

# Imaging for Luminal Disease and Complications: CT Enterography, MR Enterography, Small-Bowel Follow-Through, and Ultrasound

David J. Grand, MD<sup>a,\*</sup>, Adam Harris, MD<sup>b</sup>, Edward V. Loftus Jr, MD<sup>c</sup>

## KEYWORDS

- Inflammatory bowel disease • Crohn disease
- Magnetic resonance enterography
- Computed tomography enterography • Imaging

In the past decade, there has been a seismic shift in the use of imaging for Crohn disease (CD) away from small-bowel follow-through (SBFT) to cross-sectional techniques, most commonly computed tomography enterography (CTE) and magnetic resonance enterography (MRE). Because of rapid advances in CT and MRI hardware, as well as routine use of oral contrast agents designed to distend the lumen of the small bowel, cross-sectional techniques have become a first-line imaging modality, promising accurate assessment of the mucosa as well as the extraintestinal manifestations of penetrating disease. In most situations, the choice of cross-sectional modality (clinically) is essentially a tradeoff between the ease and cost of the study (which favor CTE) and the desire to minimize radiation exposure (which favors MRE).

In this new era, fluoroscopic studies, including SBFT, have been relegated to a more focused, problem-solving role including evaluation of possible obstruction and road mapping of complex fistulae. Ultrasound of the small bowel currently does not

---

The authors have nothing to disclose.

<sup>a</sup> Diagnostic Imaging, Warren Alpert School of Medicine, Brown University, 593 Eddy Street, Providence, RI 02903, USA

<sup>b</sup> Department of Gastroenterology, Warren Alpert School of Medicine, Brown University, 110 Lockwood Street, Providence, RI 02903, USA

<sup>c</sup> Division of Gastroenterology & Hepatology, Mayo Clinic, 200 First Street, SW, Rochester, MN 55905, USA

\* Corresponding author.

E-mail address: [dgrand@lifefspan.org](mailto:dgrand@lifefspan.org)

Gastroenterol Clin N Am 41 (2012) 497–512

doi:10.1016/j.gtc.2012.01.015

0889-8553/12/\$ – see front matter © 2012 Elsevier Inc. All rights reserved.

[gastro.theclinics.com](http://gastro.theclinics.com)

provide the comprehensive assessment of cross-sectional techniques. It is limited in the United States by the lack of Food and Drug Administration (FDA)-approved intravenous contrast agents.

Imaging of CD remains an active and evolving research topic as investigators hope to reliably differentiate active from chronic disease, predict disease response to medical therapy, and potentially assess bowel motility, while simultaneously reducing exposure to ionizing radiation. The next decade promises great steps forward.

## CROSS-SECTIONAL ENTEROGRAPHY: CTE AND MRE

### *What is Enterography?*

Enterography refers to the use of oral contrast agents designed to distend the lumen of the small bowel, without being reabsorbed. Although water may distend the upper tract, it does not provide adequate distension of the terminal ileum, the most commonly affected bowel segment in CD.

Adequate distention of the small bowel is critical for reliable and reproducible diagnostic enterography, as it facilitates evaluation of both mucosal enhancement and bowel wall thickening. If the lumen is not distended, the mucosa cannot be evaluated accurately, and collapsed bowel segments are too easily mistaken for pathologic bowel wall thickening.

In addition to distending the small bowel, oral contrast agents should be hypodense (“dark”) on CT and hypointense (“dark”) on T1-weighted MRI images to allow evaluation of the adjacent, brightly enhancing mucosa. Contrast agents that are hypointense on both T1- and T2-weighted images may be additionally helpful, but are not in widespread use.

Unfortunately, in daily practice, the distention achieved by oral contrast agents is variable. This variation is in part due to physiologic differences in bowel motility, but successful bowel distension is also dependent on the patient’s ability and willingness to drink the contrast. Overall, however, routine use of oral agents has been shown to be reliable and better tolerated than enteroclysis.<sup>1,2</sup> Although CT or MR enteroclysis may still have a role for detection of low-grade small-bowel obstruction, neither is routinely performed at our institutions.

There is no shortage of effective oral contrast preparations for enterography. As a general rule, as the osmolality of the agent increases, the palatability decreases and side effects (nausea, diarrhea, and flatulence) increase.<sup>3,4</sup> At our institutions, we routinely use 0.1% low-density barium sulfate suspension (VoLumen, E-Z-EM, NY) for both CTE and MRE.

The volume and timing of oral contrast also vary among institutions. We currently ask patients to drink 450 mL of VoLumen (one bottle) over 15 minutes, beginning 45 minutes before imaging. They are then given a second bottle to drink over the next 15 minutes and finally 450 mL of water 15 minutes before imaging begins. We use water immediately before imaging because it is intended only to distend the proximal small bowel and we can therefore reduce the amount of hyperosmolar fluid administered and its subsequent side effects (**Fig. 1**).

Intravenous contrast should be administered for CTE or MRE whenever possible. Standard dosing varies slightly between institutions, but whatever agent and volume is typically used for a routine abdominal CT or MRI at a given institution may be used. CT is typically performed during the “enteric” phase, approximately 50 seconds after injection (although a more standard portal venous phase will also suffice),<sup>5</sup> whereas MR should be performed dynamically; that is, imaging should be performed at multiple time points (or phases) after contrast administration.

Download English Version:

<https://daneshyari.com/en/article/3301091>

Download Persian Version:

<https://daneshyari.com/article/3301091>

[Daneshyari.com](https://daneshyari.com)