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Case Report

‘Bubbles and esophagus: A tale of unexpected and otherwise unexplained pain’^{☆,☆☆}

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ABSTRACT

Boerhaave's syndrome is a potentially fatal emergency, typically induced by forceful retching, which leads to increased intra-esophageal pressure. It commonly presents with vague symptoms such as chest pain or more classic symptoms like subcutaneous emphysema and vomiting. We present an unusual case of Boerhaave syndrome secondary to rapid and excessive intake of carbonated drinks in a 22-year-old male, who presented to our emergency department with atypical symptoms of fever and shortness of breath. Imaging studies showed left-sided hydropneumothorax with an esophageal pleural fistula, and multidisciplinary teams were involved in the patient's management.

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Introduction

Boerhaave's syndrome is a rare and life-threatening emergency, defined as a spontaneous esophageal rupture caused by elevated intra-esophageal pressure. While forceful vomiting and retching are the most common causes of spontaneous esophageal rupture, other contributing factors can include weightlifting, abdominal trauma, defecation, and childbirth [1]. The clinical presentation often comprises the Mackler triad (vomiting, chest pain, and subcutaneous emphysema) [2]. Diagnosis is typically made through a contrast esophago-

gram, CT imaging with oral contrast, or endoscopy. Associated complications may include mediastinitis, empyema thoracis, esophago-pleural fistula, pneumonia, and sepsis [3].

We discuss a rare case of esophageal rupture resulting from the consumption of carbonated beverages and the implementation of a multidisciplinary management strategy.

Case presentation

A 22-year-old male presented to the emergency department of our hospital with a 10-day history of progressive chest

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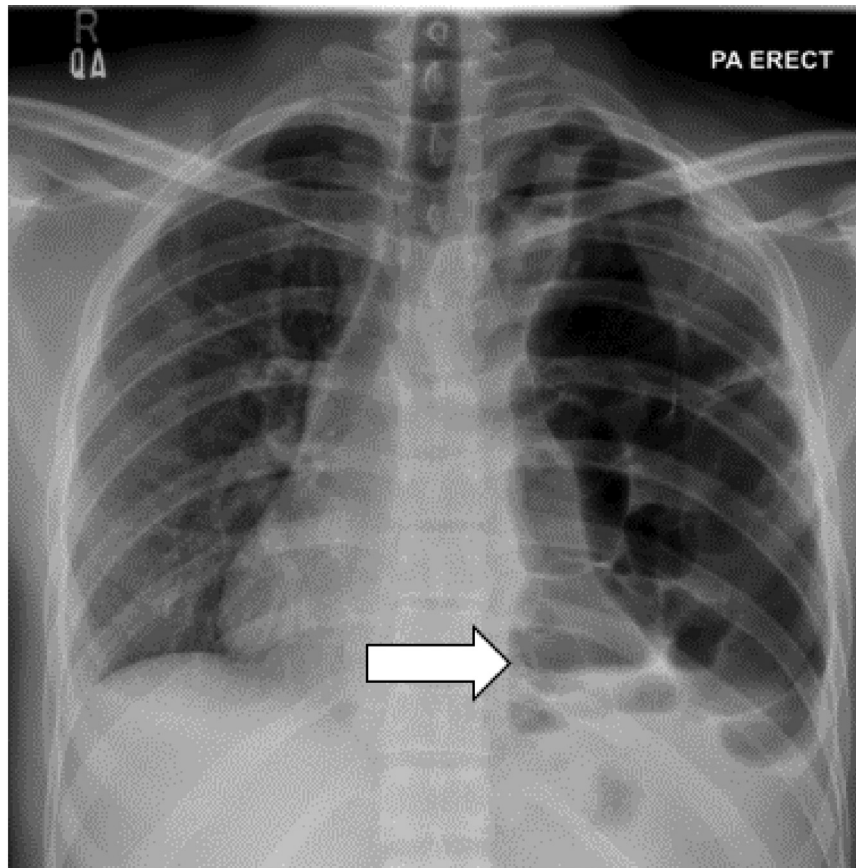


Fig. 1 – Chest radiograph indicated a left-sided hydropneumothorax. Gas-fluid levels (arrow) are seen in the left hemithorax.

pain, epigastric discomfort, and fever. He had no risk factors for esophageal rupture; however, his past medical history included hospitalization 1 year ago due to a severe trauma with possible hepatic injury. Before arriving at the ER, he had been conservatively managed in several other hospitals.

