What are the Endoscopic and Pathological Characteristics of Colorectal Polyps?

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Abstract

Background: Colon polyps need to be excised upon detection during colonoscopy due to the risk of malignancy irrespective of their size. In our study, we retrospectively evaluated the clinicopathological characteristics of polyps detected during colonoscopy. Materials and Methods: We assessed 379 patients with polyps detected during colonoscopy between January 2010 and May 2012. The demographics, complaints, colonoscopy findings (shape, place and size of the polyp) and histopathological findings were recorded. We carried out statistical analysis using PASW 18.0 for Windows. Results: There were 227 males (59.9%) and 152 females (40.1%) in the trial. The mean age was 53.8 years (32-90). The most common complaint was rectal bleeding (36.1%), followed by abdominal pain (35.4%). The most common complaint was rectal bleeding (36.1%), followed by abdominal pain (35.4%). Polyps were detected most commonly in the rectosigmoid region (43.8%), followed by the descending colon (17.4%). Some 239 patients had a single polyp (63.1%) while 140 were found to have multiple polyps (36.9%). While tubular adenoma was the most common pathological type, occurring in 181 patients (47.8%), tubulovillous adenoma (14.2%) and hyperplastic polyp (12.7%) followed, occurring in 54 and 48 patients respectively. While 313 patients (82.6%) did not feature dysplasia, 37 patients (9.7%) exhibited low-grade dysplasia, 28 (7.7%) had high-grade dysplasia and 4 had cancer (1.1%). The rates of villous components and dysplasia were detected to be high among pedunculated polyps and polyps larger than 1 cm (p<0.001). Conclusions: Due to the fact that large-diameter polyps with malignant potential are commonly located in the left colon and have a high prevalence among the middle-aged individuals, it would be appropriate to screen this population at regular intervals via rectosigmoidoscopy.

Keywords: Colonoscopy - polypectomy - dysplasia - cancer

Introduction

The structures, which protrude from the mucosa or submucosa towards the lumen in the gastrointestinal system, are called polyps (Anwar et al., 1999; Hodadoostan et al., 2010). Polyps need to be excised upon detection during colonoscopy due to the risk of malignancy irrespective of their size. The polyps detected during colonoscopy are defined by the morphological appearance (pedunculated, sessile) and size (Itzkowitz and Potack, 2006; Shussman and Wexner, 2014). Histopathologically, polyps are divided into two main groups as neoplastic and non-neoplastic (Li et al., 2014). Non-neoplastic polyps are classified into the groups of inflammatory, hyperplastic and hamartomatous while neoplastic polyps are classified as tubular, tubulovillous and villous adenoma (Karaman et al., 2013; Shussman and Wexner, 2014). Adenomas contain dysplasia irrespective of the size and need to be monitored (Winawer et al., 2006; Iravani et al., 2014). In this trial, we assessed the prevalence, the location and the histopathology results of the polyps detected during colonoscopy performed upon presentation with various complaints.

Materials and Methods

Study design

The study was a single-center, cross-sectional clinical trial, which included a retrospective assessment of the colonoscopy data and pathology reports. All endoscopy investigations were carried out by a single gastroenterologist. The biopsies obtained were assessed by independent pathologists, who were blinded to the history of the patient.

Patients and procedures

The study was conducted at the gastroenterology clinic of a state hospital in Turkey between January 2010 and May 2012. The patient group consisted of the patients, who were referred from the gastroenterology, general surgery departments of the hospital, and the general outpatients. Similarly, the patients referred from the other hospitals were also evaluated. The patient population included those patients who were detected to have polyps and underwent polypectomy during colonoscopy performed for various indications.

