Small Bowel Imaging in GI/IBD

Karen A. Hanson, APRN, CNP, MS
Disclosures

All individuals in control of the content of continuing education activities provided by the Annenberg Center for Health Sciences at Eisenhower are required to disclose to the audience any real or apparent commercial financial affiliations related to the content of the presentation or enduring material. Full disclosure of all commercial relationships must be made in writing to the audience prior to the activity. All staff at the Annenberg Center for Health Sciences at Eisenhower and the Gastroenterology and Hepatology Advanced Practice Providers have no relationships to disclose.
Disclosures

Karen A. Hanson, APRN, CNP, MS

Speakers Bureau: Abbvie, Clinical Area – IBD

Speakers Bureau/Advisory Board: Bristol Myers Squibb, Clinical Area – IBD
Objectives

• Review IBD/GI small bowel imaging procedures: current and evolving
• Review IBD/GI perianal imaging
• Define benefits and risks related to imaging in GI/IBD
• Apply knowledge to clinical decision making in APP practice
Indications for Small Bowel Imaging

- Acute abdomen
- Evaluation of Crohn’s activity/response to tx
  - Fistulae, stricture (fibrostenotic vs inflammatory), active disease
- R/O Crohn’s disease
  - Indeterminate colitis
  - Ulcerative colitis with backwash ileitis
  - Recurrent uveitis, inflammatory arthritis
Is It Crohn’s?

- Causes of bowel obstruction
  - Meckel’s diverticulum, NSAIDs, intussusception, internal hernia, adhesions, mesentery ischemia, foreign body, carcinoid tumor, paralytic ileus, volvulus

- Causes of wall thickening, mesentery inflammation
  - Infection, sclerosing mesenteritis, appendicitis

- Causes of fistulas/abcesses
  - Radiation, hx abd surgery, bowel perforation
Small Bowel Follow Through

- Fluoroscopic contrast study done with barium sulphate mixed with water
  - sometimes as a “follow through” after evaluation of the esophagus and stomach or just as a small bowel series
  - 40% weight/volume suspension to identify fistula formation
- Evaluation in real time by radiologist
  - Palpation of abdomen during procedure
Small Bowel Follow Through

• Long history of use in IBD
  – Still helpful for identifying/characterizing focal strictures

• When to use water soluble contrast?
  – If concern for perforation
    • Most accurate in proximal small bowel
  – When checking tube placement (PEG, PEJ)
Small Bowel Enteroclysis (Enema)

• 12-14Fr catheter passed under fluoroscopy to jejunum just beyond the ligament of Treitz for placement of contrast

• Helpful if patients have difficulty with oral ingestion or to identify occult causes for obstruction
“String Sign” in Crohn’s Disease

Gastrointestinal Imaging: The Requisites.
Boland, Giles W.L., MD, FACR. Published January 1, 2014. Pages 97-155. © 2014.
Figure 4-24.
Pseudopolyps

Figure 4-28.

Gastrointestinal Imaging: The Requisites.
Boland, Giles W.L., MD, FACR. Published January 1, 2014. Pages 97-155. © 2014.
Figure 4-28.
Cross-Sectional Imaging Benefits

- Computed Tomography (CT)
- Magnetic Resonance (MR)
- Evaluates extraluminal disease
  - Mesentery seen as an organ that is pro-inflammatory in Crohn’s disease

CT Enterography

- Use of both large volume oral and iodinated IV contrast
- Evaluation of luminal and extraluminal disease
- Standard CTE: radiation dose of 10-20 mSv
  - Low dose CTE dose reduction of 53-69% (2-7 mSv)

“Comb Sign” in Crohn’s

Gastrointestinal Imaging: The Requisites.
Boland, Giles W.L., MD, FACR. Published January 1, 2014. Pages 97-155. © 2014.
Figure 4-8.
MR Enterography

• Ingestion of large volume gadolinium and IV injection of anti-peristaltic agent
• Coronal T2 and post contrast T1 weighted images
• Use of surface array coils
• Mesenteric and mucosal hyperemia and thickening
• Scoring systems available
Advantages CT vs MR

CT
- Widely available
- Less time consuming
- Less expensive
- Can be used for claustrophobic patients
- Okay to use with metallic or electrical foreign bodies, devices or implants that make MR unsafe

MR
- No ionizing radiation
- Can be used in pregnancy (without gadolinium)
- High soft tissue contrast
- Static and dynamic images
- No need to delay procedures using radioactive iodine after MR
MR Diffusion Weighted Imaging

• Advantages
  – Does not use gadolinium
  – Shorter procedure
  – May not require fasting
  – Point of care

