Pseudoaneurysm of the native sinus of Valsalva

Tętniak rzekomy zatoki Valsalvy – opis przypadku

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Abstract

Pseudoaneurysm of the native sinus of Valsalva is exceedingly rare. We present a case of a 32-year-old male who was referred to the hospital after he had been symptomatic for 1.5 years. Transoesophageal echocardiography and computed tomography illustrated a pseudoaneurysm arising from the non-coronary sinus of Valsalva. A prompt operation was performed upon admission, and the patient recovered.

Key words: computed tomography, pseudoaneurysm, sinus of Valsalva

Case report

A 32-year-old male was admitted due to lethargy, weakness and shortness of breath on exertion for 1.5 years with recent attenuation. Physical examinations revealed normal vital signs, with no pulmonary rales or heart murmurs audible. The heart had a moderate prominent left atrial contour on chest radiograph (Figure 1). Transoesophageal echocardiography showed mild-moderate aortic regurgitation, mild-moderate mitral regurgitation, and mild-moderate pulmonary hypertension with a pressure gradient of 42 mmHg, and a pseudoaneurysm originating from the non-coronary sinus of Valsalva, causing compression to the left ventricular outflow tract. Computed tomographic scans confirmed the pseudoaneurysmal formation from the non-coronary sinus of Valsalva (Figures 2 and 3). He had no history of chest blunt trauma. He had undergone mitral valve replacement in 1988 for rheumatic heart disease. He developed paroxysmal atrial fibrillation 10 years earlier, which was converted successfully to normal sinus rhythm by electrical cardioversion.

A prompt operation was performed upon admission. The preoperative diagnosis was confirmed intraoperatively. The aortic valve was moderately regurgitant. A pseudoaneurysm originated from the non-coronary sinus of Valsalva, 2 cm in diameter, bulging rightward and posteriorly, and compressing the left atrium and left ventricle. The orifice of the pseudoaneurysm was closed by interrupted pledget stitches, and the aortic valve was replaced with a 21-mm Sorin SL mechanical prosthesis (Sorin Biomedica Cardio, S.p.A., Via Crescentino snc, Saluggia, Italy). The cardiopulmonary bypass time was 78 min, and the crossclamp time was 72 min. He was discharged on the fourth postoperative day, and has done well since then.

Discussion

Pseudoaneurysm of the native sinus of Valsalva is exceedingly rare, and is much rarer than congenital aneurysms [1, 3]. Only 11 cases could be retrieved from the English literature [1-10]. In total, 12 cases including the present one have been described (Table I). Their formations were spontaneous in 5 cases (41.7%), traumatic in 3 (25%), and infective in 4 (33.3%). One of them had a ruptured pseudoaneurysm at onset. In four patients who had a spontaneous pseudoaneurysm of the sinus of Valsalva, it originated from the right or left coronary sinus. This is
the first case of spontaneous pseudoaneurysm of the sinus of Valsalva arising from the non-coronary sinus. Only one patient was older, while all others were younger than 70 years. Symptoms were not mentioned in 2 patients. In the remaining patients, 1 (10%) patient was asymptomatic, and the lesion was discovered during routine physical examination. Others presented infection (n = 3), dyspnoea, palpitation or shortness of breath (n = 3), chest pain (n = 2), infection plus chest pain (n = 1) or chest pain plus hemiparesis (n = 1). Compression of the coronary artery causing myocardial infarction occurred in 3 patients, in whom two pseudoaneurysms arose from the left and one from the right sinus of Valsalva. One patient had bicuspid aortic valve and aortic dilation manifesting with cardiogenic shock.

Non-invasive methods, such as echocardiography, computed tomography or magnetic resonance imaging, were used as diagnostic tools in 9 (75%), and combined non-invasive and invasive methods (angiography or aortography) in 3 (25%) patients. Pseudoaneurysms were located in the right, left and non-coronary sinus of Valsalva in 5 (41.7%), 4 (33.3%), and 3 (25%) cases, respectively. Their dimensions were 4.74 ± 2.73 (1-9.4) cm (n = 8). Treatments for these patients were not mentioned in 2 patients. One (10%) patient did not undergo surgery due to a poor condition. Nine (90%) patients had their pseudoaneurysms resected and sinuses of Valsalva repaired. Two patients were operated on an urgent basis. Two had a simultaneous aortic valve replacement, and two had an aortic root replacement or repair. Seven of these

Figure 1. The heart had a moderate prominent left atrial contour on chest radiograph. The prosthetic valve in the mitral position could be noted

Figure 2. An axial view of the computed tomographic scan revealed a pseudoaneurysm (*) 2 cm in size arising from the posterior position of the aortic root. 

AO – aorta, LA – left atrium, LV – left ventricle, RV – right ventricle

Figure 3. Computed tomographic scan in a sagittal view showed a pseudoaneurysm (*) 2 cm in size arising from the posterior position of the aortic root. The left atrium was dilated, extending posteriorly. 

AO – aorta, LA – left atrium, PA – pulmonary artery
Histological studies demonstrated that structural weakness between the aortic wall and annulus might be responsible for the occurrence of sinus of Valsalva lesions [11]. Echocardiography, computed tomography and magnetic resonance imaging are valuable non-invasive diagnostic approaches [2]. Echocardiography may show a huge mass at the aortic root bulging into the right ventricular outflow tract, and an indirect sign such as a turbulent flow could be noted in Doppler colour flow imaging [4]. Both computed tomography and magnetic resonance imaging can show details of the pseudoaneurysms. Especially magnetic resonance imaging precisely displays size and location of the pseudoaneurysm, length and width of neck, size of thrombus, and relations with the adjacent tissues [5].

