

# Utility of Colonoscopic Biopsies in Histomorphological Spectrum of Colorectal Lesions - A Study in a Tertiary Care Centre in Aurangabad Region of Maharashtra

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## ABSTRACT

### BACKGROUND

Colonoscopy is considered as a diagnostic procedure of choice for patients presenting with chronic diarrhoea / bloody diarrhoea. Colonoscopic mucosal biopsies have shown to be accurate indicators of extent of the involvement of colon in inflammatory bowel disease. Also, colonoscopy is still considered as the gold standard in cancer surveillance. The present study was undertaken to find out the utility of colonoscopic biopsies in histomorphological spectrum of colorectal lesions.

### METHODS

This was a three-year retrospective study carried out in the Department of Pathology, at MGM Medical College, Aurangabad. Patient's clinical details, colonoscopic findings and apparent pathology were noted in 206 cases along with final histopathological diagnosis. Biopsies which showed significant findings were included in the study.

### RESULTS

In the study, the male to female ratio was 2.4 : 1. Out of 206 colorectal biopsies, 146 (70.8 %) were non-neoplastic and 60 (29.2 %) were neoplastic lesions. Amongst non-neoplastic lesions, maximum cases were of chronic colitis with 4 cases of granulomatous colitis and 30 cases of inflammatory bowel disease. Adenocarcinoma was the most common histologic type in neoplastic lesions (66.6 %), with rectum being the most common site followed by colonic polyps (25 %). As far as age group was concerned, the 2<sup>nd</sup> decade was dominated by chronic colitis, 3<sup>rd</sup> decade by adenomatous polyps and 5<sup>th</sup> decade by adenocarcinoma.

### CONCLUSIONS

Histomorphological profile of colorectal biopsies has a wide spectrum ranging from infectious diseases, inflammatory bowel disorders to colorectal malignancies. Histopathology with correlation of clinical and endoscopic findings plays a major role in accurate diagnosis of colorectal lesions.

### KEYWORDS

Colonoscopy, Biopsies, Neoplastic, Non-Neoplastic, Colitis, Adenocarcinoma

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**BACKGROUND**

A large number of human diseases are attributed to the colon. The colon, rectum & ano-rectal regions are a site for various diseases which include both neoplastic and non-neoplastic diseases.<sup>1</sup> Primary neoplasms are found more in the colon than any other organ in the body. Wide range of colonic conditions like infections, inflammatory bowel diseases, polyps, colorectal tumours often require colonoscopic biopsy for their conclusive diagnosis. With the development of flexible endoscopes, there is an increase not only in the direct visualisation of the lesions but also in mucosal biopsy evaluation for histopathological diagnosis.<sup>2</sup> Thus helping in further assessment and treatment of the patients. Colonoscopy is a method to visualize entire colon and terminal ileum which is carried out to detect intestinal disorders as well as to obtain biopsy for definitive diagnosis. It is the most commonly sought diagnostic procedure for patients presenting with long standing diarrhoea/bloody diarrhoea and a better approach to pick up early signs of colorectal cancer. The procedure of colonoscopy is relatively safe since complications like perforation, haemorrhage, sepsis or cardiorespiratory arrest are very low. At the same time, it is not only widely used for screening of colorectal cancer, but also as an application of therapeutic colonoscopy for colonoscopic polypectomy.

Virtual colonoscopy is another technique in which data from computed tomography is used to generate two dimensional as well as three dimensional displays of the colon and rectum. This is a minimally invasive method of colon examination also called as CT colonography which appears as a good alternative to colonoscopy, since it requires no intravenous administration of sedation, analgesia or recovery time. However, no biopsies can be taken for histopathological confirmation of lesions.<sup>3</sup> Hence, colonoscopy is still considered as the gold standard for cancer surveillance<sup>3</sup> and is a diagnostic procedure of choice for patients with diarrhoea lasting for several weeks to months, or for any bloody diarrhoea.

