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Prevalence of intestinal obstruction in patients with colon cancer: A single-center observational study

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Abstract

Introduction: Patients with colon cancer are at risk of malignant intestinal obstruction (MIO). The study aimed to determine the prevalence of MIO in a group of patients with colon cancer in a public regional reference center.

Methodology: This cross-sectional study was carried out at the IESS Ceibos General Hospital in Guayaquil, Ecuador, from March 2017 to June 2020. Patients with incident colon cancer were included in the study period. The variables were age, sex, and the presence of MIO. Descriptive statistics are presented as frequencies and percentages.

Results: Ninety patients were analyzed, 55 men (61.11%). The most prevalent age group was 61 to 70, with 27 cases (30%). The most prevalent comorbidity was arterial hypertension (36%). The predominant histological type was colon adenocarcinoma (94.44%). A total of 61.11% had a tumor in the rectum, and 15.56% had a tumor in the rectosigmoid junction. The prevalence of MIO was 55 cases, 61.11% (95% CI 60.77-61.45%). In 15 cases (16.67%), there was complete obstruction; in 36 cases (40%), there was partial obstruction. Mortality was 52 cases (57.78%). The presence of the tumor in the rectosigmoid junction OR=6.188 (95% CI 1.282-29.86) P=0.0232.

Conclusion: The prevalence of MIO is high, at more than 61%. The presence of a tumor in the rectosigmoid junction was a risk factor for the development of MIO.

Keywords:

MESH: Neoplasms, Colon, Colon Neoplasms, Intestinal Obstruction, Cross-sectional studies.

Introduction

Malignant intestinal obstruction (MIO) is common in patients with abdominal or pelvic cancers. It is more prevalent in ovarian cancer (5.5% to 42%), colorectal cancer (4.4% to 24%), and gastric cancer [1]. Infrequently, metastases from extra-abdominal cancers, including breast, lung, and melanoma, can cause malignant intestinal obstruction. MIO occurs most often in patients with advanced-stage cancer. Although small bowel obstruction is more common, significant bowel obstruction occurs in approximately 25% of all intestinal obstructions [2]. In a cohort study of 490 cancer patients, anatomical sites of obstruction were classified as gastric outlet 16%, small intestine 64%, and large intestine 20% [3].

The obstruction may be functional or due to mechanical obstruction, and it can be partial or complete. On average, patients with acute symptoms present after approximately five days of symptoms [4]. This delay may be related to the nature of the symptoms with abdominal distension and discomfort from progressive distension of the colon, possibly better tolerated compared to abdominal pain and vomiting that are associated with small bowel obstruction. Approximately 70% of large bowel obstructions occur in or distal to the transverse colon [5].

The intestine is dilated proximal to the site of obstruction, and fluid is sequestered due to impaired reabsorption. Significant fluid changes can occur, as up to 10 liters of fluid can be secreted into the intestine daily. This fluid loss is compounded by reduced oral intake and vomiting, leading to intravascular volume loss and electrolyte depletion, which can progress to hypovolemic shock.

In mechanical obstruction, there is increased peristaltic activity initially in an attempt to overcome the blockage, leading to crampy abdominal pain. Eventually, the intestinal smooth muscle fatigues, and peristalsis stops. Distal to the obstruction, the intestine empties, initially often giving rise to diarrhea, before collapsing [6].

In adynamic or nonmechanical obstruction, on the other hand, there is abdominal discomfort due to distension instead of colicky pain and reduced or absent peristaltic activity [7]. Microvascular changes can lead to loss of mucosal integrity and translocation of bacteria into the bloodstream, leading to the development of systemic inflammatory response syndrome. With progressive distension of the intestinal wall, venous return may be impeded, leading to further congestion, fluid loss into the lumen of the intestine, and leakage of serous fluid into the abdomen, resulting in ascites. Additional venous congestion compromises arterial flow to the capillary bed, leading to intestinal ischemia. Ultimately, this can lead to necrosis and perforation of the intestinal wall.

