Short communication

An evaluation of myringoplasty in war injured people

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Abstract

Perforation of the tympanic membrane is a common war injury, especially after explosions. Such perforations will normally heal spontaneously under favourable conditions. A small number in whom the defect persists will benefit from closure by myringoplasty. Thirty-four such cases underwent operative repair and were compared with an equal number due to other causes.

Introduction

The purpose of performing a myringoplasty is to repair a perforation in the tympanic membrane, thus, improving the patient’s hearing and decreasing the susceptibility of the ear to infection.

A perforation of the tympanic membrane has been found to be the commonest war injury, especially in explosions. However, the healing of such perforations is common; Kerr (1980) claimed a healing rate of 83 per cent in those injured in the Abercorn explosion. Here, the results of myringoplasty operations performed on a number of injured people during the Iraq-Iran war were compared with those undergoing a similar operation performed on an equal number of patients with perforations from other causes. The factors that influence the success of the ‘graft taking’ are discussed.

Materials and method

In the Al-Rasheed Military Hospital, the author performed 68 operations on selected cases so that half had tympanic membrane perforations due to war injuries (especially blast injury) and the other half a perforation due to other causes (Table 1). The number of patients who sustained perforations which healed spontaneously is not known as only those who failed to heal were referred and these were transferred from hospitals near the front line. The operations were performed during the years 1985 and 1986. Forty of the 68 patients had central perforations with a loss of less than 80 per cent of the tympanic membrane and were thus classed as ‘small’; of these 20 were due to war injuries and 20 to other causes. All the ‘small’ perforations were treated by onlay myringoplasty.

The remaining 28 patients had large subtotal perforations where more than 80 per cent of the tympanic membrane had been lost; some had loss of a large part of the eardrum anteriorly or posteriorly. Fourteen of these cases were war injuries and a similar number due to other causes. All the ‘large’ perforations were treated by a posterior underlay and anterior onlay technique. A post-auricular incision was used and then after making a window incision in the posterior meatal skin, a tympano-meatall flap was elevated and the edge of the perforation freshened, the outer epithelium of the anterior part of the remnant of the tympanic removed and a large temporalis fascia graft inserted under the tympano-meatall flap posteriorly, but lateral to the tympanic membrane and malleus anteriorly. The tympano-meatall flap was then returned to its original place covering the posterior part of the graft and the external meatus was packed with gelatin sponge and BIPP cotton wool.

None of the war injury patients gave a history of otorrhoea or infection, but all those with a perforation due to other causes had suffered such problems at frequent intervals, but had no discharge for a period of at least three months prior to operation. Those with ‘small’ perforations due to war injury, were allowed a period of four months but if there had been no sign of spontaneous healing, then an operation was performed; those in the same group with a sub-total perforation, were observed over a two month period before operation was performed.

No tests of Eustachian tube function were carried out because of the lack of standardization of such tests. Hearing was assessed by pure tone audiometry (frequency range 500-4000 Hz); none of the patients had any obvious sensorineural hearing loss and all showed a definite air-bone gap. A follow-up of all patients was carried out post-operatively for a period ranging from three to six months.

Results (Table II)

In the 40 patients with ‘small’ central perforations in whom a perforation technique was used, 38 had a successful graft take with a post-operative air-bone gap within 10 dB (Table III); 50 per cent of this group had a war injury (19 successful, one failure). In the other half (‘small’ perforations from other causes) 17 operations were successful (three failures).

In the 28 cases of sub-total perforations who underwent underlay-onlay myringoplasty, 22 were successful (war injury...
TABLE II

<table>
<thead>
<tr>
<th>Size of perforation</th>
<th>No. of patients</th>
<th>Successful</th>
<th>Un-successful</th>
<th>Success rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>War injured</td>
<td>20</td>
<td>19</td>
<td>1</td>
<td>95%</td>
</tr>
<tr>
<td>Other causes</td>
<td>20</td>
<td>17</td>
<td>3</td>
<td>85%</td>
</tr>
<tr>
<td>Sub-total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>War injured</td>
<td>14</td>
<td>12</td>
<td>2</td>
<td>85%</td>
</tr>
<tr>
<td>Other causes</td>
<td>14</td>
<td>10</td>
<td>4</td>
<td>71%</td>
</tr>
</tbody>
</table>

TABLE III

<table>
<thead>
<tr>
<th>Post-operative air conduction threshold level</th>
<th>Normal threshold</th>
<th>5db loss</th>
<th>10db loss</th>
<th>15db loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small perforations (N = 40)</td>
<td>32</td>
<td>6</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Large perforations (N = 28)</td>
<td>5</td>
<td>7</td>
<td>11</td>
<td>5</td>
</tr>
</tbody>
</table>

group-12/14; perforations from other causes—10/14. In this group, the air-bone was closed within 15 dB (Table III).

Discussion

In war injured people a tympanic membrane perforation was found to be very common and is mostly due to the Spalling Effect of the positive wave front especially implicated as the cause of the large perforations (Kerr, 1980). Most of such perforations tend to heal spontaneously as claimed by Kerr and Byrne (1975) who found that 81 per cent closed with conservative treatment, a percentage also reported by Pahor (1981) on victims of the bombing that occurred in Birmingham. Most traumatic perforations tend to heal spontaneously but there remain some who show no sign of this. In such cases a myringoplasty operation is essential to protect the middle ear, prevent infection and improve hearing. Furthermore in this series, success rate ('Graft Take') reached 90 per cent compared to 78 per cent in operations performed on patients in whom the perforation was due to other causes. To explain the higher success rate in war injured people, one should consider the relative freedom from infection in such cases as opposed to the sepsis accompanying perforations from other causes whose history almost invariably includes repeated attacks of infection and otorrhoea and where healing, if it occurs, will be by fibrous scar tissue with its poor blood supply. Also, the repeated infections probably arise from residual foci that may in turn damage the graft itself. All this will, of course, lower the percentage of 'Graft Taking'.

Another important factor that adds to the reasons why, or further explains the higher success rate seen in operation performed on war injured patients, is the presence of a patent efficient Eustachian tube. This contrasts with the tubal insufficiency often seen in perforations due to other causes. From Table II it is clearly shown that the small perforations show a higher percentage of post-operative success reaching 90 per cent compared with 78% seen in the sub-total perforation group (Booth, 1974; Kerr, 1980). In this series, an onlay technique was used to repair small central perforations with a wide meatus and an underlay for sub-total perforations which need a larger graft and more support from the tympanomeatal flap which will also provide a better blood supply, increasing the chance of success.

Conclusion

A higher graft success rate was obtained in the war injured group (90 per cent) compared with those of perforations due to other causes (78 per cent). This was thought to be due to lack of infection and better Eustachian tube function in the first group. The success rate was also greater in those with small perforations.

References


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Short communications:
This feature will be used on an occasional basis. Examples of material suitable for inclusion under this title would be, for example: a piece of work which was of clinical interest but had failed to produce findings which were of statistical significance; where an investigative technique has been applied to an allied field, not warranting a further in-depth description of its earlier application and methodology.

EDITOR