Esophageal Perforation

Esophageal perforation can become a life-threatenining medical condition very quickly. Iatrogenic causes are the most common precipitants (e.g., endoscopy). Inflammation from caustic ingestion or malignancy are other etiologies in addition to esophageal trauma and Boerhaave syndrome. Retrosternal chest pain, subcutaneous emphysema, and pneumomediastinum are common manifestations of this condition. The best initial step in diagnosis is chest X-ray, and the gold-standard confirmatory test is esophagogram. CT scan can also be used for confirmation, particularly in unstable patients. Treatment begins with stabilizing airway, breathing, circulation (ABCs), and broad-spectrum IV antibiotics. Surgical repair of the primary defect is the most definitive treatment for patients with large-sized defects.

PLAY PICMONIC

Etiologies

Iatrogenic

i-at-medic Camp

Esophageal perforation is usually iatrogenic. It is most commonly caused by procedures that involve instrumentation of the esophagus (e.g., dilation, biopsy during endoscopy).

Inflammation

Camp In Flames

Irritation and damage to the esophagus from infections, ingestion of caustic substances, malignancy, or idiopathic esophagitis can lead to inflammatory changes in the wall of the esophagus. This can weaken the wall and increase the risk of perforation.

Trauma

Trauma-spike

Trauma to the cervical, thoracic, or abdominal parts of the esophagus can result in transmural disruption of the esophagus, perforation, and leakage of intraluminal contents.

Boerhaave Syndrome

Boar-half

Boerhaave syndrome is a perforation of the esophagus, caused by a sudden increase in intraesophageal pressure (usually in the setting of vomiting). Boerhaave syndrome should be suspected in patients with severe chest, neck, or upper abdominal pain following an episode of severe vomiting after excessive intake of food and/or alcohol.

Presentation

Retrosternal Pain

Retro-dancer with Pain-bolt

Retrosternal chest pain radiating to the back is a very common manifestation of esophageal perforation and is frequently accompanied by vomiting.

Subcutaneous Emphysema

Sub-q-tip M-Fist-Zebra

Subcutaneous emphysema occurs when gas or air travels under the skin. Esophageal perforation can let air escape into the soft tissues around the throat and neck. On physical exam, a crackling-feel to the touch (crepitus) is frequently present in the suprasternal notch. Crackling/crunching sound can also be heard on chest auscultation (Hamman sign).

Pneumomediastinum

Air Coming Out of Mediastinum

Esophageal perforation can result in a leakage of air from the esophagus into the soft tissues of the mediastinum (pneumomediastinum). This can be seen on X-ray imaging as radiolucencies in the soft tissues of the mediastinum.

Diagnostic Workup

Chest X-Ray

Chest X-ray

In suspected esophageal perforation, a chest X-ray should be ordered first. It typically reveals widened mediastinum, mediastinal air-fluid levels, pneumomediastinum, and pleural effusions. Upright abdominal X-ray can be ordered if there is a suspicion of thoracic/intra-abdominal perforation, and neck X-ray can be ordered if cervical esophageal perforation is suspected.

Esophagram

Sarcophagus Graham-cracker

Esophagogram involves the use of X-ray and contrast material to visualize the esophagus. While barium contrast is best for detecting small perforations, it can cause irritation and inflammation if it leaks into the mediastinum from perforations in the esophagus. Therefore, a Gastrografin swallow should be performed first, which is water-soluble and has fewer side effects. If this study is negative, a barium swallow can be attempted to detect smaller perforations.

Computed Tomography

Cat Scanner

Computed tomography with oral contrast is indicated if a patient is unstable, uncooperative, or if a chest X-ray reveals pneumomediastinum. CT scan can also be used if chest X-ray and esophagogram are inconclusive.

Management

ABCs (Airway, Breathing, Circulation)

ABC Girl-Number 1 Foam Finger

ABC stands for airway, breathing, and circulation. Maintaining a patent airway and stable oxygen saturation and maintaining adequate blood pressure (e.g., IV hydration) are crucial first steps in the management of esophageal perforation. Patients should also be kept NPO (nothing by mouth, nil per os) to avoid exacerbation of the condition.

Broad-Spectrum Antibiotics

ABX-guy

Leakage of esophageal and gastric contents into the mediastinum creates a necrotizing inflammatory process that can lead to sepsis, multiorgan failure, and death. This necessitates the use of broad-spectrum intravenous antibiotics that provide coverage for aerobes and anaerobes. Regimens most commonly used include ampicillin/sulbactam, piperacillin/tazobactam, or carbapenems. In patients with beta-lactam hypersensitivity, clindamycin plus a fluoroquinolone can be used. Parenteral nutrition, pain control, proton pump inhibitors, and IV antibiotics are important parts of the initial conservative treatment of esophageal perforation.

Surgical Repair

Surgeon

Primary repair of the perforation site with or without drainage is the most definitive way of treating esophageal perforation, particularly in patients with large defects/contamination. Esophagectomy (removal and reconstruction of the esophagus) is the last resort intervention, reserved for hemodynamically stable patients with no extraluminal contamination who have a malignancy or extensive esophageal damage. If the extraluminal contamination is present diversion might be a better option.