Esophageal Disorders: The Surgical Considerations

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Objectives

• To present benign and malignant conditions and the surgical options that may be performed
• To have an understanding of the complex surgical management of patients who undergo esophageal reconstructive surgery
• To compare and contrast the open esophageal procedures with minimally invasive surgery
• To present a patient clinical pathway undergoing a transhiatal esophagectomy
Thoracic Surgery encompasses the operative, perioperative, and surgical critical care of patients with acquired and congenital pathologic conditions within the chest. Included are the surgical repair of congenital and acquired conditions of the heart, including the pericardium, coronary arteries, valves, great vessels and myocardium.

In addition to operations and management of diseases of the thoracic and thoracoabdominal aorta, the scope of practice includes the evaluation of vascular disease, the exposure, cannulation, reconstruction and treatment of the carotid, brachiocephalic, axillary, iliac and femoral vessels.

It also includes pathologic conditions of the lung, esophagus and chest wall, tumors of the mediastinum, and diseases of the diaphragm and pericardium. Management of the airway and injuries to the chest are also within the scope of the specialty.

Excerpt from the American Board of Thoracic Surgery – Definition of Thoracic Surgery
Clinical Indications for Esophageal Surgery

Benign disease
• Esophageal Perforation
• Hiatal hernia
• Achalasia

Malignant Disease
• Barretts Esophagus
• Esophageal Cancer
Esophageal perforation is a life threatening injury for which early diagnosis and prompt surgical intervention is essential to minimize morbidity, mortality, and to maintain normal swallowing function.
Hermann Boerhaave
Liebermann-Meffert, Brauer, Stein

1668-1738

Professor of Medicine
Leyden, Holland

Described death of Baron de Wassenaer from post-emetic esophageal leak
# Boerhaave Syndrome

**Dinner**
- veal soup
- lamb and cabbage
- sweetbread/spinach
- duck
- two larks
- dessert
- fruits
- beer/moselle

**Treatment**
- bled to syncope
- poultices
- anodyne draughts
- enemas
- emetics - p.o and medical

**Demise**
- 18 hours

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Disease of the Esophagus 1997;10:77-85
Boerhaave’s Syndrome
autopsy findings

• “...on careful examination, not a drop of blood or pus could be seen.”
• “…though he searched in the expectation of finding some pre-existing lesion of the gullet-walls…the more he looked at the edges of the rent and the surface of the esophagus near them, the more perfectly healthy they seemed to be.”

Disease of the Esophagus 1997;10:77-85
Radiographic Visualization of Esophageal Perforation

Perforation due to ingestion of a fishbone

Radiological Society of North America, 2001

Boerhaave’s syndrome

Courtesy of Seth N. Glick, MD, Philadelphia, PA., 2008

Postop CXR d/t GSW

Clinics, 2005
Radiographic Causes of Esophageal Perforations

Esophageal-bronchial fistula due to stent

Esophageal perforation/Mediastinitis

Esophageal perforation due to foreign body, courtesy of MedPix
Esophageal stent placed preoperatively
Treatment – Things to Ask

• What is the *location* of the leak?
• Is it free or contained?
• How sick is the patient?
• Is there any associated esophageal disease?
• How much time has elapsed since the leak?
Treatment – Basic Principles

- Early diagnosis and prompt intervention yields best outcome
- Control the leak
- Repair/resect associated esophageal pathology *only* if it does not compromise leak control
Management - Esophageal Perforation

Non Surgical Management
Contained perforation
• IV fluids
• NPO
• Broad spectrum Abx
• Nutritional support
• Esophageal stents

Surgical Management
Non Contained perforation
• Primary closure
• Drainage
• Controlled fistula/cervical diversion
• Esophagectomy
Esophageal Stent

Perforation

Polyflex stent (temporary)
**Cervical Leak drainage**

- Widely open neck to expose cervical injury
- Make sure that there is no deeper mediastinal extension
- Irrigate wound
- Leave wound open with dry packing
- Generally, no drains are needed
- T-tube placement (old technique)
Cervical Perforation

Primary repair – surgical intervention

Primary closure

1. Debridement of the area
2. Single layer of interrupted or running 5-0 monofilament wire sutures
3. If necessary, drainage of involved area – chest, drainage, or neck
Surgical intervention

