Esophageal Strictures, Leaks and Emergencies

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20 min

Disclosures

- Olympus Inc. – Consultant
- Boston Scientific – Consultant
- Microinterventions – Consultant
- Fractyl – Consultant

- Off-Label Use Discussed:
  - Self-expanding esophageal stents for benign stricture indications
Esophageal Strictures, Leaks and Emergencies

- Learning objectives:
  - Be familiar with the endoscopic diagnosis and management of routine and refractory esophageal strictures
  - Know the options for endoscopic management of esophageal leaks and fistulae
  - Be knowledgeable about the management of acute esophageal perforation

Esophageal Strictures: Assessment

- Etiology
- Duration
- Location
- Diameter
- Length
- Complexity
  - Multi-focal, angularity
Esophageal Strictures: Planning Strategies

- Stricture characteristics
  - Pre-procedure barium study?
- Availability of fluoroscopy
  - Can you traverse with the scope?
- Endoscope availability
  - Small caliber scope?
- Initial vs. subsequent

Esophageal Dilation: Fixed Diameter vs. Pneumatic?
Esophageal Dilation Equipment: “The not so great debate”

- **Fixed-Diameter Catheter Dilators**
  - Polyvinyl
  - Graded sizes (FR/mm)
  - Taper-tipped
  - Wire-guided
  - Reusable
    - Savary-Guillard
    - American Endoscopy

- **Balloon Dilators**
  - Pneumatic
  - Through-the-scope (TTS)
  - Wire-guided
  - Variable Radial Expansion
  - Single-use

Esophageal Dilation: Fixed Diameter vs. Pneumatic?

- Insufficient evidence to indicate a safety or efficacy advantage
- Interchangeable for most indications
- FDCD are preferred* (*in my opinion)*:
  - Tactile sensation
  - Rule of 3
  - Definitive diameter
  - Dilation along the entire esophageal lumen
  - Affordability
Fixed Diameter Tapper-Tip Catheter Dilation Technique: 1

Fixed Diameter Tapper-Tip Catheter Dilation Technique: 2
Malignant Esophageal Stricture:
Fully Covered Self Expanding Metal Stents

- **Etiology**
  - Adeno CA, SCCA, Metastatic
  - Extrinsic compression
    - Consider concurrent endobronchial stent
- **Location**
  - Proximal, Mid, EGJ
- **Fistula**
- **Concurrent therapies**
  - Chemo-radiotherapy

Gastrointest Endosc 2012;76:44-51

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Benign Esophageal Strictures

- Peptic
- Rings
- Webs
- Eosinophilic
- Congenital/Atresia
- Systemic condition
- Caustic
- Radiation
- Pill induced
- ICU/NG-Tube
- Post-sclerotherapy
- Post-PDT
- Circumferential ELR
- EMR plus RFA
- Anastomotic
  - Esophagectomy
  - Anti-reflux
  - Bariatric
**Refractory/Recurrent Strictures**

Benign refractory esophageal Strictures (BRES)

- Effective acid suppression (?)
- Infiltrative carcinoma (?)
- Eosinophilic (?)
- Systemic process (?)
- Anastomotic/Laryngectomy
  - Q 1-2 wk dilations
  - Incrementally increasing diameter
  - Up to 18-20 mm
  - Gradual interval expansion

**Corticosteroid Injection**

- Consider after recurrent stricture with no improvement following incremental dilation
- Kenalog
  - 10 mg/ml
  - Sclerotherapy needle
    - 1-2 cc circumferentially
    - Dilate after/before injection (?)
- Results are inconsistent
- Expand dilation intervals

*World J Gastrointest Endosc 2010 February 16; 2(2): 61-68*
Tissue Incision

- Scissor
- Needle knife

Stenting for Benign Strictures

- **Goal:** Durable tissue remodeling
- **SEPS**
  - Fully covered
  - Approved for benign indications
- **SEMS**
  - Fully covered
  - Not approved for benign indications
  - Partially covered
    - Not approved for benign indications
    - Epithelial hyperplasia
      - Blessing and a curse
**Fully Covered SEPS**
- Expandable
- Polyester
- Silicone-covered
- Retrievable
- FDA approved for BRES

