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Colorectal tumor-related intestinal obstruction: Surgical approaches and treatment strategies

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MAIN POINTS

- Colorectal tumor-related intestinal obstruction most commonly occurs in the sigmoid colon, necessitating emergency surgical intervention.
- Resection with stoma formation was the most frequently performed surgical procedure (70.7%), especially in sigmoid colon tumors.
- Tumor localization showed a significant linear association with the type of surgical intervention (p=0.019).
- No statistically significant difference was found between age groups and surgical strategies, highlighting tumor features as more decisive than age.
- The study supports the need for personalized surgical approaches based on tumor location and clinical presentation in colorectal emergencies.

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ABSTRACT

Aim: This study aims to evaluate the treatment approaches and management strategies applied in patients with colon tumor-related intestinal obstruction in colorectal emergencies. The efficacy of treatment methods and the types of surgical interventions based on tumor localization were analyzed.

Materials and Methods: A total of 45 patients diagnosed with intestinal obstruction due to colorectal tumors at Erciyes University Department of General Surgery between 01.08.2022 and 01.08.2024 were retrospectively reviewed. The demographic data, tumor localizations, and treatment methods were analyzed.

Results: The study included patients with an average age of 65.09 (± 12.65) years, of whom 57.8% were male and 42.2% were female. The most common tumor location was the sigmoid colon (66.7%). Emergency surgery was performed in 91.1% of cases, with tumor resection and stoma creation being the most frequent procedures (70.7%). A significant linear relationship was observed between tumor location and the type of surgical procedure (p=0.019).

Conclusion: Surgical intervention is the preferred treatment method for colorectal cancer-related intestinal obstruction. While resection with stoma creation is frequently performed for sigmoid colon tumors, the final treatment strategy depends on both the specific location of the tumor and the overall health of the patient.

Keywords: Colon tumor, Colorectal emergencies, Intestinal obstruction treatment, Surgical intervention, Tumor localization

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INTRODUCTION

Colorectal cancers rank third among the most common malignancies worldwide and are considered a significant public health issue in both developed and developing countries [1]. Most colorectal cancers progress slowly and can remain asymptomatic for an extended period, but once the disease advances or becomes complicated, severe clinical manifestations may arise [1]. One of these complications is intestinal obstruction, defined as bowel obstruction caused by colorectal tumors, a critical condition that often requires emergency surgical intervention [2]. Tumor-related intestinal obstruction typically occurs in the advanced stages of the disease, significantly impacting both the treatment process and patient survival [1].

The management of intestinal obstruction due to colorectal tumors varies depending on tumor localization, the patient's general condition, tumor size, and its extent [3]. While treatment options primarily involve surgical intervention, in some cases, medical management may also be pursued. Surgical options include tumor resection with anastomosis, resection with stoma formation, or stoma without resection [4]. These options are determined based on factors such as the pa-

tient's clinical condition, tumor size, and location [5]. However, determining the most appropriate treatment approach for tumor-related intestinal obstruction remains a topic of ongoing debate [6]. The literature on this subject is limited, and there is no consensus regarding which treatment strategies are the most effective [3].

In cases of colorectal intestinal obstruction, emergency surgical intervention is typically the first line of treatment. However, the outcomes of these interventions vary depending on factors such as patient age, tumor location, and overall health status. Factors such as advanced age, comorbidities, and tumor localization can influence surgical outcomes and play a critical role in treatment selection [7]. Therefore, the management of intestinal obstruction due to colorectal tumors necessitates the application of personalized treatment strategies.

In this study, we aimed to retrospectively evaluate the treatment approaches and management strategies applied in cases of colon tumor-related intestinal obstruction in colorectal emergencies. Our study aims to contribute to clinical practice and address the gap in the literature regarding the treatment outcomes of patients with tumor-related intestinal obstruction. Additionally, we aimed to provide more data on the types of surgical interventions tailored according to the tumor localization and age groups.

