emDocs

The EM Educator Series

The EM Educator Series: Not Your Typical Chest Pain Case

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Case 1: A 22-year-old male presents with diffuse nausea, vomiting, and chest pain, followed by back pain and chills. Vital signs reveal tachycardia and fever, but normal blood pressure and oxygen saturation.

Case 2: A 45-year-old female presents with shortness of breath, with a recent upper endoscopy performed 2 days ago for esophageal dilation.

Questions for Learners:

1. What are the etiologies and pathophysiology of esophageal perforation?
2. How can patients present with esophageal perforation?
3. What is the differential diagnosis for pneumomediastinum?
4. What is the ED evaluation?
5. What is the ED management?
6. When should you consider an antifungal in the ED setting?

Suggested Resources:

- Articles
  - emDocs Case
  - Esophageal Perforation Pearls
  - LITFL
  - Core EM
  - IBCC Antifungal therapy
- Journal Articles
  - EM Clinics of NA – Elderly Chest Pain
  - JEM Case – Rare but Lethal Cause of Chest Pain

Answers for Learners:

1. What are the etiologies and pathophysiology of esophageal perforation?

Boerhaave Syndrome is the spontaneous rupture of the esophagus that is caused by a sudden increase in intraesophageal pressure, as seen in forceful vomiting. So, if the patient presents with the right symptoms and any vomiting in their history, keep this diagnosis in mind. Other causes you might see, though less common, are childbirth, seizure, prolonged coughing or laughing, or weightlifting. The lack of serosal layer makes the esophagus more prone to rupture, compared with the rest of the GI tract. Additional etiologies of esophageal perforation include trauma, foreign body or caustic ingestion, invasive neoplasm, infection, and spontaneous perforation.

2. How can patients present with esophageal perforation?

Keep esophageal rupture on your differential for deadly causes of chest, epigastric or back pain. We don't see it often, but it's a real thing. Patients with esophageal perforation frequently present with nondescript complaints such as chest pain, dyspnea, or simply with respiratory distress. Due to the varied presentations of this pathology, a brief, focused history is vital to successful early diagnosis, treatment, and appropriate disposition.

History Pearls:

- Obtain key pieces of history that may increase your clinical suspicion for esophageal perforation:
    - Most common presenting symptom is chest pain.
    - The classic presentation of chest pain, vomiting, and subcutaneous air, known as Mackler's triad, is neither sensitive nor specific for the diagnosis but should highly raise clinical suspicion.
    - Patients who have recently experienced symptoms of forceful vomiting or have a history of bulimia are at risk for developing spontaneous esophageal rupture. In less common scenarios, heavy weight lifting may also precipitate Boerhaave syndrome.
    - Past history of esophageal cancer or infection can cause weakening in the muscular layers of the esophagus, putting patients at a higher risk for rupture. In particular, a history of HIV places patients at a higher risk for multiple esophageal infections.[1-2]
    - History of recent endoscopic procedure.
    - Penetrating trauma to the neck or upper thoracic region.
    - History of potential foreign body or caustic ingestion should place esophageal rupture on the differential in the appropriate clinical setting. A particularly high index of suspicion should be kept in the pediatric population.
    - In terms of ingestants, alkali substances are particularly concerning due to their tendency to cause rapid transmural perforation via liquefactive necrosis.
    - As always, use every modality of history taking at your disposal from the patient, to family and friends, to your electronic medical record.

History Pitfalls:

- Nondescript symptoms such as chest pain and shortness of breath present to the ED countless times per day. Particularly in the setting of the resuscitation room, with limited history available, it is easy to think first of the more common etiologies of chest pain or respiratory distress.
    - Beware of clinical tunnel vision and anchoring on the more common etiologies of chest pain and respiratory distress.

- If the pieces to the clinical puzzle aren't aligning the way you want them to, take a step back and reevaluate the situation.
- Patients with esophageal rupture will not always necessarily present with severe symptoms or in extremis. In some situations, the initial severe chest pain may have occurred with rupture and initial extravasation of contents but then sealed off. In these settings, patients may present with normal vital signs and well appearing, but are at high risk for decompensation and septic shock due to mediastinitis.

