



Incidence and Imaging of Colorectal Cancer Between 2015-2020 in Somalia: A Review of 585 Colonoscopy

Somali'de 2015-2020 Yılları Arasında Kolorektal Kanser İnsidansı ve Görüntüleme: 585 Kolonoskopinin İncelenmesi

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Article Info: Received; 21.06.2023. Accepted; 12.07.2023. Published; 13.07.2023.

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Cite as: Er S, Kaya V. Incidence and Imaging of Colorectal Cancer Between 2015-2020 in Somalia: A Review of 585 Colonoscopy. Life Med Sci 2023; 2(3): 117-124.

Abstract

The aim of the study is to determine the frequency and distribution of all colonoscopic pathologies, especially colorectal cancer (CRC), in Somalia between 2015 and 2020. For this retrospective and descriptive study, a total of 760 colonoscopy results were analyzed from the medical records of Somalia Turkey Recep Tayyip Erdoğan Training and Research Hospital. We excluded 175 patients with incomplete colonoscopy findings and medical records. Patient characteristics, presence of normal mucosa, presence, characteristics, localization, and histopathology of the lesion were recorded. Abdomino-pelvic computed tomography (CT) scans were evaluated. The median age of 585 patients (male; n=384, 65.6%) included in the study was 44 years (range; 19-94). 20.5% (n=120) had normal colonoscopy findings and 31.8% (n=186) had benign perianal pathologies (most common hemorrhoids; n=139, 23.8%). In 40.9% (n=239/585) of patients, lesions were detected in the colorectum and biopsy was performed. The number of cases with CRC on colonoscopy was 50 (8.5%), the most common histopathological type was adenocarcinoma (n=40/50; 80%) and the most common localization was rectosigmoid colon (n=37/50; 74%). The median age of CRC cases was 53 years (range, 29-85) and 72% (n=36) were male. The most common morphologic type of adenocarcinoma on CT image was mass-forming (n=35/40; 87.5%). In all patients, the tumor had invaded the bowel wall and periintestinal fat infiltration was present. Lymph node metastases were present in 38% (n=19/50) and distant organ metastases in 18% (n=9/50) of patients with CRC. Our study reveals that colonoscopies in Somalia mostly find perianal lesions (most commonly hemorrhoids), the incidence of CRCs is 8.5%, all CRCs are diagnosed at an advanced stage and require neoadjuvant chemoradiotherapy. Community education and screening programs should be developed to detect CRCs early in the precancerous stage and reduce mortality.

Keywords: Somalia, Incidence, Colorectal cancer, Colonoscopy, Epidemiology.

Özet

Çalışmanın amacı 2015-2020 yılları arasında Somali'de başta kolorektal kanser (*colorectal cancer*, CRC) olmak üzere tüm kolonoskopik patolojilerin sıklığını ve dağılımını belirlemektir. Retrospektif ve tanımlayıcı

nitelikteki bu çalışma için Somali Türkiye Recep Tayyip Erdoğan Eğitim ve Araştırma Hastanesi'nin tıbbi kayıtlarından toplam 760 kolonoskopi sonucu analiz edildi. Kolonoskopi bulguları ve tıbbi kayıtları eksik olan 175 hasta çalışma dışı bırakıldı. Hasta özellikleri, normal mukoza varlığı, lezyonun varlığı, özellikleri, lokalizasyonu ve histopatolojisi kaydedildi. Abdomino-pelvik bilgisayarlı tomografi (*computed tomography*, CT) çekimleri değerlendirildi. Çalışmaya dahil edilen 585 hastanın (erkek; n=384, %65.6) ortanca yaşı 44 yıl (yaş aralığı, 19-94) idi. Hastaların %20.5'inde (n=120) normal kolonoskopi bulguları ve %31.8'sinde (n=186) benign perianal patolojiler (en sık hemoroid; n=139, %23.8) mevcuttu. Hastaların %40.9'unda (n=239/585) kolorektumda lezyon tespit edildi ve biyopsi yapıldı. Kolonoskopide CRC'li olgu sayısı 50 (%8.5) olup, en sık histopatolojik tip adenokarsinom (n=40/50; %80) ve en sık lokalizasyon yeri rektosigmoid kolon (n=37/50; %74) idi. CRC olgularının ortanca yaşı 53 (yaş aralığı, 29-85) olup, %72'si (n=36) erkekti. CT görüntülerinde en sık görülen morfolojik adenokarsinom tipi kitle oluşturan (*mass-forming*) tipti (n=35/40; %87.5) Tüm hastalarda tümör bağırsak duvarını invaze etmişti ve periintestinal fat infiltrasyonu mevcuttu. CRC'li hastaların %38'inde (n=19/50) lenf nodu metastazı ve %18'inde (n=9/50) uzak organ metastazı vardı. Çalışmamız Somali'deki kolonoskopilerde çoğunlukla perianal lezyonların (en sık hemoroid olmak üzere) tespit edildiğini, CRC insidansının %8.5 olduğunu, CRC'lerin tümünün ileri evrede teşhis edildiğini ve neoadjuvan kemoradyoterapi gerektirdiğini ortaya koymaktadır. CRC'leri prekanseröz aşamada erken tespit edip mortaliteyi azaltmak adına toplum eğitilmeli ve tarama programları geliştirilmelidir.

