Traumatic Esophageal Injury

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Injury Disease/Demographics

- Injuries to the esophagus are rare, and generally occur more commonly in the neck than in the thorax due to protection of the bony thorax.
- Most injuries to the esophagus are from penetrating mechanisms: gunshot wounds 70-80%, stab wounds 15-20% and shotgun wounds 3-5%. Blunt mechanisms account for less than 1% of all esophageal injuries.
- Blunt injuries are very rare, and can occur either from a direct blow against a hyperextended neck, or less commonly due to a blow to the epigastrium with a closed glottis, resulting in over-pressurization and disruption in the thorax.
- Other causes of esophageal injury include caustic ingestions and iatrogenic perforations. There are approximately 5000-15000 caustic ingestions annually in the US, with a bimodal age distribution (1-5 years and > 21 years). The reported incidence of iatrogenic perforation from flexible endoscopy varies from 0.018 to 0.03%. Therapeutic endoscopy is associated with a much higher frequency of perforation (1–10%).
- Virtually all patients with esophageal injury have associated injuries, commonly to the respiratory and vascular structures that lie in proximity. Mortality rates range from 2-30%, generally due either to associated injuries or due to sepsis related to delays in diagnosis and management.

Clinical Presentation

- Initial presentation may be subtle.
- Injuries must be suspected in penetrating neck injuries that violate the platysma, transmediastinal gunshot wounds, and following severe chest trauma with associated tracheobronchial injuries.
- Cervical injuries are associated with neck pain, dysphagia, tenderness to palpation, dyspnea and hoarseness.
- Thoracic injuries are associated with chest pain, fever (late), hematemesis, odynophagia, dysphagia, shortness of breath, tachycardia.
- Palpable crepitus within the soft tissues may suggest esophageal injury.
- Pain is the most common presenting symptom.
- On physical exam the patient may have a mediastinal “crunch” with auscultation or cervical emphysema with palpitation in patients with thoracic injury.
- Injuries to the distal esophagus often present with abdominal tenderness and signs of peritonitis.
- Signs of severe sepsis, abscess, and empyema may develop with delays in diagnosis.

Evaluation/Diagnostics/Imaging

- A wide prevertebral shadow on imaging of the neck may suggest esophageal injury.
- Chest radiograph with mediastinal air or pleural fluid may be suggestive but is not diagnostic; films can be normal in up to 10% of patients.

- Patients may present with concomitant pneumothorax or hemothorax. The presence of hydrothorax is highly suggestive of esophageal injury.
- Contrast esophagography has traditionally been the test of choice to evaluate both the cervical and thoracic esophagus. In patients unable to swallow, contrast may be instilled into an NG tube that is pulled back into the proximal esophagus. Sensitivities for identifying injuries is approximately 80%.
- Rigid esophagoscopy is more sensitive than flexible esophagoscopy in the identification of injuries but requires specialized training.
- Flexible esophagoscopy has a negative predictive value of 100% but a positive predictive value of only 33%.
- The combination of endoscopy and contrast esophagography has the highest success in identifying esophageal injury.
- CT scan findings can also be nonspecific and should be interpreted in the setting of patient history. However, CT scans are static, and one cannot evaluate the passage of contrast through the esophagus. Findings suggestive of injury include:
    - Extraluminal air in the mediastinum or surrounding the esophagus
    - Obliteration of fat planes
    - Esophageal thickening
    - Pleural effusions (usually unilateral)
    - Extravasation of oral contrast material (rare)

Role of Non-operative Management and Associated Considerations

- Esophageal injury is a surgical emergency.
- Overall mortality increases significantly with a delay in repair of more than 24 hours.
- Endoscopic covered stent placement has been described as an alternative procedure to primary repair, particularly for mid thoracic and distal thoracic injuries. However, there are few guidelines regarding appropriate patient selection, and no long term data on outcome.
- In general, esophageal injuries are managed surgically.

Pre-operative Preparation

- Patients should be kept NPO.
- Broad spectrum intravenous antibiotics that provide coverage for aerobes and anaerobes should be instituted.
    - anti-fungal agents may be indicated in patients with HIV or who are inpatient or immunosuppressed
- Close hemodynamic monitoring.
- Obtain CBC, chemistry, arterial blood gas, lactate

Operative Techniques/Intraoperative Considerations

- Most esophageal injuries are managed with primary repair.
- Important principles of operative repair include:
    - Debridement of devitalized tissue
    - Drainage
    - Identification of full mucosal injury and repair
    - Esophageal repair is performed in two layers and must be tension free
    - Reinforcement of repair with vascularized pedicle flap of muscle (SCM in the neck, intercostal in the chest), pleura, or in rare cases pericardium, although this is less optimal in cases with significant contamination.
- Cervical injuries should be approached with an incision overlying the left sternocleidomastoid muscle. The SCM is retracted laterally and blunt dissection performed in the prevertebral plane. Care must be taken to avoid injury to the recurrent laryngeal nerve. Drains should be placed.
- Thoracic esophageal injuries are best approached through a right posterolateral thoracotomy at the level of the injury. Distal esophageal injuries are best approached through a left thoracoabdominal incision and may be buttressed with a gastric wrap.
    - The degree of mediastinal contamination impacts surgical management
    - Most injuries can be managed with wide local debridement, primary repair and flap coverage, similar to the cervical esophagus.
    - In all cases esophageal excision and resection with diversion should be avoided. Damage control procedures, including the creation of a fistula by using a t-tube can be effective. This technique, combined with wide drainage can control mediastinal contamination while preserving esophageal length.
    - In devastating injuries, or severe caustic injuries, esophageal resection may be required. A cervical esophagostomy and surgical gastrostomy should be created. Delayed reconstruction with either stomach, jejunum or colon is feasible should the patient survive.
- Wide mediastinal drainage is indicated. Occasionally, in cases with severe contamination of the thoracic cavity, concomitant decortication is required.
- Gastric decompression, either with an NG tube through the site of injury or via surgical gastrostomy is indicated in all cases.
- Distal enteral access for feeding should be established in all cases.

Postoperative Management/Complications

- Broad spectrum antimicrobial therapy should be continued until resolution of septic physiology.
- Nutritional replacement should be initiated within 48 hours.
- Most would evaluate the esophagus with a contrast study once the patient stabilizes to ensure that there is no leak.
- Post-operative complications include
    - abscess formation
    - leak

- tracheoesophageal fistula

Considerations for Special Populations

- Older patients have a higher mortality for the same injury severity score as compared to younger patients
- Immunocompromised patients have a higher degree of complications
- Use of anti-fungal therapy is indicated in immunocompromised patients and patients with AIDS

Suggested Readings

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