



ENDOSCOPIC EVALUATION OF PATIENTS WITH COLONIC WALL THICKENING DETECTED ON COMPUTED TOMOGRAPHY

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SUMMARY – Colorectal wall thickening is a condition which is occasionally encountered on computed tomography (CT) investigations. Malignancies and inflammatory bowel disease (IBD) may be the most common and most important pathologies in some cases. Our objective in this study was to evaluate colonoscopy results in patients with increased colorectal wall thickness identified on CT. Patients with colorectal wall thickening detected on abdominal CT taken for different indications in different healthcare facilities between October 2009 and March 2015 were evaluated. These patients were referred to gastroenterology department, received colonoscopy, and the results were compared retrospectively and statistically. A total of 132 patients having undergone colonoscopy for colonic wall thickening detected on CT were evaluated retrospectively. With the colonoscopies performed, malignancies were detected in 38 (28.8%), Crohn's disease in two (1.5%), diverticulitis in 18 (13.6%) and colorectal polyp in 30 (22.7%) patients. Colonoscopy results were normal in 44 patients. All patients with colorectal malignancies were over 60 years of age, yielding a statistically significant figure ($p=0.01$). The mean hemoglobin level was 12.8 g/dL in patients with normal colonoscopy as compared with 9.5 g/dL in those with malignancies ($p=0.001$). On multivariate analysis, hemoglobin and age were the only significant variables to predict an abnormal result on endoscopy. Detecting colonic wall thickening on CT may indicate malignancy, especially in patients who are over 50 years of age and have hemoglobin values less than 10 g/dL.

Key words: *Colonoscopy; Computed tomography; Colonic wall thickening*

Introduction

Colorectal wall thickening is a condition that is occasionally encountered on computed tomography (CT) investigations. This finding is sometimes purely incidental and may have no clinical relevance¹. What approach should physicians follow in patients with colonic wall thickening detected on CT is not clear and many physicians cannot decide on the right course of action². The length of involvement, the degree of

mural thickening, the appearance of mesenteric vessels, mesenteric changes, lumen content and site of involvement are the parameters that are evaluated on CT³. Increased wall thickness may be seen on CT in inflammatory bowel diseases (IBD), ischemia or malignancy⁴.

Colonic wall thickness may be affected by some variables including intra-colonic distension, oral contrast agent not completely filling the lumen, and failure to fully evacuate intestinal content. Increased wall thickness associated with edema may also occur if the patient has another condition that may result in an underlying edema, including cirrhosis, heart failure, nephrotic syndrome and hypoalbuminemia⁵.

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In measurements of the gastrointestinal (GI) system wall thickness, the length of the involved segment together with the extent of wall thickening may provide preliminary information on the underlying condition. The involved segment being less than 5 cm is usually interpreted as malignancy, whereas if it is longer than 10 cm, it is considered to indicate IBD, ischemic colitis or infectious colitis. Involvements of 5 to 10 cm in length are interpreted as diverticulitis, Crohn's disease or ischemic colitis. Thickening along the whole colon and all-layer involvement also indicate primarily IBD⁶.

Sometimes there is no pathology in patients with increased GI wall thickness, while occasionally malignancies and IBD may be the most common and most important pathologies in some cases⁷. In addition to colonic wall thickness, the presence of filling defects in the intraluminal soft tissue, thinning of the adipose tissue surrounding the intestines, pathologic lymph nodes and tendency of wall thickness to increase on the follow-up imaging performed at least one month later suggests primarily a malignancy⁸.

Despite these findings, there is no algorithm to guide the physician on what to base their strategy or how to determine it. Our objective in this study was to evaluate colonoscopy results in patients with increased colorectal wall thickness identified on CT.

Patients and Methods

Study population

Patients with colorectal wall thickening detected on abdominal CT taken for different indications in different healthcare facilities between October 2009 and March 2015 were evaluated. These patients were referred to the gastroenterology department, received colonoscopy and the results were compared retrospectively. Demographic data, hemoglobin values, CT data and endoscopy results of the patients included in the study were recorded. An informed consent was obtained from all patients.

