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Original Article

Correlation of Colonoscopic Findings with Histopathological Diagnosis in Colorectal Biopsies

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ABSTRACT

Background: Lesions of the large intestine encompass a broad spectrum of inflammatory, infectious, premalignant, and malignant disorders and are a significant cause of gastrointestinal morbidity worldwide. Colonoscopy with biopsy allows direct visualisation of mucosal abnormalities and targeted tissue sampling, while histopathological examination remains the gold standard for definitive diagnosis.

Aim: To study the histopathological spectrum of large intestine and rectal lesions in endoscopic biopsy specimens and to correlate colonoscopic findings with histopathological diagnosis.

Materials and Methods: This prospective study was conducted in the Department of Pathology, MGM Medical College and Hospital, Navi Mumbai, on 25 large intestine and rectal endoscopic biopsies. All specimens were processed routinely, stained with Haematoxylin and Eosin, and examined for morphological changes. Lesions were stratified into non-neoplastic, premalignant, and neoplastic categories, and correlated with clinical and endoscopic findings.

Results: Non-neoplastic lesions predominated (76%), followed by premalignant (16%) and neoplastic lesions (8%). A male predominance (68%) was observed, with the highest number of cases in the 41–60 year age group. Colitis was the most common non-neoplastic finding, while adenomatous polyps with dysplasia and adenocarcinoma represented the major premalignant and malignant lesions. Endoscopic–histopathological correlation was good-to-strong for inflammatory and malignant lesions, but moderate-to-poor for polyps and non-specific findings.

Conclusion: Endoscopic biopsy followed by histopathological examination is an indispensable diagnostic modality for large intestinal lesions, enabling accurate differentiation of inflammatory, premalignant, and malignant conditions.

Keywords: *Colorectal lesions, Colonoscopy, Histopathology, Adenocarcinoma, Ulcerative colitis, Adenomatous polyp.*

INTRODUCTION

Lesions of the large intestine comprise a broad spectrum of inflammatory, infectious, premalignant, and malignant disorders and are a significant cause of gastrointestinal morbidity worldwide. Colonoscopy with biopsy has become the cornerstone for the evaluation of colorectal lesions, allowing direct visualization of mucosal abnormalities and targeted tissue sampling for histopathological examination, which remains the gold standard for definitive diagnosis. Histopathological assessment not only confirms the nature of the lesion but also distinguishes non-neoplastic, premalignant, and malignant conditions, thereby guiding appropriate clinical management and improving patient outcomes [1–3].

The spectrum of large intestinal lesions varies according to age, sex, environmental factors, and geographic distribution. Non-neoplastic lesions, including infectious and inflammatory colitis, are encountered more frequently, whereas adenomatous polyps and colorectal carcinoma represent important premalignant and malignant lesions requiring early detection and treatment. Correlation of colonoscopic findings with histopathological diagnosis enhances diagnostic accuracy, as some lesions may have similar endoscopic appearances but distinct microscopic features [4–6].

The present study was undertaken to evaluate the histopathological spectrum of large intestinal lesions in colonoscopic biopsy specimens and to assess the correlation between endoscopic and histopathological findings, thereby emphasizing the diagnostic value of biopsy in the management of colorectal diseases.

AIMS

To study the histopathological spectrum of various large intestine and rectum lesions found in endoscopic biopsy specimens.

OBJECTIVES

1. To determine the various large intestine and rectum lesions found in endoscopic biopsy specimens.
2. To study and stratify the various large intestine and rectum lesions into benign, inflammatory, and neoplastic categories.

MATERIAL AND METHODS

Sample size - 25 large intestine and rectum biopsies.
Study design - Prospective study.
Place of study - Pathology Department, MGM's Medical College and Hospital, Navi Mumbai.

Inclusion criteria - All large intestine and rectum endoscopic biopsies of all age and sex.

Exclusion criteria - Resection specimens. Liver and gallbladder specimens. Patients not willing to give consent. Inadequate biopsies.

