

Cervical Esophageal Perforation Caused by a Fifteen-Centimeter Foreign Body: Diagnostic and Therapeutic Approach

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ARTICLE INFO

Article history:

Received: 16 April 2018

Accepted: 08 May 2018

Published: 09 May 2018

Keywords:

Esophageal perforation;

Foreign body;

Primary repair;

Mortality

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Citation this article: Cárdenas G, Delgado E, Vidal O, Valentini M, Nuñez J et al. Cervical Esophageal Perforation Caused by a Fifteen-Centimeter Foreign Body: Diagnostic and Therapeutic Approach. Ann Orthop Trauma Rehabil. 2018; 2(1):119.

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ABSTRACT

1. Background

Cervical esophageal perforation of traumatic origin is a rare condition that entails a vital risk for the patient. Early management by the emergency team is crucial to reduce the high morbidity and mortality that is usually associated with this pathology.

2. Methods

We describe a rare case of cervical esophageal perforation caused by a large foreign body and review the diagnostic and therapeutic approach of this condition. An unconscious 30-year-old woman was referred to our center after falling from an 8 meters height balcony. In the emergency room she was found hemodynamically stable and was intubated due to respiratory distress. Initial body CT scan was performed showing important subcutaneous cervical-thoracic emphysema related to a foreign body of 15 x 1.2 cm located in the posterior mediastinum, suggesting esophageal perforation.

3. Results

The foreign body was extracted orally and a primary repair of the esophageal lesion was performed by cervical approach. The patient did not present postoperative complications and was discharged 12 days after surgery.

4. Conclusion

Early diagnosis and immediate surgical treatment in traumatic esophageal perforations correlate with patients' survival. An experienced emergency team plays a key role in the therapeutic decision, whether opting for a surgical approach or a conservative treatment. Nowadays, the most important factor to minimize mortality is the time to diagnosis and treatment.

Introduction

Esophageal perforation is an infrequent but life-threatening condition with an overall mortality rate around 20%. The most common etiology is endoscopic instrumentation (60%), followed by Boerhaave Syndrome (25%), foreign bodies (16%), and perforating trauma (9%) [1].

The location of the perforation varies according to the etiology, being more frequently caused by foreign bodies and trauma in the cervical portion of the esophagus; and of iatrogenic origin in the thoracic and abdominal

compartments. All of them represent an emergency challenge to the surgeon, in which time to diagnosis and treatment play a fundamental role to minimize the high morbidity and mortality associated with this pathology [2]. Etiology, location and time of diagnosis will mark the therapeutic decision.

The aim of this article is to describe a rare case of cervical esophageal perforation caused by a foreign body and discuss the diagnostic and therapeutic approach of these cases.

Case Report

A 30 year-old woman, with a history of recent suicidal attempts, was transferred to the emergency room (ER) of our hospital after falling from an 8 meters height. Upon arrival, despite being hemodynamically stable, she received a score of 5 points on the Glasgow Coma Scale so she was intubated immediately. Shortly afterwards, important neck and thorax subcutaneous emphysema were pointed out. Immediate portable chest and pelvis X-rays were performed with no clear pathological findings. Secondary survey did not contribute with more findings. Urgent blood tests came out strictly normal. Subsequently, urgent full-body Computed Tomography (CT) scan was performed showing severe subcutaneous cervical-thoracic emphysema with anterior and middle mediastinum distribution. Surprisingly, a 15 x 1.2 cm prevertebral foreign body located on the posterior mediastinum from oropharynx to T3 vertebral body, was observed. These findings supported a cervical esophageal perforation (Figure 1).

Results

The foreign body, which corresponded to a plastic refrigerator handle, could be extracted orally. Broad-spectrum antibiotic therapy consisting of piperacillin/tazobactam and fluconazole was initiated at this moment. The patient was checked and transferred to the Intensive Care Unit. The subsequent re-evaluation did not reveal other findings and blood analysis at 6 hours from admission showed only a mild leukocytosis of 14.000. A second CT scan, in this case with oral contrast, was performed, confirming esophageal perforation with

contrast progression towards the left latero-cervical, retropharyngeal and posterior mediastinum spaces; and showing increased extension of cervico-thoracic emphysema (Figure 2).



