Recent advances in surgery for esophageal cancer

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Surgery for esophageal cancer

Challenges

– High degree of technical expertise
– High risk patients
  • Elderly
  • Comorbid illness
  • Malnourished
– Careful patient selection
– Optimal preoperative management
Historical aspects

• Earliest reports of esophageal surgery: removal of foreign bodies- 6th century AD
• 1st successful esophagectomy for cancer (Torrek, 1913)

Rubber tube between esophagostomy and gastrostomy
Survived 12 years
Current treatment modalities

- Transthoracic/ transhiatal esophagectomy
- Radical enbloc esophagectomy
- Stage directed surgery
Transthoracic esophagectomy

• Most conventional
• Resection under direct vision
• Adequate longitudinal/ lateral clearance
• Lymph node dissection possible
• Pulmonary complications increased
• Operative time increased
• Change of position required
Salient technical aspects

- Abdominal incision, assessment of resectability
- Mobilization of the stomach (preserving right gastroepiploic and right gastric artery)
Salient technical aspects

- Right thoracotomy 5th space
- Division of the azygous vein
- Mobilization of the esophagus with adjacent lymph nodes and fatty tissue

Ligated and divided azygous vein
Salient technical aspects

• Division of the stomach to create a gastric tube
• Mediastinal esophagogastric anastomosis
Transthoracic esophagectomy
Transhiatal esophagectomy

• Safe, quick, no thoracotomy
• Achieves longitudinal clearance
• Pulmonary complications less
• Lymph node dissection not possible
• Blind procedure – partly, at least
Salient technical aspects

• 3 phases
  – Abdominal phase: similar to TTE
  – Cervical phase: mobilization of the esophagus in the neck (preserve recurrent laryngeal nerve)
  – Mediastinal phase: Esophagus mobilization via dilated esophageal hiatus using sharp and blunt dissection
Esophageal mobilization

Anastomosis in the neck
Creation of a gastric tube
Cervical anastomosis at completion
Resected esophagectomy specimen
Radical esophagectomy

- Includes in addition to tumor bearing organ; pericardium, pleura, thoracic duct, lymphoareolar tissue, cuff of diaphragm, 2- or 3-field lymphadenectomy
- Two-field lymphadenectomy: nodal groups from tracheal bifurcation to celiac axis
- Three-field lymphadenectomy: Above 2 fields + excision of nodes along both the recurrent laryngeal nerves and modified cervical lymph node dissection
3-field lymphadenectomy: mediastinum
3-field lymphadenectomy: neck
At completion
Resected specimen
Radical esophagectomy

Rationale

• Conventional esophagectomy
  – Lymph node recurrence 40%
• Lymph node dissection (2 or 3 field)
  – Lymph node recurrence 10-20%

Radical lymphadenectomy

Results

- Mortality: 3-7%
- Morbidity: 35-70%
- Survival (5 yr): 30-40% ($N_1$) & 70-80% ($N_0$)
- Recurrent Nerve Palsy: 70%
- Quality of life: very poor
  - 20% severe hoarseness
  - 5% permanent tracheostomy
  - Poor oral intake and poor exercise tolerance

DeVita – Cancer Principles & Practice of Oncology, 2001
Minimally invasive esophagectomy

• Rationale
  – Decrease morbidity of open surgery
    • Pain
    • Pulmonary complications
  – Quicker return to normal function
  – Shorter hospital stay

• Approach:
  – Myriad of methods implies lack of consensus
    • Laparoscopic transhiatal
    • Thoracoscopic
    • Thoracolaparoscopic
    • Videomediastinoscopic
Combined approach

Ports for thoracoscopy

Thoracosscopic mobilization

Creation of gastric tube

Ports for laparoscopy
Minimally invasive esophagectomy (contd)

• Limitations
  – Cost
  – Steep learning curve
  – No long term follow-up studies
  – No clear proof of superiority over open
Stage directed surgery

- **Rationale:**
  - Depth of tumor determines nodal spread

<table>
<thead>
<tr>
<th>Tumor Depth</th>
<th>Prevalence of lymph node metastases (%)</th>
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</thead>
<tbody>
<tr>
<td>Intramucosal</td>
<td>3-6</td>
</tr>
<tr>
<td>Submucosal</td>
<td>20-30</td>
</tr>
<tr>
<td>Intramuscular</td>
<td>45-75</td>
</tr>
<tr>
<td>Transmural</td>
<td>80-85</td>
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</tbody>
</table>

*DeMeester SR, 2005*
Management of intramucosal tumors

• Conventional surgery: massive morbid solution for microscopic mucosal problem

• Endoscopic mucosal resection
  – Excision of disc of esophageal wall till M. propria
  – Staging tool
  – Therapeutic role
  – Indications
    • High grade dysplasia
    • Intramucosal cancers
  – Limitations: multifocal tumor
Vagal sparing esophagectomy

• First advocated by Akiyama et al

• Indications
  – Intramucosal tumors with no L.N.s

• Contraindications
  – Submucosal tumor
  – Prior vagal transection

• Preoperative requisite
  – EMR
  – EUS (for L.N.s)
• Technique
  – No mediastinal or transhiatal dissection
  – Esophageal stripping
  – HSV from antrum to distal esophagus
Stage directed surgery

*Results*

<table>
<thead>
<tr>
<th>Stage</th>
<th>Survival</th>
<th>Treatment</th>
</tr>
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<tbody>
<tr>
<td>Stage 0</td>
<td>100%</td>
<td>Endoscopic Rx</td>
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<tr>
<td>Stage I &amp; IIa</td>
<td>80%</td>
<td>Esophagectomy</td>
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<tr>
<td>Stage IIb &amp; III</td>
<td>10%</td>
<td>Surgery ± CT/RT</td>
</tr>
</tbody>
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*Lightdale. Am J Gastro, 1999*
Carcinoma esophagus

AIIMS experience

- Total esophageal surgery: 1025 cases
- Total esophageal cancer: 763 cases
- Squamous Cell Carcinoma: 615 cases
- Adenocarcinoma: 148 cases
- Operative Mortality: 9%
- Survival
  - 1 year: 70%
  - 5 year: 25%
# Carcinoma esophagus

<table>
<thead>
<tr>
<th></th>
<th>PGI’96</th>
<th>AIIMS’02</th>
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</thead>
<tbody>
<tr>
<td>Resectability</td>
<td>100%</td>
<td>81%</td>
</tr>
<tr>
<td>Mortality</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Complications</td>
<td>50%</td>
<td>20%</td>
</tr>
<tr>
<td>5-year survival</td>
<td>5%</td>
<td>38%</td>
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Conclusion

• Esophageal cancer is a lethal disease
• Aim of treatment
  – Symptomatic relief
  – Prolong life
• Surgery continues to be mainstay of Rx
• Combined modality treatment
  – May improve survival
• Stage directed surgery - ? the answer