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Original Article

Clinicopathologic comparison between proximal and distal colorectal cancers

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Abstract

Background: Different anatomical structure and physiologic function of colon and rectum guided some researchers to examine probable molecular, clinical and pathologic differences of rectal and colonic cancers. Awareness about characteristics of colorectal tumors at different anatomical sites enables better cancer control strategies.This study aimed to compare the clinicopathologic features of cecal and rectal cancers.

Methods: In this cross-sectional study, Demographic, clinical and pathologic information of patients with newly diagnosed rectal and cecal cancer were statistically compared, using SPSS software.

Results: 98 patients with cancer of rectum and 53 patients with cancer of cecum were included, the mean age of patients with cecal cancer was significantly higher than rectal cancer (P= 0.012) and the odds of cecal cancer in patients older than 50 years old was two times more than the younger ones**.** The number of male patients was significantly higher than female patients in rectal cancer group comparing with cecal cancer group (P=0.016). 41.8% of patients with cecal cancer and 20.8% of patients with rectal cancer had smoking risk factor (P=0.012). Abdominal pain was more frequent in cecal cancer group (P=0.007) and the proportion of rectal bleeding was significantly higher in rectal cancer group (P=0.006). In terms of histopathologic findings, rectal tumors tend to be more differentiated than cecal cancers (P= 0.004).

Conclusion: Despite the differences of proximal and distal colorectal cancers, due to the lack of enough evidence in this area, it is not possible yet to conclude whether rectal and colon cancer are distinct diseases or not.

Keywords: colorectal cancer, rectal cancer, cecal cancer, clinical features, pathologic features

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Colorectal cancer is a leading cause of the death in the world (1-3).Traditionally, colorectal cancer was known to be a disease of western countries (1),but recent studies have shown an increasing trend in the incidence rate of colorectal cancer in other parts of the world including Asia and the Middle east(1, 4). Colon cancer and rectal cancer are considered as a single tumor entity**,** however, the different embryological origin, anatomical structure and function of colon and rectum have raised the concerns that colon and rectal cancer are different entities from a clinical and tumor biological point of view and guided some researchers to study probable different aspects of colorectal cancer located at different anatomical sites (5-7). Determining Colorectal tumors at different anatomic sites have variable clinical characteristics (8). In the proximal colon, tumors typically present at a later stage with a poorer prognosis than those in the distal colon and rectum (9-11). Patients with rectal cancer tend to be younger than patients with tumors in the proximal colon (11).Women are more likely to develop cancers in the proximal colon, whereas in men cancers are more common in the distal colon region (12). Unlike western countries where studies about all aspects of colorectal cancer are numerous (13, 14),

There are few studies comparing the differences between colorectal cancers in different anatomical subsites in the Middle Eastern countries like Iran. Thus, the aim of this study was to compare the clinical and pathological differences between cancers in proximal part of colon and rectum.

Methods

In this cross-sectional study we utilized data of 169 newly diagnosed patients with cecal or rectal cancer.This database was gathered retrospectively from the patients who underwent diagnostic colonoscopy in Rouhani Tertiary University Hospital-the largest hospital in North of Iran- between September 2009 to March 2019. The rectal cancer group included carcinomas of rectosigmoid, rectum and anal canal. The cecal cancer group included carcinomas of cecum, the most proximal part of colon. The data regarding age at diagnosis, gender, body mass index (BMI), symptoms, smoking, opium consumption as well as anatomical subsite of cancer and cancer type were extracted. Patients with synchronous malignancy and incomplete data were excluded from the study. Demographic and clinicopathologic information of the patients with cecal and rectal cancer were statistically compared with SPSS software (Version 24, IBM, Chicago, IL, USA). Differences in clinical and pathological characters between colonic and rectal cancer were performed by Pearson's Chi-squared for categorical variables and *t*-test for interval ones. Differences were considered significant when P-value (two tailed) was less than 0.05.

Results

After exclusion of cases with we incomplete file data and synchronous colon and rectal cancer, A total of 151 patients were recruited (35% [n=53] with cecal cancer and 65% [n= 98] with rectal cancer). Demographic characteristics, clinical and histological features of the patients are shown in table 1. 43/4% (n=23) of patients with cecal cancer and 64/3 % (n=63) of patients with rectal cancer were men. Women constituted 56.6% (n=30) of patients with cecal cancer and 35.7% (n=35) of rectal cancer group. Regarding the demographic data.

