



St. Paul's Hospital



Capsule Endoscopy



George Ou and Robert Enns
St Paul's Hospital, UBC
Vancouver BC



Disclosures

- Robert Enns
 - None

- George Ou
 - None

Outline

1. Indications
2. Definition of OGIB
3. Timing of Procedure
4. Device assisted enteroscopy
5. Role in Crohn's disease
6. Capsule retention

Indications of capsule endoscopy

- Obscure Gastrointestinal bleeding
- Inflammatory bowel disease
- Polyposis syndrome
- Radiological abnormalities
 - Intussusception
- Reassurance?
 - Chronic pain/IBS
 - Exclude secondary causes of bleeding in unusual situations (hemorrhoids, HH)

Definition

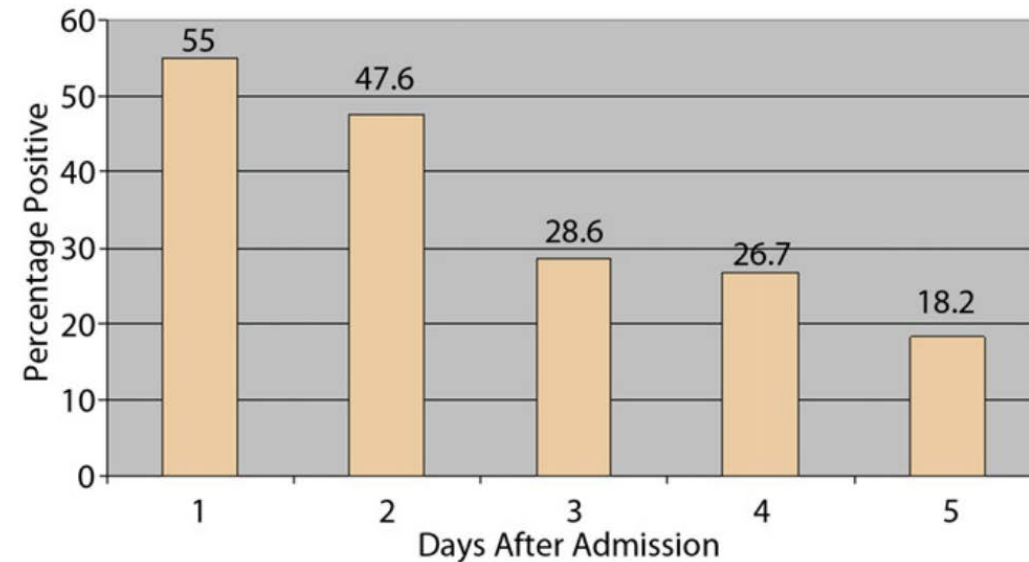
- Obscure gastrointestinal (GI) bleeding is defined as recurrent or persistent GI bleeding despite the absence of explanatory findings at upper endoscopy or colonoscopy
 - AGA Medical Position Statement. Gastro 2000
- The term “obscure GI bleeding” should be reserved for patients not found to have a source of bleeding after performance of standard upper and lower endoscopic examinations, **small bowel evaluation with VCE and/or enteroscopy**, and radiographic testing.
 - ACG Clinical Guideline. Am J Gastro 2015
- Suspected small bowel bleeding
 - Where does chronic Fe deficiency fit in with this?

CE in iron deficiency anemia (IDA)

- Emphasis on **history** and **history** and **history** and still **history**
 - Diet
 - Menstrual loss
 - Medication
- ? Second look endoscopy
 - 75% +’ve CE findings were within reach of standard endoscopy (Tong et al. CJG. 2012)
 - Potentially missed – Cameron erosion, GAVE, Dieulafoy lesion, TI Crohn’s
 - CE rapid transit in proximal SB

Timing of CE in overt bleed

- Pennazio et al. Gastroenterology 2004
 - Highest yield with **active bleed** – 92% vs 13%
 - Yield diminishes with time (**2-week** threshold)
- Bresci et al. J Gastroenterol 2005
 - 91% yield within **15 days**, vs 34% after 15 days
- Katsinelos et al. Med Princ Pract 2011
 - 88% yield within **10 days**, vs 11% after 10 days
- Singh et al. Gastrointest Endosc. 2013
 - Higher diagnostic/treatment yield within **3 days**



Diagnostic yield decreases with time (Singh et al)

Timing of CE in overt bleed- Does it change outcomes?