The present study is a prospective evaluation of large intestine and rectum endoscopic biopsies and histopathological diagnosis of the biopsies. The study included 25 large intestine and rectum biopsies from patients who presented to the Department of Surgery with various symptoms including constipation, diarrhea, bleeding per rectum, abdominal pain, weight loss, etc. All relevant clinical details including age, sex, clinical presentation, endoscopic findings, and histopathological diagnosis of patients were noted in the proforma prepared for this study.

Staining Technique - All endoscopic biopsies taken from different sites were submitted to the histopathology laboratory in 10% buffered formalin and were oriented and embedded with the mucosa downwards. After overnight fixation in formalin, dehydration was carried out with graded alcohol, followed by clearing in xylene, paraffin embedding, and section cutting on a rotary microtome. Sections of 3 µ thickness were prepared and stained with hematoxylin and eosin (H&E). All biopsies were evaluated for morphological changes with special reference to atrophy, dysplasia, metaplasia, neutrophilic infiltration, lymphoid infiltration, and malignant changes.

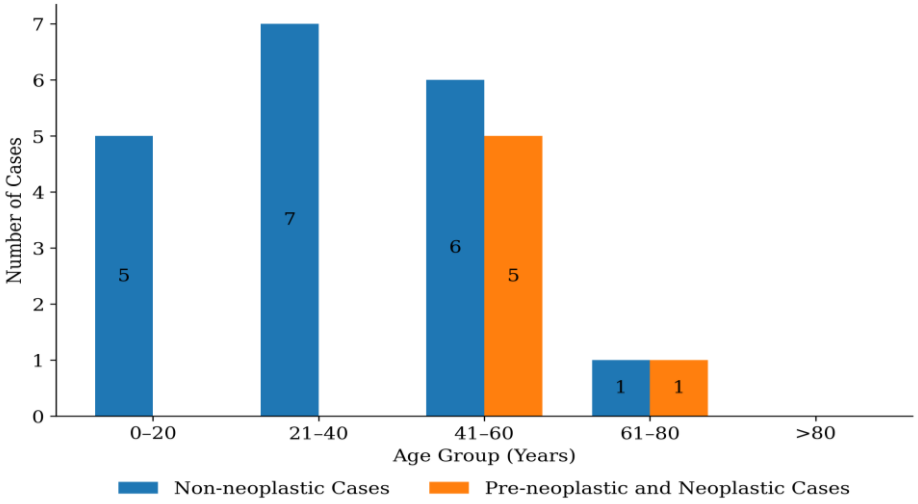
Hematoxilin and Eosin Procedure - Sections were dewaxed and rehydrated through graded alcohol to water, and fixation pigments were removed. Sections were stained in alum hematoxylin for 5 minutes and washed in running tap water until blueing was observed (≤5 minutes). Differentiation was performed in 1% acid alcohol for 5–10 seconds, followed by washing in tap water until blueing recurred; blueing was completed by dipping in an alkaline (ammonia water) solution followed by a 5-minute tap water wash. Sections were then counterstained in 1% eosin Y for 30 seconds to 1 minute, dehydrated through 2–3 changes of absolute alcohol, cleared through 2–3 changes of xylene, and mounted with Dibutyl Phthalate Polystyrene Xylene (DPX). Result: nucleus stains blue; cytoplasm and connective tissue stain in shades of pink.

Statistical analysis - All categorical variables were expressed as frequency and percentage, while quantitative variables with symmetrical distribution were expressed as mean ± SD. Comparisons between categorical variables were performed using tests appropriate to the distribution of the data. Statistical significance was defined as $p < 0.05$, where applicable. All analyses were carried out using standard statistical software (MS Excel).
Study design and place of study - A one-and-a-half-year prospective study of gastrointestinal biopsies was conducted in the Histopathology Section, Department of Pathology.

