Revalidation of the Bondy technique

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The results of 37 cases surgically treated using the modified Bondy technique, over a six-year period at the Gruppo Otologico-Piacenza, Italy are reported. This technique, indicated in epitympanic cholesteatoma with intact ossicular chain and pars tensa, provides a one-stage mastoid cavity exteriorization with radical removal of cholesteatoma while preserving the preoperative hearing levels. The technique, indications, results and comparison with other current techniques are discussed in this article. [Turk J Med Res 1994; 12(1): 42-47]

KeyWords: Epitympanic cholesteatoma, Bondy technique.

Epitympanic cholesteatoma arising from epitympanic retraction pocket may sometimes present with intact tympano-ossicular system, intact pars tensa and good hearing (Figure 1). This constitutes a problem to the surgeon in choosing the appropriate technique to manage this situation. The options are, the closed technique preserving the posterior canal wall with supposed better functional results as regards hearing but with a higher incidence of recurrence necessitating a second look operation. Or the open technique which takes down the posterior canal wall with better control of the pathology in a one-stage procedure but with less functional results as well as the problems of the residual cavity(1).

In 1910 Gustave Bondy(2) described his technique of modified radical mastoidectomy for the treatment of epitympanic cholesteatoma with intact pars tensa. The rational of the technique of Bondy was to produce a safe ear with preservation of hearing by removal of the lateral attic wall and posterior osseous meatal wall to exteriorize the cavity without disturbing the intact ossicular chain and the pars tensa. We have been using the modified Bondy technique in the Gruppo Otologico-Piacenza, Italy in selected cases of epitympanic cholesteatoma. The selected patients have an epitympanic cholesteatoma with intact tympano-ossicular system, good hearing and mesotympanum free of disease. The aim of this study is to evaluate the results of the modified Bondy technique in the surgical management of epitympanic cholesteatoma with intact ossicular chain as regards cholesteatoma control, revision rate, postoperative hearing preservation, complications and, above all, the success in obtaining a stable ear.

MATERIALS AND METHODS

The records of cases operated upon for epitympanic cholesteatoma from July, 1986 to July, 1992 were reviewed. During this time, 493 cases were operated upon. The canal wall up technique was performed in 302 cases and the canal wall down technique in 154 cases. The modified Bondy technique was performed in only 37 cases who fulfilled the criteria of selection for this technique by having an average air-bone gap not exceeding 30 dB measured in 250 Hz, 500 Hz, 1 kHz, 2 kHz and 4 kHz frequencies (Table 1). The cases were 24 males and 13 females, whose age ranged from 12 to 62 years (average 19 years). All showing an epitympanic cholesteatomatous sac with gross mucosal disease around but with an intact ossicular chain and mesotympanum free of disease. 25 cases had a unilateral disease, 12 in the right ear and 13 in the left. The disease was bilateral in 10 cases. However, the modified Bondy technique was performed in both ears of only two cases who fulfilled our criteria of selection for the technique, thus making the
bone gaps measured in the 250 Hz, 500 Hz, 1 kHz, 2 kHz, and 4 kHz. The incidence of recurrence of cholesteatoma, revision rate, complications and the status of the cavities resulting in these cases after utilizing the modified Bondy technique were reviewed.

**Surgical technique**

Under anaesthesia, the mastoid is exposed through a retroauricular incision. A simple mastoidectomy is done after saving the posterior canal skin as a vascular strip. All the air cells are removed with the particular attention to remove the perilabyrinthine and the retrosigmoid air cells, to avoid the formation of mucous cysts postoperatively. The sinodural angle is widely opened and the facial bridge is removed as well as the anterior and the posterior butresses. Special care is taken to avoid contact with the intact ossicular chain at this point. To create a round cavity, the facial ridge is lowered followed by the widening of the anterior meatal wall after reflecting the anterior meatal skin inferiorly to the tympanic membrane which are protected with an aluminium plate during drilling. To avoid retraction of skin around the ossicles postoperatively, a piece of cartilage is put under the body of incus and head of malleus.

Another piece of cartilage can also be put over the long process of the incus to prevent retraction around it. A temporalis fascia graft is split to encompass the incus passing over its long process and under its body. Another separate piece of fascia is used to cover the exposed body of incus. A meatoplasty is done in all cases except when having a small sized cavity attributed to the forward placement of the sigmoid sinus and a low middle fossa dura (Fig 2-3).

