Dark Lumen MR Colonography: Comparison to Conventional Coloscopy

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ABSTRACT:

The aim of this study was to assess MR colonography for the detection of colonic polyps/malignancy. 50 subjects underwent MR colonography prior to conventional colonoscopy. MRC is based on a rectal enema with water in combination with the intravenous application of a paramagnetic contrast agent. MRC correctly identified 20 polyps in 12 patients. Two small polyps seen at colonoscopy were missed by MRC.
The MRC concept based on a dark colonic lumen and a bright, contrast enhanced colonic wall appears to be a promising alternative to traditional MRC based on a bright colonic lumen.

INTRODUCTION:

MR colonography permits accurate detection of colonic polyps (1). Patients acceptance remains limited because of the need for bowel cleansing. The technique is based on a rectal enema with water in combination with the intravenous application of a paramagnetic contrast agent (2). The aim of this study was to compare dark lumen MR colonography with conventional coloscopy.

METHODS:

50 subjects with suspected colonic lesions were prospectively included in this study undergoing MRC and subsequent conventional colonoscopy on the same day. All patients underwent standard preparation for colonoscopy. For MR colonography the colon was filled in prone position with approximately 3000 ml of tap water while a dosage of 0.2 mmol/kg body-weight of Gd-BOPTA (Multihance®, Bracco/Italy) was intravenously injected. Imaging was performed on a 1.5T MR scanner (Magnetom Sonata®, Siemens Medical Systems/Germany). A T1-w 3D VIBE sequence (TR/ TE/ FA: 3,1ms/1,2ms/12°) was acquired before and 75 sec after contrast administration. Results obtained by MRC were compared to conventional colonoscopy (CC).

RESULTS:

MR colonography was well tolerated by all patients. MR image quality was sufficient for diagnosis in 48 of the 50 (96%) patients. CC revealed a total of 20 polyps in 12 patients, with 12 (60%) lesions smaller than or equal to 5 mm in diameter and 8 (40%) larger than 5 mm. Two of the small polyps ($\leq$5-mm-diameter) were overlooked at MR colonography, but all large polyps (>5-mm) were correctly identified, resulting in an overall sensitivity/specificity of 90%/100%, and both a sensitivity and specificity of 100% for the detection of large polyps (>5-mm).
In 2 patients with colorectal cancer and 3 patients with inflammatory disease the findings of the MRC examination were correct.

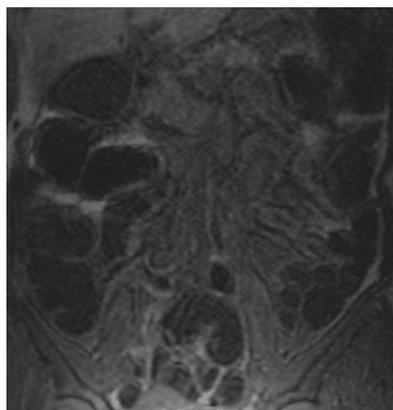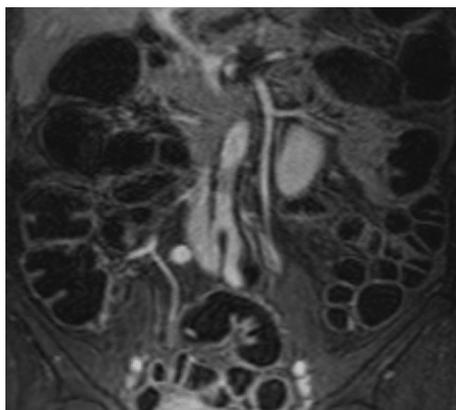
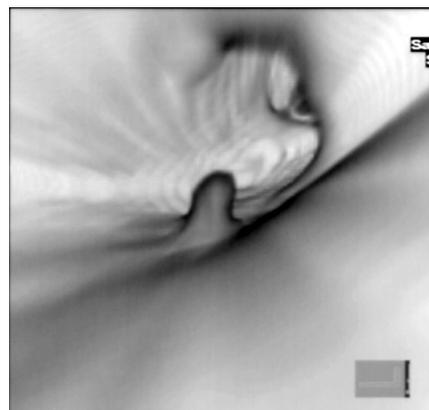Fig.1   Fig.2   Fig.3

Fig. 1-3: Fig. 1 shows a 3 D VIBE sequence pre-contrast with a small polyp in sigmoid colon. Fig.2. reveals an enhancement of the polyp after contrast administration. In Fig. 3 the polyp can be visualized from inside in virtual coloscopy.

DISCUSSION:

The MR colonography concept based on a dark colonic lumen and a bright, contrast enhanced colonic wall represents a promising alternative to the traditional MRC based on a bright lumen concept. It suggests a higher accuracy in detecting polyps, a better evaluation of other parenchymal organs as well as a reduced time needed for data acquisition and analysis.

REFERENCES:

1) Lauenstein T, Herborn CU, Vogt FM, Goehde SC, Debatin JF, Ruehm SG: Dark lumen MR colonography : initial experience. Rofo Fortschr Geb Rontgenstr 2001; 173 (9): 785-9.
2) Luboldt W, Bauerfeind P, Steiner P, Fried K, Krestin GP, Debatin JF: Preliminary assessment of three-dimensional magnetic resonance imaging for various colonic disorders. Lancet 1997; 349:1288-1291