Therefore, this study aims to retrospectively evaluate the treatment approaches and surgical strategies used in patients with intestinal obstruction due to colorectal tumors, with a particular focus on the type of surgical interventions concerning the tumor localization and patient characteristics. This study also seeks to provide practical data that can guide future personalized treatment planning in emergency colorectal surgery.

MATERIALS AND METHODS

Patient selection

This retrospective study was conducted to evaluate the treatment approaches and management strategies for cases of intestinal obstruction due to colon tumors in colorectal emergencies between August 1, 2022, and August 1, 2024, at the Department of General Surgery, Erciyes University School of Medicine. A total of 45 patients who were treated and followed up in the department of general surgery during this period were included in the study.

Patients included in the study were those over 18 years of age, diagnosed with intestinal obstruction due to colorectal tumors, requiring either emergency surgical intervention or medical treatment, and followed up at the General Surgery Clinic of Erciyes University. Exclusion criteria included intestinal obstruction due to causes other than colorectal tumors, patients previously treated in another clinic and only followed up at Erciyes University, and patients with incomplete or insufficient medical data.

As this was a retrospective observational study, a formal sample size calculation was not conducted prior to data collection. We employed a non-probability purposive sampling method, including all eligible patients who were diagnosed and treated for intestinal obstruction caused by colorectal tumors at the Department of General Surgery, Erciyes University, during the study period from August 1, 2022, to August 1, 2024.

Data collection

The data collected included the demographic characteristics of the patients (age, gender), tumor localizations, and treatment methods applied. Tumors were localized in various segments, including the rectum, sigmoid colon, left colon, transverse colon, and right colon. Treatment methods were categorized into two main groups: emergency surgical intervention and medical management. Surgical interventions were further classified into resection with anastomosis, resection with stoma formation, and stoma formation without resection.

Statistical analysis

Descriptive statistics were used to summarize the data. Categorical (qualitative) variables, such as gender, tumor localization, and treatment types, were expressed as frequencies and percentages. Continuous (quantitative) variables, such as age, were expressed as mean, standard deviation, minimum, and maximum values. Data analysis was performed using IBM SPSS 22.0 (Statistical Package for the Social Sciences). Demographic data were presented as mean, standard deviation, minimum, and maximum values. Categorical variables were expressed as frequencies and percentages. The Pearson Chi-Square test was used to analyze differences between groups, and Fisher's exact test was applied for low-frequency data. Additionally, a linear-by-linear association test was conducted to evaluate the relationship between tumor localization and surgical procedures according to age categories. A p-value of less than 0.05 was considered statistically significant.

The primary outcome measure of this study was the type of surgical intervention (resection with anastomosis, resection with stoma formation, or stoma formation without resection) performed in patients with intestinal obstruction due to colorectal tumors, evaluated in relation to tumor localization. Secondary outcomes included age- and gender-based distribution of tumor locations and treatment methods. The assumptions for statistical tests were evaluated prior to hypothesis testing. For the Pearson Chi-Square test, the expected frequency assumption was checked, and Fisher's Exact Test was applied in cases where the expected cell frequency was below 5. For the linear-by-linear association test, the assumption of ordinal variables was met based on the ordered categorization of age groups and surgical procedures. All statistical analyses were two-tailed, and a p-value < 0.05 was considered statistically significant.

RESULTS

A total of 45 patients were evaluated in this study, with a mean age of 65.09 (± 12.65) years, ranging from 36 to 87 years. The

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Table 1. Demographic, Tumor Localization, and Treatment Characteristics of patients undergoing.

