

Research Article



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**ASSESSING THE SIGNIFICANCE ON ENDOSCOPY OF THICKENING OF LARGE BOWEL WALL ON ABDOMINAL COMPUTED TOMOGRAPHY IN SUBJECTS WITH NO PRIOR HISTORY OF GASTROINTESTINAL DISEASE**

**Dr. Rakesh Kumar Rai,<sup>1</sup> Dr. Amitkumar Madhusudan Bagdia<sup>2\*</sup>**

<sup>1</sup>Assistant Professor, Department of General Surgery, Rama Medical College Hospital & Research Centre, Hapur, Uttar Pradesh

<sup>2\*</sup>Assistant Professor, Department of General Surgery, Saraswati Institute of Medical Sciences, Hapur, Uttar Pradesh

**Corresponding Author**

Dr. Amitkumar Madhusudan Bagdia

Email Id- [rajkumar2410@gmail.com](mailto:rajkumar2410@gmail.com)

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**ABSTRACT**

**Background:** Computed tomography (CT) is a safe and effective imaging technique utilised in most disorders, including those of the abdomen. When a client undergoes an abdominal CT scan without a prior history of gastroenterological illness, BWT (bowel wall thickness) is seen. The relevance of this general result is still unclear, though.

**Aim:** The purpose of this study was to evaluate the impact of large bowel thickness on abdominal CT by comparing the results with a diagnosis made by colonoscopy.

**Methods:** In CT, those who had a colonoscopy during the previous 30 days and had a CECT finding of thickened large intestine wall were evaluated. Experts in the area performed colonoscopies on all individuals after routine bowel preparation. When necessary, biopsies were performed on the participants, and all results were documented. Those having a history of gastrointestinal (GI) disorders, such as diverticulitis, infectious colitis, tuberculosis, inflammatory bowel disease, and/or colon cancer, were excluded.

**Results:** Of normal coloscopy individuals, 40% (n=12) showed diffuse involvement, 20% (n=6) showed rectum and sigmoid colon involvement, 16.66% (n=5) showed descending colon involvement, 10% (n=3) showed transverse colon involvement, and 13.33% (n=4) showed ascending colon involvement. Diffuse involvement was seen in 19.64% (n=11) of the abnormal coloscopy group participants, rectum and sigmoid colon in 30.35% (n=17) of the subjects, descending colon in 21.42% (n=12) of the subjects, transverse colon in 10.71% (n=6) of the subjects, and ascending colon in 17.85% (n=10) of the research subjects. Among the subjects exhibiting abnormal wall thickness, the CECT findings ultimately led to the diagnosis of ischemic colitis and non-specific colitis in 5.81% (n=5), diverticulitis in 6.97% (n=6), inflammatory bowel disease in 8.13% (n=7), tuberculosis in 8.13% (n=7), and colon cancer in 12.79% (n=11) of the study participants, respectively.

**Conclusion:** The current study concludes that, in subjects without a history of gastrointestinal disorders, there is a high predictive value of bowel wall thickening assessed on CT for abnormal findings on colonoscopy, including conditions like intestinal tuberculosis, inflammatory bowel disease, and/or colorectal cancer. Results from CECT, such as focus wall thickening greater than 7 mm and haemoglobin less than 10 g/dl, can be used to predict favourable colonoscopy results in patients who have colonic thickening on CT.

**Keywords:** CT, CECT, bowel-wall thickness, colonoscopy, abdominal computed tomography Introduction

## INTRODUCTION

Computed tomography (CT) is a frequently utilised and dependable imaging modality in patients who arrive to emergency room with significant abdominal discomfort for unexplained reasons. Bowel wall thickening, which is often seen on abdominal-pelvic CT, is one of the prevalent findings on abdominal CT in patients with abdominal discomfort of uncertain aetiology. CT-detected parameters such as lymphadenopathy, fat stranding, extraluminal abnormalities, diffuse/focal involvement, symmetry, attenuation pattern, and/or degree of thickening are often utilised to evaluate the thickening of the intestinal wall. One of the most frequent reasons for a visit to the gastroenterologist is thickening of the bowel wall on CT imaging, which necessitates endoscopic assessment.<sup>1</sup>

These factors mean that intestinal wall thickening results in colonoscopies, which put patients at high risk and have an impact on their quality of life and medical treatment. Furthermore, the American Society of Gastrointestinal Endoscopy does not recognise or accept results from literature data as a justification for endoscopy, and the clinical relevance of gut wall thickening is poorly known. There are no precise criteria for a colonoscopic assessment of people who exhibit BWT on CT imaging in Indian settings. Because of the limited sample size and diverse population under study, the data from previous research has little therapeutic importance. However, intestinal wall thickness was measured as an unintentional finding in the majority of the investigations, and symptomatic people were not measured.

