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Surgical Treatment of Colorectal Cancer in Period Of 2018 - 2022

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ABSTRACT

Background: This research aims to identify differences in surgical treatments, including operation type, urgency, and hospital stay length based on cancer site, as well as variations in colorectal cancer incidence by age and gender.

Methods: The study included 585 male and female patients diagnosed with colorectal cancer at the Surgical Clinic of the University Hospital Mostar from January 1, 2018, to December 31, 2022. Patients were categorized by cancer location (ascending, transverse, descending, sigmoid, rectosigmoid, rectum, and multiple sites) and also grouped into three: right-sided colon cancer, left-sided colon cancer, and rectal cancer.

Main findings: There were 558 patients who participated in the study and were admitted to the Surgical Clinic of the University Clinical Hospital Mostar, with a mean age of 68.6 years (SD = 11.272). With regard to cancer location, tumors of the ascending colon, sigmoid colon and rectum were statistically more common than descending colon, rectosigmoid colon, transverse colon and tumours with two locations ($p < 0.001$). No statistically significant difference was found in the prevalence of patients over the different periods (years), nor in the changes in the number of hospital admissions over the observed five-year period ($\chi^2 = 7.036$, $df = 4$, $p = 0.134$).

Principal conclusions: Early detection and prevention are crucial for improving surgical management. Open surgery needs to be replaced by newer surgical techniques such as laparoscopic and robotic surgery.

Key words: colorectal cancer, differences, surgical treatment, operative approach, location

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INTRODUCTION

One of the most common cancers globally is colorectal cancer (1). In Croatia, it ranks first in total number of cancer deaths and new cases (2). The rectosigmoid colon (3) is the most common site for colorectal cancer. While left-sided cases are more frequent, right-sided colorectal cancers have risen in recent decades (3, 4), and the possible causes of this distribution need to be identified (4). Right- and left-sided colon cancer should be considered as two different identities (5). Possible causes of the difference include anatomical and developmental origin, exposure to certain carcinogens like bile acids, certain nutrients and bacteria (6). Patient demographics (5, 6), clinical presentation and symptoms (7) differ between patients with right and left-sided colorectal cancer. Studies confirm that right-sided colon cancer is more likely to present in older age and in women (8-10). Rectal cancer, unlike the rest of the colon, is more common in younger populations and less common in women (11). The clinical presentation of patients with left- and right-sided colorectal cancer differs. Rectal bleeding and changes in bowel movements are more common with distal cancers, like those in rectum and sigmoid colon, while cancers in proximal sites are often asymptomatic (7). However, no difference in the urgency of surgery was found according to the tumor location (8). The characteristic presentation of colorectal cancer can affect the timing of detection, tumor size, and ultimately the choice of treatment (12). The frequency of liver metastases doesn't differ between rectal and other colorectal cancers (13), while peritoneal metastases are more common in right-sided cancers and lung metastases in rectal cancers (14). Additionally, mortality within the first ninety days is unaffected by tumor location, while the five-year survival rate is significantly lower for right-sided cancers. (13). Surgery, as the only curative treatment, varies in approach (15). The classic or open approach is more common for right-sided colon cancer, while laparoscopic techniques are preferred for left-sided cases (9, 16). This is supported by the higher number of laparoscopic left colectomies compared to right colectomies (12, 16). Patients with left-sided colon cancer have shorter hospital stays after surgery compared to those with right-sided cancer, likely due to the operative approach (9). In the open approach, the average is longer compared to the laparoscopic approach (17). There was also no difference in the number of days spent in hospital in patients with rectal cancer compared with other types of colon cancer (13). With the development of minimally invasive surgery, the number of operations performed in the classical way is decreasing. While laparoscopic techniques are standardized globally, the open approach remains dominant in less developed countries (17, 18). In such countries, no difference has been found in the length of hospital stay between the open approach and the laparoscopic approach (18). The length of hospital stay is also affected by the urgency of the procedure, with patients undergoing urgent surgery experiencing longer stays and less frequent laparoscopic surgeries (19). It remains unclear whether differences in hospital stay are due to the surgical approach or tumor location. Furthermore, recent studies on the correlation between surgical approach and postoperative recovery, based on tumor location, are limited. There is also a lack of data comparing primary tumor location with factors like sex, age, hospital stay, and postoperative mortality. Additionally, studies from regions with similar geographic and economic conditions for outcome comparisons are lacking. With this cross-sectional study, we aim to show the success of surgical treatment over a five-year period and examine differences in socio-demographic characteristics of colorectal cancer patients by anatomical location, as well as differences in surgical treatment and length of hospital stay. This research aims to identify differences in surgical treatment such as operation type, urgency, and hospital stay based on cancer

