


Tracheoesophageal Fistula with Secondary Mediastinitis due to Infants Ingesting Caustic Substance: A Case Report and Literature Review

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Abstract: The ingestion of caustic substances is an important cause of emergency care, with children under 5 years of age being the highest risk age group. Tracheoesophageal fistula is an uncommon complication, but with high severity, being associated with mortality of up to 40% when combined with mediastinitis. The objective of this report is to present the case of ingestion of a caustic substance by a 9-month-old infant, describing the clinical and operative management, as well as a brief literature review.

Keywords: Tracheoesophageal Fistula, Mediastinitis, Caustic Injury, Infant

Introduction

The ingestion of caustic substances is an important cause of emergency care in the world, particularly in developing countries, being responsible for significant morbidity and mortality. It is the leading cause of severe esophageal stricture in children and the second leading cause of esophageal replacement in this age group^(1, 2).

The incidence of ingestion of caustic products is bimodal, and the age group at greatest risk is children who are under 5 years old, who account for more than 80% of accidental ingestions⁽³⁾. The remaining reported cases are related to young adults over 21 years old, and are mainly related to suicidal purposes⁽⁴⁾.

Alkalis are the most frequently ingested caustic substances, with caustic soda representing 76.2% of cases⁽³⁾. In comparison to acidic substances, alkaline intake has a greater association with injuries with a worse prognosis⁽⁵⁾. Severe caustic lesions present a high risk of perforation of the esophagus in the acute phase, evolving, in most cases, to narrowing and tortuosity of the organ in the chronic phase⁽⁶⁾. Among the acute complications of caustic ingestion, fistulas are included, with tracheoesophageal fistula being an uncommon complication, but with high severity, morbidity and mortality⁽⁷⁾.

The objective of this report is to present the case of ingestion of caustic substance by a 9-month-old child and to describe the clinical and operative management.

Case Report

A 9-month-old male, admitted to the Thoracic Surgery Service of the Hospital Geral Público de Palmas, in Palmas - TO, presented a history of hospitalization in the pediatric ICU for 12 days after ingestion of caustic substance, associated with hyporexia and cough with purulent sputum.

On physical examination, the patient was hemodynamically stable, active, reactive, eupneic, hydrated, pale, tachycardic, and afebrile. He presented lesions on the lips and oropharynx with purulent discharge, lung auscultation with audible vesicular breath sounds, more audible transmission rhonchi on the right side, soft abdomen, painless on palpation; using a nasogastric tube.

Upper digestive endoscopy performed unsuccessfully in attempts to advance the endoscope through the esophagus. Computed tomography of chest and abdomen performed 10 days after admission with images suggestive of tracheoesophageal fistula near the carina (Figure 1).





Figure 1. Computed tomography of the chest showing, in cross-section, the presence of communication between the trachea and the esophagus.

The patient was referred for emergency surgery, initially performed on the left posterolateral exploratory thoracotomy. Esophageal lesion with extensive and complete destruction of walls in the thoracic portion and tracheoesophageal fistula in the left main bronchus was identified. The lesion was sutured in the left main bronchus and the terminal esophagus was closed.

At the next step of the surgery, the patient was repositioned and underwent a right posterolateral thoracotomy, and a complete lesion of the right main bronchus was identified. A bovine pericardium band was used to close the lesion and make a patch to reinforce the graft with the thymus. A thoracotomy with chest drains was performed bilaterally. Subsequently, exploratory cervicotomy was performed on the right, which identified esophagus with destruction of the anterior wall, inserted and fixed part of Kehr drain for esophagostomy.

The patient returned to the Intensive Care Unit, being maintained on mechanical ventilation. In a second surgical procedure, a tracheostomy was performed, with a jejunostomy plan after clinical stabilization. In the first 10 postoperative days (POD), he had a good evolution and extubation was performed on the 6th POD, with the patient remaining afebrile, eupneic and normocardic. After the 7th POD, he progressed with worsening of the general condition, with manifestations suggestive of sepsis, dying on the 12th POD without further surgical interventions.

Discussion

The case described reported the surgical procedure for the treatment of a tracheoesophageal fistula associated with mediastinitis in a 9-month-old patient after ingestion of a caustic substance. These conditions are

complications of caustic lesions that, despite being classic in the literature, are uncommon and are of great relevance, as they are associated with high mortality⁽⁸⁾.

Mediastinitis is a serious complication of esophageal perforation, but it is an infrequent entity of great clinical severity. When it occurs, it is associated with mortality between 20 and 40%, being almost always related to septic shock. The main signs and symptoms of esophageal perforation with mediastinitis include fever, subcutaneous or mediastinal emphysema, tachycardia, tachypnea, vomiting, and dysphagia. An interval of more than 24 hours between esophageal perforation and initiation of treatment is related to increased morbidity and mortality in affected patients⁽⁹⁾.

The diagnostic investigation of caustic lesions should initially focus on identifying the patient with possible transmural necrosis, in whom urgent surgical intervention is beneficial. Laboratory alterations such as severe acidosis, liver dysfunction, leukocytosis, CRP elevation, renal failure and thrombocytopenia are predictive of transmural necrosis and worse prognosis⁽¹⁰⁾. Continuity of the investigation occurs through imaging tests, and recent studies have shown greater accuracy of computed tomography (CT) compared to endoscopy⁽¹⁰⁾.

Current *guidelines* recommend performing CT scans of the neck, chest, and abdomen 3 to 6 hours after ingestion, obtaining images before and after contrast administration⁽¹⁰⁾. Due to the low incidence of these complications, due to their rarity, there is still a divergence of conduct and surgical management in the approaches among different authors⁽⁷⁾.

According to Chirica *et al.* (2019), surgical treatment is indicated early in cases with necrosis, with resection of all visible devitalized tissues and jejunostomy for enteral feeding being indicated. The performance of preoperative bronchoscopy is mandatory for the detection of tracheobronchial necrosis as a result of the extension of the esophageal lesion, being necessary, in these cases, to perform a thoracotomy.

In the initial moments of hospitalization, the patient did not present alterations in the laboratory tests which were suggestive of transmural necrosis, as described by Chirica *et al.* (2019), a fact that justifies the lack of early surgical intervention. It is perceived, however, the delay in performing gold standard imaging tests for diagnosis, which had as an outcome the postponement of the diagnosis and establishment of appropriate therapy. Despite the clinical and surgical measures, the patient evolved poorly, with compatible signs of mediastinal focus sepsis, with death as a clinical outcome.

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