



TORONTO EAST
GENERAL HOSPITAL

Esophageal Perforation

Dr. Carmine Simone
Thoracic Surgeon, Division of
General Surgery
Head, Division of Critical Care

May 15, 2006

T E G H



TORONTO EAST
GENERAL HOSPITAL

Overview

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



TORONTO EAST
GENERAL HOSPITAL

Operative Management

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



TORONTO EAST
GENERAL HOSPITAL

Sites of Perforation

- Cervical
- Thoracic
- Abdominal





TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

Cervical Esophageal Perforations

- 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.





TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

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)

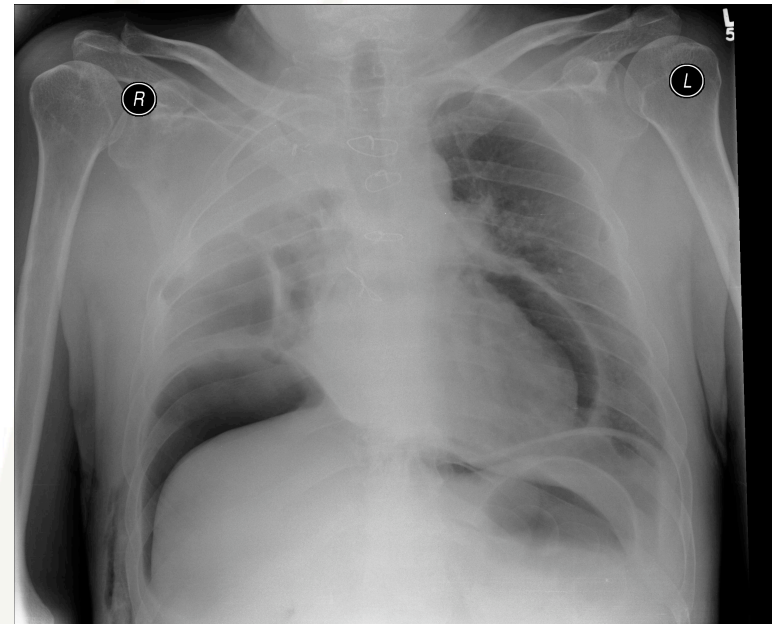




TORONTO EAST
GENERAL HOSPITAL

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

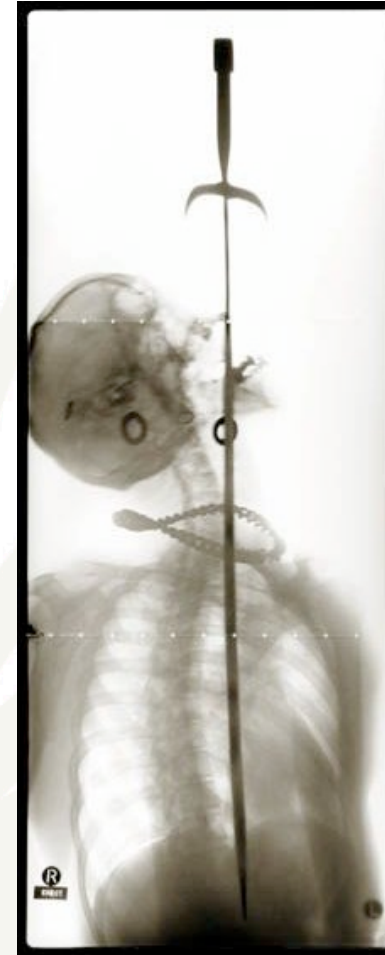




TORONTO EAST
GENERAL HOSPITAL

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





TORONTO EAST
GENERAL HOSPITAL

Thoracic Esophageal Perforations

- 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



TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

Thoracic Esophageal Perforations

- Postoperative Care:
 - Mechanical ventilation often required for early post-operative 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



TORONTO EAST
GENERAL HOSPITAL

Esophageal Perforations

- 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



TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

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



TORONTO EAST
GENERAL HOSPITAL

For more information:

Dr. Carmine Simone

Toronto East General Hospital

825 Coxwell Ave., K wing, Suite 303

Toronto, Ontario M4C 3E7

Tel: (416) 465-9133 Fax: (416) 465-9584

csimo@tegh.on.ca

Above all,
we care.

T E G H