The patient group was planned to include patients

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Results

A total of 379 patients, including 227 males (59.9%) and 152 females (40.1%), were enrolled in the trial. The mean age was 53.8 (32-90); the number of patients within the age range of 40 and 49 was 124 (32.7%) and this was the largest group, followed by the group of 117 patients within the age range of 50 and 59 (30.9%). The number of patients within the age range of 32 and 39 and the elderly age group above 60 years constituted 21 (5.5%) and 117 (30.9%) respectively. The complaints of rectal bleeding and abdominal pain were the most common complaints reported by the patients. For screening purposes, colonoscopy was performed in 61 patients (16.1%). The number of patients between 40 and 49 years was statistically higher in the IBS group compared to that in the other groups (p<0.001) (Table 1). The polyp was detected in the rectosigmoid region in 65% of the patients presenting with rectal bleeding (p<0.001). There was no statistical difference between the histopathological types by symptomatology. However, patients with bleeding complaints were observed to have a higher rate of malignant change and villous formation. All of the cancer patients were detected to have a rectal bleeding complaint. However, since the number of cancer patients was small, these patients were excluded from the statistical assessment. Dysplasia was detected at a rate of 21%.

### Table 1. Symptom Distribution by Age, Location, Histological Type and Dysplasia Type

| Age (year) | Rectal bleeding | Abdominal pain | IBS | Screening | p       |
|------------|-----------------|----------------|-----|-----------|---------|
| 32-39      | 10 (7.3)        | 6 (4.5)        | 4 (8.5) | 1 (1.6) | <0.001  |
| 40-49      | 36 (26.3)       | 34 (25.4)      | 36 (76.6)* | 18 (29.5) |         |
| 50-59      | 37 (27)         | 46 (34.3)      | 6 (12.8) | 28 (45.9) |         |
| 60-69      | 34 (24.8)       | 44 (32.8)      | 1 (2.1)  | 8 (13.1)  |         |
| 70-70+     | 20 (14.6)       | 4 (3)          | 0 (0)    | 6 (9.8)   |         |

| Location   | Rectal bleeding | Abdominal pain | IBS | Screening | p       |
|------------|-----------------|----------------|-----|-----------|---------|
| Cecum      | 0 (0)           | 11 (47.8)      | 8 (34.8) | 4 (17.4) | <0.001  |
| Ascending Colon | 0 (0)       | 20 (54.1)      | 10 (27)  | 7 (18.9)  |         |
| Transverse Colon | 0 (0)       | 20 (52.6)      | 4 (10.5) | 14 (36.8) |         |
| Descending Colon | 15 (22.7)  | 35 (53)        | 6 (9.1)  | 10 (15.2) |         |
| Rectosigmoid Colon | 119 (65)*  | 37 (20.2)      | 11 (6)   | 16 (8.7)  |         |
| All Colon  | 3 (9.4)         | 11 (34.4)      | 8 (25)   | 10 (31.3) |         |

| Histopathological Type | Rectal bleeding | Abdominal pain | IBS | Screening | p       |
|------------------------|-----------------|----------------|-----|-----------|---------|
| INF                    | 12 (40)         | 9 (30)         | 2 (6.7) | 7 (23.3)  |         |
| Mucosa                 | 7 (21.2)        | 8 (24.2)       | 10 (30.3) | 8 (24.2)  |         |
| TA                     | 66 (35.5)       | 72 (39.8)      | 20 (11)  | 23 (12.7) |         |
| TVA                    | 20 (37)         | 21 (38.9)      | 4 (7.4)  | 9 (16.7)  |         |
| VA                     | 13 (44.8)       | 7 (24.1)       | 4 (13.8) | 5 (17.2)  |         |
| CA                     | 4 (100)*        | 0 (0)          | 0 (0)    | 0 (0)     |         |

| Dysplasia Type | Rectal bleeding | Abdominal pain | IBS | Screening | p       |
|----------------|-----------------|----------------|-----|-----------|---------|
| High-Grade Dysplasia | 12 (44.4)     | 10 (37)        | 1 (3.7) | 4 (14.8)  | NS      |
| Low-Grade Dysplasia   | 17 (48.6)      | 9 (25.7)       | 5 (14.3) | 4 (11.4)  |         |
| None                  | 106 (34.2)     | 112 (36.1)     | 40 (12.9) | 52 (16.8) |         |

*Group that makes the difference, †Because of the small number, these were not to be evaluated; Hyperplastic Adenoma (HPA), Inflammatory Polyp (INF), Tubular Adenoma (TA), Tubulovillous Adenoma (TVA), Villous Adenoma (VA), Carcinoma (CA), IBS: Irritable Bowel Syndrome
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14% and 13% in patients with rectal bleeding, patients with abdominal pain and those with IBC symptoms, who underwent screening, respectively. This difference was not statistically significant (Table 1).

