



Figure 3. Transesophageal echocardiogram demonstrates large, hypermobile echodensities on the mitral (white arrow) and aortic valve leaflets (clear arrow) consistent with valvular vegetations

thrombolytic and percutaneous coronary intervention (PCI) in the setting of infective endocarditis related myocardial infarction is limited. The use of thrombolytic is largely unfavorable given an increased risk of intracranial hemorrhage from coexisting cerebral septic embolism or mycotic aneurysms (7-9). Despite lack of direct comparison, PCI in this setting appears to be a preferred approach and considered to be safer than thrombolytic therapy (3-5, 9). Catheter thrombectomy appears to be useful in this clinical setting (10). Percutaneous transluminal balloon angioplasty, though provide satisfactory result, it carries a risk of mycotic aneurysm at the balloon dilation site and reocclusion of the vessel (4-6). Placement of intracoronary stent may prevent elastic recoil and improve coronary artery patency, especially in the setting of firm embolus as is with infected vegetation; however, it also has a fatal risk of stent infection (4-6).

Conclusion

Coronary artery embolism from endocarditis is an uncommon but life-threatening complication of infective endocarditis. In the appropriate setting, the clinical presentation of acute coronary syndrome without significant atherosclerotic disease discovered should alert clinician to search for this unusual condition. High index of suspicion and prompt diagnosis are essential to favorable outcome.

Video 1. Selective coronary angiogram (right anterior oblique view) demonstrated minimal luminal irregularity of the left anterior descending and left circumflex artery and their branches. There is an abrupt termination of the contrast at the very distal segment of the left anterior descending artery suggestive of embolic phenomenon

Video 2. Transesophageal echocardiogram (mid-esophageal view at 135 degree) demonstrates large, hypermobile echodensities on the mitral and aortic valve leaflets consistent with valvular vegetations

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Available Online Date: 04.02.2014

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DOI:10.5152/akd.2014.5183



A rare cause of congestive heart failure after seven years of open heart surgery: Organized intrapericardial hematoma

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Introduction

Delayed hemopericardium with constrictive pericarditis is an extremely rare complication of open heart surgery, chest trauma, or epicardial injury (1, 2). We present the case of a patient who underwent triple coronary artery bypass grafting that was complicated seven years later by the presence of calcific constrictive pericarditis. The patient was asymptomatic for seven years following bypass surgery before the symptoms of heart failure became apparent.

Case Report

A 60-year-old male who had undergone triple coronary artery bypass grafting 7 years prior presented at our clinic with progressive shortness of breath (New York Heart Association class III) and generalized edema over the prior two months. At admission, arterial blood pressure was 135/90 mm Hg and heart rate was 83 bpm. Routine laboratory tests revealed normal electrolyte levels, and normal renal and liver functions with the exception of elevated serum brain natriuretic peptide (295 pg/dL). Two and three dimensional transthoracic echocardiography revealed normal left ventricle dimensions and an ejection fraction of 60%. A large heterogeneous mass, pronounced infero-posteriorly and surrounding the heart was observed (Fig. 1). Echocardiography also demonstrated a pronounced ventricular diastolic septal bounce, a restrictive left ventricular filling pattern, normal respiratory variation of the mitral and tricuspid flows, a mildly enlarged right ventricle, biatrial dilatation, and a dilated (25 mm) non-collapsing inferior vena cava (Fig. 2, Video 1. See corresponding video/movie images at www.anakarder.com). Cardiac catheterization revealed the elevation of both right and left atrial pressures with equalization of diastolic pressure in all heart chambers. Elevation of pulmonary artery pressure (45/27 mm Hg) and pulmonary capillary wedge pressure (24 mm Hg) were also noted. Contrast-enhanced 64-slice computed tomography (CT) demonstrated a heterogeneous, hypo dense, and sharply marginated intrapericardial mass with an absence of contrast enhancement, consistent with organized hematoma, measuring 5x2.5 cm proximate to the left ventricle inferoposterior wall. Thickening of the pericardium was noted at the apex and left ventricle infero-postero-lateral wall (Fig. 3). Cardiac magnetic resonance imaging (MRI) was performed, demonstrating an organized hematoma between the visceral and parietal pericardial layers at the apex and infero-postero-lateral wall with a pericardial thickness of 20 mm (Fig. 4). The attending physician elected to perform a pericardiectomy on the patient prior to surgical removal of the intrapericardial mass; however, during the procedure it was not possible to completely resect the mass due to the extreme density and fixed to the surrounding perimyocardial tissues. The operation was terminated following pericardiectomy and excision of a 1.0x0.7 cm diameter portion of the mass for pathological examination. Histopathologic examination demonstrated the presence of fibrosis with granulation tissue, areas of necrosis, and ossification. The patient was prescribed an oral diuretic (furosemide) during the post-operative period and experienced remarkable improvement in cardiac symptoms. The restrictive diastolic filling pattern and the constrictive physiology resolved spontaneously, as observed in transthoracic echocardiography performed six months after the surgical procedure (Fig. 5, Video 2. See corresponding video/movie images at www.anakarder.com).

