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Early Multidisciplinary Management of Cervical Esophageal Perforation Complicated by Extensive Mediastinitis: A Case Report and Literature-Based Analysis

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Abstract **Case Report**

Esophageal perforation is a rare but life-threatening condition associated with high morbidity and mortality, particularly when complicated by mediastinitis. We report the case of a 43-year-old male presenting with acute respiratory distress and cervical subcutaneous emphysema, in whom contrast-enhanced computed tomography revealed a cervical esophageal perforation with extensive mediastinal collections and right-sided pleural empyema. The patient underwent urgent multidisciplinary management combining broad-spectrum antibiotic therapy, cervico-mediastinal surgical drainage, and enteral nutrition via jejunostomy. Despite a complicated postoperative course marked by loculated pleural effusion, clinical evolution was favorable following appropriate drainage and intensive care support, allowing discharge on day 15. This case underscores the critical importance of early clinical suspicion, prompt imaging, and aggressive multidisciplinary management in improving outcomes in severe esophageal perforation with mediastinal extension.
Keywords: Esophageal perforation; Mediastinitis; Critical care; Thoracic surgery; Source control; Case report.

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INTRODUCTION

Esophageal perforation is an uncommon but devastating condition, with an incidence estimated between 2.6 and 3.1 cases per million inhabitants per year [1]. Despite its rarity, it remains associated with substantial mortality, ranging from 10% to 30% in contemporary series, largely due to rapid progression toward mediastinitis, sepsis, and multiorgan failure [2,4].

The prognosis is strongly influenced by the timing of diagnosis and the rapid initiation of appropriate management, including antimicrobial therapy, source control, and intensive care support. Delayed recognition remains a major contributor to poor outcomes.

We report a case of cervical esophageal perforation complicated by extensive mediastinitis, successfully managed through early multidisciplinary intervention, and discuss it in light of current evidence.

CASE PRESENTATION

A 43-year-old male with a history of chronic active smoking presented to the emergency department with acute dyspnea and productive cough of several hours' duration.

On admission, the patient was conscious and hemodynamically stable (blood pressure 130/80 mmHg), but exhibited severe respiratory distress with tachypnea (40 breaths/min), hypoxemia (SpO_2 70% on room air), and tachycardia (110 beats/min).

Physical examination revealed a painful lower cervical swelling associated with cervical subcutaneous emphysema, strongly suggestive of cervico-mediastinal involvement.

INVESTIGATIONS

Laboratory findings demonstrated a marked inflammatory response with leukocytosis (23,960 cells/mm³), neutrophilia (20,170 cells/mm³), and elevated C-reactive protein (46 mg/L). Electrolyte analysis revealed moderate hyponatremia (125 mmol/L),

while renal and hepatic parameters remained within acceptable limits.

Contrast-enhanced cervico-thoracic computed tomography identified a defect in the cervical esophageal wall associated with extensive mediastinal collections involving the superior, posterior, and inferior mediastinum. A communication with a right-sided pleural empyema was observed, along with bilateral lower lobe consolidations consistent with aspiration pneumonia.

These findings confirmed the diagnosis of esophageal perforation complicated by extensive mediastinitis with pleuropulmonary involvement.

