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Localization and size of 1058 polyps detected in the lower gastrointestinal system and the approach used for their treatment

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Abstract

The occurrence of colon cancer typically depends on the presence or absence of adenomatous polyps. Hence, performing colonoscopy and polypectomy can aid in cancer prevention. This study aimed to retrospectively investigate demographic, endoscopic, and histopathological data of patients who presented with colorectal polyps and underwent endoscopic resection at our center. In this single-center retrospective study, we collected the data of 1058 colorectal polyps that were excised from 498 cases between September 2019 and September 2020. We reviewed patient's information, including patient age and sex, indications for colonoscopy, polyp characteristics (localization, size, number, and histopathology), endoscopic resection techniques, and presence of related complications. Mean age of the 498 cases included in this study was 62.44 ± 11.77 years (21–90 years); among these patients, 296 (59.4%) were females. The age group of 60–69 years had the highest number of cases (150 cases) presenting with polyps (30.1%). The most common indication for colonoscopy was polyp surveillance in 100 cases (20.1%). The polyps were most commonly localized in the sigmoid colon (26%). Histopathologically, the most common type of polyp was tubular adenoma. Furthermore, 54.3% of the polyps were diminutive. Polyps with dysplasia were significantly different from those without dysplasia in terms of polyp size, polyp localization, and post-polypectomy complications ($p < 0.001$, $p = 0.006$, and $p < 0.001$, respectively). In people aged >50 years, colon polyps were more common in the left colon, especially in the rectosigmoid region. Endoscopic polypectomy is a safe method for resecting precancerous lesions. Polypectomy should be performed immediately after identifying polyps in colonoscopy screenings to determine their histology and prevent progression to malignancy. Additionally, these patients should be included in a polyp surveillance program.

Keywords: Colonoscopy, colorectal polyp, polypectomy, adenoma, dysplasia

Introduction

Annually, colorectal cancer (CRC) is diagnosed in more than one million individuals worldwide; it is the cause of death in approximately 500,000 patients [1]. More than 95% of these cancers originate from adenomatous polyps. This transformation involves the transition from a normal-looking mucosa to adenoma, dysplasia, and, ultimately, carcinoma [2]. Detection and excision of precancerous lesions through screening programs are important in preventing progression to advanced stage cancer [2,3]. According to the recommendations of the World Health Organization, the American College of Gastroenterology, and the Ministry of Health, one of the diagnostic modalities to screen for CRCs in individuals aged >50 years is colonoscopy. Colonoscopy has several advantages over other screening methods, including the fact that it facilitates direct visualization of the colonic mucosa, biopsy, and removal of polyps and local tumors [4]. Gastrointestinal system (GIS) polyps are frequently observed in the colorectal region [5]. These polyps are usually asymptomatic, but depending on the polyp's size, they can cause tenesmus, rectal bleeding, constipation, and ileus in the lower GIS [6]. Generally, colorectal polyps can be categorized as neoplastic and non-neoplastic [7].

This study aimed to determine the clinical and demographic characteristics of patients with polyps that were detected in colonoscopies performed for various reasons at our center, which is one of the largest gastroenterology clinics in our country. We also aimed to identify the characteristics of polyps, polypectomy techniques, post-polypectomy complications, and characteristics of dysplastic polyps.

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Material and Methods

In this study, 498 of 2091 colonoscopic procedures performed in the Gastroenterology Department of our University Hospital between September 2019 and September 2020 and 1058 polyps detected in these procedures were retrospectively evaluated. The study included patients aged ≥18 years who were found to have polyps, successfully underwent polypectomy, and whose polypectomy sample was hispathologically reported as a polyp. We excluded cases of those with insufficient bowel preparation (n = 292), those who could not undergo polypectomy because they used an antiaggregant and/or anticoagulants (n = 20), those who did not successfully undergo colonoscopy (n = 7), those who could not undergo polypectomy for technical reasons (n = 3), those with an ulcerovegetan mass (n = 105), those with normal colonic mucosa reported in their polypectomy findings (n = 32), and those without polyps (n = 1134) (Figure 1).

