

*Research Article*

## Assessment Of Small Bowel lesions by Magnetic Resonance Enterography technique

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### Abstract

**Background:** The small intestine has always been a challenging area to investigate by clinical or radiographic means due to its anatomy, location, and relatively tortuosity. We aimed to assess the Small Bowel lesions by the Magnetic Resonance Enterography technique. **Methods:** This prospective study was done at the radiology department, Minia university hospital. The study includes fifteen patients suspected of small bowel disorders and referred by department of internal medicine in the period between April 2021 to April 2022: **Results:** The result of this study revealed that the range of age of the suspected patients was 18-64 years old with mean  $42.47 \pm 14.89$  (Table 1). The ileum was the most affected portion of the small bowel (10 patients from 30, 33.3%), followed by combined involvement (ileum and jejunum 20%). **Conclusion:** MRI provides several advantages for imaging the small bowel. Superior tissue contrast and lack of ionizing radiation are its major advantages over ultrasonography and CT

**Keywords:** dilated, colonoscopy, jejunum, site, tumor

### Introduction

The small intestine has always been a challenging area to investigate by clinical or radiographic means due to its anatomy, location, and relatively tortuosity. The upper gastrointestinal tract, comprising the esophagus, stomach, and duodenum, is accessible by direct endoscopy, as the colon is. The small bowel, however, is beyond the reach of the most flexible endoscopes.<sup>(1)</sup>

MRI provides a number of advantages for imaging the small bowel. Superior tissue contrast and lack of ionizing radiation are its major advantages over computed tomography (CT) and contrast-enhanced fluoroscopy. Furthermore, with its dynamic sequences, MRI permits the assessment of functional information and improved visualization of the entire bowel.<sup>(2, 3)</sup>

Lastly, MR imaging may also be used for patients with contraindications to contrast-

enhanced CT imaging, including those who are pregnant and those with allergies or contraindications to iodinated contrast<sup>(3)</sup>

MRI techniques available to evaluate the small bowel include MR enterography and MR enteroclysis. In MR enteroclysis, enteric contrast is administered directly via a nasoenteric tube, providing superior distention of small-bowel loops compared to oral ingestion in MREg. However, MR enteroclysis remains of limited availability, perhaps due to patient discomfort<sup>(3,4)</sup>.

### Patients and Methods

#### 1- Study population:

This prospective study was done at the radiology department, Minia university hospital. The study includes fifteen patients suspected with small bowel disorders and referred by the department of internal medicine in the period between April 2021 to April 2022 after fulfilling the inclusion criteria. Written consent was taken from all

patients after approval of the Medical Ethical Committee of our institution.

**Inclusion criteria:**

- 1- Adult cooperative patient.
- 2- Clinical symptoms suggestive of small bowel disorder as chronic diarrhea, chronic vomiting, hematemesis, and melena after excluding upper GIT diseases by upper endoscopy.

**Exclusion criteria:**

- 1- Children or non-cooperative adult patients
- 2- Patient with general contraindication to MRI as the presence of Para-magnetic substance as metallic clips, a pacemaker or claustrophobic patient.

**For each patient, the following was done:**

Full history was taken: Personal history, past history of medication or operation, present data and complaining, laboratory investigation. Abdominal ultrasonography was done.

**2- MRE examination**

**2.1- Patient preparation for MREg**

Firstly, psychological preparation of the patient about the scanner environment and information the patient about each step to make him felt comfortable and safe. fasting of the patient from ingesting solids and liquids at least 6–8 h before the examination and water up to 1–2 h prior to examination. The patient also asked not to void one hour before the examination.

All metallic or paramagnetic substances were removed prior to examination

**2.2- MR Enterography protocol:**

- A phased array body coil was also employed for optimization of signal reception. Multiplanar rapid localizers were followed by 2D steady-state free precession (SSFP–true-FISP) sequences, acquired in

the coronal and axial planes and encompassing

- Scanning the entire abdomen from the diaphragmatic apex to the groins in cranio-caudal extent in the coronal and axial planes.

