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Original Research Article

The correlation between tumor site and prognostic factors in colorectal cancer

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Abstract: Cancers in the proximal colon, distal colon, and rectum are frequently studied together; however, there are biological differences in cancers across these sites, particularly in the prevalence of microsatellite instability. The aim of the study is to evaluate prognostic factors and survival in CRC patients based on tumor site in Northeastern Iran. Between of 2010 to 2015, 94 patients with CRC referred to Oncology Clinic in Mashhad city, Iran. The patients were divided on two groups based on tumor site (37 patients in colon group and 57 patients in rectum group). The mean follow-up was 30 months. In this interval, there were 19 deaths and 7 patients lost follow-up and therefore, were censored from survival analysis. In results the mean age at diagnosis of colon group was 58.8 years (range, 23-89 years) versus 56.5 years (range, 28-85 years) for rectum group. Mucinous adenocarcinoma was more in colon group compared to rectum group ($P<0.05$). Survival rate and mean for colon group was 79.4% and 17.7 months, respectively, versus 75% and 22.5 months for rectum group, respectively ($P>0.05$). In conclusion the prevalence of rectal cancer in Iran is higher than other studies compared to colon cancer. Also, the mean age of rectal cancer patients were less than colon cancer patients and in all studies; there was no significant difference in survival in two groups.
Keywords: Rectal cancer, Colon cancer, Survival.

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer in the United States, accounting for 10% of all cancer diagnoses, and is the second leading cause of cancer-related death, accounting for 8% of all cancer deaths among men and 9% of all cancer deaths among women [1]. Variation in CRC incidence by tumor site and its association to geography, age, and gender led to the concept of distinct CRC diseases based on proximal or distal location in the large bowel [2]. Cancers in the proximal colon, distal colon, and rectum are frequently studied together; however, there are biological differences in cancers across these sites, particularly in the prevalence of microsatellite instability [3,4]. For example, family history is more strongly associated with risk of proximal colon cancer than rectal cancer [5], and alcohol consumption is more strongly associated with risk of rectal cancer than colon cancer [6]. Also, physical inactivity and body mass index have been associated with colon cancer, but not with rectal cancer [7] or differences in tumor suppressor genes, point mutations, and genetic instability [8]. Specifically, it has been noted that left sided colon lesions have a higher rate of chromosomal instability whereas right sided colon lesions more often show microsatellite instability (MSI) [9]. The aim of study is to evaluate prognostic factors and survival in CRC patients based on tumor site in Northeastern Iran.

MATERIALS AND METHODS

Between of 2010 to 2015, 94 patients with CRC referred to Oncology Clinic in Mashhad city, Iran. The patients were divided on two groups based on tumor site (37 patients in colon group and 57 patients in rectum group). Age, sex, type of pathology, stage, grade, tumor size, lymph node metastasis and survival were analyzed in two groups. The mean follow-up was 30 months. In this interval, there were 19 deaths and 7 patients lost follow-up and therefore, were censored from survival analysis. Overall survival (OS) was defined from the date of diagnosis until death from any cause or the date of the last follow-up. The data were analyzed in IBM SPSS version 19 by T-test for means and Chi-square test for other variables. Also, the survival graph was plotted by GraphPad Prism 5. $P<0.05$ was significant statistically.

RESULTS

The mean age at diagnosis for colon group was 58.8 years (range, 23-89 years) versus 56.5 years (range, 28-85 years) for rectum group (**Table 1**). There is no significant correlation between sex, stage, grade, tumor size and lymph node metastasis with tumor site, but there was between the type of pathology and tumor site (P<0.05). Therefore, mucinous adenocarcinoma was more in colon group compared to rectum group.

Table 1: The correlation between prognostic factors with tumor site (colon vs. rectum) (n=94)

Variables	**Colon** N=37	**Rectum** N=57	**P-value**
Age , years			
Mean	58.8	56.5	0.474*
Range	23-89	28-85	
Sex			0.505**
Male	20(54.1%)	32(56.1%)	
Female	17(45.9%)	25(43.9%)	
Type of pathology			0.014**
Non-mucinous adenocarcinoma	31(83.8%)	56(98.2%)	
Mucinous adenocarcinoma	6(16.2%)	1(1.8%)	
Tumor size, cm			
Mean	4.7	4.4	0.495*
Range	3-8	1.5-8	
Stage			0.354**
I	1(2.7%)	2(3.6%)	
II	13(35.1%)	28(50.9%)	
III	10(27%)	14(25.5%)	
IV	13(35.1%)	11(20%)	
Unknown	-	2	
Grade			0.658**
I	18(48.6%)	24(43.6%)	
II	19(51.4%)	30(54.5%)	
III	0	1(1.8%)	
Unknown	-	2	
Lymph node metastasis			0.137**
Yes	18(48.6%)	20(35.1%)	
No	19(51.4%)	37(64.9%)	

* T-test **Chi-square test

Figure 1 shows 4-year OS for colon group vs. rectum group. Survival rate and mean for colon group was 79.4% and 17.7 months, respectively, versus 75% and 22.5 months for rectum group, respectively. There was no significant correlation between survival in two groups (P>0.05).

