ROLE OF MASTOIDECTOMY IN TYPE 1 TYMPANOPLASTY OF SAFE TYPE CHRONIC SUPPURATIVE OTITIS MEDIA- A PROSPECTIVE STUDY
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ABSTRACT
BACKGROUND
Chronic Suppurative Otitis Media (CSOM) is one of the most common diseases of younger age in middle class population of the developing countries. Loss of hearing due to CSOM has a role in learning and intelligence of the students. There are multiple factors, which affect the tympanic membrane repair, mastoidectomy is one.

MATERIALS AND METHODS
This study at Era’s Lucknow Medical College and Hospital was planned to assess the effect of cortical mastoidectomy in safe type CSOM. For that, 120 patients were taken who were divided in two groups of 60 each. One group was subjected to tympanoplasty type 1 and other to cortical mastoidectomy and type 1 tympanoplasty.

RESULTS
After six months of follow up, it was found that graft rejection was 13 in group 1 compared to 12 in group 2 and cortical mastoidectomy has almost no effect on graft acceptance and hearing gain in pure tone audiometry.

CONCLUSION
This study was planned to find the effect of cortical mastoidectomy in tympanoplasty type 1 in safe type CSOM. Two groups of 60 patients were taken. In one group, only tympanoplasty type 1 while in other cortical mastoidectomy along with tympanoplasty type 1 was done. After 6 months of follow up, no statistically significant difference was found in the graft rejection and hearing gain between the two groups.

KEYWORDS
Mastoidectomy, Otitis Media, Audiometry.


BACKGROUND
Chronic suppurative otitis media is an inflammatory disease of the mucoperiosteal lining of the middle ear and mastoid cavity. Its characteristic features are thickening of the mucosal membrane of middle ear space owing to infiltration with chronic inflammatory cells, oedema and submucosal fibrosis. It is estimated that almost 6% of Indian population suffers from chronic ear disease. Acute or unresolved otitis media, if not treated properly, may progresses to CSOM particularly in children with poor socioeconomic conditions and usually presents within the first 5 years of life. Infection may also spread to middle ear cavity secondary to contamination from ear canal or upper respiratory tract.

A perforation in the tympanic membrane can result from physical injury, scalds, burns, pressure effects, head injuries or infection (acute otitis media or otomycosis). Myringoplasty is the operation specifically designed to close tympanic membrane defects. The aim is reconstruction of the tympanic membrane (Krishna and Devi, 2013). Infection in and around the middle ear cleft may make any attempt of reconstruction futile. In this context, cortical mastoidectomy seems to be an integral part of every tympanoplasty (Krishnan et al, 2002).

The effect of mastoidectomy on patients without evidence of active infectious disease remains highly debated and unproven (Albu et al, 2012; Kamath et al, 2013). However, in cases with active infections, mastoidectomy has been shown to have significantly better outcome (Mutoh et al, 2007). The present study was planned to evaluate the role of mastoidectomy in the outcome of myringoplasty in...
patients with chronic suppurative otitis media (safe type) in dry as well as in wet ear.

MATERIALS AND METHODS

The prospective study was done from January 2013 to December 2015. A total of 120 patients were taken from the Outpatient Department of ENT, Era’s Lucknow Medical College, presenting with chief complaint of ear discharge and hearing loss diagnosed as chronic suppurative otitis media (safe type). The patients suitable for type I tympanoplasty (myringoplasty), i.e. safe type CSOM were enrolled in the study and were randomly allocated to one of the two groups. Patients having unsafe CSOM, extreme age patients, having history of surgery in either ear or with any systemic diseases were not included in the study.

RESULTS

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Age Group (Yrs.)</th>
<th>Total (n=120)</th>
<th>Group I (n=60)</th>
<th>Group II (n=60)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>&lt;20 Yrs.</td>
<td>25</td>
<td>11</td>
<td>17.3</td>
</tr>
<tr>
<td>2.</td>
<td>21-30 Yrs.</td>
<td>42</td>
<td>24</td>
<td>40.0</td>
</tr>
<tr>
<td>3.</td>
<td>31-40 Yrs.</td>
<td>42</td>
<td>18</td>
<td>30.0</td>
</tr>
<tr>
<td>4.</td>
<td>41-50 Yrs.</td>
<td>11</td>
<td>7</td>
<td>11.7</td>
</tr>
</tbody>
</table>

Table 1. Age Wise Distribution of Patients in Two Groups

No significant difference between the ages of two groups was observed statistically. Majority of patients (n=68; 56.3%) were males. There were 52 (43.8%) females. Male-to-female ratio of study population was 1.3:1.

In group-1, there were 36 males and 24 females, while in group-2, there were 32 males in comparison to 28 females and the variations were insignificant. At 12th week, although rejection rate was higher in Group I (10 patients) as compared to Group II (8 patients), the difference between two groups was not significant statistically (p>0.05). At 24 weeks, 3 patients in group I and 4 patients in group II were lost to follow up.
### Table 2. Distribution of Patients in Two Groups with Respect to AB Gap at 24 Weeks (n=95)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>AB Gap (dB)</th>
<th>Total (n=95)</th>
<th>Group I (n=47)</th>
<th>Group II (n=48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>1.</td>
<td>5 dB</td>
<td>3</td>
<td>1</td>
<td>2.0</td>
</tr>
<tr>
<td>2.</td>
<td>10 dB</td>
<td>40</td>
<td>19</td>
<td>40.4</td>
</tr>
<tr>
<td>3.</td>
<td>15 dB</td>
<td>39</td>
<td>23</td>
<td>48.9</td>
</tr>
<tr>
<td>4.</td>
<td>20 dB</td>
<td>13</td>
<td>4</td>
<td>8.5</td>
</tr>
</tbody>
</table>

**Males/Females Profile of Study Group**

**Postop Hearing Status**
In Group I, 42 (89.3%) had AB gap of 10 and 15 dB and almost similar results were found in Group II where we had AB gap of 10 and 15 dB in 37 cases (77.0%). Variation between the two groups was not statistically significant as p >0.05.