RESULTS AND OBSERVATIONS

Table 1. Age-wise Distribution of Large Intestine and Rectum Cases

Age Group (Years)	No. of Non-Neoplastic Cases	No. of Pre-Neoplastic and Neoplastic Cases	Total
0–20	5	0	5
21–40	7	0	7
41–60	6	5	11
61–80	1	1	2
>80	0	0	0
Total	19	6	25



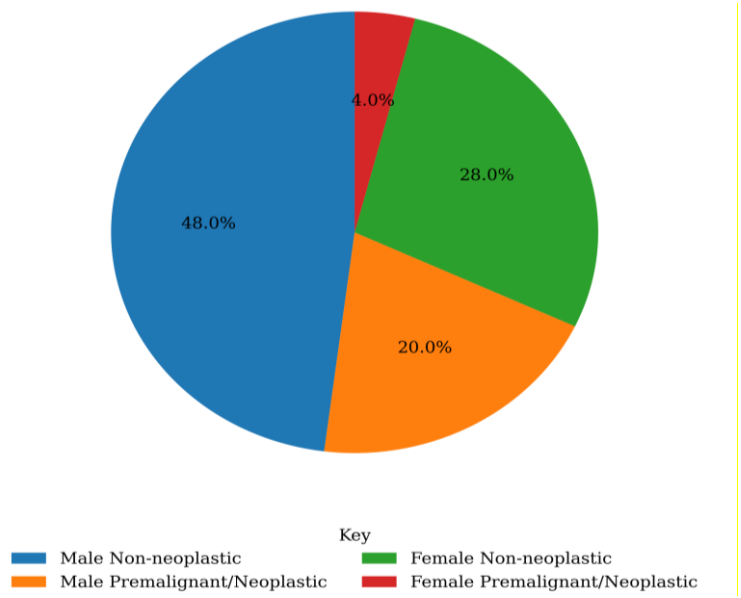
Graph 1. Age-wise Distribution of Large Intestine and Rectum Cases

Large intestine and Rectum disorders are most frequently seen in the middle-aged population; the age-wise distribution shows the greatest number of patients in the 41–60 year range, followed by the 21–40 year group, indicating a significant frequency in younger persons as well. The 0–20 year age group shows that these disorders are still present in the paediatric and adolescent population, albeit less commonly. No cases were reported in individuals older than 80 years, and the proportion in the 61–80 year group was comparatively smaller. Overall, middle-aged and younger adults were more likely to have large intestine lesions, with the 41–60 year group showing the highest incidence.

Younger age groups, particularly those under 40 years, showed a higher prevalence of benign lesions, suggesting that infections and inflammatory bowel disorders primarily affect younger individuals. Malignant lesions were distributed across all age groups; one instance in a patient under 40 years indicates early-onset colorectal cancer, though the majority of malignant cases remained in middle-aged or older patients, consistent with known epidemiology.

Table 2. Sex-wise Distribution of Large Intestine and Rectum Cases

Sex	No. of Non-Neoplastic Cases	No. of Premalignant and Neoplastic Cases	Total Cases
Male	12	5	17
Female	7	1	8
Total	19	6	25



Graph 2. Sex-wise Distribution of Large Intestine and Rectum Cases

Of the 25 cases, males predominated (17 cases) over females (8 cases). Non-neoplastic lesions were the most frequent findings overall (19 cases), with males contributing more of these (12 cases) than females (7 cases). Premalignant and neoplastic lesions totaled six cases, five of which occurred in males and only one in females. Overall, the data indicate a male predominance in both non-neoplastic and premalignant/neoplastic lesions of the large intestine, with a notably higher incidence of neoplastic and premalignant disease among males.

