

Endoscopic and Histopathological Characteristics of Colorectal Polyps Resected Endoscopically at a University Institution in Bogotá D. C.

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Abstract

Colorectal cancer is one of the most important causes of death in Western countries. Since the progression from adenoma to carcinoma was established, it has been considered that colon polyps are an important risk factor for development of colorectal cancer, hence the importance of knowledge and research about them as well as their detection and resection. In our country there had been no prospective evaluations of the characteristics of colorectal polyps, so we considered this study to determine the endoscopic and histopathological characteristics of colonic polyps found and resected through colonoscopy to be of great importance.

This descriptive and observational study includes analysis of polyps resected from patients in the Gastroenterology and Digestive Endoscopy service of the Clínica Universitaria Colombia. Sample size was calculated probabilistically ($n = 306$ resected polyps). Contrary to reports in the literature, most of the polyps detected in our study (170) were adenomatous (55.6%). The highest percentage (86%) were tubular which is consistent with the literature. Most of them had low grade dysplasia. Only two of our patients had polyps found whose histology indicated adenocarcinoma.

Keywords

Polyps, colorectal cancer, resection, histopathology.

INTRODUCTION

Worldwide, colorectal cancer is one of the most important causes of morbidity and mortality, and its incidence is constantly increasing. Progression from adenoma to carcinoma has been clearly established, and it is thought that colon polyps are an important risk factor for development of colorectal cancer. For this reason, knowledge, detection, resection and histopathological analysis are important. (1) Polyps are mucosa-dependent masses that protrude towards open space (in this case intestinal) and that can be characterized by their macroscopic appearance, size, number and by whether or not they have a pedicle. They can be divided into neoplastic and non-neoplastic. Depending upon whether a diagnosis is histologically confirmed, either surgery should be performed or the patient should be monitored. (2)

In developed countries, colorectal cancer is the third most common cancer and is the second leading cause of cancer death. A 5-year survival rate of 90% has been established when it is diagnosed as localized disease, but this drops to 68% when there is nodal involvement, and drops all the way to 10% when there is metastasis. Based on these considerations and the knowledge that 90% of cases of sporadic colorectal cancer are generated in the adenoma-carcinoma sequence, screening programs, early detection of adenomatous lesions, and prevention through polypectomy implemented in recent years have caused mortality from colorectal cancer to decrease. (3-5)

Adenomatous polyps are common in adults over 50 years of age, but only a few will become adenocarcinomas. Polyp histology and size determine their clinical importance. Neoplastic high-risk adenomas with tubular histology that

measure more than 10 mm in size, those with hairy histology independent of size, and those with high-grade dysplasia are considered to be high risk. Also, whenever there are three or more adenomas, the risk is considered to be high. (6, 7)

Polyps measuring less than 5 mm in diameter have classically been considered to be non-neoplastic lesions, but some studies have shown that 30% to 50% of them may be adenomas and that up to 4.4% of these may present high risk characteristics. (8, 9)

Based on these data, the universally adopted strategy until now has been resection and histopathological study of all polyps. However, since 40% to 50% of colonoscopies find polyps, resection and study of all polyps is very costly for health care systems. In order to reduce costs without increasing risks to patients, a search for strategies to identify which lesions must be analyzed histologically, and which do not need to be analyzed, has been conducted. (10). For this reason, the resect and discard strategy has arisen. It proposes the possibility of differentiating between hyperplastic and adenomatous histology of small polyps based on the use of endoscopic technologies to determine whether there is a need to send a specimen to pathology. Although this strategy seems promising, up to now there has not been enough data in the literature to make a any formal recommendation. (11, 12)

JUSTIFICATION

In our environment, morphological characteristics of polyps including size, number, and correlation with histopathological findings were unknown. This prospective study shows characteristics of colorectal polyps in our population.

OBJECTIVES

The objective of this study was to determine endoscopic and histopathological characteristics of colon polyps found and resected by colonoscopy in patients treated in our institution. We have evaluated the frequency and location of polyps in the study population and described the incidence of malignant pathology patients who underwent polypectomies.

