

# MRI OF THE SMALL BOWEL : IMPACT OF A RECTAL ENEMA REGARDING IMAGE QUALITY

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## Introduction

MRI of the small bowel has emerged as primary radiological examination tool in many departments (1). To gain wider clinical acceptance for small bowel MRI, the features of non-invasiveness have to be retained. Thus, distending contrast liquids will need to be administered orally without prior duodenal intubation (2). A sufficient distension of the terminal ileum and the ileocecal region is crucial since most inflammatory pathologies are located in these regions. The purpose of this study was to assess whether the administration of an additional rectal enema increases image quality and results in a better distension of small bowel segments.

## Methods

40 patients with known Crohn's disease were included (age range 19-47 years, mean age 33 years). In a randomized order, twenty patients only ingested an oral contrast agent (group A), the other twenty subjects ingested the oral contrast agent and obtained an additional rectal water enema (group B). For small bowel distension, a solution containing 0.2 % locust bean gum (LBG; Roeper, Hamburg, Germany) and 2.5% mannitol (Merck, Darmstadt, Germany) was used. All 40 patients ingested 1500ml of this solution within 45 minutes prior to the MR examination. 100 mg erythromycin (Abbott Pharmaceuticals, Wiesbaden, Germany) were administered intravenously directly following the ingestion of the first 150 ml of the contrast solution to enhance gastric emptying. No bowel cleansing procedures were applied. In group B, the colon was filled with approximately 2000ml of warm tap water using hydrostatic pressure (1-1.5 m water column). To minimize bowel peristalsis, 40mg of scopolamine (Buscopan®; Boehringer Ingelheim, Germany) were injected intravenously immediately prior to the examination. MRI were performed on a 1.5 T system (Magnetom Sonata, Siemens Medical Systems, Erlangen, Germany). Patients were examined in the prone position. A first T1w 3D gradient echo data set with integrated fat suppression (Volumetric Interpolated Breathhold Examination, "VIBE") was collected in coronal plane. Subsequently, paramagnetic contrast (Gd-BOPTA, Multihance®, Bracco, Italy) was administered i.v. at a dosage of 0.2 mmol/kg and a flow rate of 3.5 ml/s. Following a delay of 75 s, the 3D data acquisition was repeated with identical imaging parameters. The 3D data were collected breathheld in 22 s. For data analysis, small and large bowel were divided into nine segments: jejunum, proximal ileum, terminal ileum, cecum, ascending / transverse / descending / sigmoid colon and rectum. Bowel distension of the single segments was assessed quantitatively by measuring five bowel loop diameters and calculating an average value. Ratings of both groups were compared by an unpaired Wilcoxon rank test, considering a p-value of < 0.05 to indicate a statistical significance. Furthermore, presence of image artifacts was analyzed.

## Results

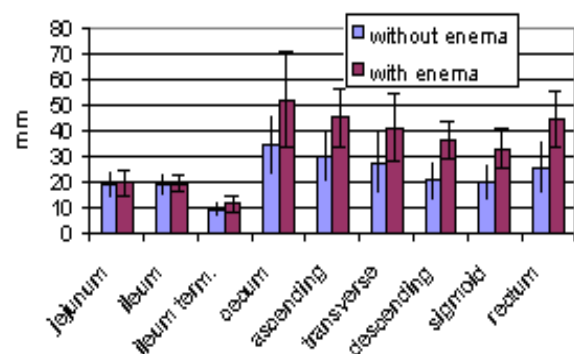
There were no statistically significant differences between both patient groups regarding bowel distension of the jejunum and the proximal ileum. However, the bowel lumen of all segments between the terminal ileum (fig 1) and the rectum showed a significantly higher distension following the rectal administration of water (table 1). Furthermore, fewer artifacts were seen within group B. Thus, the reader's confidence was higher for the diagnosis of bowel disease not only in the colon but also in the ileocecal region after the administration of a rectal enema.

## Discussion

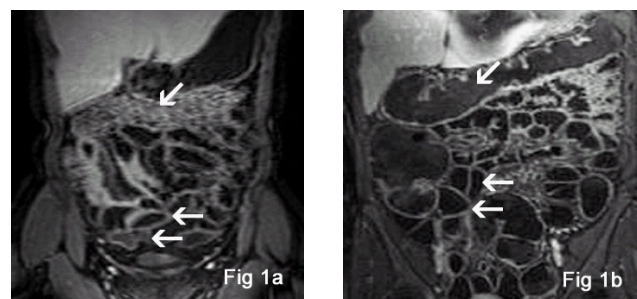
Our data show that the additional administration of a rectal enema is useful in small bowel MRI for the visualization of the ileocecal valve and even the terminal ileum. Since most lesions of Crohn's disease are located in this area, we conclude that a rectal enema should be part of every small bowel MRI examination protocol. The additional time needed for the enema administration is minimal. Besides, images quality can be significantly increased.

## Reference

1. Kim KW, Ha HK. MRI for small bowel diseases. *Semin Ultrasound CT MR.* 2003 Oct;24(5):387-402.
2. Schunk K. Small bowel magnetic resonance imaging for inflammatory bowel disease. *Top Magn Reson Imaging.* 2002 Dec;13(6):409-25.



**Table 1:** Mean values of bowel loop distension for both patient groups. Single standard deviations are displayed.



**Figure 1:** MRI of the small bowel after the administration of oral contrast agents (fig 1a). Distension can be increased by the additional administration of a rectal enema (fig 1b).