The baseline chest radiograph demonstrated a left-sided hydropneumothorax (Fig. 1). A subsequent CT scan revealed a large loculated left sided hydropneumothorax with a collapsed adjacent lung. Additionally, a 33 mm rent was identified along the left lateral esophageal wall just above the gastroesophageal junction. A peri-esophageal collection was also observed, communicating with the left-sided pleural cavity and the hydropneumothorax (Fig. 2). Based on these cumulative findings, a diagnosis of spontaneous Boerhaave syndrome with a pleuro-esophageal fistula was made.

The radiologist obtained a history from the patient, which revealed that the development of these symptoms coincided with the consumption of a number of carbonated beverages at a social gathering. In collaboration with the gastroenterology team, the thoracic surgery team initiated a management plan. The patient underwent intraoperative endoscopy-guided esophageal stenting, and a left-sided chest tube was also placed for the loculated left-sided hydropneumothorax under general anesthesia. Postoperatively, the patient developed empyema thoracis. Subsequently, video-assisted thoracoscopy with decortication was performed, along with gastrostomy for PEG tube insertion.

Approximately 2 weeks later, the patient was readmitted due to persistent fever. At the request of the gastroenterology team, a contrast esophagogram was performed, revealing the leakage of contrast from the left lateral wall of the distal esophagus, with pooling in the para-esophageal collection and the left pleural cavity (Fig. 3). Subsequently, an intervention was performed to place an endoscopic metallic stent to repair the esophageal rupture. A follow-up contrast esophagogram, conducted four days after the intervention, showed no active contrast extravasation from the esophagus (Fig. 4). At the 1-month follow-up, the patient was in a usual state of good health without any active complaints with an unremarkable chest radiograph (Fig. 5).

Discussion

Boerhaave's syndrome is a potentially fatal upper gastrointestinal tract emergency caused by continuous or violent vomiting. The clinical presentation may vary from case to case, making it a diagnostic challenge. However, the most common presenting symptom is chest discomfort. A case presented by Bani Fawwaz et al. highlighted the misinterpretation of Boerhaave syndrome as acute coronary syndrome [4]. Likewise, the radiological presentation of spontaneous esophageal perforation is also variable. The most common findings on a

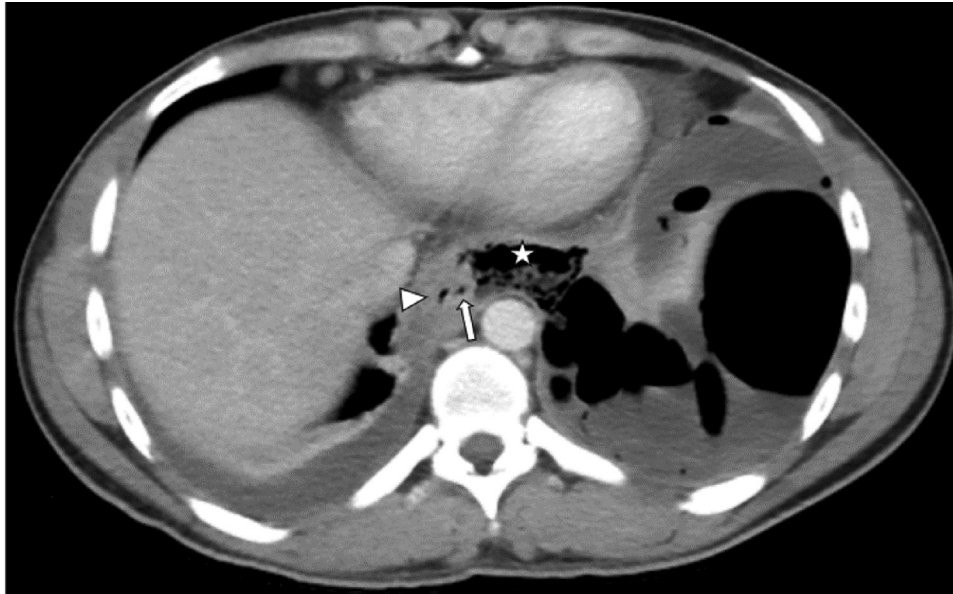


Fig. 2 – Axial section of contrast-enhanced CT shows rent in the distal esophagus (arrow) just above the gastro-esophageal junction, with adjacent collection (star). Esophageal lumen is also seen. (arrow head).

