



Colonoscopic polypectomy: Analysis of 429 cases

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Abstract

Aim: It is well known that most colorectal cancers develop from colon polyps. Therefore, removing polyps found during colonoscopy, regardless of their size and characteristics, is critical because of the risk of developing colorectal cancer. This study aimed to evaluate the outcomes of colonoscopic polypectomy performed in our clinic.

Materials and Methods: The data of patients who underwent colonoscopy for various reasons between January 2018 and December 2020 and who had polypectomy performed during the procedure were evaluated retrospectively. These patients were divided into two groups, single polypectomy, and multiple polypectomy cases.

Results: Single polyp was detected in 72% (n=309) of the 429 patients included in the study, whereas multiple polyps were detected in 28% (n=120). Of these patients, 62.9% (n=270) were male and 37.1% (n=159) were female. The median age of patients with a single polyp (61.0) was lower than that of patients with multiple polyps (65.0) (p=0.014). In patients with a single polyp, the most common localization was rectum (32.4%), and the most common histopathological subtype was tubular adenoma (50.8%). In patients who underwent multiple polypectomies, the most common localization was a sigmoid colon (25.5%), while the most common histopathological subtype was again tubular adenoma (48.1%). There was no statistically significant difference between the two groups in the severity of dysplasia (p=0.838). A significant difference was found between polyp diameter and dysplasia severity in adenomatous polyps in both groups (p<0.001).

Conclusion: Colonoscopic polypectomy effectively reduces the risk of colorectal cancer by removing precancerous polyps. Colon polyps are often prominent in the rectosigmoid region and more common in the male gender. An increase in the number of colon polyps is observed with age. In our country, a multicenter prospective study with many participants is required to characterize polyps.

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Introduction

Polyps are structures that originate from the intestinal mucosa and submucosa and protrude toward the lumen. Colonic polyps are classified into two main groups according to their histopathological features as neoplastic polyps (adenomas and carcinomas) and non-neoplastic polyps (hyperplastic, inflammatory, hamartomatous polyps, etc.) [1]. On the other hand, adenomatous polyps are divided into tubular, tubulovillous, and villous adenomas according to the presence and volume of the villous tissue they contain [2]. In general, it is believed that 80-95% of colorectal cancers (CRC) develop gradually from colorectal polyps, especially adenomatous polyps [3]. This process, known as the adenoma-carcinoma sequence, is a slow process that can take many years [4]. Furthermore, some fea-

tures of polyps (number, size, presence of dysplasia, etc.) are factors that can play a role in malignant transformation [5].

Colorectal cancer is the second most common cause of cancer-related death and the third most common cancer worldwide [6]. Currently, colonoscopy is considered the gold standard procedure for reducing CRC morbidity and mortality [7]. Colonoscopy reduces the risk of developing CRC by detecting and removing precancerous lesions, such as adenomas. It has been reported that for every 1.0% increase in adenoma detection rate, the risk of CRC decreases by 3.0% [8].

Wolff and Shinya first described colonoscopic polypectomy in the 1970s, and it continues to be one of the most common and most effective therapeutic procedures performed in endoscopy units [9].

In autopsy and endoscopic studies evaluating colon polyps, it has been found that there are social and geograph-

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ical differences. Therefore, our aim in this study was to evaluate the results (number of polyps, localization, size, histopathological features, demographic data, etc.) Colonoscopic polypectomy is performed in our surgical endoscopy department.