Discussion

Of the most prevalent cause of constrictive pericarditis include prior cardiac surgery, mediastinal irradiation, pericarditis, trauma to the chest wall; however, a significant number of cases are of idiopathic origin (1-3). Delayed hemopericardium is an unusual complication of open-heart surgical procedures, and may result in constrictive pericarditis and heart failure despite normal left ventricle systolic function (2). In the present case, the absence of a medical history of mediastinal

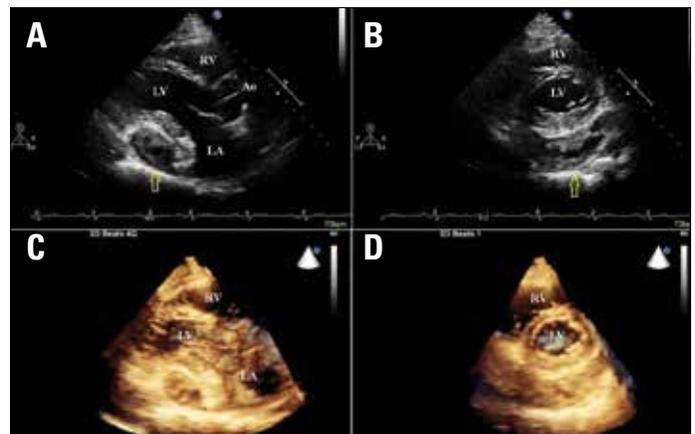


Figure 1. Two-dimensional transthoracic echocardiographic views of the mass; (A) Parasternal long-axis view. (B) Parasternal short-axis view. Three-dimensional transthoracic echocardiographic views of the mass; (C) Parasternal long-axis view. (D) Parasternal short-axis view. A large, heterogeneous mass surrounding the heart with inferior-posterior pronouncement (yellow arrows)

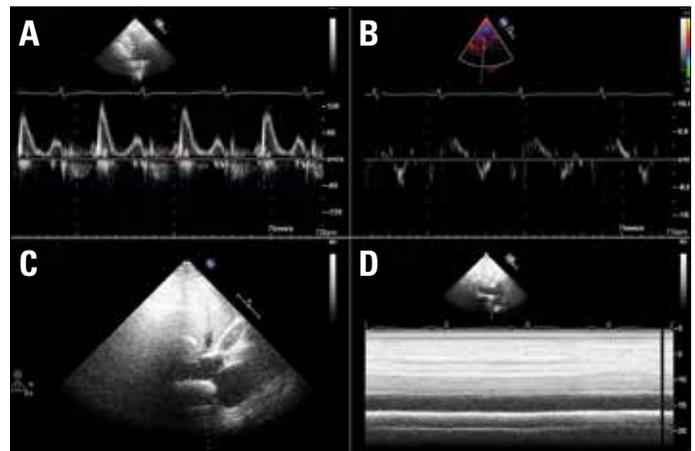


Figure 2. (A) CW Doppler echocardiography showed an exaggerated E/A ratio (E/A=2.3) of the mitral valve inflow with a short deceleration time (DT=130 msc). (B) Decreased peak Em velocity (<8 cm/s) via pulsed tissue Doppler of the lateral mitral annulus is shown. (C and D) The dilated and non-collapsing inferior vena cava is shown

