Case Report

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Boerhaave Syndrome: A Case Report

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Abstract

Boerhaave syndrome is a spontaneous longitudinal transmural rupture of the esophagus, first described in 1724 by German physician Herman Boerhaave. Spontaneous ruptures constitute 15% of all esophageal ruptures, typically occurring after persistent vomiting that leads to a sudden increase in intraluminal esophageal pressure. The syndrome has a high mortality rate and presents with Mackler's triad: vomiting, mild chest pain, and subcutaneous emphysema. This case report describes a 63-year-old male who presented to the emergency department with severe chest and upper abdominal pain. Physical examination revealed tenderness in the upper quadrants and mild crepitus around the neck. A thoracoabdominal CT scan showed extraluminal air in the mid-lower esophageal area, leading to a diagnosis of Boerhaave syndrome. Emergency surgery included a right-sided thoracotomy, revealing a 3 cm esophageal perforation, which was repaired. Postoperatively, the patient was treated in the intensive care unit with expanded antibiotic therapy and managed for various complications. The patient was discharged on the 18th postoperative day. Early diagnosis and treatment of Boerhaave syndrome are critical for improving patient survival. Detailed patient history, recognition of clinical symptoms, and the use of appropriate diagnostic tools are essential for accurate diagnosis and timely surgical intervention.

Keywords: Boerhaave syndrome, esophageal perforation, esophageal repair, primary

Introduction

Boerhaave syndrome is a spontaneous, longitudinal, and transmural rupture of the esophagus, first described in 1724 by the German physician Hermann Boerhaave (1). While iatrogenic esophageal rupture may occur during endoscopic procedures conducted for diagnostic or therapeutic purposes, spontaneous ruptures are more commonly precipitated by persistent vomiting that causes a sudden increase in intraluminal esophageal pressure. Spontaneous ruptures account for approximately 15% of all esophageal ruptures (2). Given that Boerhaave syndrome is a rare clinical entity often identified postmortem, accurate assessments of incidence and mortality rates are challenging; however, high mortality remains inevitable (1,3,4).

Boerhaave syndrome occurs most frequently in patients aged 50-70 years (1). Its clinical presentation varies depending on the location of the rupture, the volume of leakage, and the time elapsed since the injury occurred. In approximately half of spontaneous rupture cases, Mackler's triad; comprising vomiting, mild chest pain, and subcutaneous emphysema is observed (3).

This study presents a case of Boerhaave syndrome that was surgically diagnosed and treated, accompanied by a comprehensive review of diagnostic and treatment approaches informed by current literature.

Case Report

The patient, a 63-year-old male, presented to the emergency department with severe chest and bilateral upper abdominal pain that began 3 hours prior. This chest discomfort and abdominal pain developed after the patient experienced a violent cough following water aspiration. Pain intensity fluctuated with position and respiration.

On physical examination, the patient was conscious, restless, and agitated, sitting in a wheelchair and breathing shallowly. Due to discomfort, he was unable to lie in a supine position. Abdominal examination while seated revealed tenderness, rebound, and involuntary guarding in the upper quadrants. The oropharynx appeared normal, with crepitus and tenderness noted on palpation in the anterior neck, which increased with swallowing. Vital signs included a temperature of 36.8 °C, blood pressure of 110/70 mmHg, and

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oxygen saturation of 96%. The electrocardiographyshowed sinus tachycardia at 120 beats per minute, and the patient was tachypneic at 24 breaths per minute. His overall condition was stable; he was conscious and oriented. On auscultation, bilateral lung sounds were normal.

The patient had no known history of surgery or chronic illness. Laboratory findings indicated a leukocyte count of 16,590 x 10^9/L, hemoglobin level of 15.6 g/dL, and venous blood gas lactate of 2.80 mmol/L. Although the patient reported no other comorbidities, his blood glucose level was elevated at 230 mg/dL.

Before admission to our hospital, the patient had visited another hospital, where a thoracoabdominal CT scan was performed. Examination of the abdominal CT images revealed extraluminal air in the mid-lower esophageal region, leading to a diagnosis of Boerhaave syndrome (Figure-1).

Since a thoracotomy was planned for emergency surgery, selective endotracheal intubation was performed, and the right lung was depressurized. The patient was positioned in the left lateral decubitus position, and a thoracotomy incision was made between the 6th and 7th ribs on the right hemithorax, followed by placement of a retractor. A 3 cm perforation in the esophagus was identified in the mediastinal region, and the esophagus was dissected from the surrounding tissue (Figure-2). No additional defects were found. The primary repair of the esophagus was performed since 5 hours had elapsed from the onset of the patient's complaints and there was no evidence of mediastinitis (Figure-3). A thoracic tube was inserted on the right side and positioned posterior to the esophagus. The operation concluded after layer closure.

Post-operatively, the intubated patient was transferred to the intensive care unit, where a midazolam infusion was initiated. The antibiotic regimen was broadened with the addition of piperacillin-tazobactam. Initial blood gas analysis revealed a lactate level of 3.27 mmol/L and a pH of 7.33.