**RESULTS**

The average postoperative air-bone gap improved 5-15 db in 11 cases (30 %), unchanged in 16 cases (43 %), and became worse in 10 cases (27 %). In the latter group, the air-bone gap deteriorated by 5-10 dB
REVALIDATION OF THE BONDY TECHNIQUE

Table 1. Number and percentage of patients with average air bone gap in dB. measured in 250, 500, 1000, 2000, 4000 Hz frequencies. Preoperative versus postoperative. SNHL: Sensorineural hearing loss.

<table>
<thead>
<tr>
<th>Average A-B gap in dB</th>
<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of patients</td>
<td>A</td>
</tr>
<tr>
<td>&lt;5</td>
<td>2</td>
<td>5.5</td>
</tr>
<tr>
<td>6-10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>11-20</td>
<td>25</td>
<td>67</td>
</tr>
<tr>
<td>21-30</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>31-40</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SNHL</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2. Pathologies detected in contralateral ears in cases presented with unilateral epitympanic cholesteatoma. (n=number of patients).

<table>
<thead>
<tr>
<th>n</th>
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<tbody>
<tr>
<td>Perforated pars tensa</td>
</tr>
<tr>
<td>Tympanosclerosis</td>
</tr>
<tr>
<td>Attic retraction pocket</td>
</tr>
<tr>
<td>Monomeric</td>
</tr>
<tr>
<td>Retracted pars tensa</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

in nine cases and in one case by 30 dB. Compared to 88.5 % of cases that started with a preoperative air-bone gap equal or less than 20 dB, the postoperative results show that this level was preserved in 81 % of cases. However, 16% had a postoperative air-bone gap in the range of more than 20 dB to 30 dB. In only one case (3 %) that the postoperative air-bone gap exceeded 30 dB compared to zero % preoperatively. There were no cases of postoperative sensorineural hearing loss (Table 1).

Revising the status of the contralateral ears in cases presented with unilateral epitympanic cholesteatoma (25 cases), normal contralateral ears were detected in only 16 cases with the remaining nine cases showing different pathologies in the contralateral ears as described in Table 2.

In the follow up period ranging from one to six years (average three and half years), dry cavities were achieved in all cases except two. These were revised for draining cavities where a revision of their meatoplasty was performed for a postinfection stenosed meatus. All tympanic membranes remained intact. No signs of recurrent cholesteatoma were detected during this follow up period. The meatoplasties were aesthetically accepted by all patients who enjoyed their usual activities as regards water sports and showering.

DISCUSSION

The objectives of cholesteatoma surgery should include the identification and elimination of intractable disease, to achieve dry, safe ear, and if possible, without compromising this goal, preservation or improvement of hearing. Analysis of the hearing results obtained utilizing the modified Bondy technique in 37 ears with epitympanic cholesteatoma shows that this technique has fulfilled these objectives. While in the majority of cases (43 %) there was a preservation of the preoperative air-bone gap, 30 % of cases had improvement in their air-bone gap compared to their preoperative gap. Only in 27 % of cases that the air-bone gap became worse than that preoperatively. Nevertheless, this deterioration in the air-bone gap was in the range of 5-10 dB. In only one case the air-bone gap deteriorated by 30 dB.

It is well known that eradication of the cholesteatoma usually excludes maintenance of the normal anatomy of the ear and therefore disfavors the improvement of hearing. Yet, comparing our overall results of the percentage of cases which had air-bone gaps equal or less than 20 dB, it becomes clear that we achieved this level in 81 % of cases treated with the one-stage technique of modified Bondy’s compared to 68 % and 55 % achieved by Bonding’ and Kinney’ respectively using a one stage canal wall up procedure, 68% achieved by Shelton and Sheehy’ using staged procedures , 49 % and 58 % achieved by Lau and Tos’ using canal wall down and canal wall up techniques respectively, 34 % with modified radical and 62 % with intact canal wall technique as reported by Brown’.

This comparison of hearing results is only to stress the value of early identification of attic cholesteatoma since we are comparing a pathology with no tympano-ossicular involvement to more extensive ones. It is also meant to indicate that although no technique can achieve a 100 % hearing improvement or even preservation, the modified Bondy technique stands out to be the best technique available as compared to other techniques in achieving the highest percentage of hearing preservation and/or improvement in indicated cases.

Several attempts have been described reconstructing the lateral attic wall after removal of an attic retraction cholesteatoma such as those described by Zöllner and Mannolidis’, Pappas et al.’ and, Mc-

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REFERENCES
8. Zollner F, Manolidis L. The importance of the aeration of the attic in autogenic or homogenic tympanoplasties. Arch Ohr Nas u Kehlk Heilk 1973; 204; 289-295.