The most common sites of polyp localization were the rectosigmoid region (183 patients, (48.3%)) and the descending colon (66 patients, (17.4%)) (Figure 1). 239 patients had a single polyp (63%) while 140 were detected to have multiple polyps (37%). There were 207 (54.6%) pedunculated polyps, 107 (28.2%) sessile and 65 flat polyps (17.2%). There was a statistical difference between the histopathological diagnosis and dysplasia by endoscopic appearance of the polyps (p<0.001). Inflammatory adenomas were only observed in flat polyps. No dysplasia was detected in the flat polyps. In contrast, the group pedunculated polyps were observed to involve dysplasia at the highest rate and accordingly, precancerous adenomas and carcinomas were detected at a higher rate (Table 2). Carcinoma was detected in a total of 4 patients (1.1%), which were all in the group of pedunculated polyps. 188 (49.6%) polyps were smaller than 1 cm while 191 polyps were (50.4%) larger than 1 cm. Polyps larger than 1 cm were mostly detected to be villous adenomas and the difference was statistically significant. Similarly, the rate of dysplasia was also observed to be significantly high in polyps larger than 1 cm (Table 3).

All the cases of carcinoma were detected in polyps larger than 1 cm. There were 3 female and 1 male case of cancer. The mean age was 59 years (54-61). Two were located in the rectosigmoid colon while the other was located in the descending colon.

Table 2. The Relationship between the Appearance of Polyps and Histopathology and Dysplasia

| Histopathological Findings | n (%) | HPA | INF | Mucosa | TA | TVA | VA | CA | p     |
|----------------------------|-------|-----|-----|--------|----|-----|----|-----|-------|
| Flat                       | 14 (29.2) | 30 (100) | 8 (24.2) | 9 (5) | 4 (7.4) | 0 (0) | 0 (0) | <0.001 |
| Pedunculated              | 7 (14.6) | 0 (0) | 2 (6.1) | 124 (68.5) | 42 (77.8) | 28 (96.6) | 4 (100) |       |
| Sessile                   | 27 (56.3) | 0 (0) | 23 (69.7) | 48 (26.5) | 8 (14.8) | 1 (3.4) | 0 (0) |       |

| Dysplasia Type             | n (%) | High-Grade Dysplasia | Low-Grade Dysplasia | None | p |
|----------------------------|-------|----------------------|---------------------|------|---|
| Flat                       | 0 (0) | 0 (0)                | 65 (21)             |      | <0.001 |
| Pedunculated              | 28 (100) | 35 (94.3) | 140 (45.2) |      | |
| Sessile                   | 0 (0) | 2 (5.7)              | 105 (33.9)          |      | |

*Hyperplastic Adenoma (HPA), Inflammatory Polyp (INF), Tubular Adenoma (TA), Tubulovillous Adenoma (TVA), Villous Adenoma (VA), Carcinoma (CA)

Table 3. The Relationship between the Polyp Size and Histopathology and Dysplasia

| Histopathological Findings | n (%) | HPA | INF | Mucosa | TA | TVA | VA | CA | p     |
|----------------------------|-------|-----|-----|--------|----|-----|----|-----|-------|
| <1cm                       | 44 (91.7) | 30 (100) | 33 (100) | 67 (37) | 14 (25.9) | 0 (0) | 0 (0) | <0.001 |
| >1cm                       | 4 (8.3) | 0 (0) | 0 (0) | 114 (63) | 40 (74.1) | 29 (100) | 4 (100) |       |

| Dysplasia Type             | n (%) | High-Grade Dysplasia | Low-Grade Dysplasia | None | p     |
|----------------------------|-------|----------------------|---------------------|------|-------|
| <1cm                       | 0 (0) | 0 (0)                | 188 (60.6)          |      | <0.001 |
| >1cm*                      | 28 (100) | 37 (100) | 122 (39.4) |      | |

*Hyperplastic Adenoma (HPA), Inflammatory Polyp (INF), Tubular Adenoma (TA), Tubulovillous Adenoma (TVA), Villous Adenoma (VA), Carcinoma (CA)

