MR colonography – preliminary results of a new fecal tagging concept avoiding bowel cleansing

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Introduction:

Although colorectal cancer is the second most malignant tumor regarding the mortality rate (1) preventive examinations are often neglected. One reason is related to low patients' acceptance of bowel cleansing, which is mandatory for colonoscopy and virtual endoscopy (2). To improve patient acceptance, techniques like fecal tagging were developed. Signal intensity of residual stool is modified by the ingestion of contrast agents prior to the examination. This should ensure a confident differentiation between feces and colorectal masses. This study was designed to evaluate the accuracy of a new fecal tagging protocol for MR colonography.

Methods:

143 screening patients older than 50 years without any history of previous bowel disturbances were included in this study. In addition to their regular meals they ingested 2000 ml of a tagging solution starting 48 hours prior to the MR examination. The solution contained 5% gastrografin, 1% barium and 0.2% locust bean gum. No bowel cleansing was applied. MRC was performed on a 1.5 T MR system (Magnetom Sonata, Siemens Medical Solutions, Erlangen, Germany) in patients' prone position. The colon was filled with approximately 2000ml of warm tap water using hydrostatic pressure (1-1.5 m water column) to assure adequate bowel distension. Furthermore, we administered 40mg of scopolamine (Buscopan®; Boehringer Ingelheim, Germany) to minimize bowel peristalsis and to reduce colonic spasms. A T1w 3D GRE sequence was acquired pre- and 75s after gadolinium administration (TR/TE/flip/FOV/matrix 3.08/1.13/35°/50/168x256). Paramagnetic contrast was intravenously administered at a dosage of 0.1 mmol/kg BW Gd-DTPA (Magnevist®, Schering, Germany) and a flow rate of 2ml/s. In addition, a 3D TrueFISP sequence was acquired (TR/TE/flip/FOV/matrix 3.79/1.9/70°/40/205x256). The latter sequence was used to prove presence of fecal material in the large bowel.

All patients underwent conventional colonoscopy within 3 weeks of the MR examination. MR data were analysed concerning image quality. Besides, presence of colorectal masses was determined. Patient acceptance was assessed for MRI and endoscopy using a standardized questionnaire.

Results:

Image quality of fecal tagging based MRC was diagnostic in 87% of the examinations (fig.1). Reasons for non-diagnostic examinations were related to motion artefacts in 6% and signal-intense stool on the T1w images in 8% of the procedures. Colorectal masses > 5mm (fig.2) were detected with a sensitivity of 74% and a specificity of 97% compared to CC. 67% of the patients preferred MRC over endoscopy for future examinations.

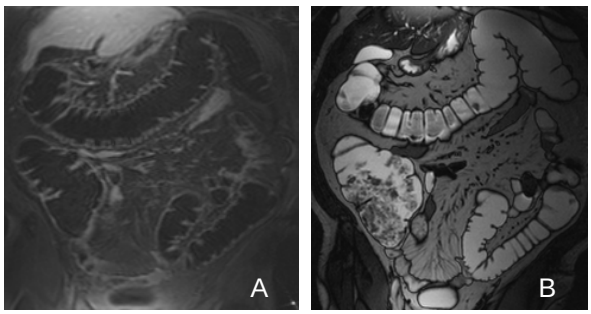

Fig.1: MRI of the large bowel after the administration of fecal tagging solution. The contrast-enhanced T1w GRE data (A) shows a homogenous dark signal throughout the large bowel in spite of the presence of feces, which can be depicted on the TrueFISP sequence (B).

Discussion:

Fecal tagging MRC is applicable for screening purposes. Mayor advantages are related to the high patient acceptance and the specific detection of colorectal masses. However, further investigations need to be performed to improve the detection rate for small colorectal masses.

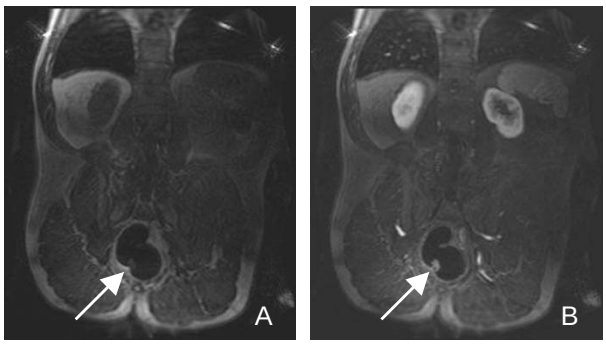

Fig.2: (A) pre and (B) post contrast-enhanced T1w GRE data set of a patient with a polyp in the sigmoid colon (arrows).

Reference

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