Complications After Esophagectomy

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Disclosures

- Consultant (Physicians’ Advisory Board), Medtronic

- The content herein is based solely on literature and reports; I have no practical experience managing post-esophagectomy complications
Objectives

• Describe the most common complications following esophageal surgery

• Discuss the management of these complications
Complications After Esophagectomy

General/Systemic
- Pulmonary/pneumonia
- Atrial fibrillation
- Chylothorax
- RLN Injury/vocal fold paralysis

Conduit-Related
- Ischemia/necrosis
- Fistula
- Anastomotic leak
- Anastomotic stricture
- Delayed gastric emptying
- Diaphragmatic hernia
Pulmonary/Pneumonia

- Relatively common, up to 60% of patients
- Includes pneumonia, ARDS/acute lung injury (ALI), PE
- Rx for ARDS/ALI is supportive
- Best Rx for complications such as PE, pneumonia is to avoid them altogether
Prevention of Post-Op Pneumonia

• **Preop optimization/conditioning**
  – Poor nutrition leads to muscle wasting (including respiratory muscles!)
  – Smoking cessation
  – Pulmonary rehab/inspiratory muscle training
  – Minimizing irradiated lung volume

• **Perioperative**
  – Minimally invasive surgical approach
  – Protective ventilatory strategies
  – Avoid RLN injury
  – Goal-directed fluid therapy/avoid pulmonary edema
  – Early ambulation, aggressive pulmonary toilet
  – Evaluate for aspiration before feeding

Recurrent Nerve Injury/Vocal Fold Paralysis

- RLNs are subject to injury due to their course in the TE groove

- Injury occurs in ~2% of esophageal resection cases, leading to vocal fold paralysis (VFP)

- VFP is associated with pneumonia, higher likelihood of trach, longer LOS and higher hospital charges\(^1\)

- Assessment and intervention by OHNS and Speech/Language Pathology helps to ameliorate these complications\(^1,2\)

\(^1\)Tong BC, Crowson MC et al. *Laryngoscope*. Accepted for publication

\(^2\)Berry MF et al. *J Thorac Cardiovasc Surg* 2010; 140(6):1266
Survey of GTSC surgeons’ practice patterns regarding VTE prophylaxis for esophagectomy

- 77 respondents completed online survey
  - 58 affiliated with academic institutions
- Wide practice patterns among respondents

Suboptimal dosing
Atrial Fibrillation

- Incidence ~20% of patients following esophagectomy
- Usually occurs on POD 2-3
- Risk factor(s): age, ICU LOS\(^1\); HTN\(^2\); pulmonary complications, sepsis\(^3\)
- Associated with anastomotic leaks and pulmonary complications\(^2,3\)
- Conflicting data re operative approach and association with POAF

\(^1\)Stawicki SPA et al. *Gen Thorac Cardiovasc Surg* 2011; 59(6):399
\(^3\)Murthy SC et al. *J Thorac Cardiovasc Surg* 2003; 126:1162-7
POAF is Associated with Mortality

- Mortality ~18-23%¹
- Improved in “modern” era but still significant

1Murthy SC et al. *J Thorac Cardiovasc Surg* 2003; 126:1162-7
2Stawicki SPA et al. *Gen Thorac Cardiovasc Surg* 2011; 59(6):399

- 60-day survival lower for patients with POAF²
Chylothorax

• Etiology: injury to thoracic duct or tributaries during surgery
• Relatively uncommon (<8%) but associated with high mortality (up to 18%)
• Should be recognized early and managed aggressively
Diagnosis of Chylothorax

- High output drainage from chest tube while NPO
- Milky in character after initiation of enteral feeding
- Triglycerides > 110 ng/dl is diagnostic
Initial Management of Chylothorax

- NPO
- TPN vs. tube feeds with medium chain triglycerides
- Consider Octreotide 50-500 mcg SC TID (standard dose 200 mcg)
  - Inhibits gastric, pancreatic and intestinal secretions
  - No large, RCT data to support this; only retrospective studies and case reviews¹
- Continue conservative management for 1 week max; if fails then intervention is necessary

Chylothorax – Diagnostic Imaging*

*Thoracic duct embolization can sometimes be achieved in same setting
Surgical Management of the Thoracic Duct

- VATS preferred over open
- Instill cream via J tube during surgery to assist with visualization

