



An Evaluation of Colorectal Polyps by Size and Advanced Histological Features: In a Secondary Referral Centre

Kolorektal Poliplerin Boyut ve İleri Histolojik Özelliklerine Göre Değerlendirmesi: İkinci Basamak Sağlık Merkezimizin Sonuçları

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ABSTRACT

Aim: Advanced histological features, polyp size, and polyp count are factors known to increase the risk of adenomatous polyps' transformation into a malignancy. We aimed to analyze, in detail, the advanced histological features of a large number of polyps that are under the size of 1 cm, which we have identified, and to compare our findings with those of similar studies in literature.

Method: A total of 2,302 colonoscopy procedures that were performed for any reason in adult patients above the age of 18 years in our endoscopy unit of the department of gastroenterology between October 2016 and January 2020 were screened. The endoscopic and histological features of the identified procedures were analyzed retrospectively.

Results: In 401 (17.42%) of the 2,302 colonoscopy procedures, at least one polyp had been identified. Diminutive polyps (67.21%), small polyps (25.91%), and large polyps (6.88%) were detected. The most common histological diagnosis in the polyps was adenomas (61.13%) and, among all adenomas, tubular adenoma (88.08%) was the most frequent type. Low-grade and high-grade dysplasia was detected in 58.91% and 2.63% of the polyps, respectively. Advanced histological features were detected in 2.41% of the diminutive polyps, 13.28% of the small polyps, and 47.06% of the large polyps. As the polyp size increased, the frequency of the advanced histological features also increased.

Conclusion: The number of diminutive polyps and small polyps as well as the frequency of advanced histological features in our study were slightly higher when compared to those in similar studies.

Keywords: Polyp, advanced histological features, size

ÖZ

Amaç: İleri histolojik özellikler, polip boyutu ve polip sayısının adenomatöz poliplerin maligniteye dönüşümünde önemli risk faktörleri olduğu bilinmektedir. Çalışmamızda 1 cm boyutun altındaki çok sayıda kolorektal polibin ileri histolojik özelliklerini ayrıntılı olarak analiz etmeyi ve bulgularımızı literatürdeki benzer çalışmalarla karşılaştırmayı amaçladık.

Yöntem: Ekim 2016-Ocak 2020 tarihleri arasında hastanemiz gastroenteroloji kliniği endoskopi ünitesinde 18 yaş üstü erişkin hastalara herhangi bir nedenle yapılmış olan toplam 2302 kolonoskopik işlem tarandı. Bu işlemlerde belirlenen poliplerin endoskopik ve histolojik özellikleri retrospektif olarak analiz edildi.

Bulgular: 2302 kolonoskopik işlemin 401'inde (%17,42) en az bir polip tespit edildi. Diminutif polip, küçük polip ve büyük polip (%6,88) oranları sırasıyla %67,21, %25,91 ve %6,88 olarak tespit edildi. Poliplerde en sık histolojik tanı adenomlardı (%61,13) ve tüm adenomlar arasında tübüler adenom (%88,08) en sık görülen adenoma tipi idi. Poliplerin %2,63'ünde düşük dereceli, %58,91'inde yüksek dereceli displazi saptandı. Diminutif poliplerin %2,41'inde, küçük poliplerin %13,28'inde ve büyük poliplerin %47,06'sında ileri histolojik özellikler tespit edildi. Polip boyutu arttıkça ileri histolojik özelliklerin görülme sıklığı da artmaktaydı.

Sonuç: Çalışmamızda diminutif ve küçük poliplerin sayısı ve bu poliplerdeki ileri histolojik özelliklerin sıklığı literatürdeki benzer çalışmalara göre bir miktar daha yüksek oranda saptandı.