The mean age of patients with cecal cancer was significantly higher than the age of patients with rectal cancer (P = 0.012)**,** Patients older than 50 years old had higher odds of cecal cancar in comparison to younger ones.(OR 2.04 95% CL 1.03 to 4.02), also the number of male patients was significantly higher than female patients in rectal cancer group comparing with cecal cancer group (P =0.016). Regarding risk factors,20.8% of patients with rectal cancer and 41.8% of patients with cecal cancer had smoking risk factor, which means that smoking is statistically more frequent in rectal cancer group.(P=0.012), while there was no statistical significant difference between the groups of rectal and cecal cancer in terms of opium addiction (P = 0.141).

On the other hand,smoking was associated with increased odds of rectal cancer (OR=2.74 95% CI 1.26 to 5.96) compared to non-smokers in adjusted analysis (Table 2). Regarding clinical symptoms, abdominal pain was more frequent in cecal cancer group (P=0.007) and the proportion of rectal bleeding was significantly higher in rectal cancer group (P = 0.006). There was no statistically significant difference between two groups regarding bloating (P = 0.067), constipation (P= 0.223) and weight loss (P = 0.284). In terms of histopathological findings, 74.5% of patients with rectal cancer and 47.2% of patients with cecal cancer, had well differentiated adenocarcinoma, which means that rectal tumors tend to be more differentiated than cecal cancers (P= 0.004), figure 1.

Table 1. Demographic characteristics, clinical and histological features of the patients in cancer of rectum and cecum

Characteristics	Cancer of Rectum, n(%)	Cancer of Cecum, n(%)
Gender		
Male	63 (64.3%)	23 (43.4%)
Female	35 (35.7%)	30 (56.6%)
Mean age, years	57.64	63.67
<50	58 (72.5%)	22 (27.5%)
≥50	40 (56.3%)	31 (43.7%)
BMI (body mass index: kg/m²)	25.14	25.95
Normal	50 (65.8%)	48 (34.2%)

Characteristics	Cancer of Rectum, n(%)	Cancer of Cecum, n(%)
Abnormal	48 (64%)	27 (36%)
Smoking	41 (41.8%)	11 (20.8%)
Opium addiction	10 (10.2%)	10 (18.9%)
Symptoms		
Abdominal Pain	26 (26.5%)	26 (49.1%)
Rectal bleeding	63 (64.3%)	21 (39.6%)
Constipation	35 (35.7%)	25 (47.2%)
Bloating	8 (8.2%)	10 (18.9%)
Weight loss	31 (31.6%)	22 (41.5%)
Histologic differentiation		
Well differentiated	73 (74.5%)	25 (47.2%)
Moderately differentiated	14 (14.3%)	15 (28.3%)
Poorly differentiated	11 (11.2%)	13 (24.5%)

Table 2. Logistic regression analysis of factors associated with rectal and cecal cancer

	Odds Ratio Value	95% Confidence Interval		P-value
		Lower	Upper	
Sex (male / female)	2.34	1.18	4.64	0.016
Age (≥50/<50)	2.04	1.03	4.02	0.039
Body Mass Index (BMI: kg/m ^{2}) (Abnormal/Normal)	0.92	0.47	1.8	0.818
Smoking (yes / no)	2.74	1.26	5.96	0.012
Opium addiction (yes / no)	0.48	0.18	1.26	0.141
Abdominal Pain(yes / no)	0.37	0.18	0.75	0.007
Rectal bleeding(yes / no)	2.74	1.37	5.45	0.006
Constipation(yes / no)	0.62	0.31	1.22	0.223
Bloating`(yes / no)	0.38	0.14	1.03	0.067
Weight loss(yes / no)	0.65	0.32	1.30	0.284
Histologic differentiation (Well / Moderately and Poorly differentiated)	3.27	1.61	6.61	0.001

