Case report

Perforation of the lower thoracic oesophagus following crush injury to the chest and abdomen

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Received 24 September 2004; received in revised form 1 December 2004; accepted 6 December 2004; Available online 13 January 2005

Abstract
We report a case of perforation of the lower thoracic oesophagus following a crush injury to the chest and upper abdomen. A laparotomy was performed for abdominal injuries, and appropriately placed drains resulted in complete resolution of the oesophageal leak, 21 days following the injury. This case report demonstrates that a conservative approach to lower thoracic oesophageal perforations can be carried out successfully without the added morbidity of a thoracotomy, or risks of a direct repair.

Keywords: Oesophageal perforation; Blunt injuries; Thoracostomy

1. Introduction
Perforation of the lower thoracic oesophagus from blunt trauma is an extremely rare injury, with only six previously reported cases in the world literature. We report a case from our unit and discuss the management options available.

2. Case history
A 22-year-old male was crushed under a moving tractor sustaining chest, abdominal and upper limb injuries. On arrival at the local Accident and Emergency department, the patient had a blood pressure of 120/78 mmHg, a heart rate of 150 beats per minute, and a reduced level of consciousness (Glasgow Coma Score 12/15).

Chest examination revealed good air entry bilaterally with coarse crepitations and arterial oxygen saturations of 92% on 10 l per minute of oxygen via facemask. Abdominal examination revealed a tense abdomen but no peritonism.

The patient was resuscitated with 2 l of intravenous 0.9% saline. Chest X-ray delineated mediastinal air and bilateral lung contusions. Bilateral pleural drains were placed for drainage of the posterior mediastinum.

On transfer to the regional trauma centre, his condition had deteriorated. He was responsive only to pain, his respiratory rate was 46 breaths per minute and he had a persistent tachycardia. He was intubated, ventilated and resuscitated further with 1 l of Hartman’s solution.

Repeat CXR showed bilateral pneumothoraces and pulmonary contusions. Bilateral pleural drains revealed only air in the left pleural space but gastric contents drained from the right.

CT scan of chest showed mediastinal haematoma but no great vessel injury. There were bilateral paravertebral collections (Fig. 1). Contrast, administered via a nasogastric tube, passed outside the oesophageal lumen (Fig. 2), thus confirming a lower thoracic oesophageal perforation. Abdominal CT showed a tear in the spleen.

Laparotomy performed 8 h after the initial time of injury revealed a tear at the splenic hilum with intra-peritoneal blood, and a small tear in the liver at the entry of the falciform ligament; a splenectomy was performed. Gastrostomy was performed via the anterior wall of the stomach. A size 32 Fr chest drain was passed into the stomach, through the oesophagogastric junction, into the oesophageal lumen, primarily for drainage of the oesophagus at the perforation site. An extra hole was fashioned in the tube to drain the stomach. The other end was passed through the abdominal wall and secured to the skin with 2/0 silk suture. A flexible gastroscopy passed per orally allowed exact positioning at the level of the perforation. The perforation was identified at 35 cm from the incisors but was poorly visualised, as the oesophagus would not distend with air. Bilateral pleural drains were placed paravertebrally for drainage of the posterior mediastinum. Feeding jejunostomy was performed.

The patient was nursed in the regional intensive care unit post-operatively. His main problems were pulmonary contusions and Systemic Inflammatory Response Syndrome (SIRS), requiring inotropic support with noradrenaline until day 4 post-op. The patient required ventilatory support for his...
pulmonary contusions but was successfully extubated on the 10th post-operative day. He made an uneventful recovery and a niopam swallow on day 21 confirmed the leak to have sealed. Normal oral intake was reintroduced without any problems and he was discharged home.

3. Discussion

Thoracic oesophageal rupture secondary to blunt trauma is an exceedingly rare injury. In a meta-analysis carried out in 1988, Beal et al. identified 96 cases using the MEDLARS system from 1900 to 1988 [1]. In the 63 cases they reviewed, 52 (82.5%) occurred in the cervicothoracic region. Mid and lower thoracic perforations accounted for 7.9% (5 cases) and 9.5% (6 cases), respectively. The mechanism of injury was most often from rapid acceleration/deceleration injuries. Delayed perforations were thought to be due to deceleration/traction injuries causing disruption to the segmental blood supply leading to necrosis of part of the oesophageal wall.

Muir et al. in a retrospective review of 75 patients with perforation of the oesophagus from a variety of causes, showed that the only predictor of mortality identified was time from perforation to diagnosis, irrespective of aetiology, site of perforation and treatment strategy. Mortality rates reported in this series was 5, 14 and 44% for immediate diagnosis, early diagnosis (1-24 h) and late diagnosis (>24 h), respectively. Therefore, prompt recognition and rapid institution of supportive measures, followed by an appropriate, patient specific treatment option optimizes the chance of a successful outcome [2].

Management options in oesophageal perforations include primary repair with drainage, drainage alone, oesophageal exclusion and drainage or resection with cervical oesophagostomy [3]. The optimum approach depends on the amount of soiling of the mediastinum, size of the tear, presence of associated injuries and physiological state of the patient. The optimum strategy for managing lower thoracic oesophageal perforations following blunt trauma is unclear because of the rarity of such cases. Cordero et al. [4] in 1997 reported two such cases that were managed by primary repair; failure of this approach in one case necessitated oesophageal exclusion.

The main difference between traumatic rupture and iatrogenic or Boerhauve’s is the presence of associated injuries with trauma. For this reason, diagnosis can be difficult as clinical and radiological signs can be subtle and this rare injury may not be suspected. In this report, the patient suffered a lower thoracic oesophageal perforation from a severe crush injury to the chest and abdomen leading to both intra-thoracic and intra-abdominal injuries. Avoidance of a thoracotomy was beneficial as our patient had significant pulmonary contusions. Endoluminal drainage via gastrostomy, extraluminal drainage via well placed pleural drains with enteral nutritional support have been shown to have similar success rates to thoracotomy and primary repair [2] and led to a successful outcome in this case. We used a 32 F chest drain to drain the oesophagus and stomach. It should be recognised that this deviates from the manufacturers’ intended use. However, we have used various methods of drainage for oesophageal perforations and found this to be the most satisfactory and least likely to block.

This case report emphasises the need to bear in mind the diagnosis of lower oesophageal perforation in blunt chest trauma; as adequate drainage alone through a laparotomy, indicated for other reasons, can be performed safely and successfully without the added morbidity of a thoracotomy.

Fig. 1. CT scan showing bilateral paravertebral collections with air/fluid levels.

Fig. 2. Contrast enhanced CT scan showing leakage of contrast outside oesophageal lumen.
References


