

## MRI in Patients with Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) is a chronic relapsing bowel disorder affecting approximately 1.4 million people in North America. IBD is most commonly diagnosed in late adolescence and early adulthood, leading to a significant prevalence within the young adult population. Imaging plays an important role in the evaluation of symptomatic IBD patients, including initial primary diagnosis (Crohn's vs UC), disease activity, treatment response, and extraintestinal complications. CT is the primary imaging modality for evaluating gastrointestinal tract pathology in IBD and, although effective, one significant limitation is its associated patient exposure to ionizing radiation. The issue of ionizing radiation risk to patients associated with diagnostic radiology examinations has received much attention in recent years; especially for young adults, in whom the relative cancer mortality risk per unit radiation dose is significantly higher compared with older patients. This issue is particularly relevant to the pediatric IBD population that is likely to require frequent imaging over the course of their lifetimes. Magnetic resonance imaging (MRI) provides superior soft tissue contrast without exposing patients to ionizing radiation, and is a very promising alternative imaging modality for patients with IBD.

The development of MRI pulse sequences that provide motion-free, high resolution images with T1 or T2 contrast has made MR imaging of intestinal pathology possible. The comprehensive sequence combination that can be used to image the bowel is collectively labelled as MR Enterography (MRE). The superior soft-tissue contrast makes MR a potentially ideal technique for studying both the small and large bowel, particularly in young adults. However, until recently, MR imaging in IBD was impaired by abdominal motion artifacts and the lack of consistent bowel opacification. With the advent of fast breath-hold sequences and suitable oral contrast agents has renewed interest in MR as an imaging modality in the study of the bowel. T2-weighted imaging is complemented in most cases by gadolinium-enhanced T1-weighted images in combination with fat saturation. An essential prerequisite for an adequate MR study is optimal distension of bowel loops in order to properly evaluate wall thickness and mural contrast enhancement. Most transmural abnormalities, including cobblestoning, thickening, stenosis, prestenotic dilatation and increased parietal enhancement, are well depicted by MRI. MR Enterography has an excellent ability to differentiate active inflammation from fibrosis in a thickened bowel segment. The presence of layered pattern of enhancement on gadolinium-enhanced T1-W images is considered highly specific for active disease. Similarly, bright bowel wall due to increased signal of water on T2-W sequences suggests disease activity. This distinction may have management implications in that the finding of a fibrotic stenosis suggests surgery while inflammation would prompt a more aggressive medical approach. Extramural manifestations and complications such as fibrofatty proliferation, comb sign, mesenteric lymph nodes, abscesses, fistulae and sinus tracts are also easily detected. In both adults and children, MRI has been shown to be superior to CT and fistulography in assessing perineal complications of Crohn's disease, as well as fistulae and sinus tracts, and avoids substantial radiation to the pelvis. Therefore, MRI has become a cornerstone in the evaluation of patients with perianal CD as it is noninvasive and accurate in depiction

The proposed session will highlight, by way of clinical examples, the clinical application of MRE in imaging patients with inflammatory bowel disease.