Overall, success rate was 79.2%. It was in 47 (78.3%) cases in group-I as compared to 48 (80%) cases in group II and this difference was also not significant statistically.

**DISCUSSION**

Chronic suppurative otitis media is a repairable disease and myringoplasty is often accompanied with cortical mastoidectomy to increase the ventilation of middle ear in active type safe CSOM, but its role in quiescent and inactive disease is questionable. This study was carried out with an objective to find out the efficacy and role of cortical mastoidectomy in patients with chronic suppurative otitis media (safe type).

This study was done on 120 patients with chronic suppurative otitis media (safe type). They were randomly allocated into two groups. 60 patients of Group-I were subjected to myringoplasty only. Group-II comprised of 60 patients, in whom myringoplasty was done along with cortical mastoidectomy.

Age has been evaluated as possible confounding factor having an impact on the outcome (Webb and Chang, 2008; Gupta, 2009). Hence, in present study, both extreme ends paediatric age group as well as elderly were excluded from the study. Age of patients was also matched between two groups.

Male-to-female ratio of the study population was 1.3:1. No gender wise difference in prevalence of CSOM has been reported in community studies.

However, in-hospital based studies, a higher prevalence of males over females is reported in both safe and unsafe types (Caye-Thomasen et al, 2007; Rehman et al, 2011; Baloch et al, 2012; Akayleb and Alroosan, 2012). Although, some western studies (Webb and Chang, 2008) have reported a higher prevalence of female as compared to male patients yet gender wise differences could be purely incidental and could generally be attributed to gender-biased healthcare seeking practices in our settings. Yoon et al (2007) in their study concluded that there were no significant relationships between surgical success rate and the status of the contralateral ear. But, Merenda et al (2007) reported that disease of the contralateral ear and a large tympanometric volume was statistically significant. Thus, a matched bilateral involvement in two groups diminished the confounding effect.

In this study, patients with wet (active) and dry (inactive) type of CSOM were equally divided between the two groups. This was systematically allotted in order to assess the validity of cortical mastoidectomy in both wet and dry situations and to resolve the debate related with the effect of mastoidectomy on patients without evidence of active infectious disease (Albu et al, 2012; Kamath et al 2013).

In the present study, graft rejection rate was 16.7% (10 cases) in Group-I and 13.3 (8 cases) in Group-II after 12th postoperative week. Later, 3 cases in Group-I and 4 in Group-II were lost to follow up. No new rejection took place in subsequent follow ups. Overall, graft rejection rate was 21.6% in cases undergoing myringoplasty alone as compared to 20% in cases subjected to myringoplasty along with cortical mastoidectomy, thus having a better success rate for myringoplasty with cortical mastoidectomy (80%) in comparison to myringoplasty alone group (78.4%), however, the difference was not statistically significant.

Graft take up rates for the two groups range from 50% to 100% in different series. As far as graft take up rate is concerned, our results are comparable to Bhat et al (2009) and Albu et al (2012) who observed success rate of 75% and 76% for myringoplasty alone group as compared to 82.85% and 82.8%, respectively for myringoplasty with cortical mastoidectomy group. Most of the studies above have reported between 70 to 80% for myringoplasty alone and between 80 to 90% for myringoplasty with cortical mastoidectomy. However, no study was available to show a statistically significant difference.

In our study, mean AB gap improvement in two groups was 9.75 dB and 10.13 dB for myringoplasty alone and myringoplasty with cortical mastoidectomy groups. A wide range reported from 3.3 dB to 20.61 dB, respectively. Similar to our results, Habib et al (2011) and Kaur et al (2014) have also shown that gap closure was higher for myringoplasty with cortical mastoidectomy as compared to myringoplasty alone. However, investigators like Balyan et al (1997), McGrew et al (2004), Saha et al (2006) and Toros et al (2010) found that AB gap closure values were higher for myringoplasty alone as compared to myringoplasty with cortical mastoidectomy. Variability in air-bone gap closure has been observed in different series with different values, however, it would be pertinent to mention here that except for the difference of 11.23 dB between two modalities as observed by Habib et al (2011), All the other investigators obtained difference between two groups to be within 2 to 3 dB, a very nominal difference and has a limited clinical value as observed in present study.

Thus, on overall assessment, we found that cortical mastoidectomy did not offer any additional benefit as compared to myringoplasty alone. These views are shared by a number of researchers (Krishnan et al, 2002; Albu et al, 2012; Kamath et al, 2013; Gupta, 2009; Yoon et al, 2007; Bhat et al, 2009; Eliades and Kaur et al 2014; Balyan et al, 1997; McGrew et al, 2004). However, we found that in case of wet ear, cortical mastoidectomy has a better graft take up rate and lower odds of failure as compared to myringoplasty alone.

**CONCLUSION**

This study was planned to find the effect of cortical mastoidectomy in tympanoplasty type 1 in safe type CSOM. Two groups of 60 patients were taken. In one group, only tympanoplasty type 1 while in other cortical mastoidectomy along with tympanoplasty type 1 was done. After 6 months of follow up, no statistically significant difference was found.
in the graft rejection and hearing gain between the two groups.

REFERENCES


