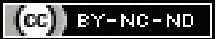


# A Prospective Cohort Study of Colonic Malignancy in a Tertiary Care Hospital in North Kerala, India

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## ABSTRACT

**Introduction:** Colon cancer is the third most commonly diagnosed cancer in males and the second in females, with more than 1.4 million new cancer cases every year. Colon cancer can take many years to develop and early detection of colon cancer greatly improves the chances of a cure.

**Aim:** To study the different modes of clinical presentation of colonic malignancy and its relation to the site of the lesion as seen at a tertiary care hospital in North Kerala, India.

**Materials and Methods:** This was a prospective cohort study carried out in patients diagnosed with colonic cancer and admitted to the Department of Surgery of a tertiary care hospital in North Kerala, India, during the study period of one year from November 2014 to November 2015. Total of 45 patients were clinically evaluated, investigated, taken up for surgical management and followed-up. The collected data were entered into the study proforma and analysed using Statistical Package for Social Sciences. The Chi-square test for goodness of fit, Chi-square test for association and Student's t-test were used. Results were considered statistically significant when p-value was less than 0.05.

**Results:** Of the 42 cases of carcinoma of colon, 24 (57.1%) were males and 18 (42.9%) were females with a male to female ratio of 1.3:1. The maximum frequency of cases were in between the ages 51 and 60 years (6<sup>th</sup> decade) followed by the 7<sup>th</sup> and 8<sup>th</sup> decades. The mean age of presentation of carcinoma in the left colon (64.43 years) was significantly higher than the right side (55.95 years). The most common symptom/signs were abdominal pain (78.6%), anaemia (54.8%), altered bowel habits (50%), abdominal mass (38.1%) loss of weight/appetite (33.3%), constipation (31%) and blood and mucus per rectum (28.6%).

**Conclusion:** Cancer of the colon primarily affected older individuals especially those with left colonic cancers. Common complaints such as abdominal pain, altered bowel habits, constipation and blood and mucous per rectum were seen frequently in the patients having colonic cancer. Certain symptoms like constipation, altered bowel habits and blood and mucous per rectum were more in patients with cancer in the left colon.

**Keywords:** Carcinoma, Colon cancer, Left colon, Right colon

## INTRODUCTION

Colon cancer is the third most commonly diagnosed cancer in males and the second in females, with more than 1.4 million new cancer cases every year [1]. Geographical variation in occurrence of colon cancer has been observed with higher incidence rates in developed countries [2]. In India, the age standardised rate for colon cancer is at 7.2% per one lakh population in males and 5.1% per one lakh population in females [3].

Colon cancer can take many years to develop and early detection of colon cancer greatly improves the chances of a cure. Surgery remains the primary treatment, while chemotherapy and/or radiotherapy may be recommended depending on the individual patient's staging and other medical factors. Mortality rates have been decreasing in many western countries due to early screening and improved treatment [2]. However, the five year survival of colon cancer in India is one of the lowest in the world at less than 40% [4]. This may be attributed to delayed diagnosis on account of several factors relating to the discrete features of symptomology, the low level of health education of patients and the inadequacy of infrastructure. Though India is not lagging in surgical expertise, it is lagging behind as far as early diagnosis is concerned. Besides, there are only a few published studies from India on colonic malignancy. The present study was conducted to evaluate various modes of clinical presentation of colonic malignancy, to determine the different sites of lesion in the colon and to study the relation of clinical presentation to the site of the lesion as seen at a tertiary care hospital in North Kerala, India.

## MATERIALS AND METHODS

This was a prospective cohort study carried out on patients diagnosed with colonic cancer and admitted to the Department of Surgery of a tertiary care hospital in North Kerala, India, during the study period of one year from November 2014 to November 2015. The study was conducted after obtaining Institutional Ethics Committee approval no. G1.2747/12/ACME and patient's treatment was not altered in any form for this study.

**Inclusion criteria:** Patients aged between 20-75 years of either sex diagnosed with colon cancer for first time and have not taken any treatment prior to their first visit were included in the study.

**Exclusion criteria:** Patients diagnosed with colon cancer and treated with other modalities of treatment prior to their first visit and those with recurrence of colon cancer were excluded from the study.

**Sample size calculation:** The following formula was used for calculating the adequate sample size  $n = Z^2 P(1-P)/d^2$

where,

n is sample size

Z is the statistic corresponding to level of confidence,

P is expected prevalence (that can be obtained from same studies or a pilot study conducted by the researchers),

d is precision (corresponding to effect size).

A sample size of 45 was calculated considering a 10% dropout.

The patients were clinically evaluated, investigated, taken up for surgical management and followed-up.

## STATISTICAL ANALYSIS

The collected data were entered into the study proforma and analysed using Statistical Package for Social Sciences version 13.0. The Chi-square test for goodness of fit, Chi-square test for association and Student's t-test were used. Results were considered statistically significant when p-value was less than 0.05.

## RESULTS

In this study, a total of 45 cases of clinically diagnosed carcinoma of colon were initially recruited, of which three cases were excluded at the end on the basis of histopathological examination of the resected specimen. Of the 42 confirmed cases of carcinoma of colon, 24 (57.1%) were males and 18 (42.9%) were females with a male to female ratio of 1.3:1. The percentage of males and females having right colonic cancer were 52.4% and 47.6%, respectively (male to female ratio of 1.1:1) while that of those having left colonic cancers were 61.9% and 38.1%, respectively (male to female ratio of 1.63:1). There was no significant association between the gender and the side of the colon on doing Chi-square test for association.

The maximum frequency of cases were in between the age group of 51-60 years (6<sup>th</sup> decade) followed by the 7<sup>th</sup> and 8<sup>th</sup> decades. The mean age of presentation of males was 60.19 years with a standard deviation of 10.73 years and of females was 58.44 years with a standard deviation of 14.56 years. The difference in mean age of presentation was not statistically significant for the two genders. However, there was a statistically significant difference between the mean age of patients with right and left colonic cancers with the mean age of presentation of carcinoma in the right colon being less than the left colon [Table/Fig-1].

Site of colonic cancer	Number of patients (n)	Mean age of presentation of carcinoma (in years)	Standard deviation	Student's t-test	
				t	P-value
Right colon	21	55.95	13.555	-2.323	0.025*
Left colon	21	64.43	9.796		

**[Table/Fig-1]:** Comparison of mean age of patients with right and left colonic cancer. Student's t-test; \*p-value <0.05 was considered statically significant;

Most frequent site of carcinoma in the colon was found to be sigmoid colon (28.6%) followed by caecum (21.4%) and then hepatic flexure (14.2%). Descending colon and transverse colon accounted for 11.9% and 9.5%, respectively while ascending colon and splenic flexure accounted for 7.2% each.

Out of the 42 cases, 4 cases (9.5%) presented as acute intestinal obstruction and 2 cases (4.8%) presented as perforation peritonitis. A total of 36 cases (85.7%) presented with chronic symptoms [Table/Fig-2]. The most common feature encountered was abdominal pain (78.6%) followed by anaemia (54.8%), altered bowel habits (50.0%), abdominal mass (38.1%), loss of weight/appetite (33.3%), constipation (31%) and blood and mucus per rectum (28.6%).

Mode of presentation		Number of patients	Percentage (%)
Acute presentation	Obstruction	4	9.5
	Perforation	2	4.8
Chronic presentation		36	85.7

**[Table/Fig-2]:** Presentation-wise incidence in the study group.

The most frequent symptom seen in right colonic lesions was abdominal pain (85.7%), which was mostly felt in the right iliac fossa and associated with localised tenderness. Other frequent clinical features included abdominal mass (52.4%), anaemia (52.4%), loss of weight and appetite (47.6%), altered bowel habits (28.6%) and vomiting (28.6%). Constipation and blood and mucus per rectum were less frequently seen. The clinical features most frequently seen in left colonic lesions were abdominal pain (71.4%), altered bowel habits (71.4%), anaemia (57.1%) constipation (47.6%) and blood

and mucous per rectum (47.6%). Abdominal mass, vomiting and loss of weight and appetite were less frequently seen [Table/Fig-3].

A statistically significant association was seen between the side of cancer and the symptom in the case of altered bowel habits, constipation and blood and mucus per rectum [Table/Fig-3]. The odds ratio estimated for each of these symptoms showed the odds of altered bowel habits being present in left colon cancer was 6.25 times the odds of it being present in right colon cancer. Likewise the odds of blood and mucus per rectum and constipation in left colon cancer was 8.64 times and 5.46 times, respectively of them being present in right colonic cancer [Table/Fig-4].

