

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Study Of Evaluation Of Malignant Neoplasm Of Small And Large Intestine By Computed Tomography (CT).

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ABSTRACT

Malignant neoplasms of the bowel, including those affecting the small and large intestines, represent a significant health burden worldwide. Early diagnosis and accurate staging are critical for improving patient outcomes. This study aimed to evaluate the role of computed tomography (CT) in diagnosing and assessing malignant bowel neoplasms. A total of 38 patients with biopsy-proven malignant bowel neoplasms were evaluated using CT imaging of the abdomen and pelvis. The study was conducted at Sir Hurkisondas Nurrotamdas Hospital & Research Centre, Mumbai, from August 2009 to April 2011. Data on patient demographics, site of bowel involvement, and length of bowel segment involvement were analyzed. The majority of patients were in the 40-49 and 50-59 age groups (46%). The rectum was the most commonly affected site (26.3%), followed by the transverse colon (13.1%) and ileum (13.1%). Short segment involvement was observed in 71% of patients, while 28.9% had long segment involvement. These findings are consistent with known patterns of bowel malignancies. CT imaging plays a pivotal role in the evaluation and staging of bowel neoplasms, particularly in identifying the site and extent of disease, which are critical for determining the appropriate management strategy.

Keywords: Bowel neoplasm, Computed tomography, Malignant

<https://doi.org/10.33887/rjpbcs/2024.15.4.48>

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INTRODUCTION

Computed Tomography (CT) has become a pivotal imaging modality in the evaluation of malignant neoplasms of the small and large intestine, offering significant advantages in diagnosing, staging, and planning treatment strategies for intestinal cancers. Malignant neoplasms of the small and large intestine, including colorectal cancer, are among the leading causes of morbidity and mortality worldwide. Early and accurate diagnosis is essential for improving patient outcomes, as delayed detection often leads to advanced stages at presentation and poor prognosis. CT plays a crucial role in identifying the extent of tumor invasion, the involvement of surrounding structures, lymph node metastasis, and distant spread, thereby providing a comprehensive assessment of the disease [1-3].

CT imaging offers excellent anatomical detail, with the ability to visualize both bowel wall thickening and extraintestinal structures. The use of oral, intravenous, and rectal contrast agents enhances the accuracy of detecting bowel wall abnormalities, luminal narrowing, and masses. In addition, CT aids in the detection of complications such as bowel obstruction, perforation, and fistulas, which are critical in the management of intestinal malignancies. Its ability to perform a non-invasive, rapid, and detailed evaluation makes CT a preferred imaging tool in clinical practice for assessing malignant neoplasms of the small and large intestines [4].

METHODOLOGY

The present study included 38 patients who underwent CT abdomen examinations at Sir Hurkisondas Nurrotamdas Hospital and Research Centre, Mumbai. Out of 80 patients who had abnormal bowel findings on CT, 38 were selected for the study, as they were proven to be malignant on biopsy. The study was conducted from August 2009 to April 2011, and approval was obtained from the hospital ethics committee. Detailed clinical histories were collected from all patients, and their laboratory investigations were evaluated. The most common presenting symptoms included melena, constipation, diarrhea, alternating diarrhea and constipation, weight loss, anorexia, and a palpable lump in the abdomen. Several patients were initially found to have bowel thickening on ultrasonography (USG) and barium studies before undergoing CT examination.

All patients gave informed written consent and fasted for a minimum of four hours before the procedure to reduce the risk of vomiting after intravenous contrast injection. A thorough history of allergic reactions to drugs and contrast media was also recorded. Emergency drugs for managing any possible drug reactions were kept ready at the time of examination. Patients were advised to remove any metal objects from the area of interest to avoid artifacts. The CT study was performed using a Multislice CT scanner (Siemens Somatom Spirit). Patients were positioned supine on the CT table, with their heads immobilized using a headrest, and their hands folded above their shoulders around their heads. A scout topogram was obtained from the diaphragm to the symphysis pubis to define the region of interest. Positioning was confirmed using a laser mark to ensure accuracy.