PATIENTS AND METHOD

Study Design

This descriptive observational study was performed through analysis of colonoscopy and histopathology reports of polyps completely resected with endoscopic polypectomy loops or forceps from patients of the gastroenterology service of the Clínica Universitaria Colombia between January and March 2016. The colonoscopies and resection of the

polyps were performed by gastroenterologists and resident physicians of the gastroenterology service according to the protocols of the institution.

Population

The sampling frame consisted of all the polyps resected in the service and study histopathologically. Polyps were extracted from adult patients 18 years or older who had been referred to the service for outpatient endoscopy. A sample size of $n = 306$ resected polyps was calculated probabilistically, and samples without pathology reports or clinical data were excluded.

Statistical Analysis

Measures of frequency and central tendency were analyzed, and the distribution of normality of variables of interest was evaluated using P-P and Q-Q charts and the Shapiro-Wilk test. Categorical data were analyzed using the nonparametric Mann-Whitney U test, the chi squared (χ^2) test, and Fisher's exact test. The nonparametric χ^2 test was used to identify the relationship between macroscopic findings, relevant clinical history, and findings of dysplasia in the histopathology study provided that the Cochrane assumptions for the test were met (Less than 20% of the cells must have expected values of less than 5 and no cell should have an expected value of less than one.). 95% confidence intervals (CI) were calculated for each estimator. P values for hypothesis testing were considered significant when $p < 0.05$. The data was analyzed with STATA 13.0.

Quality Control of Information

Information, selection and misclassification biases, both differential and non-differential, were taken into account to guarantee that the study had sufficient information.

Ethical Considerations

This research protocol was governed by the principles established in the Helsinki Declaration and good research practices and was approved by the research and ethics committees of the Fundación Universitaria Sánitas.

RESULTS

The sample size was completed after 2 months and 7 days during which time 1,808 colonoscopies were performed in our institution. In total, 306 polyps resected by endoscopic polypectomy of the colon and rectum were included in the study. Each polyp was completely resected with either

biopsy forceps or with a polypectomy loop in procedures performed on 214 patients (115 women and 99 men). The average age of the patients was 61.07 years (range: 19 to 88). The mean number of polyps resected per patient was 1.4 (minimum 1 and maximum 8). Abdominal pain (32.71%) and a history of polyps were the main indications for performance of colonoscopy for the patients included in the study (Table 1).

Table 1. Demographic and clinical characteristics of patients included in the study

Variable	Value	
Patients	214	
Sex: M:F	99:115	
Average age in years (minimum-maximum)	61,07 (19-88)	
Number of polyps resected	306	
Indications for colonoscopy	n (%)	95 % CI
Abdominal pain	70 (32,71)	26,78-39,25
History of polyps	48 (22,43)	17,36-28,48
Other indications	22 (10,28)	6,88-15,07
Occult bleeding	21 (9,81)	6,50-14,53
Rectal bleeding	14 (6,54)	3,93-10,68
Irritable bowel syndrome	11 (5,14)	2,89-8,96
Constipation	11 (5,14)	2,89-8,96
Screening for family history of cancer	11 (5,14)	2,89-8,96
Screening	9 (4,21)	2,22-7,79
Chronic diarrhea	7 (3,27)	1,59-6,59
Weight	5 (2,34)	1,00-5,35
Diarrhea	3 (1,40)	0,47-4,04
Bowel habit changes	3 (1,40)	0,47-4,04
Diverticular disease of the colon	3 (1,40)	0,47-4,04
Personal history of cancer	2 (0,93)	0,25-3,34
Melena	1 (0,47)	0,08-2,59
Anemia	1 (0,47)	0,08-2,59

Macroscopic findings from colonoscopy showed that the resected polyps were mostly located in the sigmoid colon ($n = 89$, 29.08%, 95% CI: 24.28-34.41), followed by the rectum ($n = 67$, 21.90%; 95% CI: 17.63-26.86). They were less frequently resected in the cecum ($n = 16$, 5.23%, 95% CI: 3.24-8.32). The most frequent morphology of the resected polyps was sessile ($n = 245$, 80.07%, 95% CI: 75.23-84.16). Most of the polyps measured less than 5 mm ($n = 222$, 72.55%, 95% CI: 67.29-77.25), and most were adenomatous ($n = 169$, 55.23%, 95% CI: 49.63-60.70) (Figure 1).

