

Prospective Comparison of Dark Lumen MR Colonography with Conventional Colonoscopy in Asian Population: Preliminary Results

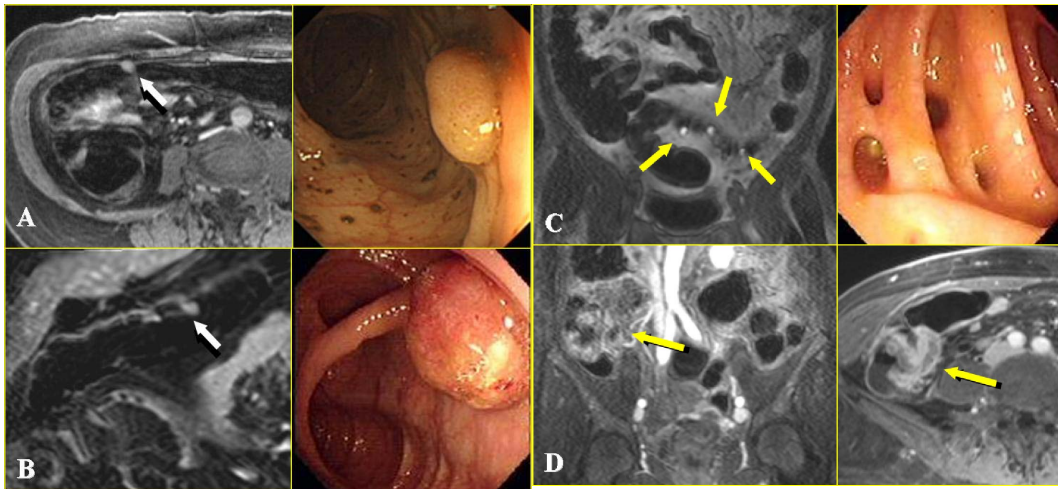
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Introduction: Colorectal cancer is an important cause of morbidity and mortality in the western population and recently it has become one of the leading causes of cancer related deaths in Asian population as well. Conventional colonoscopy is considered reference standard for evaluation of the colon and its pathologies but has poor patient acceptance due to invasiveness and discomfort. CT Colonography has been established as a valuable tool for screening for colonic polyps. CT Colonography although an excellent technique carries the risk ionizing radiation and may limit its applicability as a screening modality. Recently dark lumen MR Colonography has been described as an effective modality for detection of clinically significant colonic polyps [1, 2]. To date most of the studies have been performed in the Western population. We undertook a prospective study to determine the feasibility and clinical relevance of MR Colonography for detection of colonic lesions using conventional colonoscopy as reference standard.

Methods: This prospective comparative study was approved by the institutional review board. Sixty-six patients underwent an MR Colonography (MRC) followed by Conventional Colonoscopy (CC) on the same day. All patients underwent standard preparation for the CC as per hospital protocol. No special bowel preparation for MR Colonography was performed except that patients were asked to minimize intake of meat, green vegetables and chocolates during the bowel preparation. MR Colonography was performed on a 1.5 T MR scanner (Avanto, Siemens, Erlangen, Germany). A spasmolytic (Scopolamine 20mg) was given intravenously to reduce peristalsis and bowel motion artifacts. A thin rectal tube or a Foley's catheter was placed in the rectum and secured by distending the balloon with air. Patient was then made to lie prone and 1-2L of lukewarm water or room air was administered retrograde to distend the colon. The distension was performed until patient complained of some discomfort. A localizer scan was performed and a coronal Tru-FISP sequence to see for adequacy of distension of the colonic segments. After confirming adequate distension of the colonic segments, pre-contrast 3D T1-W FLASH coronal VIBE (Volumetric Interpolated Breath-hold Examination) sequence was performed. The sequence parameters are as follows: TR/TE= 3.7/1.1; FA=7; slice thickness=1.2 to 2mm; matrix 460 x 512; breath hold of 18-20seconds. This was followed by post gadolinium enhanced coronal sequences performed 75 seconds after the start of injection of gadolinium given intravenously at 0.2mmol/kg body weight. T1-W FLASH-VIBE sequences in axial plane was also performed. Similar sequences were performed after turning the patient in supine position. After confirming the adequacy of the scans the rectal catheter was removed and patients went to the bathroom. The findings on MR Colonography were entered on an excel sheet. CC was performed with standard optical colonoscope by experienced gastroenterologist and colorectal surgeon. The endoscopist performing the colonoscopy recorded the location and size of the colorectal lesions. Two radiologists blinded to endoscopic findings read in consensus the findings on MRI and recorded the abnormalities on different segments as well as extracolonic findings. Two patients refused to undergo colonoscopy after the MRC and therefore excluded from the study. Finally 64 patients made the study group.

Figure 1



Results: The MRC and CC results were available in 64 patients. There were 35 males and 29 females with a mean age \pm SD; 53.7 ± 12.5 years. In 4 patients colonoscopy was incomplete with evaluation of only rectum and sigmoid as scope could not be passed beyond sigmoid colon either due to acute bend or discomfort to patient. A total of 21 polypoid lesions were detected on the CC. The abnormalities included 20 polyps (mild dysplasia-11; moderate dysplasia-2; inflammatory-2; hyperplastic-2; lymphoid tissue-2; normal -1). MRC detected only 6 polyps. The MRC detection of polyps ≤ 5 mm (Fig 1A) was 1/15 (6%); 6-9mm (fig 1 B) was 3/4 (75%) and ≥ 10 mm (100%). One case of carcinoma (Fig 1 D) was detected on

both MRC and CC. In addition there were diverticulae (Fig 1C) and a rectal fistula which were demonstrated on MRC. On per patient basis, the accuracy of MRC for detecting all size polyps was 87.5%; for polyps ≥ 6 mm the accuracy is 98.4%. In those cases where CC was incomplete MRC did not detect any colonic lesions.

Discussion: The sensitivity of MRC for demonstrating polyps ≤ 5 mm is very low in our study and is similar to that reported in literature. However the accuracy of MRC for detection of clinically significant polyps (≥ 6 mm) is higher. The negative predictive value for a ≥ 6 mm sized polyp is 98.3%. Nearly half of the ≤ 5 mm polyps detected at colonoscopy were either normal tissue/lymphoid tissue or hyperplastic and the remainder were very small in size and had low grade dysplasia. Two polyps with moderate dysplasia were identified with MRC. The limitation of our study is the low prevalence of polyps in our study. Twenty four patients also had extracolonic findings. In one case of carcinoma of the colon, the staging could be performed in the same study and there were no liver metastases demonstrated.

Conclusion: MR Colonography is feasible and results in our Asian population are similar to that described in the literature. The study results are encouraging and provides motivation for study of a larger group of patients for determining the accuracy of MRC.

References:

1. Ajaj W, Ruehm SG, Gerken G, Goyen M. JMRI 2006; 24:1088-94.
2. Hartmann D, et al. Radiology 206;238: 143-49.