Original Article

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Clinicopathological Features of Colorectal Cancer in Young Patients in Comparison with Older Patients

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ABSTRACT

Background: Colorectal cancer (CRC) has traditionally been considered a disease of older adults; however, recent evidence shows an increasing incidence among younger patients. Understanding the differences in clinicopathological features between young and older individuals is essential for improving early diagnosis, treatment strategies, and outcomes. **Aim**: The primary objective of this study is to compare the demographic profiles and clinicopathological characteristics of younger patients (aged <40 years) with those of older patients (aged ≥40 years) diagnosed with colorectal cancer. **Methods**: Eighty-five consecutive patients admitted to our hospital were prospectively followed for their entire hospital stay or up to 7 days, whichever came first. Each patient's blood glucose measurement was recorded according to ward protocol. Indices included total blood glucose per ward, per patient-day, or patient stay, and percentage blood glucose levels per predefined cut points to assess the incidence of hypo-, eu-, and hyperglycemia. The trial registration number at Clinicaltrials.org is NCT04800861. **Results**: Total data consisted of 645 blood glucose tests from 85 patients and 284 patient-day results, with an average of 2.27 tests per patient-day and 7.59 measurements per patient stay. The percentage of blood glucose in the range (80–180 mg/dL) varied by model, with patient-day showing the highest results at 48.24%, while the percentage of patients with hypoglycemia (blood glucose <60 mg/dL) was highest per patient stay at 1.18%. **Conclusions**: Younger colorectal cancer patients in this study presented more frequently with rectal tumors, poor differentiation, and advanced disease stages. Despite similar symptom profiles, delayed diagnosis may contribute to worse pathological features. These findings support the need for greater awareness and consideration of earlier screening in younger populations.

Keywords: diabetes mellitus, inpatient, performance measure, glycemic control, critical care unit, glucometrics.

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INTRODUCTION

Cancer remains a leading global cause of mortality and a significant obstacle to increasing life expectancy. Among malignancies, colorectal cancer (CRC) ranks as the fourth most commonly diagnosed cancer and accounts for approximately 9.2% of global cancer-related deaths. It is currently the second leading cause of cancer mortality worldwide.[1] In recent decades, the global incidence of CRC has shown a marked increase.[2] While approximately 60% of CRC cases are diagnosed in developed nations, the incidence is also rising in developing countries, including those in the Middle East.[3] Traditionally, CRC is considered a disease of older adults: approximately 90%

of CRC cases occur in individuals aged 55 years and older, with 50% diagnosed in those over 75 years.[4] However, emerging epidemiological data indicate an alarming increase in CRC incidence among younger individuals in both Western and non-Western populations.[5] Notably, early-onset CRC in younger patients is often associated with more aggressive histological features and advanced disease at diagnosis, necessitating more intensive treatment approaches.[6] The prognosis in this demographic is particularly concerning, given the potential impact of the disease and therapy on fertility, career development, psychosocial well-being, and overall life expectancy.[7] Although there is no universal consensus, the definition of "young" CRC patients generally includes individuals aged ≤40 years; however, some studies have used alternative cutoffs such as 30 or 45 years.[8] Western literature reports a relatively low incidence of early-onset CRC, estimated between 2.3% and 5.8% of all cases.[9] In contrast, higher proportions—ranging from 17% to 36%—have been observed in studies from Asia and Africa.[10] Several studies have debated the prognosis and clinical features of CRC in younger patients. Research has suggested a male predominance, a higher frequency of right-sided tumors, and more advanced tumor stages with poorer differentiation at presentation, which may contribute to a worse overall prognosis.[11-14].

MATERIALS AND METHODS

Study Design and Setting: This retrospective observational study was conducted at the Surgical Department of the Gastroenterology and Hepatology Hospital, Medical City, Baghdad, Iraq. The study reviewed medical records and histopathological reports of patients newly diagnosed with colorectal cancer (CRC) between January 2020 and January 2021.