- Gomes et al. World J Gastrointest Endosc. 2018

- Reduce rebleeding rate
- No difference in mortality

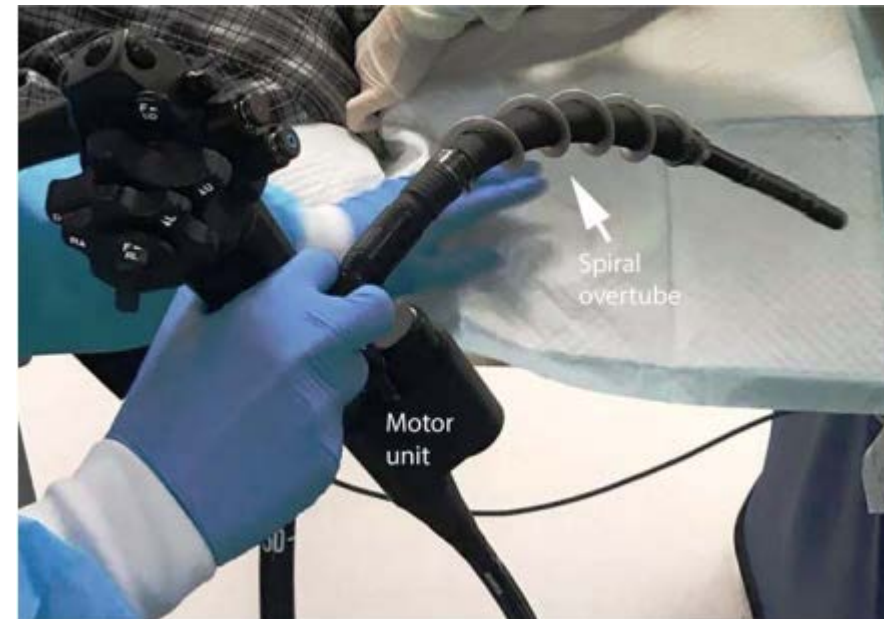
- Conclusion

- Earlier CE = higher diagnostic yield
- Earlier CE + intervention = lower rebleed

| | ≤ 48 hours | 2-14 days | ≥ 14 days |
|--------------|--------------|-----------|-----------|
| Dx yield (%) | 82.1% | 85.7% | 73.2% |
| Tx yield (%) | 66.7% | 40.0% | 31.7% |
| Rebleed (%) | 15.4% | 34.3% | 46.3% |

Improved outcome with earlier CE (Gomes et al)

Device-assisted enterography



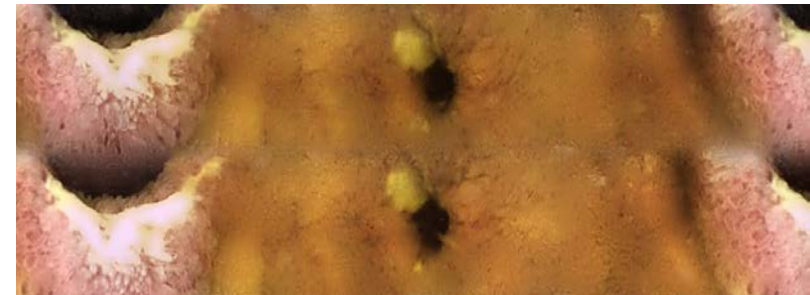
Tang et al. Endoscopy. 2020 Jan 29.

Where does device-assisted enteroscopy fit?

