Surgical outcome and clinicopathological characteristics of emergency presentation elective cases of colorectal cancer

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Abstract

Introduction: The aim of this study was to evaluate the significance of clinicopathological characteristics of colorectal cancer patients undergoing emergency and elective surgery.
Material and methods: In total, 116 tumors from patients treated surgically for colorectal cancer at four hospitals in Tehran between 2008 and 2013 were analyzed in the current study.
Results: Our findings revealed that the emergency cases were significantly more likely to have an advanced TNM stage (p = 0.027) and histologic grade (p = 0.01) compared with the elective patients. Furthermore, the nature of surgery was significantly associated with vascular and perineural invasion (p = 0.021; p = 0.001). We also evaluated the association of gender, age, and tumor location with the nature of surgical presentation. However, no association was found between these parameters and the nature of surgery. Emergency was also correlated with greater length of hospital stay and higher rate of admission to the intensive care unit. The mortality rate was 20% in emergency cases, while patients with elective surgery had 5.63% perioperative mortality (p = 0.001). The emergency patients had a higher rate of mortality.
Conclusions: Our data indicated that colorectal cancer patients undergoing emergency surgery showed an advanced stage. The emergency patients had a higher rate of mortality than elective cases.

Key words: tumor, patients, colorectal, mortality, emergency.

Introduction

Colorectal cancer (CRC) is known as a preventable cancer worldwide with 850,000 annual new cases and 500,000 deaths annually [1, 2]. It has been reported that most patients have an advanced stage at the time of diagnosis and undergo surgery with curative intent. A high proportion of colorectal cancer patients may present as an emergency most often as obstruction or perforation.

It has been previously indicated that the high postoperative mortality rate and poor survival are correlated with emergency presentation [3–6], as well as low 5-year survival [7]. The symptoms that lead patients to present as emergency, including perforation, obstruction and intestinal bleeding, contribute to advanced disease. Furthermore, patients with emergency CRC may also present with cardiovascular, metabolic, respiratory or infectious emergencies that can be markedly associated with higher risk of mortality [8]. Previous investigations indicated that emergency surgery was correlated with poorer outcome compared with elective surgery [9].

The aim of this study was to evaluate the significance of clinicopathological characteristics of colorectal cancer patients undergoing emergency and elective surgery.

Material and methods

All participating patients signed the consent forms, and all protocols in the present study were conducted in accordance with the Declaration of Helsinki Guidelines. In total, 116 patients treated surgically for CRC at the four hospitals in Tehran and Tabriz between 2008 and 2013 were included in the present study. The tissues were confirmed by pathological evaluation. The data of patients were obtained from medical records and the individual surgeons after surgery. The data of 30-day mortality, intensive care unit (ICU) admission, and length of hospital stay were obtained in the study.

The patients who underwent emergency CRC surgery were assigned as emergency cases due to obstruction, perforation, or bleeding, and other patients were considered elective with abdominal pain, blood in stool, change in bowel habit, mass and weight loss.

Slides stained with hematoxylin and eosin (H + E) were obtained from the patients. The histopathology report was based on the World Health Organization (WHO) classification [10]. The clinicopathological characteristics of the patients are shown in Table I.

Statistical analysis

The χ^2 test was used to analyze the relationships among variables. The correlation between clinical and pathologic parameters and type of surgery were evaluated using the χ^2 test or Mann-Whitney *U*-test as appropriate. Statistical analysis was performed with the software SPSS version 16.0 for Windows (SPSS Inc, IL, USA). *P*-value < 0.05 was considered to be statistically significant.

Results

A total of 116 patients were included in the study; 61.20% (71) were elective and 38.79% (45) were emergency cases. The mean age of the patients was 65.4 years. Of the 116 patients, median age of patients who had emergency surgery was 60.23 years, while it was 58 years for elective cases ($p > 0.05$). Overall, 66 patients (56.89%) were male and 50 (43.10%) were female.

The tumors were located: in the right colon (33.62%; 39 cases), in the left colon (25.86%, 30 cases), or in the rectum (40.51%, 47 cases).

Among the emergency patients, 22 (48.8%) had obstruction, and perforation was observed in 16 (35.5%); the remaining cases were operated on for suspected acute appendicitis, incarcerated hernia or a gynecological condition. Perforations were observed at the tumor site in patients and close to the tumor in 13 patients. Furthermore, obstruction of the right colon was observed in 63.3% of patients and left-sided obstruction was observed in 36.3%.