Indications for CT examination were as follows: abdominal pain, rectal bleeding, patients who had defecation changes and did not accept colonoscopy in the first place, and symptoms such as nausea, bloating and weight loss.

Colorectal wall thickening was defined as follows: ≥ 3 mm for the colon and ≥ 5 mm for the rectum were considered as increased wall thickness.

All patients started juicy diet 3 days before colonoscopy. At 7.00 pm and 9.00 pm on the day before the treatment, they drank 150 mL of sennoside A-B and applied 210 mL of sodium dihydrogen phosphate half an hour before the procedure.

Patients with known prior GI system pathology (malignancy, IBD, etc.), as well as those with conditions that may result in GI thickening secondary to edema, such as heart failure, cirrhosis, nephrotic syndrome and hypoalbuminemia, were excluded from the study. In addition, the results of patients whose colonic evacuation was not complete during colonoscopy were not included in the evaluation.

Statistical analysis

Statistical analyses were performed using the SPSS 21.0 software in this study. Patient demographic and clinical characteristics were expressed as mean \pm standard deviation (SD), median and percentage. Parametric data were evaluated using Student's t-test and non-parametric data with Mann-Whitney U and χ^2 tests. Statistical significance was set at $p < 0.05$.

Results

A total of 132 patients having undergone colonoscopy for colonic wall thickening detected on CT were evaluated retrospectively. There were 67 (50.7%) men and 65 (49.2%) women, median age 61 ± 4.6 (37-80) years. With the colonoscopies performed, malignancies were detected in 38 (28.8%), Crohn's disease in two (1.5%), diverticulitis in 18 (13.6%) and colorectal polyp in 30 (22.7%) patients. Colonoscopy results were normal in 44 (33.3%) patients (Table 1).

All patients with colorectal malignancies were over 60 years of age, which was statistically significant ($p = 0.01$). Median age of patients with Crohn's disease was significantly younger as compared to patients with normal colonoscopic findings ($p = 0.01$) (Table 2).

The mean hemoglobin level was 12.8 g/dL in patients with normal colonoscopy compared with 9.5 g/dL in those with malignancies ($p = 0.001$). The mean hemoglobin was 12.0 g/dL in patients with polyp compared with 12.8 g/dL in normal patients, yielding a statistically significant difference ($p = 0.007$). In patients with diverticulitis and Crohn's disease, the mean hemoglobin levels were significantly different from

Table 1. Demographic findings and colonoscopy results in patients with colonic wall thickness detected on computed tomography examination

	Number of patients N=132
Age (years)	61±4.6
Sex (female/male)	65/67
Hemoglobin (g/dL)	11.7±0.5 mg/dL
Symptom on admission:	
Abdominal pain	39 (29.5%)
Rectal bleeding	17 (12.8%)
Bloating	3 (2.3%)
Weight loss	33 (25.0%)
Defecation changes	26 (19.7%)
Nausea	14 (10.6%)
Condition:	
Colon cancer	38 (28.8%)
Crohn's disease	2 (1.5%)
Diverticulitis	18 (13.6%)
Polyp	30 (22.7%)
Normal	44 (33.3%)

Table 2. Mean patient age distribution according to location and condition in patients having undergone colonoscopy

Colonoscopy result	Mean age (years)	p
Normal	57.7	
Malignancy	69.3	p=0.01*
Crohn's disease	37.5	p=0.01*
Diverticulitis	63.7	p= 0.09*
Polyp	59.2	p=0.257*

*Compared to patients with normal colonoscopy findings

Table 3. Colonoscopy results and mean hemoglobin levels by location in patients having undergone colonoscopy

Colonoscopy result	Hemoglobin level	p
Normal	12.8 mg/dL	
Malignancy	9.5 mg/dL	p=0.001*
Crohn's disease	12.0 mg/dL	p=0.01*
Diverticulitis	12.1 mg/dL	p=0.01*
Polyp	12.0 mg/dL	p=0.007*

*Compared to patients with normal colonoscopy findings

those recorded in patients with normal colonoscopy (12.1 vs. 12.0 vs. 12.8 g/dL; p=0.01) (Table 3).