The great majority of polyps were resected using biopsy forceps ($n = 255$, 83.33%, 95% CI: 78.75-87.09). Some indicators of the quality of the conditions under which colonoscopies were performed in these 214 patients show that 3.74% of them were incomplete. Most of these were

due to technical problems or stenoses which occurred in 2.8% of the patients. Other factors related to the quality of the procedure did not exceed 1%. Adenomatous histology was found in 169 polyps, mixed histology in 11, low-grade dysplasia in 173 (96.11%; 95% CI: 92.19-98.10) and tubular type polyps in 148 (82.22%, 95% CI: 75.98-87.12) (Table 2).

Table 2. Characteristics of colonoscopy and histopathology reports

Variable	n (%)	IC 95 %
Resection technique		
Forceps	255 (83,33)	78,75-87,09
Diathermy	31 (10,13)	7,22-14,02
Cold snare	18 (5,88)	3,75-9,10
Mucosectomy	1 (0,33)	0,05-1,82
No data	1 (0,33)	0,05-1,82
Total	306 (100,00)	
Quality of procedure *		
Incomplete	8 (3,74)	1,90-7,20
Bad preparation	2 (0,93)	0,25-3,34
Loop or stenosis	6 (2,80)	1,29-5,98
Inflammation	0 (0,00)	-
Intolerance	0 (0,00)	-
Dysplasia **		
Low grade	173 (96,11)	92,19-98,10
High grade	5 (2,78)	1,19-6,33
Cancer	1 (0,56)	0,09-3,07
Indeterminate	1 (0,56)	0,09-3,07
Type **		
Tubular	148 (82,22)	75,98-87,12
Villous tubule	23 (12,78)	8,66-18,44
Other	8 (4,44)	2,26-8,52
Villous	1 (0,56)	0,09-3,07

* 214 colonoscopy procedures were performed of which 8 were incomplete. ** These were the degrees of dysplasia and the type of adenoma found in the 180 polyps with adenomatous or mixed histology.

The clinical conditions most frequently found in this group of patients who had undergone endoscopic polypectomies were internal hemorrhoids (37.85%), diverticula in the rectum and sigmoid (24.30%), external hemorrhoids (20.09%) and diverticulosis (11.21%).

Bivariate analysis using the χ^2 and Fisher's exact test allowed identification of the relationship of a number of demographic and clinical characteristics with varying degrees of dysplasia. Statistically significant differences were found for the location of the polyp ($p = 0.000$), size of the polyp ($p = 0.002$), personal history of polyps ($p = 0.004$), history of irritable bowel syndrome ($p = 0.001$)

