Obscure GI bleeding

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Objectives

- Know the definitions and etiologies of obscure bleeding
- Be familiar with endoscopic options
  - Video capsule endoscopy
  - Push enteroscopy
  - Deep enteroscopy techniques
  - Intra-operative enteroscopy
- Understand radiologic modalities
- Be able to formulate an effective diagnostic and treatment strategy
Definitions of anatomic location of gastrointestinal bleeding

- **Traditional classification:**
  - Upper: *above* ligament of Treitz
  - Lower: *below* ligament of Treitz

- **New classification:**
  - Upper: *above* ligament of Treitz
  - Mid or small bowel: *from* ligament of Treitz to ileocecal valve
  - Lower ("colorectal"): *below* ileocecal valve

Prakash C, Zuckerman GR. GIE 2003;58:330-335
Wong RC. GIE 2003;58:409-412 [editorial]

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**Gastrointestinal bleeding**

- **Upper Tract**
  - Esophagus
  - Stomach
  - Duodenum
  - 85%

- **Middle Tract**
  - Small Intestine
  - 5%

- **Lower Tract**
  - Colon
  - 10%
Obscure GI bleeding (OGIB)

- Defined as absence of identified source of persistent or recurrent bleeding after upper endoscopy and colonoscopy

**Overt obscure:**
Visible bleeding (hematochezia, maroon stool or melena) with or without iron deficiency

**Occult obscure:**
Guaiac positive stool with no visible GI bleeding with or without iron deficiency

<table>
<thead>
<tr>
<th>Upper GI &amp; lower GI bleeding overlooked</th>
<th>Mid GI bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper GI Lesions</strong></td>
<td><strong>Below 40 years of age</strong></td>
</tr>
<tr>
<td>Dieulafoy’s lesion</td>
<td>Tumors</td>
</tr>
<tr>
<td>Cameron’s erosions</td>
<td>Meckel’s diverticulum</td>
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<tr>
<td>Angiodysplasia</td>
<td>Dieulafoy’s lesion</td>
</tr>
<tr>
<td>Gastric antral vascular ectasia (GAVE)</td>
<td>Crohn’s disease</td>
</tr>
<tr>
<td>Fundic varices</td>
<td><strong>Older patients</strong></td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td>Angiodysplasia</td>
</tr>
<tr>
<td>Celiac disease</td>
<td>NSAID enteropathy</td>
</tr>
<tr>
<td><strong>Lower GI Lesions</strong></td>
<td><strong>Uncommon</strong></td>
</tr>
<tr>
<td>Angiodysplasia</td>
<td>Hemobilia</td>
</tr>
<tr>
<td>Neoplasms</td>
<td>Hemosuccus pancreaticus</td>
</tr>
<tr>
<td></td>
<td>Aortoenteric fistula</td>
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</tbody>
</table>
More common sources of small bowel bleeding

- Vascular ectasias
  - 30 to 40%
  - Most common source in older patients
- Small bowel tumors
  - Most common source in patients between 30 and 50 years old
- Meckel’s diverticulum
  - Young patients
- Ulcerations or erosions
  - NSAID related

Vascular ectasias

- Most common etiology of OGIB (30-40%)
  - Older age
  - Chronic renal failure
  - Valvular heart disease
  - Von Willebrand’s disease
  - CREST syndrome
  - Hereditary hemorrhagic telangiectasias
- Spontaneous cessation rate up to 40% per year
- Immediately treat when seen on enteroscopy
- APC preferred modality
- Recurrent bleeding in ~50% of cases
Bleeding angioectasia

Repeat scope?

- After initial negative EGD and colonoscopy, repeat EGD finds a lesion in 3-26%
- Predictors of increased yield of repeat EGD: large hiatal hernia, NSAID use and hematemesis
- Consider repeating EGD with a push enteroscopy
- Repeat colonoscopy if initial exam incomplete, poor prep or predominant hematochezia

Zaman. GIE 1998; Kitiyakara. GIE 2005; Sidhu. JGLD 2006; Fry. APT 2009
Conservative management of obscure OGIB

- Manage with iron supplementation and/or transfusions appropriate in select patients
  - Trivial amounts of obscure OGIB
  - Significant comorbidities and slow blood loss
  - Self limited obscure OGIB