Table 4. Histopathological Classification of the Polyps

| Histopathological Findings | n (%) | M/F | Mean age years |
|----------------------------|-------|-----|----------------|
| Tubular Adenoma (TA)       | 181 (47.8) | 106/75 | 53.5          |
| Tubulovillous Adenoma (TVA)| 54 (14.2) | 35/19 | 50             |
| Hyperplastic Adenoma (HPA) | 48 (12.7) | 27/21 | 53.1           |
| Mucosa                     | 33 (8.7) | 22/11 | 52.2           |
| Inflammatory Polyp (INF)   | 30 (7.9) | 20/10 | 54.2           |
| Villous Adenoma (VA)       | 29 (7.7) | 16/13 | 52.6           |
| Carcinoma (CA)             | 4 (1.1) | 1/3  | 61             |
| Total                      | 379 (100.0) | 227/152 | 53.8          |

Figure 1. The Location of the Polyps by Age
4 patients had cancer (1.1%) (Table 5). Among 62 patients with dysplasia (16.3%), the rates of high-grade and low-grade dysplasia were 43.5% and 56.5% respectively.

### Discussion

The incidence of adenomatous polyps increases in direct proportion to the age and the mean age is reported to be 43-61 years in the literature (Aldinparmak et al., 2001). In a trial by Wang et al. (2014), the 45-60 age group represented the period where the polyps occurred most frequently. In our cases, the rate of polyps was 63.6% within the age range of 40 and 59. While the number seems to be decreasing, this reduction may be explained by the number of presentations to the hospital, the length of the life span and the small number of patients undergoing colonoscopy at advanced age. The male gender is considered a risk factor for adenomatous polyps and the literature reports a rate of 53-59% for males and 40-46% for females (Lieberman et al., 2008; Diamond et al., 2011). Among our cases, the rate of males was higher than the females and this result was consistent with the literature.

In their trial, Alaties et al. (2014) most commonly reported patients with rectal bleeding (49.3%) and less commonly the patients in the screening group (19.4%) with chronic diarrhea, abdominal pain and intra-abdominal mass. No difference was observed with respect to the distribution of indications. In a study by Solakoglu et al. (2014), chronic constipation (50%) was the most common complaint followed by rectal bleeding (13%) and abdominal pain (10%). In our trial, rectal bleeding (36.1%) was the most common complaint followed by abdominal pain, IBS symptoms and the screening patients. The incidence of indications may vary between different patient populations and endoscopy clinics. What’s important is to predict the potential location of the polyp and determine the diagnostic priority with respect to dysplastic transformation based on the symptoms. In this respect, while rectal bleeding is predominant in case of rectosigmoid polyps, patients with polyps in the other sites of the colon had commonly abdominal pain. Irrespective of the histopathology, the fact that a majority of the dysplasia cases occur in patients with rectal bleeding indicates the significance of colonoscopy in patients presenting with these complaints.

Colorectal polyps are most commonly located in the rectosigmoid region and exhibit a decreasing incidence towards the cecum (Pendergrass et al., 2008). In their study in a series of 914 cases, Emini et al. (2011) reported that the adenomas were localized in the rectosigmoid region at a rate of 47. In a trial by Dolek et al. (2013), the polyps were reported to be located in the rectum and sigmoid colon at a rate of 36.2% and 10.3% respectively; so rectosigmoid site was the most commonly involved site. Similarly, Delavari et al. (2014) also detected the colon polyps most commonly in the sigmoid colon (26.8%) and rectum (19.0%). In our study, a vast majority of the polyps were located in the rectosigmoid colon (48.3%) with a tendency of reduction towards the proximal.

Lowenfelds et al. (2011) reported that two thirds of the colorectal polys were solitary. Silva et al. (2014) reported that more than half of all the patient series (51%) were solitary. In our trial, this rate was consistent with the literature (63%).