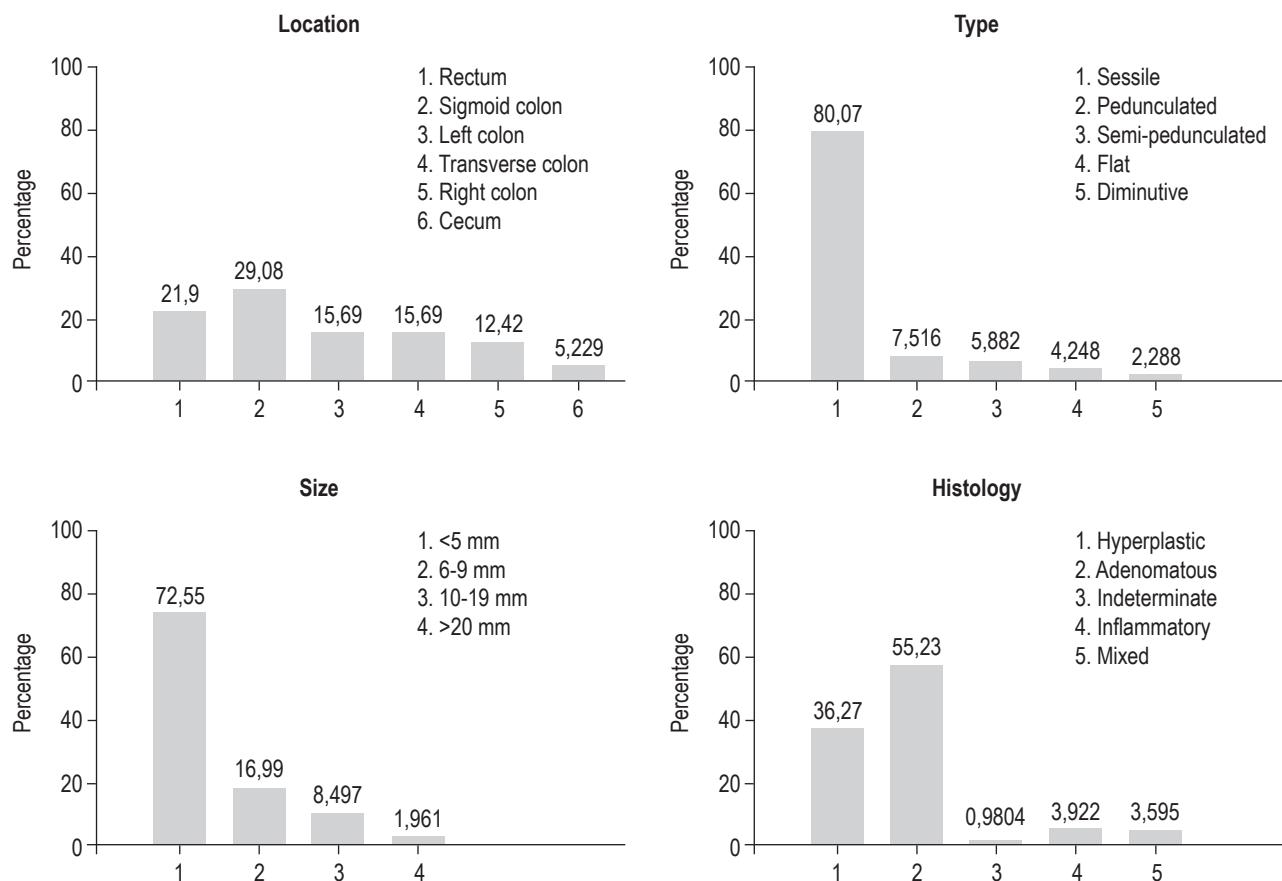


Figure 1. Endoscopic and histological findings of 306 resected polyps.

and rectal bleeding ($p = 0.013$). Other variables of interest did not show any statistically significant associations.

DISCUSSION

The number of cases of colorectal cancer, already one of the most important causes of death in Western countries, has increased in recent decades. Since progression from adenoma to carcinoma was established more than 70 years ago, colon polyps have been considered to be important risk factors for colorectal cancer. This makes knowledge and research about this topic, especially about detection and resection an important subject of study. (13)

Gastrointestinal polyps can be characterized macroscopically by size and number and by the presence or absence of a pedicle. Colorectal polyps can be divided into neoplastic and non-neoplastic polyps. (14)

Hyperplastic polyps are the most common non-neoplastic lesions of the colon. Histologically they have normal cellular components but have not advanced to dysplasia. They are

usually smaller than 5 mm across, and mostly innocuous, and can be found throughout the colon although they occur most frequently in the rectum and the sigmoid colon. Their prevalence increases with age and can be as high as 30% in people over 50 years old. Since they usually have no symptoms, they are most often found incidentally in colonoscopies. (15)

Inflammatory pseudopolyps correspond to inflamed areas of the mucosa that project into the adjacent mucosa. They usually result from a localized or diffuse inflammatory response such as inflammatory bowel disease. These polyps are not considered precursors of colorectal cancer. (2, 15)

Adenomatous polyps are benign epithelial neoplastic tumors which are almost always asymptomatic. Morphologically they are classified as sessile, pedunculated and flat. The clinical importance of adenomatous polyps lies in their variable potential for malignancy. They manifest as obvious digestive bleeding in some cases but manifest in others as occult blood in the stool. The adenoma-carcinoma sequence is well known, and it is accepted that 80% to 90% of all colorectal cancers originate as adenomas. (16)