Inclusion and Exclusion Criteria: Patients were eligible for inclusion if they were newly diagnosed with CRC during the study period and had complete clinical and pathological data. Exclusion criteria included patients with recurrent CRC, a prior diagnosis of inflammatory bowel disease, or other gastrointestinal malignancies such as gastrointestinal stromal tumors (GISTs), neuroendocrine tumors (NETs), or lymphoma. Out of 80 patient records reviewed, 66 met the inclusion criteria and were included in the final analysis; 14 cases were excluded due to incomplete follow-up data. Data on demographic, clinical, and pathological characteristics were extracted from patient records. The variables collected included age, gender, body mass index (BMI), smoking status, family history of cancer, presenting symptoms, tumor location, tumor grade, TNM Stage (based on the American Joint Committee on Cancer [AJCC] classification), and associated comorbidities (diabetes mellitus, Hypertension, and cardiovascular disease).

Statistical Analysis: All statistical analyses were performed using SPSS software, version 22.0. Categorical variables were summarized using frequencies and percentages. The Chi-square test was used to evaluate associations between categorical variables. The analysis of variance (ANOVA) test was used to compare means across more than two groups, while the paired *t*-test was applied to compare two related means where applicable. A *p*-value of less than 0.05 was considered statistically significant.

RESULTS

Demographic and Clinical Pathological Characteristics

A total of 66 newly diagnosed colorectal cancer (CRC) patients were included in the analysis, comprising 36 males (54.5%) and 30 females (45.5%), with a mean age of 47.12 ± 10.5 years (range: 20–70 years). Patients were stratified into two groups: those younger than 40 years (n=26, 39.3%) and those aged 40 years or older (n=40, 60.6%). Table 1 shows that no significant differences were observed in gender, BMI, or presenting symptoms between age groups. However, comorbidities (hypertension, diabetes, coronary disease) were significantly more prevalent in older patients ($p < 0.05$), while the family history of CRC was slightly higher in younger patients, though not statistically significant.

Younger patients had a significantly higher prevalence of rectal tumors ($p = 0.026$) and poor tumor differentiation ($p < 0.002$), suggesting more aggressive disease. TNM stage distribution was similar between groups, though younger patients showed a higher proportion of advanced-stage cancers. Figure 1 shows that rectal bleeding was the most common symptom in both age groups. Other symptoms (e.g., changes in bowel habits, abdominal pain) varied slightly but without significant differences. Figure 2 shows that older patients exhibited a trend toward higher-stage presentation (Stage III/IV). Figure 4 shows that colonic cancer was more common in older patients, compared to rectal cancer, which slightly differed between the age groups.

Table 1: Patients' demographic and clinical characteristics based on age group

Variable	Category	Total (n=66)	Age Group		P Value
			< 40 years (n=26)	≥40 years (n=40)	
Gender	Male	36 (54.5%)	14 (53.8%)	22 (55.0%)	0.915
	Female	30 (45.5%)	12 (46.15%)	18 (45.0%)	
Clinical Features	Rectal Bleeding	34 (51.5%)	13 (50.0%)	21 (52.5%)	0.132
	Changes in Bowel Habit	13 (19.6%)	4 (15.38%)	9 (22.5%)	
	Abdominal Pain	12 (18.18%)	5 (19.2%)	7 (17.5%)	
	Obstruction	4 (6.06%)	2 (7.69%)	2 (5.0%)	
	Others	3 (4.54%)	2 (7.69%)	1 (2.5%)	
BMI	< 25	32 (48.48%)	13 (50.0%)	19 (47.5%)	0.923
	25-29.9	18 (27.27%)	7 (26.9%)	11 (27.5%)	
	>29.9	16 (24.24%)	6 (23.07%)	10 (25.0%)	
Family History	CRC	4 (6.06%)	2 (7.69%)	2 (5.0%)	0.373
	hypertension	6 (9.09%)	1 (3.8%)	5 (12.5%)	<0.002
	Smoker	4(6.06%)	1(3.8%)	3 (7.5%)	0.108
	D.M.	8 (12.12%)	1(3.8%)	7 (17.5%)	0.003
	Coronary Heart Disease	7 (10.6%)	1(3.8%)	6 (15.0%)	0.004
	Other Disease	2 (3.03%)	0 (0.0%)	2(5.0%)	0.142

