Imaging of the Small Bowel

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Small Bowel Facts

- Consists of: duodenum, jejunum, ileum
- 20 to 30 feet long
- Role
  - Digestion of proteins, carbohydrates, lipids
  - Absorption of nutrients

Why image the small bowel?

- Structural problems
  - Strictures (medications, Crohn's disease)
  - Inflammation (Crohn's, infection, ischemia)
  - Masses or polyps
  - Foreign bodies (capsules)
- Bleeding
  - Vascular ectasia (AVMs)
  - Masses/tumors
  - Polyps
  - Meckel's diverticulum
  - Dieulafoy's lesion
  - Ulcerations

Radiology Imaging

- Small Bowel Follow Through
- Enteroclysis
- CT
- Tagged RBC scan
- Angiography

SBFT

- Po radio-opaque contrast followed by serial x-rays
- Position changes, abdominal pressure often needed
- Unable to see small lesions or mucosal lesions (AVMs)

SBFT

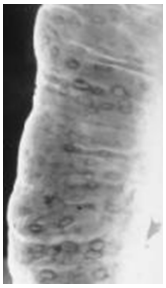
- Useful for fistulas (Crohn's disease)

Enteroclysis

- Injection of contrast followed by methylcellulose through nasoduodenal tube. Contrast coats the intestine and the methylcellulose distends the lumen to help with visualization.

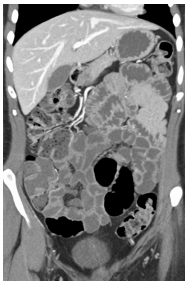
Enteroclysis

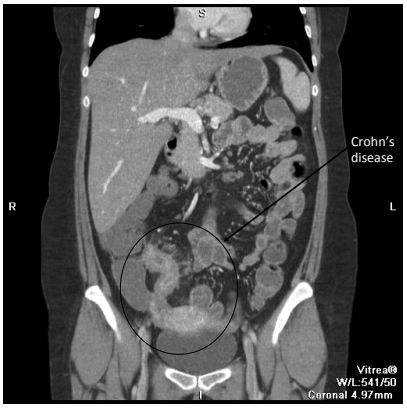
- Con: nasoduodenal tube, uncomfortable, time-intensive



CT Enterography

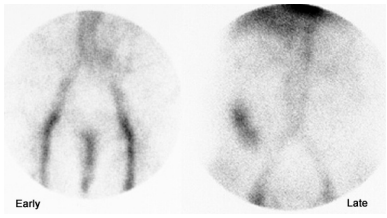
- High volume (1200ml) negative oral contrast over 1 hour (no tube)
- improves small bowel distension c/w regular CT
- Give IV contrast to evaluate bowel wall





Tagged RBC scan

- Small amount of blood drawn and labeled with radioactive material (Technetium)
- Blood then re-injected and circulates: picked up by gamma scan

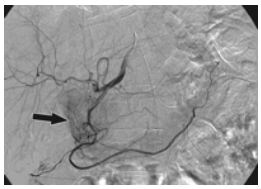


Tagged RBC scan

- Pro: may pick up slower bleed
- Con:
  - Only approximate location given
  - Does not pick up intermittently bleeding lesions
  - No option for intervention

Angiography

- Selective cannulation and contrast injection of blood vessels by interventional radiologist under fluoroscopy to pick up brisk/active bleeding



Angiography

- Pro: Intervention possible (occlusion of bleeding vessel with coils, etc)
- Con:
  - Fast, active bleeds only
  - Need at least approximate location
  - Invasive
  - High IV contrast load -> renal issues
  - Not available everywhere

Endoscopic Imaging of Small Bowel

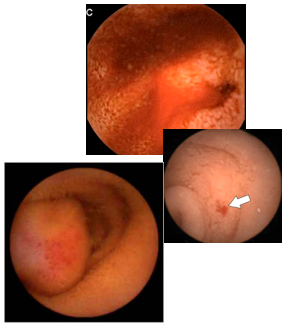
- Video Caspule Endoscopy
- Push Enteroscopy
- Single Balloon Enteroscopy
- Double Balloon Enteroscopy

Capsule Endoscopy

- Small capsule capable of taking sequential still images that are transmitted to receiver is swallowed by patient.
- Capsule disposable.
- Images downloaded from receiver and analyzed by MD.

Capsule Endoscopy

- Pro: Noninvasive
- Con:
  - No control over images
  - Unable to intervene
  - Still requires prep
  - Takes some time
  - Not all patients suitable candidates



"Standard" Enteroscopy

- Pro:
  - Able to intervene
    - Biopsy, polypectomy, cautery, foreign body retrival
- Con:
  - Invasive
  - Not suitable for all patients

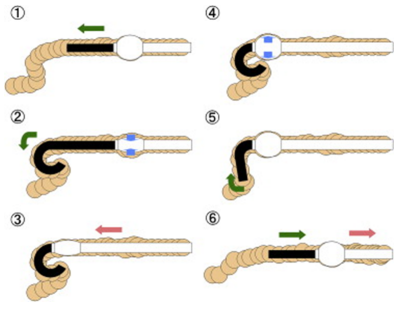
Push Enteroscopy

- Simply pushing a (pediatric) colonoscope (180cm) or dedicated enteroscope (200cm) into the small bowel as far as possible
- Limitations:
  - Uncomfortable (anesthesia)
  - Small bowel is non-fixed, and therefore difficult to simply advance scope
  - Looping in stomach

Single Balloon Enteroscopy

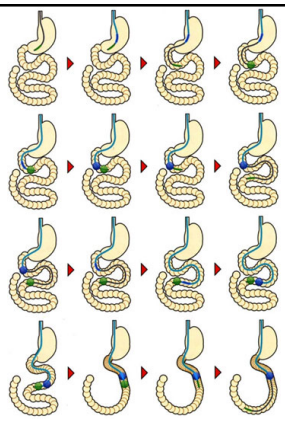
- Push-and-pull mechanism
- Needed: Balloon Control Unit and single-use splinting tube
- Most procedures take about 1 hour
- Limitations:
  - Still uncomfortable for patient (anesthesia)
  - Post-surgical anatomy
  - Contraindicated with varices

Single Balloon Enteroscopy



Double Balloon Enteroscopy

- One balloon on endoscope, one on overtube
- Visualization of more distal small bowel
- Limitations:
  - Fujinon system
  - More difficult to learn
  - 90-120 minutes procedure time



Questions?