INTRODUCTION

Otitis media is the most common disease in early childhood across the world. It has been stated that almost every child suffers from at least one episode of otitis media by the age of two years. If not treated adequately, it may lead to persistent perforation of tympanic membrane. The most troublesome effect of perforated ear drum is the recurrent discharge from ears. This condition is then termed as chronic suppurative otitis media. The treatment of this condition is culture and sensitivity guided topical and systemic broad spectrum antibiotics. Due to persistent perforated ear drum and emergence of resistant bacteria, the condition is not only recurrent, but over a period of time, it brings about irreversible damage to middle ear mucosa, leading to development of certain other pathological conditions, e.g. granulation tissues, aural polypi, and even cholesteatoma formation. Besides, there is also a considerable degree of hearing loss ranging from 10-60 dB. Most often this condition is unilateral. Regardless of degree of hearing loss, if the problem is unilateral, provided that other ear is normal, person’s hearing is not much affected. But 5-15% patients suffer otitis media affecting both ears causing significant hearing loss and disability, resulting in difficulty in linguistic communication and ultimately social isolation. This condition is prevalent in many developing countries, especially in Pakistan.
Tymanoplasty with or without mastoidectomy is a commonly performed surgical procedure in chronically discharging ear. But once the ear is dry, as it occurs in inactive chronic otitis media, myringoplasty is performed. It is the surgical procedure to reconstruct tympanic membrane perforation using autologus graft. The aim of this surgery is not only to reconstruct tympanic membrane defect, but also to protect ear from recurrent ear infection and nevertheless, to improve hearing i.e. closure of air-bone gap in pure tone audiometry (PTA).

Myringoplasty is commonly performed in one ear. Bilateral myringoplasty may be required in 20-30 % cases of all myringoplasties. But it is generally avoided. Longer duration of surgery, repeatedly changing position of patients, surgical team and equipments including microscope, increased chances of post operative complications, and also increased cost of surgery may be the factors leading to reluctance of surgeons for concomitant bilateral myringoplasties. The advantages of bilateral myringoplasty is not only avoidance of 2nd surgery but also the graft material obtained from one site may be utilized on both sides in closing tympanic membrane perforation. So the purpose of this article is to share our experience of bilateral myringoplasty in patients who had dry perforated ear drum for more than eight weeks duration, and to look for successful closure of tympanic membrane perforation and improvement of hearing.

**METHODOLOGY**

This study was conducted at the Department of ENT-Head-Neck Surgery, Dow University of Health Sciences, and Civil Hospital, Karachi from September 2010 to September 2012. A total of 30 patients above 15 years of age, who had bilateral perforated ear drum involving pars tensa only, for more than 12 months’ duration, but without any discharge for six to eight weeks, were included in the study. Patients who had persistently discharging ear, or had evidence of middle ear infection, granulation tissues, aural polypi, cholesteatoma, ossicular erosion or evidence of sensorineurual hearing loss, were excluded from the study. Size of perforation was assessed depending upon the number of quadrants involved in pars tensa. A small perforation was involving only one quadrant, a medium perforation involving two quadrants, a large perforation involving three and subtotal perforation was labeled when there was large central perforation involving all quadrants with intact tympanic annulus. Patients with marginal or attic perforations were excluded from the study. All patients were also assessed for patency of Eustachian tube. Preoperative pure tone audiometry was obtained for all patients to assess type and degree of hearing loss. All patients were operated under general anaesthesia. In general, the ear with larger perforation was operated first. Post-aural incision was preferred if complete margins of the perforations were not visible. Large temporalis fascia graft was also harvested from this side. Permeatal incision was usually employed on the other side. The large temporalis fascia graft which was harvested from the first operated ear site with the intention to cover both tympanic membrane defects. Alternatively, tragal perichondrium, cartilage or fat were used as graft material. After freshening the margins of tympanic membrane perforation, grafts were placed by underlay technique and stabilized with gelfoam. Bismuth iodide paraffin pack was applied for two weeks. Post-aural wound was closed in two layers. Post operative antibiotics were prescribed for two weeks. After removal of ear pack, topical antibiotics were also prescribed for another three weeks. Patients were also instructed to avoid water entering inside ear canal. Patients were reviewed after 3 months, 6 months and one year. Post-operative closure of tympanic membrane perforation was assessed at each visit. Post operative pure tone audiometry was obtained at six months to assess the closure of air-bone gap and hearing improvement.

Demographic data including patients’ age, duration of disease, pre-operative air-bone gap, size of tympanic membrane perforation, surgical approaches, graft material used and successful closure of tympanic membrane perforation and postoperative closure of air bone gap for hearing improvement were recorded on institutional approved Proforma. Data was entered analyzed using SPSS version 16. Statistical analysis of the data was computed to know the outcome of bilateral myringoplasty by applying paired samples ‘t’ test. A p-value of 0.05 was used as reference.

