Case report - Coronary

Delayed papillary muscle rupture following repair of post-infarction ventricular septal defect

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Abstract

Ventricular septal defect (VSD) and papillary muscle rupture are severe complications of myocardial infarction which are usually observed individually although their simultaneous occurrence has been observed in pathological studies. An 82-year-old female underwent repair of a post-infarction VSD and 13 days later required mitral valve replacement due to delayed papillary muscle rupture. Mechanical complications of myocardial infarction can occur in the same patient even in delayed fashion and a two-stage correction may be successfully accomplished.

Keywords: Myocardial infarction; Ventricular septal defect; Mitral insufficiency

1. Introduction

Left ventricular (LV) free wall rupture is the most frequent mechanical complication of myocardial infarction followed by post-infarction ventricular septal defect (VSD) and papillary muscle rupture [1]. Such complications have been reported individually although their simultaneous occurrence has been observed in pathological studies [2]. We report here a patient who underwent repair of a post-infarction VSD and subsequent mitral valve replacement due to delayed papillary muscle rupture.

2. Case report

An 82-year-old female was admitted to the cardiological intensive care unit with precordial pain of recent onset. On arrival the patient was dyspnoeic with a blood pressure of 85/55 mmHg and a heart rate of 115 beats/min; the ECG showed signs of inferior myocardial infarction with increased serum troponin-T and CPK-MB (1.5 ng/ml and 6.6 ng/ml, respectively). A harsh grade 4/6 holosystolic murmur was audible on the precordium. A transthoracic 2D echocardiogram with colour Doppler showed a LV ejection fraction of 48% with akinesia of the inferior wall, a competent mitral valve, a left-to-right shunt at the level of the postero-basal portion of the interventricular septum and a pulmonary artery pressure of 40 mmHg. An intra-aortic balloon was inserted through the right femoral artery and intotopic support with dopamine was started. Under more stable haemodynamic condition, coronary angiography was performed revealing occlusion of the right coronary artery and confirming rupture of the interventricular septum. The patient was then transferred to the operating room where a transoesophageal echocardiography confirmed the presence of the posterior VSD and absence of mitral regurgitation (Fig. 1).

Through a median sternotomy, moderately systemic cardiopulmonary bypass was instituted with aortic and bicaval cannulation where the heart was arrested with antegrade cold blood cardioplegia. The LV was opened parallel to the posterior interventricular groove and the defect visualized. The postero-medial papillary muscle was intact although its base appeared partly involved in the ischaemic area. A large patch of bovine pericardium was then used to close the VSD sewn to the healthy myocardium and partly to the residual VSD and absence of mitral prolapse due to delayed papillary muscle rupture.

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Fig. 1. Transoesophageal short axis view of the left ventricle at midpapillary level. The 2D image (left side, white arrow) shows the septal rupture. At colour Doppler (right side, white arrow) blood flow through the defect is shown.

Fig. 2. Transoesophageal long axis four-chamber view of the left ventricle showing the head of the posterior papillary muscle (left side, white arrow) and the severe mitral regurgitation at colour Doppler (right side) with an asymmetric regurgitant jet directing towards the posterior leaflet due to papillary muscle rupture.

anterior mitral leaflet leaving all the residual chordal attachments in site. The procedure was well tolerated and the patient, after a prolonged postoperative course, was transferred to a rehabilitation facility 35 days from the initial operation. Currently, at four months follow-up, she is at home in stable clinical condition.

3. Discussion

Cardiac rupture is a catastrophic event in the course of myocardial infarction usually leading to death without surgical correction [4, 5]. Because of ischaemia the myocardium may rupture at the LV free wall, the interventricular septum or at one papillary muscle. Simultaneous occurrence of all these complications has been observed in autopsy studies with no reports of survival from such an event [2]. Recently, however, Walts and Gillinov have described the successful repair of a post-infarction free LV wall rupture, VSD and papillary muscle rupture in the same patient [6]. In their paper, they underscore the importance of transoesophageal echocardiography in patients with LV rupture since identification of a single site of rupture does not exclude additional ruptures which must be addressed simultaneously. The patient herein reported presented with a posterior VSD which was closed using well-established techniques. During intraoperative inspection of the LV cavity the posterior papillary muscle appeared undamaged although partly involved by the ischaemic area. Rupture of the posterior papillary muscle occurred late after VSD repair and possibly due to an expansion of the initial area of myocardial infarction, prompting emergency mitral valve replacement. The present experience demonstrates that mechanical complications of myocardial infarction can occur in the same patient even in delayed fashion and that a two-stage correction may be successfully accomplished.

References