Anahtar Kelimeler: Polip, ileri histolojik özellikler, boyut



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Introduction

Colorectal cancer (CRC) is among the most common cancers in the world. It is among the leading causes of mortality and morbidity associated with cancer in western countries. According to the American Cancer Society's (ACS) statistics on CRC (revised on January 2020), in the United States, CRC is the third most common cause of cancer-related deaths in both men and women and the second most common cause of cancer-related deaths among the entire populace. It is expected to cause around 53,200 deaths during the course of 2020.^{1,2,3} In general, CRC originates from polyps. The term polyp refers to a protuberance into the lumen from the normally flat colonic mucosa.⁴ Colorectal polyps are usually asymptomatic; however, when they increase in size, they can cause tenesmus, rectal bleeding, and bowel obstruction. The malignant potential to transform into CRC is the most significant feature of polyps. Cancers resulting from adenomas are called adenoma carcinomas and 95% of all CRC result from adenomatous polyps (APS).^{5,6} A number of studies have demonstrated that removing adenomas through endoscopic polypectomy or surgical resection reduces the risk of cancer.^{7,8,9,10} For this reason, polyps detected during colonoscopy should be removed and histologically diagnosed, since such polyps may serve as the precursor lesion of CRC. In general, polyps are classified as either neoplastic [benign: adenomas (APS); malign: carcinomas] or non-neoplastic (hyperplastic and inflammatory) based on their histological features.^{11,12} The clinically most significant colon polyps are APS, which are the main elements of the neoplastic polyps that pose a risk of transforming into cancer. APS account for two-thirds of all colonic polyps and more than 95% of all CRCs originate from APS. The resulting tumor is suggested to be formed by a carcinogenesis pathway starting from the transformation of APS into dysplasia and finally reaching the carcinoma stage. Such transformation may be completed in a 7- to 10-year period, but fortunately, most APS cannot reach the carcinoma stage.¹³ APS are divided into three types: tubular adenomas, tubulovillous adenomas, and villous adenomas.¹⁴ The factors known to increase the risk of developing CRC include advanced histological features (AHF: $\geq 25\%$ villous features, high-grade dysplasia, or cancer), polyp size (especially >1 cm), polyp count, high-grade dysplasia (HGD), and a significant villous component. Therefore, the identification and excision of APS decreases the mortality associated with CRC and increases survival.^{15,16,17} In spite of some geographical differences, APS are more common at older ages; therefore, a colonoscopy follow-up is recommended before in such older cohorts. In the ACS guideline published in 2018, a routine screening is recommended at age 45 in people at average risk of CRC.¹⁸ Polyps have been divided according to size

into three groups: diminutive polyps [(DPS); ≤ 5 mm], small polyps [(SPS); 6-9 mm], and large polyps [(LPS); ≥ 10 mm]. Majority of the polyps detected in the course of colonoscopy comprise DPS and SPS. In such polyps, the risk of developing a tumor is considered very low, given their small sizes. However, the American College of Gastroenterology 2012 guidelines for colonoscopy surveillance after screening and polypectomy posits that 10.10% of SPS adenomas and 1.70% of DPS adenomas involve an advanced histology, including carcinoma.¹⁹ In this study, we aimed to analyze, in detail, the AHF and size of polyps that we have identified and compare our findings with those of similar studies in literature.

Materials and Methods

In this study, a total of 2,068 colonoscopy procedures performed for any reason in adult patients in the endoscopy unit of Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital secondary referral state hospital between October 2016 and January 2020 were analyzed retrospectively. Any procedures in which a colonoscopic polypectomy had been performed were sorted out and thoroughly examined. Patients undergoing the procedure had a one-day long colon cleanse and had not eaten anything for in the last 8 hours before commencement of the procedure. During the procedure, sedoanalgesia had been administered by an anesthesiologist. All colonoscopic procedures had reached the caecum. Polyps identified during the course of the procedure had been excised by means of a forcep or snare and transferred to the pathology laboratory in a 10% formaldehyde solution. Polyps had been divided according size into three groups: DPS (≤ 5 mm), SPS (6-9 mm), and LPS (≥ 10 mm). We identified the AHF of the polyps that we have divided according to size into three groups, such as $\geq 25\%$ villous features, HGD, or cancer. We identified the villous histology feature based on the respective classification of the World Health Organization's, which states that tubular adenomas are those bearing $<20\%$ villous component, tubulovillous adenomas are those bearing 20%-80% villous component, and villous adenomas are those bearing $>80\%$ villous component. In this manner, we included all tubulovillous and villous adenomas into the group having $\geq 25\%$ villous features.²⁰ In this study, we compared the identified AHF based on size. Approval for this study was obtained from the Ethics committee (Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital, 22.05.2019, 53).

