Capsule Endoscopy in IBD: Indications and Interpretations
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Capsule Endoscopy: Indications and Issues in IBD

• Diagnosis in suspected CD, and in indeterminate colitis
  – Issues of sensitivity and specificity
• Scoring system for identified lesion
  – Issues of specificity and interobserver variability
• Capsule retention
  – Frequency
  – Prevention
  – Provocatively?
CE to Assess Mucosal “Lesions”

Mucosal lesions are not necessarily synonymous with a disease

Standardizing Reporting; The Capsule Endoscopy Lewis Score

- Evaluates for:
  - Villous appearance: normal or edematous
  - Ulcers: none, single, few multiple
  - Stenosis: single, multiple, ulcerated (or not), passable (or not)

- Sliding scale based on severity and extent

Gralnek, et al. APT 2008; 27: 146-154
Villous Edema

Capsule scoring index:
Edematous villous appearance

- Score for
  - Length of segment
  - Single, patchy or diffuse
Capsule Scoring Index: Ulcers

Ulcers Scored for
- Number
- Distribution
- Extent
- Shape
- Size ( < or > 50% circumference)

Capsule scoring index: Strictures

- Strictures scored for
  - Number
  - Traversed
  - Ulceration
Capsule endoscopy (Lewis) score: Caveats

- Fair to good interobserver variability.
  - Kappa scores:
    - Villous appearance: 0.48
    - Ulcers: 0.66
    - Stenosis: 0.58
- None of the parameters are specific for any particular disease. i.e.
  - Crohns, NSAIDS, Vasculitis, Radiation enteritis etc.

Are All SB Lesions CD? The Specificity Problem
Large Ulcer > 50% circumference

- 24 y.o woman 6 months intermittent crampy loose stools
- Half marathon runner, COX-2 selective inhibitor 3 days/week
- Arthralgias, ankles, knees, hips
- Hct = 35%, CRP 0.6, ESR 18
- CTE nl, Colonoscopy nl, TI scattered shallow erosions

Large Ulcer, >50% circumference

- 32 y.o. woman 6 months intermittent crampy loose stools and RLQ discomfort, 6 lb. wt loss
- Marathon runner, celecoxib 3x/wk
- Hgb = 31%, CRP 4.7, ESR= 39
- CTE nl, Ileocolonoscopy: colon nl, TI scattered shallow erosions
Summary of incremental yield (IY) of CE over other modalities

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Total yield CE (%)</th>
<th>Total yield other modality (%)</th>
<th>% IY for CE (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vs. SB radiography</td>
<td>66</td>
<td>24</td>
<td>42 (0.30-0.54)</td>
</tr>
<tr>
<td>Vs. Ileoscopy</td>
<td>61</td>
<td>46</td>
<td>15 (0.02-0.27)</td>
</tr>
<tr>
<td>Vs. CT Enterography</td>
<td>75</td>
<td>37</td>
<td>38 (0.23-0.54)</td>
</tr>
<tr>
<td>Vs. Push Enteroscopy</td>
<td>51</td>
<td>7</td>
<td>44 (0.31-0.57)</td>
</tr>
<tr>
<td>Vs. Small bowel MRI</td>
<td>60</td>
<td>40</td>
<td>20 (-0.41-0.81)</td>
</tr>
</tbody>
</table>

Triester S, Leighton JA et al. AJG June 2006

CE vs. other SB Imaging: Conclusions

- CE is
  - more sensitive for detecting mucosal lesions than other small bowel imaging technique
  - May be useful in patients with suspected CD and negative radiologic and endoscopic evaluations

However, prospective blinded studies with standardized definitions of findings and “gold standard” for CD are imperative
Small Bowel Imaging in Crohn’s Disease: A Prospective, Blinded, 4-Way Comparison Trial

- Analyze role of CE, CT Enterography, colonoscopy, SBFT
  - Individually
  - All pair wise combinations for diagnosis of small bowel Crohn’s disease

Solem, Loftus, et al 2005

Summary: 4 way comparative trial

- CT Enterography and CE demonstrated similarly high sensitivity for SB Crohn’s disease, but CT enterography more specific

- Combining SB tests improves specificity
How often does CE identify ulcers/erosions in subjects without SB disease?

How often do lesions occur in normal volunteers?

- Findings from a study of COX-2 selective NSAIDs, and SB injury in normal volunteers
  - 14% on no NSAIDS had “mucosal breaks” at baseline

- CE studies in osteoarthritis patients without GI symptoms and on no NSAIDS
  - 17% on acetaminophen and no NSAIDS, had SB lesions at baseline

Goldstein et al. CGH 2005  Graham, et al CGH 2005
Capsule Endoscopy: Safety Concerns in Crohn’s disease

The Problem of Strictures
The Problem of Strictures

- 31 year old, s/p TI ICR, 22 cm, 3 yrs ago
- Hx many yrs IBS pre-dx of CD
- Asymptomatic on 6-MP post-op maintenance
- New onset abd pain, ESR, CRP, CTE, neoTI and ileocolic anastamosis normal

Capsule Retention
Capsule Retention: How often does it occur?

Well, it depends….

### Capsule retention rate in CD depends on clinical scenario

<table>
<thead>
<tr>
<th>Author</th>
<th>Patients (n)</th>
<th>Capsule retention (%)</th>
<th>CD?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herrerias</td>
<td>21</td>
<td>0</td>
<td>Suspected</td>
</tr>
<tr>
<td>Fireman</td>
<td>17</td>
<td>0</td>
<td>Suspected</td>
</tr>
<tr>
<td>Eliakim</td>
<td>20</td>
<td>0</td>
<td>Suspected</td>
</tr>
<tr>
<td>Sant’Anna</td>
<td>20</td>
<td>5</td>
<td>Susp (hi prob)</td>
</tr>
<tr>
<td>Mow</td>
<td>50</td>
<td>4</td>
<td>Known</td>
</tr>
<tr>
<td>Buchman</td>
<td>30</td>
<td>6</td>
<td>Known</td>
</tr>
<tr>
<td>Cheifetz</td>
<td>62</td>
<td>10</td>
<td>Known</td>
</tr>
<tr>
<td>Chiefetz</td>
<td>38</td>
<td>13</td>
<td>Suspected strictures</td>
</tr>
</tbody>
</table>
Agile™ Patency System

Agile Patency Capsule

Dimension - Ø11 x 26 mm
Weight - 3.3gr
12 Month Expiry

RF Tag

Handheld Scanner

Agile™ Patency System Procedure

Day 0: Liquid diet from noon
NPO @ 10 pm

Day 1: Morning ingestion

Day 2: Scanning* (close but not later than 30 hours)

Patency proven (capsule not detected in patient’s body)
Patency NOT proven (capsule present in patient’s body)

Capsule disintegrates after 30 hrs
CE in IBD: Take Home Messages

• CE scoring index may be a useful to establish a range of severity of findings, but not specific for any given disease

• CE sensitive in identifying SB lesions in CD, but specificity is limited

CE in IBD: Take Home Messages

• Capsule retention may occur in as many as 10% of Crohn’s disease patients, even with negative prior SB imaging

• Advent of Agile patency capsule reduces risk of capsule retention