

# Efficacy of MR Colonography and Conventional Colonoscopy in Colonic Polyps Assessment

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## ABSTRACT

**Introduction:** Polyps are fibro vascular extensions of mucosa into bowel lumen. Radiological assessment plays a major role in depicting colonic polyps. Colonoscopy is a gold standard technique to detect polyps with high sensitivity and specificity. Magnetic Resonance (MR) Colonography is also an even less invasive method without any ionizing radiation.

**Aim:** This study designed to compare the efficacy of MR Colonography with conventional colonoscopy in colonic polyps.

**Materials and Methods:** A total 42 patients with chief complaints of bleeding per rectum and familial background of colonic polyps were recruited. 200 mL of peglec

solution, five times for every 15 minutes was administered for bowel cleansing. All the cases were undergone for MR Colonography and Conventional Colonoscopy.

**Results:** MR Colonography showed sensitivity 82.04%, specificity 84.66%, positive predictive value 93% and negative predictive value 61%. Conventional colonoscopy showed sensitivity 88%, specificity 92.54%, Positive predictive value 96.02% and Negative predictive value 48%.

**Conclusion:** MR Colonography has moderate sensitivity and specificity than conventional colonoscopy. Patient acceptance of MR Colonography was less when compared to conventional colonoscopy.

**Keywords:** Magnetic resonance colonoscopy, Sensitivity, Specificity

## INTRODUCTION

Polyp simply means a projection of the mucosa into the bowel lumen. The polyps appear initially in the distal portion of the colon. Colorectal cancers are the second leading cause of cancer related deaths in western countries [1,2]. Radiological assessment plays key role in the diagnosis and management of colonic polyps and colorectal cancers. Polyps appear as radiolucent filling defects as ring shadow [3,4].

Radiological detection of polyps is sometimes difficult to distinguish from fecal residues. Different screening methods have been evaluated to diagnose polyps such as Barium contrast enema, Fecal Occult Blood Test (FOBT), Sigmoidoscopy, Colonoscopy and MR Colonography. Among these tools, colonoscopy is the most accurate tool for examining the colon and its related complications, with high sensitivity and specificity regarding the detection of colorectal cancer and adenomatous polyps, with polypectomy reducing mortality rates of colorectal cancer [5,6].

MR Colonography is an even less invasive method without any ionizing radiation [7]. MR Colonography was distinguished in 1997 by Luboldt et al., Depending on inside colonic lumen signaling, it is divided in to bright lumen and dark lumen

MR Colonography [8]. Bright lumen MRC depends on the visualization of filling defects i.e. air bubbles and fecal material. Lesions appears as dark filling defects on a bright background of distended colon. Dark lumen MRC based on contrast produced between dark colonic lumen and brightly enhancing colonic wall. Lesion appears as white on dark background of distended colon. It is most preferred technique which makes use of negative contrast agents [9-11].

This study was undertaken to compare the results of MR Colonography and conventional colonography findings in cases with colonic polyps.

## MATERIALS AND METHODS

The present prospective, monocentric study was conducted in Department of Radiology, MNR Medical College and Hospital, Sangareddy during April 2016 to December 2017. A total 42 patients were selected. The study sample size was considered based on the prevalence of PEM children attending to the pediatrics department. Patients with chief complaints of bleeding per rectum and familial background of colonic polyps, above 10 years age and willing to participate were included in this study. Cases with anal incontinence and under 10 years

and with MR contradictions were excluded from the study. Based on familial background cases were divided into two groups, i.e. group-1 with positive family history and group-2 without a family history.

Informed consent was obtained from all the participants and work protocol got ethical committee clearance. All the cases were subjected to detailed clinical examination, clinical history, i.e. duration of symptoms, past history of intestinal surgery and familial background. All the cases underwent standard bowel preparation (200ml of peglec solution, five times for every 15 minutes) on the day before procedure. Peglec administration was continued until the rectal effluent was clear.

All the cases underwent for Bright lumen MR Colonography and Conventional Colonoscopy (CC). In bright lumen MRC, Polyps appear within fluid filled bright colonic lumen as dark filling defect. In conventional colonoscopy, polyps appeared as mucosal projection. In MRC and CC, biopsy can be taken for histopathological examination in all the cases.

### STATISTICAL ANALYSIS

Statistical comparison was done between MRC and CC. Sensitivity, Specificity, Negative predictive value and Positive predictive value was assessed based on ability of lesion detection in colonic lumen. Sensitivity was calculated by true positive/false negative+true positive.

### RESULTS

A total 42 cases with chief complaints of bleeding per rectum and familial history of colonic polyps were considered. Among the cases 24 (57.2%) cases had positive family history and 18 (42.8%) cases does not have a family history of colonic polyps. In both groups, majority of cases were in between age group 21-40 years [Table/Fig-1].