The scan was conducted in spiral mode with settings of 120 kV and 240 mA, and a field of view (FOV) of 350 mm. Plain scans were followed by contrast-enhanced studies, utilizing both oral and intravenous contrast. Adequate bowel distension and luminal enhancement were achieved using a combination of oral and rectal contrast. Patients ingested oral contrast in the form of 2 ampoules of 60% iodinated contrast (Gastrografin), mixed in one liter of water, with 300-400 ml given at 20-30-minute intervals. Rectal contrast, consisting of 200-500 cc of contrast, was administered to opacify the rectum and distal colon. In married female patients, a vaginal tampon was used to better delineate pelvic anatomical structures. Intravenous contrast was administered at 2 ml/kg using non-ionic iodinated contrast (iopamidol/ultravist) via a pressure injector.

RESULTS

38 patients of biopsy proven malignant bowel neoplasm were studied with CT abdomen and pelvis. The study was conducted in the department of Radiodiagnosis, Sir Hurkisondas Nurrotumdas Hospital & Research Centre, a tertiary care centre, Mumbai. Following observations were made.

Table 1: Age wise distribution of patients

Age Groups (Yrs)	No. Of Patients	Percentage
0-9.	3	7%
10-19	1	2%
20-29	5	13%
30-39	7	18%
40-49	9	23%
50-59	9	23%
60-69	4	10%
70-79	1	2%

Table 2: Site involved in bowel

Site Involved	No Of Patients	Percentage
Jejunum	1	2.6%
Leum	5	13.1%
Ileocaecal	3	7.8%
Caecum	1	2.6%
Ascending Colon+ Caecum	2	5.2%
Ascending Colon	4	10.5%
Transverse Colon	5	13.1%
Descending Colon - Sigmoid Colon	1	2.6%
Sigmoid Colon-'- Rectum	3	7.8%
Rectum	10	26.3%
Rectum +Anal Canal	2	5.2%

Table 3: Length of bowel segment involvement diagnosed with CT

	Length Of Bowel Segment Involved	
	Short Segment	Long Segment
No. Of Patients	27	11
Percentage	71%	28.9%

DISCUSSION

The present study evaluated 38 patients with biopsy-proven malignant neoplasms of the bowel, utilizing CT imaging of the abdomen and pelvis. The findings provided valuable insights into the age distribution, site of involvement within the bowel, and the length of bowel segments affected by the malignancy. These observations not only align with existing literature on bowel malignancies but also contribute to the understanding of demographic and anatomical patterns of the disease [5].

Age Distribution

The age-wise distribution of patients shows a peak incidence in the 40-49 and 50-59 age groups, each accounting for 23% of the cases. This is consistent with previous studies that indicate colorectal cancers are more common in middle-aged and older adults. The fact that 46% of the patients fell between the ages of 40 and 59 highlights the importance of screening and early detection in this age group, as bowel malignancies often present at advanced stages when discovered later in life. Interestingly, 18% of the cases were seen in the 30-39 age group, which underscores the rising incidence of bowel malignancies in younger individuals. The presence of 7% of patients in the 0-9 age group, although rare, could be attributed to familial or genetic syndromes such as familial adenomatous polyposis or Lynch syndrome, which predispose individuals to early-onset bowel cancer. Similarly, a small percentage of patients (2%) were noted in the 70-79 age group, highlighting the possibility of either late detection or the natural decline in cancer incidence due to overall reduced life expectancy [6-8].

Site of Bowel Involvement

The site of involvement in malignant bowel neoplasms plays a crucial role in clinical presentation, treatment planning, and prognosis. In this study, the rectum was the most commonly affected site, accounting for 26.3% of cases, followed by the transverse colon (13.1%) and ileum (13.1%). The predominance of rectal cancer is consistent with global patterns, as rectal malignancies constitute a significant proportion of colorectal cancers. Rectal cancer often presents with symptoms such as rectal bleeding, tenesmus, and changes in bowel habits, which may prompt earlier detection compared to more proximal lesions.