Controlled fistula/cervical diversion

Creation of “spit” fistula
- Esophagus resected at area of perforation
- Feeding tube
- Chest drainage system
- Surgical reversal (few months later)

Esophagectomy – usually for malignant disease
1. Cervical diversion
2. Chest drainage +/- wound debridement or closure
3. Chest drainage system
4. Draining gastrostomy
5. Feeding jejunostomy
6. Repaired perforation

Esophageal Diversion
Chest Tube Indications

• Emergency situations
  – All patients on mechanical ventilations
  – Pneumothorax

• Non-emergency situations
  – Malignant pleural effusion
  – Pleurodesis
  – Postoperative care – Thoracotomy, Esophagectomy, and Cardiac Surgery
Chest Tube Selection
Garden Variety
Cervical diversion/Revision

Sternocleidomastoid muscle

Radiographic evidence of no esophageal leak
Postoperative Course – Staged Procedure

• Ostomy bag placed over “spit” fistula
• NPO - tube feeding dependent
• Pain medication
• Return to hospital for “reconnection” of esophagus in 2-3 months
• Returned for 2nd preoperative visit
• Surgery performed/NPO/NGT
• Ventilated overnight – extubated
• Day 5 – Barium swallow
  – Sips and Chips
  – Soft, mechanical diet
• Day 7-8 – Discharged home on regular diet
Hiatal hernia

The protrusion of “herniation” of the upper part of the stomach into the thoracic cavity through an opening – either by a tear or weakness – in the diaphragm.

Two types – sliding or paraesophageal
Symptoms of Hiatal Hernia

• Known as the “Great Mimic”
• Pain and discomfort is the reflux of the acid, air or bile
• Can present with dull chest pain, SOB, or heart palpitations
Diagnosis of Hiatal Hernia

Diagrams of Hiatal Hernia – Barium Swallow Study & Chest X-Ray and/or CT scan
Treatment

• **Initially treat the symptoms**
  – Antireflux medications

• **Surgery – Nissen Fundoplication**
  – “Open”
  – Minimally invasive
Surgery
Open Nissen Fundoplication

• Described by Dr. Rudolf Nissen in 1950 for severe reflux esophagitis. It involved using a 360 degree wrap of the fundus.
• The fundus of the stomach, closest to the entry of the esophagus is gathered, and wrapped around the lower end of the esophagus and esophageal sphincter.
• Sutured into place, thus eliminating the reflux.
The fundus of the stomach is wrapped around the lower end of the esophagus/LES – anchoring the stomach down.
Open Nissen Fundoplication

• Usually a big operation – may or may not have a thoracotomy incision
• Typical hospital LOS is 4-5 days
• More often than not, they will leave with a gastrostomy tube to assist with “anchoring” the stomach.
• Pain management an issue, especially with thoracotomy incision
• If working, cannot return to work quickly.
Laparoscopic Nissen Fundoplication

CTSNet – The Cardiothoracic Surgery Network
Mary S. Maish, MD, Steven R. DeMeester, MD - 8/9/2014
Surgeon stands between patient’s legs

Port Placement for Nissen Fundoplication
Laparoscopic Nissen Fundoplication

• Typically, reduced postoperative pain
• Hospital LOS is usually reduced, up to 2 days
• Faster return to work
• Improved cosmetic return
Esophageal Cancer or Barrett’s Esophagus

Esophageal Cancer

• Long standing history of GERD
• Documented history (endoscopy) of Barrett’s esophagus w/HGD
• Prior to surgery patients may require Chemo/XRT, then surgery is done
• Stage II or III adenocarcinoma

Barrett’s Esophagus

• Barrett’s esophagus w/ LGD vs. HGD
• Surgical candidate – two different surveillant endoscopies that identify Barrett’s esophagus w/ HGD
• Prophylactic esophagectomy – Gold standard
• Slides are reviewed prior to surgery

*Patients with either diagnosis are offered the same surgery for cure
Prophylactic Esophagectomy
“The Gold Standard”

• Controversial
• Literature states that surgery should not be performed until endoscopic surveillance reveals diagnosis of adenocarcinoma
• Study at JHH, 1982-1994, 30 patients found the following:
  – 13 patients (43%) had the presence of occult adenocarcinoma in the specimen
  – Of these 13, all had GERD and hiatal hernia
  – Mortality was 3.3%
  – Early staged tumors (Stage I and II) are still alive at 30 and 96 months
Follow the yellow brick road

