Overview

• Case presentation
• Radiology
• Pre-operative management
• Operative and post-operative management
• Discussion
Operative Management

- Left thoracotomy
- Identification of tear
- Primary repair
- Feeding jejunostomy via laparotomy
Sites of Perforation

- Cervical
- Thoracic
- Abdominal
Causes of Perforation

- **Instrumental (50%)**
  - Esophagoscopy with or without biopsy
  - Bougienage for strictures
  - Pneumatic dilatation for achalasia
  - Placement of intraesophageal tubes (NG, Sengstaken-Blackmore, stents)
  - TEE
- **Traumatic (20%)**
  - Blunt trauma
  - Penetrating trauma
  - Foreign bodies (dental prosthesis, bones)
  - Caustic injuries
- **Spontaneous (Boerhaave) (15%)**
- **Postoperative (10%)**
- **Neoplastic (5%)**
  - Spontaneous
  - Post-radiation therapy
Most pharyngeal or cervical esophagus perforations are secondary to instrumentation, foreign objects (usually bones), penetrating trauma to neck.

Consequence – soft tissue contamination from saliva and oropharyngeal flora.
- Most perforations are from instrumentation and occur in fasting patients
- Compact nature of cervical tissue planes tends to prevent wide dissemination of infection
- Local soft tissue abscesses will often form before infection reaches mediastinum.
Cervical Esophageal Perforations

• **Clinical features**
  - Cervical pain, neck stiffness and cervical swelling (usually due to subcutaneous emphysema).
  - Fever and leukocytosis develop quickly (within hours).

• **In penetrating injuries**
  - Associated airway injury in 75%
    » Respiratory distress, air leakage around the wound
  - Great vessel injury in <30%
    » Massive hemorrhage

• **Radiology**
  - CXR – air in preveterbal space extending into neck and to posterior mediastinum
  - Easily confirm with Gastrograffin study
Cervical Esophageal Perforations

- **Management**
  - Strict NPO
  - NG tube to suction
  - Antibiotics (covering oral flora)
  - Surgery

- **Surgical approach**
  - Oblique incision along anterior border of SCM muscle (on side of perforation)
  - Lateral retraction of carotid sheath and SCM muscle and medial retraction of trachea
  - If perforation seen, repair with absorbable suture
  - Bluntly develop prevertebral space and insert 2 soft suction drains
  - Strongly consider feeding jejunostomy
Thoracic Esophageal Perforations

- Etiology
  - Most perforations result of instrumentation
  - Spontaneous perforations occur in thoracic esophagus above diaphragm (80 – 90%) or more proximally in the lower third of thoracic esophagus (10 – 20%)

- Clinical features
  - Patients with Boerhaave syndrome nearly always present with classic history - Ingested a large meal, followed by forceful vomiting, chest pain and dyspnea
  - Develop septic shock quickly
  - Even early in presentation, CXR is abnormal - Pneumomediastinum, pneumothorax, pleural effusion (L>R)
Thoracic Esophageal Perforations

- Despite such apparently typical findings, diagnosis delayed >12 hours on 80% of patients
  - Misdiagnosed for MI, aortic dissection, perforated PU
- Radiology
  - Accurately identified by Gasrograffin contrast swallow study
  - Intramural esophageal perforation (Mallory-Weiss syndrome) a thin linear extravasation parallel to esophageal lumen without actual extravasation into mediastinum
  - Thoracocentesis – purulent exudate, high amylase
Thoracic Esophageal Perforations

- **Non-operative management**
  - Contained perforation within mediastinum
  - Collection drains back into esophagus
  - Minimal or no LOCAL symptoms
  - Minimal or no SYSTEMIC symptoms

- **Operative Management – Main objectives:**
  - Drain infected spaces
  - Prevent further contamination by repairing the site of rupture
  - Restore esophageal continuity
  - Re-expand the lung
  - Prevent gastresophageal reflux
  - Maintain nutritional support
  - Maintain ventilatory support
  - Give appropriate and specific antibiotics
• Surgical management of perforations of intrathoracic esophagus:
  • Primary repair – preferred technique, with site of repair reinforced with healthy vascularized tissue
    » Perforation usually diagnosed early and commonly in fasting patients
  • Primary repair with correction of underlying problem
    » Short strictures can often be dilated, covered with fundoplication
    » Long strictures need to be resected
    » Perforations with pneumatic dilatation managed by 2-layer close and myotomy
    » Perforations due to cancer – resect if low stage and minimal soilage
Thoracic Esophageal Perforations

- Surgical management of perforations of intrathoracic esophagus:
  - Exclusion and division (Urcshel technique)
    » Seldom required
    » Commits patient to second major procedure
    » Reserved for patients with extensive esophageal destruction
  - T-tube drainage (Abbott technique)
    » Seldom required
    » Useful in cases of late perforations with extensive esophageal necrosis
    » Involves closure of perforation around a large-bore Silastic T tube
  - Resection and reconstruction
    » Consider in cases of perforation after dilatation of very long strictures or cancers
    » Reconstruction best deferred until patient’s condition has improved
Thoracic Esophageal Perforations

• Technique of primary closure of thoracic esophageal perforations:
  • Ipsilateral posterior thoracotomy
  • Elevation of esophagus and location of esophageal defect
  • Longitudinal incision of esophageal muscle to ensure that entire length of defect is visualized
  • 2-layer closure reinforced with healthy vascularized tissue
    » Grillo flap, intercostal muscle, pericardial fat, pedicled diaphragm, omentum, Thal patch
  • Wide debridement of mediastinum and decortication of lung
  • Insertion of 3 chest tubes
  • Gastrostomy and feeding jejunostomy
Thoracic Esophageal Perforations

**Postoperative Care:**

- Mechanical ventilation often required for early postoperative period
- Maintain adequate enteral nutrition
- Maintain specific antibiotics for prolonged period (> 2 weeks)
- NPO until no leak as demonstrated by contrast study
- Chest tubes to remain in situ until no leak or until pleural space obliterated
- Remove chest tubes in gradual fashion
- If residual spaces are demonstrated, drain with CT-guided pigtail catheters
Factors predictive of good outcome in patients with esophageal perforations:

- Younger age
- Iatrogenic and instrumental perforation (versus spontaneous)
- Cervical perforation (versus thoracic)
- Contained perforation (versus intrathoracic)
- Early diagnosis within 24 hours
- Buttressing of suture line
- Early re-establishment of enteral nutrition
Esophageal Perforations

- Mortality rates as high as 50% in series that have delay >24 hours to repair
- Approaches are very much individualized to particular patient
- Appropriate pre-operative management key to survival in patients to undergo facility transfer
  - Management of sepsis
  - Antibiotics
  - Securing airway in late presentations
Conclusion

- Early diagnosis is key
- Pre-operative management to be aggressive
- Surgical approach depends on site of perforation, etiology of perforation and on patient co-morbidities
- Post-operative care is intense
- There are a subset of patients that will do well if all principles are followed
Above all, we care.