The prevalence of colon adenomas increases in direct proportion to age. According to the literature, approximately 12% to 30% of people have adenomas from the fifth decade of life. Of these adenomas, close to 25% are considered to have high risks of becoming malignant. (17) The World Health Organization (WHO) classifies adenomas as

- Tubular (less than 25% villous architecture): 80% -86%.
- Tubulovillous (between 25% and 75% villous architecture): 8% -16%.
- Villous (at least 75% villous architecture): 3% -16%. (18)

By definition, all adenomas have some degree of dysplasia, although it is often low grade. Dysplasia of adenomas is classified as low-grade (mild to moderate) or high-grade (severe, includes carcinoma in situ). (18)

Only 5% of adenomas are at risk of malignant transformation. The probability of high grade dysplasia and carcinomatous transformation increases as the size of the polyp increases, and is especially high for polyps that measure more than one cm across. This probability also increases when for partially and completely villous adenomas, multiple adenomas, and when a patient's age at diagnosis is over 60 years. A polyp is considered to have advanced histology when it is larger than 10 mm, when its villous component is greater than 25%, and when high-grade dysplasia is present. (19)

In contrast to reports in the literature, most of the polyps detected in our study (170) were adenomatous (55.6%). The highest percentage (86%) were tubular, which is in accordance with the literature, and most had low grade dysplasia.

Serrated adenomas are a subtype of adenomatous polyps whose dysplastic epithelia have growth patterns similar to those of hyperplastic polyps. They are slightly more common in the left colon. (20, 21) In our study, three serrated polyps (0.98% of the sample) were found.

Polyp size has been shown to be related to potential for malignancy. Some studies have shown that 30% to 50% of polyps that measure less than 5 mm have adenomatous structures, and that only 1.3% of adenomas measuring less than 10 mm develop into malignancy. This rate increases up to 10% when there is a villous component and increases up to 27% when there is significant dysplasia. Adenomas that are between 10 mm and 2 cm have a 5% risk of developing into carcinoma by the time resection. The risk is between 10% and 20% for those that measure more than 2 cm. The degree of dysplasia is a risk factor for malignancy, regardless of size. (22)

Early detection of colorectal cancer is essential for improving treatment options and reducing mortality. In terms of secondary prevention, endoscopic resection of adenomatous polyps reduces the incidence of colorectal cancer. For

this reason, the accepted treatment for colorectal polyps, regardless of size, architecture or degree of dysplasia, is complete resection. (1, 23)

Colonoscopy is the preferred screening strategy for colorectal cancer. The incidence of this disease has been reduced by up to 90% in patients who have undergone polypectomies compared to patients in three reference groups: two cohorts in which colorectal polyps were not resected and a record of the general population. Colonoscopy can be completed with minimal risk in more than 95% of cases. Colonoscopic screening has been shown to be cost-effective. (24)

Recently, strategies intended to predict the potential for malignancy of a polyp have been described. The intention is to way determine whether a polyp can be resected and discarded. The strategy is called "predict, resect, and discard." This type of strategy is used especially for polyps measuring less than 5 mm, and less frequently for polyps measuring between 6 and 9 mm. Nevertheless, this is still a source of intense debate. (25, 26)

We only found two polyps whose histology diagnosed adenocarcinoma. One was a 20 mm polyp taken from a 43 year old woman, and the other was a polyp that measured less than 5 mm taken from a 77 year old woman.

This study has identified characteristics of polyps resected from our patients and highlights our finding that more than 50% of the polyps resected in our institution were adenomatous. In one case, histopathological report for a resected polyp measuring only 5 mm showed neoplastic pathology. For this reason, we the resection of the polyps found during colonoscopies to be of great importance in our population. Resected polyps should be sent for histopathological study and should not be discarded.

Conflicts of Interests

The authors declare that they have no conflicts of any nature related to the development of this research and further declare that funding of this project came entirely from contributions from the authors.

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