MRI Pediatric Inflammatory Bowel Disease: What is Your Regimen?
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Crohn disease (CD) and ulcerative colitis (UC), the two main types of inflammatory bowel disease (IBD), are chronic inflammatory conditions that can affect the entire gastrointestinal tract, with extraintestinal manifestations common as well. IBD has been reported to have an incidence in the pediatric population of approximately 17 cases per 100,000 children, with pediatric patients comprising approximately 25% of the total population with IBD [1]. Assessment for disease presence in patients with suspected IBD, as well as assessment of inflammatory activity in known IBD patients is critical to determine prognosis, clinical course, optimal treatment options, and for disease surveillance.

While ileocolonoscopy with biopsy is the primary tool for diagnosing and following IBD in pediatric patients, it is limited by its inability to evaluate extraluminal disease manifestations and complications, high cost, need for sedation, low pediatric patient compliance and acceptance, and its restricted access to the proximal small bowel, which is important as up to 30% of Crohn disease patients have disease confined to the proximal small bowel. Capsule endoscopy, while allowing for evaluation of the full length of the small bowel and not requiring sedation, is limited by inability to definitively localize lesions, and the possibility of missing lesions due to poor bowel preparation, rapid or delayed transit, or orientation of the camera away from a lesion. Additionally, with capsule endoscopy, there is the risk of capsule retention, particularly in an IBD patient with a stricture.

Imaging plays a crucial role in the evaluation of patients with suspected and known IBD. Historically, the gold-standard imaging modality for evaluating patients with IBD has been contrast fluoroscopy (upper GI series, small-bowel follow through, enteroclysis, and enema). Over the last decade, contrast fluoroscopy has been supplanted by cross-sectional imaging modalities, namely ultrasound (US), computed tomography (CT), and magnetic resonance imaging (MRI) in the evaluation of IBD in children. US, while widely available, low-cost, noninvasive, and readily accepted by pediatric patients, is operator dependent, time consuming, of limited value in obese patients, and limited in its ability to evaluate for stricturing/penetrating complications. CT enterography (CTE) has proven to be an effective imaging modality for pediatric IBD, as it is widely available, fast, and can demonstrate intestinal and extraintestinal manifestations and complications of the disease [2]. The main drawback of CTE is its reliance on ionizing radiation, which is of particular concern in pediatric IBD patients, as IBD is a chronic, relapsing disease often necessitating multiple radiology exams over time, and because children are at increased risk of cancer development related to ionizing radiation exposure compared to adults [3].

MR enterography (MRE) is a very appealing imaging modality for the evaluation of IBD because of its superior soft-tissue contrast, ability to assess both intestinal and extraintestinal manifestations and complications, ability to evaluate perianal disease, and most importantly, for its lack of ionizing radiation. MRE also allows for evaluation of inflammatory bowel disease activity by diffusion weighted imaging, quantitative dynamic contrast enhancement, and real-time bowel motility assessment. Recent studies comparing MRE to ileocolonoscopy/histopathology in children have reported sensitivities and specificities in the 83-94% range [1,4].

In this presentation, the indications, contraindications, advantages, and disadvantages of MRE in children will be reviewed. A brief literature review will be provided, as well as specific pediatric MRE techniques and protocols. Case examples of normal and abnormal MRE examinations in children will be illustrated.