The American Society for Gastro-Intestinal Endoscopy has developed guidelines for colonoscopy based on the indication as "generally indicated" and "generally not indicated".<sup>4</sup> Biopsies are sought for specific diagnosis for determination of disease extent and response to therapy. Colonoscopic mucosal biopsies have been shown to be most accurate indicators of extent of involvement of the colon in any inflammatory bowel disease and have also been useful in diagnosing congenital abnormalities like Hirschsprung's disease.<sup>5</sup> The present study was undertaken to highlight the utility of colonoscopic biopsies in diagnosis of various conditions of the gastrointestinal tract to correlate the findings with histopathological diagnosis and to study histopathological features of colonoscopic biopsy specimens.

**Objectives**

1. To determine the utility of colonoscopic biopsies in histomorphology of various lesions.
2. To assess clinical profile and histomorphology of various lesions in colonoscopic biopsies.

**METHODS**

This was a three-year retrospective cross-sectional study from January 2016 to December 2018 carried out in the Department of Pathology, after getting approval from ethics committee (Ethics committee registration no. ECR / 581 / Inst / MH / 2014 / RR-20). Patient's clinical details, colonoscopic findings and apparent pathology was noted in 206 cases along with final histopathological diagnosis. Biopsies which showed significant finding (N = 206) were included in the study.

**Inclusion Criteria**

1. Patients belonging to all age groups and both sexes included.
2. Biopsies taken from ascending colon to ano-rectal region included.

**Exclusion Criteria**

1. Patients presenting with lesions in small intestine.
2. Inadequate biopsies.

A minimum of 3 - 5 bits were studied in each case. The biopsy specimens were fixed in 10 % formalin wrapped in a tissue paper to prevent dispersion and actual tissue loss. After embedding, 4 – 6 micron sections were cut and visualised after staining with haematoxylin and eosin stain. Detail and careful study of the sections were done under light microscope and impression was rendered.

**Statistical Analysis**

Collected data was compiled in MS Excel sheet. For analysis of this data, SPSS version 25 was used. For qualitative data, frequency and percentage were used and quantitative data was represented in the form of mean and standard deviation.