Diagnostic approach in OGIB

- Document objective evidence of GI bleeding
  - Exclude hematologic causes for anemia
  - Exclude malabsorption
- Rule out an upper and lower gastrointestinal tract bleeding source with second-look endoscopy/push enteroscopy as indicated
- Proceed with a small bowel evaluation
Push enteroscopy

- Exam to proximal jejunum (50-150 cm distal to ligament of Treitz)
- Widely available
- Overall diagnostic yield: 40% (15-75%)
- Allows for diagnosis and therapy
- Limitations:
  - Only examines proximal jejunum
  - Difficult to prevent looping
  - Can cause discomfort

Descamps. Endoscopy 1999
Waye. Gastrointest Endosc 1997

Capsule endoscopy (CE)

- Painless and well-tolerated
- Visualizes entire small bowel in 80-90%
- Improved diagnostic yield (45-77%) over radiography or push enteroscopy
- The test of choice after upper endoscopy and colonoscopy in evaluating OGIB
- Limitations
  - No ability to sample tissue or perform therapy
  - May tumble as it advances
  - Rare capsule retention
OGIB outcomes with CE

- The overall range of diagnostic yield for CE in obscure GI bleed is 55 to 83%
- Yield depends on indication and timing
- Improved diagnostic yield with bowel prep
- High positive predictive value of 94-97% and negative predictive value of 83-100%
- Change in management in 37 to 87% patients
- Consider endoscopic placement for in-patients and gastroparesis

Rondonotti E. World J Gastroenterol. 2007;13:6140-9
Raju GS. Gastroenterology. 2007;133:1694-6

NSAID ulcers
Eroding GIST

Deep enteroscopy options

- Double balloon enteroscopy
- Single balloon enteroscopy
- Spiral enteroscopy
- Intraoperative endoscopy
Determining approach

- Positive capsule endoscopy
  - Within first 10% – push enteroscopy
  - Within 70% – antegrade approach
  - Greater than 70% – retrograde approach

- Negative capsule endoscopy
  - With a high suspicion for SB findings: start with antegrade approach
  - With a low suspicion for SB findings: avoid deep enteroscopy

Review of capsule endoscopy
Estimate location to plan DE approach

\[
\frac{(\text{Lesion time} - \text{Duodenum time})}{(\text{Cecum time} - \text{Duodenum time})} = \% \text{ of small bowel transit}
\]

\[
\frac{90 \text{ min} - 60 \text{ min}}{180 \text{ min} - 60 \text{ min}} = \frac{30 \text{ min}}{120 \text{ min}} = 25\% \text{ of small bowel transit}
\]
**Enteroscopy tips for OGIB**

- Perform enteroscopy during acute bleeding whenever possible
- Don’t completely correct INR
- Take your time (typically takes 1-1.5 hours)
- Clear all blood
- Consider water immersion technique

**Deep enteroscopy**

- Overall diagnostic yield: ~ 60% (41%-80%)
- Channel allows therapeutic interventions
- Total enteroscopy is possible using both routes in ~50-70% of cases
- Often requires anesthesia with MAC or GA
- Resource utilization is high with procedure duration >60min and need for assistants + fluoroscopy
- Complications rate low: 1-3%
- Test of choice with a positive capsule endoscopy

Predictors of high diagnostic yield

- Ongoing overt obscure GI bleeding
- Marked decrease in hemoglobin value
- Higher transfusion requirements
- Increasing age
- Anticoagulant use
- Comorbid liver abnormalities
- Chronic renal failure


Contraindications

- Poor medical condition/high risk for anesthesia
- Suspected GI tract perforation
- High-grade intestinal obstruction
- High-risk esophageal varices (antegrade exams)
- Latex allergy (double balloon only)
- Ileostomy (perforation)
- Post chemotherapy for intestinal lymphoma (perforation)
- Ehlers-Danlos syndrome
Double balloon enteroscopy

- First described in 2001 by Yamamoto
- FDA approved in the US in 2004
- Used in more than 40 countries

Performing DBE

1. With the overtube balloon inflated, the scope is advanced

2. Scope balloon is inflated

3. Overtube balloon is deflated and the over-tube is advanced (scope balloon anchors small bowel)

4. Overtube balloon is inflated
5. Scope and over-tube are withdrawn (in this step, loops are reduced)

6. Scope balloon is deflated

7. Scope is advanced while over-tube balloon anchors small bowel and the cycle is repeated

**Comparison of CE with DBE**

- Meta-analysis of 10 studies
- Diagnostic yield for CE – 62%
- Diagnostic yield for double balloon enteroscopy – 56%
  - If prior positive capsule study – 75%
  - If prior negative capsule study – 28%

