Introduction

CT enterography and MR enterography are currently the state-of-the-art radiological examinations to evaluate the small bowel. The two examinations are similar in some aspects but have different strengths and weaknesses. Therefore, it is important to use them for proper clinical indications. This lecture will address which examination(s) should be chosen and why for different clinical settings, particularly focusing on the diagnostic evaluation of gastrointestinal (GI) bleeding, Crohn’s disease, and select neoplasms, which are the major indications for the examinations.

CT Enterography versus MR Enterography: General Characteristics

1. CT enterography (compared with MR enterography)
   - Technically more robust and easy
   - Short examination time
   - More accessible
   - Higher technical and interpretive reproducibility
   - Better in evaluating clinically unsuspected pathology outside the bowel
   - Works better for acute, severe, complex, and emergent cases
   - Less expensive
   - Causes radiation exposure

2. MR Enterography (compared with CT enterography)
   - Technically more difficult
   - Long examination time
   - Less accessible
   - Relatively lower technical and interpretive reproducibility
   - Better suited for organ specific and disease specific (e.g. Crohn's disease) evaluation
   - May not work well for acute, severe, complex, and emergent cases
- More expensive
- No radiation exposure

**Urgent/Massive GI Bleeding**

- Recommend using CT enterography (including angiographic evaluation) either as the 1st-line modality (particularly for lower GI bleeding) or when endoscopy has failed or is difficult to perform.4-8
- Neutral oral enteric contrast (such as sorbitol) is not required in urgent/hemodynamically unstable patients
- Unenhanced and dynamic contrast-enhanced, including both arterial and venous phases, scans are recommended

**Hemodynamically Stable Obscure GI Bleeding**

- Generally recommend using CT enterography rather than MR enterography, unless CT is contraindicated, except for a few specific indications such as imaging follow-up of inflammatory bowel disease or polyposis syndrome
- Neutral oral enteric contrast is required
- Unenhanced and dynamic contrast-enhanced (both arterial and venous phases) scans are recommended
- CT enterography is generally not recommended as the 1st-line modality, given that angioectasia is the most common cause of obscure GI bleeding for which CT enterography has a low sensitivity.9
- CT enterography is typically performed when the 1st-line endoscopic examination of the small bowel such as capsule endoscopy has turned up negative
- Reported diagnostic yields of CT enterography in obscure GI bleeding patients: 50% in patients who had overt obscure GI bleeding and non-diagnostic capsule endoscopy10 and 25-45% overall, i.e. without regard to particular capsule endoscopy results.11-14
- CT enterography is more accurate and effect for small bowel tumors, where endoscopy has a weakness,8,15 and Crohn’s disease compared with angioectasia and when a large amount bleeding is present.10,12,13

**Crohn’s Disease**

- Both CT enterography and MR enterography are effective and essential.16-18
- Neutral oral enteric contrast is required
- Single enteric-phase (i.e. in between arterial and portal venous phases) contrast-enhanced scan is recommended for CT enterography and unenhanced and dynamic multi-phase contrast-enhanced scans are recommended for MR enterography
- Summary of diagnostic performance and recommended use.1-3
- Similar accuracy between CT enterography and MR enterography in diagnosing active bowel inflammation
- MR enterography is maybe better for evaluating the severity of bowel inflammation (further evidence is
CT enterography is recommended for first enterography examination

- CT enterography is recommended for acute, severe, complicated, or emergent cases
- MR enterography is likely better for repeat follow-up imaging after medical therapy, given the lack of radiation exposure
- MR enterography for younger patients or when pregnancy is a concern
- MR enterography when concomitant evaluation of anal fistula is needed

**Peutz-Jeghers Syndrome**

- MR enterography, using the same technique as used for evaluating Crohn's disease, is recommended
- Steady-state GRE and contrast-enhanced T1-weighted images are useful

**Conclusions**

CT enterography and MR enterography are not a mere substitute of the other method and a knowledge-based choice of the proper examination should be made for each patient according to the clinical setting.

**References**


