

Profile of Colorectal Polyps and Cancer: A Retrospective Study from Western India

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ABSTRACT

Background: Early diagnosis and endoscopic resection of adenomatous polyps is the main approach for screening and prevention of colorectal cancer (CRC). We aimed to assess polyp detection rate (PDR) and to characterize demographic, clinical, and pathological features of colorectal polyps in our population.

Methods: We retrospectively analyzed the data from 845 colonoscopies performed during January 2017 till March 2022 at GCS Medical College, Hospital and Research Center, Ahmedabad.

Results: Our sample included 540 (64%) men and 305 (36%) women, with the mean age of 52.3 years (SD=16.1). The most common reasons for colonoscopy included, altered bowel habit in 23% and gastrointestinal bleeding (occult as well as overt) in 15.2% and for screening in 8.0%. Cecal intubation was successful in 96% of patients. The quality of bowel preparation was fair to excellent in 87% (n=474) of colonoscopies. Overall PDR was 34.31% (95% CI: 31.03-37.3). The PDR in men (54.1%, 95% CI: 50.4-57.1) was significantly higher than women (31.2%, 95% CI: 28.4-34.9, $p<0.001$). Polyps were more frequently observed in patients after the 6th decade of life ($F=3.3$; $p=0.004$). CRC was detected in 5.4% (29/540) of men and 3.05% (10/305) of women ($p=0.02$). The mean age for patients with cancer was significantly higher than that for individuals with polyps, 68.6 (SD=13.4) year vs. 56.9 (SD=13.7) year, respectively ($p=0.001$). Almost 82.8% of the lesions were precancerous with tubulovillous type predominance (58.3%) followed by tubular (26.7%), villous (15%), and serrated (3.44%). 9.6% were Hyperplastic, 4.13% inflammatory while 3.8% were juvenile polyps. The sigmoid colon was the most commonly involved region (47%). Dysplasia was significantly associated with female patients who had large size tubulovillous polyps located in the left colon.

Conclusion: The type and distribution of colorectal polyps in western India is quite similar to Western countries. Patient gender, and size, histological type and location of polyps are closely related to dysplastic change in colonic polyps. Distal colon was more prone to develop polyps and cancer than proximal colon in our series. These findings provide a great infrastructure for next preventive programs and have implications for colorectal cancer screening at population-level.

Keywords: Colonic polyps; Colonoscopy; Colorectal cancer; Polyp detection rate

- What is already known?

In the Asia-Pacific region, the incidence varies between regions, with high incidence in Australia, and Eastern Asia, and low incidence in South-central Asia. According to the International Agency for Research on Cancer, the incidence of CRC in many Asian countries is similar to that in many Western countries.

- What is new in the study?

The type and distribution of colorectal polyps in western India is gradually approaching to Western countries. Patient gender, size, histological type and location of polyps are closely related to dysplastic changes in colonic polyps. Distal colon is more prone to develop polyps and cancer than proximal colon in our series. These findings provide a great infrastructure for next preventive programs and have implications for colorectal cancer screening at population-level.

- What are the future clinical and research implications of the study findings?

CRCs develop from colorectal polyps. Over a period of ten years, most of adenomatous polyps can be converted to colon carcinoma. Given that the process of conversion of colorectal adenomas into adenocarcinoma is very long and slow, early detection and endoscopic removal of these precancerous lesions are very effective in reducing the incidence and mortality rate of CRC.

INTRODUCTION

Colorectal cancer (CRC) poses a great burden on population health. It represents the 4th and 3rd most common type of cancer among men and women, respectively.^[1] The estimated lifetime risk of developing the disease is 5%.^[2] Its incidence is increasing in the majority of countries, It is widely known that 60-90% of this cancer arise from adenomas, through the adenoma-carcinoma sequence. In the majority of cases, this transformation is relatively slow, taking up to 10–15 years. This slow growth enables prevention of CRC by endoscopic resection of polyps. In view of its prevalence, its long asymptomatic interval, and the presence of treatable precancerous lesions, CRC fulfills all criteria for routine population-wide screening. Colonoscopy is considered the method of choice for this purpose. Randomized clinical trials and several cohort studies have shown that colonoscopic polypectomy reduces its incidence by 76-90%, as compared with a general population. Colorectal adenomas are the neoplasms most commonly detected during screening colonoscopy, as well as in diagnostic colonoscopy of symptomatic patients over the age of 50. Adenomatous polyps may be classified as low-, moderate-, or high-risk lesions in terms of the risk of progression to cancer. Lesions are considered advanced when they are ≥ 1 cm in size or exhibit a villous component or high-grade dysplasia. Age is considered a risk factor for the presence of adenomas and dysplasia, the incidence of which increases once the sixth decade of life is reached. The objective of this study was to assess the characteristics of polyps resected endoscopically from a consecutive series of patients who underwent colonoscopy and to compare histopathological findings by patient age, polyp size and other parameters at a GCS medical college, Hospital and Research center, Ahmedabad.

