**INTRODUCTION**

Interatrial communication (IAC) is the fourth most frequently encountered congenital heart malformation, and one of the most common in adults. As an alternative to surgical closure of ostium secundum, percutaneous closure procedures have been developed, with the aim of avoiding sternotomy and coronary bypass, thus reducing morbidity and length of hospital stay. Multiple devices have been developed, and the most recent of these, the auto-expandable Amplatzer device, seems to have the best properties with regard to safety and efficacy. Transient ST segment elevation in the inferior derivations during device implantation has been anecdotally reported (1 case in a series of 100 cases).

**CLINICAL CASES**

From December 2000 to May 2001, 8 adults diagnosed with IAC ostium secundum and the need for its correction, with an average age of 49±15 years (range 23 to 69 years) underwent percutaneous closure with the Amplatzer device. Patient characteristics are listed in Table 1. In all patients a transesophageal echocardiogram (TEE) was performed to define the morphology and diameter of the defect. The conditions required were: ostium secundum IAC, maximum 30 mm diameter with a free border greater than 5 mm. The implant was performed under general anesthesia in all cases. The choice of the device was based on the size as defined by TEE and that provided by a balloon occluder. The procedure was carried out following the usual protocol described previously. We were parti-

**Key words:** Atrial septal defect. Catheterization. Electrocardiography.

**Palabras clave:** Comunicación interauricular. Cateterismo cardíaco. Electrocardiografía.
cularly careful with the introduction of the device into the sheath, which was performed under physiologic saline serum, and we performed the operation repeatedly until we were sure that no bubbles appeared in the serum upon extraction.

During the manipulation and implantation of the device in 6 of the 8 cases a transitory (<1-2 minutes) but significant elevation of the ST segment was observed in the inferior derivations (Figure 1). This elevation was variable in magnitude; in 2 cases it was greater than 3 mm and in the remaining 6 cases 1 to 3 mm, and was not associated with changes in arterial pressure, cardiac frequency, or arterial oxygen saturation, and, obviously, symptoms were not present as the patient was anesthetized.

In the first case in which we observed a marked ST segment elevation (case 2, 59-year-old woman) we performed coronary angiography, which revealed a significant lesion in the right proximal coronary artery. This was evaluated by intracoronary echography, which revealed a minimum luminal area of 3.5 mm², and we decided to treat the lesion with angioplasty. In the immediately preceding cases (younger patients), we also observed changes in the ST segment, but coronary angiography was not considered appropriate. In cases 7 and 8, the patients’ age, coronary angiography had been performed previously, and was normal.

We did not observe changes in any patient on electrocardiogram performed after the procedure. We also did not observe changes in the segmental contractility of the left ventricle on echocardiogram.

**DISCUSSION**

The transitory elevation of the ST segment in the inferior derivations has been described as a rare complication during the percutaneous closure of IAC with the Amplatzer device, and it has been attributed to the possible embolization of small air bubbles. This complication has been observed more frequently during other non-coronary percutaneous procedures, specifically mitral valvuloplasty (MVVP) with Inoue balloon. Vahanian et al described this finding in 2.6% of MVVP procedures; it was observed upon deflating the balloon, and attributed it to air embolisms introduced into the right coronary artery, given the high location of the right coronary ostium in relation to the left in the decubitus supine position. In all cases, right coronary angiography was normal. Ludman et al described this complication in a greater percentage of valvuloplasties (7.4%), observing the elevation immediately before the balloon traversed the mitral valve, so that they considered it unlikely that an air embolism was the cause. These authors postulated the possible existence of ischemic or mechanical changes, or both (coronary spasm, deformation of the AV frown, etc.) caused by the manipulation of rigid cathe-

**TABLE 1. Characteristics of cases of interatrial communication treated with the Amplatzer device**

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex</th>
<th>Age (years)</th>
<th>TEE</th>
<th>Device</th>
<th>History of heart disease</th>
<th>Elevation of ST segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>56</td>
<td>23</td>
<td>26</td>
<td>No</td>
<td>Yes +</td>
</tr>
<tr>
<td>2</td>
<td>W</td>
<td>59</td>
<td>15</td>
<td>17</td>
<td>No</td>
<td>Yes ++</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>23</td>
<td>30</td>
<td>32</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>W</td>
<td>46</td>
<td>25</td>
<td>28</td>
<td>No</td>
<td>Yes +</td>
</tr>
<tr>
<td>5</td>
<td>W</td>
<td>35</td>
<td>25</td>
<td>28*</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>W</td>
<td>49</td>
<td>24</td>
<td>28</td>
<td>No</td>
<td>Yes +</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>56</td>
<td>27</td>
<td>30</td>
<td>No</td>
<td>Yes +</td>
</tr>
<tr>
<td>8</td>
<td>W</td>
<td>69</td>
<td>18</td>
<td>22</td>
<td>No</td>
<td>Yes ++</td>
</tr>
</tbody>
</table>

*The device did not remain stable and was not ultimately implanted; TEE indicates diameter of the defect on transesophageal echocardiography; +, 1-3 mm elevation of the ST segment; ++, ST segment elevation >3 mm.

**Fig. 1.** Electrocardiography monitor recording that shows the ST segment elevation in derivations II and III.
In any case, whatever the etiological mechanism, the only avoidable factor is the embolization of air, so that it is important to be very careful with the external manipulation of the device, checking several times that there are no air bubbles.

REFERENCES


Fig. 2. Liberation of bubbles upon extracting the device from the sheath after the first introduction of same.