Stenting 101

Grant F. Hutchins MD
Midwest Gastrointestinal Associates (MGI)

The Expanding Role of SEMS
(Self-Expanding Metal Stents)

- A rapidly increasing arena in terms of advanced endoscopy
- Trend away from SEPS/silastic (plastic stenting)
- Covered to partially covered to fully covered (a progression)
- Metal stents have been around for 15-20 years
- Still designed / indicated for malignant obstruction but...
- Rapidly evolving in terms of use in benign indications (TE fistula, diverticular disease, leaks, etc.)
- Designed for use in numerous luminal locations
SEMS

• Many companies have their version, confusion exists
• Local variability / experience exists regarding placement
• Cost has been an issue in terms of widespread use
• Special considerations...
• How to choose the right stenting option

Clinical Situations / Indications

• Unresectable Malignancy
  Pancreatic, Gallbladder, Cholangiocarcinoma, Esophageal

• Metastatic Disease (most often ovarian/uterine)
• Locally invasive colorectal carcinoma
• Gastric Malignancy
  Primary vs. Recurrent disease

Benign Indications rapidly increasing !!

Complications of Stenting

• Tumor ingrowth / overgrowth
• Migration [esoph esp.]
• Perforation
  Immediate vs. Delayed

• Impaction
• Bleeding
• Pain/Tenesmus/Globus*
SEMS: An Overview

- Endoscopic vs. radiologic placement vs. combination
- Non-through-the-scope (TTS) difficult but possible
- TTS placement can be placed beyond ligament of Treitz
- Fluoroscopic and guidewire assistance “handy”
- Operator experience, patient selection, and comfort with stent type keys to success

Enteral Stents in the US

- **Esophageal (TNTC)**
  - Boston Scientific (Polyflex/ Ultraflex covered/uncovered/Wallflex covered)
  - Cook Medical (Esophageal Z-stent/Evolution partially vs. fully covered)
  - Endochoice (Bonastent Esophageal)
  - Merit Medical Systems, Inc. (ALIMAXX-ES fully covered esophageal stent)

- **Gastrointestinal**
  - Enteral Wallstent (20, 22 mm diameter / 60, 90 mm length)
  - Enteral Wallflex (22, 27 mm diameter / 60, 90, 120 mm length)

- **Colonic**
  - Colonic Wallstent (20, 22 mm diameter / 60, 90 mm length)
  - Colonic Wallflex (22-30 mm diameter / 60, 90, 120 mm length)
  - Ultraflex Precision (25 mm diameter / 57, 87, 117 mm length)
  - Colonic Z-stent** (25 mm diameter / 40, 60, 80, 100, 120 mm length)

Pick your stent!!
Esophageal Stenting

Historically esophageal stents placed to palliate malignancy of the esophagus*
A variety of SEPS** and SEMS available

Changing landscape:
- Refractory strictures (peptic/anastomotic/radiation)
- Tracheoesophageal fistulas
- Iatrogenic perforation
- Post-surgical leaks
- Management of refractory esophageal variceal bleeding

Malignant Esophageal Stenting

- Well studied, high success rate
- Costamagna et al. (2003) demonstrated high success rate
- Stenting most successful in the mid-esophagus
- Globus sensation and “free” reflux major complaints of patients involving prox/distal
- Evolution from SEPS to SEMS

Representative Placement
Enteral (i.e. Duodenal) Stenting

First things first...

Tools needed include: Therapeutic upper endoscope, long biliary (.035in.) guidewire, fluoroscopy

Stent can be placed under direct visualization or with fluoroscopic assistance
Multiple stent-within-a-stent configuration

Successful Deployment

Endoscopy vs. Surgery

<table>
<thead>
<tr>
<th></th>
<th>ENDO</th>
<th>GASTRO-J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Median survival (days)</td>
<td>94</td>
<td>92</td>
</tr>
<tr>
<td>NS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median charges incurred*</td>
<td>$9921</td>
<td>$28,173</td>
</tr>
<tr>
<td>*p-value</td>
<td>&lt; .005</td>
<td>&lt; .005</td>
</tr>
<tr>
<td>Median hospitalization*</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>*p-value</td>
<td>&lt; .005</td>
<td>&lt; .005</td>
</tr>
<tr>
<td>Number requiring repeat procedures and hospitalization</td>
<td>7 (58.3%)</td>
<td>15 (100%)</td>
</tr>
</tbody>
</table>

Vim, et. Al. GIE, 2001

Median p value: < .005*
Post-Deployment Guidelines

- Plain x-ray immediately and after 12-24 hours
- IV analgesia and antiemetics
- Nutrition consult if not already obtained*
- Clinically improved then clears OK the same day
- Long term follow-up??

Malignant Colorectal Obstruction

- 20% of patients present with
- Three main indications for a colorectal stent:
  1. Pre-operative
  2. Palliative
  3. Indeterminate / In-between

Gastrograffin enema* and CT scan review suggested prior to any colonic stenting attempt

Pre-operative Colonic Stent Benefits

- One-stage operation
- Reduced costs
- Improved quality of life
- Elective operation
- "Improved" pre-op assessment
  Resectability of primary
  Patient operability

Recent studies not withstanding many benefits to be gained**
In Conclusion...

- SEMS are effective for TEF and treating all forms of malignant esophageal obstruction
- SEMS are cost and technically effective for palliation of outlet obstruction in the gastroduodenum
- SEMS can be used successfully in both the pre-operative and palliative arenas regarding colorectal cancer obstruction