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Original Article

Comparative Analysis of Colorectal Cancer in Patients Aged above and below 50 years in Northern Iran

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ABSTRACT

Background:
The incidence of colorectal cancer (CRC) has been rapidly increasing in individuals under the age of 50 over the past decade, highlighting the need for greater focus and research to optimize screening strategies. The aim of this study was to compare the clinical and endoscopic features of CRC in patients younger than 50 years with those aged 50 years and older

Materials and Methods:
In this cross-sectional study, we analysed data from 148 patients with newly diagnosed CRC. The patients were divided into two groups: those under 50 years of age (<50 years) and those aged 50 years or older (≥50 years). Demographic, clinical, and endoscopic information from both groups was statistically compared using SPSS software.

Results:
Of the 148 patients, 38.5% were under 50 years of age, while 61.5% were 50 years or older. In the <50 years group, the number of women was statistically higher than men, whereas in the ≥50 years group, men were more frequently affected (P=0.005). Patients under 50 years were also more likely to have a family history of CRC in both first-degree (P=0.040) and second-degree (P=0.001) relatives. Hematochezia was more common in the <50 years group (P=0.014), while abdominal pain was significantly more frequent in the ≥50 years group (P=0.009). No significant differences were observed between the two groups in terms of BMI (P=0.816), smoking (P=0.974), opium addiction (P=0.772), or tumor location (P=0.309).

Conclusion:
There is a pressing need to raise awareness about early-onset CRC, identify high-risk young individuals for screening, and ensure prompt evaluation of CRC symptoms.

Keywords: Colorectal neoplasms, Colonoscopy, Colorectal cancer, Early onset colorectal cancer, Colon cancer, Rectal cancer

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INTRODUCTION

Colorectal cancer (CRC) is a major global health concern, ranking as the third most commonly diagnosed cancer and the third leading cause of cancer-related deaths worldwide (1, 2). In Iran, recent studies indicate a rising incidence of CRC, now ranking as the third most common cancer in men and the fourth in women, with higher rates observed in the central, northern, and western regions (3-5).

The incidence and mortality rates of CRC have been declining in adults over 50 years of age, likely due to enhanced screening programs and preventive measures (6). However, an alarming increase in CRC cases among younger adults has been documented (7). Most CRC cases in young adults are sporadic, likely due to behavioral and environmental factors; however, the exact etiology remains unclear. The recent increase in CRC cases among young individuals highlights the need for further research and focused attention (7).

In recent years, numerous studies have been published examining CRC and familial CRC, highlighting evolving insights into epidemiology, genetic predisposition, clinical management, and prevention strategies. These findings underscore the importance of investigating age-related differences in CRC within our population (8, 9).

Unlike in Western countries, where numerous studies have explored all aspects of CRC (10, 11), there are few studies comparing CRC across different age groups in Middle Eastern countries like Iran. Therefore, the aim of this study was to compare demographic, clinical, and endoscopic characteristics between patients with CRC younger than 50 years and those aged 50 years or older.

MATERIALS AND METHODS

In this cross-sectional study, we utilized data from 148 newly diagnosed patients with cecal or rectal cancer. The database was retrospectively gathered from patients who underwent diagnostic colonoscopy at Rohani Tertiary University Hospital between September 2009 and March 2019. The results of the colonoscopic examinations and pathological evaluations were used to confirm the diagnosis of CRC. Patients with a history of CRC and those with incomplete data were excluded. Patient information remained confidential throughout the study. Approval was obtained from the Ethics Committee of Babol University of Medical Sciences (Approval code: IR.MUBABOL.HRI.REC.1398.374).

The sample size was calculated using the formula from a previous study by Chen et al. (12), which recommended 63 participants per group, resulting in a minimum total sample size of 126. The calculation was based on $\alpha = 0.05$, $\beta = 0.20$, $P1 = 0.72$, $P2 = 0.63$, and $d = 0.3$.

$$n=\frac{(Z_{1-\alpha/2}+Z_{1-\beta})^2 (P_1 (1-P_1)+P_2 (1-P_2))}{d^2}$$

Data on age at diagnosis, sex, body mass index (BMI), symptoms, smoking, opium consumption, anatomical subsites of cancer, and family history of cancer in first- and second-degree relatives were collected. Paraclinical data, including colonoscopy results, site of involvement, and pathology findings, were also recorded.

Data were statistically analyzed using the Chi-square, Fisher's exact test, and independent samples t-tests. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, 2019). A significant level of 0.05 was considered.