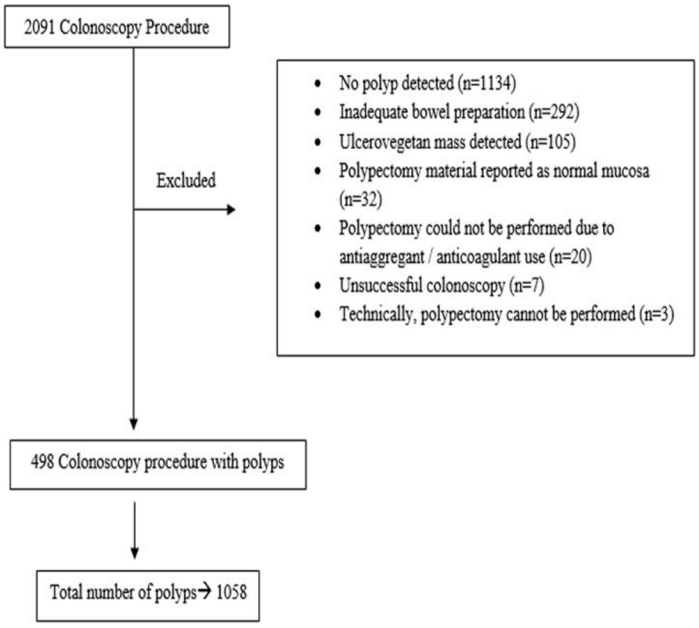

Figure 1. Flow chart of the study design

Endoscopy data of the patients included in the study were obtained from the Endocam system. Information related to patients' age and sex, colonoscopy indication, number of polyps, localization of polyps in the colon, and polypectomy method was obtained from the patients' colonoscopy reports. Histopathological information of the polyp, presence of dysplasia, and post-polypectomy complications were screened using the hospital database.

All patients that were scheduled for a colonoscopy had been prescribed with a pulp-free liquid diet regimen 3 days before the procedure. Additionally, intestinal cleansing had been performed 1 day before the procedure as a part of a standardized protocol. Endoscopic examinations had been performed using Olympus CFH-170L-CFQ-150L ileocolonoscopy devices (with carbon dioxide insufflation) by a gastroenterologist and a gastroenterology subspecialty assistant under the supervision of a gastroenterologist and an endoscopy nurse.

According to their localization, polyps are typically classified as cecum, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid colon, and rectum polyps. They are also categorized as right and left colon polyps. Right colon polyps include cecum, hepatic flexure, and transverse colon polyps, whereas left colon polyps include splenic flexure, descending colon, sigmoid colon, and rectum polyps. According to the European Society of Gastrointestinal Endoscopy (ESGE) guidelines, polyp sizes are categorized as ≤5 mm (diminutive polyp), 6–9 mm, 10–19 mm, and ≥20 mm [8]. According to the number of polyps, polyps are divided into single and multiple polyps.

Polypectomy techniques are defined as forceps biopsy, cold snare polypectomy, hot snare polypectomy, endoscopic mucosal resection (EMR), hot snare polypectomy post hemoclip application to the polyp's stem, and hot snare polypectomy post endoloop application to the polyp's stem. EMR is defined as the removal of a polyp after separating the mucosa from the underlying muscularis propria along with saline + indigo carmine application to the mucosal lesion [8].

Post-polypectomy complications were classified as intra- or postprocedural bleeding, perforation, and post-polypectomy coagulation syndrome. According to this classification, post-polypectomy intraprocedural bleeding was defined as bleeding occurring during the intervention and lasting longer than 60 seconds or requiring endoscopic intervention, whereas post-polypectomy postprocedural bleeding was defined as bleeding occurring after the intervention (up to 30 days after polypectomy) and requiring emergency admission, hospitalization, or re-intervention [8]. Post-polypectomy coagulation syndrome was defined as the development of focal peritonitis without perforation and thermal damage due to electrosurgical cauterization in the colon wall after polypectomy [9].

This study was approved by the local ethics committee (ethics committee number: 20-11T/11).

