Acute Pericarditis as a Complication of Percutaneous Mitral Balloon Valvulotomy

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During the past two decades, percutaneous mitral balloon valvulotomy (PMBV) has been frequently used, with high success and low complication rates, in the treatment of patients with moderate to severe rheumatic mitral stenosis. The case is reported of a patient with severe rheumatic mitral stenosis who developed acute pericarditis two days after successful PMBV. To the best of the authors' knowledge, this is the first such case to be reported.

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With incremental operator experience and ongoing technical refinements, percutaneous mitral balloon valvulotomy (PMBV) has become an option for the treatment of patients with mitral stenosis Randomized trials have shown that PMBV affords excellent short- and long-term hemodynamic and survival outcomes (1,2). Although rarely encountered, major complications such as severe mitral insufficiency, systemic embolism, atrial septal defect, or cardiac perforation may develop during the PMBV procedure (3-6). Here, the case is reported of a young man with severe rheumatic mitral stenosis who underwent successful PMBV but developed acute pericarditis two days after the procedure. To the present authors' knowledge, this is the first such case to be reported.

Case report

A 32-year-old man was admitted to the authors' clinic with a complaint of exertional dyspnea (NYHA functional class II). A physical examination revealed an accentuated first heart sound, an opening snap of the mitral valve, and diastolic rumbling at the apex on cardiac auscultation. The electrocardiogram showed sinus rhythm, right axis deviation, right ventricular hypertrophy, and biatrial enlargement. Transthoracic echocardiography (TTE) revealed the presence of a rheumatic mitral valve with valve area 0.9 cm^2, a mean diastolic transmitral gradient of 14 mmHg, mild mitral regurgitation, moderate tricuspid regurgitation, left atrial enlargement, an estimated systolic pulmonary artery pressure of 50 mmHg, and normal left ventricular size and function. Preprocedural laboratory investigations, including complete blood count and erythrocyte sedimentation rate (ESR), were within normal limits. PMBV was performed successfully using an antegrade, trans-septal approach with an Inoue balloon catheter (Toray Industries, Houston, TX, USA), without any acute complications. The PMBV technique utilized has been described previously (7). Subsequent TTE performed immediately after and 2 h after PMBV revealed an absence of pericardial effusion. On the morning of the next day, the patient complained of severe retrosternal pain which radiated to his back, and was aggravated by deep breathing. Electrocardiography revealed a diffuse ST segment elevation on precordial (V2-6) and extremity (D1, D2, D3, aVL and aVF) derivations (Fig. 1). Repeat TTE indicated the presence of minimal pericardial effusion on the posterior and inferior wall (Fig. 2). Laboratory investigations revealed elevated levels of acute inflammatory markers, including white blood cell count, ESR and C-reactive protein. The patient's clinical and laboratory findings were considered to be compatible with acute pericarditis. Consequently, treatment with a non-steroidal anti-inflammatory agent was started and continued for four weeks, during which time the patient's symptoms, laboratory parameters, electrocardiogram and echocardiographically detected pericardial effusion were normalized.

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Discussion

During the PMBV procedure, repeated inflation of the balloon causes the stenotic mitral valve to become

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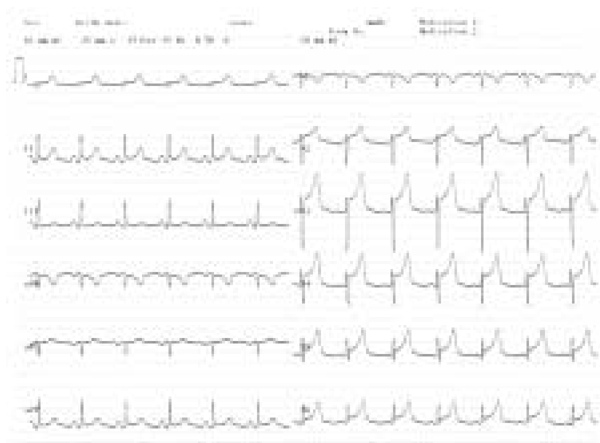

Figure 1: Electrocardiogram showing diffuse ST segment elevation, except leads aVR and V1.

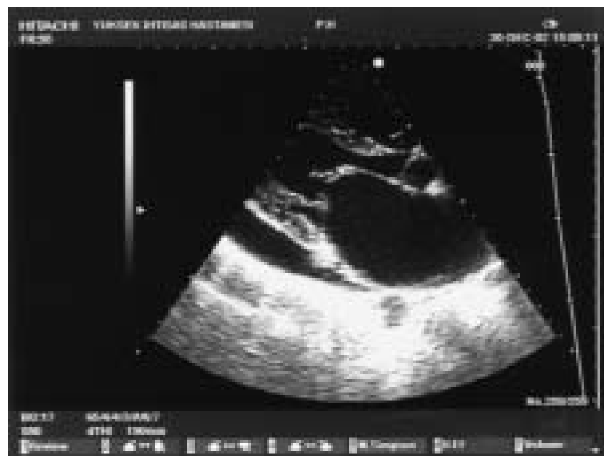

Figure 2: Transthoracic echocardiography; parasternal long-axis view showing pericardial effusion on the posterior wall of the left ventricle.

enlarged as a result of tearing and separation of the fibrotic and fused valve leaflets. At the same time, myocardial trauma or injury may develop during the process. This myocardial injury may cause an autoimmune or inflammatory response on the pericardium. Previously, Demirtas et al. (8) reported the case of a patient with severe mitral stenosis who developed a Dressler-like syndrome at about three weeks after PMBV. In the present patient, however, acute pericarditis developed at only two days after the procedure.

Cardiac perforation is one of the major complications of PMBV. Hemopericardium most commonly occurs as a consequence of erroneous trans-septal puncture (6,9), and less frequently is the result of guidewire- or balloon catheter-induced left ventricular perforation (6,9). The rate of bleeding into the pericardial space is variable, and may be dependent upon the size of the rupture, the site of perforation, the coagulability of the blood, or the abrupt pressure changes during inflation procedure. Although TTE, when performed immediately and at 2 h after PMBV, did not reveal any degree of pericardial effusion, the presence of minor hemopericardium, which was not detected on TTE, cannot be excluded. Thus, an autoimmune or inflammatory response to a small quantity of blood entering the pericardial space might be a possible cause of acute pericarditis, resulting later in a pericardial effusion.

In conclusion, the case is presented of a previously unreported complication of PMBV, the most likely causative agent of which was an autoimmune or inflammatory response to myocardial injury or minor pericardial hemorrhage. Interventional cardiologists should be aware of this rare, but clinically significant, complication in order to make a correct diagnosis and ensure appropriate management.

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