The clinicopathological characteristics of the patients with elective and emergency presentations are shown in Table I. Our findings revealed

Table I. Association of clinicopathological characteristics with nature of surgery

Parameters	Elective (*N* = 71) *n* (%)	Emergency (*N* = 45) *n* (%)	*P*-value
Age group [years]:			0.352
< 64	38 (53.52)	26 (57.7)	
> 64	33 (46.47)	19 (41.30)	
Gender:			0.571
Female	31 (43.66)	21 (46.6)	
Male	40 (56.33)	24 (53.3)	
Tumor site:			0.653
Right colon	24 (33.80)	15 (33.3)	
Left colon	19 (26.76)	11 (24.44)	
Rectum	28 (39.43)	19 (42.2)	
TNM staging:			0.027
I	28 (39.43)	5 (11.1)	
II	21 (29.57)	13 (28.8)	
III	10 (14.08)	17 (37)	
IV	12 (16.90)	10 (22.2)	
Histological grade:			
I	39 (54.92)	7 (15.5)	0.01
II	26 (36.69)	22 (48.8)	
III	6 (8.45)	16 (35.5)	
Vascular invasion	20 (28.16)	17 (37.7)	0.021
Perineural invasion	11 (15.49)	13 (28.8)	0.001

Table II. Elective and emergency surgical outcome

Outcome	Elective cases (*N* = 71) *n* (%)	Emergency cases (*N* = 45) *n* (%)	*P*-value
Admission to ICU	28 (39.43)	34 (75.5)	0.001
Length of stay [days], median (range)	18 (7–62)	29 (13–78)	0.023
Mortality of patients	4 (5.63)	9 (20)	0.001

that the emergency cases were significantly more likely to have an advanced TNM stage ($p = 0.027$) and histologic grade ($p = 0.01$) compared with the elective cases. Furthermore, the nature of surgery was significantly associated with vascular and perineural invasion ($p = 0.021$; $p = 0.001$).

On the other hand, we examined the association of clinicopathological parameters such as gender, age, and tumor location with surgical presentation. But no association was found between these parameters and the nature of surgery (Table I). Emergency was also correlated with greater length of hospital stay and higher rate of admission to the ICU. The mortality rate was 20% in emergency cases, while patients with elective surgery had 5.63% perioperative mortality ($p = 0.001$). The emergency patients had a higher rate of mortality (Table II).

Discussion

Emergency presentation has been shown to have worse outcomes when compared with elective resections in patients with colorectal cancer. The poor outcomes for emergency patients begin at their initial hospital stay and continue into their long-term survival [11, 12].

The aim of this study was to evaluate the significance of clinicopathological characteristics of colorectal cancer patients with emergency and elective admission. Our results indicated that the emergency cases were significantly more likely to have an advanced TNM stage and histologic grade compared with the elective patients, which is in agreement with previous studies [13, 14]. Ghazi *et al.* [15] reported that emergency cases generally show a more aggressive histopathologic profile and a more advanced stage than do elective cases. Previous studies indicated that emergency surgery cases tend to have more advanced cancers (AJCC stages III and IV), with more tumor (T)3 and T4 tumors and more node (N)1 and N2 cases as compared to elective surgery [13, 16]. Furthermore, the nature of surgery was significantly associated with vascular and perineural invasion. Vascular invasion was more common in the emergency patients in the present study. It seems that patients with emergency presentation can show a higher frequency of both vascular and perineural invasion. This evidence showed poor prognosis for patients with emergency surgery [13, 14, 16, 17]. We also evaluated the association of gender, age, and tumor location with the nature of surgical presentation. However, no association was found between other parameters and the nature of surgery, including age, and sex and tumor location.

Median age of patients who had emergency surgery was 60.23 years, while it was 58 years for elective cases ($p > 0.05$). Wong *et al.* reported that patients undergoing emergency surgery were older than elective surgery and both groups are in danger of having their symptoms ignored, albeit for different reasons [13]. Overall, the tumors were located: in the right colon (33.62%; 39 cases), in the left colon (25.86%, 30 cases), or in the rectum (40.51%, 47 cases). Left colon cancer is constrictive in nature. It has been shown that left-sided colon cancers may be associated with change in bowel habit, constipation and rectal bleeding tenesmus. Sigmoid cancers can mimic diverticulitis with pain, fever, and obstructive symptoms [17]. Previous studies reported an age-related shift toward the colon in CRC, and found that up to 40% of cancers were located in the right colon [18, 19].

In the present study, the emergency patients had a higher rate of mortality. Ascanelli *et al.* [20] demonstrated 27% morbidity and 12% mortality in patients with colorectal cancer subjected to emergency surgery. Sjo *et al.* [21] reported a mortality rate of 3.5% after elective and 10% after emergency operation with resection. A previous study showed morbidity and mortality of 41% and 15% in patients operated on for obstruction or perforation respectively [22]. Previous investigations have revealed that a high rate of mortality and shorter survival may be related to emergency admission [5, 6, 21]. These clinicopathological parameters were previously reported by different authors for various cancers [23–26].

In conclusion, our findings suggest that colorectal cancer patients undergoing emergency surgery showed an advanced stage. The emergency patients had a higher rate of mortality than elective cases.

Conflict of interest

The authors declare no conflict of interest.

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