Materials and Methods

This study was conducted retrospectively after approval by the local ethics committee (Alanya Alaaddin Keykubat University Clinical Research Ethics Committee, 22.09.2021; No:14-07). Patients who underwent colonoscopy for various indications between January 2018 and December 2020, during which polyps were detected, and polypectomy was performed, were included in the study. In the study, patients were included in the study to compare the single and multiple polyp groups. The population of the study was determined as the patients who applied to the endoscopy unit in the last 3 years and met the admission criteria, and it was determined that the number of these patients was around $N=3.500$. It was seen that 385 patients could represent the population of this determined population with a simple random sampling method at 5% error and 95% confidence level. After this calculation, $n=429$ patients who met the admission criteria were included in the study. Previous history of colon cancer, history of colon surgery, inflammatory bowel disease, and patients under 18 years of age were excluded from the study. Demographic data of all patients, number of polyps detected, polyp diameter, histopathological type, polyp localization (caecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid colon, and rectum), presence of dysplasia and polypectomy method were recorded. Vascular access was established in all patients before the procedure, and sedo analgesia was administered in the presence of an anesthesiologist. Then, colonoscopic polypectomy was performed by the surgeon using two different methods. These methods were performed as polypectomy with forceps or with the help of a snare (by giving 1/10.000 saline and adrenaline solution to the submucosal area with a sclerotherapy needle). After the procedure, the specimens were kept in formalin solution and sent to the pathology laboratory for histopathological examination.

Statistical analysis

The mean, standard deviation, median, minimum, maximum, frequency and percentage values were used to obtain the descriptive statistics of the data. The Kolmogorov-Smirnov test measured the distribution of variables. Analysis of independent quantitative data was found using the Mann-Whitney u test. Qualitative independent data were analyzed using the chi-square test. Statistical analysis was performed using the SPSS version 27.0 (IBM Corp. released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: USA).

Results

A total of 429 patients who underwent colonoscopic polypectomy in our unit were included in the study. Of these patients, 62.9% ($n=270$) were male and 37.1% ($n=159$) were female. While single polyp was detected in

72.0% ($n=309$) of the patients, multiple polyps were detected in 28% ($n=120$). The mean age of patients with a single polyp (59.9 ± 12.9) was lower than the mean age of patients with multiple polyps (63.1 ± 12.7) ($p=0.014$). In addition, while dysplasia was not seen in 38.1% ($n=74$) of the patients with adenomatous polyps in the single polyp group, low-grade dysplasia was observed in 56.1% ($n=109$) and high-severity dysplasia was present in 5.6% ($n=11$). In the multiple polyp group, high severity dysplasia was detected in 6.2% ($n=14$) and low severity dysplasia in 55.8% ($n=125$) polyps in adenomatous polyps. The rate of polyps without dysplasia was 37.9% ($n=85$). No statistically significant differences were found when the groups were examined according to the severity of dysplasia ($p=0.838$). The distribution between the groups in terms of age, gender, and severity of dysplasia is shown in Table 1.

In patients with a single polyp and underwent polypectomy, the most common polyp site was the rectum (32.4%). The number of polyps found under 1 cm in this group was 261 (84.5%). In the histopathological evaluation, tubular adenoma was detected in 50.8% of the patients ($n=157$) and ranked first. Hyperplastic polyp ranked second was found in 23.3% ($n=72$) of the patients. The clinical and endoscopic features of the patient group with a single polyp are shown in Table 2.

341 polypectomy procedures were performed on 120 patients with multiple polyps. When the polyp sites were examined, the sigmoid colon was in first place with 25.5% ($n=87$), while the rectum was in second place with 24.9% ($n=85$). In the histopathological evaluation, tubular adenoma was reported in 48.1% ($n=164$) of the polyps. The hyperplastic polyp was found in 65 (19.1%) cases. The number of polypectomy with forceps was 237, while the number of polypectomies with snare was recorded as 104. The clinical features of the patient group who underwent multiple polypectomies are shown in Table 3.

A total of 418 adenomatous polyps were detected in the two groups. Among adenomatous polyps, the number of polyps without dysplasia and found below 1 cm was 64 (%40.0), 90 (%56.2) with low-grade and 6 (%3.7) with high-grade severity of dysplasia in single polyp group. In addition, a statistically significant difference was found between the increase in polyp diameter and the severity of dysplasia in single polyp and multiple polyps ($p<0.001$) (Table 4).