On multivariate analysis, hemoglobin and age were the only significant variables to predict an abnormal result of endoscopy.

Discussion

The rates with which pathologies are identified by endoscopic investigations after GI wall thickness was detected with imaging methods vary considerably across healthcare facilities. In a study in our country, malignancies or polyps larger than 1 cm were initially considered in 224 of 505 (44.4%) patients evaluated with CT, and colonoscopic follow-up confirmed the initial diagnosis in 204 (40.2%) (malignancy in 192 and polyps in 12) patients. In the same study, colonic wall thickening was considered to be indicating IBD in 214 (42.4%) patients, and colonoscopic follow-up demonstrated IBD in all of these patients (100%)³. The sensitivity and specificity of CT in detecting neoplastic pathology were quite high (95.6% and 90.4%, respectively) in this study. In the same study, the sensitivity and specificity of detecting IBD were greater, i.e. 97.2% and 97.9%, respectively. Relative to these quite successful rates in this study, the sensitivity of radiological imaging was lower in our study. This difference between units may be associated with the contrast agent used and the extent of how successfully the patients accomplished bowel evacuation, as well as the experience of the radiologist, particularly considering digestive system imaging.

In a study by Colvin *et al.*⁹, the sensitivity and specificity of CT in detecting colon cancer were 100% and 95.7%, respectively. In another study by Stermer *et al.*¹⁰ with 94 patients, wall thickening was detected by CT in 48 patients, with follow-up colonoscopy identifying pathologies in 34 (26 malignant and 8 benign) patients. The figures reported in this study are closer to those in our study. In a study by Nicholson *et al.*¹¹ with 94 patients, pathology was not observed in only 11%, while malignancies were observed in 26% and adenoma in 25% of study patients.

In a meta-analysis by Horsthuis *et al.*¹², there were quite high rates of success with 84.3% sensitivity and 95.1% specificity in patients with IBD. Only two patients were diagnosed with IBD in our study. This small number precluded statistical analysis.

In a meta-analysis of patients with detected diverticulitis, 95% sensitivity and 96% specificity are reported for colonoscopy¹³. It has been reported that diverticulitis was identified in 60% of patients aged >60 and in 10%-25% of those aged <62¹⁴. Given these figures, one may expect that diverticulitis should be detected more often. However, in our study, diverticulitis was identified in 18 patients but it was not considered as an initial diagnosis in any of these patients and only colonic wall thickening was reported as a result of CT procedure, therefore we could not provide sensitivity data. In another study, 394 patients were diagnosed with acute diverticulitis clinically and with CT but malignancy was identified in 2.7% of these patients as a result of colonoscopy. Other patients received surgical or medical treatment for acute diverticulitis diagnosis¹⁵.

On CT in patients with pseudomembranous colitis due to *Clostridium difficile* infection, colonic wall thickness varied between 0.5 mm and 16 mm^{16,17}. In patients with wall thickening due to ischemic colitis, thickness, as identified by CT, ranged between 6 mm and 17.5 mm and the mean value measured was 10.5 mm¹⁸. Ischemic or pseudomembranous colitis was not seen in our patients.

In a study by Al-Kowaiter *et al.*, colonoscopy was found to be normal in only 24% of 76 symptomatic patients with colonic wall thickening with no history of GI disease. IBD was identified in 20% and infectious colitis in 18%. The rate of detecting malignancy was 8%¹⁹.

When colonoscopy results were analyzed according to the location where pathology was detected, cecum (43.9%) and rectum (34.8%) were the colonic sites where thickening was most frequently observed. More effective cleaning by using an additional enema for rectal cleaning prevents misinterpretation of feces-stained areas as wall thickening. Failure to clean the cecum completely can lead to false observation of wall thickening in that area. Difference in the rates of detecting pathologies in the cecum and rectum may be associated with the cleanness of these areas.