**Migrated SEPS**
- 30% stent migration
- Durable stricture resolution 23%

Not FDA approved for use in benign disease

- Retrospective analysis from 6 referral centers
- A total of 329 stents were removed including
  - 265 (80.5%) SEMS
    - fully covered N = 171 (64.5%)
    - partially covered N = 94 (35.5%).
  - 64 (19.5%) SEPS
- Indications
  - benign strictures N = 158 (48.0%)
  - fistulas N = 164 (49.8%).
- Mean stenting time was 60 days (inter-quartile range 57, range 0 – 659 days).
- At time of removal
  - 91 (27.7%) stents had migrated
  - 15 stents (4.6%) severely embedded by granulation tissue.
Majority of stent removed with grasping forceps or snare

Stent-in-stent technique for embedded SEMS
- 7 biodegradable stents
- 4 FCSEMS
- 1 SEPS
- both stents removed as one using a RTF after a mean 12 days (range 6 – 21)

35 (10.6%) removal-related complications
- 7 (2.1%) major complications
  - perforation 3 (0.9%), esophageal avulsion 1 (0.3%), stridor requiring intubation 1 (0.3%), embedment requiring surgical removal 1 (0.3%) and fistula 1 (0.3%).
Anastomotic BRES

**FCFDMS** for BRES

*not all FDA approved for this indication

- Provide immediate and durable relief of dysphagia while in place
- Effective tissue-remodeling to achieve durable post-stent dysphagia relief is variable – and may be disappointing
- Stenting for BRES is not without risk
  - Epithelial hyperplasia,
  - 4% fistula rate (XRT, poor performance status) [Gastrointest Endosc 2013;77:181-9]
- Often optimal therapy for selected patients with BRES
  - Optimal indications, duration, interval manipulation, materials, diameter remain unknown
**Esophageal Leaks and Fistulae**

- **Etiologies**
  - Iatrogenic
    - Operative
      - Anastomotic, Bariatric, Heller myotomy
    - Endoscopic
      - EMR, ESD, dilation
  - Malignant T-E fistula
  - Boerhaave syndrome

- **Endoscopic therapies**
  - Stents
    - FCSEMS, PCSEMS, FCSEPS
  - Closure
    - TTS clips
    - OTS clips
    - Suturing
  - Sealants
    - Fibrin glue

**Tools for Esophageal Leaks and Fistulas**

[Images of various tools used for endoscopic treatments]
Ischemic RYGBP Anastomosis

Covered Stent Therapy
Endoscopic Clip Closure

Management of Acute Esophageal Perforations

- High morbidity and mortality (10-40%)
- Individualized therapy
- Should only be undertaken with multidisciplinary collaboration
  - Thoracic Surgery, Diagnostic Imaging
- Supporting evidence is level C-D
  - Retrospective series
  - Expert opinion
Acute Esophageal Perforations

- Etiologies
  - Iatrogenic, Boerhaav, penetrating trauma, foreign object ingestion
- Underlying conditions
  - Malignancy, motility disorder
- Timing of presentation
  - < 12 hrs, > 24 hrs, presence of sepsis
- Diagnostic imaging
  - CXR, CT scan, Gastrografin esophagram, EGD
- Location
  - Proximal vs distal

Predictors of Successful Non-Operative Management

Factors associated with success of nonoperative management

- Recent perforation
- Well-circumscribed perforation
- Not perforated within the abdominal cavity
- Contained cavity that drains back into esophagus
- No free extravasation of contrast into body cavities
- No malignancy, obstruction, or stricture in region of perforation
- No evidence of sepsis
- Minimal symptoms

Raminder Nirula, MD, MPH
Stent Therapy

- 76 consecutive acute EP
- Median age 64
- 90% distal esophagus
- 67% iatrogenic
- NPO, IV antibiotics
- < 24 hrs covered stent placement
- Serial Gastrografin swallow to confirm leak sealed
- Mean ICU stay 3 days
- Chest drainage of visible collections
- 1/3 prolonged intubation
- Nutrition support


Predictors of Successful Endoscopic Closure of Gastrointestinal Defects: Experience from a Single Tertiary Care Center

Kamron Pourmand 1 · Brian Riff 2 · Michael L. Kochman 1 · Gregory G. Ginsberg 2 · Vinay Chandrasekhar 2 · Nuzhat A. Ahmad 2


