Pediatric MR enterography

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Optima™ MR450w GEM

Parameters

Sequence	Slice thickness (mm)	Scan time (min)	Resolution
Axial FIESTA FatSat – respiratory triggered	4	3:06	224 x 224
Axial PROPELLER T2 FatSat motion correction	4	6:13	256 x 256
Axial DWI with multiple b values 0, 50, 150 & 800 with corresponding ADC; respiratory triggered	4	5:07	80 x 192
Axial LAVA Flex dynamic series, arterial-venous & delayed, with Auto Navigator	3	1:39	256 x 192
Coronal LAVA Flex post gadolinium injection (delayed)	3	1:22	256 x 224

Pediatric MR enterography (MRE) presents additional challenges due to the small body size and small field of view that may come at the expense of SNR. There is often suboptimal oral contrast injection as many children find it tastes unpleasant. Rapid breathing can also create image artifacts from respiratory motion.

The introduction of fast scanning techniques may overcome some of these pediatric MRE obstacles and enable the diagnosis of these patients without the use of ionizing radiation.

Patient history

Three-year-old with suspicion of Crohn's disease. The patient was prepared with oral contrast for bowel distension and the procedure was done under general anesthesia.

Fast imaging was employed to minimize scanning as well as sedation timing for the patient with a motion correction series. MR was chosen over other modalities to avoid a radiation hazard.

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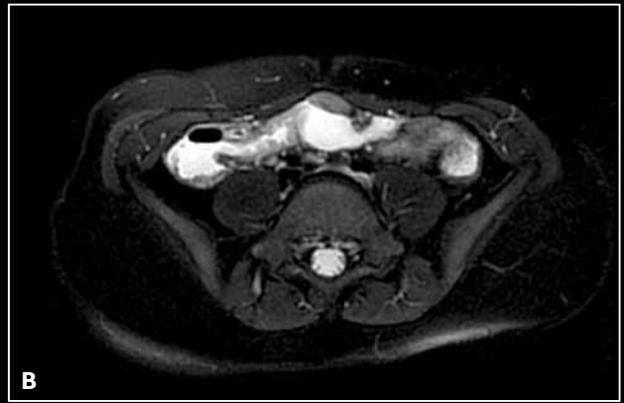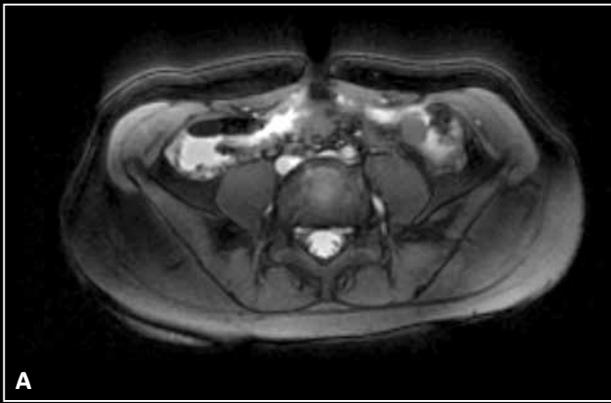
Figure 1. (A) Axial FIESTA FatSat, 4 mm, Respiratory Trigger, acquisition time of 3:06 min; (B) Axial PROPELLER T2 FatSat, 4 mm, Respiratory Trigger, acquisition time of 6:13 min.
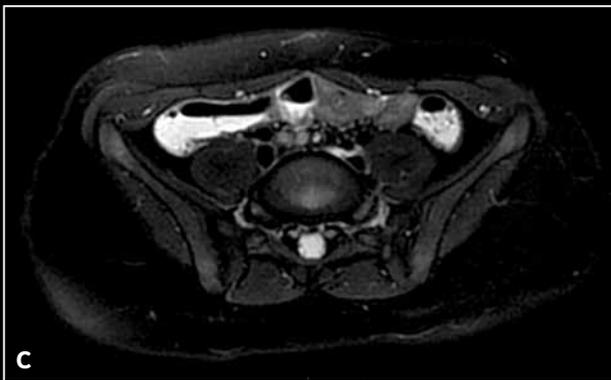

Figure 2. (A) Axial DWI, 4 mm, Respiratory Trigger, acquisition time of 5:07 min, b600; (B) pre-contrast LAVA Flex Axial; (C) PROPELLER T2 FatSat; (D) Fusion of the DWI to the LAVA Flex post contrast.