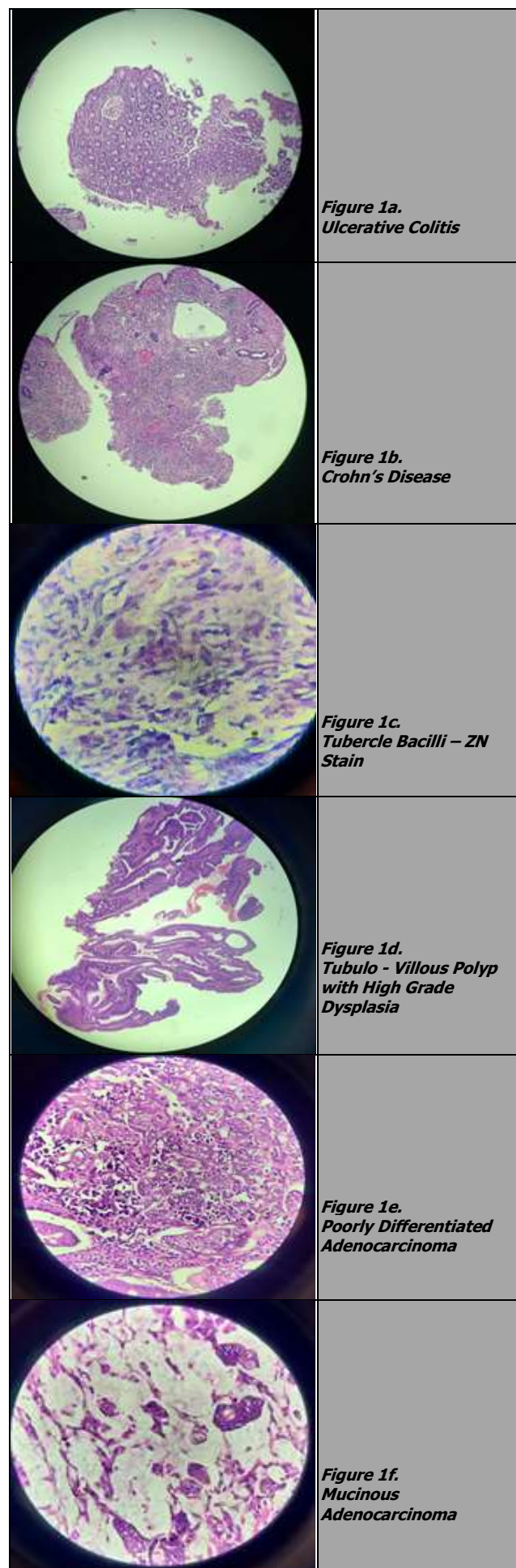
**RESULTS**

A total of 206 colorectal biopsies were obtained during the three-year study period.

Type of Lesion	No. of Cases	Percentage
Non-neoplastic	146	70.8 %
Neoplastic	60	29.2 %
<b>Total</b>	<b>206</b>	<b>100 %</b>

**Table 1. Distribution of Colonoscopic Lesions**

Biopsies were obtained from different sites. The study included males and females with male to female ratio of 2.4 : 1. Biopsies were performed on patients of all age groups, the oldest being 90 years and youngest being 7 months old. The median age was 43 years.



Out of 206 cases, patients presenting with variable clinical features in descending order of frequency were diarrhoea, bleeding, abdominal pain, constipation, weight loss, anaemia, and combination of one or more symptoms. In our study, the younger age group (< 50 years) commonly presented with pain in abdomen, diarrhoea and bleeding whereas the older age group (> 50 years) was commonly presented with weight loss diarrhoea, and bleeding. The colonoscopic biopsies were divided as non-neoplastic and neoplastic (Table - 1). The non-neoplastic spectrum of cases constituted a total of 146 cases where maximum cases (84) were of chronic colitis, which dominated the picture. (Table - 2).

Sr. No.	Diagnosis	No. of Cases	Percentage
1	Chronic colitis	84	57.5 %
2	Ulcerative colitis	28	19.1 %
3	Chronic proctitis	15	10.2 %
4	Chronic active colitis	10	6.8 %
5	Tuberculous colitis	04	2.7 %
6	Crohn's disease	02	1.3 %
7	Solitary rectal ulcer syndrome	02	1.3 %
7	Hirschsprung's disease	01	0.6 %

**Table 2. Distribution of Non-Neoplastic Lesions**

In the non-neoplastic group, maximum cases were of chronic inflammatory colitis in the age group of 21 - 30 years. No cases were found beyond 80 years age group.

Out of 60 neoplastic lesions, 15 (25.0 %) were benign in nature and remaining 45 (75.0 %) were malignant. In this three-year retrospective study, we have observed a rising trend of neoplastic lesions with each successive year.

Amongst neoplastic lesions (Table 3), adenocarcinoma was the most common histologic type (66.6 %), followed by adenomatous polyps (25.0 %). Three cases of mucinous adenocarcinoma (5.0 %) and two cases of adenoma with intramucosal carcinoma (3.4 %) were recorded. Frequency of adenocarcinoma was more in age group of 51 - 60 years, whereas adenomatous polyps was more in age group of 31 - 40 years.

