Capsule Endoscopy: When, Why and Why Not

Joel R. Rosh, MD
Goryeb Children’s Hospital/Atlantic Health
Morristown, New Jersey

Disclosure

In the past 12 months, I have had the following relevant financial relationship with the following manufacturer of commercial products discussed in this CME activity:
– Given Imaging: consultant (received honorarium

I do not intend to discuss an unapproved or investigative use of commercial products or devices in my presentation.

Outline

• Indications and contraindications for capsule endoscopy (CE) in the pediatric population
• Lesions commonly detected by CE
• Common pitfalls and “pearls” in the pediatric use of CE
Imaging Small Intestine: The GI Holy Grail

- Significant length
- Contractility
- Overlying loops

Imaging Small Intestine: Pediatric Issues

- Radiation
  - Increased sensitivity for complications?
  - Long-term burden
- QOL
  - Impact of imaging especially contrast
  - Impact of multiple tests
  - “Yuk vs. cool”

Hey Kids—Which would you prefer?
**ASGE Recommendations:**

**Indications for Capsule Endoscopy**

- Obscure GI bleeding
- Suspected/monitoring Crohn’s disease
- Suspected small bowel tumors and surveillance in patients with polyposis syndromes
- Suspected or refractory malabsorptive syndromes

---

**Why CE in Pediatrics?**

The evolution of mucosal examination—

Move toward direct visualization:

- Contrast UGI series → EGD
- Contrast enema → colonoscopy
- Small bowel series → CE
  - 2009: Approved ≥ 2 years

---

**Mucosal Healing With Infliximab**

**SONIC: Mucosal Healing at Week 26**

- 16.5% of patients in the AZA + placebo group, 30.1% in the IFX + placebo group, and 43.9% in the IFX + AZA group showed mucosal healing.

**When: CE in Pediatric IBD**

- Most common pediatric indication
- Diagnosis
  - Confirmation
  - Phenotyping (eg Crohn’s vs. indeterminate)
  - Extent
    - If informs treatment choice
- Disease Monitoring/Treatment response
  - 15-30% with mid-small bowel
  - Post-operative


**CE Impact on Pediatric IBD Management**

- Single Center retrospective (N = 83)
- Poor growth/GI symptoms most common indication
- 86% positive CE; 75% treatment escalated
- 43% with greater CE > radiologic findings
- Significant one year improvements
  (height, BMI, ESR)


**When: CE in Pediatric Polyposis**

- Establish diagnosis in suspected cases
- Surveillance in known cases
- Change in symptoms of known case
  - Ongoing bleeding
  - Pain (assess size--?lead point)

CE in Polyposis: Pluses and Pitfalls

• **Pros**
  - Less invasive than DBE
  - No radiation

• **Cons**
  - What/Where was that??
  - No biopsies (surveillance)
  - Sensitivities (tumbling, no second chance)
  - Specificities (lumps and bumps, eg LNH)


When: CE in Pediatric Obscure GI Bleeding

• Negative EGD and colonoscopy
• Approximately 5% of GI bleeding occurs between the ligament of Treitz and the ileocecal valve


SI Causes of Obscure Bleeding

<table>
<thead>
<tr>
<th>SI Causes of Obscure Bleeding</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angioectasia or vascular anomaly</td>
<td>20-55%</td>
</tr>
<tr>
<td>Small bowel tumors</td>
<td>10-20%</td>
</tr>
<tr>
<td>Crohn’s disease</td>
<td>2-10%</td>
</tr>
<tr>
<td>Celiac disease</td>
<td>2-5%</td>
</tr>
<tr>
<td>Meckel’s diverticulum</td>
<td>2-5%</td>
</tr>
<tr>
<td>NSAID enteropathy</td>
<td>5%</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>1-2%</td>
</tr>
<tr>
<td>Ecstatic varices</td>
<td>1-2%</td>
</tr>
<tr>
<td>Portal hypertension enteropathy</td>
<td>1-2% (60-70% in those with portal hypertension)</td>
</tr>
<tr>
<td>Radiation enteritis</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Meta analysis of pediatric capsule endoscopy

- N = 723
- 17% for OGIB (1.5-7.9 years; n=83)
- Overall CE yielded a specific diagnosis in 60% of patients with OGIB

Pediatric OGIB and CE

AGA Algorithm: Obscure GI Bleeding

Why Not CE:
Capsule Retention

- Depends on indication
  - 1% in obscure gastrointestinal bleeding
    GIE 2008;68:174 –18
  - 10% in patients with known CD
    AJG 2006;101:2218 –2222
- Preceded by Agile Capsule

Pediatric Capsule Retention

- 1,013 pediatric CE exams
- Retention rate 2.3% (22/1013)
- Includes 5 with gastric retention
- Overall correlation with indication not age:
  - 2.2% Crohn’s disease
  - 1.4% OGIB
  - 1.2% polyposis

Cohen, SA. Gastro Hepatol 2013;9:92-97

Agile™ Patency System

- Agile Patency Capsule
- RF Tag
- Handheld Scanner
- Dimension - Ø11 x 26 mm
- Weight - 3.3gr
- 12 Month Expiry
- RFID
Capsule Limitations

• Strictly diagnostic
  – No biopsies or therapeutics
• Limited to small bowel (for now)
  – does not replace EGD or Colonoscopy
• Diagnostic yield reduced in patients with poor bowel prep or delayed gastric emptying

Why Not CE?

• Mucosal exam vs. anatomic exam
  – An age old decision
• Taking a look vs. taking tissue
  – A clinical decision
• Mucosal exam vs. transmural exam
  – An emerging decision

Pearls and Pitfalls of Pediatric CE

• Tolerability
  – Acceptance
  – Patency
• Sensitivity and Specificity
• Reproducibility
• None of the parameters are specific for any particular disease. i.e. Crohns, NSAIDS, Vasculitis, Radiation enteritis etc.
Summary

- CE provides full small bowel mucosal visualization without radiation or sedation
- Patency capsule, direct placement and careful patient selection limit capsule retention
- Pediatric CE plays a role in diagnosis and disease monitoring of IBD, OGIB and polyposis syndromes