Figure 1: Initial CT-scan. It shows esophageal 15 cm foreign body from oropharynx to T3.

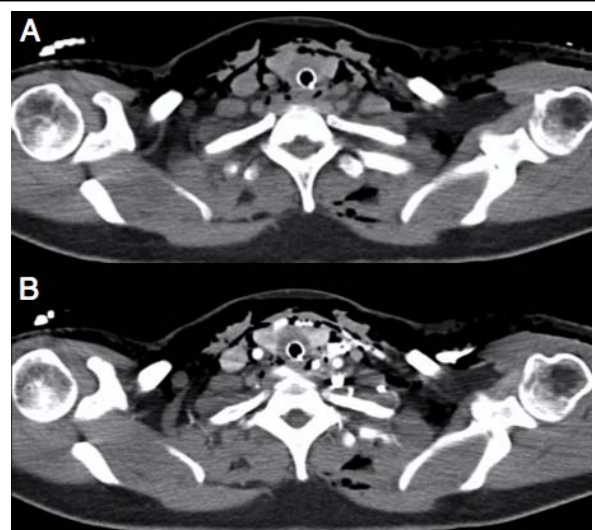


Figure 2: Second CT-scan: normal (A) and contrast (B). It shows cervical-thoracic emphysema (big arrows) and contrast extended to the left latero-cervical space (small arrow).

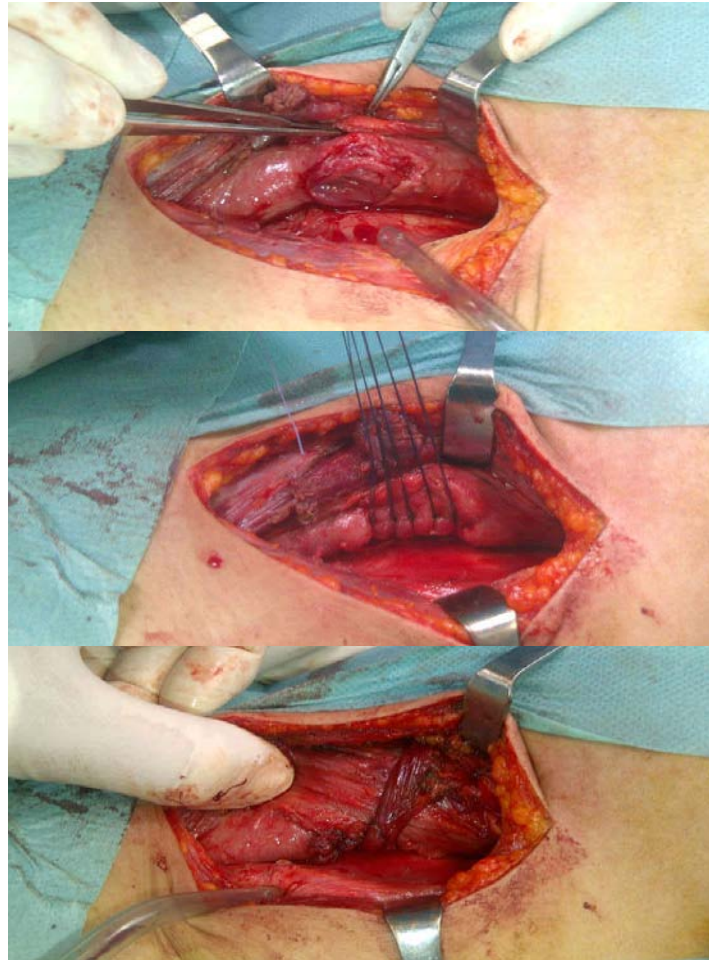


Figure 3: Cervical esophageal perforation primary repair with omohyoid muscle flap.

At that moment, given that the patient was stable, the diagnosis was made in less than ten hours from the patient's arrival to the ER, and after discussing the options with the emergency team, surgical treatment was indicated without delay. Lateral cervical approach was performed and a primary repair with cervical omohyoid pedicled flap to buttress the wound was completed (Figure 3).

Despite the severe prognosis, the postoperative course went uneventful. At day 8 of admission, control esophageal barium transit showed good contrast transition and oral intake was started, being well tolerated. She was discharged in optimal clinical conditions and transferred to a Psychiatric Institution at postoperative day 12. The 6-month follow-up occurred without incidents.

