Concomitant blunt aortic and thoracic duct injury

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Case report

A 47-year-old male was brought to the emergency department after a work-related injury when multiple metal gates, estimated to weigh 1000 pounds total, fell onto his chest and upper abdomen and entrapped him for approximately one minute. He complained of dyspnoea and pain with deep inspiration but denied loss of consciousness or abdominal pain. Vital signs were normal (blood pressure 138/89, pulse of 75 and respiratory rate of 18) on arrival to the trauma centre. Physical exam revealed a small abrasion across his chest at the level of the xyphoid, a benign abdominal exam and intact distal pulses. Focused abdominal sonography for trauma (FAST) exam and chest radiograph were normal. However, he complained of dyspnoea and pleuritic chest pain, and a computed tomography (CT) of the chest revealed small bilateral effusions that were high in attenuation most consistent with small haemothoraces, a small right pneumothorax and anterior left 4th and right 8th rib fractures. In addition to these findings, a traumatic aortic pseudoaneurysm at the level of the diaphragm with surrounding retrocrural haemorrhage was also noted (Fig. 1). Subsequent sagittal and coronal spine reconstructions from this CT showed a subtle acute fracture of the superior endplate of T11 with minimal wedge deformity that was treated with a brace (Fig. 2).

Initial aortic pseudoaneurysm management included admission to the intensive care unit with esmolol infusion to maintain systolic blood pressure between 100 and 120 mmHg. On post-injury day one, the pseudoaneurysm was excluded endovascularly using a technique developed and reported by our institution.5 Briefly, a large self-expanding stent (Wallstent® 24 mm × 70 mm, Boston Scientific, Watertown, MA) was deployed and lined with aortic extender cuffs X 3 (Gore Excluder® 23 mm × 37.5 mm; W.L. Gore) (Fig. 3). The patient did well until post-injury day 3, when he complained of increased dyspnoea. Chest radiograph and CT revealed large bilateral pleural effusions (Fig. 4). Bilateral thoracostomy tubes were placed, draining 350 mL from the left and 725 mL from the right chest of blood tinged fluid. The pleural fluid became milky in appearance with a triglyceride level of 586 mg/dL. Despite non-operative management with thoracostomy tube drainage and medium chain fatty acid diet, the chylothorax persisted and on post-injury day 12 the patient was taken to the operating room for thoracoscopic evaluation. Using three 12 mm ports, the chylothorax was evacuated and the oesophagus was mobilized, revealing the leaking portion of the thoracic duct. The duct was ligated with several large titanium clips at the level of the diaphragm and covered with Tisseel® (Baxter) fibrin sealant followed by mechanical pleurodesis. Post-operative thoracostomy tube output remained clear and the tube was removed on postoperative day three. The patient was discharged home the following day.

Discussion

Blunt vascular injuries and thoracic duct injuries are relatively rare. The classic aortic transaction at the ligamentous arteriosum has been described after mechanisms with rapid deceleration (i.e. falls from significant height and high speed frontal impact with stationary objects). The location of the injury described here clearly does not fit the classic example and is likely a result of injury from the direct blow. The patient in this case report admitted to cocaine use on the day prior to injury. Although cocaine use may have predisposed him to the aortic pathology, the anatomic location of the vascular, spine and thoracic duct injuries makes systemic vascular anomalies an unlikely cause of his injury. Significant injuries to the lymphatic system from such mechanisms are even more unusual. Several case reports postulate that sudden hyperextension of the spine may be responsible for injuries to the thoracic duct, as many of these patients sustained concomitant unstable spinal column injuries.4 However, the patient described in this report had suffered minimal thoracic spine compression deformity, with the vascular and lymphatic injuries occurring after direct trauma to the area. Only one prior case of simultaneous aortic and thoracic duct injury has been reported (Russian literature).
This case also demonstrates how minimally invasive techniques can be used to treat the stable patient with acute injuries. Endovascular management of blunt aortic injuries has become more common and is as effective as open repair in short-term outcome comparisons. Endovascular repair of blunt thoracic aortic injury as described here has become the preferred treatment approach at our institution. While traumatic chylothorax has been managed successfully with non-operative management and medium chain fatty acid diet, indications for surgical intervention include daily chyle losses of ≥1500 mL, chyle flow that has not diminished while approaching 14 days in duration and nutritional complications that result from loss of chyle. Thoracoscopic options for treating chylothorax have been described and include talc pleurodesis alone, thoracic duct clipping with pleurodesis, and thoracic duct clipping with fibrin sealant covering and pleurodesis. The latter combination was employed successfully in this case.

This case demonstrates that blunt aortic injury and thoracic duct injury can occur with low velocity crushing trauma. These injuries can occur without unstable spine fractures. Aortic injury secondary to blunt trauma should initiate a thorough diagnostic search for injuries to other surrounding structures.

References