- Update of earlier study, done in 2004 at Union Memorial Hospital, 60 patients with HGD were followed over 4.6 years:
  - 18 patients (30%) were found to have invasive adenocarcinoma; 13/30 (43%) diagnosed with occult cancer from 1982-1994; 5/30 (17%) harbored occult malignancy from 1994-2001
  - All patients with adenocarcinoma in the recent interval – Stage I vs. only 61.5% from earlier study
  - Operative mortality decreased from 3.3% to “0”
  - Length of stay (LOS) decreased from 14 days to 10 days
  - Five year survival is 88%
Esophageal Cancer

- 13,000 people/year
- Men > Women
- White male/middle to upper socioeconomic class – retirement
- Squamous or Adenocarcinoma
- Causes – cigarette smoking, ETOH, Diet, Barrett’s esophagus
Cancer at the junction of stomach and the esophagus

Signs and symptoms of Esophageal cancer:

- Progressive dysphagia
- Weight loss
- Anemia
Treatment of Esophageal Cancer

• Goal of therapy is cure
• Early staged cancer (Stage 0 or I) is surgical resection
• Stage II or III – patients receive chemo/XRT – therapy lasts about 4 weeks; 4 to 6 weeks later –
  – Patients that are not surgical candidates have the option of chemo/XRT only or evaluation for PDT/EMR
• Surgery
Prophylactic Surgery

The Gold Standard of Care

TRANSHIATAL

ESOPHAGECTOMY
Transhiatal esophagectomy

1. Supine position with arm left arm tucked by their side and right arm extended; neck roll is placed under shoulders for better cervical exposure

2. Gastric mobilization “freeing up the stomach”

3. Pylorotomy is performed – allows for better gastric emptying
Esophageal mobilization

4. Widening of the hiatus for esophageal mobilization

5. Esophageal mobilization

6. Creation of gastric tube
Cervical esophago-gastric anastomosis

7. Passing of stomach tube through the neck – chest tube attached to stomach to minimize twisting

8. Stomach tube in placed in position at skin level to optimize anastomotic exposure

9. Two layered, inverting hand sewn anastomosis; 4-0 silk sutures
Esophageal Reconstruction

“New” esophagus

Frontal view

Lateral View
Laparoscopic esophagectomy vs. THE
Data for Minimally Invasive Surgery

- Total number = 46
- Of those, 41 were thorascopic/laparoscopic esophagectomy with cervical anastomosis (5 were done with a different approach)
- OR time range 350 minutes +/- 75 (range was 210-520)
- Five of the 46 patients needed blood transfusions
- LOS 8 days with a range of 4-60 days (ICU stay - 2 days)
- Mortality was 4.3%
- Major complications – 17.4% - occurred in 8 of 46 patients; this included 2 that died
- Minor complications – 10.9% - occurred in 5 of 46 patients

* Nguyen, N et al. Journal of the ACS, Volume 197, Issue 6, pages 902 -913
OR Day
Day 1: ICU, Intubated, NPO for 5 days
Day 2: Cervical drain (JP) removed
Day 3: Low rate tube feedings - 20-30 cc/hr Jevity 1.5
Transfer to floor - no intervention
Day 4: NGT remove – after lunch
Sips and chips ~ 30 cc/hr OOB/chair
Day 5: Contrast swallow
Day 6: Advance diet to clear liquids, then rapidly to regular diet
Day 7-8: Discharge to home

Esophagectomy Plan of Care
Recovery from Esophageal Surgery

• LOS is 7 – 10 days
• Most complications from surgery occur early in postoperative period – day 1-3
• Complications include pneumonia, arrhythmias, and esophageal leaks
• Tube feedings postoperatively, but not used for nutrition, used to prevent bowel obstructions – low rate at 20-30 cc/hr.
• Patients discharged home with the following instructions:
  – May eat or drink what they want
  – Anti-reflux and motility agent for one month
  – Small, frequent (6-8) meals that are chewed well, no gulping of liquids, but sipping and staying hydrated.
  – Lube it up!
  – Sit upright while eating. Do not eat then immediately go to bed/lie down.
  – Maintain normal bowel regimen
  – No tube feedings, unless “failed swallow study”

“It is not what you eat, but how you eat”
References