Discussion

Despite diagnostic and therapeutic advances, esophageal perforation continues to be a challenging condition with a significant morbidity-mortality rate. Within esophageal perforations, the rarest location is the cervical. It is generally caused by a penetrating trauma or foreign bodies, and is accompanied by a complex diagnostic and therapeutic approach, making the study of this condition very important for emergency care [1 again]. Foreign body ingestions are more common in the pediatric population and psychiatric patients [3], as in our case report. Therefore, when it happens, the need for emergency surgery significantly increases [4]. In addition, other determining factors to increase this risk are the shape and size of the object. In this specific case of a plastic refrigerator handle,

perhaps size more than shape was the most important factor.

The diagnostic approach for cervical esophageal perforations is similar to abdomino-thoracic perforations, consisting mainly of a complete history inquiry and physical examination which will guide us into suspecting this entity, followed by X-rays and oral contrast CT scan which may confirm the diagnosis. Nevertheless, this diagnosis is not always evident, as it may mimic a large list of other life-threatening conditions such as acute myocardial infarction or aortic dissection. A quick clinical suspicion and an early diagnosis by image play an essential role in esophageal perforations. Several studies have shown that delaying treatment past the first 24 hours of injury, dramatically increases mortality [2,5]. This period is known as the “golden 24-hours”.

Once the diagnosis is confirmed, the most difficult decision is whether to opt for a surgical or a conservative strategy. In order to choose the best therapeutic option, 4 essential parameters must be considered: the hemodynamic stability, the degree of extraluminal contamination, the time of therapeutic delay and underlying conditions such as esophageal cancer or esophageal strictures.

As previously mentioned, early treatment is vital. The literature describes that delaying treatment more than 24 hours implies doubling the mortality rate (from 14% to 27%), and this increase is even more evident when primary repair is elected (from 4% to 14%) [1]. Hemodynamic instability of the patient or small clean perforations are two situations that may indicate an urgent endoscopic stent placement, as a first step before surgery (hybrid technique) or as definitive approach [6]. Interestingly, recent studies suggest that the use of endoscopic stents is associated with lower mortality rates, shorter length of stay and lower costs when compared to surgery [7,8]; nevertheless, studies with a larger number of cases are needed to support this.

Whenever is possible, as shown in the case report, a primary repair is recommended. For cervical esophageal perforation surgery, anatomic domain is essential. The incision is made medial to the sternocleidomastoid muscle and the side of the injury

determines the side of the incision. By steps, first a careful dissection identifying the carotid artery (posterior) and the recurrent laryngeal nerve (anterior) are important for a correct esophageal exposure and to avoid iatrogenic injuries. After finding the perforation, one of the most important steps is a completely mucosa defect exposition by enlarging the muscular layer with an electric scalpel. Following, after devitalized tissue is debrided, closure in two layers is performed, suturing mucosa and muscularis mucosa separately. If considered necessary, in cases of primary repair with important extraluminal contamination or delayed treatment, a pedicled sternocleidomastoid muscle flap or the use of the cranial part of the omohyoid muscle to form a flap, may be useful to buttress the wound. If the perforation is not found, exhaustive drainage should be done.

Postoperative care consists of esophageal protection with parenteral nutrition, nasogastric tube, broad-spectrum antibiotics and the performance of a contrast-enhanced image test in a week, in order to restart oral intake [9]. Finally, a conservative approach with broad-spectrum antibiotics should be considered when there is low extraluminal contamination in a clinical stable patient [8]. A recent study in cervical esophageal perforation describes that patients who have eaten between the time of perforation and diagnosis, that have more than 24 hours between injury and diagnosis, and those that show signs of systemic toxicity are at higher risk of failing conservative treatment and surgical drainage should be considered [10].

Conclusion

In conclusion, cervical esophageal perforation is a rare but serious entity associated with a high mortality rate. There is still much controversy about which is the best therapeutic approach; nevertheless, our case report aims to exemplify how we can approach this entity based on the most recent evidence found in literature. Patient individualization is crucial to make the right decision and until today the most important factor known to reduce mortality is prompt diagnosis and treatment.

Acknowledgements

The authors wish to thank the emergency surgery team at the Hospital Clinic.

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