The GI system wall thickness identified incidentally during imaging procedures performed for different reasons is clinically relevant. Mortality rates from colon cancer have been shown to increase in men and women²⁰. Therefore, a pathology is more likely to be detected in elderly patients with low hemoglobin value.

The rate at which colonic thickness was detected, along with associated pathologies other than malignancies, which were significant and required treatment was 66.7%. After malignancy, polyps with 22.7% were the most frequent condition, followed by other digestive system diseases including IBD and diverticulitis.

Our study had some limitations. First, the study had a retrospective design. In addition, a greater number of patients would have increased statistical reliability. Another limitation was that thickness of the wall was indicated on tomography but the millimeter measurement of the thickness was not recorded.

Computed tomography is in particular effective in GI system conditions such as malignancy, IBD and diverticulitis. However, there are significant differences in establishing specific diagnosis among healthcare facilities depending on good bowel cleaning by patients and personal experience of the radiologist. Therefore, we believe that endoscopic examination is necessary in patients in whom GI system wall thickening was observed and who are elderly and have low hemoglobin levels.

In conclusion, benign or malignant lesions of the colon may cause wall thickening on CT. Detecting colonic wall thickening on CT may indicate a malignancy, especially in patients aged over 50 years with hemoglobin values less than 10 g/dL. We believe that more careful evaluating of these patients with endoscopic methods may be important for early diagnosis. Studies to be performed in a large number of patients will provide clearer information on the results in patients having been diagnosed with colon wall thickness on tomography.

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Sažetak

ENDOSKOPSKA PRETRAGA U BOLESNIKA SA ZADEBLJANJEM STIJENKE KOLONA OTKRIVENIM KOMPJUTORIZIRANOM TOMOGRAFIJOM

B. Ormeci Bas i Z. Betul Pakoz

Zadebljanje stijenke kolona je stanje koje se ponekad vidi kod pretrage kompjutoriziranom tomografijom (*computerized tomography*, CT). Najčešće i najvažnije patologije u nekim slučajevima mogu biti maligne bolesti i upalne bolesti crijeva (*inflammatory bowel disease*, IBD). Cilj ovoga istraživanja bio je procijeniti rezultate kolonoskopije u bolesnika s povećanom debljinom kolorektalne stijenke utvrđenom na CT-u. Studija je obuhvatila bolesnike sa zadebljanjem kolorektalne stijenke otkrivenim na CT-u abdomena zbog različitih indikacija od listopada 2009. do ožujka 2015. godine. Ovi bolesnici su upućeni u kliniku za gastroenterologiju, napravljena im je kolonoskopija, a rezultati su retrospektivno statistički analizirani. Retrospektivno su analizirana 132 bolesnika podvrgnuta kolonoskopiji zbog zadebljanja stijenke kolona otkrivenog na CT-u. Na kolonoskopiji su otkrivene zloćudne promjene u 38 (28,8%), Crohnova bolest u dvoje (1,5%), divertikulitis u 18 (13,6%) i kolorektalni polip u 30 (22,7%) bolesnika. Rezultati kolonoskopije bili su normalni u 44 bolesnika. Svi bolesnici s kolorektalnim malignim promjenama bili su stariji od 60 godina, što je bilo statistički značajno ($p=0,01$). Srednja vrijednost hemoglobina bila je 12,8 g/dL u bolesnika s normalnim nalazom kolonoskopije u usporedbi s 9,5 g/dL u onih sa zloćudnim promjenama ($p=0,001$). Multivarijatna analiza pokazala je da su hemoglobin i dob jedine značajne varijable koje pretkazuju nenormalan endoskopski rezultat. Otkrivanje zadebljanja stijenke kolona na CT-u može ukazivati na malignitet, poglavito u bolesnika starijih od 50 godina s vrijednostima hemoglobina nižim od 10 g/dL.

Ključne riječi: *Kolonoskopija; Kompjutorizirana tomografija; Zadebljanje stijenke kolona*