This cross-sectional study aimed to measure the prevalence of MIO in a group of patients with colon cancer referred to a public hospital of regional influence in Guayaquil,

Ecuador.

Materials and methods

Study design

The present study is cross-sectional. The source is retrospective.

Study area

The study was carried out in the statistics service of the Hospital General de los Ceibos of the Ecuadorian Institute of Social Security in Guayaquil-Ecuador. The study period was from March 1, 2017, to June 30, 2020.

Universe and shows

The universe was made up of all the patients registered in the institution. The sample size calculation was nonprobabilistic, census type, where all incident cases in the study period were included.

Participants

Cases of patients diagnosed with colon cancer were included. Metastatic cases were excluded.

Variables

The descriptive variables were age, sex, year of care, histological characteristics, tumor site, intestinal obstruction, type of obstruction, smoking, alcoholism, obesity, history of hemorrhoids, death, and time of evolution.

Procedures, techniques, and instruments.

The data were taken from the institutional electronic file (AS400) in a form designed exclusively for this purpose. ICD-10 case identification codes were used: C18, C19, and C20.

Avoidance of bias

To guarantee the reliability of the information, the researchers were trained in data collection and the use of the AS400 system. A double checklist was used to include the cases. The data were validated and cured by the principal investigator.

Statistical analysis

Once the information was compiled in an Excel spreadsheet, it was entered into a data matrix of SPSS™ 25.0 software (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Descriptive statistics were used based on frequencies and percentages for the qualitative variables and the quantitative measures of central tendency.

Results

The analysis included 90 patients.

Clinical characterization

There were 55 men (61.11%) and 35 women (38.89%). The most prevalent age was 61 to 70 years (Table 1). The study period is presented in the second section of Table 1; 2018 was the year with the highest incidence. Most of the cases were diagnosed during hospitalization (Table 1). Forty percent of the patients studied did not present any comorbidities. The most prevalent disease was arterial hypertension in 36% of the cases (Section 4, Table 1).

Table 1. Colon cancer patients by age

Age range	No.=90
30-40 years	4 (4.44%)
41-50 years	10 (11.11%)
51-60 years	25 (27.78%)
61-70 years	27 (30.0%)
71-80 years	24 (26.67%)
Year of diagnosis	
2017	11 (12.22%)
2018	29 (32.22%)
2019	22 (24.44%)
2020	28 (31.11%)
Type of care	
External consultation	20 (22.22%)
Emergency	8 (8.89%)
Hospitalization	43 (47.78%)
Operating room	7 (7.78%)
Urgency	12 (13.33%)
Comorbidities*	
Essential arterial hypertension	36 (36%)
Diabetes mellitus type 2	8 (8%)
Alcoholism	8 (8%)
Smoking	6 (6%)
Obesity	2 (2%)

*Some cases had double comorbidity

Tumor characteristics

The predominant histological type was colon adenocarcinoma in 94.44% (Table 2). Of the patients studied, 61.11% had a tumor in the rectum, followed by 15.56% who presented it in the rectosigmoid junction and 5.56% in the sigmoid colon. Ten percent of the patients had a colon tumor with a location not specified in the electronic file, so the origin could not be identified (Table 2).

Table 2. Characteristics of the colon tumor.

Tumor type	No.=90	Percentage
Adenocarcinoma	85	94.44%
Mucinous Carcinoma	3	3.33%
Squamous cell	1	1.11%
Gastrointestinal stromal tumor	1	1.11%
Tumor site		
Right colon	55	61.11%
Rectosigmoid junction	14	15.56%
Colon site unspecified	9	10%
Sigmoid colon	5	5.56%
Descending colon	3	3.33%
Ascending colon	1	1.11%
Hepatic angle colon	1	1.11%
Transverse colon	1	1.11%
Blind colon	1	1.11%

Prevalence of intestinal obstruction and mortality

The prevalence of intestinal obstruction in the patients studied was 55 cases, 61.11% (95% CI 60.77-61.45%). In 15 cases (16.67%), it was complete obstruction; in 36 cases (40%), it was partial obstruction; in 4 cases, the specific type of obstruction could not be documented. Mortality was 52 cases (57.78%).

