

## Original Research Article

# Clinicopathological profile of colorectal polyps: retrospective analysis from tertiary care center in Southern India

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### ABSTRACT

**Background:** Colorectal Cancer is the fourth most commonly diagnosed and chronological changes in colorectal polyps and cancer is important in efficacy of screening strategies. In this study, we aimed to compare clinicopathological features of colorectal polyps and also aimed to characterise the distribution and the pathological features of polyps during an 18-year period divided in to two groups.

**Methods:** This is retrospective analysis of cases that underwent colonoscopy and found to have colorectal polyps were re-viewed retrospectively for 18 year period are retrieved. 18 year period was divided in to 2001 to 2010 and 2011 to 2018.

**Results:** Among 4230 patients underwent colonoscopy between January 2001 and September 2018, 1356 were excluded; of the remaining 2874, 986 were found to have 1,272 polyps. 306 patients had 412 polyps in 2001 to 2010 group and 680 patients had 860 polyps in 2011 to 2018 group. Adenomas on the left sided colon were significantly higher in the first time period (40.2% vs 30%,  $p < 0.0003$ ). Polyps on the right sided colon were significantly higher in the second time period (37.3% vs 36.9%,  $p < 0.0005$ ). The most common histology in the both periods is tubular adenoma. Histology of adenomas with high grade dysplasia were significantly more in first period (12.4% vs 7.6%,  $p < 0.005$ ).

**Conclusions:** Our data shows shift in polyps from left side to right side colon in recent years. There was no significant change in shift in advanced adenomas from left side to right side of colon.

**Keywords:** Adenomas, Colorectal cancer, Colorectal polyps, Dysplasia

### INTRODUCTION

Colorectal Cancer (CRC) is the third most commonly diagnosed malignancy throughout the world.<sup>1</sup> Burden of CRC expected to increase by 60% to more than 2.2 million new cases and 1.1 million cancer deaths.<sup>1</sup> Around 80% of CRC emerge from pre-existing adenomas.<sup>2</sup> Anatomical distribution and localization of adenomatous polyps are viewed of increased importance. There is evidence demonstrating endoscopy polypectomy reduces the incidence and mortality of CRC.<sup>3,4</sup> Colonoscopy is

considered as gold standard screening tool for CRC prevention by removing precancerous adenomas. 30% of western population has colonic polyps.<sup>5</sup> Data from Asian countries are relatively scarce.<sup>6</sup> There are only few studies from India and CRC is low reported incidence in India.<sup>7</sup> Adenomas and CRC features may differ between populations; the screening tool should rely on local data. There is a gradual locational shift of CRC and adenomas towards the right colon.<sup>8,9</sup> Chronological changes in colorectal polyps and cancer is very important in efficacy of colorectal screening strategies. Only few chronological

comparative studies are conducted on colorectal polyps. In this study, authors aimed to compare clinicopathological features of colorectal polyps in a tertiary care centre located in southern India during an 18-year period divided into two groups. Authors also aimed to characterise the distribution and the pathological features of polyps according to age and sex in order to assess the locational shift.

## METHODS

This is a retrospective analysis of cases that underwent colonoscopy in gastroenterology department of PSG hospital, Coimbatore, India. Patients who underwent colonoscopy in this department from 1/1/2001 to 31/09/2018 were retrieved from database. Those patients who had full length colonoscopy examination were included in the study for proper assessment of polyp detection rate in the right sided colon. Exclusion criteria were poor bowel preparation, familial adenomatous, history of colorectal cancer, history of colectomy, inflammatory bowel disease or diagnosis of advanced CRC. Authors divided the patients into two groups, the first group comprised cases between 2001 to 2010 and the second group cases between 2011 to 2018. All colonoscopy cases were analyzed for age, gender, clinical presentation, indication for colonoscopy and findings in colonoscopy. All polyps were removed by biopsy forceps or snare catheter and were referred for histopathological examination. The following data were documented for each patient polyp number, location, size, gross morphology and histology for each polyp. The location of the polyps was defined as right sided or left sided. Right sided colon defined as started at cecum and ending at splenic flexure. Left sided colon defined as distal to splenic flexure. Patients having polyps both on right and left sided were evaluated and every polyp was analyzed separately. Polyp locations were classified into cecum, ascending colon, transverse colon, descending colon, sigmoid colon and rectum. Polyps were classified into diminutive (<5mm in diameter), small ( $\geq 5$ mm to 10mm) and large ( $\geq 10$ mm). Gross morphology was classified into sessile and pedunculated. Polyps based on histology were classified into neoplastic and non-neoplastic polyps. Neoplastic polyps included tubular, tubulovillous, villous, serrated adenomas and adenocarcinoma. Non-neoplastic included hyperplastic, inflammatory and Juvenile. Cases which are not able to define in both groups were classified into other. Dysplasia in the adenoma was graded as low or high. Intramucosal carcinoma and carcinoma in situ were noted within high grade dysplasia. Invasive carcinoma was considered as malignant cells which are found in the submucosa or in deep tissue.