site, as well as variations in colorectal cancer incidence, age, and gender by site.

MATERIALS AND METHODS

A cross-sectional study included colorectal cancer patients with confirmed pathohistological diagnoses treated at the Surgery Clinic from January 1, 2018, to December 31, 2022.

Participants

The study included 585 male and female patients over 18 years old, diagnosed with colorectal cancer and treated at the Surgical Clinic of the University Clinical Hospital Mostar from January 1, 2018, to December 31, 2022. Patients were admitted for elective or urgent procedures, which included those with ileus or acute abdomen due to tumors. They were categorized by cancer location (ascending, transverse, descending, sigmoid, rectosigmoid, rectum, or multiple sites) and grouped into three types: right-sided colon cancer (ascending colon, appendix, hepatic flexure), left-sided colon cancer (descending colon, sigmoid colon, splenic flexure), and rectal cancer. Inclusion criteria required complete medical records and a diagnosis confirmed by preoperative examinations (clinical exams, colonoscopy with pathohistological diagnosis, ultrasound, CT, MRI). Patients undergoing urgent or elective surgery with a diagnosis of colorectal neoplasia and a postoperative pathohistological diagnosis of colorectal cancer were also included. Patients under 18 years of age, unoperated and inoperable patients undergoing exploratory laparotomy, and patients with incomplete medical documentation were eliminated from the study.

Methods

Data on tumor location, type of surgery, surgical approach (laparoscopic/open) and urgency of the procedure (elective/urgent) were collected from the surgical protocol. Urgent surgery included patients with acute abdomen confirmed by physical examination, and ileus diagnosed by physical examination and radiographs, with colon tumors identified during the operation. In this research ileus referred specifically to mechanical bowel obstruction caused by the tumor without perforation, whereas acute abdomen comprised non-obstructive surgical emergencies, such as bowel perforation, local or diffuse peritonitis, or severe hemorrhage. The following parameters were collected from the hospital information system: age, sex and place of residence. Age was calculated as the difference between the patient's age and the surgery year. Place of residence was defined by the nearest town. Length of hospital stay was found in the hospital information system. It was calculated as the difference between the first day of hospitalization and the day of discharge. The patients were separated into two categories: first, according to the location of the cancer, into cancers of the ascending colon, transverse colon, descending colon, sigmoid colon, rectosigmoid colon, rectum, and colon with more than one location. One category were patients treated for right-sided colon cancer, which includes the localization of the ascending colon, appendix and hepatic flexure. The second category includes patients treated for left-sided colon cancer, which is defined as cancer of the descending colon, sigmoid colon and splenic flexure. The third category consisted of patients who underwent surgery with a diagnosis of rectal cancer. Collected data were compared between these categories and statistically analyzed.

