

# Abnormal Large Bowel Wall Thickness; As A Diagnostic Marker of Colorectal Carcinoma

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## ABSTRACT

**Objective:** To determine the abnormal large bowel thickness as marker of colorectal cancer among clinically suspected patients by using histopathology as gold standard. **Study Design:** Descriptive study. **Settings:** Radiology department of Bilawal Medical College Jamshoro Pakistan. **Duration:** November 2017 to October 2018. **Methodology:** Patients more than 16 years of the age referred for contrast enhanced CT (CECT) of abdomen due to clinical suspicion of colorectal carcinoma, having bleeding per rectum, altered bowel habit, anemia with hemoglobin <10gm/dl or positive fecal occult test, patients underwent histopathology after positive findings of contrast enhanced CT (CECT) and either of the gender were included. Patients having bowel wall thickness >3mm were considered as colorectal carcinoma and conformed after histopathological findings. All the data was recorded in the self-made proforma. **Results:** Total 150 patients were selected their mean age was 46.78 years and mean of wall thickness was 15.73 mm. Males were found in majority 61.3%. Colorectal carcinoma was significantly associated with elevated bowel wall thickness, p-value 0.008. There was no significant difference in colorectal carcinoma according to gender, p-value 0.815. **Conclusion:** Large bowel wall thickness >10cm on contrast enhanced CT (CECT) is the best indicator for early diagnosis of colorectal carcinoma.

**Keywords:** Bowel wall thickness, CECT, Colorectal carcinoma.

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## INTRODUCTION

The term "colorectal cancer" denotes the growth that commences in the large bowel or colon. Such malignancies, depending on their site of appearance, can also be defined individually as large bowel cancer or colon cancer. These cancers have different attributes in common. <sup>1</sup>Colorectal cancer remains among the major causes of mortality and morbidity all around the world with a 5-year prevalence of 12.7% and 9.3% in men and women worldwide respectively.<sup>2,3</sup> Gastric carcinoma-associated mortality has significantly decreased in past couple of years, however remains a significant concern of public health in underdeveloped nations and is yet the world's 4th commonest cancer.

In fact, recent technological advancements and cumulative object processing knowledge indicate that important data can be gathered on gastrointestinal disorders. Normal variants in addition to abnormal conditions can possibly cause bowel wall thickening. Different criteria for differentiating normal forms and pathological conditions have been investigated, such as modulation patterns of gastrointestinal wall thickening; circumferential asymmetric thickening versus symmetric thickening; involving diffuse, segmental or focal; and related perienteric anomalies; level of gastrointestinal wall thickening.<sup>4</sup> The thickness of bowel-wall normally measures  $\leq 3$  millimeters.<sup>5</sup> Some researchers used an upper reference range of 2–3 millimeters for typical thickness.<sup>6,7</sup> Others suggested that any apparent thickening can indicate abnormalities.<sup>8,9</sup> The wall of large bowel comprises of five layers including serosa, subserosa,

muscular layer, submucosa and mucosa from external to internal respectively.<sup>10</sup> Specific layers or the entire wall thickness may be affected by certain pathologies.<sup>11</sup> Generally, in benign diseases bowel wall thickness measures less than 2cm and more than 2cm in malignant diseases.<sup>7</sup> Circumferential bowel wall thickening was found in 44% of colorectal cancers on computed tomography in a local study.<sup>12</sup> Abnormal colonic wall thickening is characterized by various appearances on computed tomography ranging from eccentric to circumferential.<sup>13</sup> Neoplasms like colorectal cancer and inflammatory processes including bacterial colitis, inflammatory bowel disorder and ischemic colitis constitute common causes of thickened large bowel wall.<sup>14</sup> Asymmetric bowel wall thickening is a common feature of colorectal adenocarcinoma. Colonic wall thickening also occurs proximal to colonic cancers.<sup>15</sup> Therefore this study had been planned to determine the bowel wall thickness as a marker of colorectal carcinoma.