Statistical Analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 23.0 (IBM Corp., Armonk, N.Y., USA). In addition to descriptive statistics (mean, standard deviation,

median, frequency, and ratio), Shapiro-Wilk test was used to determine the variables that had normal distribution and boxplot graphics were used for such variables. Student t-test was used to compare normally distributed variables between groups, while Mann-Whitney U test was used to compare variables without normal distribution between groups. For comparison of qualitative data, chi-square test, Fisher's exact test, and Fisher-Freeman Halton test were applied. P value <0.05 was considered statistically significant.

Results

We determined that, in 401 out of the 2302 colonoscopy procedures performed in our endoscopy unit, at least one or more polyps were detected. A total of 494 polyps were detected in these 401 procedures, revealing that at least one polyp was found in 17.42% of all colonoscopy procedures. Mean age of patients with a polyp was 60.32±12 (range: 18-92) years. Mean age of men was 61.06±14 (range: 18-90) years and mean age of women was 59.86±11 (range: 19-92) years. Of all cases, 251 (62.60%) were men and 150 (37.40%) were women. The distribution of polyps according size was as follows: 332 DPS (67.21%), 128 SPS (25.91%), and 34 LPS (6.88%). In this study, polyps were mostly localized in the sigmoid colon and least frequent in the caecum (Table 1). Sixteen different histological diagnoses had been reported for the polyps. The most common diagnosis was APS [detected in 302 (61.13%) cases], which constitute the largest neoplastic polyp group. On the other hand, the distribution of APS types detected in the

polyps was as follows: tubular APS [266 (88.08%) polyps], tubulovillous APS [30 (9.94%) polyps], and villous APS [6 (1.99%) polyps]. When dysplasia/cancer features of polyps were reviewed, low-grade dysplasia (LGD) in 291 (58.91%) polyps, HGD in 13 (2.63%) polyps, and an intramucosal adenocarcinoma in 2 (0.40%) polyps was identified. When the presence of dysplasia/cancer was reviewed based on polyp size, LGD and HGD was found in 171 (51.51%) and 2 (0.60%) of the 332 DPS, respectively. Of the total of 128 SPS, 103 (80.47%) and 3 (2.34%) involved LGD and HGD, respectively. Of the total of 34 LPS, 17 (50.00%) and 8 (23.53%) involved LGD and HGD, respectively; whereas 2 (0.40%) involved intramucosal adenocarcinoma (Table 2). When the AHF was examined based on polyp size, no polyp was found to include two or more villous histology, HGD, and cancer. However, 6 DPS with villous histology and 2 DPS with HGD were detected, suggesting that an AHF was identified in 8 (2.41%) of the 332 DPS. Fourteen SPS with villous histology and 3 SPS with HGD were detected, suggesting that AHF was identified in 17 (13.28%) of the 128 SPS. In the case of LPS, which were already advanced in size, 8 LPS with villous histology, 6 LPS with HGD, and 2 LPS with intramucosal adenocarcinoma were detected, suggesting that AHF was identified in 16 (47.06%) of the 34 LPS (Graphic 1).

Discussion

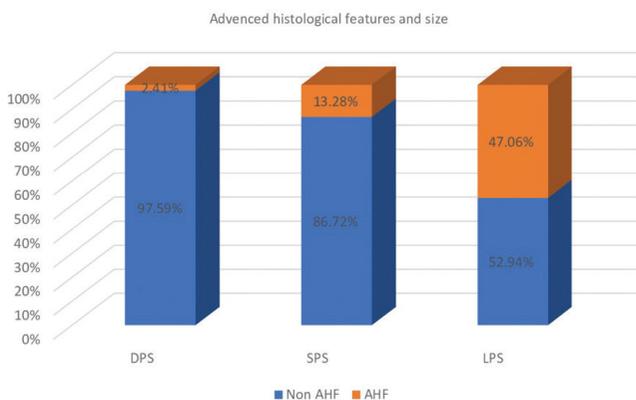
CRCs resulting from adenomas are called an adenomacarcinomas and 95% of all CRCs result from APS.