- Double-assisted enteroscopy (DAE) more invasive than CE
 - 1% major adverse event (pancreatitis, ileus, perforation)
 - Variable complete enteroscopy time with double-balloon enteroscopy
 - **18-66%** (Wadhwa et al. Gastroenterol Rep (Oxf). 2015)
- Direction/Approach typically guided by other imaging (e.g. CE, CT)
- Role in hemodynamically stable, overt bleeding?
 - CTA vs CE vs DAE
 - Mostly determined by local expertise and resources

CE in Crohn's disease

- 30% of Crohn's isolated to small bowel
 - Most however, can assess at ileocecal valve
- Up to 2/3 of ileal and/or colonic Crohn's can have proximal involvement (Cotter et al. J Crohns Colitis. 2014)
- Yield similar to MR enterography (Kopylov et al. Dig Liver Dis 2017)
 - CE higher yield for **proximal disease** than MR enterography (OR 2.79)



Pan-enteric SB-colon capsule

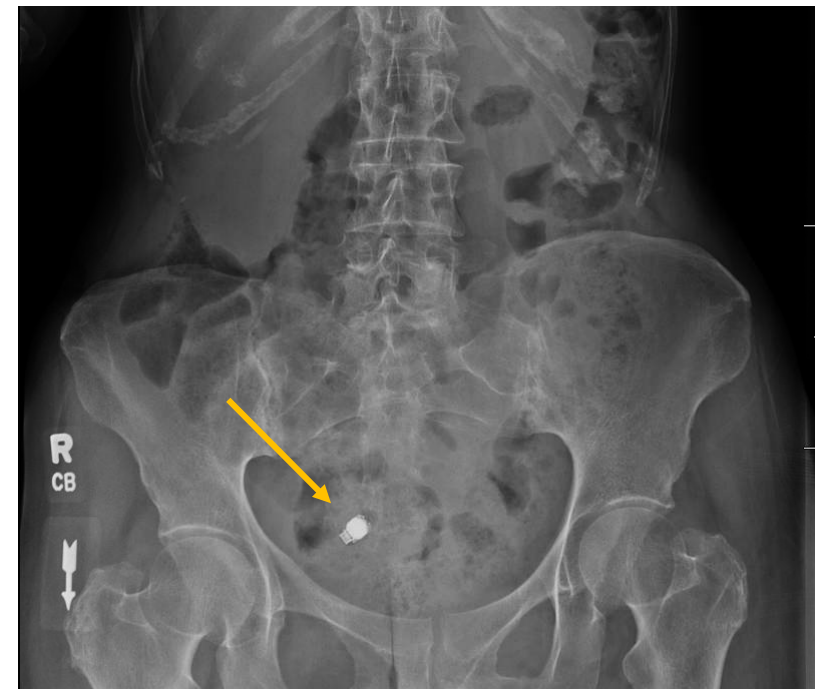
- 35 FPS max (transit speed dependent) vs 6 FPS in SB CE
- 344 deg FOV (172deg/camera)
- One-stop shop for both SB and colon?
 - 83% excreted before end of recording (Eliakim et al. Endosc Int Open. 2018)
- Leighton et al. Gastrointest Endosc 2017
 - Prospective study of Crohn's patients
 - CE followed by ileocolonoscopy
 - Dx yield: 83.3% vs 69.7%



Leighton et al. Gastrointest Endosc 2017

CE retention

- Retained capsule within GI tract for >14 days
 - GI bleed - 2.1% (95% CI 1.5%-2.8%)
 - Suspected CD - 3.6% (95% CI 1.7%-8.6%)
 - Known CD - 8.2% (95% CI 6.0%-11.0%)
 - Known CD after patency capsule/imaging - 2.7% (95% CI 1.1%-6.4%)





| | PillCam™ SB3 | EndoCapsule EC-S10 | MiroCam® MC1600/MC2000 | CapsoCam® Plus | OMOM® Capsule |
|----------------------------|----------------|--------------------|--------------------------|-------------------------|----------------|
| Dimensions (mm x mm) | 26.2 x 11.4 | 26 x 11 | 24.5 x 10.8/30.1 x 10.8 | 31 x 11 | 25.4 x 11 |
| Battery life (hours) | ≥ 8 | 12 | 12 | 15 | 12 |
| Camera orientation | End-view | End-view | End-view/2 x end-views | Side-view camera x 4 | End-view |
| Field of view (degrees) | 156 | 160 | 170/170 per camera | 360 | 150 |
| Data storage/Communication | Radiofrequency | Radiofrequency | Human body communication | Stored in capsule | Radiofrequency |
| Frame per second | 2-6 | 2 | 6/3 per camera | 3-5 per camera | 2 |
| Retrieval post-procedure | Not necessary | Not necessary | Not necessary | Yes for image retrieval | Not necessary |