Sr. No.	Diagnosis	No. of Cases	Percentage
1	Adenocarcinoma	40	66.6 %
2	Mucinous adenocarcinoma	03	5.0 %
3	Adenomatous polyps	12	20 %
4	Hyperplastic polyps	03	5.0 %
4	Adenoma with intramucosal carcinoma	02	3.4 %
<b>Total</b>		<b>60</b>	<b>100 %</b>

**Table 3. Distribution of Neoplastic Lesions**

## DISCUSSION

The spectrum of colorectal regions span from infections, inflammatory bowel diseases, polyps and colorectal cancers. All of them require endoscopic biopsy for their conclusive diagnosis.<sup>3</sup> Symptoms in colorectal lesions fail to distinguish between neoplastic and non-neoplastic lesions and hence colonoscopy plays a central role in early detection of lesions.<sup>4</sup> Colonoscopic evaluation helps in visualisation of all these lesions as well as taking biopsies for histopathological impression thus helping in further assessment and treatment.

In the present study, 206 colonic and rectal biopsies were received. Out of 206 biopsies, 70.8 % were non-neoplastic and 29.2 % were neoplastic lesions. These findings are similar to other studies where non-neoplastic lesions far outnumbered the neoplastic lesions (Table no. 4).<sup>2,4,5</sup> In another study, the neoplastic lesions were more than non-neoplastic lesions.<sup>3</sup> Among 146 non-neoplastic lesions, 57.5 % were chronic colitis, 19.1 % ulcerative colitis, 2.7 % granulomatous colitis, and others made up to 4.3 %. A similarity of finding was observed with cases of non-specific colitis and ulcerative colitis,<sup>1,3</sup> while number of polyps were more than ulcerative colitis in these two studies (Table no. 5). A lower rate of colitis (14.9 %) was seen in another study.<sup>2,6</sup> In the present study, most common histological lesion was chronic colitis. Study by Heymann et al. suggested that the presence of chronic colitis may represent early stages of inflammatory bowel diseases like ulcerative colitis and Crohn's disease.<sup>1,6</sup> Abdulkader in his study suggests that chronic colitis is an inconclusive diagnosis. The microscopic picture may be due to subclinical/resolving infection or may represent a spectrum of inflammatory bowel disease and hence it requires further investigations and/or follow up.<sup>7</sup>

Our study shows the diagnosis of ulcerative colitis as the second common lesion which is comparable to that of Qayyum et al.<sup>1,8</sup> However, it is not compatible with studies done by Rajbhandari et al.<sup>1</sup> and Karve et al.<sup>3</sup>

In the present study a wide age range was observed from 7 months to 90 years. Clustering of cases was seen between 21 to 70 years of age group with maximum cases observed in 21 - 30 years (25 %) and 31 - 40 years and 51 - 60 years (16.1 %). Table no. 4 shows comparative study of age distribution in lesions of colorectal biopsies. Our study corresponds with Hassan Abdulla et al. study in this respect.

Age	Hassan Abdulla et al.	Karve et al.	Present Study
0 - 10	6	4	7
11 - 20	28	6	15
21 - 30	81	29	48
31 - 40	77	33	41
41 - 50	45	32	32
51 - 60	65	24	24
61 - 70	30	25	26
71 - 80	0	5	12
81 - 90	0	1	1
<b>Total</b>	<b>332</b>	<b>159</b>	<b>206</b>

**Table 4. Age Distribution in Comparison with Other Studies**

Study	No. of Cases	Non - Neoplastic	Benign	Malignant
R.H. Teague et al.	57	25 (43.9 %)	15 (26.3 %)	17 (29.8 %)
Sidney J. et al.	212	130 (61.3 %)	42 (19.8 %)	40 (18.9 %)
Rajbhandari M. et al.	126	93 (73.8 %)	8 (6.3 %)	25 (19.8 %)
Kavre et al.	159	68 (42.8 %)	23 (14.4 %)	68 (42.8 %)
Present study	206	146 (70.8 %)	15 (25.0 %)	45 (75.0 %)

**Table 5. Distribution of All Lesions as Compared to Other Studies**

In the present study, out of 206 cases of colorectal biopsies, 45 cases were diagnosed as malignant lesions, 25 cases as benign and 146 cases as non-neoplastic lesions. Our findings are compatible with studies carried out by Rajbhandari et al.