Inferential analysis

The prevalence of intestinal obstruction in the patients studied was 55 cases (61.11%; 95% CI 60.77-61.45%). In 15 cases (16.67%), it was complete obstruction; in 36 cases (40%), it was partial obstruction; in 4 cases, the specific type of obstruction could not be documented. Mortality was 52 cases (57.78%) (Table 3). The presence of the tumor in the rectosigmoid junction was a risk factor for the development of MIO (Table 3).

Table 3. Comparison of variables between patients with and without malignant intestinal obstruction (MIO).

Variable	With MIO No.=55	Without MIO No.=35	OR	CI95%-OR	P
Sex					
Men	36 (65.5%)	19 (54.3%)	1,596	0.671-3.796	0.2907
Age					
30-40 years	3	1	1,962	0.196-19.64	0.5666
41-50 years	9	1	6,652	0.804-55.03	0.0788
51-60 years	13	12	0.593	0.233-1.511	0.2737
61-70 years	15	12	0.719	0.288-1.797	0.4799
71-80 years	15	9	1,083	0.414-2.837	0.8705
Type of care					
External consultation	12	8	0.942	0.341-2.601	0.9080
Emergency	4	4	0.608	0.142-2.607	0.5028
Hospitalization	26	17	0.949	0.406-2.217	0.9043
Operating room/Emergency	13	6	1,496	0.510-4.392	0.4635
Histological features					
Adenocarcinoma	52	33	1,051	0.167-6.625	0.9582
Mucinous carcinoma	2	1	1,283	0.112-14.70	0.8413
Squamous cell	0	1	0.207	0.008-5.232	0.3393
Gastrointestinal stromal tumor	1	0	1,954	0.077-49.32	0.6842
Tumor site					
Rectosigmoid junction	12 (21.8%)	2 (5.7%)	6,188	1.282-29.86	0.0232
Hepatic angle	0	1	0.207	0.008-5.232	0.3393
Blind colon	1	0	1,954	0.077-49.32	0.6842
Ascending/descending colon	3	1	1,962	0.196-19.65	0.5667
Sigmoid colon	2	3	0.403	0.064-2.540	0.3329
Transverse colon/unspecified	6	4	0.949	0.248-3.634	0.9391
Right colon	31 (56.4%)	24 (68.6%)	0.592	0.243-1.443	0.2487
Risk factor's					
Alcoholism	8	0	12,705	0.710-227.5	0.0842
Diabetes	6	2	2020	0.384-10.62	0.4063
Obesity	2	0	4,081	0.190-87.78	0.3691
Hypertension	23	13	1,216	0.510-2.904	0.6591
Smoking	5	1	3,400	0.380-30.41	0.2736
None	21	19	0.520	0.220-1.228	0.1359
Mortality					
Deceased	35 (63.6%)	17 (48.6%)	1,853	0.783-4.383	0.1603

Discussion

Intestinal obstruction occurs when the small intestine or colon is wholly or partially blocked. The blockage prevents food, liquid, and gas from generally passing through the intestines and is a complication that commonly affects patients with colorectal cancer. The present study revealed a prevalence of intestinal obstruction in patients with colon cancer at the IESS Ceibos General Hospital in Guayaquil from March 2017 to June 2020 of 61.11%. Male patients were the most frequent, accounting for 61.11% of the total. The most frequent comorbidity was arterial hypertension, at 36%, followed by alcoholism and diabetes, both at 8%. A total of 94.44% presented with adenocarcinoma, 61.11% had a tumor in the rectum, 15.56% presented with a tumor in the rectosigmoid junction, and 5.56% presented with a tumor in the sigmoid colon. In addition, 65% of the patients presented partial intestinal obstruction, and the mortality rate in our study was 57.78%.