## METHODOLOGY

**Study Design:** Descriptive study.

**Settings:** Radiology department of Bilawal Medical College Jamshoro Pakistan.

**Duration:** November 2017 to October 2018.

**Inclusion Criteria:** Patients more than 16 years of the age referred for contrast enhanced CT (CECT) of abdomen due to clinical suspicion of colorectal carcinoma, having bleeding per rectum, altered bowel habit, anemia with hemoglobin <10gm/dl or positive fecal occult test, patients underwent histopathology

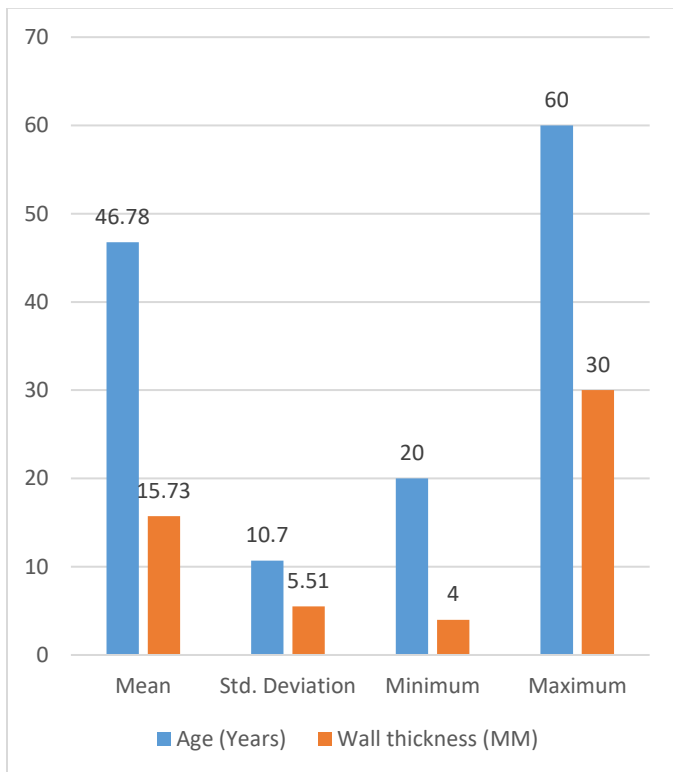
after positive findings of contrast enhanced CT (CECT) and either of the gender were included.

**Exclusion Criteria:** Patients already diagnosed as colorectal carcinoma, ischemic bowel diseases, recurrent development of colorectal carcinoma, renal impairment and patients those were not agree to participate in the study were excluded.

**Methods:** "CT scan of abdomen was performed with IV contrast using 16 Slice Toshiba Activion Scanner in the portal venous phase (at 70sec)". Images were analyzed and labeled positive for colorectal carcinoma when showing focal asymmetric bowel wall thickening (>3mm) associated with one or more CT findings like heterogenous enhancement, perilesional fat stranding, local visceral invasion, regional lymphadenopathy and hepatic metastasis. Patients having bowel wall thickness >3mm were considered as colorectal carcinoma. Patients were followed for histopathological assessment those were underwent specimen biopsy by decision of surgeons. All the data was recorded in the self-made proforma. Data was analyzed by using SPSS version 23. Mean and SD were calculated for numerical variables. Frequency and percentage were calculated for categorical variables. Chi-square test was applied and a p-value <0.05 was considered as significant.

## RESULTS

Total 150 patients were selected, their mean age was 46.78 years and mean of wall thickness was 15.73 mm. Figure 1



**Figure 1: Mean of age and wall thickness of patients n=150**

Males were found in majority 61.3%, while females were 38.7%. Most of the patients 76.7% had 7-12 months of duration, 12.7% had symptoms duration <6 months and 10.7% had duration of symptoms >12 months. Table. 2

**Table 2: Distribution of patients according to gender and duration of symptom (n=150)**

|                            | Variables   | Frequency | Percent |
|----------------------------|-------------|-----------|---------|
| <b>Gender</b>              | Female      | 58        | 38.7%   |
|                            | Male        | 92        | 61.3%   |
|                            | Total       | 150       | 100.0%  |
| <b>Duration of Symptom</b> | <6months    | 19        | 12.7%   |
|                            | 7-12 months | 115       | 76.7%   |
|                            | >12 months  | 16        | 10.7%   |
|                            | Total       | 150       | 100.0%  |

Colorectal carcinoma was significantly associated with elevated bowel wall thickness, p-value 0.008. Majority of patients 57(38.0%) and 48(32.0%) having colorectal carcinoma, their wall was 11-20mm and 20mm respectively. While 23(15.3%) patients of colorectal cancer wall thickness was 3 to 10mm. Table. 3

