Case reports

Constrictive pericarditis after cardiac surgery

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Constrictive pericarditis is an infrequent complication of cardiac surgery. We report the case of a young woman who developed dyspnea and ascites 3 years after surgical closure of an atrial septal defect, and the findings at chest X-ray, computed tomographic scan and Doppler echocardiography are described. Epidemiology of the disease, new pathophysiologic concepts, diagnostic features, and therapeutic targets are reviewed.

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Case report

A 31-year-old woman from Ecuador was admitted to our hospital because of progressive effort dyspnea since approximately 2 years and recent development of ascites. Three years previously she underwent cardiac surgery for an atrial septal defect type secundum repair. Hemodynamic study recently performed elsewhere demonstrated elevated capillary wedge pressures (mean 29 mmHg) and a diastolic plateau in the right atrium, in agreement with the clinical diagnosis of constrictive pericarditis. Chest X-ray revealed a calcification rim surrounding the cardiac silhouette (Fig. 1). Computed tomography confirmed the presence of a thickened pericardium with a thickness ranging from 3 to 5 mm (Fig. 2). Magnetic resonance imaging was not performed because of the presence of metal clips inserted during previous cardiac surgery. Transthoracic echocardiography revealed a thickened pericardium localized at the medium-apical area of the ventricles with impaired relaxation in diastole (Fig. 3). A transesophageal echocardiographic study was performed in order to completely evaluate both the atrial septum and the ventricular function and the presence of a thickened pericardium was confirmed. In addition, pulsed Doppler interrogation of the mitral inflow revealed a restrictive pattern. A sample volume was placed at the mitral annulus for Doppler myocardial evaluation of the mitral annulus motion (Fig. 4).

Figure 1. *Postero-anterior* (left panel) *and lateral* (right panel) *chest X-ray showing a calcification rim surrounding the cardiac silhouette* (arrows).

Figure 2. *Computed tomographic scan section, showing a 5 mm, thickened pericardium* (arrows).

Figure 3. *Transthoracic echocardiography (parasternal long-axis view) during systole* (upper panel) *and diastole* (lower panel). *The medium-apical area of the left ventricle is constricted and does not relax in diastole.*

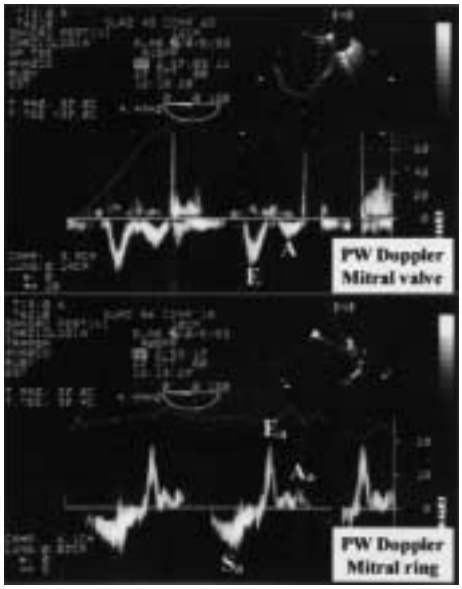

Figure 4. *Doppler interrogation at transesophageal echocardiography. Pulsed wave Doppler during mitral inflow shows a restrictive pattern (E/A ratio 2, deceleration time 80 ms)* (upper panel). *In the* lower panel, *the findings at Doppler myocardial interrogation at the mitral annulus level are shown. The velocities indicate that the myocardial properties are preserved, but owing to constriction, the hemodynamic pattern is modified. A_a = late diastolic velocity; E_a = early diastolic velocity; S_a = systolic velocity.*

Discussion

Epidemiology. In a recent series from the Mayo Clinic, previous cardiac surgery accounted for 18% of all the causes of constrictive pericarditis[1]. Constrictive pericarditis is an infrequent but well-documented complication of cardiac surgery, with an incidence ranging between 0.025 and 0.15%[2]. In most of the cases reported in the literature the surgical procedure prior to the development of constriction was coronary artery bypass grafting and/or valvular surgery. However, in the series from the Mayo Clinic previous atrial septal defect repair was reported in only 1 case.

Diagnosis. The diagnosis of constriction remains a challenge because, owing to a non-specific symptomatology, the clinical presentation is often subtle. In addition, it is often mimicked by restrictive cardiomyopathy. The detection of a thickened pericardium by two-dimensional echocardiography is difficult and objective criteria for its definition are lacking. Even a pericardial thickness > 3 mm at computed tomography is considered diagnostic only if the characteristic hemodynamic pattern is present[3]. Doppler echocardiography plays a major role in the diagnosis of constriction with typical respiratory variations in the mitral and tricuspid inflow patterns. More recently, Doppler myocardial imaging[4] has been proposed for the discrimination of constrictive pericarditis from restrictive cardiomyopathy[5].

Pathophysiology. Several strategies have been attempted to reduce the clinical impact of pericardial fibrosis[6,7]. A recent study suggests that angiotensin AT_1 receptor activation may contribute to the development of pericardial thickening and collagen accumulation in the postoperative period[8]. Thus, angiotensin AT_1 receptor inhibition may provide a novel therapeutic strategy for the prevention of pericardial fibrosis and adhesion formation after cardiac surgical procedures.

Therapy. The postoperative prognosis and functional outcomes after pericardiectomy remain good for most patients and, in particular, for younger patients without radiation pericarditis. Furthermore, pericardiectomy may not offer a definitive cure or good long-term results for patients with advanced constrictive pericarditis (age, NYHA functional class, and radiation as a cause of constrictive pericarditis are baseline variables that predict the long-term outcome)[1]. Thus, pericardiectomy

should be performed promptly in symptomatic patients with constrictive pericarditis[9].

In conclusion, although a very rare complication, constrictive pericarditis should be always considered in patients who present with unexplained dyspnea after cardiac surgery.

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