPANO-PLASTY)	GROUP-II (MASTOIDECTOMY WITH TYMPANOPLASTY)	P-Value	SIGNIFICANCE
	MEAN ±S.D	MEAN ±S.D		
Pre-op hearing loss	37.7± 2.12	40.69±3.5	0.002	Significant
Pure tone threshold at 3rdmonth (post op.)	24.45±1.92	26.86±1.5	0.0016	Significant
Benefit in decibels	13±1.2	13.58±1.8	0.1474	Not Significant

In Group-I, 30 cases of tympanoplasty alone the average hearing gain

was 13dB and it was 13.58dB in Group-II (cases of mastoidectomy with tympanoplasty). So hearing improvement was nearly same in both the procedures as it was statistically insignificant (p=0.1474).

DISCUSSION

In this study, the cases registered were between in the age group of 20-60 years. Randomly, 30 of these cases were selected for tympanoplasty alone (Group -I) and 30 cases were selected for cortical mastoidectomy with tympanoplasty (Group -II).

Mean age group of the both groups are nearly 44 years. **A study of *DishaAmarMethwani et al*[4]** had 30 years as average age.AnjanaAgarwal et al, study also had,Most common age group in their study as, between 20 and 30 years of age in both the groups, which is lesser than the present study finding and In both the groups, females outnumbered males I the same study.

In present study, in both the groups male to female ratio was nearly equal to 1:1.***RachanaVijayanNambiar et al***[5],had more number of males than females (62% males and 38%females.) which is not coinciding with preset study.But in***DishaAmarMethwani et al***[4]study ,females outnumbered males.

In present study Post operatively subjects were followed up for 6 weeks,.3 weeks for evaluation of Graft intake,6 weeks for discharge evaluation.(Ear pack was kept for 3 weeks).there were 4 cases of post operative ear discharge, 2 cases in each group, indicating that there is no advantage of Mastoidectomy with tympanoplasty surgery over tympanoplasty alone in terms of post operative infections.

Post operative clinical assessment in terms of post operative ear discharge, In otherstudies showed lesser prevalence in Tympanoplasty with Cortical Mastoidectomysurgery group. But it was statistically insignificant, which are comparable to the present study findings.

TABLE-4 POST OP EAR DISCHARGE

POST OP EAR DISCHARGE POSITIVE	TYMPANOPLASTY	TYMPANOPLASTY WITH CORTICAL MASTOIDECTOMY	SIGNIFICANCE
DishaAmarMethwani et al[4]	15%	0%	NOT SIGNIFICANT
RachanaVijayanNambiar et al[5]	16%	12%	NOT SIGNIFICANT
PRESENT STUDY	**6.6%**	**6.6%**	**NOT SIGNIFICANT**

In similarstudies[4-6], apparently mild increased percentage of graft uptake success rate but found statistically insignificant. ***Padam Singh Jamwalet al***[7] **showed** similar success rate in the both groups. Which are comparable to the present study findings.

TABLE-5 GRAFT UPTAKE

GRAFT UPTAKE	TYMPANOPLASTY	TYMPANOPLASTY WITH CORTICAL MASTOIDECTOMY	SIGNIFICANCE
DishaAmarMethwani et al[4]	76.6%	83%	NOT SIGNIFICANT
ANJANA AGARWAL et al[6]	80%	95%	NOT SIGNIFICANT
RachanaVijayan Nambiar et al[5]	84%	88%	NOT SIGNIFICANT
Padam Singh Jamwal et al[7]	85.7%	85.7%	NOT SIGNIFICANT
PRESENT STUDY	**93.3%**	**93.3%**	**NOT SIGNIFICANT**

In present study tympanoplasty alone group's the average hearing gain was 13dB and 13.58dB in Mastoidectomy with tympanoplasty Group indicating , hearing improvement was nearly same in both the procedures as it was statistically also insignificant ***AnjanaAgarwal et al***[6], showed average hearing gain in Tympanoplasty alone group was 9.41 Db, 12.05dB in Mastoidectomy with tympanoplastygroup, showing mild advantage, but it was not statistically significant. In **RachanaVijayanNambiar et al**[5] study also average hearing gain is more in Mastoidectomy with tympanoplasty(32%), than tympanoplasty alone(24%) in the range of 0-20db(statistically insignificant).these studies are comparable to the present study.

CONCLUSION

At last, we concluded that Mastoidectomy with tympanoplasty gives no statistically significant benefit over tympanoplasty alone in safe ear type of CSOM in regards to post operative discharge, graft success rate and hearing gain.

IMPLICATIONS

The implications of the study are, the patients with safe type of CSOM may undergo tympanoplasty only or mastoidectomy with tympanoplasty, but in cases of dangerous or attico-antral type of CSOM, the later treatment is more beneficial.

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