Table 3. Distribution of Non-Neoplastic Lesions of the Large Intestine and Rectum

Diagnosis	No. of Cases	Percentage (%)
Infective colitis	2	8%
Chronic non-specific colitis	1	4%
Ulcerative colitis	3	12%
Moderate proctitis	1	4%
Pigmented colonic lesion (Pseudomelanosis coli)	1	4%
Ulceration with severe proctitis	1	4%
Mild to moderate colitis	4	16%
Juvenile retention polyp	1	4%
Acute on chronic colitis with eosinophilic changes	1	4%
Chronic non-specific proctitis	1	4%
Hyperplastic polyp with reactive epithelial atypia	1	4%
Benign adenomatous polyp with inflammation	1	4%
Inflammatory bowel disease	1	4%
Total	19	76%

The distribution of histological diagnoses shows that inflammatory and non-neoplastic diseases predominate, accounting for 76% of all cases. Mild to moderate colitis was the most common finding (16%), followed by ulcerative colitis (12%) and infective colitis (8%). Smaller proportions (4% each) of other inflammatory conditions — proctitis, acute-on-chronic colitis with eosinophilic changes, and chronic non-specific colitis — reflect a wide range of inflammatory bowel pathology. Polypoidal lesions such as juvenile retention polyps, hyperplastic polyps, and benign adenomatous polyps each accounted for 4% of cases, indicating a comparatively lower occurrence of benign neoplastic or pre-neoplastic lesions. Uncommon conditions such as inflammatory bowel disease and pseudomelanosis coli each accounted for 4% of cases.

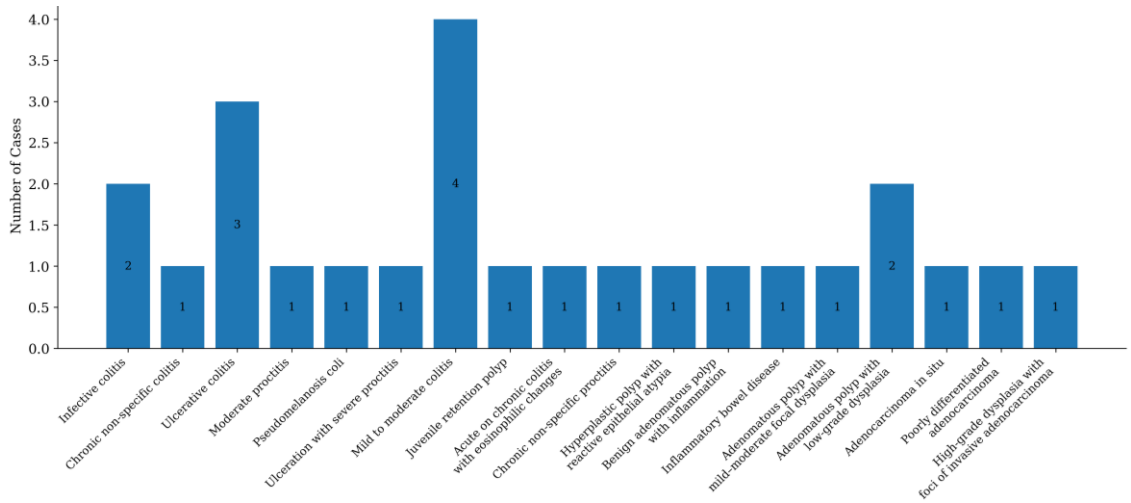
Table 4. Distribution of Neoplastic Lesions of the Large Intestine and Rectum

Diagnosis	No. of Cases	Percentage (%)
Poorly differentiated adenocarcinoma	1	4%
High-grade dysplasia with foci of invasive adenocarcinoma	1	4%
Total	2	8%

Malignant lesions accounted for 8% of the 25 cases, equally distributed (4% each) between poorly differentiated adenocarcinoma and high-grade dysplasia with foci of invasive adenocarcinoma. Although less common than non-neoplastic lesions, this distribution underscores the clinical relevance of neoplastic findings and the importance of early detection and histological examination.