The thickness of the gut wall typically indicates the presence of an underlying medical condition, such as colon ischemia, colorectal cancer, as well as inflammatory bowel disease (IBD).<sup>2</sup> The degree of intestinal distension can have a significant impact on the typical thickness of the colonic wall. The colonic wall thickness in patients with dilated colons might be less than 3 mm. intestinal wall thicknesses might appear irregularly on CT scans in circumstances of partial intestinal distension or collapse. It could be challenging to measure the gut wall thickness if there is blood, faeces, or superfluous colon. A 2/3mm scale is seldom used in published data as the upper limit to determine the typical thickness of the intestinal wall.

Conversely, some researchers regarded any detectable thickness as aberrant.<sup>3</sup> With a comparison based on the colonoscopic diagnosis, the purpose of the current study was to evaluate the importance of large bowel thickness on the abdominal CT scan.

## MATERIALS AND METHODS

The goal of the current retrospective clinical investigation was to evaluate the importance of large bowel thickness on abdominal CT by comparing the results with the diagnosis made during a colonoscopy. The individuals who visited the Institute's department of radiodiagnosis made up the study population. Information about pathological, endoscopic, and radiologic characteristics was taken from the institute and applied to all of the individuals who were included.

Subjects who showed thickening intestinal wall on CECT examination, those who were willing to participate in the study, those who were older than 20, and those who had a colonoscopy done within 30 days of a CT scan were the study's inclusion criteria. Subjects with a history of ascites, diverticulitis, infectious colitis, tuberculosis, IBD, and/or colon cancer were excluded from the research. All research individuals had thorough examinations and histories following final enrollment. The colonic wall was measured starting from the outside margin and working its way within. Additional factors evaluated were symmetry, which was classified as either symmetric or asymmetric.

Furthermore, the colonic segment was characterised as diffuse for more than 30 centimetres, segmental for 10–30 cm, and focal for only a few centimetres. Additionally, pericolic stranding and regional lymphadenopathy were identified as related perienteric abnormalities. Colonic wall thickening was categorised as moderate for thicknesses between 7 and 12 mm, severe for thicknesses greater than 12 mm.

Using SPSS software version 21 (Chicago, IL, USA) for statistical assessment and one-way ANOVA and t-test for result formulation, the gathered data were examined. The data were presented as a mean, standard deviation, percentage, and number. At  $p < 0.05$ , the significance threshold was maintained.

## RESULTS

The goal of the current retrospective clinical investigation was to evaluate the importance of large bowel thickness on abdominal CT by comparing the results with the diagnosis made during a colonoscopy. Table 1 lists the demographic and illness features of the participants with and without abnormal colonoscopy results. Thirty of the 86

participants had normal coloscopy results, whereas the remaining 56 subjects had aberrant results. For both normal and abnormal coloscopy, the research individuals' mean age was  $52.54 \pm 10.44$  and  $57.28 \pm 8.63$  years, respectively. In the normal coloscopy group, there were 46.66% (n=14) men and 53.33% (n=16) females; in the abnormal coloscopy group, there were 42.85% (n=24) males and 57.14% (n=32) females, respectively.

30% (n = 9) and 28.57% (n = 16) of the participants with normal and abnormal colonoscopies, respectively, had increased CRP levels. The WBC count was  $8700 \pm 782$  and  $9610 \pm 614$  for the normal and bad coloscopy groups, respectively, while the mean serum albumin was  $3.8 \pm 0.7$  and  $3.5 \pm 0.8$ . The relative ESRs were  $23 \pm 11.4$  and  $35 \pm 8.9$ . Haemoglobin levels in the normal and abnormal coloscopy groups were  $11.3 \pm 4.4$  and  $9.7 \pm 3.4$  g/dl, respectively. Thirty (n = 9) and twenty-nine (n = 29) research participants with normal and aberrant coloscopy, respectively, had haemoglobin  $< 10$ g/dl. In 63.33% (n=19) and 60.71% (n=34) of research participants with normal and abnormal coloscopy results, respectively, the most prevalent presenting symptom was stomach discomfort (Table 1).