Anahtar Kelimeler: Somali, İnsidans, Kolorektal kanser, Kolonoskopi, Epidemiyoloji.

Introduction

Colorectal cancer (CRC), the most important colorectal disease, is the third most common cancer in developed countries and has one of the highest mortality rates worldwide [1]. Most CRCs arise from adenoma, a benign neoplasm [1]. Early detection and removal of these precancerous lesions significantly reduces the incidence of CRC and related mortality [1,2].

Stool sampling tests such as guaiac-based fecal occult blood, immunochemical-based fecal occult blood, and stool DNA are used to detect colorectal pathologies and to screen for CRC [3,4]. Imaging methods such as double-contrast barium enema and computed tomographic colonography are also used [4]. Moreover, thanks to advances in fiberoptic technology, endoscopic methods (e.g., flexible sigmoidoscopy, colonoscopy) are also used to visually assess the colon [4]. Although endoscopic methods are invasive, they are now routinely used because biopsy can be performed during the procedure and suspicious lesions such as adenomatous polyps can be detected, visualized, and removed (polypectomy) simultaneously. However, it also has potential side effects such as colonic perforation and major bleeding [4]. These risks can be minimized in the presence of good pre-procedural preparation, surgical experience, and appropriate equipment. In addition to CRC screening, colonoscopy is also

used in patients with lower gastrointestinal symptoms such as rectal bleeding, stools with bloody mucus, lower abdominal pain, changes in bowel habits lasting more than two weeks, and tenesmus [5].

Although previous studies have reported that the incidence of CRC and diverticular disease in Africa is rare, it is observed that these diseases are reported more frequently due to increased diagnostic capacity and widespread use of endoscopy units [6,7]. However, the incidence of colorectal disease in sub-Saharan Africa (SSA) is still unclear. Although there have been studies on colonoscopy results in various regions of Africa [7], to our knowledge, there is no data in the literature on this subject in Somalia, located in the east of SSA.

Considering the large geographical variation in the global distribution of CRC and other colorectal diseases, we conducted a cross-sectional study to estimate the prevalence of colorectal diseases in Somalia, as no similar study has been conducted in this region before. The aim of this current study was to determine the prevalence and distribution of all colonoscopic pathologies, especially colorectal cancer, in Somalia Turkey Recep Tayyip Erdoğan Training and Research Hospital (STRTEH), the region's referral hospital, in the approximately a 5-year period between July 2015 and February 2020.

Material and Method

This retrospective and descriptive study was conducted after obtaining approval from the Ethics Committee of SMRTEH, and the study carried out in accordance with the tenets of the Declaration of Helsinki.

Study population and data collection

STRTEH is the region's best-equipped referral and consultant hospital and was established in 2015 in the capital Mogadishu. It is a tertiary care hospital where all kinds of surgical operations are performed and radiological methods such as ultrasound (US), computed tomography (CT) and magnetic resonance imaging (MRI) are available.

Since 2015, upper and lower gastrointestinal endoscopic procedures have been performed by the General Surgery Department at our hospital, and when a lesion is detected during endoscopy, materials are taken for histopathological sampling and sent to the pathology laboratory. For all materials received by the pathology laboratory, the demographic characteristics of the cases (age, gender), the area from which the material was taken (cecum, ascending colon, transverse colon, descending colon, sigmoid colon, and rectum), sampling method (incisional biopsy or polypectomy), and histopathologic characteristics are recorded in detail in the electronic medical record system. In addition, endoscopic findings such as presence of normal mucosa, presence of lesions and lesion characteristics are recorded on the electronic data collection form.