Table 5. Distribution of Premalignant Lesions of the Large Intestine and Rectum

Diagnosis	No. of Cases	Percentage (%)
Adenomatous polyp with mild–moderate focal dysplasia	1	4%
Adenomatous polyp with low-grade dysplasia	2	8%
Adenocarcinoma in situ	1	4%
Total	4	16%



Graph 3. Distribution of Benign, Pre-malignant and Neoplastic Lesions of the Large Intestine and Rectum

Premalignant lesions comprised 16% of total cases, with adenomatous polyps forming the majority — adenomatous polyp with low-grade dysplasia was the most common (8%), followed by adenomatous polyp with mild-to-moderate focal dysplasia (4%). Adenocarcinoma in situ accounted for 4% of cases, representing an early stage of malignant transformation confined to the epithelium. While neoplastic lesions were less frequent overall than non-neoplastic conditions, the notable presence of premalignant and early malignant changes emphasizes the role of histopathological examination in timely diagnosis and prevention of progression to invasive carcinoma.

Table 6. Correlation of Endoscopic Findings with Histopathological Findings of Large Intestine and Rectum Cases

Sr. No.	Endoscopy/Colonoscopy Report	Histopathological Diagnosis
1	Colonic ulcer ? infective ? IBD	Chronic infective colitis
2	Colonic aphthae ? infective	Infective colitis
3	Normal mucosa	Chronic non-specific colitis
4	Colitis ? infective ? IBD	? Ulcerative colitis
5	Colitis ? infective ? IBD	? Ulcerative colitis
6	Obstructed colonic mucosa	Moderate proctitis
7	Inflammatory ascending and sigmoid colon	Pigmented colonic lesion, most probably pseudomelanosis coli
8	? Rectal ulcer ? infective ? inflammatory	Ulceration with severe proctitis
9	Multiple superficial ulcers throughout colon	Mild to moderate colitis
10	Rectal polyp	Juvenile (retention) polyp
11	Multiple ulcers in rectum and sigmoid colon	Moderate colitis/proctitis
12	Fungating mass at 15 cm from anal verge	Adenocarcinoma in situ
13	? Inflammatory bowel disease	Ulcerative colitis
14	Multiple polyps from rectosigmoid junction up to 20 cm from anal verge	Mild to moderate colitis
15	Sigmoid polyp	Adenomatous polyp showing moderate focal dysplasia
16	3×2 cm sessile proliferative growth 20 cm from anal verge	Acute on chronic colitis with eosinophilia

17	Edematous rectal mucosa	Chronic non-specific proctitis
18	Sigmoid polyp	Hyperplastic polyp showing reactive epithelial atypia
19	Colonic ulcer ?	Mild to moderate colitis
20	Rectal mass	Poorly differentiated adenocarcinoma
21	Rectal polyp at 10 cm from anal verge	High-grade dysplasia with one tissue showing features of invasive adenocarcinoma
22	Moderate to severe left-sided colitis ? ulcerative colitis	Benign adenomatous polyp with inflammation
23	Rectal polyp and multiple colonic polyps	Inflammatory bowel disease
24	Rectal polyp and multiple colonic polyps	Adenomatous polyp with low-grade dysplasia
25	Rectal polyp and multiple colonic polyps	Adenomatous polyp with low-grade dysplasia

The comparison between endoscopic/colonoscopic impressions and histological diagnoses shows general concordance. Histopathological diagnoses such as infective colitis, ulcerative colitis, and mild-to-moderate colitis correlate reasonably well with endoscopic findings of colitis, ulceration, and inflammatory change. However, endoscopy frequently yields only a tentative or nonspecific diagnosis, subsequently clarified by histology. Polypoidal lesions identified on endoscopy (e.g., rectal polyp, sigmoid polyp) correspond well with histological findings such as juvenile polyp, hyperplastic polyp, and adenomatous polyp, although the precise nature (dysplasia/atypia) can only be determined microscopically. In cases of mass lesions or growths — such as a fungating mass or rectal mass — histopathology confirmed malignancy or high-grade dysplasia, indicating a strong correlation in identifying neoplastic lesions. Several discordances, in which endoscopic impressions suggested inflammatory disease while histology revealed a different or more specific diagnosis, highlight the limitations of endoscopy alone. Overall, histological examination remains the gold standard for definitive diagnosis, particularly in differentiating inflammatory, premalignant, and malignant lesions, even though endoscopy remains valuable for initial assessment and localization.