Characteristic	Number (n)	Percentage (%)
Total Number of Patients	45	
Gender Distribution	Male: 26 Female: 19	Male: 57.8% Female: 42.2%
Mean Age	65.09 years ± 12.65 (Min: 36, Max: 87)	
Mean Age of Male Patients	64.04 years ± 10.41 (Min: 36, Max: 80)	
Mean Age of Female Patients	66.53 years ± 15.38 (Min: 38, Max: 87)	
Tumor Location	Rectum: 6 Sigmoid Colon: 30 Left Colon: 3 Transverse Colon: 1 Right Colon: 5	Rectum: 13.3% Sigmoid Colon: 66.7% Left Colon: 6.7% Transverse Colon: 2.2% Right Colon: 11.1%
Type of Treatment	Emergency Surgery: 41 Follow-up with Medical Treatment: 4	Emergency Surgery: 91.1% Follow-up with Medical Treatment: 8.9%
Type of Surgery Performed (Total: 41 surgeries)	Resection with Anastomosis: 5 Resection with Stoma: 29 Stoma without Resection: 7	Resection with Anastomosis: 12.2% Resection with Stoma: 70.7% Stoma without Resection: 17.1%
		p-value
Surgical Procedure vs Age Group		p = 0.535*
Surgical Procedure vs Tumor Location		p = 0.131*
Trend between Tumor Location and Surgical Procedure		p = 0.019**

** Pearson Chi-Square test, ** Linear-by-Linear Association test.*

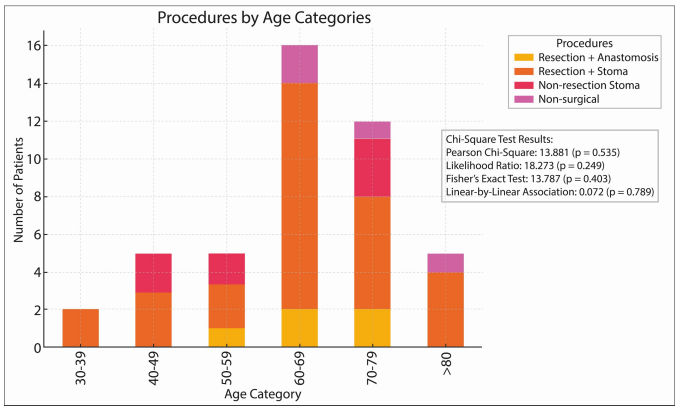

Figure 1. Distribution of surgical procedures by age categories in colorectal ileus cases.

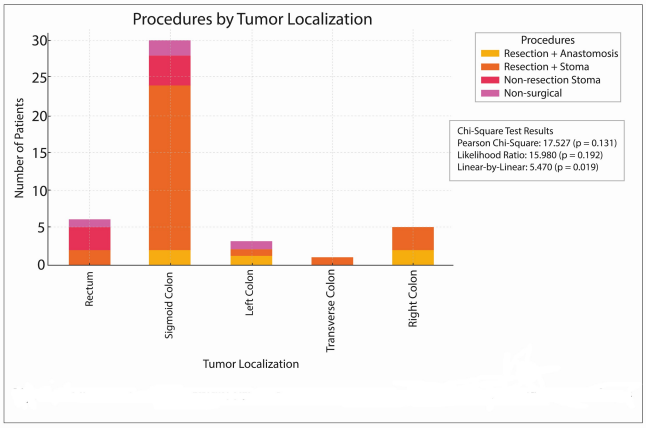

Figure 2. Distribution of surgical procedures by tumor localization in colorectal ileus cases.

mean age of male patients was 64.04 (± 10.41) years, while the mean age of female patients was 66.53 (± 15.38) years. Regarding gender distribution, 57.8% of the patients were male (n=26), and 42.2% were female (n=19). The demographic data of the patients, tumor localizations, and types of treatments administered are presented in the table.

When examining tumor localizations, sigmoid colon tumors were found to be the most common, observed in 66.7% of patients (n=30). Rectal tumors were present in 13.3% of patients (n=6), right colon tumors in 11.1% (n=5), left colon tumors in 6.7% (n=3), and transverse colon tumors in 2.2% (n=1). These data provided a basis for evaluating the relationship between tumor localizations and treatment approaches.

In terms of treatment approaches, 91.1% of patients (n=41) underwent emergency surgical intervention, while 8.9% (n=4) were managed with medical treatment. The most frequent surgical procedure among the 41 patients was tumor resection followed by stoma formation, which was performed in 70.7% of cases (n=29). Additionally, 17.1% (n=7) underwent stoma formation without tumor resection, and 12.2%

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(n=5) had resection followed by anastomosis. The distribution of these surgical interventions was also analyzed based on age categories.