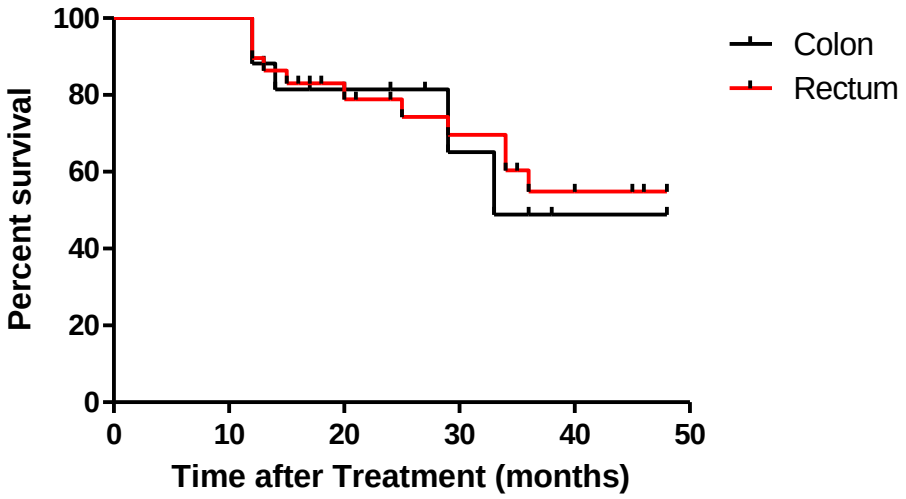

Fig-1: The 4-year survival in patients with colorectal cancer based on tumor site

DISCUSSION

CRC is one of the leading causes of cancer mortality, accounting for about 10% of all cancer deaths, with approximately 40%-50% of all cases diagnosed as metastatic [10]. The oncogenesis of rectal cancer may be more complex than that of colon cancer. Some genes could be new biomarkers for distinguishing between these two cancers [11]. Some statistical reports demonstrated that the most common tumor location is the proximal colon, followed by the rectum [12]. One study in Iran [13], showed the rectum and sigmoid were the most frequent anatomical locations. In CRC patients in another study, 70.3% had colon cancer and 29.7% had rectal cancer [14], and in the study of Zell et al.[15] was 68% colon and 32% rectal cancer cases. In Kirchhoff's study [16], patients had 82% colon and 18% rectal cancer. A research in the West of Iran [17], showed that location of tumors in CRC patients was: rectum (81.8%) and colon (18.2%). Out of 94 patients in our study (Northeast Iran), 39.4% were colon cancer patients and 60.6% were rectal cancer patients. Therefore, the prevalence of rectal cancer in Iran is higher than other studies compared to colon cancer. The median age of rectal cancer patients at diagnosis was 5 years less than colon cancer patients. Male and female had the reverse proportion of colon and rectal cancer. Females accounted for 50.3% of colon cancer group and 43.2% of rectal cancer group [14]. In our research, the mean age of rectal cancer patients was less than colon cancer patients (almost 2.5 years). Also, more of female patients or male patients had rectal cancer compared to colon cancer. The hazard of recurrence and metastasis in rectal cancer was 1.6 times that in colon cancer. In both groups, there were no statistical differences in age, sex, tumor size, type of pathology and grade [18], but in this study, type of pathology between colon cancer group and rectal cancer group had a significant correlation. Mucinous adenocarcinoma was more in colon cancer group compared with non-mucinous adenocarcinoma, but there was no significant correlation in age, sex, tumor size, stage and lymph node metastasis in both groups. In one study, colon cancer patients had better survival than those with rectal cancer [14]. For colon cancer, one-year survival was 67% in the UK and ranged between 71% (Denmark) and 80% (Australia and Sweden) elsewhere. For rectal cancer, one-year survival was also low in the UK (75%), compared to 79% in Denmark and 82-84% elsewhere [19]. Another study [20], reported that 5-year survival for patients with colonic tumors was 76%, and for rectal tumors was 69%. In our study, 4-year survival was 79.4% in colon cancer group compared with 75% in rectal cancer group ($P<0.05$). In all studies, there was no significant difference in OS in two groups.

CONCLUSIONS

The prevalence of rectal cancer in Iran is higher than other studies compared to colon cancer. Also, the mean age of rectal cancer patients was less than colon cancer patients and in all studies; there was no significant difference in OS in two groups.

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