Statistical analysis

MS Excel database (version 11. Microsoft Corporation, Redmond, WA, USA) and SPSS 20.0 statistical programme (IBM Corp., Armonk, NY, USA) were used to collect data. Data were processed using descriptive statistics, with categorical variables presented as frequencies and percentages, and continuous variables as arithmetic means and standard deviations. The normality of the distribution of the results of the continuous

variables was tested with the Kolmogorov-Smirnov test and it was found that the distributions of the variables ″age″ and ″length of hospital stay″ deviated statistically significantly from the normal distribution, but by looking at the indices of asymmetry and flattening, it can be seen that the same, according to Kline's normality parameters (2005), meet the expected criteria on the basis of which the use of parametric statistical procedures during statistical analysis is justified processing the results collected in this research. The Chi-square test was used to test for differences between categorical variables. One-way analysis of variance was used to analyze differences between continuous variables. Pearson's correlation coefficient was used to determine the correlation between variables. A probability level of $p<0.05$ was considered statistically significant.

RESULTS

There were 558 patients engaged in the study and admitted to the Surgical Clinic of University Clinical Hospital Mostar, with a mean age of 68.6 years (SD = 11.272). The youngest patient was 28 years old and the oldest was 91 years old. Of the total number of operated patients, the majority were men (male 338 or 60.57 %, female 220 or 39.43 %) which was shown as a statistically significant difference ($\chi^2 = 24.953$, df =1, $p < .001$).

The minimum length of hospital stay was 1 and the maximum was 82 days, while the mean length of hospital stay was 15.65 days (SD=8.499). With regard to cancer location, tumors of the ascending colon, rectum and sigmoid colon were statistically more common than descending colon, rectosigmoid colon, transverse colon and tumors with two locations ($p < 0.001$). Statistically significant difference was not found in the presence of tumors of the ascending colon, sigmoid colon and rectum ($p < 0.05$), i.e. the mentioned tumors are approximately equally represented in this research (Table 1).

Table 1. Differences in cancer prevalence, mean patient age and gender distribution according to cancer localisation

	Cancer localization						
	Ascending colon	Descending colon	Sigmoid colon	Rectum	Rectosigmoid colon	Transverse colon	Two locations
Number of cases (%) [a]	138 (24.7)	50 (9)	146 (26.2)	130 (23.3)	75 (13.44)	17 (3)	2 (0.36)
Age [b]	70.27 ±11.61	66.16 ± 11.91	67.98± 11.11	68.43± 10.82	68.23± 10.91	70± 12.66	77 ±5.66
Gender [c]							
Male n (%)	86 (62.32)	32 (64)	82 (56.16)	86 (66.15)	41 (54.67)	10 (58.82)	1 (50)
Female n (%)	52 (37.68)	18 (36)	64 (43.84)	44 (33.85)	34 (45.33)	7 (41.18)	1 (50)

[a] $\chi^2 = 265.918$, $p < 0.001$; [b] $F = 1.22$; $p = 0.295$; [c] $\chi^2 = 4.517$, $p = 0.607$

Over a five-year period, the highest proportion of patients was hospitalized in 2021, in contrast to the lowest number of admissions occurred in 2018 and 2020. No statistically significant difference was detected in the prevalence of patients over the different periods (years), nor in the changes in the number of hospital admissions over the observed five-year period ($\chi^2 = 7.036$, df = 4, $p = 0.134$) (see Figure 1).

The distribution of the surgical urgency was found to be significantly different ($\chi^2 = 144.545$, df = 1, $p < 0.001$), with elective surgery being statistically more common (421, or 75.4% of the total sample) compared to emergency surgery (137, or 24.6% of the total sample) . When

considering the causes of urgency, ileus (108, or 79.4% of respondents) was identified as a significantly more common cause of urgency than acute abdomen, which was recorded in 28 patients (or 20.6% of patients) ($\chi^2 = 47.059$, df = 1, $p < 0.001$).

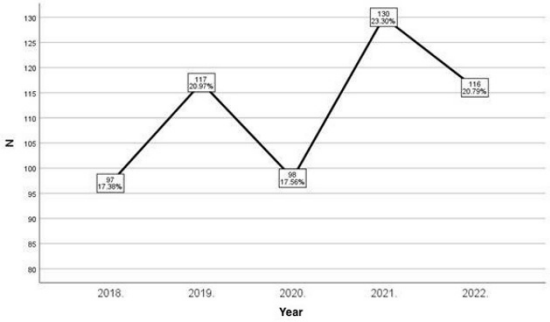

Figure 1. Presentation of the number of hospital admissions in the period of 2018-2022

Furthermore, open surgery was used significantly more often than laparoscopic surgery when considering the approach (see Figure 2).