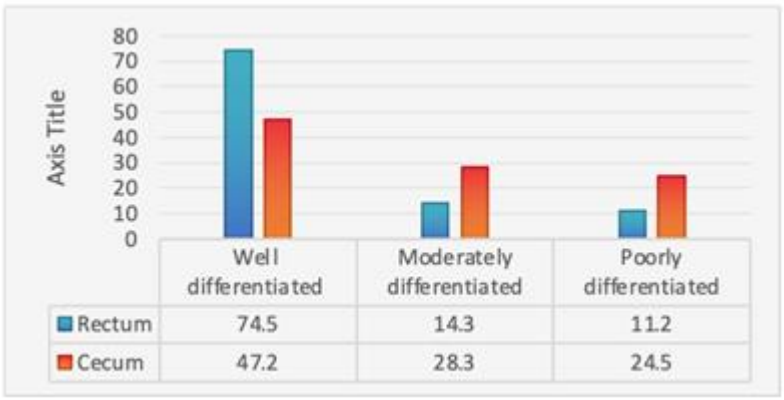

Figure 1. Histologic differentiation in cancers of rectum and cecum

Discussion

Our study showed some differences in risk factors, demographic and histopathological characteristics in colorectal cancers located at cecum and rectum. In this study, the mean age of patients with cecal cancer was significantly higher than patients with rectal cancer, which means that patients with rectal cancer tend to be younger. Multiple studies have shown an age shift toward older age in rectal to cecal cancer (11, 13, 15, 16). According to our findings, the number of male patients was significantly higher than female patients in rectal cancer group comparing to cecal cancer group. Notably, males had significantly higher odds relative to females for rectal cancer, a finding also supported by prior research (13). Gender difference in anatomical subsides of colon and rectal cancer is still unclear. Women are more likely to develop cancers in the proximal colon, whereas in men cancers are more common in the distal colon region (12),however there are few studies regarding this issue so far (7, 11, 13). No significant difference was between patients with rectal and cecal cancer in terms of BMI.

In our study, smoking was seen more frequent in patients with rectal cancer comparing with patients with cecal cancer.Botteri *et al.* indicated that smoking is associated with CRC cases displaying high microsatellite instability, which tend to arise from the serrated pathway of CRC. Nevertheless, the data regarding association of smoking and anatomical subsite of colorectal cancer is conflicting (13, 17, 18). In our study, rectal bleeding was seen more frequently in patients with rectal cancer compared to patients with cecal cancer, while abdominal pain was seen more in cecal cancer. Anatomical characteristics of cecum versus rectum make some symptoms more common in each (19). In tumors that are located in distal part of colon and rectum, rectal bleeding is common, However pain in rectal cancer is rare except neural involvement of anal canal or the surroundings happens (20, 21). In terms of weight loss and constipation, there were no statistical differences in patients with rectal versus those with cecal cancer in our study. Symptoms such as constipation and weight loss showed no statistically significant difference.

We also observed histopathological differences between cecal and rectal cancer in our patients. In fact, rectal cancers were more differentiated than cecal cancers.The findings regarding tumor differentiation in colorectal cancers show a considerable variation in different studies. To illustrate, in a study from south of Iran, no significant difference was detected in colon versus rectal cancer group (7). This is in contrast to the findings of Liu et al. (22). This can be due to the differences in the genetic and environmental factors in different parts, however due to the lack of sufficient studies in the field of pathological differences between rectal and cecal cancer, the actual statistics are unknown. Our study had limitations including the small sample size and the cross-sectional nature of the study which weakens the ability to evaluate causal relationships, so future studies with larger sample size and multiple treatment centers are warranted. Our study findings show that the demographic features, risk factors and histologic grade may differ by anatomic site of colorectal cancer. Information about different aspects of colorectal cancer directs us toward better management of colorectal cancer,however, due to the lack of enough evidence in this area,it is not possible yet to conclude whether rectal and colon cancer are to distinct diseases or not. Based on our observations, future comprehensive and appropriate researches that focus on distinctions of colorectal cancers at different anatomical sites may enable better insights into colorectal cancer pathogenesis and cancer control strategies

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Authors' contribution: J SH: Conceptualization, Study design, Data curation, Methodology. CB: Conceptualization, Project administration, Investigation, Methodology, Supervision, Editing the manuscript. M SH: Writing–original draft, Administration. M R: Supervision on pathologic data, H GH: Methodology, Statistical analysis. All authors have reviewed and approved the final manuscript and agreed to the author order.

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