Discussion

Colorectal cancer develops from benign precursor lesions, and malignant transformation can persist for many years [10]. This process, which is defined as the adenoma-carcinoma sequence, was first introduced by Marson [11]. Therefore, colorectal cancers (CRC) are well suited for population-based screening methods. Polyps may also be discovered incidentally as part of an initial screening colonoscopy program, a surveillance program for high-risk patients, or during colonoscopy for other indications. Detection of colon polyps in a population is crucial in identifying and preventing potential CRC risk. In this study, a detailed evaluation of clinical features, physical characteristics and histopathological findings was done to determine

Table 1. Age, gender, and dysplasia distribution of patients with single polyp and patients with multiple polyps.

		Single Polyp		Multiple Polyps		p-value
		Median (Min-Max)/n-%		Median (Min-Max)/n-%		
Age		61.0 (21.0-91.0)		65.0 (38.0-89.0)		0.014 ^m
Gender	Male	188	60.8	82	68.3	0.149 ^{X²}
	Female	121	39.2	38	31.7	
Dysplasia	None	74	38.1	85	37.9	0.838 ^{X²}
	Low-grade	109	56.1	125	55.8	
	High-grade	11	5.6	14	6.2	

m Mann-Whitney u test / X^2 Chi-Square test.

Table 2. Characteristics of patients with a single polyp.

Single Polyp	n	%		
Polyp Site	Rectum	100	32.4	
	Sigmoid Colon	94	30.4	
	Descending Colon	33	10.7	
	Transverse Colon	31	10.0	
	Ascending Colon	20	6.5	
	Caecum	19	6.1	
	Splenic Flexure	7	2.3	
	Hepatic Flexure	5	1.6	
Polyp Diameter	1 cm	261	84.5	
	1-2 cm	32	10.4	
	≥ 2 cm	16	5.2	
Pathology	Tubular Adenoma	157	50.8	
	Hyperplastic Polyp	72	23.3	
	Chronic Inflammation	25	8.1	
	Tubulovillous Adenoma	22	7.1	
	Serrated Adenoma	13	4.2	
	Edema	8	2.6	
	Inflammatory Polyp	4	1.3	
	Mixed Polyp	3	1.0	
	Xanthomatosis	2	0.6	
	Villous Adenoma	2	0.6	
	Lipoma	1	0.3	
	Polypectomy	Polypectomy with Forceps	196	63.4
		Polypectomy with Snare	113	36.6

the nature of colon polyps detected in various age groups in our region.

Colon polyps can be seen in various age groups, and the incidence increases with age. 'The National Polyp Study', published in 2004, reported the incidence of polyps as 13% of patients under the age of 50; 28% between the ages of 50 and 59; 39% between the ages of 60 and 69; 18% between the ages of 70 and 79; and 2% between the ages of 80 and over [12]. In our study, the mean age of patients with single polyps was 59.9 ± 12.9 , while the mean age of patients with multiple polyps was 63.1 ± 12.7 ($p = 0.014$), consistent with the literature. However, it should be noted that in our study, we had 21-year-old and 91-year-old patients in whom we found polyps.

Several literature studies are reporting that colon polyps

are more common in men than in women. In their study involving 17,265 patients, Diamond et al. reported that 40.5% of the patients who underwent colonoscopic polypectomy were female, and 59.4% were male [13]. Again from our country, Oymacı et al. found that 65% of the patients who underwent colonoscopic polypectomy were female, and 35% were male [14]. In our study, 62.9% of the patients were male, and 37.1% were female. The higher prevalence of colon polyps in men remains unclear, although various theories have been proposed. The first of these argues that estrogen has a protective effect on improving colorectal polyps and that this effect is trans-

Table 3. Characteristics of patients with a multiple polyps.

