Transoesophageal echocardiographic examination of a patient with venacaval and pericardial tears after blunt chest trauma

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Summary
A 58-yr-old male was admitted with blunt thoracic and abdominal trauma. Transoesophageal echocardiography (TEE) was performed acutely to determine the cause of intrathoracic haemorrhage. We found atrial septal haematoma and tear, which have not been described previously, and which may be useful indicators of major intrathoracic venous tears which are always difficult to diagnose. Although the outcome was not altered in this case, we feel that TEE is a useful adjunct in the diagnosis of acute thoracic trauma. (Br. J. Anaesth. 1995; 75: 495–497)

Key words

Case report
A 58-yr-old male was admitted to the emergency department after a road traffic accident suffering from chest trauma, abdominal trauma and head injury. Examination revealed a distended abdomen, fractured left clavicle and marked surgical emphysema over the left chest. Heart rate was 120 beat min⁻¹, arterial pressure 70/50 mm Hg and Glasgow coma scale 11. Air entry was poor bilaterally.

Serum urea and electrolyte concentrations and full blood count were normal. Arterial blood-gas measurements indicated mild metabolic acidosis. Chest x-ray showed a left haemopneumothorax, right pneumothorax fractured ribs on the left and a widened mediastinum. Bilateral intercostal drains were inserted and from the left drain 900 ml of fresh blood was removed with ongoing blood loss.

Peritoneal lavage revealed fresh blood, and urgent laparotomy was indicated as fluid resuscitation was failing to maintain an adequate arterial pressure. In view of the continuing blood loss from the chest drain and the widening mediastinum, aortic injury or cardiac tamponade could not be excluded but the patient was too unstable to undergo either computerized tomography (CT) scan or an aortogram. Therefore, the patient’s trachea was intubated and transoesophageal echocardiography (TEE) performed. This demonstrated abnormal echoes in the region of the atrial septum consistent with haematoma and possible disruption to the integrity of the atrial septum (see fig. 1). There was no pericardial effusion, the left ventricle, aortic and mitral valves, and descending aorta appeared normal, and there was no evidence of aortic dissection. Laparotomy was performed immediately and 3–4 litre of blood were found in the peritoneal cavity. The only injury found was an avulsed inferior mesenteric artery. Bleeding was controlled and a partial colectomy and colostomy performed. In the perioperative period, arterial pressure remained between 100 and 135 mm Hg (systolic) with central venous pressure between 2 and 8 cm H₂O.

Continuing blood loss from the left intercostal drain necessitated thoracotomy. A 37-gauge, left-sided, double-lumen endobronchial tube was inserted and the position confirmed by fibreoptic bronchoscopy. Thoracotomy revealed a left hemithorax filled with loose clot and the pericardium was found to be opened. On evacuation of the clot, torrential venous bleeding ensued which was unable to be controlled with local pressure. It was not possible to replace blood losses and profound hypotension and circulatory arrest ensued within 3 min. In view of the continued unstemmable haemorrhage, resuscitative attempts were curtailed soon after.

Further examination revealed a 4-cm tear in the inferior vena cava extending from the central tendon to the right atrium.

Discussion
Cardiac rupture usually results in rapid death because of pericardial tamponade or exsanguination [1]. The number of patients with these injuries who reach hospital alive is small, and it has been reported that only 10–21 % of patients survive long enough to be considered for surgery [2, 3]. Tears of the great vessels or right atrium have been reported to have a better survival rate than ventricular injury [4]. In our patient, concurrent pericardial rupture prevented cardiac tamponade, yet was small enough to prevent exsanguination. Injuries such as these arising from blunt trauma occur as a result of either sudden increases in intra-abdominal pressure causing a...
Diagnosis of cardiac and major vessel injuries in patients with blunt chest trauma is difficult. The presence of other injuries and the lack of clinical signs can obscure the diagnosis. Clinical presentation is that of profound hypotension, hypovolaemia and haemothorax [7]. Chest x-ray and electrocardiogram may be abnormal in up to 50% of cases, but findings are usually non-specific [8, 9]. CT scan or aortography require the transfer of very unstable trauma patients to the radiology suite, which is both difficult and risky, and the use of emergency thoracotomy in all cases of serious blunt chest trauma. Positive findings can hasten the decision to proceed to surgery and negative findings allow continuing treatment of other injuries. In our patient the degree of abdominal bleeding necessitated urgent intervention but the decision to proceed to laparotomy was expedited by TEE which demonstrated the absence of cardiac tamponade or aortic dissection rapidly without the need for aortography or CT scan.

The TEE findings of atrial septal rupture or haematoma in the presence of major haemorrhage should alert the observer to the possibility of tears involving the great veins and may provide a method of aiding diagnosis of these rare, diagnostically difficult and often fatal conditions.

References


