

Case Report

Treatment of Acute Mediastinitis Secondary Traumatic Esophageal Perforation by Naso-Mediastinal Drainage

Michael A Lopez¹, Jessica L Buicko^{2*} and Miguel A Lopez-Viego³

¹Department of General Surgery, University of Miami Palm Beach Regional Campus, Atlantis, FL, USA

²Department of Surgery, Weill-Cornell Medicine, New York, NY, USA

³Department of Surgery, Bethesda Memorial Hospital, Boynton Beach, FL, USA

Background

Mediastinitis secondary to esophageal perforation is a serious condition with potentially grave complications. Traditional treatment regimens involve open trans-thoracic mediastinal drainage procedures which have a high morbidity and mortality rate [1].

Surgical drainage options primarily include a trans-cervical or trans-thoracic approach. The decision of which approach to use is typically dependent on the extent of the disease process. If the disease process extends below the fourth thoracic vertebra, trans-cervical drainage is usually inadequate, and a trans-thoracic approach should be considered, or a combination of the two techniques [2].

In regard to the mortality of this condition, Corsten et al., showed a high mortality rate of patients undergoing trans-cervical drainage alone (47% mortality) versus a combined trans-cervical and trans-thoracic mediastinal approach (19% mortality, $p < 0.05$) [3].

A thoracic approach allows for great exposure of the entire mediastinum and permits more aggressive drainage and debridement. However, entering the chest is more invasive and could potentially lead to contamination of the pleural space. Contrary to Corsten et al., and Inoue et al., demonstrated that trans-cervical drainage for patients with localized necrotizing mediastinal infections was adequate with minimal morbidity and mortality [2]. Patients with extensive necrotizing infections were more likely to develop empyema and therefore require trans-thoracic drainage, but still had favorable outcomes with a mortality rate of 13% [2].

*Corresponding author: Jessica L Buicko, Department of Surgery, Weill-Cornell Medicine, New York, NY, USA, Tel: +1 518 2297711; E-mail: JBuicko@med.miami.edu

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We present the unique case of acute mediastinitis secondary to traumatic esophageal perforation treated by naso-mediastinal drainage.

Keywords: Esophageal Perforation; Mediastinitis; Thoracic Surgery; Trauma

Case Presentation

A 24 year-old female with a history of foreign body ingestions secondary to a psychiatric disorder forced a metal kitchen knife through her posterior esophagus into the posterior mediastinum. She developed chest pain and tachycardia. Her leukocyte count on admission was 20,000 cells/ μ L.

Plain chest radiography and CT scanning revealed the knife to be lodged in the mediastinum posterior to the esophagus (Figures 1A and 1B). Oral examination and flexible laryngoscopy confirmed that no part of the knife was present in the oropharynx or esophagus.



Figure 1A: AP Chest X-ray showing a metallic knife in the chest cavity.



Figure 1B: Lateral Chest X-ray showing a metallic knife in the chest cavity.

In the operating room the patient underwent trans-oral extraction of the knife under fluoroscopic guidance through a posterior esophagotomy. Upon removal of the knife, purulent drainage was observed from the extraction site.

The mediastinum was then drained with a 10 mm Jackson Pratt Drain that was secured to the patient's left nares. A nasogastric tube was inserted through the patient's left nares under direct visualization (Figure 2). The patient was treated with a course of piperacillin-tazobactam and vancomycin for seven days. Cultures eventually returned positive for *Streptococcus viridans* and the patient recovered uneventfully.



Figure 2: CT scan showing a 10mm Jackson Pratt drain secured in the posterior mediastinum.

Discussion

Penetrating injuries to the esophagus are rare but life-threatening [4]. Most esophageal injuries are iatrogenic. Cases of non-iatrogenic injuries are often due to spontaneous rupture or ingestion of a foreign body. These injuries are often misdiagnosed because presentation is often non-specific. Therefore, these injuries are associated with a significant morbidity and mortality due to injury to surrounding structure and infection.

Posterior cervical perforations are most common because of the thin posterior wall of the esophagus. Dissection of the retroesophageal space allows for bacterial spread through the mediastinum [5].

In a ten-year, multi-center study evaluating patients presenting to trauma centers with penetrating esophageal injuries, Asensio et al., found that of the 405 patients enrolled, the majority were male (88%) with an average age of 29. Furthermore, on presentation, 24% of patients were hypotensive with a systolic blood pressure less than 90 mmHg, 19% had subcutaneous emphysema and 7% had dysphagia [6]. Most patients presented with very minimal or no symptoms. This study also found the injuries were primarily to the cervical esophagus (56%) and that complications associated with esophageal injuries with or without surgical intervention were not uncommon. Of the 41% of patients in the study that developed complications, a majority were either abscess, mediastinitis or empyema [6]. Although uncommon, some patients developed esophageal leaks or tracheoesophageal fistulas. Timing of intervention appeared to be directly related to morbidity and mortality [6]. Early diagnosis and management are necessary to avoid these potential complications.

The diagnosis can be made using many different modalities. According to the Western Trauma Association's esophageal perforation guidelines, stable patients who have sustained a penetrating injury with a suspected trans-mediastinal trajectory should have a CT scan performed first rather than esophagography [7]. Esophagography using a water-soluble contrast can diagnose small esophageal perforations, however is underutilized because CT scanning can demonstrate air in the soft tissues of the mediastinum indicating perforation and can most times be performed more expediently [1].

Currently there have been many treatment options discussed in current literature, including both operative and non-operative modalities. Operative management includes primary closure, resection, T-tube drainage, exclusion and diversion, and intraluminal stenting [8]. All of these modalities require an incision in the lateral neck or through a thoracotomy.

Non-operative management includes the use of antibiotics, but still runs a high risk of pneumothorax, pneumomediastinum, septic shock and respiratory failure. Other minimally invasive modalities for treatment include percutaneous drainage via CT guided drain placement, but this technique has proved to be very difficult due to the surrounding anatomy.

Conclusion

The goal of treatment in the management of mediastinitis secondary to esophageal perforations is to control the enteric leak, effectively drain the mediastinum and medically treat the patient with IV antibiotics and nutritional support.

If this can be accomplished without a major operative intervention the patient's recovery and overall management should be greatly improved.

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