Multiple Polyps	n	%	
Polyp Site	Rectum	87	25.5
	Sigmoid Colon	85	24.9
	Descending Colon	56	16.4
	Transverse Colon	35	10.3
	Ascending Colon	30	8.8
	Caecum	26	7.6
	Splenic Flexure	15	4.4
	Hepatic Flexure	7	2.1
Polyp Diameter	1 cm	289	84.8
	1-2 cm	41	12.3
	≥ 2 cm	11	2.9
Pathology	Tubular Adenoma	164	48.1
	Hyperplastic Polyp	65	19.1
	Tubulovillous Adenoma	33	9.7
	Serrated Adenoma	25	7.3
	Inflammatory Polyp	20	5.9
	Mixed Polyp	10	2.9
	Chronic Inflammation	10	2.9
	Edema	6	1.8
	Lymphoid polyp	2	0.6
	Villous Adenoma	2	0.6
	Xanthomatosis Polyp	2	0.6
	Fibroepithelial polyp	1	0.3
	Pseudolipomatosis Polyp	1	0.3
Polypectomy	Polypectomy with Forceps	237	69.5
	Polypectomy with Snare	104	30.5

Table 4. The relationship between the polyp diameter and severity of dysplasia in adenomatous polyps with single polyp and multiple polyps.

Polyp diameter	None n (%)	Low-grade n (%)	High-grade n (%)	p-value
Single Polyp				
≤ 1 cm	64 (40.0)	90 (56.2)	6 (3.7)	0.001 X^2
1-2 cm	9 (33.3)	16 (59.2)	2 (7.4)	
≥ 2 cm	1 (14.2)	3 (42.8)	3 (42.8)	
Multiple Polyps				
≤ 1 cm	75 (41.4)	99 (54.6)	7 (3.8)	<0.001 X^2
1-2 cm	9 (27.2)	21 (63.6)	3 (9.0)	
≥ 2 cm	1 (10.0)	5 (50.0)	4 (40.0)	

X^2 Chi-Square test.

mitted through estrogen receptor genes. The second theory suggests that because of women's lower bile acid production, colonic mucosal irritation and subsequent colonic polyp formation are observed less frequently [15,16].

When the localization of colon polyps is analyzed, we see that polyps located in the left colon are more prominent in the literature. In their study, which evaluated the results of artificial intelligence-assisted colonoscopy, Luo et al. found the rate of polyps in the left colon as 55% [17]. In studies conducted in our country, Oymacı et al. reported the rate of polyps in the left colon as 71%. In the colonoscopic polypectomy series of 876 patients, Sahintürk et al. found this rate as 69% [14,18]. In our study, polyp localization was consistent with the literature. In patients with a single polyp, the location was rectum in 32.4% of the cases, sigmoid colon in 30.4%, and descending colon in 10.7%. In patients with multiple polyps, the sigmoid colon was the site in 35.5%, the rectum in 24.9%, and descending colon in 16.4%.

Prevalence of hyperplastic polyps (H.P.s) is around 20% in the western population and constitute approximately one-third of all resected polyps. Hyperplastic polyps are classified as non-neoplastic polyps. However, adenomatous transformation is observed in approximately 13% of them. These polyps are called mixed hyperplastic-adenomatous polyps. Again, if there are findings such as nuclear atypia and structural distortion in the histology of these polyps and adenomatous transformation is seen, it is defined as a serrated adenoma [19]. Among the polyps detected during a colonoscopy, the most clinically important group is adenomatous polyps and is included in the neoplastic polyp group. Adenomas constitute 2/3 of all colon polyps [2]. Qarini found the frequency of adenomatous polyps as 68.6% [16]. In studies conducted in our country, the frequency was reported as 74.3% by Şahintürk et al. and 66.76% by Celasin [18,20]. These studies reported tubular adenoma as the most common histological structure among adenomatous polyps.