Upon evaluating the CECT results for the research participants, pericolic fat stranding was observed in 23.33% (n=7) of the patients with normal CECT results and in 23.21% (n=130) of the subjects with bad CECT results for coloscopy. Only 13.33% (n=4) of the participants with normal coloscopy showed pericolic lymphadenopathy, compared to 35.71% (n=20) of the subjects with abnormal colposcopy. Within the group undergoing normal colonoscopy, 46.66% (n=14) of the participants had wall thicknesses between 4-6 mm, whereas 13.33% (n=4) of the subjects had wall thicknesses more than 12 mm. In the group with abnormal coloscopy, 41.07% (n = 23) of the participants had a common wall thickness of 7–12 mm, whereas 28.57% (n = 16) of the subjects had a wall thickness of  $> 12$  mm.

50% (n=15) of the participants with normal coloscopy and 58.92% (n=33) of the subjects with abnormal coloscopy findings showed asymmetry. Focal thickening was observed in 33.33% (n=10) of the normal coloscopy group, followed by diffuse in 40% (n=12) and segmental in 26.66% (n=8) of the research participants. Table 2 shows that among study participants with abnormal coloscopy, localised thickening was most frequently observed in 40.69% (n = 35), segmental in 31.39% (n = 27), and diffuse in 27.90% (n = 24).

After the segments were evaluated, it was seen that in normal coloscopy participants, the diffuse colon was present in 40% (n=12) subjects, the rectum and sigmoid colon in 20% (n=6) subjects, the descending colon was present in 16.66% (n=5) subjects, the transverse colon was present in 10% (n=3) respondents, and the ascending colon was present in 13.33% (n=4) study subjects. Table 3 displays the diffuse involvement observed in 19.64% (n=11) of the abnormal coloscopy group subjects, rectum and sigmoid colon in 30.35% (n=17) of the subjects, descending colon in 21.42% (n=12) of the subjects, transverse colon in 10.71% (n=6) of the subjects, and ascending colon in 17.85% (n=10) of the study subjects.

As shown in Table 4, among the study subjects with abnormal wall thickness, the final diagnosis based on CECT findings revealed that 5.81% (n=5) had ischemic colitis and non-specific colitis, 6.97% (n=6) had diverticulitis, 8.13% (n=7) had inflammatory bowel disease, 8.13% (n=7) had tuberculosis, and 12.79% (n=11) had adenocarcinoma colon.

## DISCUSSION

The goal of the current retrospective clinical investigation was to evaluate the importance of large bowel thickness on abdominal CT by comparing the results with the diagnosis made during a colonoscopy. Upon evaluating the CECT results for the research participants, pericolic fat stranding was observed in 23.33% (n=7) of the patients with normal CECT results and in 23.21% (n=130) of the subjects with bad CECT results for coloscopy.

Only 13.33% (n=4) of the participants with normal coloscopy showed pericolic lymphadenopathy, compared to 35.71% (n=20) of the subjects with abnormal colposcopy. Within the group undergoing normal colonoscopy, 46.66% (n=14) of the participants had wall thicknesses between 4-6 mm, whereas 13.33% (n=4) of the subjects had wall thicknesses more than 12 mm. In the group with abnormal coloscopy, 41.07% (n = 23) of the participants had a common wall thickness of 7–12 mm, whereas 28.57% (n = 16) of the subjects had a wall thickness of  $> 12$  mm. 50% (n=15) of the participants with normal coloscopy and 58.92% (n=33) of the subjects with abnormal coloscopy findings showed asymmetry.

Focal thickening was observed in 33.33% (n=10) of the normal coloscopy group, followed by diffuse in 40% (n=12) and segmental in 26.66% (n=8) of the research participants. The majority of people (40.69%; n = 35) with abnormal coloscopy had focal thickening, followed by segmental (31.39%; n = 27) and diffuse (27.00%; n = 24) study

participants. These findings aligned with those of Eskaros S et al. (2009) and Wolff GH et al. (2008), who observed similar CECT findings in persons exhibiting both aberrant and normal CECT findings.

The evaluation of the segments revealed that, among normal colonoscopy subjects, the diffuse colon was observed in 40% (n=12) subjects, the rectum and sigmoid colon in 20% (n=6) subjects, the descending colon in 16.66% (n=5) subjects, the transverse colon in 10% (n=3) subjects, and the ascending colon in 13.33% (n=4) study subjects, respectively. Diffuse involvement was seen in 19.64% (n=11) of the abnormal colonoscopy group participants, rectum and sigmoid colon in 30.35% (n=17) of the subjects, descending colon in 21.42% (n=12) of the subjects, transverse colon in 10.71% (n=6) of the subjects, and ascending colon in 17.85% (n=10) of the research subjects. These outcomes were in line with those of studies conducted by S. S. Al-Khowaiter et al. in 2014 and Khan S et al. in 2016, whose authors indicated comparable segment participation.

