Obscure Gastrointestinal Bleeding
Capsule Endoscopy and Single Balloon Enteroscopy

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Obscure Gastrointestinal Bleeding

- Bleeding from a source not identified by EGD, colonoscopy or radiographic studies.
- Can be subdivided into obscure overt and obscure occult bleeding.
- Accounts for approximately 5% of GI bleeding.
- May be increasing in frequency due to an increase in the prevalence of vascular disease, increased use of anti-platelet agents, and an aging population.
- Most is related to small bowel lesions, but gastric and colonic lesions are significant causes of obscure bleeding.
<table>
<thead>
<tr>
<th>Obscure GI Bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameron Lesions</td>
</tr>
<tr>
<td>Dieulafoy Lesions</td>
</tr>
<tr>
<td>Antral Vascular Ectasia</td>
</tr>
<tr>
<td>Hemobilia</td>
</tr>
<tr>
<td>Hemoductal Pancreatitis</td>
</tr>
<tr>
<td>Angioectasias</td>
</tr>
<tr>
<td>Small Bowel Tumors</td>
</tr>
<tr>
<td>Other Vascular Lesions (AVMs, Blue Rubber Bleb Nevus)</td>
</tr>
</tbody>
</table>
Capsule Endoscopy in OGB

Advantages
- Visualization of entire small bowel
- Noninvasive
- Minimal discomfort and high patient acceptance
- Safe
- Selects the route for deep enteroscopy

Disadvantages
- Inability to control capsule movement
- Inability to focus in on abnormalities
- No biopsy capability
- Not therapeutic
- Difficulty in localizing findings
- Contraindicated in strictures
UGI Findings on CE in OGIB

• Retrospective review of 203 consecutive CEs done for obscure GI bleeding.
• Lesions were found within reach of a standard UGI endoscope in 86 patients (42%).
• These included the following:
  – GAVE 7 patients (3.4%)
  – Angioectasias 15 patients (7.4%)
  – Gastric ulcers 7 patients (3.4%)
  – Duodenal ulcers 7 patients (3.4%)

Elijah D, Brady P.
### Obscure GI Bleeding Meta-analysis

<table>
<thead>
<tr>
<th>Modality</th>
<th>IY (%)</th>
<th>P (%)</th>
<th>CI (%)</th>
<th>NNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB barium</td>
<td>36 -59**</td>
<td>0.00001</td>
<td>48-70</td>
<td>2-3</td>
</tr>
<tr>
<td>PE</td>
<td>35</td>
<td>0.00001</td>
<td>26-43</td>
<td>3</td>
</tr>
<tr>
<td>CT enterography*</td>
<td>38</td>
<td>0.08</td>
<td>- 4 - +79</td>
<td>-</td>
</tr>
<tr>
<td>Intraop Endo*</td>
<td>0</td>
<td>-16 - +16</td>
<td>-16 - +16</td>
<td>-</td>
</tr>
<tr>
<td>MRI*</td>
<td>36</td>
<td>0.007</td>
<td>10- 62</td>
<td>-</td>
</tr>
</tbody>
</table>

*One study  **Any finding*  

Triester SL. Am J Gastroenterol 2006; 100: 2407
Capsule Endoscopy or Angiography in Acute Obscure Overt GI Bleeding

• 60 patients randomized to capsule endoscopy or angiography and followed for 4 years.
• Diagnostic yield of immediate capsule endoscopy was significantly higher (53% vs 20%, P=0.016).
• Cumulative risk of rebleeding was 33.3% in angiography group and 16.7% in capsule endoscopy group (P=0.10).
• CE has a higher diagnostic yield and comparable long term outcomes compared with angiography.

## Evaluation of CE in OGIB

<table>
<thead>
<tr>
<th>Study</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>PPV (%)</th>
<th>NPV (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennazio 2004</td>
<td>89</td>
<td>95</td>
<td>97</td>
<td>83</td>
</tr>
<tr>
<td>Botelbarge 2005</td>
<td>92</td>
<td>86</td>
<td>88</td>
<td>90</td>
</tr>
<tr>
<td>Hartmann 2005</td>
<td>95</td>
<td>75</td>
<td>95</td>
<td>86</td>
</tr>
</tbody>
</table>
### Changes in Management after CE

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients (n)</th>
<th>Change in Management n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mata 2004</td>
<td>31</td>
<td>7 (22)</td>
</tr>
<tr>
<td>Kraus 2004</td>
<td>42</td>
<td>14 (33)</td>
</tr>
<tr>
<td>Ben Soussan 2004</td>
<td>35</td>
<td>13 (37)</td>
</tr>
<tr>
<td>Albert 2005</td>
<td>209</td>
<td>96 (46)</td>
</tr>
<tr>
<td>Mylonaki 2003</td>
<td>38</td>
<td>25 (66)</td>
</tr>
<tr>
<td>Troillet 2004</td>
<td>52</td>
<td>46 (88)</td>
</tr>
</tbody>
</table>
## Effect of CE on Outcome