### Table I. Data from literature on pseudoaneurysms arising from the native sinus of Valsalva

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Gender</th>
<th>Nature</th>
<th>Symptom</th>
<th>Diagnostic method</th>
<th>Location in sinus of Valsalva</th>
<th>Size [cm]</th>
<th>Surgery</th>
<th>Clinical outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Misumi et al.</td>
<td>2001</td>
<td>77</td>
<td>f</td>
<td>spontaneous</td>
<td>asymptomatic, check-up for cardiomegaly</td>
<td>X-ray + echo + aortography</td>
<td>right</td>
<td>1</td>
<td>resection + sinus repair</td>
<td>alive</td>
</tr>
<tr>
<td>White and Plotnick</td>
<td>2001</td>
<td>44</td>
<td>f</td>
<td>traumatic</td>
<td>NG</td>
<td>echo + MRI</td>
<td>left</td>
<td>6</td>
<td>surgery</td>
<td>NG</td>
</tr>
<tr>
<td>White and Plotnick</td>
<td>2001</td>
<td>56</td>
<td>m</td>
<td>spontaneous</td>
<td>chest pain</td>
<td>CT</td>
<td>right</td>
<td>NG</td>
<td>NG</td>
<td>NG</td>
</tr>
<tr>
<td>Salanitri et al.</td>
<td>2005</td>
<td>33</td>
<td>m</td>
<td>mycotic</td>
<td>a history of pulmonary and pericardial Aspergillus infection</td>
<td>pathology + MRI</td>
<td>right</td>
<td>3.5</td>
<td>palliative care</td>
<td>NG</td>
</tr>
<tr>
<td>Lee et al.</td>
<td>1998</td>
<td>59</td>
<td>f</td>
<td>spontaneous (rupture)</td>
<td>exertional dyspnoea</td>
<td>echo + angiography</td>
<td>right</td>
<td>9.4 × 8.3</td>
<td>urgent resection + patch repair</td>
<td>alive</td>
</tr>
<tr>
<td>Katayama et al.</td>
<td>2005</td>
<td>55</td>
<td>f</td>
<td>postoperative</td>
<td>high fever + general fatigue</td>
<td>echo + CT</td>
<td>non-</td>
<td>4 × 4</td>
<td>urgent 2-staged operation resection + patch repair of non–coronary sinus</td>
<td>alive</td>
</tr>
<tr>
<td>Gharzuddine et al.</td>
<td>1997</td>
<td>38</td>
<td>m</td>
<td>traumatic</td>
<td>palpitations and a heart murmur, left coronary artery compression</td>
<td>echo</td>
<td>left</td>
<td>NG</td>
<td>sinus repair + coronary artery bypass + ASD closure</td>
<td>alive</td>
</tr>
<tr>
<td>Habib et al.</td>
<td>1998</td>
<td>69</td>
<td>f</td>
<td>traumatic</td>
<td>chest pain /left main compression</td>
<td>echo</td>
<td>left</td>
<td>7 × 6</td>
<td>aortic root replacement, left main coronary artery ligation, and arterial bypass</td>
<td>alive</td>
</tr>
<tr>
<td>Núñez et al.</td>
<td>2004</td>
<td>36</td>
<td>f</td>
<td>spontaneous</td>
<td>chest pain, aphasia, right hemiparesis</td>
<td>MRI + angiography</td>
<td>left</td>
<td>NG</td>
<td>AVR + sinus repair</td>
<td>alive</td>
</tr>
<tr>
<td>Kim et al.</td>
<td>2004</td>
<td>42</td>
<td>m</td>
<td>septic</td>
<td>paravalvular abscess</td>
<td>3D CT angiography</td>
<td>non-</td>
<td>NG</td>
<td>aortic root repair + sinus repair</td>
<td>NG</td>
</tr>
<tr>
<td>Cayla et al.</td>
<td>2006</td>
<td>25</td>
<td>m</td>
<td>septic/mycotic</td>
<td>chest pain, fever / compression of right coronary artery</td>
<td>CT</td>
<td>right</td>
<td>5 × 3</td>
<td>AVR + sinus repair</td>
<td>NG</td>
</tr>
<tr>
<td>present</td>
<td>2006</td>
<td>32</td>
<td>m</td>
<td>spontaneous</td>
<td>lethargy, weakness and shortness of breath on exertion</td>
<td>echo, CT</td>
<td>non-</td>
<td>2</td>
<td>AVR + sinus repair</td>
<td>alive</td>
</tr>
</tbody>
</table>
The indication for prompt surgery for pseudoaneurysms of the sinus of Valsalva is based on the risk of sudden rupture [4]. Infections confined to the leaflets may simply require a valve replacement, but extensive manoeuvre and further reconstruction would be necessary if the annulus and the surrounding tissues were encroached in septic cases [5].

Pseudoaneurysms of the native sinus of Valsalva may imply high morbidity in view of their tendency to rupture. A good outcome could be obtained by prompt diagnosis and surgery.

References