**RESULTS**

A total of 60 myringoplasties were performed in 30 patients, who had dry perforated ear drum. Out of 30 cases included, 18 were males and 12 were females, with male to female ratio of 3:2. The age range of the patients was 15 to 45 years with mean age of 21 years. All patients had bilateral perforated ear drum ranging from one year to 15 years. Average duration of disease in left ear was 6.36 years and in right ear, it was 5.82 years. Most of the patients were having medium or large sized perforations observed in 29 (48.3%) and 18 (30%) ears respectively. Small perforations were rare which were observed only in 4 (6.6%) ears. Subtotal perforation was found in 9 (15%) ears (Table I).
Pure tone audiometry was obtained in all patients to assess the type and degree of hearing loss. Almost all patients were having conductive type of hearing loss with air-bone gap ranging from 20 dB to 40 dB. Pre-operatively, the average air-bone gap in left ear was 29.83 ±5.258 dB and in the right ear it was 30.69±6.083 dB. (Table 2, Fig.I)

Table 1. Association of size of perforation and successful closure of perforation after bilateral myringoplasty

<table>
<thead>
<tr>
<th>Size of perforation</th>
<th>Closure of perforation</th>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>%</td>
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<tr>
<td>Large</td>
<td>16</td>
<td>88.9</td>
</tr>
<tr>
<td>Medium</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>Small</td>
<td>4</td>
<td>100</td>
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<tr>
<td>Sub Total</td>
<td>7</td>
<td>77.8</td>
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Almost all patients were operated on larger sized perforation first by post-aural approach performed in 33( 55%) ears. Permeatal approach was employed on the smaller perforation side in 26(43.3%) ears, except one patient in which end-aural incision was used. Temporalis fascia was the most commonly used graft for closure of tympanic membrane defect, used in 90% (54/60) ears, followed by tragal perichondrium in 3/60 (5%) ears. Fat was used only in one ear where the tympanic membrane perforation was very small. In that case, after freshening margins of perforation, a plug of fat was introduced through tympanic membrane perforation, which was well taken up.

Successful closure of tympanic membrane was achieved in 93.3 % (56/60) ears. Pure tone audiometry performed after 6 months of successful myringoplasty revealed mean hearing improvement of 13.10±4.312 dB in left ear and 13.62±4.204 dB in right ear. Paired sample ‘t’ test was used to determine the level of significance of hearing improvement in terms of post operative closure of air bone gap which was highly significant (p<0.001).

DISCUSSION

Although chronic suppurative otitis media is common in general population, majority have unilateral disease. Bilateral disease is less common. Incidence of chronic suppurative otitis media varies from 10-20%. Incidence of bilateral dry perforation seems to be about 5-10%. There are many causes of tympanic membrane perforation. But perforation resulting from unresolved otitis media during early childhood is the main factor accounting upto 80%. The most important nuisance effect of tympanic membrane perforation is the recurrent discharge from the ear. The other important effect is hearing impairment. Patients usually don’t bother much about hearing if the other ear is normal. The resulting hearing impairment is troublesome, if it is bilateral. It is also the second most important cause of hearing impairment after impacted wax. Furthermore, the degree of hearing loss is affected not only by size of perforation, but is also affected by site of perforation. Posterior perforations cause more hearing loss than anterior perforations. Similarly extent of ossicular damage also affects in direct proportions to the degree of hearing loss.

Tympanoplasty or myringoplasty is usually avoided in children. It is generally thought that wider and more horizontal Eustachian tube in children and increased incidence of upper respiratory tract infection may lead to increased chances of graft rejection in children. But recent studies have shown equally good results in children. In this study, we included patients above the age of 15 years. Although there was no restriction in the upper age limit. But most patients were from younger age group with mean age of 21 years. This is in accordance with other studies published in this context.

As the purpose of this study was to see the outcome of results of bilateral myringoplasty, so only those patients were selected whose ears were kept dry for at least 6 to 8 weeks. Patients with chronically discharging ears, or those with aural polypi, granulation tissues
and cholesteatoma were not included in the study, because all these patients require mastoidectomy combined with tympanoplasty. Pure tone audiometry was also performed in all patients to document degree of hearing loss and also to exclude sensorineural hearing loss. In this study pre-operative hearing loss was in accordance to the size of perforation and the duration of discharge ranging from 20 dB to 40 dB with average of 30 dB. This finding may contradict with other published data,20 because, most other studies were not restricted to bilateral surgeries, so a wide range of air-bone gap of up to 60 dB was observed in those studies.21

In this study, we focused only on bilateral myringoplasty. In majority of other studies, different types of tympanoplasties including myringoplasties, ossiculoplasties and mastoidectomies with unilateral or bilateral chronic otitis media with or without active discharging ears were included.22 In contrast, in this study, only patients with bilateral dry perforated ear drum were selected without ossicular damage, discharging ears and cholesteatoma. Most of the patients in this series, had medium sized perforation followed by large perforation as was also observed in most other studies.23,24

Since 1953, a number of different graft materials have been used to reconstruct tympanic membrane defect.21 But still temporalis fascia and tragal perichondrium are most widely used graft materials for tympanic membrane closure with good anatomical and functional results.23 We used temporalis fascia graft in 54 (90%) ears, because a large graft can be easily harvested from single site for closure of tympanic membrane defects on both sides. Cartilage with perichondrium was used in only 2/60 (3.33%) ears and only perichondrium in 3(5%) ears. Fat was used only when the tympanic membrane perforation was very small. The only fat graft that we used in this series, was well taken up.

The other advantage that we took by bilateral myringoplasty was the external post aural scar on one side and no external surgical scar on the other side by using post aural approach on larger perforation side and permeatal approach on the other side with smaller perforation.

Successful anatomical closure of tympanic membrane perforation was achieved in 56 (93.3%) ears with significant improvement of mean hearing loss from an average of 30.26 ±5.66 dB to 13.36±4.25 dB, with an average hearing gain of 17 dB in each ear. This is also comparable to most other studies.23,25

CONCLUSION
Bilateral myringoplasty is safe and effective procedure in patients with bilateral dry central perforation of tympanic membrane. It has the advantage of being performed in one sitting, with single anesthesia, only one sided visible post-aural surgical scar, with single temporalis fascia graft used on both sides, without visible surgical scar on the other side, with equally good anatomical and functional results as achieved in unilateral myringoplasties.

REFERENCES

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