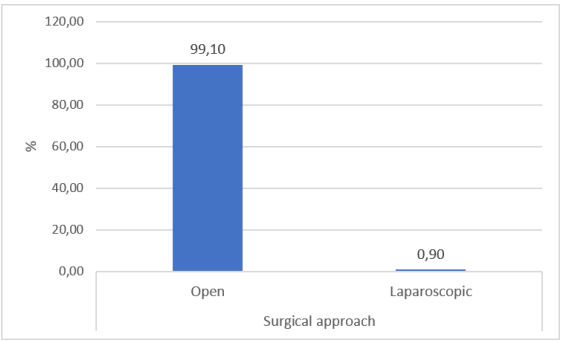

Figure 2. Distribution of patients by surgical approach

The majority of patients had no metastases (see Figure 3), while a statistically significantly smaller number had some form of metastasis ($\chi^2 = 152.803$, df = 1, $p < 0.001$).

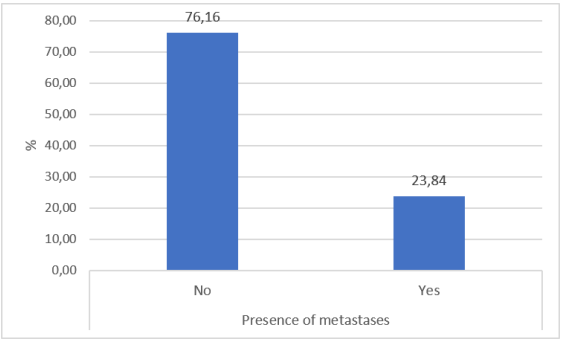

Figure 3. Distribution of patients according to the presence of metastases

Statistically, there is a significantly higher representation of those who did not have a fatal outcome (481, or 86.2% of patients) compared to those with postoperative mortality, which were 77, or 13.8% ($\chi^2 = 292.502$, df = 1, $p < 0.001$).

There were no statistically significant changes in intrahospital postoperative mortality over the five-year period ($\chi^2 = 5.273$, df = 4, $p = 0.260$) (see Figure 4).

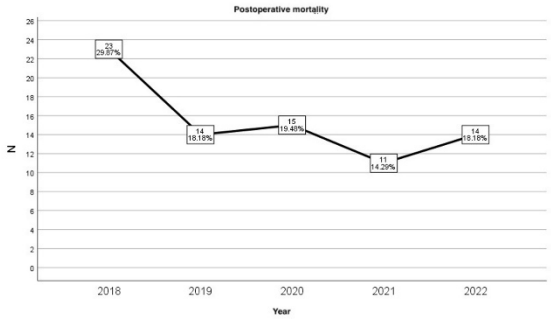

Figure 4. Number of deaths over a five-year period

Analysis of the distribution of respondents according to their place of residence shows that the largest proportion of respondents came from Mostar, followed by Široki Brijeg and Ljubuški. The smallest proportions were from Jablanica, Hadžići, Drvar, Bileća and Nevesinje. The rest are shown in Table 2.

Statistically significant difference was not observed in the mean age of the patients, regarding the location of the carcinoma (Table 1).

In addition, statistically significant difference in gender was not noticed in relation to cancer location (Table 1).

Statistically significant changes were not detected in the prevalence of cancer in the ascending colon, descending colon, sigmoid colon, rectosigmoid, transverse colon and two other sites, i.e. no differences in cancer prevalence over the years were observed according to site ($p > 0.05$), except in the rectum ($\chi^2 = 17.231$, df = 4, $p = 0.002$) (Figure 5).