Physical Exam Pearls:

- Patients presenting with esophageal perforations will generally be uncomfortable in appearance, possibly septic or in extremis due to their pathology. This leads to the need for a very focused physical exam in conjunction with team-based resuscitation.
  - Vitals signs will be deranged in most patients presenting with esophageal rupture. Tachycardia and tachypnea will likely be present due to discomfort. However, fever in the setting of possible esophageal rupture is concerning for mediastinitis progressing to sepsis.
  - Assess for crepitus throughout the neck and anterior chest wall indicative of subcutaneous air.
  - Unilateral diminished breath sounds may indicate pneumothorax which may occur in conjunction to esophageal rupture.

Physical Exam Pitfalls:

- Physical exam findings indicative of septic shock or tension pneumothorax may lead to anchoring on a singular diagnosis, while in fact may both be subsequent to esophageal rupture.
- Mediastinal emphysema requires significant time to develop, and its absence does not rule out esophageal perforation.

3. What is the differential diagnosis for pneumomediastinum?

Pneumomediastinum occurs when air infiltrates the mediastinal structures after a rupture of the esophagus, trachea, or lung. Sometimes it occurs spontaneously, with the cause never determined.

- **Esophageal:** Boerhaave syndrome, Mallory-Weiss tear, complication of endoscopy, blunt or penetrating trauma, foreign body ingestion. Carries a mortality rate of 30-50% from ensuing mediastinitis.
- **Pulmonary:** Asthma (most common source in pediatrics), barotrauma, vigorous coughing, vomiting, childbirth, weightlifting, valsalva, rapid ascent while scuba diving, blunt or penetrating trauma, toxic inhalants. Usually self-limiting without intervention and does not carry a mortality risk.

4. What is the ED evaluation?

5. What is the ED management?

The source for pneumomediastinum needs to be identified, as the morbidity/mortality, and treatment differ greatly. A careful history and physical exam are important. What risk factors do they have for esophageal versus pulmonary sources? How long have they had symptoms? Are they sick?

- Patients with an esophageal source require admission, broad spectrum antibiotics, resuscitation, and a surgical consult (CT surgery) due to high mortality.

- Patients with a pulmonary source may or may not be sick and may require admission. This depends on their mechanism, level of pain/anxiety, baseline health, and degree of air leak, and ability to follow up. They don't need antibiotics unless there's already an infection.

6. When should you consider an antifungal in the ED setting?

As we manage an increasingly complex population of critically ill patients, the burden of fungal infections is continually increasing. Thus, we need to understand antifungal medications and feel comfortable initiating them promptly. Infectious disease consultants will often be involved with these patients, but we shouldn't be calling them at 3 AM for guidance to start an echinocandin for management of candidemia.

antifungal agents in critical illness

	Azoles: FluCONAZOLE	VoriCONAZOLE	IsavuCONAZOLE	Echinocandins: MicaFUNGIN CaspoFUNGIN AnidulaFUNGIN	Amphotericin
Yeast					
Candida albicans	+	+	+	+	+
Candida tropicalis	+	+	+	+	+
Candida dubliniensis	+	+	+	+	+
Candida kefyr	+	+	+	+	+
Candida auris	+	+	+	+	+
Candida glabrata	-	+	+	+	+
Candida parapsilosis	+	+	+	+/-	+
Candida krusei	-	+	+	+	+
Candida guilliermondii	+	+/-	+	+/-	-
Candida lusitaniae	+	+	+	+	-
Cryptococcus spp.	+	+	+	-	+
Dimorphic fungi (a.k.a. endemic mycoses)					
Histoplasmosis	+/-	+	+	-	+
Blastomycosis	+/-	+	+	-	+
Coccidioidomycosis	+	+	+	-	+
Mold					
Aspergillus fumigatus	-	+	+	+/-	+
Aspergillus nidulans	-	+	+	+/-	+
Aspergillus flavus	-	+	+	+/-	-
Aspergillus terreus	-	+	+	+/-	-
Aspergillus niger	-	-	+/-	+/-	+
Aspergillus lentulus	-	-	+	+/-	+
Mucorales					
Rhizopus spp.	-	-	+	-	+
Mucor spp.	-	-	+	-	+
Lichtheimia spp.	-	-	+	-	+
Fusarium spp.	-	+	+	-	+
Scedosporium spp.	-	+	+		+

The Internet Book of Critical Care