Imaging in Small Bowel Disease

"Compare the roles of various small bowel imaging modalities in the diagnosis management of gastrointestinal disorders."
Outline

1. Available technologies
2. Small Bowel Bleeding
3. Small Bowel Masses
4. Small Bowel Thickening
5. Crohn’s Disease

Primary ways to image the small bowel

- Capsule Endoscopy
- MRI enterography
- CT enterography
- Small bowel follow through
Capsule Retention

- Consider CTE before VCE in the setting of established inflammatory bowel disease, prior radiation therapy, previous small bowel surgery, and suspected small bowel stenosis*

- Patency Capsule: Spada et al studied 27 patients with known strictures
  - 15 patients passed an intact patency capsule (avg 25hrs).
  - All 15 of those patients successfully completed a subsequent VCE.

Small Bowel Bleeding


The Role of Endoscopy in Suspected Small Bowel Bleeding. Gastrointest Endosc June 2016 [epub ahead of print]
**Active Bleeding + Hemodynamic instability**

- **Next step:** Angiography
  - Detection of 0.5-1ml/min

- When active bleeding is found, studies note high technical success rates (96% of patients in one study).

- This is probably the best way to scare away a bleeding vessel...

- Recurrent bleeding can still be an issue

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**Active bleeding but hemodynamically stable**

- **Next Step:** CT-angiogram

- Can detect as little as 0.3ml/min

- Sun et al reported sensitivity of 86% and specificity of 100% in 113 patients

- **Pro’s**
  - High comfort level with CT
  - Readily available
  - Can suggest diagnosis*
  - Better localization

- **Con’s**
  - Contrast-induced nephropathy
  - Can’t repeat study easily
Tagged RBC Scan

- Use if acute overt bleeding with slower rates of bleeding (0.1-0.2 ml/min) or if uncertainty if actively bleeding
  
  ...if enteroscopy or VCE is not available.

- Pros
  - Repeatable over 12 hrs
  - Limits risk of renal failure 2/2 contrast

- Cons
  - Poor geographic localization

Capsule Endoscopy

- Capsule Endoscopy is the test of choice after negative standard endoscopy

- Diagnostic yields are highest in overt bleeding
  - 53% among 260 OGIB patients (Cary 2006)
  - 66% among 144 inpatients (Singh 2013)
  - 92% among those with ongoing overt bleeding (Pennazio 2004)

- Higher diagnostic yield compared to CT-A*
Timing of Capsule Endoscopy in Small Bowel Bleeding

- Timing of capsule endoscopy is important
  - Pennazio et al found the highest diagnostic yield in overt bleeding (92%)
    - Progressive decline in diagnostic yield at 10-14 days (67%) and still further at 3-4 weeks (33%)
  - Singh et al showed a similar trend of decrease diagnostic yield as soon as 3 days into a hospitalization for small bowel bleeding

Bleeding cases can go either way...
Negative Capsule Endoscopies are good!

- Rate of rebleed by 12 months is 6-11% after a negative study
  - Vs 48% in those with (+) CE
  - In this study, there zero bleed-related mortality in those with (-) CE

- If you have rebleeding
  - Diagnostic yield can be 35-42%

- If you have persistent anemia
  - Changed management in about 10% of patients (Bar-Meir 2004)

Small Bowel Masses

- Latest ACG guidelines recommend enterography in small bowel bleeding patients with a negative capsule endoscopy.

- One important take home. Enterography may better than capsule endoscopy at finding masses.

- Important: A negative CE should not preclude further testing!!
Small Bowel Masses

- Small bowel masses can occur in a small but significant number of cases
- In one study of patients with known small bowel masses by Hakim et al:
  - CT-Enterography identified 16/17
  - Capsule identified 6/17 patients with a small bowel mass lesion

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<th>Sensitivity</th>
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Hakim et al. Dig Dis Sci 2011

Young gentleman with overt small bowel bleeding who had a jejunal lesion notable on capsule endoscopy
Small Bowel Masses

- Very limited indication or evidence to screen small bowel with capsule or enterography for masses.

- Peutz-Jeghers patients
  - Goal: Avoid obstruction and intussusception
  - MRE and WCE had similar detection rates of polyps >15mm in prospective series of 19th PJ patients. MRE probably more accurate with regards to size and location.
  - Another series of 20 FAP and PJ patients showed similar detection rates in 15mm or larger polyps.
Bowel Thickening

- Thickening can be a result of under-distension, edema, inflammation, or mass effect
- Retrospective review of 92 CT scans and 50 subsequent endoscopies
  - 18% of colon findings were malignant.
  - No patient <50 had cancer.
- Bottom line: persistent bowel thickening is something that should be considered carefully given the possibility of cancer
  - While clinical context may be reassuring, reimaging or endoscopy might also be reasonable

49 y/o female with RLQ pain:

- Initial CT for abdominal pain: Focal circumferential wall thickening involving a portion of the ileum without stenosis, upstream dilatation, or significant adjacent inflammatory stranding
- Unable to intubate TI during colonoscopy.
- Plan made for repeat imaging.
- Presented with worsening pain and repeat CT showed similar thickening but also focal pneumatosis and possible perforation. Underwent surgical resection and was found to have a B-cell lymphoma.
Crohn’s Disease

The trouble with capsule...

- One study has shown that 22% of asymptomatic controls can have a (+) capsule finding.
- No clear diagnostic criteria for small bowel Crohn’s Disease*
- It is not an effective way to examine complications of Crohn’s such as fistula and abscess
Possible Crohn’s

- Meta-analysis of 12 trials showed that CE was more sensitive:
  - CE (52%) vs SBR (16%)
  - CE (68%) vs CT-E (21%)
  - CE (47%) vs C+Il (25%)
  - CE comparable with MR-E

- **Bottom Line:** we will typically utilize capsule endoscopy to help rule out Crohn’s in a symptomatic patient with negative enterography.

Enterography and Capsule are complementary

- Normal EGD + ileocolonoscopy
- CT-enterography suggestive of nonspecific bowel inflammation
- Pillcam two areas of blood and possible ulceration
- Pathology showed:
  - GRANULOMATOUS ENTERITIS CONSISTENT WITH CROHN’S DISEASE.
Known Crohn’s Disease

- Meta-analysis of 12 trials showed that CE was more sensitive:
  - CE (71%) vs SBR (36%)
  - CE (71%) vs CT-E (39%)
  - CE comparable with MR-E

- One retrospective study of 106 patients noted meaningful change in therapy was initiated in 40% of patients
  - 69% staging, 22% flare, 9% post-op staging
  - Patients significantly more likely to be on immunosuppression after capsule study
  - High Lewis score result in 90% chance of changing therapy

Review

- Discussed modalities for small bowel imaging including
  - Capsule Endoscopy
  - CT and MR Enterography
  - SBFT

- Discussed role of these modalities in:
  - GI bleeding
  - Small bowel masses
  - Bowel thickening
  - Small bowel Crohn’s disease
Thank you for your time

**Small Bowel Thickening**

- Etiologically nonspecific CT finding
- One example of thickening can be seen in enteropathy associated with celiac sprue
- Celiac Sprue diagnosis via capsule
  - Sensitivity 89%, Specificity 95%
  - Particularly useful if refractory symptoms?