CASE REPORT

Anterior mitral valve aneurysm perforation in a patient with preexistent aortic regurgitation

A 71-year-old man with a history of prostatic cancer and without reported fever in the previous weeks was admitted to our department for increasing dyspnea. He was restless and preferred to remain sitting up in bed. Cardiac auscultation revealed a 4/6 holosystolic murmur at the apex radiating to the axilla. Chest percussion revealed dull sounds and rales upon auscultation of the lungs. No skin lesions were detected. Blood arterial pressure was 90/55 mmHg, heart rate 130 beats per minute, and respiratory rate 40 breaths per minute. Hemogasanalysis revealed hypoxemia and respiratory acidosis (pH= 7,2; pO2= 55 mmHg; pCO2= 52 mmHg). Troponin I was in the normal range, whereas B-type natriuretic peptide concentration was elevated (960 pg/ml). White blood cell count as well as inflammation laboratory indexes were not altered. Blood cultures were negative. No significant ST-T changes were observed on ECG. Chest X-ray revealed bilateral and diffuse fluffy shadows with minimal visualization of the normal lung fields that confirmed the diagnosis of pulmonary edema. Real-time three-dimensional transthoracic echocardiography (RT-3D TTE) in the surgeon’s view showed an aneurysm of the anterior mitral leaflet with severe mitral regurgitation (Fig. 1). Left ventricular enlargement (left ventricular end-diastolic volume = 140 ml/m²; n.v. <75 ml/m²) with mildly reduced systolic function (ejection fraction = 44%) were also detected. Color flow mapping of the aortic root showed moderate aortic regurgitation. The left atrium was enlarged (49 mm). Pulmonary artery systolic pressure derived from the peak velocity of tricuspid regurgitation was elevated (63 mmHg). The right chambers were within normal limits, and the tricuspid annular plane systolic excursion was normal (31 mm). Perforation of the mitral valve aneurysm (MVA) causing mitral regurgitant jet was clearly appreciated during two-dimensional transesophageal echocardiography (TEE) (Fig. 2). In addition, the long-axis view showed a wide and eccentric aortic regurgitant jet directed towards the anterior mitral leaflet (Fig. 2). Having a life expectancy of more than one year (Eastern Cooperative Oncology Group grade = 1), the patient was referred for surgery. Mitral and aortic valves were replaced with a Carpentier-Edwards bioprosthesis (25 mm and 21 mm, respectively). Despite inotropic support after 24 hours the patient died of pump failure.

Discussion

MVA is a rare finding that typically occurs as a complication of endocarditis but may also be associated with other diseases, in particular connective tissue disorders (e.g., Marfan syndrome, Barlow syndrome, osteogenesis imperfecta and pseudoxanthoma elasticum) [1]. In the absence of other possible causes, aortic regurgitation has previously been related to MVA development [2, 3].
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MVA may result from a “jet lesion” mechanism of the regurgitant aortic flow that impacts the anterior (more frequently) or posterior mitral leaflets. RT-3D TTE evaluation appears useful to better define the anatomical features of MVA. However, TEE still remains an essential tool for a comprehensive assessment of the mitral apparatus, allowing accurate identification of the origin and severity of mitral regurgitation. Additionally, in our patient, TEE detection of the aortic regurgitant jet directed towards the anterior mitral leaflet reinforces the hypothesis of a “flow-dependent” mitral valve lesion [2].

MVA perforation is a possible catastrophic complication that precipitates rapid deterioration of the hemodynamic status. Acute heart failure may be the first clinical presentation of a previously unrecognized MVA [4]. This clinical condition requires urgent surgical valve replacement or repair, especially in patients with preexisting aortic regurgitation and left ventricular systolic dysfunction.

**Abbreviations and Acronyms**

MVA: mitral valve aneurysm  
ECG: electrocardiography  
RT-3D TTE: real-time three-dimensional transthoracic echocardiography  
TEE: transesophageal echocardiography

**References**