The second most commonly involved site, the transverse colon, accounted for 13.1% of cases. Tumors in the transverse colon often present with nonspecific symptoms, such as abdominal discomfort or anemia, making early diagnosis more challenging. The ileum, also involved in 13.1% of cases, is a less frequent site for primary malignancies, but when affected, it is typically associated with neuroendocrine tumors or lymphoma, rather than adenocarcinoma, which is more common in the colon and rectum [9].

The involvement of the ascending colon and caecum, either individually or in combination, was observed in 15.7% of patients. These tumors often present with symptoms of anemia due to occult bleeding, as well as right-sided abdominal pain. Tumors in this location can grow large before becoming symptomatic, contributing to delayed diagnosis and poorer prognosis compared to left-sided lesions.

Interestingly, only 7.8% of the cases involved the ileocaecal region, a site that is commonly associated with intestinal tuberculosis or Crohn's disease, but can also be the location of adenocarcinoma or lymphoma. The descending colon, sigmoid colon, and rectosigmoid junction were less frequently involved, with each accounting for 2.6% to 7.8% of cases. Malignancies in these areas are more likely to cause changes in bowel habits, such as alternating diarrhea and constipation, as noted in several of the study's patients.

Length of Bowel Segment Involvement

The length of the involved bowel segment is an important factor in determining the stage of the disease, surgical approach, and overall prognosis. In this study, 71% of patients had malignancies that involved a short segment of the bowel, while 28.9% had long segment involvement. Short segment involvement is generally associated with localized disease, which is more amenable to surgical resection and may have a better prognosis. In contrast, long segment involvement may indicate more extensive disease, either through direct extension or multifocality, which could suggest advanced stage malignancy or a more aggressive tumor biology.

The high percentage of patients with short segment involvement in this study suggests that many of the cases may have been detected at an earlier stage, allowing for potentially curative surgical intervention. However, it is also possible that some of these short segment tumors were part of a multifocal disease process, particularly in patients with a genetic predisposition to bowel cancer, such as those with Lynch syndrome or familial adenomatous polyposis [10, 11].

Long segment involvement, observed in 28.9% of patients, is often associated with poorer outcomes due to the greater extent of bowel involvement and the likelihood of metastatic spread. These patients may require more extensive resections and are at higher risk for postoperative complications. Additionally, long segment disease may indicate a more aggressive tumor subtype, such as mucinous adenocarcinoma or signet ring cell carcinoma, both of which are associated with worse prognosis compared to typical adenocarcinoma.

Clinical Implications

The findings from this study have several important clinical implications. First, the predominance of rectal involvement highlights the need for targeted screening programs for rectal cancer, particularly in middle-aged individuals. The high incidence of rectal cancer also suggests that a significant proportion of patients may benefit from neoadjuvant chemoradiation, which has been shown to improve local control and reduce recurrence rates in rectal cancer.

Second, the observation that a significant number of patients had short segment involvement underscores the importance of early detection and intervention in improving outcomes for bowel cancer. CT imaging, with its ability to detect both localized and more extensive disease, plays a crucial role in the initial diagnosis and staging of bowel malignancies.

Lastly, the varied site distribution of tumors suggests that a thorough understanding of the clinical presentation associated with each location is essential for timely diagnosis. Right-sided tumors, which often present with nonspecific symptoms such as anemia, may require a higher index of suspicion for early detection. Conversely, left-sided tumors, which more commonly present with obstructive symptoms or changes in bowel habits, may be diagnosed earlier due to more pronounced clinical manifestations.

CONCLUSION

In conclusion, this study underscores the utility of CT imaging in the evaluation of malignant neoplasms of the bowel, providing detailed information on the site and extent of disease, which is critical for guiding treatment decisions and improving patient outcomes. The age and site distribution of the malignancies in this study align with global patterns, while the length of bowel segment involvement highlights the importance of early detection in achieving favorable prognosis.

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