Table 2. Distribution of respondents and mortality rate by settlement

Settlement	n	%	Mortality		Mortality rate/100.000
			Yes	No	
Mostar	188	33.7	35 (18.6)	153 (81.4)	33.082
Grude	18	3.2	2 (11.1)	16 (88.9)	11.555
Široki Brijeg	70	12.5	14 (20)	56 (80)	48.394
Stolac	22	3.9	0	22 (100)	0
Ljubuški	57	10.2	5 (8.8)	52 (91.2)	34.478
Čitluk	35	6.3	2 (5.7)	33 (94.3)	11.025
Čapljina	49	8.8	4 (8.2)	45 (91.8)	15.292
Posušje	30	5.4	5 (16.7)	25 (83.3)	24.418
Konjic	20	3.6	2 (10)	18 (90)	7.953
Neum	9	1.6	0	9 (100)	0
Prozor-Rama	22	3.9	2 (9.1)	20 (90.9)	14.006
Tomislavgrad	8	1.4	2 (25)	6 (75)	6.331
Jablanica	5	0.9	0	5 (100)	0
Livno	7	1.3	2 (28.6)	5 (71.4)	5.859
Hadžići	2	0.4	0	2 (100)	0
Drvar	2	0.4	0	2 (100)	0
Bileća	2	0.4	1 (50)	1 (50)	9.257
Kiseljak	1	0.2	0	1 (100)	0
Ostalo	9	1.6	1 (11.1)	8 (88.9)	-
Nevesinje	2	0.4	0	2 (100)	0

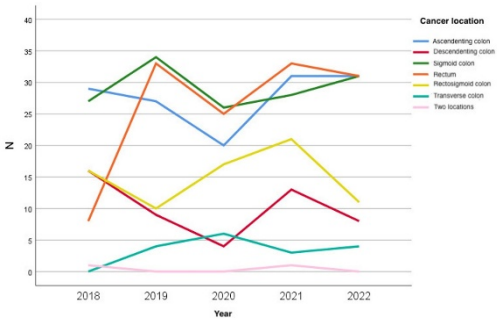

Figure 5. Plots of changes in cancer prevalence over five years by tumor site

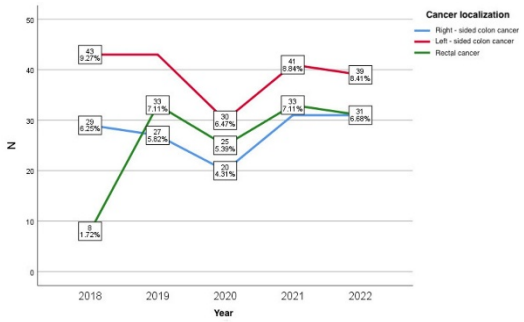

Figure 6. Illustration of changes in cancer prevalence over a five-year period

Furthermore, statistically significant changes were not discovered in the prevalence of right (χ^2 = 5.149, df = 4, p = 0.272) and left colon cancer (χ^2 = 2.980, df = 4, p = 0.561) over the years, while a significant change was observed for rectal cancer (χ^2 = 17. 231, df = 4, p = 0.002) - in 2018, a significantly lower number of rectal cancers was recorded compared to other years (Figure 6).

There is a statistically significant difference in the urgency of the surgical procedure for tumors in all locations except the descending colon, where a similar number of emergency and elective procedures were performed. In other tumor locations - ascending, descending and sigmoid colon, rectum, rectosigmoid and transverse colon - elective surgery is statistically significantly more common than emergency surgery (Table 3).