For this hospital-based, cross-sectional study, 760 patients who underwent total colonoscopy for various lower gastrointestinal symptoms between July 2015 and January 2020 were analyzed. Patients with clinically suspected ileal pathology also underwent ileal intubation. We excluded 175 patients in whom colonoscopy findings were not available or medical records were incomplete. As a result, 585 patients whose colonoscopy and pathology data were available and whose diagnosis was confirmed were included in the study. In our routine colonoscopy practice, when polyps are detected, biopsy is performed for lesions less than 5 mm and polypectomy is performed for lesions larger than 10 mm. The management of polyps between 5-10 mm is

decided by the operator according to the patient's symptoms, and also family and medical history. In addition to colonoscopy, abdominopelvic CT with intravenous and oral contrast is performed for staging in patients with malignancy. For this study, CT images were obtained from the hospital archive system (PACS) by a radiologist with nine years of experience and evaluated. CT images were evaluated for the presence of local spread and distant metastasis.

Colonoscopy procedure protocol

Patients were given detailed information about the colonoscopy procedure and possible complications before the procedure. Informed consent was obtained from all patients. Patients were advised to eat liquid food 3 days before the colonoscopy procedure. As standard, X-M® (sennoside A+B calcium) 250 ml diet at 17:00 p.m. 2 days before the procedure, BT enema® (sodium hydrogen phosphate) 135 ml in the morning, XM 250 ml diet at 17:00 p.m. 1 day before the procedure, BT enema 135 ml in the morning and evening, and BT enema 135 ml in the morning of the procedure were administered. During the colonoscopy procedure, sedative and antispasmodic drugs were administered to ensure that they tolerated the procedure well and did not feel pain. For sedation, midazolam 1-5 mg, propofol 0.5 mg/kg and scopolamine butyl bromide 20-40 mg were given intravenously. Flumazenil was kept ready in our unit to prevent possible complications. Immediately after the procedure, colonoscopy findings were recorded electronically by the operator.

Statistical analyzes

All analyses were performed using SPSS v. 22.0 (IBM SPSS Statistics Version 22.0. Armonk, NY: IBM Corp.) software. Age and gender were expressed as mean \pm standard deviation and numbers and percentages, respectively. Categorical variables were expressed as numbers and percentages.

Results

Of the 585 patients who underwent colonoscopy and were included in the study, 65.6% (n=384) were male and 34.4% (n=201) were female. The age range was 19-94 years with

a median of 44 years. **Table 1** shows the macroscopic findings of colonoscopy. Normal colonoscopy findings were present in 20.5% of the patients (n=120). In 40.9% (n=239/585) of the patients, a lesion was detected in the colorectum and sampling was performed for histopathologic examination. Of these, 67.4% (n=161/239) were male and 32.6% (n=78/239) were female. The mean age of those who underwent biopsy was 47.9±17.7 years (range 19-94 years) with a median value of 49 years. There were 11 (1.9%) patients with perforation during the procedure.

The frequency of colorectal cancer diagnosed at colonoscopy was 8.5% (n=50/585) and the most common histopathologic type was adenocarcinoma (n=40/50; 80%). The median age of the patients with colorectal cancer was 53 years (range, 29-85) with a mean age of 53.7±15.2 years and 72% (n=36) of the patients were male. The most common location of colorectal cancer was the rectosigmoid colon (n=37/50; 74%). When CT images of patients with CRC were evaluated; the most common morphologic type of 40 patients with

adenocarcinoma was mass-forming (n=35; 87.5%), followed by annular wall thickening (n=5; 12.5%). In all patients, the tumor had invaded the bowel wall and periintestinal fat infiltration was present. Lymph node metastasis was present in 38% (n=19/50) and distant organ metastasis in 18% (n=9/50) of patients with CRC (**Figure 1** and **Figure 2**). The distribution of pathology results of colonoscopically detected lesions is shown in **Table 2**.

Table 1. Distribution of macroscopically detected lesions at colonoscopy.