For statistical analyses, normal distribution of the variables was examined by visual (histogram) and analytical methods (Kolmogorov–Smirnov test). The numerical data obtained from the study data were expressed as mean, median, standard deviation, and minimum-maximum values, whereas the categorical data were expressed as number and percentage using descriptive statistics. The Mann–Whitney U test was used for intergroup comparisons of numerical variables, and the Chi-square or Fisher's exact test was used for the comparison of categorical variables. A p value of <0.05 was considered statistically significant. For all statistical analyses and calculations, SPSS Statistics Ver. 22.0 (SPSS Inc. Chicago, IL, USA) software was used.

Results

In our study, we examined the data of 1058 polyps that were identified in 498 cases, of which 296 (59.4%) were females. The mean patient age was 62.44 ± 11.77 years (21–90 years). The polyps were most commonly observed in patients aged 60–69 years with 150 (30.1%) cases, followed by those aged 50–59 years with 138 (27.7%) cases, and those aged 70–79 years with 128 (25.7%) cases. The most common indications for colonoscopy were polyp surveillance in 100 (20.1%) patients, GIS malignancy screening in 92 (18.5%) patients, and referral from an external center for polypectomy in 65 (13.1%) patients (Table 1). According to the

localization, 275 (26%) polyps were detected in the sigmoid colon, 212 (20%) in the descending colon, and 163 (15%) in the ascending colon (Figure 2).

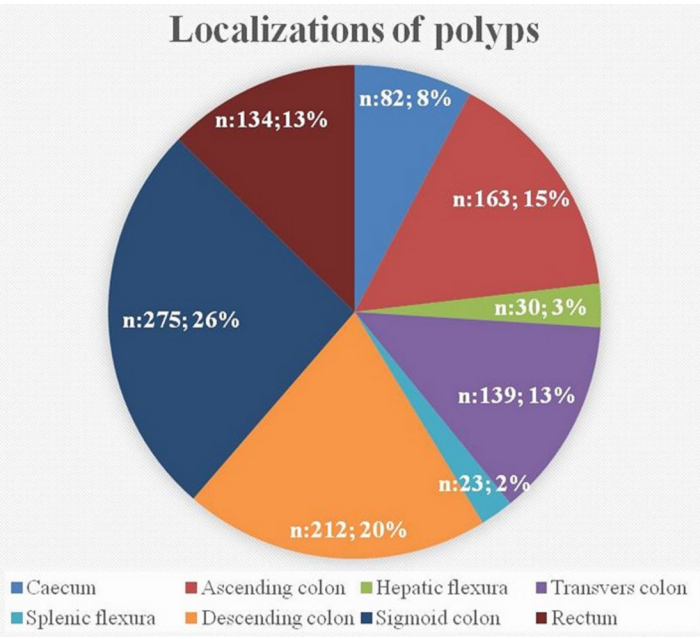

Figure 2. Localizations of polyps

The average number of polyps was 2.12 ± 1.8 and the average size was 6.52 ± 5.38 (2–45) mm. Also, the sizes of 575 (54.3%) polyps were ≤5 mm, 285 (26.9%) were 6–9 mm, 156 (14.7%) were 10–19 mm, and 42 (4%) were ≥20 mm. The most common polypectomy techniques were forceps biopsy for 532 (50.3%) polyps, hot snare polypectomy for 202 (19.1%) polyps, and cold snare polypectomy for 152 (14.4%) polyps. Forceps polypectomy was performed for 92% of the diminutive polyps. For polyps that were 6–9 mm in size, 57.8% polyps were removed by hot snare polypectomy and 40.3% by cold snare polypectomy. EMR was performed for 75% of the polyps that were 10–19 mm in size. The most commonly used methods for removal of polyps ≥20 mm in size were EMR (45.2%) and hot snare polypectomy (28.5%) post endoloop application to the polyp's stem. There were no complications due to polypectomy in 463 (93%) patients, but intraprocedural post-polypectomy bleeding occurred in 34 (6.8%) patients and postprocedural post-polypectomy bleeding occurred in 1 (0.2%) patient (Table 2). The patient who developed postprocedural post-polypectomy bleeding was admitted to our emergency department 48 hours after undergoing polypectomy. The patient was evaluated with colonoscopy, and hemostasis was achieved by applying 3 hemoclips to the bleeding area. Consequently, after receiving follow-up care, the patient was discharged 3 days later with full recovery. Histopathologically, the most common type of polyp was tubular adenoma (n = 656; 62%), followed by hyperplastic polyp (n = 182; 17.2%) and tubulovillous adenoma (n = 139; 13.1%). Low grade dysplasia was observed in 5 (0.5%) polyps, high grade dysplasia (HGD) in 56 (5.3%) polyps, and intramucosal carcinoma in 4 (0.4%) polyps (Table 3). Tubular adenomas were most common in the sigmoid colon and descending colon, hyperplastic polyps in the sigmoid colon and rectum, and tubulovillous adenomas in the descending colon and ascending colon (Table 4). No significant difference was found between polyps with and without dysplasia in terms of patient's age, patient's sex, and the number of polyps (p = 0.148, 0.063, and 0.880, respectively). However, polyps with dysplasia were significantly different from those without in terms of polyp size, polyp localization, and post-polypectomy complications (p < 0.001, 0.006, and 0.001, respectively). The mean size of polyps with dysplasia was 16.8 ± 9.7 mm, whereas that of polyps without dysplasia was 5.8 ± 4.1 mm. Dysplasia was detected in 59.5% of the polyps that were ≥20 mm in size. Additionally, dysplasia was observed in 3.6% of the right colon polyps and 7.8% of the left colon polyps. Although dysplasia was present in 42.9% of the patients who developed bleeding after polypectomy, it was also reported in 3% of the patients who did not develop bleeding (Table 5). There was no statistically significant difference between the patients with and without bleeding after polypectomy in terms of sex, age, polyp size, and polyp localization (p = 0.086, 0.985, 0.247, and 0.641, respectively).