irradiation, trauma to the chest wall, or tuberculosis, we propose that the most likely inciting cause of the organized hemopericardium and constrictive physiology was the patient's prior history of open-heart surgery. Very few cases of delayed-onset hemopericardium with constrictive pericarditis secondary to open-heart surgery have been previously described; in the majority of known cases, improved cardiac function can be achieved by pericardiectomy (3-5). To the best of our knowledge, the present case is the first reported in which hemodynamic symptoms resolved despite the fact that the hematoma could not be removed surgically. Although the mass could not be completely resected, the hemodynamic parameters measured by Doppler echocardiography in control CW and PW tissue resolved spontaneously. The patient exhibited normal clinical presentations and echocardiography parameters despite the presence of the hematoma. This may be attributable to relaxation of the left ventricle during diastole subsequent to the pericardiectomy.

The present case illustrates the complimentary utility of multiple imaging modalities, without which accurate diagnosis would have been

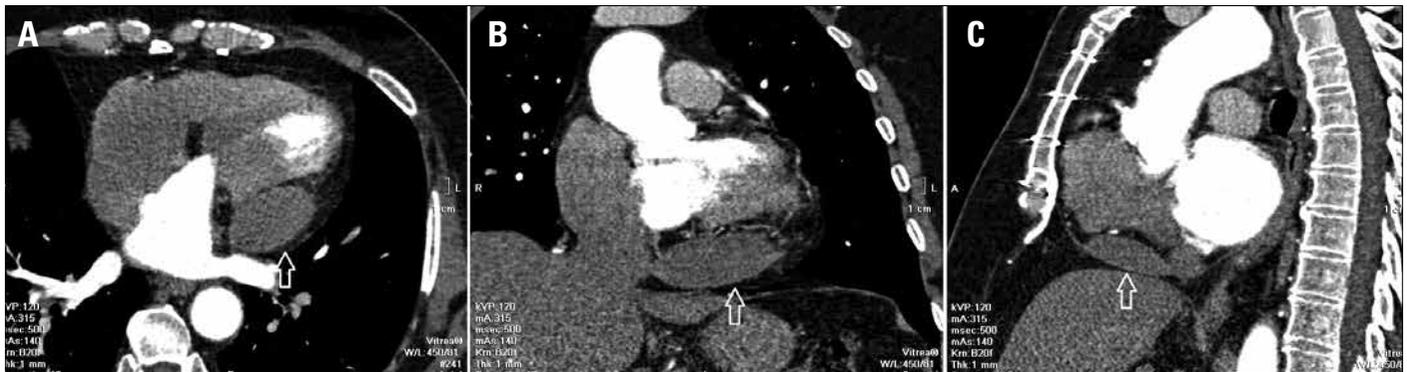


Figure 3. Contrast-enhanced CT images of a heterogeneous, hypodense, and sharply marginated intrapericardial mass, consistent with organized hematoma (yellow arrows) in the inferior posterior wall of the left ventricle. Thickened pericardium was also noted. (A) Axial view (B) Coronal view (C) Sagittal view