Multiplanar rapid localizers were followed by 2D steady-state free precession (SSFP – true-FISP) sequences, acquired in the coronal and axial planes and encompassing from the diaphragmatic apex to the groins in cranio-caudal extent. These true-FISP acquisitions

incorporated the following parameters:

4- IV contrast agent was used in some cases that were important to assess wall enhancement of inflamed bowel, lymphadenopathy, and suspected small bowel tumors and also allows better delineate sinus tracts and fistulas if present.

**3- Image analysis:**

All MRE images for all patients are revised for:

- 1- Scout coronal single-shot sequences to assess distention and confirm distention of terminal ileum.
- 2- Wall thickening, and enhancement
- 3- Localization
- 4- Extraenteric-assessment.
- 5- Diffrentation.
- 6- Complication.

**Results**

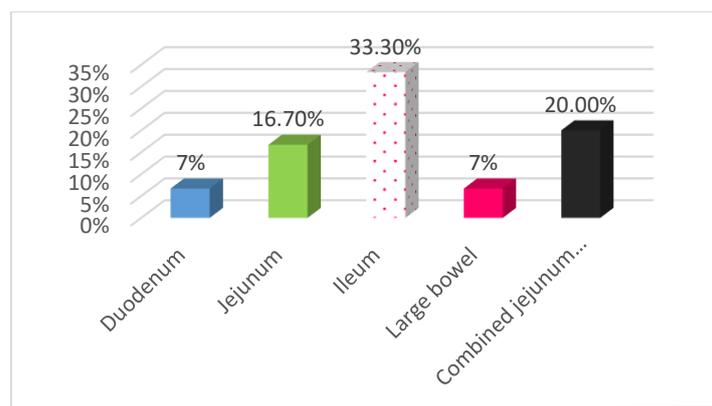
The result of this study revealed that the rang of age of the suspected patients was 18-64 years old with mean  $42.47 \pm 14.89$  (Table 1). The ileum was the most affected portion of small bowel (10 patients from 30, 33.3%), followed by combined involvement (ileum and jejunum 20%) (Table2, figure 1).

**Table (1): Age distribution of the studied patients .**

Age (years)	Total
Mean $\pm$ SD	42.47 $\pm$ 14.89 y
Range	18 – 64 y

**Table (2): Site of affected bowel loops among the studied patients .**

	(%)
Duodenum	(6.7) %
Jejunum	(16.7) %
Ileum	(33.3) %
Large bowel	(6.7) %
Combined jejunum and ileum	(20) %

**Figure (1): Distribution of affected bowel loops among the studied patients (N=25).**

### Discussion

This prospective study was conducted at the radiology department, Minia university hospital from April 2021 to April 2022. The study included fifteen patients suspected clinically for small bowel disorders with age ranged from 18-64 years old.

The result of this study revealed that the rang of age of the suspected patients was 18-64 years old with a mean of  $42.47 \pm 14.89$  y and this is agree with Siddiki HA, Fidler JL, et al., As they reported that the age range, 20-60 years with mean 40y, and agree with Jose SK, Simon B, Simon EG that reported that range of age from 18 to 68. (7),(6)

Regarding to our study, the ileum was the most affected portion of small bowel (10 patients from 30, 33.3%), followed by combined involvement (ileum and jejunum 20%). This agree with the study of

Napolitano M, Munari AM, Di Leo G et al., (2021), also agree with Mainenti PP, Castiglione et al., (2021), they found that the terminal ileum is the most affected portion with IBD. However this disagree with the study of Jose SK, Simon B, Simonet et al., (2021) which reported that ilio-cecal junction is the most affected portion followed by isolated ileum then isolated colon. (6),(9)

Also agree with the study of Siddiki HA, Fidler JL (2009), as in both have several limitations. That they did not include pediatric patients. And did not perform MR enterography using the enteroclysis technique; however, we think that this should not affect our results because published studies have shown these two techniques for MRI of the abdomen to be similar in diagnostic accuracy and disagree with Napolitano M, Munari AM et al., (2021), that examined pediatric patients. (6),(9)

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