Table 1. Demographic and clinical characteristics of patients with polyps detected in colonoscopy

	n (%)
Sex	
Female	202 (40.6)
Male	296 (59.4)
Age (years) (mean ± SD)	62.44 ± 11.77
Age groups (years)	
<20	0 (0)
20–29	6 (1.2)
30–39	12 (2.4)
40–49	40 (8)
50–59	138 (27.7)
60–69	150 (30.1)
70–79	128 (25.7)
≥80	24 (4.8)
Indications for colonoscopy	
Polyp surveillance	100 (20.1)
GIS malignancy screening	92 (18.5)
Being referred to us for polypectomy	65 (13.1)
Anemia	56 (11.2)
Operated colon cancer surveillance	49 (9.8)
Hematochezia	39 (7.8)
Abdominal pain	32 (6.4)
Constipation	25 (5)
Diarrhea	14 (2.8)
Bowel habit change	12 (2.4)
Weight loss	6 (1.2)
Melena	5 (1.0)
Primary focus investigation	3 (0.6)

GIS: Gastrointestinal System, SD: Standard Deviation

Table 2. Properties, treatment methods, and post-procedure complications of colon polyps

	n (%)
Number of polyps (mean ± SD)	2.12 ± 1.8
Groups by the number of polyps	
Single	262 (52.6)
Multiple	236 (47.4)
Polyp size (mean ± SD) (mm)	6.52 ± 5.38
Classification by polyp size	
≤5 mm (diminutive polyp)	575 (54.3)
6–9 mm	285 (26.9)
10–19 mm	156 (14.7)
≥20 mm	42 (4)
Polypectomy techniques	
Forceps biopsy	532 (50.3)
Cold snare polypectomy	152 (14.4)
Hot snare polypectomy	202 (19.1)
EMR	138 (13)
Prophylactic hemoclip + Cold snare polypectomy	15 (1.4)
Prophylactic endoloop + Hot snare polypectomy	19 (1.8)
Polypectomy complications	
No	463 (93)
Post-polypectomy interprocedural bleeding	34 (6.8)
Post-polypectomy postprocedural bleeding	1 (0.2)

SD: Standard Deviation, mm: millimeter EMR: Endoscopic mucosal resection

Table 3. Distribution of colon polyps according to histopathological type and dysplasia status

	n (%)
Histopathological types	
Tubular Adenoma	656 (62)
Hyperplastic Polyp	182 (17.2)
Tubulovillous Adenoma	139 (13.1)
Inflammatory pseudopolyp	29 (2.7)
Hamartomatous Polyp	15 (1.4)
Villous Adenoma	10 (0.9)
Sessile Serrated Lesion	8 (0.8)
Unclassifiable Serrated Adenoma	8 (0.8)
Intramucosal Adenocarcinoma	4 (0.4)
Leiomyoma	3 (0.3)
Traditional Serrated Adenoma	2 (0.2)
Lipoma	1 (0.1)
Neuroendocrine Tumor	1 (0.1)
Dysplasia	
No	993 (93.9)
Low grade dysplasia	5 (0.5)
High grade dysplasia	56 (5.3)
Intramucosal carcinoma	4 (0.4)