Teshima CE. J Gastroenterol Hepatol 2011;26(5):796-801
Single balloon enteroscopy

Spiral enteroscopy
# Small bowel enteroscopy: a comparison

<table>
<thead>
<tr>
<th>Method</th>
<th>Strengths</th>
<th>Weakness</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capsule Endoscopy</td>
<td>No sedation required, widely available</td>
<td>No therapeutic potential, missed lesions, false +</td>
<td>Diagnostic yield 60-80%</td>
</tr>
<tr>
<td>Double Balloon</td>
<td>Most well established, most data supported, highest total enteroscopy rates</td>
<td>Prolonged duration, distinct processor system</td>
<td></td>
</tr>
<tr>
<td>Single Balloon</td>
<td>Ease of use</td>
<td>Limited depth of insertion</td>
<td></td>
</tr>
<tr>
<td>Spiral Enteroscopy</td>
<td>Accelerated procedure time, easier to insert and withdraw during procedure, very stable platform, compatible with any scope</td>
<td>Limited retrograde examination; increased risk of complications related to corkscrew mechanism</td>
<td>Concerns about esophageal injury; Not currently available</td>
</tr>
</tbody>
</table>

# Motorized Spiral Endoscopy

[Internet video]
Intra-operative enteroscopy

- Endoscope is inserted through an enterotomy or per-orally or per-rectally
- Surgeon telescopes bowel over endoscope
- The entire small bowel seen in >90% of pts
- Diagnostic yield of 60 to 88%
- Complications include serosal tears, avulsion of the SMV, CHF, azotemia, ileus and death

The role of radiology

- Meckel’s scan
- CT enterography
- Angiography
Meckel’s scan

- Inject 99m technetium pertechnetate — has an affinity for gastric mucosa
- Identifies only those diverticula that contain ectopic gastric mucosa
- Sensitivity/PPV is 60% in adults
- Specificity 95%, false positives with duplications, intussusception and IBD

CT scan vs. CT enterography

Routine CT

CTE
CT enterography (CTE)

- Can detect active bleeding
- Can localize source of bleeding
- Perform dual or tri-phase CTE in active bleed
- Yield of CTE for detecting a source of OGIB is 40 percent
- CTE useful in those with overt OGIB, but not occult OGIB
- New role in the evaluation of OGIB

Agrawal JR. J Gastroenterol Hepatol 2011;27:751-759;

New imaging recommendation

- CTE should be performed after a negative VCE when small bowel bleeding suspected
- CTE preferred over MRE unless younger pt
- Consider CTE prior to VCE in setting of abdominal pain, IBD, prior XRT, prior SB surgery or suspected SB stricture/obstruction
- CTE can be performed after a negative standard CT scan

Gerson L. ACG Guidelines 2015
Angiography

- Interventional radiology
- Bleeding rate is >0.5 ml/min
- Improved localization over nuclear med
- Limited data on yield in obscure GIB
- Use if suspected active bleeding or positive CTA or tagged RBC scan
- Potential for therapy
  - Superselective embolization
- Contrast load, need for IR expertise

Occult OGIB diagnostic approach

- Start with a capsule endoscopy
- If capsule positive, further directed tests/Rx
- If capsule negative and no further bleeding, manage expectantly
- If capsule negative but further bleeding, repeat EGD/colonoscopy/capsule endoscopy
- If all negative, consider CTE and/or Meckel’s scan
Overt OGIB diagnostic approach

- Start with a capsule endoscopy
- If severe, unstable bleeding then CTA or nuclear scan and if positive, angiography
  - If negative angio, deep enteroscopy/IOE
- If capsule negative but further bleeding, repeat EGD/colonoscopy/capsule endoscopy
- If capsule positive, further directed tests/Rx
- If capsule negative, CTE or Meckel’s scan
- Proceed with deep enteroscopy if needed

Summary:
Obscure GI bleeding

- Consider repeating EGD/colonoscopy
- Capsule endoscopy guides management
- Choose route and type of enteroscopy
- Deep diagnostic and therapeutic enteroscopy possible with good results
- Incorporate radiology including CTE
- Clinical judgment is essential for personalized management approach