Table 3. Difference in urgency of surgical procedure and presence of metastases by cancer location

Cancer location	Urgency of surgical procedure		χ^2	p	Presence of metastases*	
	Emergency	Elective			Yes	No
	n (%)	n (%)			n (%)	n (%)
Ascendenting colon	32 (23.18)	106 (76.82)	39.681	<0.001	30 (21.74)	108 (78.26)
Descendenting colon	22 (44)	28 (56)	0.720	0.396	17 (34)	33 (66)
Sigmoid colon	42 (28.77)	104 (71.23)	26.329	<0.001	27 (18.49)	119 (81.51)
Rectum	10 (7.69)	120 (92.31)	93.077	<0.001	36 (27.69)	94 (72.31)
Rectosigmoid colon	26 (34.67)	49 (65.33)	7.053	0.008	20 (26.67)	55 (73.33)
Transverse colon	5 (22.73)	17 (77.27)	2.882	<0.090	2 (11.77)	15 (88.23)
Two locations	0	2 (100)	-	-	1 (50)	1 (50)

*χ^2=8.990; p=0.174

Regarding the location of the cancer, statistically significant difference was not discovered in the presence of metastases (Table 3).

Considering the different surgical approaches that the patients underwent, the length of hospital stay was not found to be statistically significantly different (Table 4).

Table 4. Differences in length of hospital stay and postoperative (intrahospital) mortality according to type of surgery

Type of surgery	Length of hospital stay* ($\bar{X}$± SD)	Postoperative(intrahospital) mortality† n (%)	
		Yes	No
Right hemicolectomy	15.39±7.883	115 (85.2 %)	20 (14.8 %)
Transverse colon resection	16.31±6.819	15 (93.8 %)	1 (6.3 %)
Left hemicolectomy	17.69±14.573	35 (83.3 %)	7 (16.7 %)
Sigmoid resection	15.15±7.360	95 (89.6 %)	11 (10.4 %)
Rectal resection	16.68±4.978	15 (78.9 %)	4 (21.1 %)
Dixon operation	15.63±7.805	17 (89.5 %)	2 (10.5 %)
High anterior rectal resection	14.92±5.737	13 (100 %)	0
Low anterior rectal resection	18±10.7	15 (88.2 %)	2 (11.8 %)
Abdominoperineal resection (Miles' operation)	16.23±9.372	49 (94.2 %)	3 (5.8 %)
Rectosigmoid resection	16.24±6.989	30 (88.2 %)	4 (11.8 %)
Hartmann's operation	13.93±7.246	71 (78 %)	20 (22 %)
Subtotal colectomy	18.93±10.528	11 (78.6 %)	3 (21.4 %)

*F=0.990, p=0.454; †χ^2 =114.11, p=0.227

According to the location of the carcinoma, statistically significant difference in intrahospital mortality was not found (Table 5).

According to the surgical approach, statistically significant difference in postoperative (intrahospital) mortality was not found (Table 4).

There was no statistically significant correlation between the presence of metastases at the time of surgery and the number of days spent in hospital (r = 0.060, p = 0.157). The minimum number of days spent in hospital in patients without metastases is 1, while the maximum is 55 ($\bar{X}$ = 15.36, SD = 8.197). The minimum number of days spent in hospital in patients with metastases is 1, while the maximum is 82 ($\bar{X}$ = 16.56, SD = 9.376).

Table 5. Difference in intrahospital mortality according to cancer location

Cancer location	Intrahospital mortality	
	Yes n (%)	No n (%)
Ascendenting colon	21 (15.22)	117 (84.78)
Descendenting colon	11 (22)	39 (78)
Sigmoid colon	16 (10.96)	130 (89.04)
Rectum	14 (10.77)	116 (89.23)
Rectosigmoid colon	13 (17.33)	62 (82.67)
Transverse colon	1 (5.88)	16 (94.12)
Two locations	1 (50)	1 (50)

χ^2 =8.940, p=0.177

A statistically significant correlation was noticed between patient age and postoperative mortality at the p < .001 levels, with older patients being more likely to experience a fatal outcome after surgery compared to younger patient (r = 0.235). No significant correlation was found between length of hospital stay and postoperative mortality (r = -0.047, p > 0.05), nor between age and length of hospital stay (p >.05, r = 0.075).

