

Comparison of Ct Colonoscopy and Conventional Colonoscopy in Patients with Lower Gastrointestinal Tract Symptoms

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ABSTRACT

To estimate the accuracy of CT colonoscopy in patients with lower GI symptoms who have been referred to the department of radiology from the department of gastroenterology at Sree balaji medical college and hospital, Chennai. To compare the findings obtained from CT colonoscopy with conventional colonoscopy and provide better understanding about the use of CT colonoscopy in regular practice and determine the utility, advantages and limitations of virtual colonoscopy in detection and diagnosis of colonic pathologies. In our study CT colonoscopy 80 % sensitivity of detecting hemorrhoids which was lesser compared to that of conventional colonoscopy. CT colonoscopy detected that 38% of the patients had extra colonic findings of which the predominant finding was renal calculi. Patient acceptability was better in our study and there was no need for sedation and analgesics.

Keywords: colonoscopy, radiology, tomography and colon lesions

INTRODUCTION

Colorectal pathologies are one of the most common debilitating illnesses in the society. Conventional colonoscopy is still being considered the gold standard of evaluating colonic pathologies but conventional colonoscopy is an invasive procedure with patient discomfort being one of the key disadvantages.

In the last decade, computed tomographic (CT) colonoscopy, a new cross-sectional technique for imaging of the colon, emerged. CT colonoscopy has potential advantages over colonoscopy and double-contrast barium enema examination: multiplanar capabilities, detection of enhancing lesions that make the distinction between fecal residue and true lesion possible, and

ante- and retrograde virtual colonoscopy. [1-3]CT colonoscopy generates a large number of source images, which have to be read carefully for filling defects and wall thickness and, if intravenous contrast material is used, enhancing lesions. An important postprocessing technique is multiplanar reformatting, which allows the viewer to see potential lesions in an orientation other than that of the source images. Virtual colonoscopy, a volume rendering technique that generates images from within the colon lumen, is used for problem solving. Currently, a number of studies suggest that patients have a preference for CT colonoscopy over colonoscopy.[4,5]

Virtual colonoscopy is a new method of imaging the colon in which thin-section, helical computed tomography (CT) is used to generate high-resolution, two-dimensional axial images. Three-dimensional images of the colon, simulating those obtained with conventional colonoscopy, are then reconstructed off-line. Studies suggest that this technique may be an attractive alternative to existing screening tests for colorectal cancer, since it is relatively safe and minimally invasive.[6]

We conducted a prospective study of the diagnostic performance of CT colonoscopy, as compared with conventional colonoscopy performed on the same day.

1. METHODOLOGY

SOURCE OF DATA:

This is a comparative study done on a minimum of 50 patients with lower GI symptoms, referred for CT colonoscopy to the Department of Radio Diagnosis at Sree Balaji Medical College & Hospital. The study period will be 2 years (August 2016 – October 2018).

METHODS OF COLLECTION OF DATA:

Duration of study: 2 years (August 2016 to October 2018)

Sample size : 50 cases

Inclusion criteria : All patients with lower GI symptoms were included (Age group > 20 years)

Exclusion criteria: Asymptomatic individuals; Children and pregnant women.

Methods: All patients will be subjected to CT

colonoscopy and followed up by conventional colonoscopy.

Imaging protocols and Procedure:

Patients of the inclusion criteria were referred from the department of gastroenterology and after

overnight fasting on empty stomach CT colonoscopy is done using HITACHI ECLOS 8 SLICE SCANNER. Patient was placed in supine position and manual insufflations of colon was done.

Scanning parameters:

All patients were examined in cranio-caudal direction starting from the level of the diaphragmatic cupola down to the anus.

Slice thickness 2.5 mm, Pitch factor 2:1 Milliampere 200 mAs,

Kilo volt 120 to 150 kv, matrix 512 · 512.

Range for scanning time 20 to 30 s,

Field of view Full Reconstruction interval 1.25 mm.

The colon was insufflated by gentle squeezing of the BP cuff using room air, until the patients stated they were full or ~15 to 20 manual compressions. The adequacy of air insufflations was evaluated with a CT scout view, with more air insufflated if required. Bowel distension with air till cecum was considered adequate. Now the patient is made to lie down prone and scout view taken to look for if additional air insufflations were necessary. When air insufflations is satisfactory then image acquisition in prone position is done.