In terms of age distribution, the 60-69 age group had the highest number of patients, with 16 individuals, of whom 75% underwent tumor resection followed by stoma formation. When analyzing the relationship between age groups and surgical interventions, it was observed that most patients in the 70-79 age group also underwent tumor resection, followed by stoma formation. In the 50-59 age group (n=5), 2 underwent tumor resection followed by stoma, 2 underwent stoma formation without resection, and 1 underwent resection followed by anastomosis. In the 40-49 age group, 3 out of 5 patients underwent tumor resection followed by stoma, while 2 underwent stoma formation without resection. Among the youngest age group (30-39 years), 2 patients underwent tumor resection followed by stoma. In the group aged 80 years and older, 4 out of 5 patients underwent surgical intervention. These data are illustrated in the graph presented in Figure 1.

When analyzing the surgical procedures based on tumor localization, we observed that 75.9% (n=22) of the 30 patients with sigmoid colon tumors underwent tumor resection followed by stoma, while 13.3% (n=4) had stoma formation without resection, and 6.7% (n=2) underwent resection followed by anastomosis. Of the 6 patients with rectal tumors, 50% (n=3) had stoma formation without resection, 33.3% (n=2) underwent tumor resection followed by stoma, and 16.7% (n=1) did not require emergency surgical intervention. Among the 5 patients with right colon tumors, 60% (n=3) underwent tumor resection followed by stoma, and 40% (n=2) underwent resection followed by anastomosis. Among the 3 patients with left colon tumors, 1 underwent resection followed by anastomosis, 1 underwent tumor resection followed by stoma, and 1 was managed with medical treatment. The patient with a transverse colon tumor underwent tumor resection followed by stoma formation. These data are illustrated in the graph shown in Figure 2, which provides a visual representation of the surgical procedures performed according to tumor localization.

Statistical analysis using the Pearson Chi-Square test found no significant difference between age groups and surgical procedures (p=0.535). Similarly, when evaluating the relationship between tumor localization and types of surgical intervention, no significant difference was found (p=0.131). However, a linear association between tumor localization and the type of surgical procedure was detected (p=0.019). This suggests that as the tumor localization shifts distally (e.g., from right colon to sigmoid colon or rectum), there is an increasing trend in favor of stoma formation rather than anastomosis. In contrast, proximal tumors are more frequently treated with resection and primary anastomosis. This pattern highlights the importance of tumor localization in determining surgical strategies.

DISCUSSION

Intestinal obstruction caused by colorectal tumors is a complication that can lead to severe clinical conditions in patients, and its management remains a topic of debate [3,8]. In our study, surgical intervention was found to be the most preferred treatment method for intestinal obstruction due to colorectal tumors. Emergency surgery was performed in 91.1% of the patients, with tumor resection followed by stoma formation being the preferred approach in 70.7% of these cases. These findings are consistent with similar studies in the literatüre [9]. For instance, it has been frequently highlighted that tumor resection followed by stoma formation is one of the common methods used in cases of sigmoid colon tumors [10].

The management of intestinal obstruction caused by colorectal tumors involves various surgical options, including tumor resection with anastomosis, tumor resection followed by stoma, and stoma formation without resection. In our study, as observed, tumor resection followed by stoma formation was the most common procedure for sigmoid colon tumors (75.9%). This finding is attributable to the anatomical characteristics of the sigmoid colon. The sigmoid colon is a narrow part of the colon, making tumors in this region more prone to causing obstructions, thus necessitating emergency surgical intervention more frequently [11].

In our study, a statistically significant relationship was also found between tumor localization and the type of surgical procedure performed. This result indicates that tumor localization is a key determinant in treatment strategies. The literature also supports that tumor localization influences surgical treatment decisions, with tumor resection followed by stoma being more common in sigmoid colon tumors, while diversion stoma without resection is more frequently preferred in rectal tumors [12]. This observation may be related to the more complex nature of surgical interventions in rectal tumors and the increased risk of anastomotic complications [13].