Macroscopic Findings		n=585 (%)
Normal		120 (20.5)
Perianal lesions	<i>Hemorrhoids</i>	139 (23.8)
	<i>Anal fissure</i>	39 (6.7)
	<i>Anal fistula</i>	8 (1.4)
Diverticulosis coli		35 (6.0)
Angiodysplasia		5 (0.9)
Solitary ulcer		15 (2.6)
Colon perforation		11 (1.9)
Inflammatory-infectious mucosa		118 (20.2)
Colorectal polyp		45 (7.7)
Colorectal cancer		50 (8.5)

Table 2. Histopathologic results of patients who underwent biopsy at colonoscopy.

Histopathologic diagnosis	median age (min-max)	male gender n, (%)	all patients (n=239)	localization			
				anorectal junction	recto sigmoid colon	descending/transverse colon	cecum/ascending colon
Colorectal polyp (adenoma)	50 (20-74)	37 (82.2%)	45	11	23	6	5
Colorectal cancer	53 (29-85)	36 (72%)	50	3	37	4	6
<i>Adenocarcinoma</i>	50 (29-85)	25 (62.5%)	40	-	32	4	4
<i>Neuroendocrine tumor</i>	65	1 (100%)	1	-	1	-	-
<i>Signet ring cell cancer</i>	65.2 (47-81)	3 (50%)	6	-	4	-	2
<i>Squamous cell carcinoma</i>	62 (50-85)	1 (33.3%)	3	3	-	-	-
Inflammatory BD*							
<i>Ulcerative colitis</i>	37 (21-60)	3 (100%)	3	-	3	-	-
<i>Chron disease</i>	32 (22-57)	3 (100%)	3	-	-	-	3
Other							
<i>Nonspecific inflammation</i>	48 (21-83)	34 (68%)	50	-	26	8	16
<i>Infectious colitis</i>	64 (21-94)	24 (75%)	32	-	12	8	12
<i>Diverticulitis</i>	60 (20-70)	5 (62.5%)	8	-	3	3	2
<i>Granulomatous disease</i>	41 (36-47)	2 (66.7%)	3	-	-	-	3
Ischemia, necrosis, and hemorrhage	42.5 (25-81)	11 (57.9%)	19	-	6	5	8
Perforation	50 (21-70)	8 (72.7%)	11	-	2	2	7
Ulcer	52.5 (20-80)	12 (80%)	15	-	8	3	4

*; Bowel disease

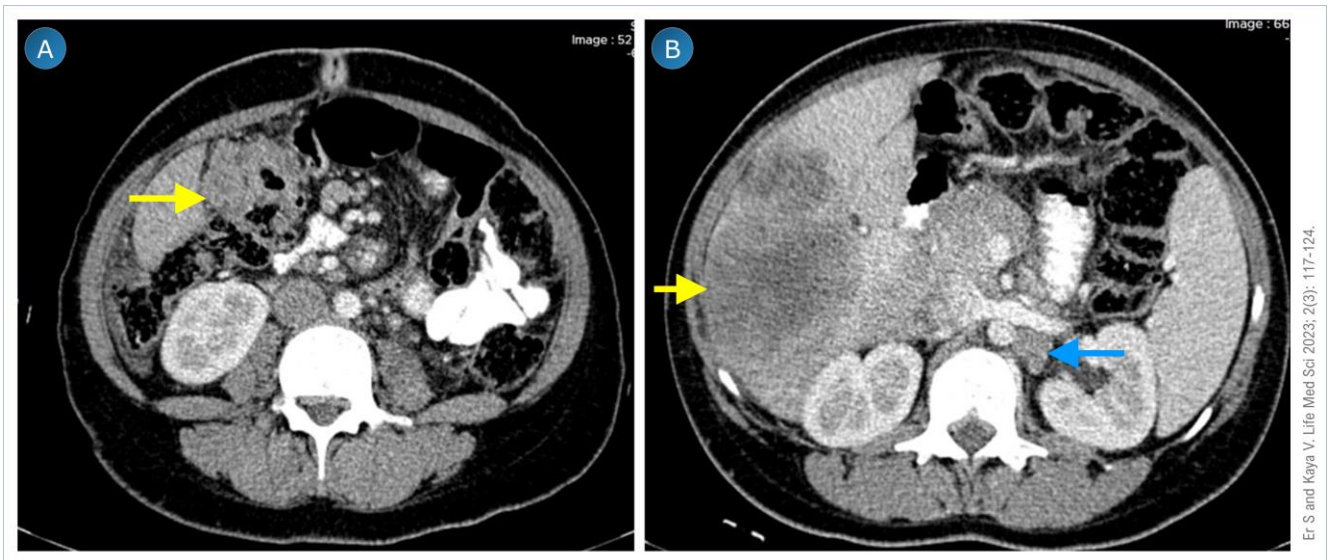


Figure 1: Computed tomography (CT) images of a 28-year-old woman with colorectal cancer and metastases. Abdominal CT images show (A) an advanced mass in the hepatic flexure (arrow), and (B) liver (yellow arrow) and lymph node (blue arrow) metastasis.