Since colorectal polyps are considered as precursor lesions of malignancy, early diagnosis and excision upon detection is of importance for early diagnosis of cancer. Classified by histopathological type, most are adenomatous polyps. These are also divided into subtypes by their incidence as follows: tubular adenomas (8-80%), tubulovillous adenomas (8-16%) and villous adenomas (3-16%) (O’Brien et al., 1990; Bond, 2000). The most common group of polyps after the adenomatous polyps is the hyperplastic polyps. While they are accepted to be neoplastic, 13% of these polyps may have adenomatous transformation properties; and even if rarely, these polyps may have a dysplasia and carcinoma focus (Snover et al., 2005). In a trial by Dolek et al. (2013), involving 233 patients, the rates of tubular adenoma, hyperplastic polyp, tubulovillous adenoma and inflammatory polyps were detected as 59.8%, 23.2%, 9.2% and 6.3%, respectively among the colon polyps. In the trial by Delavari et al. (2014), similarly, the most common polyp type was the tubular adenoma (62.3%), followed by hyperplastic polyps (17%) and tubulovillous adenomas (10.5%) respectively. In our trial, in line with the literature, tubular adenomas were the most common type (47.8%); differently, tubulovillous adenomas (14.2%) were more common than the hyperplastic polyps (12.7%).

The importance of the adenomas lies in the fact that colorectal cancers originate from these polyps; however malignant transformation occurs in only 5% of the adenomas. This transformation process lasts between 7 and 10 years. Particularly, the rate of progression to malignancy is higher in adenomas with high-grade dysplasia (Jass et al., 1990). Since excision of adenomas with dysplasia would protect against cancer, the importance of the colonoscopy investigations in prophylactic medicine is further clarified (Ransohoff, 2009). In this respect, colon cancers have a particular place in the group of cancers that can be prevented by a simple intervention. In a trial by Alatise et al. (2014),

| Pathological Type       | High-Grade Dysplasia | Low-Grade Dysplasia | None         | p      |
|-------------------------|----------------------|---------------------|--------------|--------|
| Hyperplastic Adenoma    | 0 (0)                | 0 (0)               | 48 (15.5)    | <0.001 |
| Inflammatory Polyp      | 0 (0)                | 0 (0)               | 30 (9.7)     |        |
| Mucosa                  | 0 (0)                | 0 (0)               | 33 (10.6)    |        |
| Tubular Adenoma         | 1 (3.7)              | 2 (5.7)             | 175 (56.5)   |        |
| Tubulovillous Adenoma   | 25 (92.6)            | 5 (14.3)            | 24 (7.7)     |        |
| Villous Adenoma         | 1 (3.7)              | 28 (80)             | 0 (0)        |        |
34.6% and 65.4% of 26 patients, in whom dysplasia was
detected, were observed to have high-grade and low-grade
dysplasia, respectively. In our study, we similarly detected
a lower rate of high-grade dysplasia (43.5%) compared
to low-grade dysplasia (56.5%), however the difference
tended to disappear.

An increasing polyp size was associated with increased odds of adenoma, villous component, and dysplasia. Therefore, one may conclude that small (<1 cm) polyps should not be neglected (Silva et al., 2014). In their study, Solakoglu et al. (2014) observed that 73.6% of the polyps smaller than 1 cm were tubular adenomas while 50% of the polyps larger than 1 cm were villous adenomas. In a trial by Silva et al. (2014), the rate of middle-high grade dysplasia was 4.1% and 25.9% for polyps smaller and larger than 1 cm, respectively. In this study presented, the increasing polyp size was associated with an increased villous component and dysplasia. All of the cancer cases were detected again in polyps larger than 1 cm. only 8.3% of the polyps larger than 1 cm were non-neoplastic. While a larger number of trials report that dysplasia and cancer development are independent of the size, we failed to reach such a conclusion in this trial. Considering the localization, large-diameter adenomas were reported to be more common in the rectosigmoid colon (Williams et al., 1982). As a result, many polyps of malignancy potential may be detected, even with a simple examination.

This study supports the previous literature data in many respects. Differently, the higher rate of neoplastic adenomas and high-grade dysplasia may be attributed to the socio-economic-cultural difference. We also observed a close relationship between the polyp size and malignancy potential and may conclude that the increase in the polyp size could increase malignancy.

In conclusion, due to the fact that large-diameter polyps of malignancy potential are commonly located in the left colon and have a high prevalence among the middle-aged individuals, it would be appropriate to screen this population at regular intervals via rectosigmoidoscopy.

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