There were no statistically significant variations in urgency of surgery, surgical approach, presence of metastatic disease at surgery, sex, or in-hospital mortality according to cancer location (Table 6).

Patients with right-sided colon cancer ($\bar{X}$ = 70.56, SD = 11.274) are statistically significantly older than those with left-sided colon cancer ($\bar{X}$ = 67.83 SD = 10.997), (t = 2.140, p = 0.033). However, the length of hospital stay is not statistically significantly different according to the location of the cancer (right-sided colon cancer $\bar{X}$ =15.69, SD=8.604, left-sided colon cancer $\bar{X}$ = 15.19, SD = 9.587), (t = 0.460, p = 0.646).

Table 6. Urgency of surgery, surgical approach, presence of metastases, sex, and postoperative intrahospital mortality according to cancer location

	Cancer location				χ^2	p
	Right		Left			
	n	%	n	%		
Urgency of surgery					2,982	0,084
Elective	102	77,9	123	68,3		
Emergency	29	22,1	57	31,7		
Surgical approach					0,306	0,402*
Open	130	99,2	176	97,8		
Laparoscopic	1	0,8	4	2,2		
Presence of metastases	24	18,3	38	21,1	0,216	0,642
Sex					0,148	0,701
Male	83	63,4	109	60,6		
Female	48	36,6	71	39,4		
Postoperative intrahospital mortality	19	15,0	23	13,0	0,103	0,748

*Fisher's exact test

DISCUSSION

The study showed a statistically significant higher number of cancers in the ascending, sigmoid colon and rectum compared to other sites. While there was no significant difference in patient numbers among these cancers, the highest count was observed in sigmoid colon cancer. Similar findings were noticed in the

study by Schmuk et al, where the most common site was also sigmoid colon (10). In the study by Salihbašić et al, the most common site was rectum (17). Qiu et al. found more cancers in the right colon compared to the left (5), where the left includes the sigmoid and descending colon. This complicates comparisons with our study, as a significant number of patients have sigmoid colon cancer. Symptoms like visible bleeding and changes in bowel habits explain earlier diagnosis of sigmoid and rectal cancers, in contrast to proximal cancers, which often show no visible symptoms, with anemia being the most common indicator (7, 8). The relatively high number of cancers in the ascending colon may be attributed to the older age of respondents, with an average age of 68.6 years among all colorectal cancer patients. Qiu et al. reported a similar mean age of 67.28 years and a higher percentage of right-sided colon cancers (5), while Degro's study found a mean age of 66.9 years also with more right-sided cases (3).Conversely, Cienfuegos et al. observed more left-sided colorectal cancers, but their overall average age was lower than in our study (16). No significant age difference was found by cancer location when considering anatomical parts of colon. However, when divided into left and right sides, patients with right-sided colon cancer were significantly older than those with left-sided cancer, aligning with many studies (4, 5, 6, 9, 10, 16). Conversely, Conci et al. and Olson et al. found that patients with rectal cancer were generally younger than those with cancer in other parts of the colon (13, 20). Men were more frequently diagnosed with colorectal cancer, consistent with global trends (15). However, this study found no difference in the sex distribution of cancer by anatomical location or left-right distribution. This aligns with findings from Cienfuegos et al. (16) and Fernandez Miron et al. (9), but contrasts with studies suggesting women being more diagnosed with right-sided colorectal cancer (3, 4, 5, 6, 10). This hypothesis was not confirmed in this study. From 2018 to 2022, the lowest number of hospitalizations occurred in 2018 and 2020, while the highest was in 2021. This pattern aligns with the COVID-19 pandemic, during which cancer admissions significantly decreased, as noted by Lim et al. (21). However, when considering the total number of cancer patients in 2019 and 2018 and 2021 and 2020, it is clear that there is not much difference, contrary to the findings of Rottoli et al. where there were fewer hospitalisations in 2021 and 2020 (22). Over the five-year period, the number of hospital admissions for colorectal cancer by specific anatomical locations did not change significantly, similar to trends in new colorectal cancer cases in the USA (23). However, there is limited data in the literature on changes at specific anatomical sites during this five-year period. Notably, the number of patients with rectal cancer was statistically significantly lower in 2018 contrasted to other years. These data should not be considered absolutely accurate, as subsequent review revealed a high number of patients with incomplete data, making the analysis imprecise. The majority of procedures performed were elective, aligning with global trends where treatment follows clinical evaluation (15). Another reason for this results is the exclusion of inoperable patients and those who underwent exploratory laparotomy, similar to the study by Ocak et al (24). The lack of difference in urgency of procedures between left and right-sided colon cancer is consistent with research by Yang et al (8). However, for the descending colon, emergency and elective surgeries were roughly equal, suggesting a higher incidence of ileus and acute abdomen due to tumor size and advanced cancer stages. Open surgery predominated in this study, contrasting with the global trend toward laparoscopic approaches. This discrepancy is likely due to the high costs of laparoscopic equipment, maintenance, and training, which present challenges in low-income countries like Bosnia and Herzegovina. Additionally, laparoscopic surgery requires experienced surgeons with strong spatial awareness. According to Goksoy et al., achieving