MR findings

Short segment terminal ileum bowel wall thickening with enhancement, restricted diffusion and prominent mesenteric lymph nodes. The diagnosis was confirmed by colonoscopy biopsy.
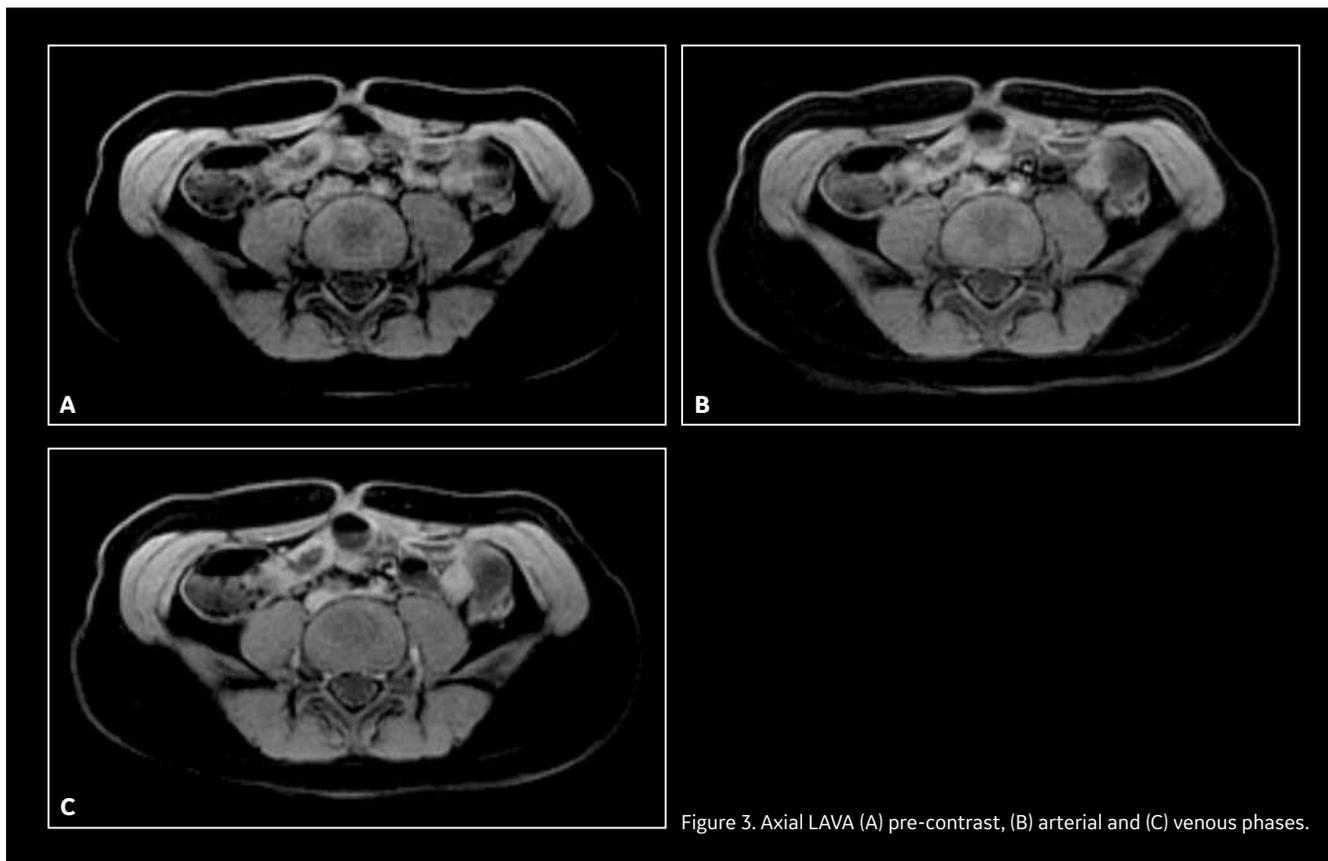
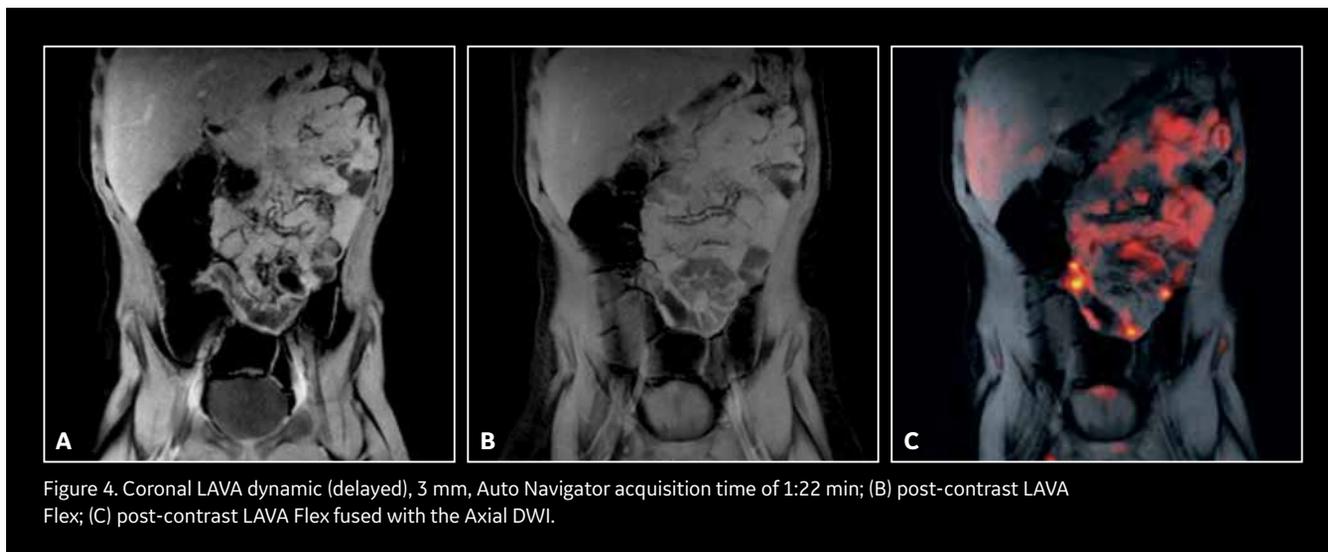Figure 3. Axial LAVA (A) pre-contrast, (B) arterial and (C) venous phases.

Figure 4. Coronal LAVA dynamic (delayed), 3 mm, Auto Navigator acquisition time of 1:22 min; (B) post-contrast LAVA Flex; (C) post-contrast LAVA Flex fused with the Axial DWI.

Discussion

The use of fast scanning and motion correction sequences with Auto Navigator and respiratory-triggered solutions helped to overcome inherent challenges in imaging pediatric patients. Image quality was excellent. These techniques provided a high level of confidence in my diagnosis and led to appropriate initiation of therapy. Continued development of appropriate respiratory-triggered sequences for pediatrics will help to further overcome inherent challenges in MR imaging of these patients. Our referring pediatric gastroenterologists now rely on our ability to diagnose inflammatory bowel disease utilizing MRE. **S**