Data analysis

All the data acquired from the examination including the scanograms supine and prone acquisitions were transferred to work station unit.

INTERPRETATION OF DATA:

STUDY WILL BE EVALUATED FOR

Bowel wall thickening: Diffuse/ circumferential / irregular

Polyp : Present / absent

Will be carried out by the gastroenterologist for all cases and lesions were resected and sent for histopathological confirmation.

Research hypotheses:

Findings of CT colonoscopy compare and correlate well with the conventional colonoscopy patients in patients with lower GI symptoms.

Data Analysis:

Comparative study

2. RESULTS

Table 1 – Age distribution

Age group	No. of cases	%
21-30	03	6%
31-40	15	30%
41-50	14	28%
51-60	18	36%
Total	50	100%

Table shows the distribution of various age groups in the cases taken for the study. Majority of the patients come under age group of 51-60 years (36%) followed by the 41- 50 years age group (28%).

Figure 1: showing the ratio of Male and female in the cases taken understudy.

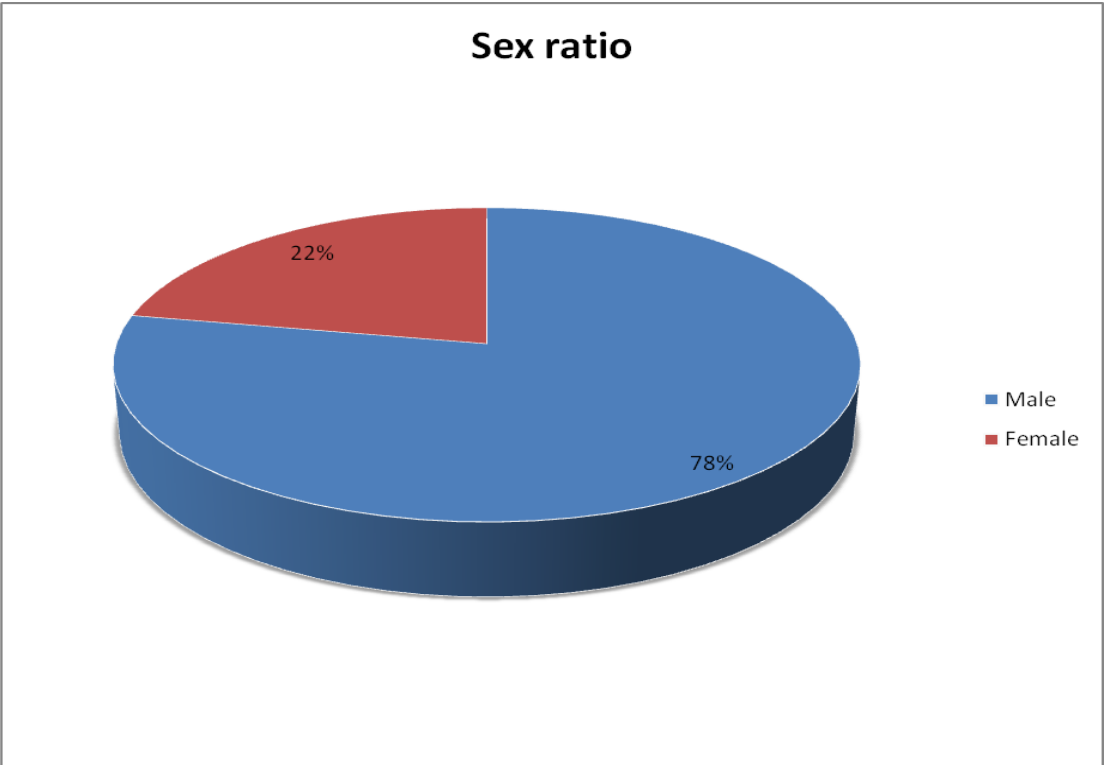


Figure 2: Anatomical Prevalence of Lesions(percentage)