However, no significant difference was found between age groups and types of surgical procedures. This suggests that surgical treatment decisions are not based solely on patients' age or age-related comorbidities, but rather on factors such as tumor localization, the extent of tumor spread, and the patient's overall clinical condition at the time. This finding is also supported by studies in the literature, which indicate that while surgical outcomes in elderly patients should be carefully evaluated, age alone is not a decisive factor in surgical decisions [14]. Although comorbidities increase with age and can negatively affect surgical outcomes, tumor stage and localization remain the primary factors influencing surgical management in cases of colorectal tumor-related intestinal obstruction.

The impact of comorbidities on surgical outcomes in cases of intestinal obstruction caused by colorectal tumors is another aspect that must be considered. Although our study did not include information on comorbidities, it is generally

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accepted that comorbidities increase with age and can have a negative effect on surgical outcomes. The literature demonstrates that comorbidities, particularly in elderly patients, increase the risk of surgical complications and raise postoperative mortality rates [15]. Therefore, when making surgical treatment decisions, a patient's comorbid condition, in addition to their age, should be carefully considered.

The findings of our study demonstrate that tumor localization is a significant determinant in the selection of surgical procedures, independent of factors such as age and comorbidities. For example, tumor resection followed by stoma formation is more commonly preferred in patients with sigmoid colon tumors, whereas this procedure is less frequent in rectal tumors. Similarly, the rate of anastomosis is higher in right and transverse colon tumors. These results highlight the influence of tumor localization on the choice of surgical intervention.

Current literature emphasizes that treatment strategies for intestinal obstruction caused by colorectal tumors remain controversial, and personalized treatment approaches should be applied in each case [16]. Our study supports this conclusion. Factors such as tumor localization and stage are pivotal in surgical decision-making. While advanced age and the presence of comorbidities increase surgical risks, the biological characteristics of the tumor are ultimately more determinative in formulating treatment strategies. Consequently, the optimal treatment approach must be tailored to the individual patient.

The findings of our study align with those reported in the review by Grigorean et a. [2], which analyzed colorectal cancer as a leading cause of low bowel obstruction (LBO). In their analysis, colorectal tumors accounted for 60–80% of all LBO cases, and in 20% of patients, bowel obstruction was the first clinical manifestation of the malignancy. In our study, all patients presented with intestinal obstruction due to colorectal tumors, and the most common localization was the sigmoid colon, consistent with the review's finding that nearly 80% of left-sided colorectal obstructions are attributable to sigmoid tumors. Additionally, Grigorean et al. [2] reported that emergency surgery is required in 8–29% of cases, with Hartmann's procedure and resection with stoma formation being the most frequently preferred surgical approaches. Similarly, in our cohort, 91.1% of patients underwent emergency surgery, and resection followed by stoma formation was the most commonly performed procedure (70.7%). The review further noted postoperative complication rates of 35–40% and mortality rates of 15–20%, particularly in older patients with comorbidities. While our study did not focus on postoperative outcomes, the demographic profile of our patients—most commonly in the 60–69 age group—supports the clinical importance of early surgical decision-making in elderly populations with tumor-related obstruction.

CONCLUSION

In the management of intestinal obstruction secondary to colorectal tumors, surgical intervention is principally dictated by tumor localization and stage. Although patient-specific variables such as age and comorbidities are considered, the tumor's intrinsic characteristics are paramount in guiding treatment. The present study provides valuable data regarding surgical strategies for this condition, contributing to the field's knowledge base and underscoring the need for further research on the influence of comorbidities in geriatric populations.

Ethics Committee Approval: Ethics committee approval was received for this study from the Health Sciences Research Ethics Committee of Erciyes University (Date: 09/10/2024, Number:194).

Informed Consent: The study was designed retrospectively, and no data that would violate patient confidentiality were used in the study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors declare that there is no conflict of interest.

Author Contributions: Concept-MK; Design-MK, SC; Supervision-SC; Resources-MK, SC; Materails-MK, SC; Data Collection and/or Processing-SC; Analysis and/or Interpretation- MK,; Literature Search- MK,SC; Writing Manuscript- MK; Critical Review- SC.

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