Table 1. Distribution of polyps by localization and size

| Localizati | Size (mm) | | | Total |
|------------------|-----------------|-----------------|---------------|------------------|
| | 1-5 mm | 6-9 mm | ≥10 mm | |
| Rectum | 58 (11.74%) | 10 (2.02%) | 2 (0.40%) | 70 (14.17%) |
| Sigmoid colon | 114 (23.08%) | 40 (8.10%) | 13 (2.63%) | 167 (33.81%) |
| Descending colon | 50 (10.12%) | 21 (4.25%) | 5 (1.01%) | 76 (15.38%) |
| Transvers colon | 79 (16.00%) | 35 (7.09%) | 11 (2.23%) | 125 (25.30%) |
| Ascending colon | 22 (4.45%) | 18 (3.64%) | 2 (0.40%) | 42 (8.50%) |
| Caecum | 9 (1.82%) | 4 (0.81%) | 1 (0.20%) | 14 (2.83%) |
| Total | 332 (67.21%) | 117 (25.91%) | 31 (6.88%) | 494 (100.00%) |

Table 2. Presence of dysplasia and cancer (adenocarcinoma) according to size and histological diagnoses of polyps

| Histological features | Size | Dysplasia degree | |
|-----------------------------|--------|---------------------------|----------------------------|
| | | Low-grade dysplasia n (%) | High-grade dysplasia n (%) |
| Tubular | 1-5 mm | 165 (56.70) | 0 (0.00) |
| | 6-9 mm | 89 (30.58) | 2 (15.38) |
| | ≥10 mm | 9 (3.09) | 1 (7.70) |
| Tubulovillous | 1-5 mm | 6 (2.06) | 1 (7.70) |
| | 6-9 mm | 13 (4.47) | 0 (0.00) |
| | ≥10 mm | 8 (2.75) | 2 (15.38) |
| Villous | 1-5 mm | 0 (0.00) | 1 (7.70) |
| | 6-9 mm | 1 (0.34) | 1 (7.70) |
| | ≥10 mm | 0 (0.00) | 3 (23.08) |
| Intramucosal adenocarcinoma | 1-5 mm | 0 (0.00) | 0 (0.00) |
| | 6-9 mm | 0 (0.00) | 0 (0.00) |
| | ≥10 mm | 0 (0.00) | 2 (15.38) |



Graphic 1. Advanced histological features (AHF) and polyp size
DPS: diminutive polyps, SPS: small polyps, LPS: large polyps

A report by the National Polyp Study Workgroup stated that colonoscopic polypectomy reduced the incidence of CRC by 76%-90%.²¹ Investigators have suggested “predict-resect-and-discard” strategies for DPS and SPS in order to decrease the costs of screening colonoscopy.²² Polyp size (adenoma ≥10 mm), increased number of polyps, and AHF are critical criteria for the development of malignancies from polyps. According to autopsy studies, generally, 10%-15% of polyps are over 1 cm in size and majority of polyps are under the size of 1 cm. For localization of polyps in the colon, the