### Statistical analysis

Statistical analysis was carried out using IBM SPSS software version 25. Results are expressed as means and standard deviations for variables or as percentages for

categorical variables. Differences in clinical characteristics for different segments were analyzed using the chi-square test for categorical variables and by analysis of variance for quantitative. Statistical significance was set at  $p < 0.05$ .

## RESULTS

### Baseline clinicopathological characteristics of polyps

Among 4230 patients underwent colonoscopy between January 2001 and September 2018, 1356 were excluded; of the remaining 2874, 986 were found to have 1,272 polyps. 306 patients had 412 polyps in 2001 to 2010 group and 680 patients had 860 polyps in 2011 to 2018 group. The patient's age and gender were tabulated in Table 1.

The mean age of patients was higher in the first time period ( $58.7 \pm 18.1$  vs  $56 \pm 19$ ,  $p = 0.01$ ). There is no difference noted in gender distribution in both periods. The most common indication for colonoscopy was abdominal pain 43% ( $n = 292$ ) in second period and while in first period, it is gastrointestinal bleed 25.4 ( $n = 78$ ). The polyp detection rate was 42% in first time period and 45.5% in second time period ( $p = 0.07$ ). The adenoma detection rate was 27.8% in first time period and 28.7% in second time period ( $p = 0.6$ ). The hyperplastic polyp detection rate was 4.7% in first time period and 5.8% in second time period ( $p = 0.2$ ). Adenomas on the left sided colon were significantly higher in the first time period (40.2% vs 30%,  $p < 0.0003$ ). The polyps on left colon are frequent in both periods but there is no significant difference. Polyps on the right sided colon were significantly higher in the second time period (37.3% vs 36.9%,  $p < 0.0005$ ). Clinicopathological characteristics of colorectal polyps divided between the two periods were shown in Table 2.

Polyps were more frequent in rectum (27.7%) in first period and sigmoid colon (24.9%) in second period. The mean size of the polyp is significantly larger in first period compared to second period ( $0.88 \pm 0.8$  vs  $0.8 \pm 0.66$ ,  $p = 0.05$ ). Distribution according to gross morphology of polyp, there are significantly more sessile polyps in the second period (78.4% vs 70.1%,  $p < 0.001$ ) and significantly more pedunculated polyps in the first period (29.9% vs 21.6%,  $p < 0.001$ ). Histology of colorectal polyps were shown in Table 3.

The most common histology in the both periods is tubular adenoma (43.9 in first period and 47.6 in second period).

### Clinical characteristics of advanced adenomas

Of the 1,272 polyps excised, 194 were diagnosed as advanced adenoma, which was more common in the first period (71, 17.2% vs. 123, 14.3%,  $p = 0.1$ ). Histological and morphological characteristics of advanced adenomas in the two periods were shown in Table 4.

**Table 1: Baseline characteristics of patients with colorectal polyp features divided between the two periods.**

Variable	First period (2001-2010)	Second period (2010-2018)	p value
Age	58.7±18.1	56±19	0.0162
Males (n; %)	226 (74.1%)	501 (73.8%)	0.9
Females (n; %)	79 (25.9%)	178 (26.2%)	0.9
<b>Indication</b>			
Abdominal pain	63 (20.5%)	292 (43%)	
Diarrhoea	59 (19.2 %)	112 (16.5 %)	
Melena/hematochezia	78 (25.4 %)	141 (20.8 %)	
Screening / surveillance	45 (14.7%)	72 (10.6%)	
Others	60 (19.5%)	62 (9.1%)	
Polyps on the right-sided colon	152 (36.9%)	321(37.3%)	0.0005
Polyps on the left-sided colon	260 (63.1%)	539(62.7%)	0.8
Adenomas on the right-sided colon	108 (24.7%)	243(28.2%)	0.1
Adenomas on the left-sided colon	166 (40.2%)	301(30%)	0.0003
Polyp detection rate	412/984 (42.0%)	860/1890(45.5%)	0.07
Adenoma detection rate	274/984 (27.8%)	544/1890(28.7%)	0.6
Hyperplastic polyp detection rate	47/984 (4.7%)	110/1890(5.8%)	0.2