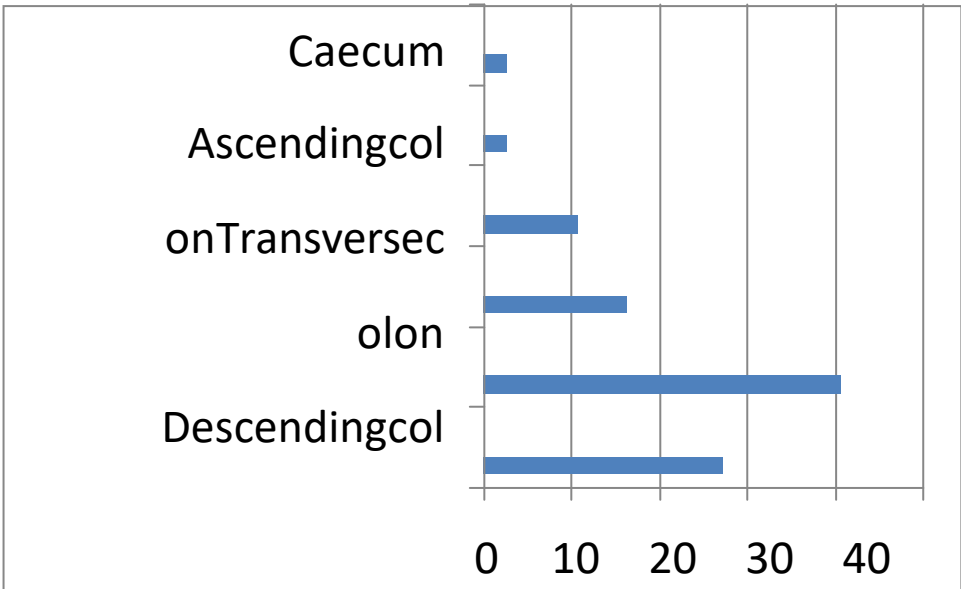


Figure 3: showing distribution of age groups among male and female cases.

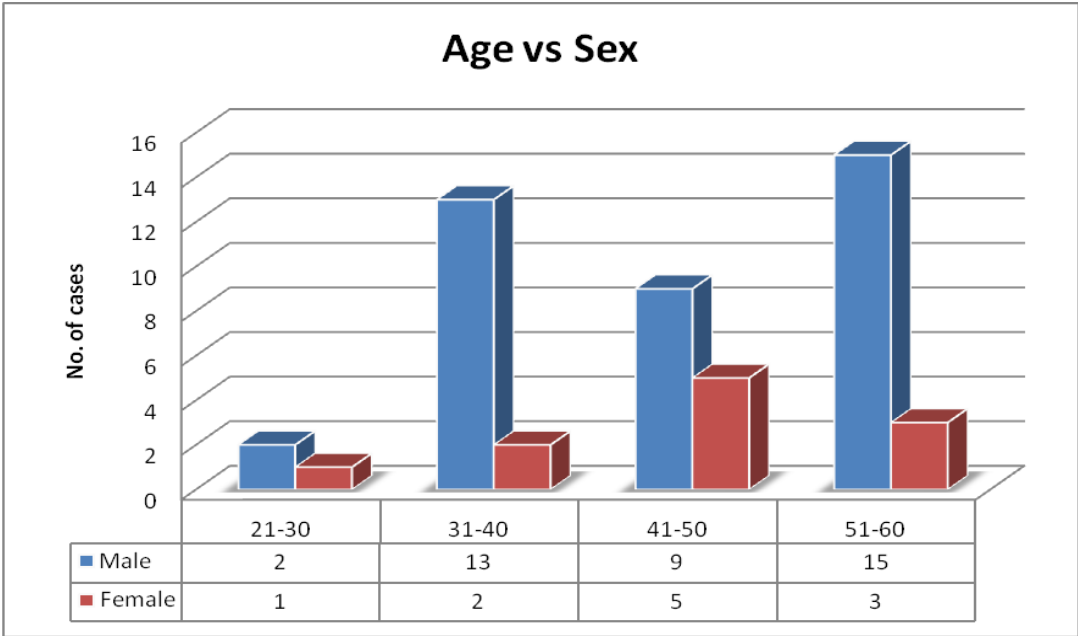


Figure 4: A case of 25 year old male with complaints of difficulty during defecation