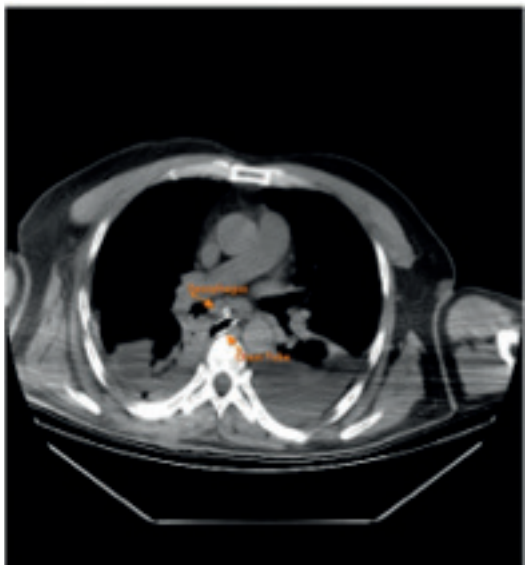

Figure 1. Perforated area in the esophagus on CT

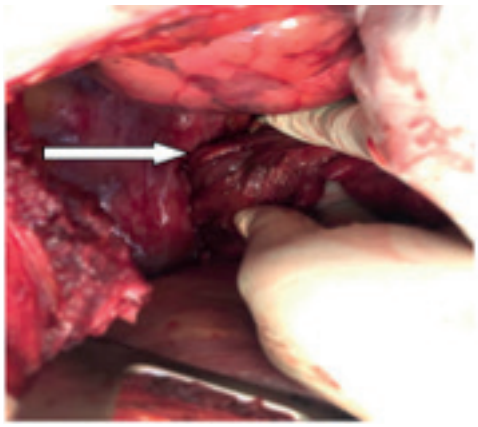

Figure 2. Perforated area in the esophagus

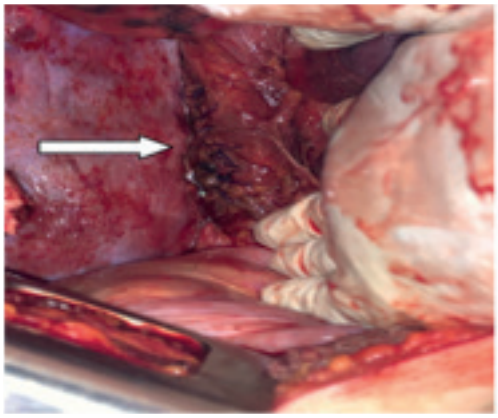

Figure 3. Appearance after primary repair

On the second post-operative day, pleural effusion was detected in the left hemithorax, prompting the placement of a pleurecan for drainage over two days. On the seventh post-operative day, due to persistently elevated CRP levels (150 mg/L), metronidazole was replaced with tigecycline. An anastomotic integrity check was performed using methylene blue administered via nasogastric tube, and no leakage was observed from the drains. Enteral nutrition through the nasogastric tube was initiated on the ninth post-operative day.

Weaning from ventilation began on the ninth day, and sedation was gradually reduced over the following 48 hours. On the tenth post-operative day, the patient was extubated, and on the eleventh day, he was transferred to the general ward.

In the ward, daily chest x-rays were conducted, and the patient received intensive respiratory physiotherapy. The chest tube was removed after resolution of the effusion and pneumothorax. The patient progressed to enteral feeding without complications while in the ward. With no signs of dyspnea, tachycardia, or effusion, the patient was discharged on the eighteenth post-operative day.

Discussion

Boerhaave syndrome is a spontaneous esophageal rupture that occurs due to a sudden and significant increase in intraluminal esophageal pressure, typically as a result of

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vomiting. While rupture can also be attributed to iatrogenic, surgical, or traumatic causes, it most commonly originates from the posterolateral wall, approximately 2-3 cm proximal to the gastroesophageal junction (6). Besides vomiting, this syndrome can occur after childbirth, during epileptic seizures, following severe coughing or hiccupping, while lifting heavy weights, running long distances, or swallowing hard substances. It predominantly affects men aged 40 to 60 years (7,8). In our patient, we believe that the onset of Boerhaave syndrome was precipitated by a forceful cough that occurred after water aspiration.

Boerhaave syndrome is a rare condition with a highly lethal progression. The primary cause of mortality is related to infections in the mediastinum, pericardium, and lungs, which can lead to sepsis. The overall mortality rate for esophageal perforation is approximately 10%; however, if diagnosis is delayed, this rate can rise to as much as 50%. The mortality rate doubles for cases that are untreated within the first 24 hours (6-8). Therefore, prompt diagnosis and treatment are critical; in our case, the patient was diagnosed and operated on within the first six hours.

The classic presentation is described by Mackler's triad, which includes vomiting, lower thoracic pain, and subcutaneous emphysema. Other common findings may include pleural effusion, abdominal rigidity, and tachypnea (9). A posteroanterior chest X-ray can reveal pleural effusion, pneumothorax, pneumomediastinum, and subcutaneous emphysema. For esophagography, water-soluble contrast agents (such as Gastrografin) are preferred over insoluble agents like barium due to their lower inflammatory potential. Thoracoabdominal CT is considered the gold standard for diagnosis, exhibiting a sensitivity of 92-100%, and typically reveals pneumomediastinum. While upper gastrointestinal endoscopy has 100% sensitivity and 92% specificity, its use remains controversial, as it may exacerbate injury and increase the risk of mediastinal contamination (10).

Primary repair is the recommended treatment for esophageal perforations in all patients without esophageal malignancy or extensive mediastinal necrosis, including those who present more than 24 hours after perforation (2).

Conclusion

In conclusion, obtaining a detailed patient history, identifying significant clinical symptoms and physical examination findings, utilizing appropriate diagnostic tools, and maintaining a high level of clinical suspicion are essential for diagnosing Boerhaave syndrome and initiating early surgical intervention. This comprehensive approach is critical in maximizing the chances of survival for affected patients.

Ethical Declarations

Informed Consent: The patient signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed. Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: A conflict of interest has not been declared by the author.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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