RESULTS

After excluding patients with incomplete file data, 148 patients were recruited, of whom 81 (54.7%) were men and 67 (45.3%) were women. The average age of patients under 50 years was 44.49±5.97 years, and the average age of patients 50 years or older was 69.43±8.30 years. Among the patients, 38.5% (n=57) were under 50 years, and 61.5% (n=91) were 50 years or older (Table 1).

Regarding sex, 40.4% of patients under 50 years were men, and 59.6% were women, whereas in patients aged 50 years and older, 63.7% were men, and 36.3% were women. These statistics indicate that in the <50 years group, the number of women was statistically higher than men, whereas in the ≥50 years group, men were more frequently affected than women (P=0.005). Concerning family history of CRC, 26.3% of patients under 50 years and 22% of patients aged 50 years and older reported CRC in at least one first-degree relative, although most patients in both groups did not have a family history of CRC. The proportion of patients with a family history of CRC in first-degree relatives was statistically higher in the <50 years group (P=0.040). Additionally, a family history of CRC in second-degree relatives was more frequent in the younger group (P=0.001). Regarding clinical symptoms, hematochezia was more common in patients under 50 years (P=0.014), while abdominal pain was significantly more frequent in patients aged 50 years and older (P=0.009). In both age groups, most tumours were located on the left side of the colon. No significant differences were observed between the two groups in terms of BMI (P=0.816), smoking (P=0.974), or opium addiction (P=0.772, Table 1). There was no statistically significant difference in BMI between individuals under 50 years and those aged 50 years or older (P=0.816, Table 2). Additionally, as shown in Table 3, no significant association was found between symptoms and age groups.

Table 1. Demographic and clinical characteristics by age group category (<50 vs. ≥50)

Variables		Age				P value
		<50		≥50		
		Count	Percent	Count	Percent	
Sex	Male	23	40.4%	58	63.7%	0.005†
	Female	34	59.6%	33	36.3%	
Smoking	No	48	84.2%	77	84.6%	0.974†
	Yes	9	15.8%	14	15.4%	
Opium addiction	No	51	89.5%	80	87.9%	0.772†
	Yes	6	10.5%	11	12.1%	
Family History of Cancer in first-degree relatives	None	41	71.9%	58	63.7%	0.040†
	Colorectal cancer	15	26.3%	20	22.0%	
	Other cancers	1	1.8%	13	14.3%	
Family History of Cancer in second-degree relatives	None	25	43.9%	75	82.4%	0.001†
	Colorectal cancer	27	47.4%	11	12.1%	
	Other cancers	5	8.8%	5	5.5%	
Site of involvement	Right side*	18	31.6%	26	28.6%	0.309†
	Left side*	29	50.9%	39	42.9%	
	Rectum	10	17.5%	26	28.6%	

†Chi-square test was used. §Fisher's exact test was used.

*The right side of the colon was defined as the cecum, the ascending colon, the hepatic flexure, and the transverse colon. The left side of the colon was defined as the descending colon, sigmoid, and rectosigmoid.

Table 2. Relationship between BMI and age group category

Age	Count	Mean	SD	P value†
<50	57	27.26	5.37	0.816
≤50	91	27.31	5.81	

†Independent samples t-test.

Table 3. Association between symptoms and age group category

Symptoms		Age				P value
		<50		≥50		
		Count	Percent	Count	Percent	
Hematochezia	No	41	71.9%	80	87.9%	0.014†
	Yes	16	28.1%	11	12.1%	
Anemia	No	49	86.0%	74	81.3%	0.491†
	Yes	8	14.0%	17	18.7%	
Melena	No	53	93.0%	85	93.4%	1.000§
	Yes	4	7.0%	6	6.6%	
Loss of appetite and weight loss	No	41	73.2%	55	60.4%	0.099†
	Yes	15	26.8%	36	39.6%	
Nausea and vomiting	No	50	87.7%	75	82.4%	0.386†
	Yes	7	12.3%	16	17.6%	
Constipation	No	37	64.9%	70	76.9%	0.112†
	Yes	20	35.1%	21	23.1%	

Table 3. Association between symptoms and age group category

Symptoms		Age				P value
		<50		≥50		
		Count	Percent	Count	Percent	
Abdominal pain (other than obstruction)	No	52	91.2%	67	73.6%	0.009†
	Yes	5	8.8%	24	26.4%	
Obstruction	No	55	96.5%	85	93.4%	0.711§
	Yes	2	3.5%	6	6.6%	
Other symptoms (including rectal pain, abdominal mass, rectal mass, occult blood in stool)	No	54	94.7%	88	96.7%	0.676§
	Yes	3	5.3%	3	3.3%	

†Chi-square test was used.