Table 2: Patients' pathological characteristics based on age group

Variable	Category	Total (n=66)	Age Group		P Value
			<40 years (n=26)	≥40 years (n=40)	
Tumor Site	Colon	26 (39.3%)	8 (30.7%)	18(45.0%)	0.026
	Rectum	40 (60.6%)	18 (69.2%)	22 (55.0%)	0.026
Tumor Grade	Well	31 (46.9%)	10 (38.46%)	21 (52.5%)	<0.002
	Moderate	28 (42.4%)	12 (46.15%)	16 (40.0%)	
	Poor	7 (10.6%)	4 (15.3%)	3 (7.5%)	
TNM stage	I	7(10.6%)	3 (11.5%)	4 (10.0%)	0.376
	II	28 (42.4%)	10 (38.46%)	18 (45.0%)	
	III	23 (34.8%)	10 (38.46%)	13 (32.5%)	
	IV	8 (12.12%)	3 (11.5%)	5 (12.5%)	

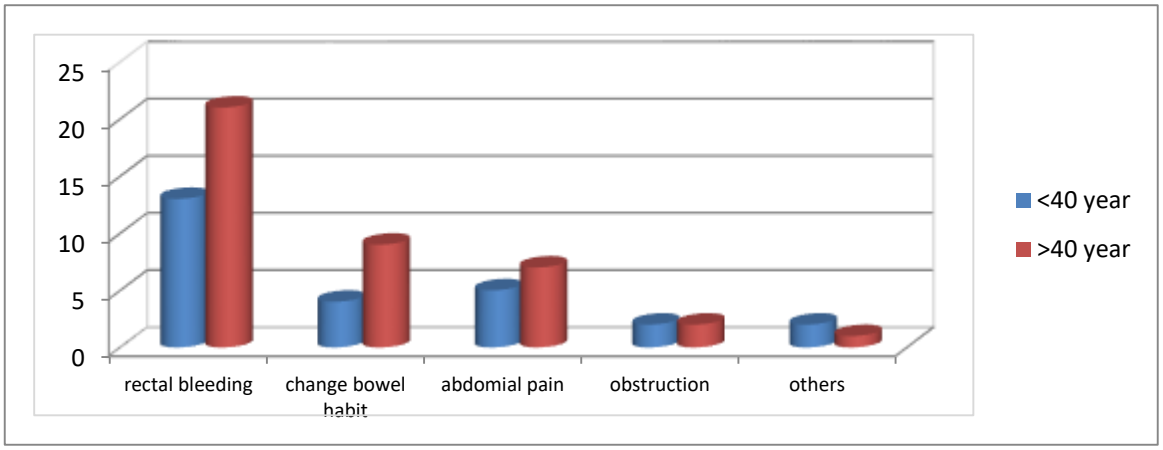

Figure 1: Graph showing clinical presentations based on age group

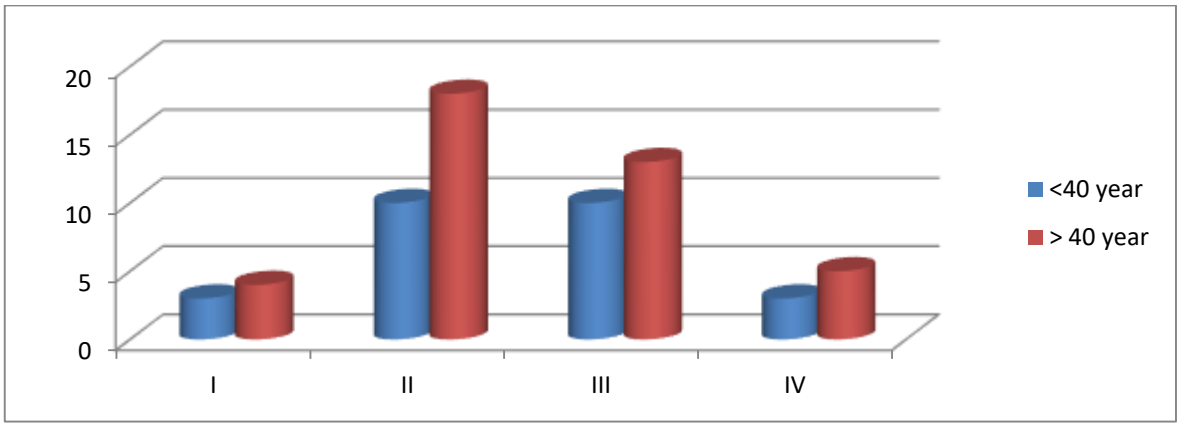

Figure 2: Graph showing tumor stage based on age group

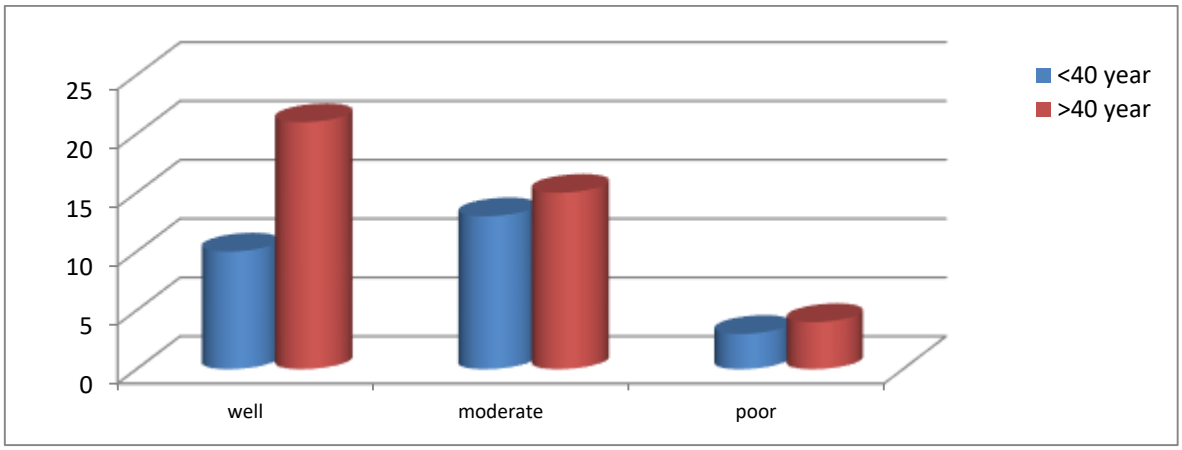

Figure 3: Graph showing tumor grade based on age

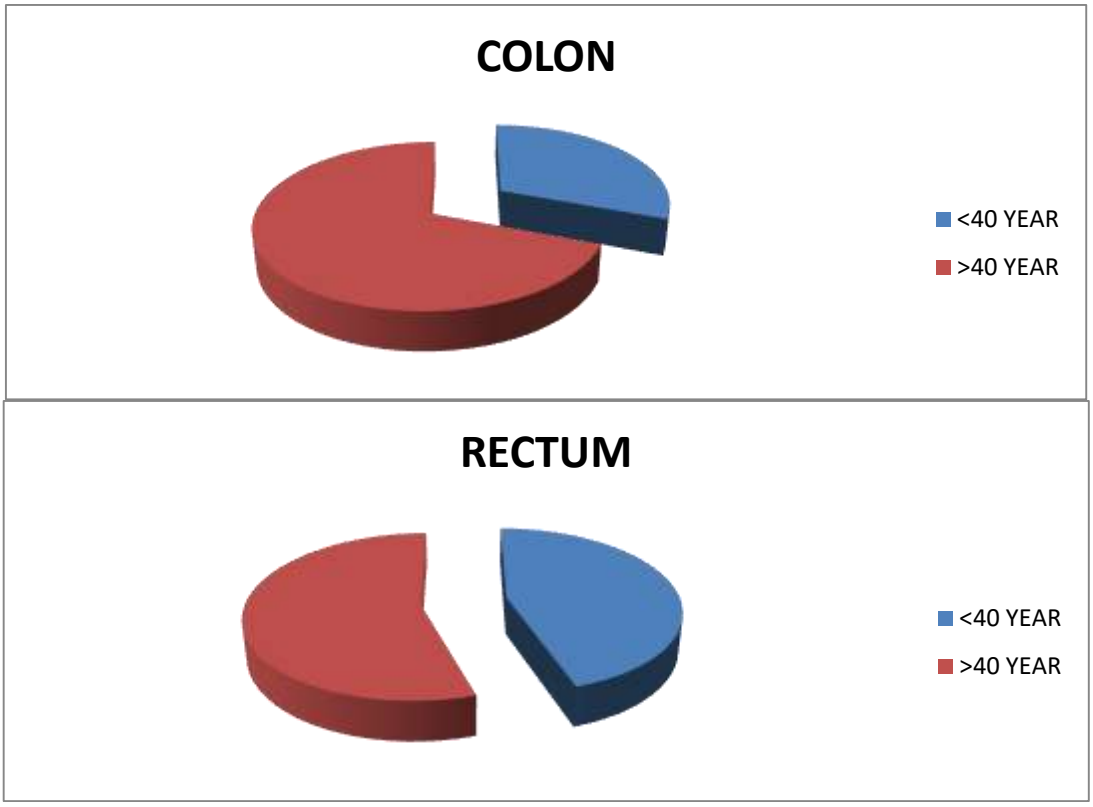

Figure 4: Graph showing tumor site based on age

DISCUSSION

The rising incidence of colorectal cancer (CRC) among younger individuals has been increasingly documented in recent years.[15,5] In the present study, we examined the clinicopathological features of CRC concerning age, and our findings reinforce the concern that early-onset CRC tends to present with more aggressive biological behavior and distinct anatomical distribution. Our results showed that younger patients were more likely to present with rectal tumors compared to older patients (69.2% vs. 55%; $p = 0.026$). This finding is consistent with prior studies indicating a higher prevalence of rectal cancer in patients under 40 years of age.