A.Scannogram



B. CoronalCT

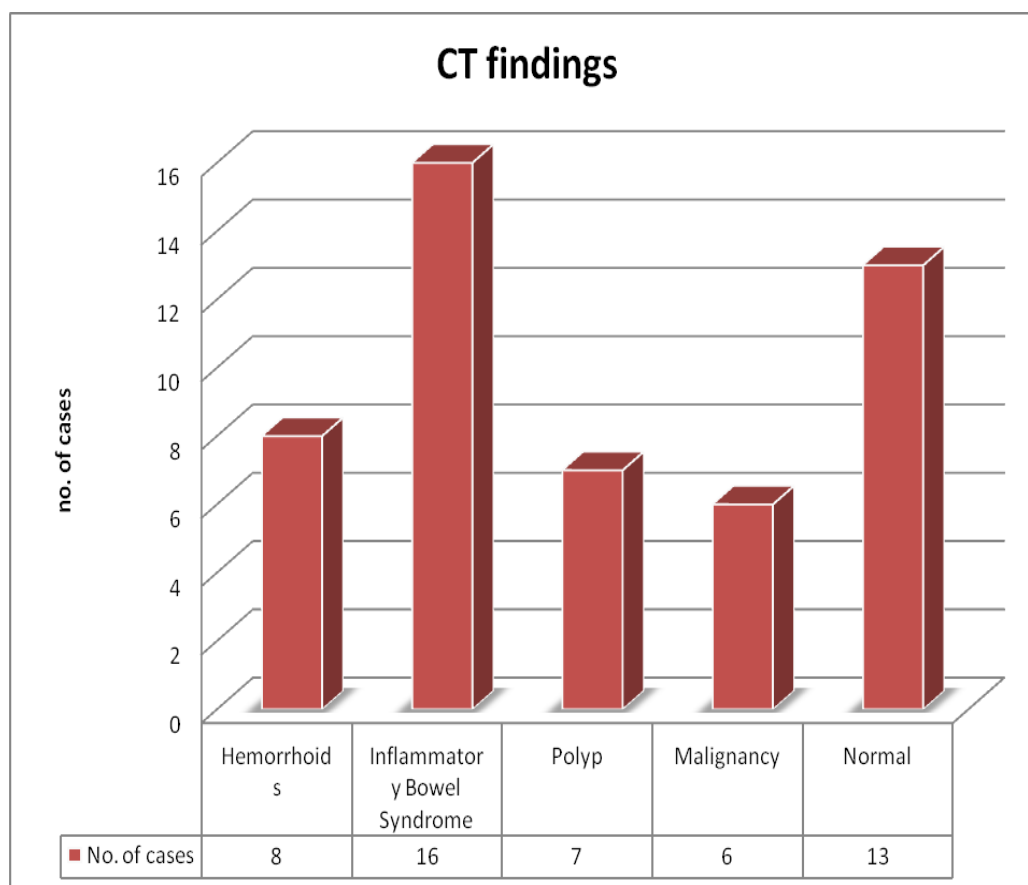
Table 2 – Conventional Colonoscopy findings

The conventional colonoscopy findings showed incidences of various conditions in the cases, where maximum findings were of Inflammatory Bowel disease (32%), followed by Hemorrhoids (20%). The incidence of Polyp findings were 18%, Adenocarcinomas (malignancy) were 12% and rest cases showed no significant findings.

Colonoscopy findings	No. of cases	Percentage
Inflammatory Bowel Syndrome	16	32%
Hemorrhoids	10	20%
Polyp	09	18%
Malignancy	06	12%
Normal	09	18%
Total	50	100%