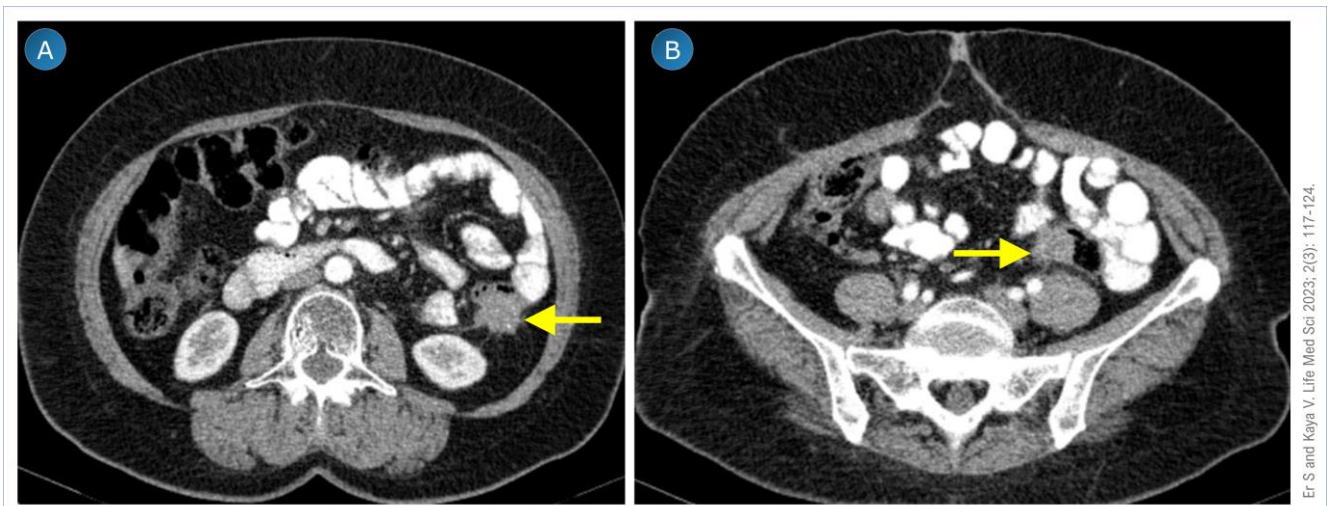


Figure 2: Computed tomography (CT) images of a 64-year-old man with splenic flexure tumor and serosal implant. Abdominal CT images show (A) mass infiltrating pericolic adipose tissue in the splenic flexure (arrow), and (B) serosal implant adjacent to the sigmoid colon (arrow).

Discussion

Given the limited data on colonoscopy findings and the distribution of colorectal diseases in Sub-Saharan Africa, especially in Somalia, this is the first study to assess the incidence and histopathologic outcomes of colonoscopies performed for any cause using the endoscopic database of the best equipped tertiary care hospital in the region. The present study reveals that 47.7% (n=279) of colonoscopies performed in Mogadishu, Somalia had pathologic findings in the colorectum, 31.8% (n=186) had perianal

pathologies without colorectal pathology and 20.5% (n=120) of patients had normal findings.

The distribution and incidence of colorectal pathologies have been found at different rates in different parts of the world. Pathologic findings were reported in 1548 (67.3%) of 2300 colonoscopies in a study conducted in Iran [8], 79.1% of all colonoscopies in Jos, Nigeria by Ismaila et al. [9], 90.2% in Senegal, West Africa by Mbengue et al. [10], and 48.0% in India by Sahu et al. [11]. Such differences in diagnostic yield may be due to different sample sizes in the

studies, differences in the spectrum of colonic diseases seen in different parts of the world, and different selection criteria and indications for colonoscopy. Despite all these differences, the common feature seen in the studies is the frequent occurrence of perianal lesions, especially hemorrhoids. In these studies, the incidence of hemorrhoids (*among pathological findings*) was reported to range between 21.2% and 58.1% [8–11]. In our current study conducted in Somalia, the incidence of positive findings on colonoscopy was 79.5%, which is higher than in other regions. In addition, the incidence of hemorrhoids detected in the colonoscopies included in our study was 23.8% (29.9% in all pathological findings) which is similar to the rates in the literature.