<table>
<thead>
<tr>
<th>Study</th>
<th>Patients (n)</th>
<th>Yield (n, %)</th>
<th>Follow up months</th>
<th>Effect on outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viazis 2004</td>
<td>52</td>
<td>28 (54)</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Chong 2004</td>
<td>75</td>
<td>52 (69)</td>
<td>5</td>
<td>+</td>
</tr>
<tr>
<td>Carey 2007</td>
<td>260</td>
<td>138 (53)</td>
<td>10</td>
<td>+</td>
</tr>
<tr>
<td>Favre 2004</td>
<td>50</td>
<td>25 (50)</td>
<td>11</td>
<td>+</td>
</tr>
<tr>
<td>Penazio 2004</td>
<td>91</td>
<td>40 (44)</td>
<td>18</td>
<td>+</td>
</tr>
</tbody>
</table>
Yield of Repeat CE in OGIB

- 24 repeat studies done in patients with OGIB and an initial negative study. Indications included recurrent bleeding and poor visibility.
- 18 studies (75%) repeat studies showed additional findings including angioectasias (7), gastropathy (2), masses (2), erosions (2), ulcer (1), red spots (2), erythema (2).
- Changes in management resulted in 15 (62%) patients.

Jones BH. Am J Gastroenterol 2005; 100: 1058.
Small Bowel Findings

• There are five general findings seen on capsule endoscopy:
  – Vascular lesions
  – Ulceration/inflammation
  – Mass lesions
  – Villous atrophy
  – Active bleeding
NSAID Induced Injury
Celiac Disease
Deep Enteroscopy

Advantages
- Therapy
  - Hemostasis
  - Polypectomy
  - Balloon dilation
  - FB removal
- Biopsy
- Tattoo

Disadvantages
- Complex and time consuming
- Entire SB not visualized in one procedure
- Invasive
- Deep sedation required
- Risk of pancreatitis
- Abdominal discomfort
Endoscopic Technique

• All maneuvers pertinent to upper gastrointestinal endoscopy and colonoscopy are necessary for performance of deep enteroscopy.

• Esophageal intubation is similar to standard upper endoscopy.

• Balloon assisted enteroscopy utilizes a push-pull advancement in conjunction with inflation and deflation of the balloon on the overtube, and/or endoscope. Balloon inflation is controlled by an insufflator that is pressure regulated to avoid over inflation.

• Fluoroscopy may be helpful early on in an endoscopist's experience, but is much less helpful with increasing experience.
CE versus Double Balloon Endoscopy in OGIB

- Thirty five patients evaluated with both CE and DBE.
- SB abnormalities detected with CE in 28 (80%), and in 21 (60%) with DBE (p=0.01).
- No adverse events occurred.
- DBE allowed biopsies in 27, APC in 19, tattoo in 8, and polypectomy in 2 patients. Biopsy or therapy were done in 27 of 35 patients.
- Detection rates are higher with CE. The procedures are complementary because of the therapy possible with DBE.

Hadithi M. Am J Gastroenterol 2006; 101: 52-57.
Diagnostic Yield of VCE Followed by Double-Balloon Enteroscopy

- 190 patients suspected of having SB bleeding who had complete VCE were studied.
- Positive findings were present in 87% on capsule endoscopy.
- 51 patients with indeterminant (44) and negative findings on VCE underwent DBE.
- DBE demonstrated a positive finding in 67% (34/51). 33 from the indeterminant group and 1 from the negative group.
- The overall diagnostic yield using both procedures was 88.9%.
- The NPV and PPV of DBE in indeterminant VCE were 82 and 100% respectively.

Role of Deep Enteroscopy

- VCE and deep enteroscopy are complementary procedures.
- Patients with a negative VCE are less likely to rebleed and may not require deep enteroscopy.
- Positive capsule findings amenable to endoscopic therapy can be approached with deep enteroscopy.
- Capsule endoscopy is useful in determining the route of insertion of the enteroscope.
- In selected patients with recurrent bleeding and a negative VCE, deep enteroscopy is needed.
Types of Enteroscopy

• Push enteroscopy
• Balloon assisted enteroscopy
  – Single balloon enteroscopy
  – Double balloon enteroscopy
• Spiral enteroscopy
Single versus Double Balloon Enteroscopy

• Randomized multicenter trial of 130 patients.
• Oral insertion depth was 258 cm with the SBE, and 253 with the double balloon enteroscope.
• Anal insertion depth was 107 cm with the single balloon, and 118 cm with the double balloon enteroscope.
• Complete small bowel visualization was achieved in 11% with SBE, and 18% with DBE.
• The diagnostic yield was similar with both techniques and there were no serious adverse events in either group.

SBE vs DBE for Total Enteroscopy

<table>
<thead>
<tr>
<th></th>
<th>SBE</th>
<th>DBE</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td>18</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td><strong>Total Enteroscopy Rate</strong></td>
<td>0</td>
<td>57%</td>
<td>0.002</td>
</tr>
<tr>
<td><strong>Diagnosis Rate</strong></td>
<td>61%</td>
<td>50%</td>
<td>0.49</td>
</tr>
<tr>
<td><strong>Therapeutic Outcome</strong></td>
<td>28%</td>
<td>35%</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Takano N. Gastrointest Endosc 2011; 73: 704-739.
Ileal Crohn’s
Retained Capsule
Small Bowel Carcinoma
Small Bowel Carcinoma-Tattoo
GIST
Presenting as Obscure GI Bleeding
Bleeding Lymphangiectasia
Mantle Cell Lymphoma
Peutz Jaeghers
Radiation Enteritis
Celiac Disease