competence in laparoscopic surgery requires between 53 and 68 procedures (25). Comparable results were discovered by El Yaakoubi et al. in Morocco, where open surgery predominated (18). Although laparoscopic surgery typically reduces hospital stay, this study found no difference in length of stay due to the small number of laparoscopic procedures. The average stay was 15.65 days, consistent with Salihbašić et al., where open surgery was also predominant (17), but longer than the 11 days reported by Conci et al. (13). The presence of metastases, indicating an advanced tumor stage, did not impact the overall length of hospital stay, despite expectations for longer stays for more extensive procedures. Additionally, metastases did not vary by tumor location, contrasting with literature findings. For instance, Degro et al. reported that right-sided tumors are more probably to have distant metastases (3), while Qiu et al. found fewer metastases on the right side but more positive lymph nodes (5). These findings suggest the need for further research with a larger sample size. Postoperative in-hospital mortality did not differ by tumor location or type of surgery, as it was mainly influenced by in-hospital care, which is consistent across patient groups. Older patients had a higher mortality risk, as expected. Surprisingly, statistically significant changes in postoperative mortality were not noticed over the five-year period, despite the COVID-19 pandemic during the study period. However, intrahospital postoperative mortality may not accurately reflect overall mortality rates, highlighting the need for long-term survival monitoring.

The study has several limitations. First, the participant number is insufficient for absolute accuracy, particularly in comparing open and laparoscopic approaches due to the low number of laparoscopic cases. This imbalance can lead to statistical errors. Second, the study was conducted at a single center, potentially reflecting a local approach to cancer treatment. Lastly, being a cross-sectional study based on existing data raises concerns about accuracy and completeness.

Future research should involve a larger participant pool and span a longer timeframe to yield more precise data on colorectal cancer location differences. A prospective study would provide even more reliable results. Additionally, investigating cancer location at the molecular and pathohistological levels could yield valuable insights for improving treatment. Long-term patient survival monitoring would further identify which cancers require advancements in surgical and oncological care, as well as strategies for prevention and early detection.

CONCLUSION

There is no statistically significant difference in urgency of surgery, length of hospital stay, surgical approach, presence of metastases and postoperative in-hospital mortality according to cancer location. The high prevalence of open surgery highlights the potential space for more modern surgical techniques, such as robotic and laparoscopic surgery.

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CONFLICT OF INTEREST
The authors have no conflict of interest to declare..

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ETHICAL BACKGROUND

Institutional review board statement: Ethics Committee of the Faculty of Medicine, University of Mostar approved this research on 23rd July 2024 (No. 01-I-1779/24).

Informed consent statement: Informed consent was obtained from all subjects involved in the study.

Data availability statement: We deny any restrictions on the availability of data, materials and associated protocols.

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