CASE REPORT

# Tension viscerothorax: an important differential for tension pneumothorax

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We describe a case of acute tension viscerothorax secondary to blunt vehicular trauma causing diaphragmatic rupture. With sufficient gastric herniation to cause mediastinal shift and haemodynamic compromise, the clinical presentation may mimic that of tension pneumothorax. Tension viscerothorax is not referred to in the Advanced Trauma and Life Support[1] (ATLS) manual.

## CASE REPORT

A 70 year old male pedestrian was struck by a fast moving motor vehicle. On arrival at a local community hospital he was haemodynamically stable with blood pressure, heart rate, and respiratory rate all within normal range. Positive examination and radiological findings included a right pubic ramus fracture, and an undisplaced right fibular fracture. Ten hours later he was transferred to a trauma facility for further management of his orthopaedic injuries.

During transfer the patient deteriorated and on arrival at the regional trauma facility the patients respiratory rate was 46/min, heart rate 132/min, and his blood pressure had fallen to 90/60. His left hemithorax was hyper-resonant with absent breath sounds. Auscultation detected prominent bowel sounds in the left infraclavicular region.

A presumptive diagnosis with reference to his first chest radiograph (fig 1), of acute tension viscerothorax was made and confirmed with a portable chest radiograph (fig 2). The patient was given 100% oxygen, a two litre bolus of crystalloid, and a nasogastric tube inserted, which promptly relieved his respiratory distress. Repeat chest examination showed improved air entry over the left hemithorax. The patient was removed to the operating theatre where a 7 cm tear in the left hemidiaphragm was oversewn. Of note at operation, the spleen and left kidney were uninjured and there was no evidence of pneumothorax or haemothorax. The patient's recovery was unremarkable.

**Figure 1** First chest radiograph of the patient.

## COMMENT

Acute diaphragmatic injury is an uncommon complication of blunt or penetrating trauma to the chest or abdomen.[2] Herniation of intra-abdominal viscus into the chest cavity with resultant tension viscerothorax is an exceedingly rare complication. Pathophysiologically, tension viscerothorax reduces venous return to the heart much like tension pneumothorax.[2] Clinically, it may be difficult to differentiate the two conditions.

Diagnosis of diaphragmatic rupture depends on a high index of clinical suspicion and careful scrutiny of the chest radiograph. In this scenario the key clinical clue was the presence of bowel sounds high in the left hemithorax associated with an earlier chest radiograph that showed a raised left hemidiaphraghm. In an estimated 40% of cases careful examination of the chest radiograph will raise the suspicion of diaphragmatic rupture. Radiological features of the chest suggestive of diaphragmatic rupture include: gas bubble in the chest, nasogastric tube in the chest, elevated hemidiaphragm, irregular diaphragmatic outline, and compression atelectasis of the lower lobe.[3]

Assessing the value of computed tomography in the diagnosis of diaphragmatic rupture has been limited by small patient populations. A recent study suggests that helical computed tomography can detect 78% of left sided diaphragmatic ruptures and 50% of right sided ruptures.[4] In the presence of herniated intra-abdominal viscera computed tomography was 100% accurate. Because most patients with diaphragmatic injuries will require computed tomography for evaluation of associated intra-abdominal injuries, helical computed tomography is seen to be the study of choice for

**Figure 2** Portable chest radiograph confirming diagnosis of acute tension viscerothorax.

visualisation of the diaphragm. In cases where doubt remains, magnetic resonance imaging is the gold standard.[5] In the acute trauma situation with attendant monitoring equipment, magnetic resonance imaging may not be an option.

Nasogastric or orogastric tube decompression is the initial treatment of choice of tension viscerothorax, followed by definitive surgical repair. If tension pneumothorax is suspected and treated, thoracocentesis will add a pneumothorax (if not already present) and possible clinical deterioration. Tube thoracostomy could result in penetration of abdominal viscus with consequent spillage of gastric contents into the chest cavity.

Bag-mask support of ventilation should be avoided in tension viscerothorax. There is one reported case of clinical deterioration after nasogastric tube insertion.[6] Direct percutaneous needle decompression of the distended stomach through the chest wall has been shown to be experimentally effective in a small cadaveric group.[6]

We recommend that tension viscerothorax be introduced in the ATLS differential for tension pneumothorax in cases of blunt chest trauma.

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# Irreducible volar dislocations of the proximal interphalangeal joint

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Volar dislocations of the finger proximal interphalangeal joint (PIPJ) is a very rare injury. It is often missed in accident and emergency (A&E) and is chronic and irreducible when first seen in the hand clinic. Intrarticular entrapment of the extensor tendon may render close reduction difficult. We report three cases, all sent home from the A&E department, one in the thumb. A good outcome was obtained in these cases with early intervention.

## CASE 1

A 20 year old athlete sustained a twisting injury to his left thumb while on a skiing holiday. He had the skiing stick in his left hand and the stick got stuck, his left thumb still being held in the leather loop of the stick sustaining this injury. On examination the interphalangeal joint (IPJ) was swollen and tender. Active flexion was possible but extension was weak and painful. Valgus stress was positive in extension. Radiographs showed mild subluxation of the IPJ. After attempts to close reduce the IPJ failed open reduction was performed. The ulnar collateral ligament was ruptured completely and on valgus stressing the extensor tendon was seen entrapped in S shaped in the IPJ (fig 1). A hook was inserted pulling the tendon and the joint was reduced. The capsule and the collateral ligament was repaired. The thumb was immobilised in 20 degrees of flexion. After two weeks mobilisation was started. This patient made an uneventful recovery.

**Abbreviations:** PIPJ, proximal interphalangeal joint; IPJ, interphalangeal joint

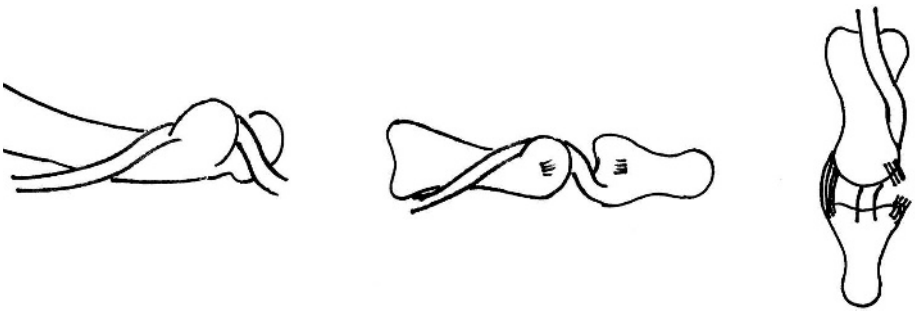

**Figure 1** Diagrammatic illustration of ulnar collateral ligament rupture and interposition of EPL tendon (case 1).