Over-Under Myringoplasty

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Abstract

The over-under myringoplasty is a technique which combines the advantages of both the over and underlay variants and at the same time avoids their complications. By placing the graft deep to the drum remnants, complications of the overlay myringoplasty such as blunting, lateralization and pearl formation are avoided and by passing superficial to the handle of the malleus the main disadvantage of the underlay namely atelectasis is minimized.

The present study evaluates this technique and at the same time compares it with the underlay counterpart. Fifty two patients undergoing the over-under procedure and 20 the underlay variant showed a high take rate but the former behaved better regarding fewer incidences of atelectasis (4.9 to 20%) and superior postoperative hearing improvement as evidenced by the reduction in the air bone gap by 9.7 and 4.9 dB respectively.

Key Words: Chronic ear – Myringoplasty.

Introduction

GRAFTING a tympanic membrane perforation is one of the most popular and successful surgical procedures in otology. The take rate [1] varies between 74 and 97% in the different publications depending upon the skill of the surgeon, his technique as well as the site and size of the perforation. Recurrent perforations behave less successfully while the age of the patient, the state of the ear whether dry or draining and the degree of hearing loss seem to be irrelevant.

There are two basic techniques for grafting; the overlay and the underlay depending upon placing the graft lateral (superficial) or medial (deep) to the fibrous tissue layer of the drum remnants including the malleus handle respectively. Both have a high success rate in competent hands. However the overlay is more demanding and suffers the potential possibility of developing lateralization, blunting of the anterior angle and epithelial pearl formation. The underlay is simple and easier but may create a narrow middle ear and adhesions may form between the graft and the promontory leading to atelectasis, yet according to Scott-Brown it is the most widely used and accepted method for patching the drum [2].

In a comparative study of the underlay and overlay myringoplasty Singh et al. [3] in 2003 found a similar take rate of 93.3% in both, but concluded that the former is more favourable because of its technical ease, better assessment of the ossicular chain integrity and mobility, less time consumption, earlier healing of the graft and superior hearing gain and fewer minor complications.

The over-under myringoplasty is aimed at eliminating the disadvantages of the two classical techniques. This is achieved by placing the graft material under the drum remnants (like the underlay) but over the malleus handle (like the overlay). Being deep to the drum remnants complications related to the overlay such as blunting and lateralization are avoided and being superficial to the malleus handle the main disadvantage of the underlay viz atelectasis is minimized.

Yigit [4] comparing the underlay and under-over techniques found a high take rate in both (91.5 and 94.9%) and atelectasis incidence of 19.5 to 12% respectively. No lateralization was observed in either group and the air bone gap decreased equally by about 16.55 dB.

Ahmad [5] reporting on 68 patients with dry central perforations and treated by over-under myringoplasty had a take rate of 97%, atelectasis in 1.5% no lateralization and average air bone gap decrease of 12.65 dB.

In a recent study in 2008 She et al. [6] found comparable graft take rates between the over-under and the under lay techniques but reported better
operative pure tone audiometry was done 6 months after the operation.

Surgical procedure:
A standard retro-auricular incision and harvesting a temporalis graft.

A permeatal incision is made through the posterior meatal skin approximately 3-4mm below the level of the lateral border of the posterior (bony wall) to get a clear view of the perforation, allow trimming of its edges and ensure at the end of operation that the graft is adequately placed as planned.

Elevation of the posterior meatal skin is continued downwards to the level of the fibrous annulus which is dissected from the tympanic sulcus and the drum is reflected anteriorly exposing its attachment to the handle of malleus.

Drum remnants are separated from the handle by sharp dissection.

Middle ear is filled with gel foam and the graft is placed over it superficial to the handle (or its remains) but deep to the drum remnants both anteriorly and posteriorly.

Drum remnants are replaced so as to overlay the graft all around and the meatal skin is made to redrap the posterior meatal wall.

Results
After a follow-up period of at least 6 months.

<table>
<thead>
<tr>
<th>Study Group (52 ears)</th>
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<tbody>
<tr>
<td>Healed Drum</td>
<td>48</td>
</tr>
<tr>
<td>Healing as related to draining</td>
<td></td>
</tr>
<tr>
<td>Dry ears</td>
<td>31 out of 33</td>
</tr>
<tr>
<td>Wet ears</td>
<td>17 out of 19</td>
</tr>
<tr>
<td>Healing in fresh ears</td>
<td>39 out of 41</td>
</tr>
<tr>
<td>Healing in recurrent ears</td>
<td>9 out of 11</td>
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<tr>
<td>Atelectasis</td>
<td>2 out of 52</td>
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<tr>
<td>Blunting</td>
<td>1 out of 52</td>
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<tr>
<td>Lateralization</td>
<td>None</td>
</tr>
<tr>
<td>Postoperative air bone gap reduction</td>
<td>9.7 dB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference Group (20 ears)</th>
<th></th>
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<tbody>
<tr>
<td>All fresh and dry</td>
<td></td>
</tr>
<tr>
<td>Healing</td>
<td>18 out of 20</td>
</tr>
<tr>
<td>Atelectasis</td>
<td>4 out of 20</td>
</tr>
<tr>
<td>No Blunting or Lateralization</td>
<td>None</td>
</tr>
<tr>
<td>Postoperative air bone gap reduction</td>
<td>4.9 dB</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Healing</th>
<th>Atelectasis</th>
<th>Blunting</th>
<th>A/B Gap reduction</th>
</tr>
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<tbody>
<tr>
<td>Study group</td>
<td>92%</td>
<td>3.8%</td>
<td>1.9%</td>
</tr>
<tr>
<td>Reference group</td>
<td>90%</td>
<td>20%</td>
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</table>
The over-under lay myringoplasty is a simple technique that combines the advantages of the two most popular and successful ones, the overlay and underlay while at the same time avoids their shortcomings.

The present study was designed to check its success rate and to compare it to the underlay procedure which is currently the most widely used one.

The graft take rate closely matches each other (92 to 90%) inspite of the fact that the over-under group included two varieties of ears which have a lower success rate namely draining ears and recurrent perforations. Both types were not represented in the underlay group which included only dry and fresh cases.

Atelectasis has been cited as a major disadvantage of the underlay technique and was found in 20% of cases as compared to 3.8% only in the study group.

Hearing improvement favours the over-under ears as shown by the postoperative diminution of the air bone gap by 9.7 dB compared to 4.9 dB in the reference cases.

Blunting was met with once in the study group (1.9%) but there was no lateralization.

It is noteworthy that although the presence of preoperative middle ear discharge (draining) was mentioned to be irrelevant yet the present results showed a high take rate in dry ears compared to wet ears (94% to 89%) suggesting that efforts should be made to get a dry ear before surgery.

Previous graft failure i.e recurrent perforation is a handicap for success. Recurrent cases were shown to have a take rate of 81% compared to 95% in fresh ears.

The over-under myringoplasty shows the following advantages:

- It is ideal for all perforation sizes in any drum quadrant.
- No blunting, lateralization or epithelial pearl formation.
- No or low incidence of atelectasis.
- More suitable for ossiculoplasty (no reduction of middle ear space).
- Low incidence of complications.
- High take rates.
- Simple and not time consuming.

The major disadvantage is that the integrity of the malleus handle, at least in part, is an essential prerequisite.

Conclusion:

The over-under myringoplasty technique is a simple procedure that promises a high success rate regarding graft taking as well as hearing improvement. It is suitable for all types of perforations and demands no additional time, cost or exceptional skills on the part of the operator. A preoperative
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integrity of the malleus handle at least in part is an essential prerequisite.

References