**Table 3: Distribution of colorectal cancer according to wall thickness (n=150)**

| <b>Wall Thickness</b> | <b>Colorectal Cancer</b> |            | <b>Total</b> | <b>P-Value</b> |
|-----------------------|--------------------------|------------|--------------|----------------|
|                       | <b>NO</b>                | <b>YES</b> |              |                |
| <b>3-10mm</b>         | 1(0.7%)                  | 23(15.3%)  | 24(16.0%)    | 0.008          |
| <b>11-20mm</b>        | 5(3.3%)                  | 57(38.0%)  | 62(41.3%)    |                |
| <b>&gt;20mm</b>       | 16(10.7%)                | 48(32.0%)  | 64(42.7%)    |                |
| <b>Total</b>          | 22(14.7%)                | 128(85.3%) | 150(100.0%)  |                |

There was no significant difference in colorectal carcinoma according to gender, p-value 0.815. Table. 4

**Table 4: Distribution of colorectal cancer according to gender (n=150)**

| <b>Gender</b> | <b>Colorectal Cancer</b> |            | <b>Total</b> | <b>P-Value</b> |
|---------------|--------------------------|------------|--------------|----------------|
|               | <b>NO</b>                | <b>YES</b> |              |                |
| <b>Female</b> | 9(6.0%)                  | 49(32.7%)  | 58(38.7%)    | 0.815          |
| <b>Male</b>   | 13(8.7%)                 | 79(52.7%)  | 92(61.3%)    |                |
| <b>Total</b>  | 22(14.7%)                | 128(85.3%) | 150(100.0%)  |                |

## DISCUSSION

Colorectal carcinoma continues to be a big health problem. Although computed tomography (CT) in expert hands is the most sensitive investigations for colorectal cancer.<sup>16</sup> CT has become extra sensitive the detection of thickness of bowel wall with reports of 69% correlation between bowel wall thickening on abdominal CT and findings at colonoscopy.<sup>13,17</sup> Colon wall thickening has a variety of CT appearances ranging from eccentric to circumferential, with underlying causes as;

neoplasms, inflammatory bowel disease, bacterial colitis and ischemic colitis.<sup>13,18,19</sup>

In our study, the mean wall thickness among positive CT finding cases was  $15.66 \pm 5.40$  mm and colorectal carcinoma was significantly associated with elevated bowel wall thickness, p-value 0.008. Similarly, Richie AJ et al<sup>20</sup> reported that the markedly elevated wall thickness had sensitivity 94.4% and specificity 88.9%, in malignant lesions diagnosis. Patel P et al<sup>21</sup> reported that out of all study participants of bowel wall thickening on CT scans, 8% had adenocarcinoma, 5% had large adenomas and remaining had other diseases, this malignant ration was very lower as compared to this study and this may because we had excluded patients had other diseases. Ko EY et al<sup>22</sup> also found comparable findings. Uzzaman MM et al<sup>23</sup> stated that 21.82% patients of bowel wall thickening on CT had diagnosis of cancer by endoscopy. Though Nicholson et al<sup>24</sup> observed that 26.6% patients of bowel wall thickening were later diagnosed with cancer. Khairnar H et al<sup>25</sup> stated that among severe thickening 10 patients 5 had growth which turned out to be malignancy by histopathology. Moon JY et al<sup>26</sup> reported that there was a significant correlation in the colorectal cancer perforation and eccentric wall thickening ( $p < 0.01$ ). In this study mean age of patients was 46.78 years and males were in majority, our mean age was higher uncontract to study of Kumar A et al<sup>27</sup> as mean age of  $36.8 \pm 13.21$  years. On other hand Richie AJ et al<sup>20</sup> reported that commonly affected age group was 61-70 years and this age range was higher in contrast to this study, these age variations may because of geographical and ethnicity variations. While in these studies gender association was similar to this study.

## CONFLICT OF INTREST

There is no conflict of interest in this study.

## CONCLUSION





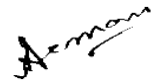

It was concluded that, large bowel wall thickness  $>10$ cm on contrast enhanced CT (CECT) is the best indicator for early diagnosis of colorectal carcinoma. Among patients diagnosed as elevated bowel wall thickness, early biopsy should be done and treatment started to reduce the morbidity and mortality.

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### **AUTHORSHIP AND CONTRIBUTION DECLARATION**

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