MATERIALS AND METHODS

Study design

We conducted a cross-sectional study and retrospectively assessed the colonoscopy database and pathology reports maintained at GCS medical college, Hospital and Research center in Ahmedabad, India. We included all patients aged 15 to 90 years, who underwent their first time colonoscopy from June 2017 to March 2022. The patients with a personal history of colon cancer and polyposis were excluded from the study. Procedures were performed using PENTAX EPK-1000 colonoscope under short general anesthesia. We collected the data on patient's demographic variables, indications for colonoscopy, quality of bowel preparation and the rate of successful cecal intubation. For all colorectal lesions, data on clinical and pathological features (i.e., number, size, site and grade of dysplasia) were obtained. Pathological features of colorectal lesions were determined using the World Health Organization criteria as follows: hyperplastic, precancerous (serrated, tubular, tubular-villous, and villous) and cancer. The overall polyp detection rate (PDR) was defined as the proportion of procedures in which at least one polyp was detected over the total number of colonoscopies.

Statistical analysis

We reviewed the endoscopic data and pathology records. Patient-level data were used for the estimates of PDR, and summary-level data for presenting pathology features and anatomic site of polyps. Histograms were developed to demonstrate polyp characteristics, i.e., size, counts, and proportion per patient. Categorical data were tested between subgroups using the Chi-square test or the Fisher exact test, where appropriate. Continuous data were presented as means (SD) and 95% confidence interval (CI). The Student t test was used for comparisons of means. For statistical significance we considered a p value of 0.05 applying 2-tailed statistical tests. All statistical analyses were performed using SPSS 25.0.

RESULTS

During the period of study (2017-2022), 1122 persons met the inclusion criteria. Our sample included 404 (36 %) of women and 718 (64%) of men. The age range was 18- 85 years with a mean of 49.8 ± 15.4 years and a median of 52 years. There were 290 cases with epithelial polyps, composed of 226 adenomatous (77.93%) and 28 hyperplastic polyps (9.6%). Based on colonoscopy findings, the overall PDR was 25.84% (290/1122). The overall ADR in this study was 20.14% (226/1122). The percentage of male patients with polyps were significantly higher than that of female patients (52.8% vs 47.2%, $P < 0.05$). CRC was detected in 3.47% (39/1122) of the total population (men, 62.5%; women, 37.5%) (Table 1).

Indications for colonoscopy were constipation (19.16%), diarrhea (9.53%), abdominal pain (18.44%), inflammatory bowel disease (2.85%), irritable bowel syndrome (25.75), bleeding (18.89%) and others (5.34%). (Table 1).

Patient's characteristics and colonoscopy findings

Table 1

Variable	All (n=1122)
Age, mean years (SD)	49.8
Sex Male/Female, n (%)	718/404 (64%/36%)

Indications	Abdominal Pain	207(18.44%)
	Inflammatory bowel disease	32(2.85%)
	Irritable bowel syndrome	289(25.75)
	Chronic constipation	215(19.16)
	Bleeding	212(18.89)
	Chronic diarrhea	107(9.53)
	Unspecified	60(5.34)
	Preparation quality, n (%)	Excellent to fair
Poor to unsatisfactory		215(19.16%)
Unspecific		98(8.73%)
Cecal intubation	Yes	1032 (91.97%)
	No	90 (8.02%)
Patients with atleast 1 Polyp, n (%)	290 (25.84)	
Cancer, n (%)	39 (3.47%)	

Distribution of Different Types of Colorectal Polyps

TABLE-2

Polyps	Number (%)	M/F	Average age (years)
Adenomatous	226 (77.93%)	136/90	47.9
Serrated	10 (3.44%)	7/3	51.6
Hyperplastic	28 (9.6%)	19/9	53.6
Juvenile	11 (3.79%)	6/5	42.2
Inflammatory	12 (4.3%)	8/4	45.4
Lipomatous	2 (0.68%)	2/0	49

Peutz-jeghers	1 (0.34%)	1/0	16
Total	290	179/111	

Among 226 patients with adenomatous polyps, 130 (57.52%) were tubulovillous adenomatous polyp and the remainders were tubular (59 cases-26.10%) and villous type of adenomatous polyp (37 cases-16.37%). There were 54 cases (18.6%) with nonepithelial polyps, composed of 11 juvenile, 12 inflammatory, two cases of lipomatous polyps and one patient with Peutz-jegher polyp. The distribution of different types of colorectal polyps is shown in Table 2.