Similarly, in our study, our adenoma rate was 62.7% for patients with a single polyp and 65.6% for patients with multiple polyps, similar to the literature. Again in our study, tubular adenoma was the most common subtype. Therefore, another clinical importance of the removal of adenomas is to determine the frequency of follow-up ex-

aminations for the patients. After polypectomy, the predisposing factors and genetic disorders necessary for developing adenoma in the intestinal mucosa will not disappear. This will create a risk for these patients to develop adenoma and colorectal cancer again in the future. Therefore, these patients are included in the follow-up programs recommended by international organizations and are taken for colonoscopy screenings.

Polyp diameter is an important risk factor for the development of malignancy, and there are limited studies in the literature on this subject. The detection rate for polyps greater than 10 millimeters in autopsy series is reported to be 10-15% [11]. In their study with artificial intelligence-assisted colonoscopy, Liu et al. found that the rate of patients with polyps smaller than 1 centimeter was 93.5%, while Qari reported this rate as 81% in his study with 211 patients [3,16]. In this study, detection rates of polyps smaller than 1 cm were found to be 84.5% and 84.8% in patients with single polyps and multiple polyps, respectively. Another factor associated with malignancy is the presence of dysplasia in polyps. Dysplasia is classified as mild, moderate, and severe in some studies, while it is classified as mild and severe dysplasia in others [16,21]. Eminler et al. found 52 (7.5%) high-grade dysplasia in 692 patients with polypectomy [21]. Oymacı et al. reported a high-degree dysplasia rate as 2.5% in their study [14]. While some studies reported that the development of dysplasia and cancer was independent of the size of the polyp, Bas et al. evaluated 379 patients. They found that the rate of dysplasia was significantly higher in polyps larger than 1 cm [22]. In the study of Silva et al., they found moderate or high dysplasia rates in polyps smaller than 1 cm and larger than 1 cm as 4.1% and 25.9%, respectively [23]. Similar results to the literature were found in our study.

Polypectomy can usually be done using forceps or a snare. The use of forceps is more common in small polyps. Hot forceps are used to destroy the remaining tissue after polypectomy with the help of electrocautery. Generally, polypectomy with the snare is preferred for polyps larger than 1 cm [24]. In accordance with the literature, we performed polypectomy with forceps in 196 patients with single polyps and 237 patients with multiple polyps.

The main limitation of this study is that it was done retrospectively in a single center, and therefore the results can-

not be generalized. Future multicenter prospective studies are needed to further define and evaluate colonic polyp patterns and their long-term consequences.

Conclusion

In conclusion, in this study, the data of patients who underwent colonoscopic polypectomy in our region were analyzed, and many data have obtained that support the previous literature results. Colon polyps are more common lesions, especially in males and the rectosigmoid region. The number of polyps in the colon increases with age, and there is a relationship between polyp diameter and dysplasia severity. Therefore, there is a need for large-scale prevalence studies, follow-up, and screening programs, especially for patients with adenomatous polyps containing dysplasia, which is considered a precursor lesion for colorectal cancer.

Ethics approval

Ethical approval for this study was obtained from the Clinical Research Ethics Committee of Alanya Alaaddin Keykubat University (Date: 22.09.2021; Decision no:14-07).