The final diagnosis based on CECT findings for subjects with abnormal wall thickness revealed that 5.81% (n=5) of the study subjects had ischemic colitis and non-specific colitis, 6.97% (n=6) had diverticulitis, 8.13% (n=7) had inflammatory bowel disease, 8.13% (n=7) had tuberculosis, and 12.79% (n=11) had colon cancer. These findings were in line with those of Akbulut UE et al. (2016) and Modi Rs et al. (2012), who reported diagnosing patients with aberrant abdominal wall thickness using CECT data.

### CONCLUSION

Within its limitations, the present study concludes that CT findings in subjects with bowel wall thickness are a reliable and helpful diagnostic modality that helps in managing and planning the treatment modalities. CT assessment of bowel wall thickening has high predictive values in subjects with abnormal findings on colonoscopy including intestinal TB, inflammatory bowel disease, and/or colorectal malignancy. However, the present study had a few limitations including small sample size, short monitoring period, and geographical area biases. Hence, more longitudinal studies with larger sample size and longer monitoring period will help reach a definitive conclusion.

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### TABLES

S. No	Characteristics	Normal colonoscopy subjects (n=30)		Abnormal colonoscopy subjects (n=56)	
		%	n	%	n
1.	Mean age	52.54±10.44		57.28±8.63	
2.	Gender				

a)	Males	46.66	14	42.85	24
b)	Females	53.33	16	57.14	32
3.	Elevated CRP	30	9	28.57	16
4.	Serum Albumin	3.8±0.7		3.5±0.8	
5.	WBC count	8700±782		9610±614	
6.	ESR	23±11.4		35±8.9	
7.	Hemoglobin (Hb) <10g/dl	30	9	51.78	29
8.	Mean Hb	11.3±4.4		9.7±3.4	
9.	Abdominal pain	63.33	19	60.71	34

**Table 1: Demographic and disease characteristics of the study subjects with normal and abnormal findings on colonoscopy**

S. No	CECT findings	Normal colonoscopy subjects (n=30)		Abnormal colonoscopy subjects (n=56)		Total (n=86)	
		%	n	%	n	%	n
1.	Pericolic Fat stranding	23.33	7	23.21	13	23.25	20
2.	Pericolic Lymphadenopathy	13.33	4	35.71	20	27.90	24
3.	Wall thickness (mm)						
a)	4-6	46.66	14	30.35	17	36.04	31
b)	7-12	36.66	11	41.07	23	39.53	34
c)	>12	13.33	4	28.57	16	23.25	20
4.	Symmetry						
a)	Asymmetrical	50	15	58.92	33	55.81	48
b)	Symmetrical	50	15	41.07	23	44.18	38
5.	Thickening						
a)	Focal	33.33	10	44.64	25	40.69	35
b)	Segmental	26.66	8	33.92	19	31.39	27
c)	Diffuse	40	12	21.42	12	27.90	24

**Table 2: CECT findings comparison in the study subjects with normal and abnormal findings on colonoscopy**

S. No	Segments	Normal colonoscopy subjects (n=30)		Abnormal colonoscopy subjects (n=56)		Total (n=86)	
		%	n	%	n	%	n
1.	Diffuse	40	12	19.64	11	26.74	23
2.	Rectum and Sigmoid colon	20	6	30.35	17	26.74	23
3.	Descending colon	16.66	5	21.42	12	19.76	17
4.	Transverse colon	10	3	10.71	6	10.46	9
5.	Ascending colon	13.33	4	17.85	10	16.27	14

**Table 3: CECT characteristic of the colonic wall thickening in the study subjects with normal and abnormal findings on colonoscopy**

S. No	Diagnosis	Percentage (%)	Number (n)
1.	Ischemic colitis	5.81	5
2.	Non-specific colitis	5.81	5
3.	Diverticulosis	6.97	6
4.	Inflammatory Bowel disease	8.13	7
5.	Tuberculosis	8.13	7
6.	Adenocarcinoma colon	12.79	11
7.	Colonic polyps	13.95	12

**Table 4: CECT based final diagnosis for colonic wall thickening in the study subjects**