CASE REPORT

Traumatic Pericardial Rupture Involved with Complication by Blunt Chest Trauma

A 65-year-old man who had sustained a blunt chest trauma in a traffic accident demonstrated a mass in the left hilum by chest radiography. Emergency surgery demonstrated a rupture of the left-side pericardium with herniation of the heart into the left pleural cavity along with a right ventricular rupture. The tear in the right ventricle was sutured using 4-0 polypropylene with felt and the pericardial rupture was repaired with an expanded polytetrafluoroethylene sheet. A 31-year-old man who had been crushed against a tree while skiing 5 years and 6 months earlier was diagnosed as having severe tricuspid valve regurgitation and tricuspid valve replacement was performed. Large left pericardial defect was found and repaired with an equine pericardial patch. In both cases, a bridging of phrenic nerve was found in the pericardial defect that was regarded as a traumatic rupture.

Key words: traumatic pericardial rupture, blunt chest trauma, right ventricular rupture, tricuspid valve regurgitation, phrenic nerve

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Pericardial rupture is found in many patients with cardiac rupture after blunt chest trauma, or with traumatic tricuspid valve regurgitation (TR), which is a rare complication of non-penetrating heart injury. Most such injuries are the result of traffic accidents involving vehicles or motorcycles. We describe 2 cases of traumatic pericardial rupture that were surgically treated during the acute phase and chronic phase, respectively.

Cases

Case 1. A 65-year-old man sustained blunt chest trauma due to impact against a steering wheel during a vehicular accident. On emergency admission, he complained of dyspnea and the systolic blood pressure was 90 mmHg. Chest radiography demonstrated a mass in the left hilum (Fig. 1). Complete atrioventricular block and bradycardia were revealed on electrocardiogram. Echocardiogram demonstrated an echo-free space around the heart. Thoracic computed tomography demonstrated free air in the pericardial space and the apex in the left pleural cavity while emergency surgery confirmed rupture of the left-side pericardium.

Fig. 1. Chest radiography in case 1 demonstrated a mass in the left hilum (arrow).
A left phrenic nerve bridge was found in the pericardial defect of case 1 (white arrow and gray arrow).

Fig. 2. A left phrenic nerve bridge was found in the pericardial defect of case 1 (white arrow and gray arrow).

with herniation of the heart into the left pleural cavity and consequent strangulation by the margins of the pericardial defect. On evulsion, a hemorrhage gushed from the right ventricle. A tear was found in the right ventricle and repaired using 4-0 polypropylene with felt. The pericardial defect measured 50 mm by 100 mm and bridging of the left phrenic nerve was found (Fig. 2). The defect was covered with an expanded polytetrafluoroethylene sheet using 4-0 polypropylene running sutures. Sinus rhythm was recovered, and he was discharged on the 14th day after the accident.

Case 2. A 31-year-old man complaining of palpitations and dyspnea exhibited cardiomegaly in chest radiography. He had crashed against a tree while skiing 5 years and 6 months before the present admission (at 25 years old). He sustained blunt chest trauma and lost consciousness for several minutes. Chest pain had persisted for three months after the accident. A grade 2/6 systolic murmur was audible at 4th left sternal border. Electrocardiogram verified a complete right bundle block. Echocardiography demonstrated a grade 4/4 TR. At cardiac catheterization, the mean right atrial pressure was 11 mmHg and the pulmonary artery pressure was 14/5 mmHg. After sternotomy, tachycardia caused the heart to vibrate from side to side. The right atrium was dilated remarkably, and the left pericardium was severely damaged. Due to cardiac arrest caused by sudden herniation into the left pleural cavity, a cardiopulmonary bypass was set up while doing cardiopulmonary resuscitation. The anterior leaflet in tricuspid valve collapsed completely. The anterior and posterior leaflets were resected, and a bovine pericardial prosthetic valve 33 mm was used for tricuspid valve replacement (TVR).

Thereafter pericardial defect was covered with an equine pericardial patch by using 4-0 polypropylene running suture (Fig. 3). Then, bridging of the left phrenic nerve was found in the defect. He was discharged on the 29th postoperative day.

Discussion

Blunt traumatic cardiac rupture likely leads to high mortality. Brathwaite et al. reported that the incidence of the right ventricular rupture was more than 30% in a series of such patients. Pericardial rupture was associ-