Distribution of Polyps Regarding the Location in the Colon

TABLE-3

LOCATION	ADENO-MATOU-S NO.	HYPERP-LASTIC NO.	JUVENI-LE NO.	INFLAMMA TORY NO.	LIPOMATO US NO.	PEUTZ-JEGHER NO.
CECUM	3		1	1		
ASCENDING COLON	35		1	2	2	
HEPATIC FLEXURE	1					
TRANSVERSE COLON	27	1	1	2		
SPLENIC FLEXURE	3					
DESCENDING COLON	32	6	3	3		1
SIGMOID	84	12	2	3		
RECTUM	38	7	2	1		
ANAL CANAL	3	2	1			
TOTAL	226	28	11	12	2	1

We followed the anatomic distribution of these polyps at the level of the colon: cecum; 5 cases (1.72%), ascending colon; 40 cases (13.8%), hepatic flexure; 1 case (0.34%), transverse colon; 31 cases (10.68%), splenic flexure; 3 cases (1.03%), descending colon; 45 cases (15.5%), sigmoid; 112 cases (38.6%), rectum; 48 cases (16.5%) and anal canal; 5 cases (1.72%).

The distribution of colorectal polyps regarding the location in the colon is shown in Table 3.

RELATIVE FREQUENCY OF ADENOMA RELATION OF HISTOLOGICAL TYPE TO SIZE

TABLE-4

HISTOLOGICAL TYPES	<10mm NO. (%)	10-20mm NO. (%)	>20mm NO. (%)	TOTAL NO. (%)
TUBULO-VILLOUS	61	43	26	(130) 57.52%
TUBULAR	30	17	12	(59)26.10%
VILLOUS	15	15	7	(37)16.37%
TOTAL	106 (46.9%)	75 (33.1%)	45 (19.9%)	226

Of all adenomatous polyps only 45 (19.9%) were greater than 20mm in diameter and 75 (33.1%) were 10-20 mm size and 106 (46.9%) were less than 10 mm in size. The relative frequency of adenoma and relation of histologic type to size is shown in Table 4.

Dysplasia Association with the Gender, Age, Histological Type, Location and Size of Polyps

TABLE-5

	LOW GRADE DYSPLASIA	HIGH GRADE DYSPLASIA	X2	p value
SEX				
MALE	79(51.29%)	75(48.70%)	9.84	0.001
FEMALE	17(23.61%)	55(76.38%)		
HISTOLOGICAL TYPES				
TUBULAR	36(61.0%)	23(38.98%)	20.64	<0.001
TUBULOVILLOUS	41(31.53%)	89(68.46%)		
VILLOUS	3(8.10%)	34(91.89%)		
LOCATION				
RIGHT COLON	37(56.06%)	29(43.93%)	8.17	0.004
LEFT COLON	53(33.12%)	107(66.87)		

POLYP SIZE				
<1CM	77(72.64%)	29(27.35%)	28.2	<0.001
>1CM	25(20.83%)	95(79.16%)		

In these adenomatous polyps, 102 cases (45.13%) had low grade dysplasia and 124 cases (54.86%) had high grade dysplasia.

Table 5 shows the association of dysplasia with the gender, histological type, location and size of polyps. High grade dysplasia is significantly associated with female patients more than male patients ($p=0.001$). Villous and tubulovillous types are associated with higher rate of dysplasia as compared to tubular type ($p<0.001$). In addition, large polyps ($>1\text{cm}$) are associated with high grade of dysplasia more than small polyps ($<1\text{ cm}$, $p<0.001$). High grade dysplasia is seen in polyps located at the left side colon more common than right side colonic polyps ($p=0.004$).

DISCUSSION

Colorectal cancer (CRC) is quite common in the world.^[3] Although Asia is considered as low incidence zones,^[4] however in one of the recent research; the incidence of CRC in the Asia was predicted to increase in the coming decade.^[5] The PDR and ADR rates obtained in this study are nearly similar, when compared to the figures from most Western countries and higher than Asian countries. In a large multicenter study from Italy, the median detection rate for polyps was 35%.^[6] Similar studies from Mayo Clinic in the United States and France reported PDR of 49% and 35.5%, and ADR of 31% and 17.7%, respectively.^[7,8] However, our findings showed higher PDR compared to reports from Kuwait, Malaysia and Oman where PDR of 20% and ADR of 10%, 11.5% and 12.1% were reported, respectively.^[8-10] Also in African countries like Nigeria these rates were reported to be lower than our results (PDR, 16.1%; ADR, 6.8%).^[11] The overall estimate for PDR in our study was 25.84%, while ADR was 20.14%. The percentage of male patients with polyps were significantly higher than that of female patients (52.8% vs 47.2%, $P < 0.05$). CRC is preventable cancer by changing the dietary habits and through screening programs. As the colorectal polyps are well known precursors of CRC, their endoscopic removal during bowel screening programs, have significantly decreased the CRC incidence in the West.^[12] Through previous and recent researches in screening endoscopy, colorectal polyps have been found to be quite common in the asymptomatic populations of the Western world^[13] however the literature is quite insufficient in Africa and Asia.