In group 1, polyps appeared predominantly over left colon (75%) than right colon (25%), whereas in group 2 also left colon (61.1%) was predominantly involved than right colon (38.9%) [Table/Fig-2]. In lesion detection sensitivity by both radiological methods showed that the true positive value is 32, false positive value is 02, false negative value is 07 and true negative value is 01 [Table/Fig-3].

### DISCUSSION

A polyp simply means mucosal protrusion into the bowel lumen. Conventional colonoscopy is a gold standard method

Age	Group 1 (+ve family history)		Group 2(-ve family history)	
	Number	Percentage	Number	Percentage
11-20	12	50%	01	5.5%
21-30	09	37.5%	03	16.6%
31-40	03	12.5%	11	61.2%
41-50	-	-	03	16.6%
Total	24	100%	18	100%

[Table/Fig-1]: Age wise distribution of cases in both groups.

Size of polyps (In mm)	MR Colonography (n=42)	Conventional Colonoscopy (n=42)	p-value
<10mm	19	24	>0.05
>10mm	29	30	>0.05
Total	48	54	

[Table/Fig-2]: Number and size of colonic polyps detected by MR Colonography and conventional colonoscopy.

MR Colonography	Conventional colonoscopy	
	Positive (>10mm)	Negative (>10mm)
Positive (>10mm)	32	02
Negative (>10mm)	07	01

[Table/Fig-3]: Lesion detection sensitivity by MR Colonography and conventional colonoscopy.

for colonic polyp detection but examination is unpleasant with a particular risk of complications. A new methods like MR and CT based Colonography depicts the colon by sectional volume imaging data [12,13]. MRC is an even less invasive method without any ionizing radiation [7]. Most of the studies concentrating on CT based imaging and comparison between types of MRC, but this study focused on comparison of bright lumen MRC with Conventional colonoscopy.

A total of 42 cases were recruited. Among the cases 24 (57.2%) cases had familial background and 18 (42.8%) cases without the familial background of colonic polyps. In both groups, majority cases were in between the age group 21-40 years [Table/Fig-1]. All 42 cases underwent for conventional colonoscopy and data was available. Conventional colonoscopy data was considered as reference data.

In the present study, MR Colonography failed to identify 5 adenomatous polyps of <10mm in 3 cases and 1 polyp of >10mm size in one case, whereas conventional colonoscopy identified six of these adenomatous polyps. The findings were statistically not significant (p>0.005). A study by Giuseppe Pappalardo et al., on 70 cases found that, MR Colonography depicted eight cases as negative for lesions, whereas, conventional colonoscopy depicted three of these eight cases having lesions and five cases were negative for lesions [14].

In lesion detection sensitivity by both radiological methods showed that the true positive value is 32, false positive value is 02, false negative value is 07 and true negative value is 01 [Table/Fig-3]. A study by Giuseppe Pappalardo et al., on 70 cases stated that, MR Colonography ranked best diagnosed ability and is detected 53 true-positive, 2 false-negative, 14 true-negative, and 1 false-positive [14].

Schoenenberg AW et al., in his study stated that, MR Colonography showed 87% sensitivity, 96% specificity, 93% positive predictive value and 92% negative predictive value. In continue, sensitivity for < 5 mm polyps was 70% and > 5mm polyps were 95% [15]. A study by Luboldt W et al., on 23 cases, showed that MR Colonography was correctly illustrated

9 mass lesions >10 mm and 4 of 10 polyps 5-10 mm. None of the polyps < 5mm were illustrated [16, 17]. In this study, MR Colonography showed sensitivity 82.04%, specificity 84.66%, Positive predictive value 93% and Negative predictive value 61% [Table/Fig-4].

Result	MRC
Sensitivity	82.04%
Specificity	84.66%
Positive predictive value	93%
Negative predictive value	61%
Accuracy	80.01%

[Table/Fig-4]: Evaluation of outcome of the present study.

## LIMITATIONS

This study limited the analyses to the efficacy of MRC and CC in minimal number of cases, but more sample size and comparison with modern techniques like dark lumen with 3D virtual colonoscopy etc. is need to determine the gold standard method.

## CONCLUSION

Colonic polyps a leading condition of the large intestine, newly developed non-invasive methods, such as CT and MR Colonography, conventional colonoscopy and double-contrast colonography are considered as effective screening tools for this condition. The outcome of this study concluding that, MR Colonography has moderate sensitivity and specificity than conventional colonoscopy. Patient acceptance of MR Colonography was less when compared to conventional colonoscopy. But in few cases conventional colonoscopy could not reach caecum and MR Colonography played a vital role in detection. MRC is a good alternative to other colorectal cancer screening method as it is non-invasive.

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