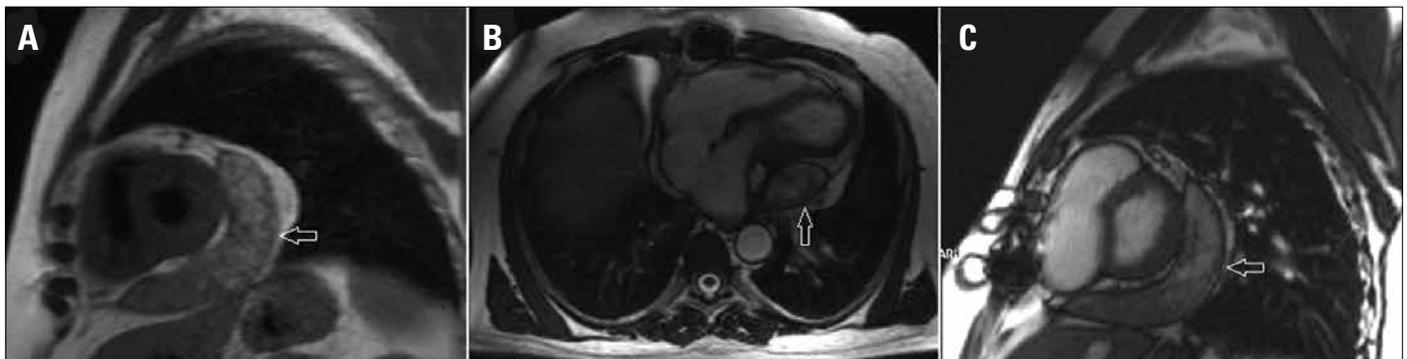


Figure 4. (A) Cardiac magnetic resonance axial section view (B and C) Contrast enhanced cardiac magnetic resonance sagittal section views; A large, organized intrapericardial hematoma (white arrows) surrounding the left ventricle with a thickened pericardium is shown

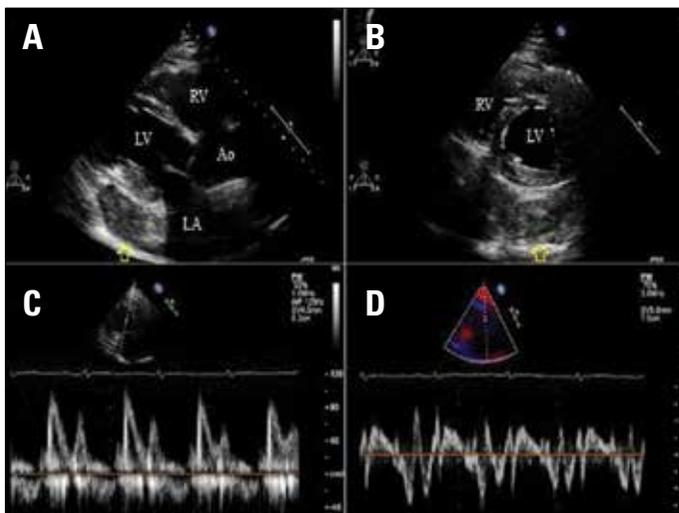


Figure 5. Two-dimensional transthoracic echocardiographic views of the mass after surgery; (A) Parasternal long-axis view. (B) Parasternal short-axis view. CW (C) and PW (D) tissue Doppler echocardiographic imaging revealed that restrictive diastolic filling pattern and constrictive physiology was completely resolved

challenging. Whereas two- and three-dimensional echocardiography was used to assess the mass and determine functional significance, cardiac MRI enabled the exclusion of other potential etiologies. In the present case, cardiac MRI was superior to CT in differentiating pericardial thickening from small effusions, while the CT scan enabled high sensitivity in the detection of pericardial calcification.

Conclusion

In conclusion, the presence of intrapericardial hematoma is a rare complication of various injuries to the cardiac tissue that should be considered in the differential diagnosis of intrapericardial masses, particularly among patients with a history, however distant, of open-heart surgery.

Video 1. Two and three dimensional transthoracic echocardiography revealed normal left ventricle dimensions and an ejection fraction of 60%. A large heterogeneous mass, pronounced inferoposteriorly and surrounding the heart was observed. Echocardiography also demonstrated a pronounced ventricular diastolic septal bounce, a restrictive left ventricular filling pattern, normal respiratory variation of the mitral and tricuspid flows, a mildly enlarged right ventricle, biatrial dilatation, and a dilated (25 mm) non-collapsing inferior vena cava.

Video 2. The restrictive diastolic filling pattern and the constrictive physiology resolved spontaneously, as observed intrasthoracic echocardiography performed six months after the surgical procedure.

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Available Online Date: 04.02.2014

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DOI:10.5152/akd.2014.5168