During the five years study period (2017-2022), we found 290 colorectal polyps; among them 66.5% were men and 33.5% were women. Our observation of predominant male involvement is consistent with a number of studies from world and region.^[14] In our study, the average age of the colorectal polyp patients was 49.8 years. One group from Hong Kong studying advanced polyps and CRC, found the mean age of 69.2 in the advanced polyps.^[15]

Out of 295 polyps, there were 226 adenomatous polyps (77.93%), followed by 28 hyperplastic polyps (9.6%). In all the recently reviewed literature from the region; almost similar figures were reported. A more recent analysis conducted in Western Australia reported that adenomas accounted for 70% of all polyps.^[16] In a study conducted in Canada in 2002, Khan et al.^[17] reported that adenomas accounted for 83% of all polyps, followed by hyperplastic (12.3%) and inflammatory (2.8%) types. Among studies conducted outside Europe and North America, Tony et al.^[18] reported that among 124 patients diagnosed with a polyp, 79.5% were adenomas, 10%

juvenile, 9% hyperplastic and 1.5% inflammatory. Findings from our study are in line with these previously conducted analyses.

Regarding the histological subtypes of 166 adenomatous polyps; in our study, there were 61.4% tubulovillous adenoma, followed by 24.7% tubular adenoma and 13.8% villous adenoma. The literature review from recent publications, however report that tubular adenoma is more common than tubulovillous adenoma. The study conducted in Iran showed 85% were adenomas polyps, 56% were tubular, 17% villous and 27% tubulovillous out of 856 polyps examined in 2010.^[19]

We followed the anatomic distribution of these polyps at the level of the colon and found 36.6% of polyps in sigmoid colon, followed by 21% in rectum

Similar were the observations from Romanian scientists, who report 39.85% polyps in sigmoid colon.^[20]

Of all adenomatous polyps only 19.9% were greater than 20mm in diameters and 33.1% were 10-20 mm size and 47% were less than 10 mm in size. From Romania, one group in their study on 795 colonoscopies found 183 cases with polyps: 33.96% were <5 mm, 38.21% were between 5-10 mm, 17.93% were between 11-20 mm and 9.9% of them were >20 mm (21). In our study, 45.13% adenomatous polyps had low grade dysplasia and 54.8y% had high grade dysplasia. High grade dysplasia is significantly associated with female patients more than male patients (p=0.001).

Villous and tubulovillous types are associated with higher rate of dysplasia as compared to tubular type (p<0.001). In addition, large polyps (>1cm) are associated with high grade of dysplasia more than small polyps (<1 cm,p<0.001). High grade dysplasia is seen in polyps located at the left side colon more common than right side colonic polyps (p=0.004). Similar observation was made by a group in Iran; who studied 240 polyps in 211 cases; and concluded that size of polyp and amount of villous component were strongly associated with high grade dysplasia.^[22] In a study from India,^[20] in which 99 adenomatous polyps were found; 56.56% were less than 1cm, 22.22% were between 1 and 2 cm and 21.21% were greater than 2cm. Dysplasia was severe in large (>2 cm) polyps compared to small (<1 cm) ones (p<0.001). In USA study analysis restricted to polyp ≥ 1 cm in diameter, found that 86% of adenomas exhibited mild dysplasia, 8% were moderately dysplasia, and 6% showed marked dysplasia, also known as carcinoma in situ. In the present study, 54.7% of polyps ≥ 1 cm were mild dysplastic, 22.6% were moderately dysplastic, and 3.3% exhibited high-grade dysplasia.

CONCLUSION

The type and distribution of colorectal polyps in western India is gradually approaching to Western countries. Patient gender, size, histological type and location of polyps are closely related to dysplastic changes in colonic polyps. Distal colon is more prone to develop polyps and cancer than proximal colon in our series. These findings provide a great infrastructure for next preventive programs and have implications for colorectal cancer screening at population-level.

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