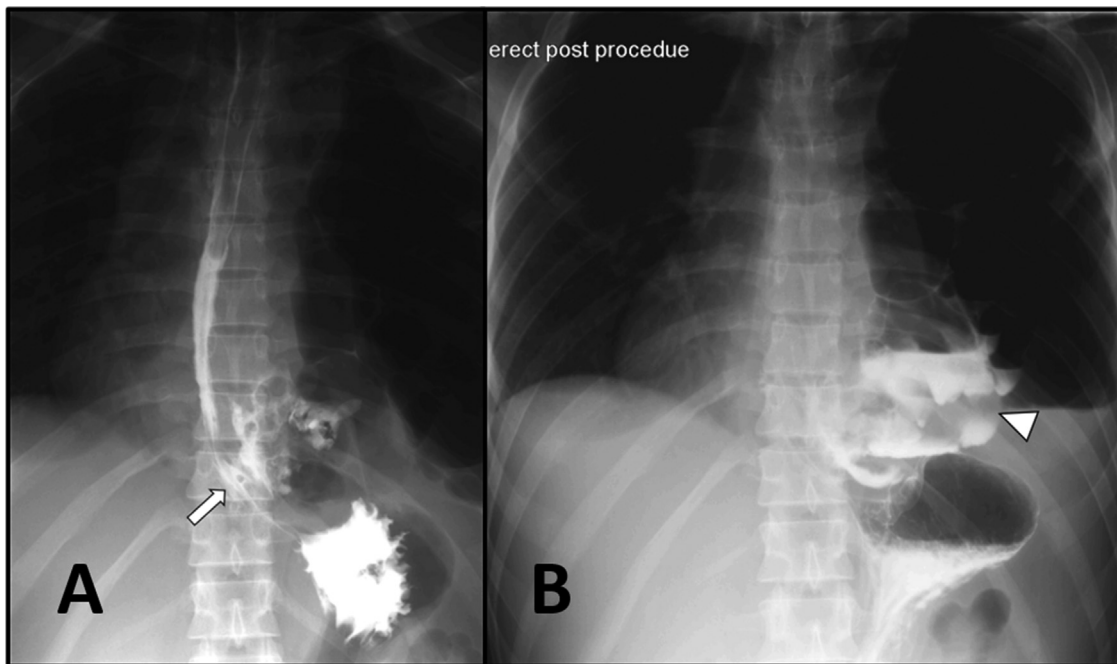


Fig. 3 – (A and B) Esophagogram show esophageal rupture at a supradiaphragmatic location (arrow) with para-esophageal collection (arrowhead).

chest radiograph include pneumomediastinum, pneumopericardium, pleural effusion, pneumothorax, and hydropneumothorax. The Naclerio ‘V’ sign, a V shaped air collection, can be seen in 20% of radiographs of esophageal perforation. In this sign, 1 limb is produced by air outlining the left lower lateral mediastinal border, and the other limb is formed by air between the parietal pleura and medial left hemi-diaphragm [5]. In around 12% of cases, a chest x-ray may be completely normal [6].

According to ACR appropriateness criteria, fluoroscopic guided esophagogram remains the modality of choice for esophageal perforation, as it can reveal extraluminal contrast extravasation or esophago-pleural fistulas. However, despite its utility, 22%-50% of perforations may be missed with fluoroscopic esophagography when using water-soluble oral contrast [7]. Additionally, there are limitations associated with this procedure, including the requirement for trained radiology staff, operator dependency, and the necessity for appro-



Fig. 4 – Post stent placement Esophagogram shows no active leakage or extravasation of contrast.