MR Pelvis

• Evaluation of perianal, perirectal or pelvic abscess and/or fistula
• Provides a virtual “road map” when clinical evaluation dubious or difficult due to pain/inflammation
• Fistulae/abcesses can lead to destruction of anal sphincter/perianal tissue over time and loss of function
MR Pelvis

- Replaces fistulography and CT for perianal disease
  - Fistulography
    - Less accurate
    - Injection of contrast can be painful, risk of sepsis
  - CT
    - Can miss smaller fluid collections
    - Doesn’t detect or characterize fistulae as well
      - Difficult to ascertain levator ani
T2-weighted axial magnetic resonance imaging (MRI) study showing perianal fistulas (arrows) in a patient with Crohn disease. Courtesy of Jonathan Kruskal, MD. UpToDate. Copyrights apply.
## Risks of Imaging Procedures

### CT
- **Lonizing radiation**
  - Carcinogenic potential
  - CD patients: Cumulative risk of 14 mSv over 5 years (cut off < 50 mSv)
- **Renal clearance**
  - Risk for contrast induced renal nephropathy if eGFR < 30 ml/min

### MR
- **Gadolinium retention**
  - Small amount remains in body (including brain) for unknown period of time
- **Renal clearance**
  - Avoid if eGFR < 30 ml/min or AKI
- **Unsafe if certain metallic or electric implants, devices, foreign bodies present**
Contrast Risks (CT/MR)

- Reactions:
  - Allergic-like
    - < 1 hr urticaria, sneezing/nasal congestion, hoarseness, wheezing, anaphylaxis
  - Physiologic
    - Flushing, warmth, chills, headache, dizziness, anxiety, N/V, metallic taste, arrhythmia, hypertension, chest pain, seizures, vasovagal.
  - Delayed hypersensitivity
    - > 6 hrs-several days later maculopapular rash, urticaria

- Severity: Mild, moderate, severe
- Prevention: consult your radiologist if unsure
  - Avoid contrast if severe
  - Mild/moderate can be premedicated with corticosteroids or anti-histamines

*UpToDate. 2021.*
Ultrasound: A Safer Alternative?

• Endoanal
  – Highly sensitive in detecting fistulizing disease (91%)
  – Alternative to pelvic MR depending on local expertise
    • Advantages: rapid, inexpensive, can be performed at time of colonoscopy or flex sig.
    • Disadvantages: cannot be used with anorectal stenosis

Francesca N. Raffa and David A. Schwartz.
Atlas of Endoscopy Imaging in Inflammatory Bowel Disease. Chapter 35, 545-549.
Bowel Ultrasound

• Advantages
  – Cheap, readily available, well tolerated
  – Widespread use in Europe, evolving in USA
    • Integrated in medical training, performed by physicians
  – Can be augmented
    • High frequency probes, doppler, oral contrast
  – Good alternative for children/younger patients
  – Correlates well with endoscopy and cross-sectional imaging techniques at detecting CD lesions

Calabrese et al. IBD. 2016 Vol 22, 1168-1183.
Bowel Ultrasound Disadvantages

- Less accurate for disease proximal to TI or deeper pelvic loops
- Images impaired by luminal gas and large body habitus
- Operator dependent

Video Capsule Endoscopy (VCE)

- FDA approved for diagnosis of small bowel disease and GI bleeding in 2001
- Occult GI bleeding/anemia
- Small bowel tumors
- Crohn’s disease features:
  - Edema, hyperemia, bleeding, exudates, aphthae, erosions, small (≤0.5 cm) and large (>0.5 cm) ulcers, denuded mucosa, and pseudopolyps
Capsule Endoscopy Crohn’s Disease Activity Index (CECDAI)

- Monitoring tx response
- Measures inflammation, extent of disease and fibrosis in proximal and distal small bowel
- Not for diagnosis

Atlas of Endoscopy Imaging in Inflammatory Bowel Disease.
Figure 17.4
VCE

• Higher diagnostic yield than imaging
  – Higher sensitivity than specificity (meaningful findings?)

• Must exclude small bowel stenosis/stricture
  – With radiologic imaging or patency capsule
  – Capsule retention in ~ 2.6% of patients

• May be helpful in locating occult stricture pre-operatively

Balloon Enteroscopy

• Antegrade or Retrograde

• Therapeutic uses
  – Single or double balloon
    • Dilation of stricture
    • Biopsy of occult lesion
    • Cauterization of GI bleed
• Small bowel imaging plays a key role in diagnosis and management of GI disorders including IBD
• SBFT has largely been replaced by cross-sectional imaging in IBD
• Perianal disease is best evaluated with pelvic MR or endoanal ultrasound
• Patient selection is important factor when choosing how to evaluate IBD