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Intrathoracic esophageal rupture distal to the carina after blunt chest trauma: Case-report

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ABSTRACT

INTRODUCTION: Esophageal rupture caused by blunt chest trauma is a very rare entity, with an incidence of 0.001%. Eighty two percent of the esophageal perforation secondary to blunt chest trauma occur above the level of the carina, with the lowest reported incidence in the intrathoracic region distal to the carina.
PRESENTATION OF CASE: We report on the case of a 48-year-old Hispanic male with intrathoracic esophageal rupture. Exploration revealed a right lateral, mid esophageal, longitudinal 1.5 cm perforation. The defect was repaired using a double-layered primary closure reinforced with an intercostal muscle flap. The patient tolerated the procedure and the recovery was complicated by a pneumonic process which was treated accordingly. No leakage was found.
DISCUSSION: A five-year retrospective review (2009–2013) at our institution identified 5586 trauma cases with only one case with esophageal rupture. This represents a 0.0002% of incidence of blunt esophageal rupture. This estimate is consistent with what has been previously reported in the medical literature. Our case represents a uniquely rare presentation of traumatic esophageal rupture due to the underline mechanism of injury and its anatomical location. A high index of suspicion and early intervention are critical in assuring a favorable outcome.
CONCLUSION: Diagnosis and surgical intervention with primary repair completed in the first twenty-four hours after presentation is fundamental to achieve a good outcome after esophageal rupture.

1. Introduction

Esophageal rupture in trauma is most commonly caused by penetrating and rarely occurs after blunt chest trauma. The incidence of esophageal rupture secondary to blunt chest trauma is 0.001 percent. Eighty two percent of these cases occur above the level of the carina known as the cervico-thoracic esophagus [1]. The lowest reported incidence is in the intrathoracic region distal to the carina [1]. Patients with this type of trauma have a high morbidity and mortality and there is a reported 70% rate of delayed presentation [4]. This case report contributes to the small number of cases of thoracic esophageal rupture distal to the carina secondary to blunt chest trauma which have been reported since the 1900s.

2. Presentation of case

A 48 year-old Hispanic male was the victim of a pedestrian versus auto (PVA) accident, where patient was impacted twice by the same car. One hour after injury the patient presented to the Puerto Rico's Medical Center Trauma Hospital. Upon initial survey, the patient had patent airway, and was tachypneic, tachycardic, and normotensive. The secondary survey revealed intact neurologic status and superficial abrasions over the sacral area and upper and lower extremities. Abdominal and pelvic examinations were non-informative due to complaints of severe back pain.

Initial imaging with non-contrast neck computed tomographic scan (CT) was unremarkable except for subcutaneous emphysema tracking along deep tissue planes of the neck. Chest CT with intravenous contrast demonstrated bilateral mildly displaced ribcage fractures, right-sided pneumothorax and pleural effusion, bilateral pulmonary contusions, and pneumomediastinum. Abdominal/pelvic CT with intravenous contrast demonstrated a large pneumoperitoneum with hemoperitoneum, and multiple pelvic fractures. There were no signs suggestive of solid organ injuries (liver/spleen).

Findings prompted right-sided tube thoracostomy and emergent exploratory laparotomy. The chest tube output consisted of thick, dusky burgundy colored fluid. Due to the peculiar appearance of the drainage fluid, fluid amylase and lipase levels were measured. The patient underwent an exploratory laparotomy. The intraoperative findings included multiple small bowel injuries that were repaired with no solid organ or diaphragmatic injuries.

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Postoperatively, the patient was transferred to the Trauma Intensive Care Unit (TICU) to continue supportive care measures. After having addressed life-threatening injuries, we focused our attention on previously identified pneumomediastinum and the unanticipated chest tube output. A gastrografin swallow was performed 15 h after admission due to the high suspicion of an esophageal injury. This study demonstrated evidence of right-sided focal outpouching at the distal thoracic esophagus, T8–T9 level; and subsequent leakage of contrast into dependent portions of right pleural space (Fig. 1).

Sixteen hours post-injury the patient was subjected to a right-sided thoracotomy. Exploration revealed a right lateral, mid esophageal, longitudinal 1.5 cm perforation (Fig. 2). The defect was repaired using a double-layered primary closure reinforced with an intercostal muscle flap. Two large bore chest tubes were left in the right hemithorax. The patient tolerated the procedure well. The post-operative recovery period was complicated by a pneumonic process that was treated accordingly. No leakage was found later and the patient was able to tolerate enteral diet. Patient was then discharged home in stable condition.

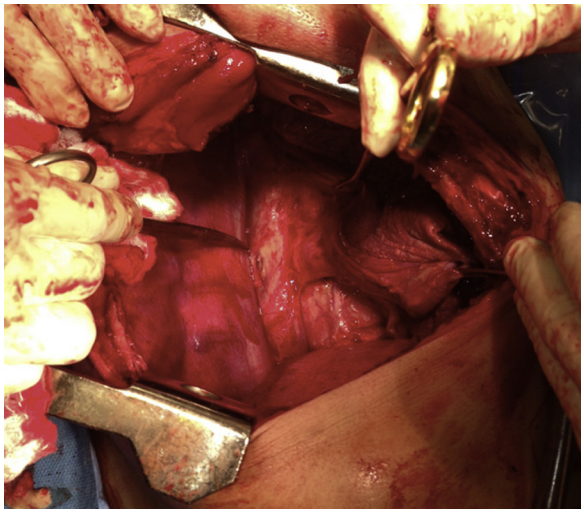

Fig. 2. View of mid-esophageal perforation during right-sided thoracotomy.

