Esophagectomy

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Associate Professor of Surgery
Disclosures

• None
Overview

• Indications
• Basic tenets
• Various approaches
• Special Considerations
• Outcomes
Indications

• Carcinoma of the esophagus
• Barrett’s with high grade dysplasia
• Caustic injury of the esophagus
• Esophageal perforation
• End-stage benign esophageal disorders (achalasia, scleroderma, GERD)
Esophageal Cancer

Esophageal cancer represents 1.0% of all new cancer cases in the U.S.

<table>
<thead>
<tr>
<th>Common Types of Cancer</th>
<th>Estimated New Cases 2018</th>
<th>Estimated Deaths 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Leukemia</td>
<td>60,300</td>
<td>24,370</td>
</tr>
<tr>
<td>18. Esophageal Cancer</td>
<td>17,290</td>
<td>15,850</td>
</tr>
</tbody>
</table>

Percent Surviving 5 Years: 19.2%
Esophageal Cancer

5-Year Relative Survival

<table>
<thead>
<tr>
<th>Stage</th>
<th>Percent Surviving</th>
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<tr>
<td>Localized</td>
<td>45.2%</td>
</tr>
<tr>
<td>Regional</td>
<td>23.6%</td>
</tr>
<tr>
<td>Distant</td>
<td>4.8%</td>
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<tr>
<td>Unknown</td>
<td>12.0%</td>
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Indications

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• Caustic injury of the esophagus
• Esophageal perforation
• End-stage benign esophageal disorders (achalasia, scleroderma, GERD)
Basic Principles

• Resection
  – Transabdominal/transhiatal
  – Transthoracic/thoracoabdominal
  – Combined (abdominal & thoracic)

• Reconstruction
  – Conduit
    • Stomach
    • Jejunum
    • Colon
  – Anastomotic technique
    • End-to-end, end-to-side, side-to-side
    • Hand-sewn, stapled
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Transhiatal Esophagectomy
Ivor Lewis Esophagectomy
McKeown (3-incision) Esophagectomy
Operative Steps

• Esophageal mobilization
• Gastric mobilization
• Lymphadenectomy
• Conduit formation
• Reconstruction
• Jejunostomy tube placement
• Gastric emptying procedure
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Nodal Involvement

Upper

Mid

Lower
Operative Steps

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- Gastric mobilization
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Operative Steps

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# Pros & Cons of Esophagectomy Types

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Personalizing approach to the patient

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<td>Benign pathology</td>
<td>Malignant pathology GEJ cancers</td>
<td>Malignant pathology Mid-esophageal cancers</td>
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Special Consideration--Conduit

- **Stomach**
  - Most commonly used
  - Good functional result
  - Can be used for intrathoracic or cervical anastomosis

- **Colon**
- **Jejunum**
Special Consideration--Conduit

- Stomach
- Colon
  - Right or left colon; isoperistaltic
  - Can be used for intrathoracic or cervical anastomosis
  - 3 anastomoses
  - More technically difficult
- Jejunum
Special Consideration--Conduit

- Stomach
- Colon
- Jejunum
  - Roux-en-Y reconstruction, pedicled interposition graft or free graft
  - Usually can reach only as high as the pulmonary hilum
  - 2-3 anastomoses
## Special Consideration—Location of Anastomosis

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<th>Intrathoracic</th>
<th>Cervical</th>
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<td>Lower anastomotic leak rate (7%)</td>
<td>Higher anastomotic leak rate (~13%)</td>
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<td>Anastomotic leaks are more morbid</td>
<td>Anastomotic leaks are less morbid</td>
</tr>
<tr>
<td>Anastomotic leaks are more easily managed with stents</td>
<td>Anastomotic leaks are difficult to stent</td>
</tr>
<tr>
<td>Increased pulmonary complications</td>
<td>Recurrent laryngeal nerve injury (9%)</td>
</tr>
<tr>
<td>Increased pain</td>
<td></td>
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<td>Longer recovery</td>
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Special Consideration—Anastomotic Technique

- Hand-sewn vs. stapled

- End-to-end vs. end-to-side vs. side-to-side
  - End-to-end used mostly in pediatric setting
Post-operative Course

• Inpatient
  – POD 0-1: resuscitation, not acidotic, pain control
  – POD 2-5: pulmonary toilet, ambulate, bowel function
  – POD 5-7: evaluation for anastomotic leak
  – POD 7-10: advance diet, discharge planning

• Outpatient
  – 2-4weeks return to 50% preop status
  – 4-8wks removal of j-tube
  – 2-6mths back to normal
Post-operative Course

• Inpatient
  – POD 0-1: resuscitation, not acidotic, pain control
  – POD 2-5: pulmonary toilet, ambulate, bowel function
  – POD 5-7: evaluation for anastomotic leak
  – POD 7-10: advance diet, discharge planning

• Outpatient
  – 4wks return to 50% preop status
  – 4-8wks removal of j-tube
  – 2-6mths back to normal
Post-op Complications

- Pneumonia (11%)
- Arrhythmia
- Anastomotic leak (5.5%)

- Less common
  - Chyle leak (2.8%)
  - ARDS (4%)
  - Small bowel obstruction, post-op ileus (4.5%)
  - Wound infection (6.3%)
  - 30-day mortality (3.9%)
Chronic Complications

- Delayed gastric emptying
- Anastomotic stricture
- Fistula (to airway; to aorta)
Minimally Invasive Esophagectomy

• Transhiatal = laparoscopy + left neck

• Ivor Lewis = laparoscopy + right thoracoscopy

• McKeown = right thoracoscopy + laparoscopy + left neck
Single institution case series (n=1033)
- Anastomotic leak (requiring surgery) rate 5%
- Gastric conduit ischemia 2%
- Vocal cord palsy 4% (1% for Ivor Lewis; 8% for McKeown)
- 30-day mortality 1.7% (0.9% for Ivor Lewis; 2.5% for McKeown)
- Pneumonia & chyle leak not reported
Outcomes After Minimally Invasive Esophagectomy
Review of Over 1000 Patients

James D. Luketich, MD, Arjun Pennathur, MD, Omar Awais, DO, Ryan M. Levy, MD, Samuel Keeley, MD, Manisha Shende, MD, Neil A. Christie, MD, Benny Weksler, MD, Rodney J. Landreneau, MD, Ghulam Abbas, MD, Matthew J. Schuchert, MD, and Katie S. Nason, MD, MPH

- Oncologic outcomes
  - Median number of lymph nodes resected 21
  - Overall 1-yr survival for Stage I 89%, Stage II 79%, Stage III 63%, Stage IV 44%
n=3170 (MIE: 814; open: 2356)

- MIE longer OR times (443min vs. 312min, p<0.001)
- MIE higher rates of reoperation & empyema
- Open higher rates of wound infection, transfusion & ileus
- MIE shorter median LOS (9days vs. 10 days, p<0.001)
- Anastomotic leak rate (5-8%), morbidity (62%) & 30-day mortality(4%) were equivalent
Summary

- Indications for esophagectomy
  - Esophageal cancer
  - End-stage benign esophageal disease

- Types of esophagectomy
  - Transhiatal (laparotomy; cervical anastomosis)
  - Ivor Lewis (laparotomy, thoracotomy; intrathoracic anastomosis)
  - McKeown (3-incision; thoracotomy, laparotomy; cervical anastomosis)

- MIE & open have similar outcomes
Esophagectomy

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