Study	No. of Cases	Chronic Colitis	Granulomatous Colitis	Ulcerative Colitis	Others
Rajbhandari et al	93	35 (27.7 %)	14 (11.1 %)	4 (3.2 %)	19 (15.1 %)
Kavre et al	68	32 (47.1 %)	3 (4.4 %)	11 (16.2 %)	8 (11.8 %)
Present study	146	84 (57.5 %)	4 (2.7 %)	28 (19.1 %)	30 (20.5 %)

**Table 6. Comparison of Non-Neoplastic Lesions with Similar Other Studies**

In the present study, as shown in Table no. 6, our findings were similar to other studies where in chronic colitis constituted the maximum number of cases.<sup>1,3,7,9</sup> However, definitive aetiology could not be identified in most cases, which corresponds to findings by Dr. Megha Pandey et al.<sup>4</sup> and Deshpande V et al.<sup>10</sup> Our study also noticed a fair amount of cases of ulcerative colitis (19.1 %) higher than studies carried out by Rajbhandari et al. and Kavre et al. Visual inspection of colon and rectum by colonoscopy with mucosal biopsies were sought out to establish not only diagnosis but also to know the extent of involvement of colon and rectum in inflammatory bowel diseases. Ulcerative colitis requires early diagnosis to avoid disease severity.<sup>11</sup> At the same time it is also important to note presence of dysplasia in ulcerative colitis and Crohn's disease to reduce the risk of colorectal cancers<sup>12</sup> since association of ulcerative colitis and colorectal carcinoma is well established.<sup>3</sup> Whether to keep long term follow up or perform colectomy in a patient of long-standing ulcerative colitis is a challenging decision. Hence finding of dysplasia, which is precursor of cancer upon biopsy in known patient of ulcerative colitis is very significant. It is generally accepted that colectomy is performed if there is high grade dysplasia on biopsy.<sup>3</sup> In a study conducted by Woolrich et al. around 18 % of the patients with low grade dysplasia progressed to carcinoma in average of 6.3 years<sup>13</sup> whereas Bernstein and associates<sup>14</sup> found that 16 - 29 % of patients with untreated low grade dysplasia progressed to high grade dysplasia or cancer. In low grade dysplasia the nuclear polarity is preserved, nuclei are elongated, hyperchromatic and crowded. In high grade dysplasia, there is loss of nuclear polarity, nuclei are hyperchromatic, show pleomorphism with prominent nucleoli and may show cribriforming of glands. Thus, documentation of dysplasia in ulcerative colitis carries great importance because this will determine the course of treatment of the patient. In our study we found three cases of ulcerative colitis with dysplasia, two cases of low-grade dysplasia and one case of high-grade dysplasia.

Study	No. of Cases	Mean Age (Years)	No. of Males	Most Common Location		
				Site	Cases	Percentage
Sudarshan et al.	233	43	134 (57.5 %)	Rectum	192	82.4 %
Laishram et al.	54	47.5	29 (53.7 %)	Rectum	29	53.7 %
Kavre et al.	159	49.4	41 (61.8 %)	Rectum	38	55.9 %
Present study	206	30.7	146 (64.0 %)	Rectum	18	72 %

**Table 7. Comparative Study of Age, Sex Distribution, and Common Site of Malignant Lesions with Other Studies**

In the present study, the mean age of malignant lesions was 30.7 years, which was lesser as compared with other studies (Table 7). Colorectal cancer is seen mostly in patients above 40 years of age, yet it affects younger population with an incidence of 1.6 to 23 %.<sup>6</sup> Suleyman Alici<sup>6</sup> and associates in their study of colorectal cancer in young patients concluded that there was no difference in clinicopathologic characteristics in patients with colorectal cancer aged 40 years or younger. However, distal location of the tumour and advanced stage should be considered as poor prognostic factors for their overall survival. Rectum was the most common site of location of malignant lesions which was compatible with similar other studies (Table 7).<sup>5,15</sup>