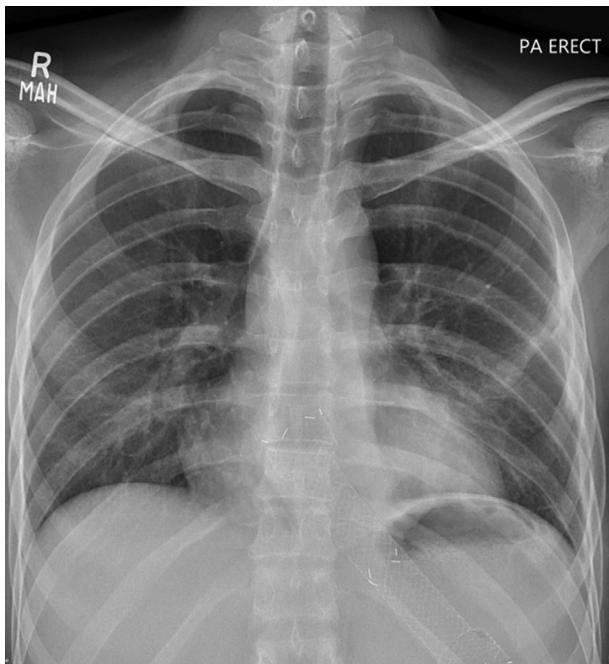


Fig. 5 – Post-treatment, a 3-month follow-up shows a normal chest radiograph.

appropriate positioning, and adequate patient cooperation. These factors may be challenging, particularly since these patients are usually critical and have limited mobility.

Due to these concerns, CT esophagography is now considered the radiological investigation of choice in emergency set-

tings. This is because of its time effectiveness, limited requirement of personnel, and the additional benefit of evaluating extra-esophageal structures, such as mediastinal collections, which cannot be visualized on fluoroscopy [8].

Common CT findings in Boerhaave syndrome include periesophageal air tracks, esophageal wall thickening, mediastinal fluid, and esophago-pleural fistula [9]. Additionally, CT may detect intramural air, such as Mallory-Weiss tears, which may be fluoroscopically occult.

In our specific case, the patient presented with shortness of breath and fever, which were attributed to hydropneumothorax secondary to a pleuro-esophageal fistula, seen on initial chest radiograph.

Subsequently, our patient underwent a fluoroscopic-guided esophagogram using water-soluble oral contrast, which revealed contrast leakage from the esophagus and pooling in the left pleural cavity. These findings suggested a pleuro-esophageal fistula secondary to esophageal rupture.

Following this diagnosis, the patient underwent endoscopically guided esophageal stenting.

In our case, the patient ingested a cold carbonated drink rapidly in an attempt to win a bet, which possibly led to esophageal spasm. This was followed by extensive effervescence, with a large volume of the cold beverage moving from the stomach into the esophagus. The formation of a closed loop due to esophageal spasm resulted in a sudden increase in intraluminal pressure from this effervescence, ultimately leading to esophageal rupture.

A similar scenario was observed in another case, and the same theory was postulated by Loh et al. [10] They presented a case involving a 57-year-old woman who experienced sudden chest pain after rapidly ingesting a cold carbonated drink directly from the bottle, which induced esophageal spasm followed by distension in a closed space.

The presentation of esophageal rupture in our 22-year-old male patient, which was secondary to carbonated beverage intake, was compared with two literature cases. The first case, reported by Carrozza et al. (2020), had spontaneous esophageal rupture, in contrast to our case [11]. On the other hand, the second case, reported by Broadbent et al. (2011), had a history of carbonated drink ingestion similar to our case [12].

The first case involved a 65-year-old female who presented with abdominal and back pain after vomiting. Radiological investigations detected a left hemothorax, pleural effusion, and pneumomediastinum. Her management included a preoperative gastroscopy followed by primary esophageal repair.

In contrast, a 26-year-old male presented with an esophageal rupture secondary to carbonated beverage ingestion, which made his case similar to ours. However, unlike our study, he had a sudden onset of a sore throat followed by radiating chest pain. Radiological assessment revealed an esophageal rupture into the mediastinal cavity. He was conservatively managed with observation and antibiotics.

In comparison to the older female's spontaneous rupture, our case, and the younger male's case, they shared carbonated beverages as a trigger but differed in terms of symptomatology, radiological findings, and management techniques. This dichotomy highlights the varied manifestations of esophageal rupture, emphasizing the need for a patient-specific and nuanced approach to both diagnosis and management.

Conclusion

This case highlights the potential hazards of excessive carbonated beverage consumption and the significance of radiological diagnosis and multidisciplinary collaboration in managing complex esophageal disorders. The patient's remote history of trauma and 10 days of conservative management for the current illness raise concerns about latent vulnerabilities and the timing of interventions in the treatment of Boerhaave syndrome. His positive outcome underscores the effectiveness of the multidisciplinary approach employed.

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None.

Patient consent

I confirm that I have obtained written informed consent for publication from the patient to share their medical information and case details in the publication of the case report titled 'Bubbles and Esophagus: A Tale of Unexpected and Otherwise Unexplained Pain'.

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