Table 2  Technical success and clinical resolution classified by defect type

<table>
<thead>
<tr>
<th>Defect type (total patients)</th>
<th>TS (%)</th>
<th>CR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaks (n=23)</td>
<td>22 (95.6)</td>
<td>15 (65.2)</td>
</tr>
<tr>
<td>Anastomotic (n=13)</td>
<td>13 (100)</td>
<td>10 (76.9)</td>
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<tr>
<td>Post-gastric sleeve (n=7)</td>
<td>7 (100)</td>
<td>3 (42.9)</td>
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<tr>
<td>Post-RYGB (n=3)</td>
<td>2 (66.6)</td>
<td>2 (66.6)</td>
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<tr>
<td>Fistulas (n=22)</td>
<td>19 (86.3)</td>
<td>15 (68.2)</td>
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<tr>
<td>Tracheoesophageal (n=11)</td>
<td>10 (90.1)</td>
<td>9 (81.2)</td>
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<tr>
<td>Enterocutaneous (n=7)</td>
<td>7 (100)</td>
<td>5 (71.4)</td>
</tr>
<tr>
<td>Large bowel (n=3)</td>
<td>2 (66.6)</td>
<td>1 (33.3)</td>
</tr>
<tr>
<td>Gastro-gastric (n=1)</td>
<td>0 (0)</td>
<td>N/A</td>
</tr>
<tr>
<td>Esophageal ruptures (n=5)</td>
<td>5 (100)</td>
<td>4 (80)</td>
</tr>
<tr>
<td>Overall (n=50)</td>
<td>46 (92)</td>
<td>34 (68)</td>
</tr>
</tbody>
</table>

RYGB Roux-en-Y gastric bypass, TS technical success, CR clinical resolution
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Kamron Pourmand¹ • Brian Riff² • Michael L. Kochman³ • Gregory G. Ginsberg² • Vinay Chandrasekhar² • Nuzhat A. Ahmad²

Table 3 Clinical outcomes based on defect acuity

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<tr>
<th>Defect type (total patients)</th>
<th>TS (%)</th>
<th>CR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute defects</td>
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<td></td>
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<tr>
<td>Leaks (n=14)</td>
<td>14 (100)</td>
<td>13 (92.3)</td>
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<tr>
<td>Anastomotic (n=10)</td>
<td>10 (100)</td>
<td>9 (90)</td>
</tr>
<tr>
<td>Post-gastric sleeve (n=3)</td>
<td>3 (100)</td>
<td>3 (100)</td>
</tr>
<tr>
<td>Post-RYGB (n=1)</td>
<td>1 (100)</td>
<td>1 (100)</td>
</tr>
<tr>
<td>Fistula (n=8)</td>
<td>9 (90)</td>
<td>9 (90)</td>
</tr>
<tr>
<td>Tracheoesophageal (n=10)</td>
<td>9 (90)</td>
<td>9 (90)</td>
</tr>
<tr>
<td>Esophageal ruptures (n=5)</td>
<td>5 (100)</td>
<td>4 (80)</td>
</tr>
<tr>
<td>Overall (n=29)</td>
<td>28 (96.6)</td>
<td>26 (89.7)</td>
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<tr>
<td>Chronic defects</td>
<td></td>
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<tr>
<td>Leaks (n=9)</td>
<td>8 (88.9)</td>
<td>2 (22.2)</td>
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<tr>
<td>Anastomotic (n=3)</td>
<td>3 (100)</td>
<td>1 (33.3)</td>
</tr>
<tr>
<td>Post-gastric sleeve (n=4)</td>
<td>4 (100)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Post-RYGB (n=2)</td>
<td>1 (50)</td>
<td>1 (50)</td>
</tr>
<tr>
<td>Fistula (n=12)</td>
<td>10 (83.3)</td>
<td>6 (50)</td>
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<tr>
<td>Tracheoesophageal (n=1)</td>
<td>1 (100)</td>
<td>0 (0)</td>
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<td>0 (0)</td>
<td>N/A</td>
</tr>
<tr>
<td>Overall (n=21)</td>
<td>18 (85.7)</td>
<td>8 (38)</td>
</tr>
</tbody>
</table>

Further Reading on Endoscopic Therapy for Esophageal Leaks and Fistulae

Endoscopic Management of Gastrointestinal Leaks and Fistulae

Field F. Willingham* and Jonathan M. Buscaglia

Tissue adhesives: cyanoacrylate glue and fibrin sealant

Volume 78, No. 2 : 2013 GASTROINTESTINAL ENDOSCOPY 209

Endoscopic closure devices

GASTROINTESTINAL ENDOSCOPY Volume 76, No. 2 : 2012
Esophageal Strictures, Leaks and Emergencies

Summary:

- Be familiar with the endoscopic diagnosis and management of routine and refractory esophageal strictures
- Know the options for endoscopic management of esophageal leaks and fistulae
- Be knowledgeable about the management of acute esophageal perforation