- Conventional Colonoscopy findings

Figure 5: Shows the CT findings

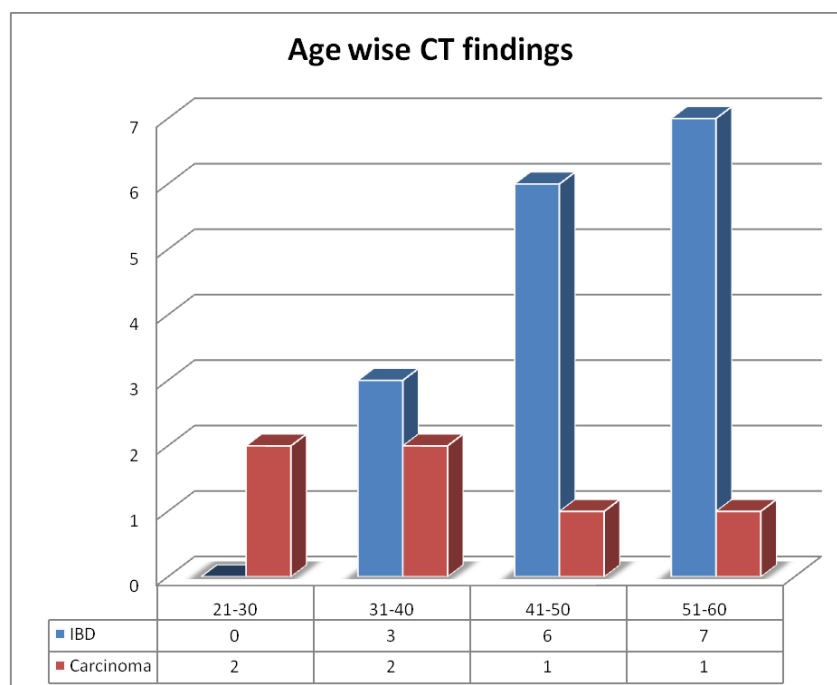


The virtual colonoscopy/ CT findings showed incidences of various conditions in the cases, where maximum findings were of Inflammatory Bowel disease (32%), followed by Hemorrhoids (16%). The incidence of Polyp findings were 14%, Colorectal malignancies were 12% and rest cases showed no significant findings.

Table 3; Comparison of Sensitivity of CT and Conventional colonoscopy in detection of various incidences

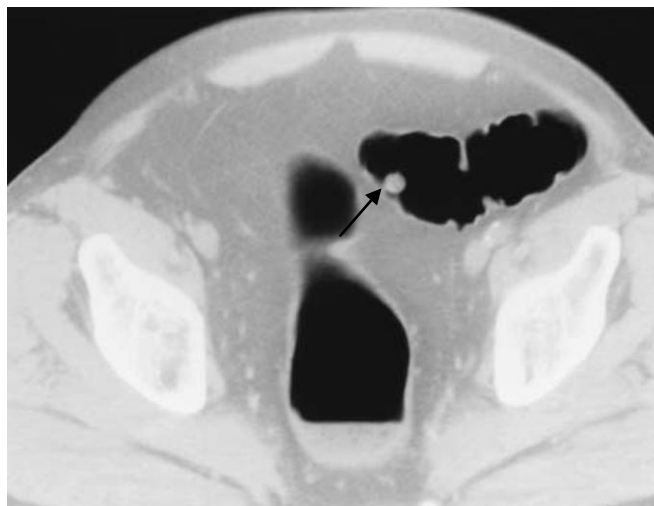
Incidence	No. of findings		True no. of findings	Sensitivity	
	CT	Conventional		CT (%)	Conventional (%)
Inflammatory BowelDisease	16	16	16	100%	100%
Hemorrhoids	08	10	10	80%	100%
Polyp	07	09	09	77.78%	100%
Carcinoma (malignancy)	06	06	06	100%	100%

Figure 6 :Age wise distribution of IBD and malignancy for CTfindings



Age wise distribution of malignancies shows 66.6% of the cases were less than 40 years of age. Inflammatory bowel disease showed predominance in age group more than 40 with 81.25% of cases more than 40 years of age.

Figure 7: A case of 30 year old male with complaints of pain during defecation



a)



b)

A) Axial CT shows an 8mm polyp in the sigmoid colon (arrow in A).The polyp was confirmed on conventional colonoscopy (arrow in b) performed the same day.