**Table 2: Clinicopathological characteristics of colorectal polyps divided between the two periods.**

Variable	First period (2001-2010)	Second period (2010-2018)	p value
<b>Location</b>			
Cecum	28 (6.8%)	71 (8.3%)	
Ascending colon	52 (12.6%)	98 (11.4%)	
Transverse colon	72 (17.5%)	156 (18.1%)	
Descending colon	58 (14.1%)	119 (13.8%)	0.1
Sigmoid colon	88 (21.4%)	214 (24.9%)	
Rectum	114 (27.7%)	202 (23.5%)	
<b>Size(cm)</b>	0.88±0.80	0.80±0.66	0.05
Diminutive	89 (21.6%)	182 (21.2%)	0.8
Small	243 (59%)	493 (57.3%)	0.5
Large	80 (19.4%)	185 (21.5%)	0.3
<b>Shape</b>			
Sessile	289 (70.1%)	674(78.4%)	0.001
Pedunculated	123 (29.9%)	186 (21.6%)	0.001
Right : left	152 (36.9):260 (63.1)	321 (37.3):539 (62.7)	0.8

**Table 3: Histology of colorectal polyps divided between the two periods.**

Variable	First period (2001-2010)	Second period (2010-2018)	p value
<b>Neoplastic</b>			
Tubular adenoma	181 (43.9%)	409 (47.6%)	0.2
Tubulovillous adenoma	14 (3.4%)	30 (3.9%)	0.6
Villous adenoma	1 (0.2%)	2 (0.2%)	0.1
Serrated adenoma	17 (4.1%)	16 (1.9%)	0.02
High grade dysplasia	51 (12.4%)	66 (7.6%)	0.005
Adenocarcinoma	10 (2.4%)	21 (2.4%)	1
<b>Non neoplastic</b>			
Hyperplastic	47 (11.4%)	110 (12.8%)	0.4
Inflammatory	36 (8.7%)	76 (8.8%)	0.9
Juvenile	14 (3.4%)	34 (4%)	0.6
Others	30 (7.3%)	74 (8.6%)	0.4

**Table 4: Histological and morphological characteristics of advanced adenomas in the two periods. LGD- low grade dysplasia; HGD- high grade dysplasia.**

Variable	First period (2001-2010)	Second period (2010-2018)	p value		
Age (years)	64±13.9	61.2±13.3	0.1		
<b>Shape</b>					
Sessile	34 (47.9%)	67 (54.5%)	0.3		
Pedunculated	37 (52.1%)	56 (45.5%)	0.3		
Location (right : left)	40 (56.3): 31 (43.7)	42 (34.1): 81 (65.9)	0.002		
Size (cm)	1.5±1.1 cm	1.37±1.1 cm	0.4		
<b>Histology</b>	<b>LGD</b>	<b>HGD</b>	<b>LGD</b>	<b>LGD</b>	
Tubular adenoma	7 (9.9%)	27 (35%)	22 (17.9%)	57 (4.3%)	0.2
Tubulovillous adenoma	3 (4.2%)	18 (25.4%)	3 (2.4%)	19 (15.4%)	0.08
Villous adenoma	0	1 (1.4%)	0	0	
Serrated adenoma	1 (1.4%)	4 (5.6%)	1 (0.8%)	0	
Adenocarcinoma	10 (14.1%)		21 (17.1%)		0.5

**Table 5: High grade dysplasia frequency related to the size of polyps between two periods.**

variable	First period (2001-2010)		Second period (2010-2018)	
	Right- sided HGD	Left- sided HGD	Right- sided HGD	Left- sided HGD
< 0.5 cm	1 (0.2%)	1 (0.2%)	15 (1.7%)	9 (1.04%)
0.6 - 1 cm	12 (2.9%)	11 (2.6%)	5 (0.5%)	8 (0.9%)
1.1 -2 cm	5 (1.2%)	8 (1.9%)	3 (0.3%)	11 (1.2%)
>2 cm	1 (0.2%)	10 (2.4%)	4 (0.4%)	18 (2.09%)
p value	0.3		0.05	

The mean age of patients was significantly higher in the first time period for advanced adenomas (58.7±18.1 vs 56±19, p=0.01). Sigmoid colon most frequent site of advanced adenomas in the both periods (25.4% in first period and 34.1% in second period). Left colonic advanced adenomas are significantly more in second period (65.9% vs 43.7%, p <0.002). Right colonic advanced adenomas are significantly more in first period (56.3 vs 34.1%). The mean size of advanced adenoma is larger in first period (1.5±1.1 vs 1.37±1.5, p=0.4). Histology of adenomas with high grade dysplasia were significantly more in first period (12.4% vs 7.6%, p <0.005). Invasive adenocarcinoma found in first period is 10(2.4%) and second period is 21 (2.4%).