Table 4. Localization of polyps according to histopathology types

Histopathological type/Localization	Cecum	Ascending colon	Hepatic flexure	Transverse colon	Splenic flexure	Descending colon	Sigmoid colon	Rectum
Histopathological type/Localization	68	110	18	109	16	147	149	**39**
Tubular Adenoma	3	7	4	11	2	17	69	69
Hyperplastic Polyp	6	30	5	11	1	30	42	14
TV Adenoma	2	5	0	5	1	7	4	5
Inflammatory PP	0	0	0	0	1	5	5	4
Hamartomatous	0	2	1	1	0	3	3	0
Villous Adenoma	2	5	1	0	0	0	0	0
SSL	1	4	0	2	0	0	1	0
USA	0	0	0	0	2	0	1	1
IMAC	0	0	1	0	0	0	1	1
Leiomyoma	0	0	0	0	0	2	0	0
TSA	0	0	0	0	0	1	0	0
Lipoma	0	0	0	0	0	0	0	1
NET	0	0	0	0	0	0	0	1

TV: Tubulovillous, PP: Pseudopolyp, SSL: Sessile serrated lesion, USA: Unclassifiable Serrated Adenoma, IMAC: Intramucosal adenocarcinoma, TSA: Traditional serrated adenoma, NET: Neuroendocrine tumor

Table 5. Comparison of polyps with and without dysplasia

	Dysplasia		
	None (Mean ± SD)	**Yes (Mean ± SD)**	**p value**
Age (years) (n = 498)	62.26 ± 11.67	65.45 ± 13.14	0,148
Number of polyps (n = 498)	2.10 ± 1.72	2.48 ± 2.77	0.880
Polyp size (mm) (n = 498)	5.85 ± 4.17	16.82 ± 9.71	<0.001
	n (%)	n (%)	
Sex (n = 498)			**0.063**
Female	195 (96.5)	7 (3.5)	
Male	274 (92.6)	22 (7.4)	
Classification according to polyp size (n=1508)			**<0.001**
≤5 mm (diminutive polyp)	570 (99.1)	5 (0.9)	
6–9 mm	274 (96.1)	11 (3.9)	
10–19 mm	132 (84.6)	24 (15.4)	
≥20 mm	17 (40.5)	25 (59.5)	
Polyp localization (n = 1508)			**0.006**
Right colon	399 (96.4)	15 (3.6)	
Left colon	594 (92.2)	50 (7.8)	
Polypectomy complications (n = 498)			**<0.001**
No	449 (97)	14 (3)	
Post-polypectomy bleeding	20 (57.1)	15 (42.9)	

SD: Standard deviation

Discussion

The incidence of CRC has shown an increasing trend, which highlights the importance of CRC screening. Most CRCs are caused by pre-existing adenomas (10,11). Considering that polyps can be symptomatic or asymptomatic, CRC-related mortality and morbidity decrease with improvements in detection and subsequent removal of the polyps detected in colonoscopy (12,13). Colon polyp detection rates have been reported to be 15%–25% worldwide (14–16). In our country, this rate has been reported to be 11%–22%; however, in our study, colon polyps were detected in 23.8% patients, which was higher than the average detection rate in our country and within the detection rate worldwide (16–18). Possible reasons for this may be that our unit is a tertiary center, wherein colonoscopy procedures are performed in the presence of experienced nurses and narrow band imaging is widely used in procedures.

According to the studies performed in the world and in our country, the age of patients with polyps is typically 57–63 years [17–23]. Similarly, in our study, the mean age of the patients was 62.44 ± 11.77 years. Although polyps are more commonly observed in males, in our study they were relatively more common in females [19–23]. Furthermore, similar to our study, prior studies have reported that they are common in females as well [24–26]. One possible reason for this may be that females are typically more proactive than males when approaching a physician, considering the socio-cultural and geographical differences.

