CASE REPORT

Missed diaphragmatic injury after blunt trauma presenting with colonic strangulation: a rare scenario

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SUMMARY

Diaphragmatic rupture occurs in 4%–5% cases of thoracoabdominal injuries. It may present acutely, in a delayed fashion or as a complicated hernia. We are describing the case of a young male presenting in respiratory distress with history of chest trauma 1.5 years back. On investigation, he was found to have left side diaphragmatic hernia containing gangrenous colon with lung collapse. The patient underwent successful operative intervention and discharged after 25 days of hospital stay. Record review suggested that the above mentioned diaphragm injury was missed in his evaluation 1.5 years back. Diaphragmatic injury must always be suspected in thoracoabdominal injuries, as missed injury may cause devastating complications like the one narrated above in due course.

BACKGROUND

Diaphragmatic rupture is an infrequent complication of trauma, occurring in about 5% of those who suffer a severe closed thoracoabdominal injury.¹ The majority of the cases (~80%) present on the left side as right side diaphragmatic herniation is protected by the liver.² Early diagnosis and management is required as abdominal viscera can become sequestered into the chest cavity in missed hernias. Patients with a large diaphragmatic defect present acutely after trauma as a result of disrupted cardiopulmonary function associated with large herniation of abdominal contents. However, delayed presentation may also lead to high morbidity and mortality from bowel strangulation and other sequel. This situation often requires surgical repositioning of herniated abdominal viscera. Intensive postoperative medical management, including complete

muscular relaxation in the immediate postoperative period, is required to control intra-abdominal pressure.

CASE PRESENTATION

A 26-year-old man presented to our emergency room in respiratory distress. On arrival, there was decreased air entry on left side. Chest X-ray showed opacity in the left hemithorax with gas shadows in lower zone and mediastinal shift to the other side (figure 2). There was no history of recent trauma. The patient had history of road traffic injury 1.5 years back; at that time he was diagnosed with left side 3rd–6th rib fractures with haemopneumothorax and fractures of left humerus and scapula (figure 1). At that time, he underwent left intercostal tube insertion and open reduction and internal fixation for fracture humerus and was discharged after uneventful recovery. There were no respiratory complaints in the interim period until presents to us in respiratory distress this time. A contrast-enhanced CT chest was obtained, which showed transdiaphragmatic herniation of transverse colon and splenic flexure with minimal pleural effusion and whole lung collapse (figure 3). The patient was planned for emergency exploration. Exploratory laparotomy with adhesiolysis, reduction and resection of gangrenous transverse colon with end colostomy and repair of diaphragmatic rent (4×3 cm) was done. The patient was discharged on the 25th postoperative day. During follow-up, chest X-ray showed progressive lung expansion. Stoma reversal was done after 6 months with uneventful recovery.

DIFFERENTIAL DIAGNOSIS

Though unusual, sometimes loculated empyema or pneumothorax may give chest X-ray appearance simulating diaphragmatic hernia.

DISCUSSION

Diaphragmatic injury may be missed following thoracoabdominal injury and may present later with catastrophes like strangulated diaphragmatic hernia as in this case. So, early diagnosis of subclinical diaphragmatic injury is of vital importance. Literature review showed that delayed presentation with complication is not common. Matevych reported three patients who presented late along with bowel complication.³ Turhan *et al* showed in their study that out of total 68 patients, three (4.4%) patients were diagnosed late.⁴ Traumatic diaphragmatic hernias following blunt trauma are

Figure 1 Chest X-ray showing left haemothorax with intercostal drainage tube (ICD) in situ during first admission.

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Figure 2 Chest X-ray showing herniated gut on left side.

thought to be produced by a sudden increase in the pleuroperitoneal pressure gradient. The tears occur at areas of potential weakness along embryological points of fusion due to sudden increase in the intra-abdominal pressure,⁵ typically at musculotendinous junction mostly in the posteromedial aspect of the hemidiaphragm. The most common viscera to be herniated are omentum, stomach, colon and spleen.^{6–8} Once herniated, these organs may even incarcerate and undergo strangulation with a fatal outcome in due course of time.⁹

A traumatic diaphragmatic hernia may pose a diagnostic challenge, especially in asymptomatic cases, and a high degree of suspicion is needed to ensure timely diagnosis and intervention. The left hemidiaphragm is more commonly involved irrespective of mechanism, blunt or penetrating.¹⁰ Males usually outnumber females. A minority (~13%) of cases are found on the right side.^{11,12} This is probably due to the protective effect of the liver for the right hemidiaphragm in blunt trauma, and the fact that most people use their right hand for defence against penetrating trauma.¹³ In penetrating trauma, there is no predisposing area of injury and the defect of the diaphragm is usually smaller than the defects caused by blunt traumas. Therefore, trans diaphragmatic hernias (TDHs) caused by penetrating injuries are potentially more dangerous in terms of getting missed initially and

possibly presenting later with obstruction and strangulation of herniated contents.¹⁴ Traumatic diaphragmatic injuries are difficult to diagnose in emergency settings unless already accompanied by herniation of intra-abdominal contents. Asymmetry in contour or level of the two hemidiaphragms is often the first clue of diaphragmatic injury on a plain radiograph. The fluoroscopic demonstration of absent or decreased diaphragmatic motion is also suggestive of diaphragmatic injury. Barium studies may show herniated viscera above the diaphragm. A CT scan may show diaphragmatic discontinuity, thickening of diaphragm, herniation of abdominal contents and the collar sign where focal constriction of abdominal viscera is seen.¹⁵

Learning points

- ▶ Missed diaphragmatic rupture may lead to devastating complications related to herniated contents.
- ▶ A thorough evaluation of thoracoabdominal injuries is always warranted to rule out occult diaphragmatic injury.
- ▶ Regular follow-up with serial chest X-rays may detect complications early in symptomatic or equivocal cases.
- ▶ Whenever there is suspicion of diaphragmatic injury, CT scan is investigation of choice.

Contributors AG, AK and AR proceeded surgery and clinical evaluation. AG, DB, AK and AR analysed and reviewed medical records of the patient regarding this pathology. All authors read and approved the final manuscript.

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Figure 3 Preoperative contrast-enhanced CT thorax, showing herniated gut on left side.

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