[16] Similarly, one study found rectosigmoid tumors in approximately 75% of younger patients.[17] Conversely, some studies have reported a higher frequency of colon tumors in younger patients.[15], suggesting that anatomical distribution may vary by population and region. Histologically, poor tumor differentiation was significantly more common in the younger cohort ($p < 0.002$), supporting previous literature that has described more aggressive features in early-onset CRC.[18] Additionally, a higher proportion of younger patients presented with Stage III and IV disease (38.4% and 11.5%, respectively), although the difference in staging between the two groups did not reach statistical significance ($p = 0.376$). These results are compatible with findings from earlier studies indicating that advanced-stage presentation is more frequent in younger individuals.[6] The advanced disease in younger patients may be attributed to diagnostic delays, partly due to the absence of routine screening in this age group and lower clinical suspicion.[6] Although symptom presentation was similar across age groups—rectal bleeding being the most common—previous work has shown that the time interval from symptom onset to diagnosis is often longer in younger patients.[19] This diagnostic delay may contribute to the more advanced disease at presentation. Comorbidities such as diabetes, hypertension, and coronary artery disease were significantly more prevalent among older patients, as expected. These findings reflect typical age-related health patterns and have implications for treatment planning and prognosis.[20] Age thresholds defining "young" CRC patients vary among studies, with cutoffs ranging from 30 to 45 years .[19] In this study, we used 40 years as the cutoff, which aligns with many prior

investigations and reflects a commonly accepted point for initiating CRC screening in the general population.

Taken together, our findings align with existing literature, confirming that CRC in younger patients is more likely to be aggressive, rectally located, and diagnosed at a later stage. These characteristics underscore the urgent need to enhance early detection strategies and raise awareness of CRC in younger age groups, especially in low- and middle-income countries where screening programs may be limited.

CONCLUSIONS

Younger colorectal cancer patients in this study presented more frequently with rectal tumors, poor differentiation, and advanced disease stages. Despite similar symptom profiles, delayed diagnosis may contribute to worse pathological features. These findings support the need for greater awareness and consideration of earlier screening in younger populations.

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