Colon polyps are most commonly observed in the rectosigmoid region (27–30, 31). Similarly, 38% of the polyps identified in our study were located in the rectosigmoid region. In a study conducted by Solakoğlu et al. in our country, 896 polyps were examined, wherein 47% cases presented with multiple polyps [6]. Similarly, 47.4% of the patients in our study presented with multiple polyps. The increase in the number of right colon polyps (32) shows that cases with distal polyps may also present with proximal polyps (33,34); furthermore, nearly 50% of the polyps were multiple polyps, indicating that colonoscopy examination is a more useful method for detecting polyps than a flexible rectosigmoidoscopy, and can thereby help in decreasing the incidence of CRC.

The ESGE guidelines prefer cold snare polypectomy to forceps biopsy for diminutive polyps due to residual risk. However, it

is stated that forceps biopsy can be used for polyps that are 1–3 mm in size. Cold snare polypectomy is recommended for polyps that are 6–9 mm in size. No significant difference was reported in the polyps in terms of the presence or amount of residual tissue between the cold and hot snare polypectomy techniques. EMR or hot snare polypectomy is recommended for polyps that are 10–19 mm in size. For polyps with a stem that is >20 mm in size, mechanical hemostasis or adrenaline injection is recommended if the polyp stem thickness is >10 mm [8]. In our study, forceps polypectomy was the most commonly used technique to remove diminutive polyps. Forceps polypectomy was performed in 92% of the patients with diminutive polyps. Snare polypectomy was performed for 91.1% of the polyps that were 6–9 mm in size. EMR was performed for 75% of the polyps that were 10–19 mm in size. For polyps that were >20 mm in size, hot snare polypectomy along with EMR or mechanical hemostasis was performed in 96.2% of the cases. Our treatment modalities are in accordance with the ESGE guidelines, except for those on diminutive polyps. Removal of diminutive polyps using forceps is probably due to use of jumbo forceps. The post-polypectomy intraprocedural bleeding rate has been reported to be 0.3%–11.3% (22,31, 35-37). Our study results revealed a rate of 6.2%, which is similar to that reported in the literature. Also, endoscopic hemostasis was achieved in all instances of post-polypectomy intraprocedural bleeding.

Adenomatous polyps are the most common type of colon polyps, comprising 62.5%– 76.8% of all colon polyps. Furthermore, 60.3%–86% of adenomatous polyps are tubular adenomas, 2%–16.4% are villous adenomas, and 8%–16.4% are tubulovillous adenomas (22,31, 38-41). Hyperplastic polyps constitute 6%–17.9% of all colon polyps, whereas 19.6% polyps are classified as other polyps (22,42). Similar to that reported in the literature, the most common polyps observed in our study were adenomatous polyps (76%), followed by hyperplastic polyps (3.1%).

The degree of dysplasia is the most important histopathological indicator for the transformation from adenoma to carcinoma. In the literature, the rate of HGD has been reported as 6.7%–8% (43,44). Similarly, 5.3% of the cases in our study presented with HGD. Risk factors defined in the literature for the development of dysplasia include advanced age and the presence polyps with larger diameters (45-47). Our study outcomes revealed the presence of a relationship between dysplasia and polyp size, polyp localization, and post-polypectomy complications.

The most important limitation of our study was that it was a single-center retrospective study. Additionally, the polyps were not classified morphologically according to the Paris Classification in the colonoscopy reports, and risk factors, such as diet, smoking, family history, and body mass index, could not be determined. Also, no comparison could be made between patients with and without polyps.

Conclusion

In conclusion, colon polyps are more common in the left colon, especially in the rectosigmoid region, in people aged >50 years. Endoscopic polypectomy is a safe method for resecting precancerous lesions. When polyps are detected in colonoscopy, polypectomy should be performed to determine the histology and prevent progression to malignancy. Also, such patients should be included in a polyp surveillance program.

Conflict of interests
The authors declare that they have no competing interests.

Financial Disclosure
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Ethical approval
Ethics committee approval was obtain Institution name: Ege University Local Ethics Committe Approval number: 20-11T/11

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