In the first period, 61.3% adenomas with high grade dysplasia (HGD) are located in the left sided colon and 38.7% in the right sided colon. In the second period, 77% located in the left sided colon and 23% in the right sided colon, respectively. HGD frequency relation to the size of polyps between two periods is shown in Table 5. In the last period, HGD was found more frequently in the left sided large adenomas (p=0.05).

## DISCUSSION

Colorectal cancer is the fourth most common cancer in the world.<sup>1</sup> In India, the incidence of CRC is increasing,

and importance of prevention and screening strategies should be focused. Colonoscopy has been considered as the most effective screening modalities because detection and remove of the colorectal polyp using colonoscopy can reduce the incidence of CRC by up to 90%.<sup>2,10</sup>

There was polyp detection rate of 124 (5.1%) of 2412 complete colonoscopies in a study from Kerala in south India.<sup>7</sup> In another study conducted in Chennai, South

India showed polyps were 3.2 times more common in men and detection rate of 12.7%.<sup>11</sup> In these study polyp detection rates was 43.7% and adenoma detection rate was 28.2%. Chronological study conducted by Irina et al, showed prevalence of adenomas increased significantly in the second time period (40.4% vs. 21.9% in the first period) and right-sided adenomas were more frequently detected in the second period.<sup>5</sup>

In this study, adenomas on the left sided colon were significantly higher in the first time period (40.2% vs 30%, p <0.0003), however there was no significant change in polyp and adenoma detection rate in both periods. In a study by Amarpurkar et al, of 515 colorectal polyps, 270 (52.4%) were adenomatous, 15 (2.9%) had adenocarcinoma presenting as polyps and mean age was 59.5 years.<sup>12</sup> In these study majority of polyps were adenomatous 853 (53.1%) and were located

in rectosigmoid region. The mean age of patients was significantly higher in the first time period for advanced adenomas. This study showed cancer incidence in polyps was (31/1604; 31.9%) and 7.85% adenomatous polyps had HGD. The prevalence of advanced adenomas is more common in the second period but not statically significant. Authors did not find any significant change in polyp size in both periods. Authors found left colonic advanced adenomas are significantly more in second period (65.9% vs 43.7%,  $p < 0.002$ ) and histology of adenomas with high grade dysplasia were significantly more in first period (12.4% vs 7.6%,  $p < 0.005$ ). In a study by Atkin et al, polyps more than >1cm have increased risk for developing CRC.<sup>13</sup> Authors found in the second period, HGD was found more frequently in the left sided large adenomas ( $p=0.05$ ).

Authors have limitations in the study as it is retrospective and single center experience. Authors could not identify risk factors, family history and body mass index. Utilization of screening endoscopy has been increasing, mean patient age has decreased and small polyp detection rate is increasing. Authors adopted criteria to reduce selection bias, and excluded patients who underwent follow-up colonoscopy after polypectomy. Authors tried to reduce selection bias by adopting strict criteria, and excluded patients who underwent follow-up colonoscopy after polypectomy. Several previous Western studies reported a left to right shift of polyps and CRC.<sup>14-16</sup> In this present study shows shift in polyps from left side to the right side in recent years and however there is significant change in shift of advanced adenomas. This result suggest that more effort should be directed on detecting polyps on the right side. Usage of newer modalities, like dye based and digital chromocolonoscopy helps in identification subtype of polyps.<sup>17,18</sup> Improvement of visualization of colon using cap-assisted colonoscopy.<sup>19</sup> Narrow band imaging (NBI) seems to be the best modality nowadays to classify polyps on endoscopy, however it requires expertise for the same.

## CONCLUSION

The most common histology was tubular adenomas. Our data shows shift in polyps from the left side to the right side of the colon in recent years. There was no significant change in shift in advanced adenomas from left side to right side of colon.

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