Blunt traumatic pericardial rupture

A.J. LEVINE & F.J. COLLINS

Department of Thoracic Surgery, Birmingham Heartlands Hospital, Bordesley Green East, Birmingham B9 5ST

SUMMARY

A 28-year old man presented with left chest, head and limb injuries following a road traffic accident (RTA). Increasing haemodynamic instability necessitated an emergency left thoracotomy at which a complete rupture of the pericardium and herniation of the heart was found. After repair, the patient made an uneventful post-operative recovery. The aetiology, investigation and management of this rare injury is discussed.

Key words: cardiac herniation, pericardial rupture

CASE REPORT

A 28-year-old man presented at a regional thoracic surgical centre having been transported by helicopter from the scene of an RTA. He had been the front-seat passenger of a vehicle and had struck his head and the left side of his chest during the accident. On arrival he was noted to be conscious (Glasgow Coma Scale 9), maintaining his airway and with a normal breathing pattern, but slightly hypotensive (blood pressure 95/60 mmHg). Further examination revealed him to have no clinical signs of pneumothorax, tamponade or gross intra-abdominal trauma, but to have multiple facial abrasions and a compound fracture of his left ankle. A chest radiograph was taken because of the suspected severity of the trauma (Fig. 1). After a few minutes his level of consciousness deteriorated (necessitating endotracheal intubation) and he developed worsening hypotension. Diagnostic peritoneal lavage was carried out which gave an equivocal result. Having been stabilized haemodynamically, he underwent a head and chest CT scan. The head scan demonstrated a small intracerebral haematoma and the chest CT scan was not considered helpful in diagnosis. The intracerebral lesion was treated conservatively and the patient taken to the intensive care unit (ICU).

In the ICU central venous access was acquired and the patient's filling pressures (right atrial pressure and pulmonary capillary wedge pressure) were measured. Large volumes of colloid were required to maintain his blood pressure and filling pressure, and urgent thoracotomy and laparotomy were undertaken.

At left thoracotomy he was noted to have a complete rupture of his pericardium (from diaphragm to apex) and herniation of his heart into the left pleural cavity. He was also noted to have a small amount of apical myocardial contusion and pulmonary contusion of his left lower lobe. On replacement of the heart into the pericardium the patient became haemodynamically stable. The pericardium was closed with interrupted sutures and the chest closed with a single intercostal drain. A laparotomy was carried out which demonstrated no intra-abdominal pathology and the compound injury of the patient's left ankle was repaired. The patient made an uneventful post-operative recovery.

Fig. 1. Chest radiograph demonstrating left chest pathology.

Correspondence:
Mr A.J. Levine,
Registrar in
Cardiothoracic
Surgery, Department
of Cardiothoracic
Surgery, Freeman
Hospital, High
Heaton, Newcastle-
upon-Tyne NE7 7DN,
UK

DISCUSSION

Pericardial rupture secondary to blunt trauma is an extremely rare occurrence. Fulda *et al.* recorded only 10 incidents in over 20 000 patients presenting to a trauma centre.¹ It is a lesion which normally occurs in the context of the multiply injured patient, is often found in association with other cardiac and great vessel lesions and more often involves the left side of the pericardium than the right. Pathophysiologically, haemodynamic instability arises, in a number of ways including herniation of the heart with associated twisting of the inflow and/or outflow tracts, rupture of a cardiac chamber, or by other viscera herniating into the pericardial sac causing 'tamponade'.²

Pre-operative diagnosis is very difficult. A clinical sign has been described by Morel-Lavallee in 1864,³ which is a characteristic murmur thought to result from haemopericardium associated with pericardial rupture. This sign was not found in our patient or in other series.¹ Investigation is also often unhelpful; ECG findings, e.g. right bundle branch block⁴ are non-specific and radiographic examinations have only been reported to have made the diagnosis pre-operatively in two cases.^{5,6} Echocardiography and pericardial lavage have been suggested if the diagnosis is suspected in an otherwise haemodynamically stable patient.¹ Occasionally the diagnosis is made some time after the initial injury.⁷

The diagnosis is almost always made at exploratory thoracotomy. The pericardium should be closed, as long as doing so does not cause excessive instability or arrhythmias, and other associated injuries should be repaired. Pericardial repair is possible through a transdiaphragmatic approach⁸ if the lesion is discovered in the course of emergency laparotomy. Methods of pericardial repair suggested have included direct suture repair, pleural patch repair⁹ and Teflon mesh.¹⁰ The result of surgical intervention is related to the severity and prompt treatment of other associated injuries.

In conclusion, rupture of the pericardium as a

result of blunt injury is a rare lesion with a high mortality. In isolation (as in this case) it is almost impossible to diagnose without thoracotomy. We feel that prompt repair to avoid haemodynamic instability secondary to intermittent or permanent cardiac herniation is indicated. With thoracic trauma a high index of suspicion as to its serious nature and early recourse to thoracotomy is the best way to manage these often critically ill patients.

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