Late Presentation of Traumatic Diaphragmatic Hernia in a Kickboxer

A 36 year old smoker was referred to a chest clinic following an employment medical. He had restrictive spirometry and a subsequent chest radiograph suggested a significant left sided pleural effusion.

Imaging Findings:
His only complaint was of mild exertional dyspnoea. Past medical history included Ramstedt pyloromyotomy for pyloric stenosis as a neonate and a road traffic accident (RTA) aged 16 sustaining left sided rib and pelvic fractures. He was a competitive full contact kick boxer from his early teens, training with weightlifting and admitted illicit anabolic steroid use.

Chronic haematothorax was suspected but multi-detector computer tomography (MDCT) of the thorax confirmed a large left sided diaphragmatic defect with herniation of abdominal contents. Elective repair was scheduled but the patient presented with acute abdominal pain and type 1 respiratory failure (PaO2 of 7.1kPa with FiO2 of 60%). Gastric volvulus was diagnosed clinically and decompressed with nasogastric tube insertion. Definitive surgical repair occurred several days later.

Discussion:
Traumatic diaphragmatic rupture (TDR) occurs in 6% of patients after blunt abdominal trauma [1,2] and 8% in those having laparotomy [3]. Most occur in young men reflecting higher RTAs and misadventure in this demographic. Side impact collisions in RTAs produce shearing diaphragmatic forces [4], while penetrating trauma is the other recognised cause.

TDR is three times more common on the left side [5]. This is partially explained by the relative protective effects of the liver in absorbing transmitted forces. Blunt trauma can cause tears of 10cm or more [1] (at the embryologically weak musculotendinous junction) whilst penetrating injuries cause defects < 1cm in diameter [2]. Both are equally dangerous with the pleuro-peritoneal pressure gradient causing progressive thoracic herniation [4]. Intubation and positive pressure ventilation after trauma appears to delay presentation and diagnosis [6].

TDR is associated with significant morbidity and mortality, due to the difficulty in making the diagnosis and the high incidence of associated injuries [5,6]. The initial CXR is usually diagnostic of TDR in 50% of left sided injuries but only 17% for right-sided injuries [3,5]. MDCT has a sensitivity of 61-71% and a specificity of 87-100% [1] but is still more sensitive for left sided injuries over right. CT signs include localized defects of the diaphragm, herniation of hollow organs and omentum into the hemithorax and ‘waist-like’ constriction of the herniated bowel, the so-called “collar sign.” [1,7]. Bergin et al in 2001 observed that if the diaphragm ruptures the herniated viscera can be seen to fall to a dependent position against the posterior ribs as they are no longer supported by the injured diaphragm (the
‘dependent viscera sign’); seen in 90% of their 28 patient population and useful in both right and left sided ruptures [1]. The diagnostic role of barium studies and fluoroscopy has been superseded by MDCT, but can be diagnostic when the examination is done for a different indication. The use of MR and nuclear imaging in acute trauma settings have not gained widespread acceptance for TDR.

In our patient we assume that pyloroplasty would have highlighted a congenital diaphragmatic defect. It is almost certain that the defect was traumatic in origin with the RTA and kickboxing as potential synergistic agents. The possibility that sport may have led entirely to the defect cannot be ruled out however the RTA would seem to be the more plausible aetiological factor. Any diaphragmatic defect could well have been exacerbated by not only valsalva manoeuvres during weightlifting, but also by the use of anabolic steroids weakening connective tissue integrity.

Most patients presenting late with TDR suffer from dyspnoea or upper abdominal pain [8,9]. This case highlights the risk of acute intestinal strangulation and respiratory compromise that can occur with late presentation TDR. A mortality rate of 30% has been quoted by some in cases of bowel strangulation [5]. Thoracotomy is necessary for surgical repair of delayed TDRs to reduce the hernia and separate intrathoracic adhesions. We highlight the potential multifactorial nature of this diagnosis.

**Differential Diagnosis List:** Traumatic Diaphragmatic Rupture

**Final Diagnosis:** Traumatic Diaphragmatic Rupture

**References:**


Figure 1

Description: PA chest film organised as outpatient that resulted in initial referral. Density occupying most of left hemithorax with fluid level. Origin:
Description: Coronal multiplanar reconstruction at the level of the carina showing herniated stomach, small and large bowel together with the associated mesentery. Origin:
Description: Axial image at the level of the carina. Origin:
Description: Coronal multiplanar reconstruction showing stomach within left hemithorax Origin:
Description: Chest radiograph obtained when the patient presented with abdominal pain and shortness of breath. The nasogastric tube is seen curled within the stomach within the left hemithorax.

Origin: