

## Histomorphological characteristics of colorectal carcinoma in the young and elderly: Is there a difference?

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### Abstract

**Introduction:** Colorectal carcinoma is among the leading causes of cancer related mortality. There has been an increase in incidence of CRC in the younger age group. Also young patients with CRC reveal different tumor characteristics than average age or older age groups.

**Aims:** This study was undertaken to analyze the differences in Histomorphological characteristics, based on gender, subsite of the tumor, tumor differentiation and disease stage of CRC in young and elderly age group.

**Materials and Methods:** Histopathologically confirmed cases of colorectal cancer from the year 2007-2013 were taken from the Department of Pathology. Sub group analyses of histomorphological features of CRC in patients <40 yrs were compared with > 40 yrs using chi square or Fischer's exact test. P value of < 0.05 was considered significant.

**Results:** Hundred and three cases of colorectal cancer were included in the study. 20.3% of cases were below the age of 40yrs. In patients less than 40 years, most common site of lesion was the rectum, followed by sigmoid colon and caecum. Mucin secreting/signet ring carcinoma (38.09%) and moderately differentiated carcinoma (28.5%) was more common in young patients, than elderly patients. 16.6% of young patients had Dukes stage A, 66.6% had stage B and 16.6% stage C disease.

**Conclusion:** Colorectal cancer in young patients are associated with aggressive histopathological characteristics and advanced stage at diagnosis. Most of the lesions were seen in rectum followed by sigmoid colon. This emphasizes the development and implementation of effective screening program in young patients.

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### Introduction

Colorectal carcinoma (CRC) is the most common cancer in men and second most common in women worldwide. The incidence of CRC worldwide is 6.5 and 7.7 / 1, 00,000 females and males respectively.<sup>[1]</sup> Compared to the western world, the incidence rates of colorectal cancer is low in India; varying from 4.3/1,00,000 among men and 3.4/1,00,000 among women<sup>[2]</sup>. Population based time trend studies show a rising trend in the incidence of colorectal cancer in India.<sup>[3]</sup>

Although the incidence of CRC increases with age, in the recent years there has been an increase in proportion of patients diagnosed at younger ages (20-40).<sup>[4]</sup> Reports have shown that colorectal cancer in Asia Pacific region and Africa occur a decade earlier compared to USA. Many Asian countries including China, Japan, South Korea and Singapore have experienced an increase of two to four times in the incidence of CRC in the past two decades. The rising trend in incidence and mortality from CRC is more striking in affluent than in poorer societies and differ

substantially in ethnic groups.<sup>[5]</sup> CRC occurring before the age of 40 years accounts for less than 10% of the total CRC.

The most common location of colorectal cancer is left side of colon, including rectum. However, reports from the west suggest that the tumor location of colorectal cancer is moving proximal to splenic flexure.<sup>[6]</sup> Also, young patients with CRC reveal different tumor characteristics than average age or older age groups. There are differences in subsite of the carcinoma when considering age and gender. This study was undertaken to analyze the difference in Histomorphological characteristics, based on gender, subsite of the tumor, tumor differentiation and disease stage of CRC in young and elderly age group.

### Aim of the Study

This retrospective study was done to compare the histomorphological characteristics of colorectal cancer in patients less than 40 years and more than 40 years.

### Materials and Methods

Histopathologically confirmed cases of colorectal cancer from the year 2007-2013 were taken from the Department of Pathology. Medical records and slides were reviewed to analyze the age, sex, site of the lesion and histopathological type of tumor. Tumor stage, whenever present, was noted. Sub group analyses of histomorphological features of patients <40 yrs were compared with > 40 yrs using chi square or Fischer's exact test. P value of < 0.05 was considered significant.

## Results

Hundred and three cases of colorectal cancer were included in the study. Out of the 103 cases, 54 were biopsy specimens and 49 were surgically resected specimens. Age of the patients ranged from 20-85yrs, average being 52.5yrs. 20.3% of cases were below the age of 40yrs. The youngest patient was 20 yrs and oldest patient was 85 yrs. Male to female ratio in the younger and older age group was 1.62:1 and 1.48:1.

Most common site of lesion in this series was rectum seen in 47.5% of cases, followed by 26.2% in sigmoid colon, 13.6% in transverse colon, and 12.6% in the ascending colon. Histologically, 46.6% of patients had well differentiated adenocarcinoma, 25.2% had moderately differentiated adenocarcinoma and 4.8% had poorly differentiated adenocarcinoma. Mucin

secreting adenocarcinoma and signet ring adenocarcinoma was seen in 23.3% of cases [Fig. 1].

However, when we compared patients who were < 40 years and > 40 years, there was no statistical significance in terms of sex, tumor subsite, tumor differentiation and staging. In patients less than 40 years, most common site of lesion was the rectum, followed by sigmoid colon and caecum. Mucin secreting/signet ring carcinoma and moderately differentiated carcinoma was more common in young patients. Well differentiated adenocarcinoma was seen in elderly patients. Out of the 49 surgically resected cases, 16.6% had Dukes stage A, 66.6% had stage B and 16.6% stage C disease. Table 1 shows the comparison of tumor subsite distribution, histopathology and tumor staging in young and elderly patients.

