

Magnetic resonance enterography in the assessment of inflammatory bowel disease in pediatric population including DWI, cine MR and Post gadolinium dynamic MR.

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Purpose: To describe the magnetic resonance enterography (MRE) findings that accurately evaluate active inflammation in inflammatory bowel disease (IBD) including DWI, cine MR and post contrast dynamic MR.

Outline of Content: MRE is part of the state of art imaging of the small bowel in the assessment of IBD. MRE without nasojejunal intubation and radiation exposure offers similar results compared to MR enteroclysis and should be therefore the preferred method. Sensitivity and specificity are comparable to those of CT enterography. Capsule endoscopy is obviously superior to MRE in detecting superficial lesions, but this is limited to the mucosa and stenosis has to be excluded before examination using imaging, like MRE. The advantages of MRE are: Non use of radiation; it allows assessing for extension and severity of the disease; and evaluate for penetrating disease and complications related to IBD like intestinal obstruction, fistula, abscess and fibrostenosing disease.

Adequate bowel distension is required for accurate diagnostic MRE. Different oral contrast substances are used with this purpose as Polyethylene glycol, manitol, low concentrations of barium, sorbitol, etc. The most frequent side effects of using these substances are nausea and vomiting, which usually follow administration of glucagon or Butylscopolamine. MRE protocol in our service includes 3 planes in SSFSE, axial FIESTA, cine MR (multiphase FIESTA), axial and coronal DWI (b 1000), administration of glucagon, dynamic volumetric LAVA post gadolinium at approximately 8, 30, 52, 74, 96 and 118 sec and axial Lava 3D post contrast. In our experience, SSFSE, FIESTA and DWI do not show significant movement artefacts related to peristalsis. Post contrast LAVA sequences are very sensitive to motion and peristalsis, reason why we use glucagon before acquiring post gadolinium images.

Mucosal enhancement, mucosal thickening and mesenteric fat hypertrophy are findings described in active IBD on CT enterography. Wall bowel thickening, early (arterial phase) post gadolinium mucosal enhancement, parenchymal and delayed phase post gadolinium enhancement, blurred wall enhancement, and comb sign are findings that correlate with active IBD.

Marked diffusion restriction is seen in the segments of bowel involved with active IBD. Diffusion restriction, but in less degree, is also seen with poor bowel distension; however, these segments of bowel show preserved peristalsis on cine MRE which helps to differentiate of involved IBD.

The most frequent pit faults are sub mucosal edema in bowel obstruction, peritoneal adhesions as cause of obstruction, functional abnormalities and collapsed bowel segment.

Summary: Bowel wall thickening, early post gadolinium enhancement, diffusion restriction and lack of normal peristalsis are findings described in active inflammatory bowel disease. Normal peristalsis in cine MR enterography allows to decrease the pitfalls related to poor bowel distension. MRE allows to make diagnosis of new patients, assess for active inflammation and detection of penetrating disease and complications related to IBD, monitor activity and to assess the response to therapy in clinical trials.

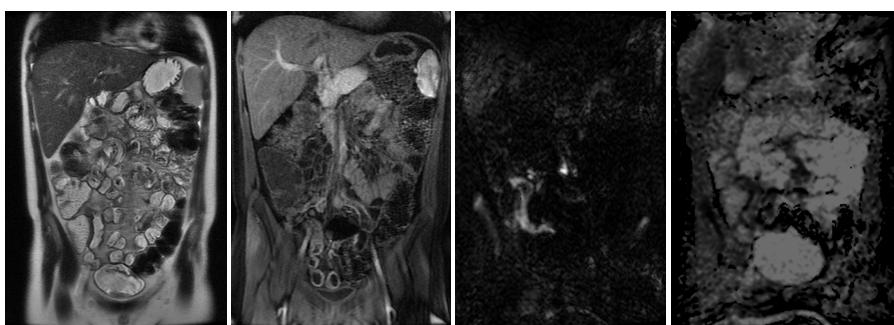


Fig. a

Fig. b

Fig. c

Fig. d

16 year old female newly diagnosed of Crohn's disease showing bowel wall thickening (Fig. a), early post gadolinium mucosal enhancement (Fig. b) and diffusion restriction (Fig. c) in the terminal ileum. Fig d: ADC map