References

1. Itzkowitz SH, Potack J. Colonic polyps and polyposis syndromes. *Sleisenger and Fordtran's Gastrointestinal and Liver Disease: Elsevier*; 2010. p. 2155-89. e7.
2. Bond JH. Polyp guideline: diagnosis, treatment, and surveillance for patients with colorectal polyps. *The American journal of gastroenterology*. 2000;95(11):3053.
3. Liu W-N, Zhang Y-Y, Bian X-Q, et al. Study on detection rate of polyps and adenomas in artificial-intelligence-aided colonoscopy. *Saudi journal of gastroenterology: official journal of the Saudi Gastroenterology Association*. 2020;26(1):13.
4. Aarons CB, Shanmugan S, Bleier JI. Management of malignant colon polyps: current status and controversies. *World Journal of Gastroenterology: WJG*. 2014;20(43):16178.
5. Brenner H, Hoffmeister M, Stegmaier C, et al. Risk of progression of advanced adenomas to colorectal cancer by age and sex: estimates based on 840 149 screening colonoscopies. *Gut*. 2007;56(11):1585-9.
6. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA: a cancer journal for clinicians*. 2018;68(6):394-424.
7. Rex DK, Boland CR, Dominitz JA, et al. Colorectal cancer screening: recommendations for physicians and patients from the US Multi-Society Task Force on Colorectal Cancer. *Gastroenterology*. 2017;153(1):307-23.
8. Wieszczy P, Regula J, Kaminski M. Adenoma detection rate and risk of colorectal cancer. *Best Practice & Research Clinical Gastroenterology*. 2017;31(4):441-6.
9. Wolff WI, Shinya H. Endoscopic polypectomy Therapeutic and clinicopathologic aspects. *Cancer*. 1975;36(S2):683-90.
10. tot Babberich MPdN, Bronzwaer ME, Andriessen J.O., et al. Outcomes of surgical resections for benign colon polyps: a systematic review. *Endoscopy*. 2019;51(10):961-72.
11. Morson B. *The polyp-cancer sequence in the large bowel*. SAGE Publications; 1974.
12. Loeve F, Boer R, Zauber AG, et al. National Polyp Study data: evidence for regression of adenomas. *International journal of cancer*. 2004;111(4):633-9.
13. Diamond SJ, Enestvedt BK, Jiang Z, et al. Adenoma detection rate increases with each decade of life after 50 years of age. *Gastrointestinal endoscopy*. 2011;74(1):135-40.
14. Oymacı E, Sari E, Uçar AD, et al. Cerrahi Endoskopi Ünitemizdeki Kolonoskopik Polipektomi Sonuçlarımızın Değerlendirilmesi. *Kolon Rektum Hast Derg* 2014;24:118-124.
15. Barzi A, Lenz AM, Labonte MJ, Lenz H-J. Molecular pathways: estrogen pathway in colorectal cancer. *Clinical cancer research*. 2013;19(21):5842-8.
16. Qari Y. Clinicopathological characterization of colonic polyps. *Nigerian Journal of Clinical Practice*. 2020;23(8):1048-53.
17. Luo Y, Zhang Y, Liu M, et al. Artificial intelligence-assisted colonoscopy for detection of colon polyps: A prospective, randomized cohort study. *Journal of Gastrointestinal Surgery*. 2021;25(8):2011-8.
18. Şahintürk Y, Çekin AH. Kolon polipleri: Lokalizasyon, histoloji, boyut-5 yıllık kolonoskopik değerlendirme. *Endoskopi Gastrointestinal*. 2018;26(2):57-60.
19. Geramizadeh B, Robertson S. Serrated polyps of colon and rectum: a clinicopathologic review. *Journal of gastrointestinal cancer*. 2017;48(4):291-8.
20. Celasin H. Kolonoskopik Polipektomi Sonuçlarımız: Prevalans, Boyut, Lokalizasyon ve Histopatolojik Değerlendirme. 2020.
21. Eminler AT, Sakallı M, Kader I, et al. Gastroenteroloji ünitemizdeki kolonoskopik polipektomi sonuçlarımız. *Akademik Gastroenteroloji Dergisi*. 2011;10(3):112-5.
22. Bas, B., Dinc, B., Oymaci, E., et al. (2015). What are the Endoscopic and Pathological Characteristics of Colorectal Polyps? *Asian Pacific Journal of Cancer Prevention*, 16(13), 5163-5167.
23. Silva, S. M., Rosa, V. F., Santos, A. C., Almeida, R. M., Oliveira, P. G., & Sousa, J. B. Influence of patient age and colorectal polyp size on histopathology findings. *Arq Bras Cir Dig*. 2014; 27 (2): 109-13.
24. Singh N, Harrison M, Rex DK. A survey of colonoscopic polypectomy practices among clinical gastroenterologists. *Gastrointestinal endoscopy*. 2004;60(3):414-8.