**Table 1: Comparison of Colorectal carcinoma in patients < 40 years and > 40 years**

	<b>Patients &lt; 40 (n= 21)</b>	<b>Patients &gt; 40 (n=82)</b>	<b>P value</b>
Sex (Male )	13(66.9%)	49(59.7%)	NS
<b>Site of primary tumor</b>			
Rectum	10(47.6%)	39(47.5%)	NS
Sigmoid colon	08(38.09%)	19(23.1%)	NS
Transverse colon	02(9.52%)	12(14.6%)	NS
Ascending Colon	01(4.76%)	12(14.6%)	NS
<b>Histopathology</b>			
Well differentiated	07(33.3%)	41(50%)	NS
Moderately differentiated	06(28.5%)	20(24.3%)	NS
Poorly differentiated	-	05(6.09%)	NS
Mucinsecreting/signetring carcinoma	08(38.09%)	16(19.5%)	NS
<b>Dukes Staging</b>	<b>Patients &lt; 40 (n= 12)</b>	<b>Patients &gt; 40 (n=37)</b>	
Stage A	2(16.6%)	-	NS
Stage B	8(66.6%)	21(56.7%)	NS
Stage C	2(16.6%)	16(43.2%)	NS

**Table 2: Incidence of CRC in young patients**

<b>Study</b>	<b>Incidence in &lt;40 years</b>	<b>Place</b>
Present study	20.3%	India
Gupta et al	39%	India
Singh et al	23%	South Asia
Soliman et al	35.6%	Egypt
Chew et al	25%	Singapore
Singh et al	28.6%	Nepal
De Silva et al	19.7%	Sri Lanka

## Discussion

The absolute number of new cancer patients in India is increasing rapidly due to an increase in the size of the population as well as an increase in the proportion of elderly persons due to improved life expectancy.<sup>[7]</sup> The relative incidence of CRC in the younger group varies from one country to another. The corresponding figures are much higher from several Asian and African countries. In present study, 21.6% of cases were below 40yrs of age. Table 2 shows incidence of CRC in patients <40 years in various other studies.<sup>[8,9,10,11,12]</sup> This suggests a possible hidden familial risk for colon cancer and identifies the need for a mass screening programme for CRC.

The most common site of lesion was rectum, followed by sigmoid colon. We considered ascending colon, caecum and transverse colon as proximal colon and sigmoid colon and rectum as distal colon. In younger patients, 23.8% and 76.2% of cases had lesion in proximal colon and distal colon. In patients aged above 40yrs, 26.3% and 73.68% had lesions in proximal colon and distal colon. This was in concordance with the study done by Fazeli et al which showed the tumor subsite distribution was almost the same between two age groups.<sup>[13]</sup> Similar studies done in Sri Lanka, Singapore and Egypt show no significant difference in the subsite location of colorectal cancer in both the age groups.<sup>[9,12,14]</sup> This finding is in contradiction to the Western literature, that incidence of CRC is moving towards the proximal colon.<sup>[6]</sup>

Chew et al, in his study found classic adenocarcinoma seen in 30% of patients aged below 40years and 12% of patients aged above 40 years. Mucin secreting adenocarcinoma/ signet ring adenocarcinoma was seen in 16% patients below 40years and 9% patients above 40 years.<sup>[10]</sup> Our study showed concordance results with the study done by Chew et al with significant number of patients below the age of 40 yrs showing mucin secreting adenocarcinoma/signet ring adenocarcinoma (38.09%).

Fazeli et al showed that 45% of younger patients had stage C and 53.2% of older patients had stage B disease.<sup>[13]</sup> Our study showed 66.6% of younger patients and 56.7% of elderly patients presented with Dukes stage B. However the characteristic of tumor staging in our study is limited by the small number of surgically resected specimens.

Few similar studies in the past analyzing the differences in CRC in young have been done considering < 35 years and < 50 years as the cut off age for young patients. Significant findings in these reported studies were an advanced stage of presentation in the young and increase in mucin secreting/signet ring type of adenocarcinoma.<sup>[15,16,17]</sup> However for comparisons, we have included only those studies where, < 40 years was taken as young.

The incidence of CRC in our institution also showed a marginal increase when compared to the previous ten years. Kalyani et al in a 10 yr period from 1997-2006 recorded 72 cases of CRC with 31 colonic carcinoma and 41rectal carcinoma.<sup>[18]</sup> Present study during a 7 yr period from 2007-2013 showed 103 CRC with 49 colonic carcinoma and 54 rectal cancers. A sedentary lifestyle, increased fat, refined carbohydrates and animal protein intake with a low intake of fruits and vegetables is now known to be responsible for CRCs. Non dietary causes include a genetic predisposition. CRC is thought to arise through 2 distinct pathways- chromosome instability and microsatellite instability (MSI). CRC are classified as high frequency MSI (MSI-H) when the instability is seen in at least 30% of the loci examined and as low frequency (MSI-L) when

less than 30% are involved. Tumors which do not show alterations in the DNA sequences are said to be microsatellite stable (MSS). The importance of recognition of MSI is to detect cases of hereditary non polyposis colon cancer and sporadic CRC.<sup>[19]</sup>

Westernization of dietary habits and lifestyle has led to increased incidence of CRC in the young. Colorectal cancer in young patients is associated with aggressive histopathological characteristics and advanced stage at diagnosis. Compared to elderly patients, younger patients are said to be in good physical condition. Even when younger patients seek medical help, colorectal cancer may not be initially suspected in the absence of associated risk factors<sup>[20]</sup>. Less aggressive screening and surveillance may lead to a higher percentage of advanced stage tumors at presentation.

### Conclusion

Our study showed that significant number of cases was diagnosed at young age. Colorectal cancer in young patients are associated with aggressive histopathological characteristics and advanced stage at diagnosis. Most of the lesions were seen in rectum followed by sigmoid colon. This study sends a message to the surgeons and physicians to be aware of colorectal cancer in a young patient presenting with altered bowel habits or bleeding per rectum. This emphasizes the development and implementation of effective screening program in young patients, especially in India where screening guidelines are not efficient.

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