Follow-up papers - Cardiac general

Unusual complication after aortic valve replacement

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Received 15 June 2007; received in revised form 13 October 2007; accepted 16 October 2007

Abstract

We present a report of a postoperative left ventricular-right atrial (LV-RA) communication after aortic valve replacement. Such intracardiac defects are rare but encountered occasionally after valve surgery. The diagnosis was made by use of transesophageal echocardiography with echo-Doppler and color-flow imaging. Complications of LV-RA shunts and differential diagnosis are discussed.

Keywords: Cardiac surgery; Valve replacement; Left ventricular-right atrial communication; Perioperative echocardiography

1. Case report

A 77-year-old lady was scheduled for a coronary-artery bypass operation and aortic valve replacement because of ischemic cardiac disease and severe aortic stenosis. The patient underwent an aortic valve replacement with a biological prosthesis valve and placement of a single coronary bypass graft. The initial follow-up was complicated by excessive blood loss, which needed a surgical treatment. Twenty-four hours later, the patient was extubated and mobilized. Within a few hours she developed hypotension, atrial fibrillation and jugular venous distension (CVP 15) associated with oliguria. The symptoms suggested the diagnosis of cardiac tamponade, which prompted us to perform an urgent transthoracic echocardiography (TTE), showing a modest amount of pericardial effusion without evidence of right cavity collapse. The remaining echocardiographic features showed a normal ejection fraction, a mild tricuspid regurgitation, normal mitral valve function and no aortic prosthetic malfunction. The patient became progressively confused, cold, tachypnoic and developed a respiratory insufficiency needing an intubation. Given the atypical clinical and echocardiographical presentation [1, 2] of post-surgical cardiac tamponade, the patient was transferred to the operating theatre for a surgical exploration and drainage. Despite the surgical procedure we did not observe any striking hemodynamic improvement. During the intraoperative TEE examination our attention was drawn by an impressive systolic echo-cardiography with Doppler color-flow examination and we saw a small high velocity jet originating from the left ventricular outflow tract entering the right atrium and finally a small communication between the left ventricle and the right atrium was found (Fig. 2).

In this patient, the occurrence of the shunt during the postoperative period was due to a surgical problem. The anchoring of the biological aortic prosthesis was performed by means of Teflon, reinforced with Ethibound ‘U’ sutures. The Teflon lied on the ventricular side. The aggressive decalcification of the anulus and the friable tissue of the patient may well have contributed to the shunt formation. During reoperation we observed a distended RA and a palpable thrill on the aortic basis.

In cardiopulmonal bypass, via aorta and vena cava, the shunt could be well visualized by opening the right atrium. The shunt was corrected in cardioplegic arrest by replacing the aortic prosthesis and closing the small defect with Prolene 4.0 sutures, reinforced with Teflon pelts.

The further recovery was complicated by a transitory liver failure. The patient was discharged four weeks later.

2. Discussion

Left ventricular-right atrial (LV-RA) communications are rare intracardiac defects. They can either be congenital [3] or acquired. Acquired defects have been reported in association with trauma, following aortic or mitral valve replacement, previous repair of atrioventricular septal defects, ischaemic heart disease and as a result from endocarditis [4]. During aortic valve replacement, aggressive debride ment of calcium from the annulus of the old valve can cause a defect. This is explained by the anatomical relationship of the left ventricle outflow tract with the peri-membranous septum and the right atrium. The hemodynamic LV-RA shunt features consist of: first in forward
left ventricular failure due the blood regurgitation into the right atrium and second in a right cavity volume overload leading to congestive right backward failure. Clinically, the right-sided volume overload is also seen as elevated jugular venous pressure. The postoperative differential diagnosis of an acute elevated jugular venous pressure should also include superior vena cava compression, severe tricuspid valve incompetence or tricuspid obstruction, failure of right cavity filling due to cardiac tamponade and left to right shunts. In most of those cases the acute worsening of the clinical conditions imposes a rapid diagnosis. The identification of a right to left shunt could be done by different ways; through an arterial pulmonary catheter, cardiac catheterization, but nowadays echocardiography [5] in experienced hands is probably the quickest way to localize such defects, particularly using Doppler color-flow. The feature of those pathologies must be actively and carefully searched knowing that acoustic shadowing of the ultrasound beam can make the detection of such a defect more difficult [6]. Distention of the right atrium as well the abnormal motion of the atrial septum should suggest this rare postoperative complication. In our case the septum bulging into the left atrium during ventricular systole, forced us to investigate further on the correct diagnosis. The potential complications of such defects are right atrium stretching with arrhythmia, rupture risk and right venous stasis. On the left side the circulatory failure combined with low output develops organ hypoperfusion and dysfunction. The repair of these shunts is in most cases mandatory because of acute hemodynamic deterioration and risk of irreversible myocardial or organ dysfunction.

In conclusion, the most important issue of our report consists in the description of an early post-surgical circulatory failure due to left to right shunt. Such conditions should be an integral part of the differential diagnosis of postoperative right circulatory failure and must be actively searched especially in regard to an unexpected right cavity distension.

References