average polyp size increases toward the proximal.²³ In the studies by Korkmaz et al.²⁴, Butterly et al.²⁵, Eminler et al.¹⁰, and Suna et al.²⁶, the frequencies of polyps under the size of 1 cm were reported as 75.00%, 58.70%, 69.50%, and 87.50%, respectively. In this study, the rate of polyps under the size of 1 cm is 93.12%, which is higher than that in literature (67.21% DPS, 25.91% SPS, and 6.88% LPS). The suggested reason for such difference in numbers of cases with LPS and cancer in our study might be that the number of colonoscopy procedures performed today has increased compared to the previous times, possibly because of the obsessive behavior of clinicians due to the increased incidence of CRC. In addition, people’s increased awareness of CRC polyp screening, ease of access to colonoscopy, and increased number of diseases leading to increased polyp formation, such as obesity, may lead to more polyps identification at the DPS or SPS stage. APS from neoplastic polyps account for approximately two-thirds of all colorectal polyps. In literature, it is stated that tubular adenomas, villous adenomas, and tubulovillous adenomas constitute 80%-86%, 3%-16%, and 8%-16% of all APS, respectively.^{27,28,29} While the risk of developing a malignancy in tubular adenomas is lower, there are studies reporting such risk to be 33% for villous and tubulovillous adenomas.³⁰ Regarding the polyp histology, in the studies by Korkmaz et al.²⁴, Eminler et al.¹⁰, and Solakoglu et al.³¹, the frequencies of neoplastic polyps were found to be 74.4%,

75.5%, and 81.7%, respectively, tubular adenomas were found to be 67.20%, 68.00%, and 71.00%, respectively, tubulovillous adenomas were found to be 6.40%, 7.20%, and 6.60%, respectively, and villous adenomas were found to be 0.80%, 0.50%, and 2.90%, respectively. In our study, the frequencies of neoplastic polyps, tubular adenomas, tubulovillous adenomas, and villous adenomas were 61.13%, 53.85%, 6.07%, and 1.21%, respectively, which are close to the respective prevalence recorded in other studies in our country. Serrated polyps are contrastingly categorized by different studies under adenomas, hyperplastic polyps, or an intermediate form.^{10,31} In our study, we did not find it appropriate to classify serrated polyps under neoplastic polyps, because villous histology or dysplasia had not been detected in the histological examinations of serrated polyps we have examined. The frequency of any AHF in DPS and SPS was lower compared to that of LPS.^{22,27,32} The very high combined frequency (93.12%) of DPS and SPS we detected in our study, unlike similar studies in literature, has channeled our focus to the importance of such smaller polyps, in spite of their low malignant potential. These findings indicated that the increase in the AHF with increase in the polyp size is compatible with the data in literature Graphic 1). The surprising aspect of our study was that we detected higher frequencies of AHF for all sizes of polyps compared to similar studies in literature. In comparison to similar studies in literature, we found the frequency of AHF for DPS to be 2.41%, while the value was found to be 1.70%, 1.70%, 3.40%, and 1.30% in the study by Lieberman et al.³⁴, Butterly et al.²⁵, Gschwantler et al.³³, and Suna et al.²⁶, respectively.²² The frequency of AHF for the SPS we reported was 13.28%, whereas the value had been reported as 6.60%, 10.10%, 13.50%, 13.50%, 15.00%, and 5.20% in the study by Lieberman et al.³⁴, Butterly et al.²⁵, Gschwantler et al.³³, and Suna et al.²⁶, respectively.^{22,35} In other words, the number of AHF of DPS and SPS in our study is close to and slightly higher than that in similar studies in literature.

Study Limitations

Our study is a retrospective study conducted in a secondary hospital. In addition, the existence of other prospective studies examining more cases and polyps in tertiary hospitals is a limitation for our study.

Conclusion

In our study, a positive correlation was observed between AHF characteristics according to polyp size. The most important conclusion in our study is that slightly higher frequency of polyps under the size of 1 cm and slightly higher rate of AHF in such polyps may cause investigators to give more attention to these polyps. This finding may

encourage investigators to perform CRC screening and prevalence studies involving a greater number of cases more often.

Ethics

Ethics Committee Approval: Approval for this study was obtained from the Ethics committee (Zeynep Kamil Gynecology and Pediatrics Training and Research Hospital, 22.05.2019, 53).

Peer-review: Internally peer reviewed.

Authorship Contributions

Surgical and Medical Practices: A.B., A.S.Ç, Concept: A.B., Design: A.B., Data Collection or Processing: A.B., A.S.Ç., Analysis or Interpretation: A.B., Literature Search: A.B., A.S.Ç., Writing: A.B.

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