THE ROLE OF MR ENTEROGRAPHY IN DIAGNOSIS OF SMALL INTESTINAL INFLAMMATORY BOWEL DISEASES.

THESIS

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Abstract

Key words: MR enterography- Diagnosis- Inflammatory bowel diseases

MR enterography has become an important diagnostic technique with radiation free imaging for small bowel diseases.

In our study, it showed a high accuracy, sensitivity and specificity concerning diagnosis of small intestinal inflammatory bowel diseases, assessment of the disease activity and detection of its complications.

List of abbreviations

- 2D Two dimensional
- 3D Three dimensional
- Balanced FFE Balanced fast field echo
- CD Crohn's disease
- CDAI Crohn's disease activity index
- CDEIS Crohn's Disease Endoscopic Index of Severity
- CTE Computed tomography enterography
- DBE Double balloon endoscopy
- DVT Deep venous thrombosis
- FLASH Fast low angle shot (ultrafast gradient echo sequence)
- Gd. Gadolinium
- GIT Gastrointestinal tract
- GRE Gradient echo sequence
- HASTE Half Fourier Acquisition single shot turbo spin echo
- I.V Intra-venous.
- IBD Inflammatory bowel disease
- IBDU Inflammatory bowel disease unclassified
- IC Indeterminate colitis
- IgA Immunoglobulin A
- MIP Maximum intensity projection
- MRA Magnetic resonance angiography
- MRE Magnetic resonance enterography
- MRI Magnetic resonance imaging
- MSCT Multislice computed tomography

- No Number
- NPV Negative predictive value
- PEG Polyethylene glycol
- PPV Positive predictive value
- SBFT Small bowel follow through
- SES-CD Simple Endoscopic Score for Crohn’s disease
- SI Signal intensity
- SMA Superior mesenteric artery
- SNR Signal to noise ratio
- SNR Signal to noise ratio
- SPAIR Spectral attenuated inversion recovery
- SSTSE Single shot turbo spin echo
- TE Time to echo
- TFE Turbo field echo
- THRIVE T1 High Resolution Isotropic Volumetric Examination
- TR Repetition time
- True- FISP True fast imaging with steady state precession
- TSE Turbo spin echo
- TSE Turbo spin echo
- UC. Ulcerative colitis
- VIBE Volumetric interpolated breath hold examination
- WCE Wireless capsule endoscopy.
- WI. Weighted image

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Introduction

The small bowel is a long (variable in length) convoluted tube affected by a host of pathologic conditions that can be difficult and challenging to diagnose ***(Levine S. et al, 2008).***

Inflammatory bowel diseases (IBD) are a heterogeneous group of diseases that can be broadly classified into Crohn's disease and ulcerative colitis (UC). The term IBD-unclassified (IBDU) applies to the subset of 10% to 15% of patients with IBD in whom this subcategorization is not possible ***(Timothy L. and David T., 2009)***

An accurate radiologic examination is, therefore, important not only for recognition of small intestinal inflammatory bowel diseases but also to help reliably document normal morphology ***(Lohan G. et al., 2008).***

The practice of gastrointestinal (GI) radiology has changed dramatically in the last two decades. There was a time when the small bowel follow-through and barium enema were the dominant modalities in the investigation of diseases of the small and large intestine. Enteroclysis was rejuvenated in the 1970s, and defecography was subsequently popularized. Together with the upper gastrointestinal series, these procedures became the primary tools of the gastrointestinal radiologist. ***(Maglinte D. and Rubesin S., 2003).***

The introduction of multislice CT and MRI technology began to further change the way radiologists looked at the hollow viscera. This technology enabled faster acquisition of a larger amount of information and led to better details of the intestines and mesenteries. Reformatting and multiplanar imaging represented a further advance. The ability of CT and MRI to diagnose intestinal disorders including inflammatory bowel diseases is no longer in question. In many conditions, they have shown more diagnostic information than barium

examinations and clearly changed clinical management ***(Maglinte D. and Rubesin S., 2003).***

MDCT and CT enterography have a disadvantage of necessitating potentially nephrotoxic iodine-based contrast medium injection and involving considerable ionizing radiation exposure ***(Lohan G. et al., 2008).***

Long acquisition times, peristalsis, and respiratory motion artifacts, however, were severe limitations of MR imaging of the small bowel in the past and MR imaging was rarely used for evaluation of small bowel diseases. Recently, because of the development of ultrafast sequences and MRI oral contrast agents, there is increasing interest in small bowel evaluation with MR imaging ***(Umschaden H. and Gasser J., 2003).***

High soft-tissue contrast resolution, acquisition of multiplanar images, particularly in the coronal plane, and possibility to obtain functional information makes MR enterography an interesting imaging technique for the evaluation of the small bowel. The absence of ionizing radiation is another important feature since the most frequent group of inflammatory bowel diseases to be studied (in particular Crohn's disease), prevalently affecting pediatric patients or young adults ***(Umschaden H. and Gasser J., 2003).***

Another major advantage of MR enterography, compared with conventional X-ray barium studies, is direct visualization of small bowel wall. This feature dramatically changes image interpretation process; radiologists are called to shift their attention from analysis of mucosal profile and lumen caliber to direct evaluation of bowel wall thickness and parietal inflammatory changes. The outcome of this cultural radiological challenge radically alters the management of patients with suspected inflammatory bowel diseases ***(Umschaden H. and Gasser J., 2003).***

MRI enterography plays a major role in the diagnosis of small intestinal inflammatory bowel diseases and detection of complications. Imaging defines the extent of disease, presence or absence of associated bowel obstruction and presence of active mucosal disease. The extent of the bowel disease has important management implications, including the need for surgical intervention. Also the advantage of cross-sectional imaging can detect pathological findings outside the bowel loops, such as fistulas and abscesses, which are not generally visualized by endoscopy ***(Zalis M. and Singh A., 2004).***

Although MR enterography may have a diagnostic effectiveness comparable to that of CT enterography, yet it is preferred as a radiation-free alternative for evaluation of patients with small intestinal inflammatory bowel disease, especially those who are young and may require repeated examinations ***(Lee S. et al., 2009).***

As a result, MRI and MR enterography have been propelled to the forefront of available imaging techniques for studying the small bowel ***(Lohan G. et al., 2008).***

Aim of work

The aim of work is to evaluate the role of MR enterography in the diagnosis, assessment of the disease activity and detection of complications of small intestinal inflammatory bowel diseases in correlation with clinical and endoscopic data.

Materials and Methods

Fifty patients clinically suspected to have small intestinal inflammatory bowel disease will be examined by MR enterography and results will be correlated with other imaging techniques as CT, BMFT and endoscopic data, whenever possible.