3. Discussion

On review of the medical literature, approximately 100 cases of blunt esophageal rupture have been reported. Only 16 of these injuries were localized in the thoracic region [1,5]. The majority of blunt esophageal perforation has been associated to high-speed motor vehicle accidents, and few cases are related to PVA [1,2–5]. A five-year retrospective review (2009–2013) at our institution identified 5586 blunt chest trauma cases with only one case with esophageal rupture. This represents a 0.0002% of incidence of blunt esophageal rupture. This estimate is comparable to what has been previously reported in the medical literature.

The diagnosis of esophageal perforation in a trauma patient can be very difficult, more so when associated to blunt chest trauma. Available literature states that the most common presenting symptoms of esophageal perforation are pain (71%), fever (51%), dyspnea (24%), and crepitus (22%) [2]. Although our patient presented with pain, dyspnea, and crepitus, these symptoms are non-specific and can be seen in patients with blunt chest trauma without esophageal perforation. Upon further radiological workup, our patient was found to have a right pneumothorax with pleural effusion and pneumomediastinum. These imaging findings prompted a right-sided tube thoracostomy placement and drainage of turbid fluid that was not consistent with hemothorax. Unusual fluid drainage from tube thoracostomies is a key finding in patients with esophageal perforation and merits further workup to exclude this diagnosis.

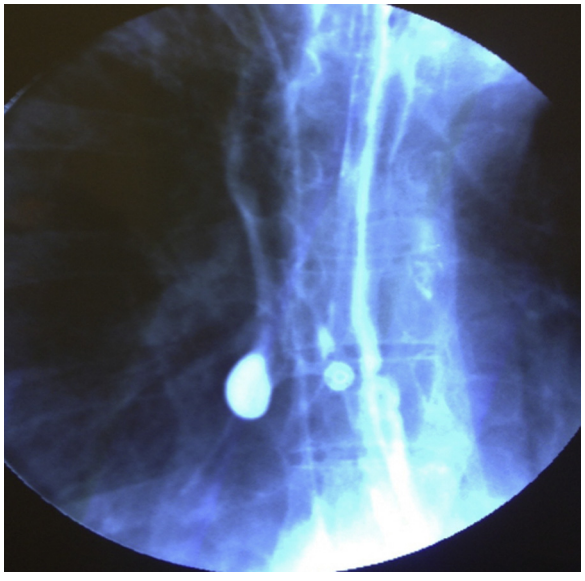

Fig. 1. Outpouching of ionic contrast at distal thoracic esophagus during gastrografin swallow study.

In this setting, patients should be stabilized according to ATLS protocols and secondary survey should include water-soluble contrast esophagogram. Our patient's esophagogram revealed a mid thoracic esophageal perforation. Nonetheless, it is important to note that this imaging modality may have a false negative rate of up to 10% and may require a barium contrast esophagogram and/or esophagoscopy in patients with high index of suspicion for esophageal perforation [2–9,10].

Upon diagnosis, management of esophageal perforations is dependent on patient stability and timing of diagnosis. The goal is always to reduce contamination and restore gastrointestinal continuity. In stable patients, were the perforation has been identified within 24 h from the time of injury, the best surgical approach is primary repair with or without pleural or muscle flap, which has been associated with a mortality of 12% [9]. For unstable patients drainage, exclusion and diversion are the options of choice but result in a mortality rate between 24 and 36% [9]. The use of T Tube drainage has also been advocated as an alternate technique in cases were primary repair cannot be done because it creates a control fistula while it helps healing of surrounding tissue [2–9,10].

Our case represents a uniquely rare presentation of traumatic esophageal rupture due to the underlying mechanism of injury and its anatomical location. A high index of suspicion based on presenting symptoms, underlying mechanism and image study results are crucial for early diagnosis and intervention are critical in assuring a favorable outcome.

4. Conclusion

Diagnosis and surgical intervention with primary repair completed in the first twenty-four hours after presentation is fundamental to achieve a good outcome after esophageal rupture.

Conflict of interest

No conflicts of interest to disclose.

Funding

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Ethical approval

This case-report was approved by the institutional review board of the university of Puerto Rico medical sciences campus.

Consent

Patient authorizes the publication of the case-report entitled: "Intrathoracic Esophageal rupture distal to the carina after blunt chest trauma: Case-report". Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editor-in-chief of this journal on request.

Author contributions

Pablo Rodríguez - supervision.
Alex Cedeño - writing, study design and data collection.
Jan Vázquez - writing.
Aura Delgado - writing and study design.
Karla Echeverría - data collection.

Guarantor

Jan Vázquez, accepts full responsibility for the case-report. Contact via e-mail: jvaz93@gmail.com.

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