3. DISCUSSION

This study was conducted in 50 patients with lower GI symptoms who were referred to the department of radiodiagnosis. Among the 50 patients in our study, 37 patients had pathologies on CT colonoscopy with the most common being inflammatory bowel disease found in 32 % of the patients included in the study. CT colonoscopy had 100% sensitivity and specificity in detecting the inflammatory bowel disease which is similar to that of the conventional colonoscopy. There has been no similar comparisons done in any previous studies as far as our knowledge is concerned.[8] In a study by Ayman Osama et al, more prevalent lesions were found in sigmoid colon accounting for 46.4% of lesions, while 10.7% were seen in the rectum, 3.5% in the descending colon, 3.5% in the splenic flexure, 10.7% in the transverse colon, 3.5% in the hepatic flexure, 10.7 % in the ascending colon and 10.7% in the cecum. Similarly in our study lesions were more prevalent in the sigmoid colon accounting for 40.5% of the lesions, while 27.1 % of the lesions were seen in the rectum and colon, 16.2% lesions in descending colon, 10.8% in transverse colon, 2.7% each in ascending colon and cecum.[9]

Riss S et al in his prospective study among 976 patients found out the incidence of hemorrhoids was 38.93%, which is higher compared to our study. Our study indicates 20% incidence of hemorrhoids. In another cross sectional study conducted by Najjar F. A. et al among 1800 patients the incidence of hemorrhoids was 9.08 % which is lower compared to the 20% incidence in our study. In our study comparison of the CT and conventional colonoscopy shows CT colonoscopy has 80% sensitivity in detecting hemorrhoids compared to the 100 % sensitivity in conventional colonoscopy. To our knowledge such a comparative study for hemorrhoids has not been done earlier. Most of the literature dictates that colorectal polyps are more common in males compared to females. This was confirmed in our study that a predominant male population was involved with 3.5:1 male to female ratio. This result matches with that of Van Gelder et al study.[10]

Ayman Osama et al in his study of role of CT virtual colonoscopy versus conventional colonoscopy in the evaluation of colonic polyps among 35 patients has sensitivity of 87% in polyp detection. In our study the sensitivity of polyp detection was 77% which is comparatively lower than the study by Ayman et al. White TJ1 et al in their study Virtual colonoscopy vs conventional colonoscopy in patients at high risk of colorectal cancer--a prospective trial of 150 patients concluded that virtual colonoscopy was an effective and safe method for evaluating the bowel and was the investigation of choice amongst patients surveyed. Virtual colonoscopy identified 19

cancers-with a sensitivity and specificity of 100% and 99.2% respectively. In our comparative study of CT vs Conventional colonoscopy , CT colonoscopy identified 6 cancers with a 100% sensitivity. and specificity which showed improved specificity and sensitivity compared to the study conducted by white TJI et al.[11]

All the cases of malignancies were further evaluated for the presence of pericolic / perirectal fat stranding and peri rectal lymphnodes , in which all the 6 cases showed the involvement of the perirectal fat stranding and peri rectal lymph nodes. Further staging by evaluation of the fat plane between the rectum and the bladder, between the rectum and the prostate were also done. Hepatic metastases in a patient with colorectal malignancy was also detected.Perry J. Pickhardt et al in his study of 30 patients with colorectal cancer where the systematic review and meta analysis of detection of colorectal cancer by CT colonography and colonoscopy was done concluded computed tomography colonography was highly sensitive for colorectal cancer which is in concordance with our study.[12-15]Michel et al in his study of prospective comparison of thin low dose multi detector row CT colonography and conventional colonoscopy among 296 patients 13.2 % had extracolonic findings (13.2%), varying in nature including aneurysmal dilatation of the aorta, vertebral changes, hemangiomas in the liver and pancreatic pseudocysts.[16-19]

In our study only four patients (8%) complained of abdominal discomfort. It was also found only verbal reassurance was sufficient in these patients and the study could be completed without any sedatives or analgesics. Ayman osama et al in his study has described ~ 20% (7 patients out of 35) felt discomfort and similar to our study no patient needed sedatives or analgesic.

4. CONCLUSION

CT Colonoscopy is an excellent, minimally invasive method of investigation of lower GI pathologies with equal sensitivity in detecting malignancy and inflammatory bowel disease as compared to the gold standard conventional colonoscopy. In addition to the detection of the lesion CT colonoscopy can evaluate the locoregional extent of the lesion and gives us the information about any extra colonic incidental findings which may help the clinicians to provide further management to the patients. However conventional colonoscopy will still be a necessary tool for evaluation of colonic pathologies due to its concurrent excision of lesion which will be helpful for the histopathological correlation.

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Ethical approval: The study was approved by the Institutional Ethics Committee

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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