Clinical symptom/sign	Right colon	Left colon	Chi-square test	
	Number (Percentage %)	Number (Percentage %)	Chi-square value	p-value
Abdominal pain	18 (85.7)	15 (71.4)	1.273	0.259
Altered bowel habits	6 (28.6)	15 (71.4)	7.714	0.005*
Blood and mucous per rectum	2 (9.5)	10 (47.6)	7.467	0.006*
Abdominal mass	11 (52.4)	5 (23.8)	3.635	0.057
Loss of weight/appetite	10 (47.6)	4 (19)	3.857	0.050
Constipation	3 (14.3)	10 (47.6)	5.459	0.019*
Vomiting	6 (28.6)	3 (14.3)	1.273	0.259
Anaemia	11 (52.4)	12 (57.1)	0.096	0.757
Acute intestinal obstruction	1 (4.8)	3 (14.3)	1.105	0.293
Perforation peritonitis	1 (4.8)	1 (4.8)	0	1

**[Table/Fig-3]:** Comparison of frequency of symptoms between right and left colonic lesions.

\*p-value <0.05 was considered statically significant; Chi-square test for association

Clinical symptom	Odd ratio for side (left/right)		
	Value	95% confidence interval	
		lower	upper
Altered bowel habits	6.250	1.638	23.843
Blood and mucus per rectum	8.636	1.593	46.807
Constipation	5.455	1.226	24.261

**[Table/Fig-4]:** Odds ratio of symptom with side of colonic cancer.

In this study, as per the TNM staging system, stages I, II, III and IV accounted for 11.9%, 40.5%, 38.1% and 9.5% of the total cases, respectively. All the stage II cases belonged to the subgroup IIA while majority of the Sstage III cases belonged to subgroup IIIB.

Laparotomy was done in all 42 cases, 40 curative surgeries with R0 resection were performed. Two cases with widespread metastases underwent palliative surgery only. Adjuvant chemotherapy was given to high risk stage II and all stage III and IV cases.

Of the 42 patients, three died in immediate postoperative period. Of the remaining 39 patients, follow-up of 69% patients was done till end of study and that of 21.4% were lost after initial three months as they received adjuvant chemotherapy at alternate centres.

## DISCUSSION

The gender distribution of carcinoma colon showed a male to female ratio of 1.3:1. The finding was not statistically significant but was comparable to other studies published in recent literature [5]. The male to female ratio of 1.1:1 in the right colon cancer and 1.63:1 in the left colon cancer was not statistically significant. However, the finding was comparable to study done by Murphy G et al, which suggested a progressively increasing male to female incidence ratio of colon cancer from caecum to rectum [6].

The peak age of incidence of carcinoma colon was found to be in the sixth decade of life followed by seventh and eighth decade. These findings were comparable to those in similar studies [7,8].

This study showed a statistically significant difference in the mean age of patients having right and left colonic cancer with the mean age of patients with left colonic cancer being greater than those with right colonic cancer. This is different from the study done by Benedix F and Kubrmeyer F where the right sided cancers occurred in significantly older patients [9]. Another study conducted in Iceland by Snaebjornsson P et al., showed no statistical difference in the mean ages between right and left colonic cancers [10].

In this study, 14.3% cases presented with acute symptoms while 85.7% present with chronic symptoms. Similar presentation was seen in the study done by Ghazi S et al., [11]. The site in colon with maximum frequency of cancer in this study was sigmoid colon followed by caecum, hepatic flexure, descending colon, transverse colon, ascending colon and splenic flexure. However statistically the incidence of cancer at all the sites were found to be similar in this study. Common literatures suggest that incidence of colon cancer is highest in the sigmoid colon followed by caecum or ascending colon and other sites account for the remaining in equal proportions [12]. However, there are a number of studies that suggest that the incidence of right colonic cancers is on the rise [13].

The most frequent symptom in the study group was abdominal pain followed by altered bowel habits, loss of weight and appetite, constipation and blood and mucus per rectum. These are comparable to findings in the literature [14,15].

The findings in this study regarding the frequency of symptoms in patients with right and left colonic cancers respectively are comparable to those in common literatures [14,15]. However, significant association was seen between the side of the colonic cancer and the symptoms of altered bowel habits, blood and mucus per rectum and constipation separately. The odds of having altered bowel habits, constipation and blood and mucus per rectum in left colonic cancer patients were 6.25, 5.46 and 8.64 times respectively that of them being present in right colonic cancer patients. Statistically the incidence of anaemia and that of palpable mass were similar in left and right colonic cancers. This is different from findings in literature which state that right sided cancers manifest with bleeding per rectum and anaemia while left sided cancers manifest with obstructive symptoms like abdominal pain [14,15].

### Limitation(s)

The limitation of this study is that the study was performed in a single centre and so the number of patients in the study group was small and the duration of study was less compared to other studies.

## CONCLUSION(S)

The clinical symptoms and signs commonly seen in carcinoma colon are variable and more often, occur as a result of benign conditions. In this study, patients with left colonic cancer were significantly older. The symptoms of altered bowel habits, constipation and blood and mucus per rectum were significantly associated with cancer in the left colon or distal part of the colon. This study further stresses the need for more studies in India with larger sample sizes to bring out any association between the clinical profile at presentation and the site of the colonic cancer so as to aid in earlier and more accurate diagnosis clinically.

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