Colorectal cancer screening guidelines have suggested regular screening beginning at the age of 50 years until the age of 75 years in prevention of colorectal cancer provided that there are no risk factors related to family history.<sup>1</sup> In the present study, most of the cases of colorectal cancers have clustered between 51 - 80 years of age with one case of adenocarcinoma in the age group of 11 - 20 years and one case of mucinous adenocarcinoma in the age group of 41 - 50 years. Suleyman Ali et al. in their study of characteristics and outcome of colorectal cancer in young patients conclude that in patients aged 40 years or younger, distal location of tumour and advanced stage should be considered as poor prognostic factors for overall survival of colorectal cancer patients.<sup>6</sup> In recent years there has been an increased incidence of colorectal cancers in younger age group.

In our study, adenocarcinoma was the commonest malignant tumour of the colon and rectum. (Table no. 3) which was compatible with studies done by Mohsin – ul – Rasool.<sup>16</sup> Out of 60 neoplastic lesions, 40 were adenocarcinoma, 3 were mucinous adenocarcinoma, 12 adenomatous polyps, 3 hyperplastic polyps and two cases of adenoma with intramucosal carcinoma. (Table no. 3). The second most common lesion was adenomatous polyps. Adenomatous polyps have a high risk of developing into carcinoma. Hence patient screening and diagnosis are important so that they can be surgically excised.<sup>3,4,17</sup> Colonoscopy with biopsy thus plays a major role where morbidity and mortality of patients with colorectal lesions can be reduced.<sup>18</sup>

Screening for colorectal cancer by colonoscopy with removal of precancerous lesions is a powerful and effective approach for reducing the incidence of colorectal cancer and mortality and hence is considered as gold standard for the diagnosis of colorectal cancer.<sup>4,17</sup> Therefore the study and categorization of different gastrointestinal lesions depending on their histopathological appearances proves useful. Colonoscopy thus provides the first source of tissue for most cases of colorectal carcinoma.<sup>3</sup> Colorectal cancer is the third prevalent cancer in men and women,<sup>3,19</sup> though rising trends in its incidence is attributed to changes in lifestyle and dietary habits. The interaction between these factors and genetic characteristics might also have a pivotal role.<sup>3,20</sup> Urbanisation and change in living habits may have added their burden to this effect. Change of dietary habits with high fat and low fibre content in meals, decreased physical activity with sedentary lifestyle and obesity may also be

responsible. At the same time, agriculture being the main occupation in India, acceleration of carcinogenic pathway due to environmental susceptibility caused by exposure to agricultural chemicals may also be responsible for development of colorectal cancers.<sup>21</sup> Due to the advantage of not only diagnosing colorectal lesions, but also monitoring the disease course and early detection of various lesions, colonoscopic biopsies have increased and these are no longer performed to simply identify neoplasms.

## CONCLUSIONS

The study concludes that histomorphological profile of colorectal biopsies have a wide spectrum ranging from infectious diseases, inflammatory bowel disorders to colorectal malignancies. A comprehensive histopathological study of colonoscopic biopsy specimens should be done with constant correlation with clinical and colonoscopic features. Since biopsy specimens are small in size, greater awareness and knowledge of colorectal diseases and understanding of pathogenesis on the part of the pathologist is necessary for better and improved diagnosis. Without biopsy, significant inflammatory bowel disease may go unrecognized or be mistaken for a functional disorder. The triad of clinical features, colonoscopic findings, and histologic biopsy features, help to arrive at proper diagnosis of colonic lesions. In the present study, our finding of dysplasia in three cases of ulcerative colitis has given a warning about the chance of development of carcinoma. Thus, colorectal lesions need an accurate diagnostic approach where histopathological interpretation of colorectal biopsies have become a cornerstone in the work up and management of patients with colorectal lesions.

Data sharing statement provided by the authors is available with the full text of this article at jebmh.com.

Financial or other competing interests: None.

Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

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