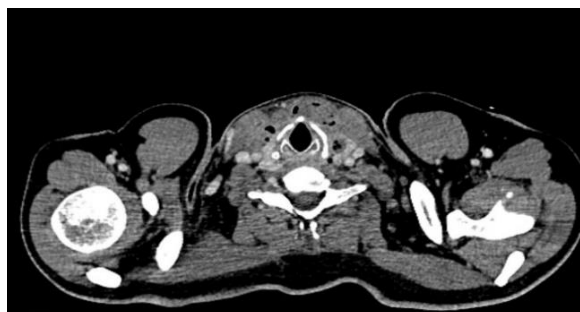

Figure 1: Collection within the anterior mediastinum

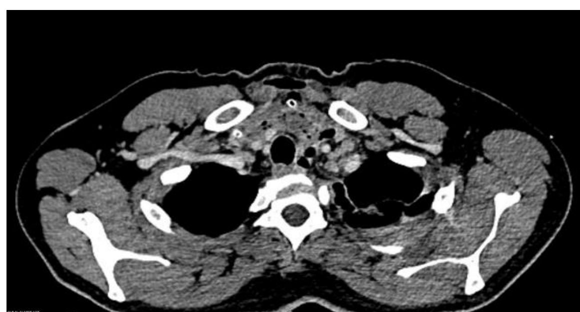

Figure 2: Collection within the middle mediastinum

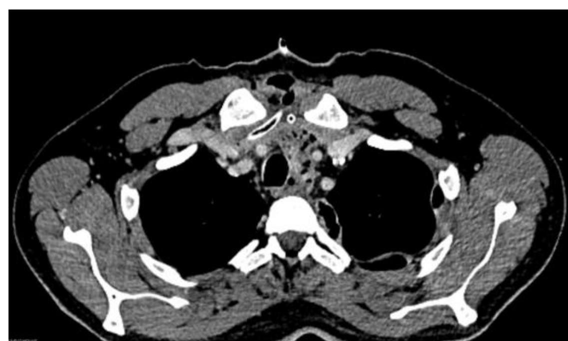

Figure 3: Collection within the Posterior mediastinum

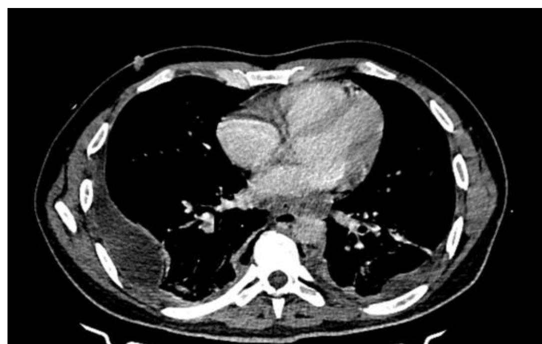

Figure 4: Right Pleural Empyema

Management

An urgent multidisciplinary strategy was implemented. Initial management included oxygen supplementation and empirical broad-spectrum intravenous antibiotic therapy targeting polymicrobial flora typically involved in upper gastrointestinal perforations.

Definitive management relied on surgical source control, including:

- Cervical drainage of infected collections
- Mediastinal drainage
- Placement of a feeding jejunostomy to ensure early enteral nutrition

Intraoperative microbiological cultures remained negative, likely due to early antibiotic administration.

Outcome

On postoperative day 5, the patient developed brownish sputum and transient episodes of desaturation. Flexible bronchoscopy excluded an esophago-tracheal fistula.

Follow-up computed tomography revealed a loculated pleural effusion, which was successfully drained, resulting in progressive clinical improvement.

After 12 days of antibiotic therapy, the patient demonstrated favorable respiratory and infectious evolution. He was transferred to the surgical ward and discharged home on day 15.

Discussion

Esophageal perforation remains a rare but highly lethal condition, with prognosis primarily determined by the timing of diagnosis and intervention. Early management within the first 24 hours is associated with mortality rates close to 10%, whereas delays beyond this period increase mortality to 30–40% [1,2]. In a large systematic review by Markar et al., only 58% of patients were diagnosed within the first 24 hours, highlighting the persistent challenge of early recognition [2].

In the present case, early recognition of key clinical signs—namely acute respiratory distress associated with cervical subcutaneous emphysema—prompted immediate imaging and diagnosis, likely contributing to the favorable outcome despite extensive mediastinal involvement.

Iatrogenic causes represent the leading etiology in contemporary series, accounting for up to 46-70% of cases, mainly following endoscopic procedures [2,4]. Spontaneous rupture (Boerhaave syndrome) represents approximately 15% of cases, whereas traumatic causes and foreign body ingestion remain less frequent [3]. Notably, a subset of patients (approximately 10%) present without an identifiable cause, as observed in our case [4].

From an anatomical standpoint, cervical perforations account for 20–30% of cases and are associated with better outcomes compared to thoracic perforations, likely due to more effective containment of contamination and easier surgical access [4]. Mortality in cervical perforations is typically below 10%, compared with 20–40% in thoracic locations [1].

Computed tomography has become the cornerstone of diagnosis, with a sensitivity exceeding 90%, allowing accurate localization of the perforation, assessment of mediastinal extension, and identification of complications [5].

Management strategies are based on three key principles: early broad-spectrum antibiotic therapy, prompt source control, and intensive care support. Surgical intervention is required in the majority of patients presenting with mediastinitis or abscess formation, reported in 70–85% of cases [4,6].

Pleuropulmonary complications, including empyema, occur in up to 40% of cases and significantly impact clinical course [3]. Negative microbiological cultures, as observed in our patient, are reported in up to 30% of cases, particularly when antibiotic therapy is initiated early [6].

Despite the severity of presentation; characterized by extensive mediastinitis, respiratory compromise, and pleural empyema; the favorable outcome observed in this case can be attributed to early diagnosis, aggressive surgical drainage, and coordinated multidisciplinary management. These findings are consistent with recent evidence demonstrating improved survival when early, targeted interventions are implemented [2,4].

Conclusion

Esophageal perforation complicated by mediastinitis remains a life-threatening condition requiring rapid diagnosis and immediate multidisciplinary intervention.

This case underscores the critical importance of early clinical suspicion, prompt imaging, and aggressive combined medical and surgical management in improving patient outcomes, even in severe presentations.

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