In a cohort that included all US cancer patients hospitalized with malignant intestinal obstruction in 2006 and 2010 using national hospitalized patient sample data provided by the Agency for Health Care Research and Quality, the prevalence of intestinal obstruction was determined to be between 25-40% of patients [8]. The mean age of the patients at the time of hospital admission was 66 years; a significant difference was observed based on sex, with a greater number of female patients (52% vs. 48%; $P < 0.001$). Compared to the present study, there was a higher prevalence of intestinal obstruction (61.11%) than that reported by the cohort, and the predominant sex was male. The average age in both studies was similar since, in our study, the average age of the patients was 62 ± 11 years, compared to the 66 years reported by this study from the United States.

In another population-based study of incidence and associated risk factors in patients with stage IV colon cancer using the Surveillance, Epidemiology, and End Results (SEER)- Medicare database [9], it was concluded that of the 12,553 colon cancer patients, 1004 (8.0%) were hospitalized with intestinal obstruction after a cancer diagnosis. In this large population of patients with stage IV colon cancer, bowel obstruction after diagnosis was less common (8.0%) than previously reported, including the results of the present study, which are well above this percentage. Finally, intestinal obstruction was more common among those with mucinous adenocarcinomas than nonmucinous tumors (10.4 vs. 7.6%; $P < 0.001$). The mortality rate was 94% at the last follow-up, higher than the 57.78% reported in this study.

In another study in Peru [10] that analyzed 114 patients with malignant colon neoplasia, 14 of the 42 patients with colon cancer presented a type of intestinal obstruction, representing 33% of the patients studied. The mean age was 60.5 years, and the female gender predominated at 66.7%. One hundred percent of the histological types were adenocarcinoma. A total of 33.3% were found in the ascending colon and 21.4% in the sigmoid colon. In agreement with this study, 94.44% presented an adenocarcinoma; however, there was a difference in the predominant site of the tumor, while in this study from Peru, it was in the ascending colon and sigmoid colon; in our study, 61.11% had a tumor in the rectum, followed by 15.6% who presented it in the rectosigmoid junction. In addition, similar to the study conducted in the United States, [8] the present study was inconsistent with the predominance of the male gender and a higher prevalence of intestinal obstruction.

In conclusion, although our study differs in some results from other more extensive studies since there were some limitations in this study due to the relatively small number of patients compared to a multicenter study, it establishes a solid foundation for future studies. Research in Ecuador on risk factors and prevalence of intestinal obstructions in patients with colon cancer.

This study was subject to certain potential limitations. Using secondary data confers a need to understand how the original data were collected. For example, some patient information may have been lost or incorrectly recorded, which can lead to underestimates or over- estimates of the finding. We managed and minimized these limitations to the extent possible by carefully selecting patient records.

Conclusions

In the present report, the prevalence of intestinal obstruction in patients with colon cancer was 61.1%. Sixty-five percent of the patients presented with a partial intestinal obstruction. Male patients were the most frequent, 61.1% of the total, and the average age was 62 ± 11 years. A total of 94.4% presented with adenocarcinoma. A total of 61.1% had a tumor located in the rectum. The mortality of the patients was 57.8%. The presence of a tumor in the rectosigmoid junction was a risk factor for the development of OIM.

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Administrative information

Abbreviations

MIO: malignant intestinal obstruction.
CI: Confidence interval.

Additional Files

None declared by the authors.

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Availability of data and materials

Data are available upon request to the corresponding author. No other materials are reported.

Author contributions

Jorge Luis Márquez Coronel: conceptualization, validation, visualization, methodology, project management, writing: review and editing.

John Enmil Saltos Carvajal: conceptualization, data curation, formal analysis, fundraising, research, resources, software, writing - original draft.

Tania Triana: conceptualization, validation, visualization, methodology, project management, writing: review and editing.

All authors read and approved the final version of the manuscript.

Ethics committee approval

It does not apply to observational studies.

Consent for publication

It does not apply when the patients' images, X-rays, or tomographies are not published.

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