Our data in this current study reveals that CRC was detected in 8.5% (n=50/585) of all-cause colonoscopies performed in Somalia over a ~five-year period, CRCs were predominantly localized in the rectosigmoid colon (74%), the most common histological CRC type was adenocarcinoma (n=40/50), and the median age of colorectal cancer cases was 53 years (range, 29-85). In a meta-analysis (*systematic analysis*) carried out to determine the incidence of CRC in SSA it was found that the incidence of CRC to be 4.04 per 100,000 population [12]. This incidence appears to be much lower than in high-income countries. These results may be related to the underreporting of CRC cases and poorer quality of cancer registration in Africa compared to high-income countries. In the same analysis [12], age-related trends were reported to peak in the over 75 age group, similar to other countries. In contrast, the peak age group in our study was in the 50s. This difference in Somalia may be related to older patients dying before accessing health services. In addition, our previous study on the distribution of cancer in this region shows that cancers in Somalia peak in the 50-60 age range [13]. Mentioned metanalysis in SSA also revealed that CRC was anatomically most common in the rectosigmoid (61% of cases) followed by the cecum (17%) [12]. These data are quite similar to western countries, and a European study found that 52% of CRCs were located in the rectosigmoid and 10% in the cecum [14]. In our current study, 74% of CRCs were in the

rectosigmoid colon, which was higher compared to other studies. In addition, in a study conducted in Zambia, it was reported that 96.2% (n=225/234) of 234 patients with CRCs had adenocarcinoma as the histologic type and 66.2% (n=155/234) were localized in the rectosigmoid colon and the mean age was 48.6 years [15].

Apart from all these, all of the patients with CRC in our current study had symptoms such as rectal bleeding indicating advanced stages of the disease. In addition, all patients had advanced tumors on abdomino-pelvic CT scans at the time of diagnosis and had lost the chance of primary surgery. Unfortunately, due to the lack of oncology units in Somalia for radiotherapy and chemotherapy, patients with advanced tumors have a poor prognosis. In countries with underdeveloped health systems like Somalia, cancer is often diagnosed at an advanced stage and patients often lose the chance of surgery. This may be related to the lack of cancer screening programs and lack of public awareness. In this context, the current situation emphasizes the need for further research in this area to improve public health service delivery.

There is consensus in the literature that colonoscopy is the most important diagnostic and therapeutic modality for diagnosing and treating lesions at the precancerous stage to reduce mortality from CRC. Many cancer and gastroenterology societies worldwide recommend colonoscopy (especially after the age of 50 years) after fecal occult blood or as an initial screening test. However, many factors such as cost, environmental and cultural factors, inadequate access to the health system, psychological factors, inadequate knowledge, and lack of awareness are barriers to public demand for CRC screening programs [16]. All the obstacles mentioned for CRC screening continue to be a problem in underdeveloped countries such as Somalia. According to our study, the rate of CRC detection in five-year colonoscopy was 8.5% (n=50), but we estimate that this rate may be higher due to the above-mentioned reasons. In order to determine the true incidence of CRC and other intestinal pathologies, comprehensive multicenter studies involving large populations are needed.

In the current study, 7.7% (n=45) of the lesions detected at colonoscopy were polyps. Cooper et al. [17] analyzed 1.8 million patients undergoing colonoscopy and found that the apparent yield of colonoscopy for polyp detection was at least 24% (23.9% to 35.7% of examinations were polyps). In our current study, the polyp detection rate was lower. This was thought to be related to the fact that colonoscopies were performed in patients with severe symptoms and not for screening purposes. In addition, the fact that the patients presented in the advanced malignancy stage after CRC development rather than in the precancerous polypoid stage supports this.

This study had limitations such as being single-center, retrospective and lack of randomization. Secondly, being a hospital-based study, it may be insufficient to reflect the whole population in terms of the incidence of colorectal pathologies. However, we believe that the fact that this study was conducted in the largest and most comprehensive tertiary referral hospital in the region will serve as a reference for future research and public health planning.

Conflict of interest: The authors declare that there is no conflict of interest. The authors alone are responsible for the content and writing of the paper. **Financial disclosure:** There is no financial support for this study.

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