§Fisher's exact test was used.

DISCUSSION

In our study, 38.5% of patients with CRC were under 50 years of age, which is higher than previously reported in Iran. This discrepancy may be due to the sample size of our study (13). However, the proportion of young-onset CRC cases in studies from Iran is significantly higher compared with Western countries (14, 15).

The high incidence of CRC among younger individuals in Iran may be attributed to two factors. First, Iran has a large proportion of young people (13), and it is possible that the current elderly generation was exposed to fewer environmental risk factors during their youth. In contrast, the younger generation may be more exposed to environmental factors due to the adoption of a Western lifestyle (16, 17). This finding highlights the need for targeted screening or diagnostic methods for younger individuals in this region who may be at higher risk of developing CRC based on clinical symptoms or risk factors.

In the present study, a statistically significant difference was found between sex and the incidence of CRC in the two age groups. In individuals under 50 years of age, the number of women was statistically higher than men, while in the ≥50 years group, men were more frequently affected than women (P=0.005). Ansari and colleagues reported that the incidence of CRC was higher in men than in women, which is consistent with our findings. However, in individuals under 45 years of age, the rates of CRC were the same in both sexes (13).

The study by Low and colleagues found that most individuals in both age groups were men (18). Chambers and others observed that the incidence of CRC in the 20 to 49 years age group was similar for both sexes (19). Additionally, Chen and others found no significant difference in age-related incidence between the sexes (12). The varying findings across these studies may be attributed to the different genetic and environmental factors considered in each study.

In our study, no statistically significant relationship was found between BMI and age groups in patients with CRC. In the study by Low and colleagues, BMI was lower in the older age group (18). However, in the study by Pandey and others, BMI was lower in the younger age group, and it was suggested that lower BMI was associated with a higher mortality rate (7). Numerous studies have shown that a high BMI increases the risk of CRC (20,21,22). However, data on statistical differences in BMI among patients with CRC across age groups remain conflicting.

In our study, hematochezia was the most common symptom in patients under 50 years of age, while abdominal pain was the most common symptom in patients aged 50 years and older, with a statistically significant difference between the two age groups (P=0.003). In Goh's study, abdominal pain, rectal bleeding, and changes in bowel habits were the most common symptoms reported in young patients (22).

In the current study, although most patients in both age groups did not have a family history of CRC, the number of patients with a family history of CRC among first- and second-degree relatives was statistically higher in those under 50 years of age. While the minority of CRC cases in adults under 50 are due to inherited CRC syndromes, the importance of family history should not be underestimated. Mork and others noted that a family history of CRC increases the likelihood of developing CRC before the age of 50 (23). Similar findings were reported by Wei and co-workers (24). Therefore, screening young family members of patients with CRC is highly valuable.

In both age groups, most tumors were located on the left side of the colon, and no statistically significant difference was observed between the groups in this regard (P=0.309). While most CRC cases are localized in the rectum and sigmoid colon, substantial variations in tumor location across different age groups have been reported. Siegel and

colleagues indicated that with advancing age, a greater proportion of colorectal tumors occur in the proximal colon (1), while other studies have reported no significant differences in the anatomical sites of CRC across age groups (19, 25). These discrepancies may be attributed to differences in genetic patterns within the populations studied, as well as variations in sample sizes.

This information highlights the importance of focusing on specific target groups, enabling better planning to reduce economic costs through early screening, diagnosis, and treatment. However, our study had some limitations, including a small sample size and its cross-sectional design, which limit the ability to establish causal relationships. Our findings should be interpreted in the context of an expanding literature on CRC and hereditary CRC syndromes that has emerged in recent years, emphasizing the role of genetic factors, changing epidemiologic trends, and the need for tailored screening strategies for younger at-risk individuals to help improve cancer control strategies.

CONCLUSION

An increase in the incidence of CRC in patients younger than 50 years has been observed over the past decade, highlighting the need to raise awareness about CRC among young individuals. Improving adherence to screening among eligible young patients and ensuring early evaluation of symptoms are crucial steps to reducing the burden of CRC and improving outcomes in this age group.

CONFLICTING INTERESTS

The authors declare no conflict of interest related to this work.

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