- Thoracic duct dissection/ligation vs.
- “Mass ligation” of soft tissues between aorta and azygos
COMPLICATIONS INVOLVING THE (GASTRIC) CONDUIT
Conduit Issues

• Major problems
  – Necrosis
  – Fistula

• “Minor” problems
  – Anastomotic Leak
  – Anastomotic stricture
  – Gastric outlet obstruction
  – Diaphragmatic hernia
  – Dumping syndrome
  – Reflux

“Say ... what's a mountain goat doing way up here in a cloud bank?”
Risk Factors for Conduit Necrosis

- **Patient-related**
  - h/o radiation
  - Malnutrition → consider J-tube feeding pre-op

- **Technical issues**
  - Must preserve right gastroepiploic
  - Avoid excessive trauma to stomach
  - Appropriate width (4-5 cm)
    - Too narrow can compromise blood supply
    - Too wide can be redundant and become compressed in thoracic inlet
• An early event in post-operative course
  – Rarely presents after POD 7
• Fever, tachycardia, oliguria, hypotension → sequelae of severe sepsis & metabolic acidosis

• Management involves resuscitation and urgent return to OR
  – Examine conduit, debride necrotic tissue
  – Drain widely
  – Consider diversion for large defect and significant necrosis

• While rare, mortality approaches 90%, especially if not promptly recognized and managed

Meyerson S and Mehta CK. *J Thorac Dis* 2014; 6(S3):S364
Airway-Conduit Fistula

- Uncommon (< 0.5% incidence) but potentially lethal
- Presents fairly early in postop course

Risk factors:
- Neoadjuvant chemo/XRT
- Underlying airway injury (technical issues, intubation, ETT cuff)
- Anastomotic leak → local irritation/enzyme leak
- Irritation by gastric staple line
Airway Conduit Fistula Management

- Endoscopic techniques
  - Fibrin glue, clipping
  - Covered stent placement
- High recurrence rate, migration
• Surgical intervention requires individualized approach

• Principles of repair
  – Drainage and debridement of nonviable tissue
  – Primary repair of airway/conduit defects
  – Buttressing with vascularized tissue to prevent re-formation of fistula
    • Muscle, omentum, pericardial fat
Anastomotic Leak

• Incidence 5 – 40%
• Associated mortality 2-12%

• Considerations
  – Anastomotic technique (hand sewn vs. stapled)
  – Anastomosis location (neck vs. chest)
  – Type of conduit (stomach vs. colon vs. jejunum)
  – Location of conduit (orthotopic vs. heterotopic)
Predictors of Anastomotic Leak After Esophagectomy: An Analysis of The Society of Thoracic Surgeons General Thoracic Database

Edmund S. Kassis, MD, Andrzej S. Kosinski, PhD, Patrick Ross, Jr, MD, PhD, Katherine E. Koppes, PA-C, James M. Donahue, MD, and Vincent C. Daniel, MD

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- STS Database Analysis, 2001 – 2011
- 7,595 esophagectomy cases

- Patient-related risk factors: CHF, HTN, Renal insufficiency, Cervical anastomosis
- Nearly all measured post-operative complications associated with anastomotic leak

Management of Anastomotic Leak

- Antibiotics

- Cervical
  - Drainage of neck wound with wet-to-dry dressing changes

- Intrathoracic
  - More likely to require intervention
  - Endoscopy + stent placement, chest tube drainage
  - Operative exploration
Anastomotic Stricture

- Occurs in 9-40% of patients
- Progressive dysphagia; can be lifestyle-limiting
- Etiology
  - Conduit ischemia (early presentation)
  - Anastomotic leak (early)
  - Recurrent disease (late)
- Symptoms
  - Dysphagia
  - Odynophagia
  - Aspiration
Anastomotic Stricture

- Diagnosis confirmed with barium swallow
- Management is upper endoscopy with dilatation
- Bx if concern for recurrent disease
• Occurs in up to 50% of patients post-esophagectomy

• Etiology
  – Vagotomy performed at time of esophagectomy
  – Compression of stomach/conduit

• Management is controversial
  – Prophylactic: pyloromyotomy, pyloroplasty at the time of resection
    • Can still result in GOO
  – Expectant: endoscopic pyloric dilatation
Acquired Diaphragmatic Hernia

• Can occur either early or late, with or without symptoms
• If symptomatic, must be managed surgically

• Management
  – Reduction of hernia, reapproximation of crura
  – Surgeon’s choice re suturing conduit to diaphragm, mesh prosthesis

Thank you