Table 7. Comparison of Age/Sex, Clinical Features, and Histopathological Diagnosis of Large Intestine and Rectum Cases

Age/Sex	Clinical Features	Histopathological Diagnosis
27/F	Difficulty in defecation, chronic diarrhoea, fatigue	Chronic infective colitis
45/F	Diarrhoea, abdominal pain and cramps, loss of appetite	Infective colitis
57/M	Difficulty in defecation, abdominal pain	Chronic non-specific colitis
32/M	Bloody diarrhoea, mucous in stool, abdominal cramps	? Ulcerative colitis
32/M	Bloody diarrhoea, mucous in stool, abdominal cramps, abdominal pain, frequent stools	? Ulcerative colitis
16/M	Sensation of incomplete evacuation, on-off stools ×6 months, mucous in stool	Moderate proctitis
49/M	Chronic constipation and bloating	Pigmented colonic lesion, most probably pseudomelanosis coli
7/M	Lower GI bleed, mucous in stool, severe rectal pain	Ulceration with severe proctitis
24/M	Pain in abdomen and intractable hiccups	Mild to moderate colitis
7/M	Painless rectal bleeding, mass coming out of rectum, mucous discharge	Juvenile (retention) polyp
23/F	Pain in abdomen	Moderate colitis/proctitis
69/F	Abdominal pain, multiple episodes of vomiting, blood in stool, change in bowel habits	Adenocarcinoma in situ
42/F	Mucous in stool, frequent stools, abdominal pain ×1 month, vomiting and loose stools ×15 days	Ulcerative colitis
50/M	Abdominal pain, diarrhea, mucus in stool	Mild to moderate colitis
48/M	Lower backache, occult blood in stool, change in bowel habits, abdominal discomfort	Adenomatous polyp showing moderate focal dysplasia
72/M	Vomiting and abdominal pain, fever, nausea, bloating	Acute on chronic colitis with eosinophilia
18/F	Loose stools after meals ×2 years	Chronic non-specific proctitis
48/M	Lower backache	Hyperplastic polyp showing reactive epithelial atypia
28/M	Abdominal pain ×8 days, loose stools ×15 days, fever ×5 days	Mild to moderate colitis
44/M	Malena and weight loss since 4–5 months, abdominal pain	Poorly differentiated adenocarcinoma
57/M	Rectal bleeding since 4 months, generalized weakness since 2 months	High-grade dysplasia with

		features of invasive adenocarcinoma
18/F	Abdominal pain since 2 years and fever since 3 days	Benign adenomatous polyp with inflammation
33/F	Chronic diarrhea, abdominal pain, bleeding per rectum, mucus in stool	Inflammatory bowel disease
59/M	Bleeding per rectum, change in bowel habits, mucus in stool	Adenomatous polyp with low-grade dysplasia
59/M	Abdominal discomfort, change in bowel habits, mucus in stool	Adenomatous polyp with low-grade dysplasia

Male patients outnumbered female patients overall. Diarrhoea, abdominal pain, mucus in stool, and bleeding per rectum were the most common clinical presentations, indicating that bowel-related symptoms predominate. These symptoms were most often linked to non-neoplastic and inflammatory disorders such as ulcerative colitis, chronic non-specific colitis, infective colitis, and mild-to-moderate colitis. Premalignant lesions — including adenomatous polyps with low-grade or focal dysplasia and adenocarcinoma in situ — frequently presented with altered bowel habits, occult blood in stool, and mild abdominal discomfort. Malignant lesions, including adenocarcinoma in situ and poorly differentiated adenocarcinoma, were associated with more severe symptoms such as weight loss, malena, and recurrent bleeding per rectum. Overall, benign and inflammatory lesions were associated with milder gastrointestinal symptoms, while premalignant and malignant lesions showed more concerning features — bleeding, anaemia, and weight loss — with increasing severity in older age groups.

PICTURES

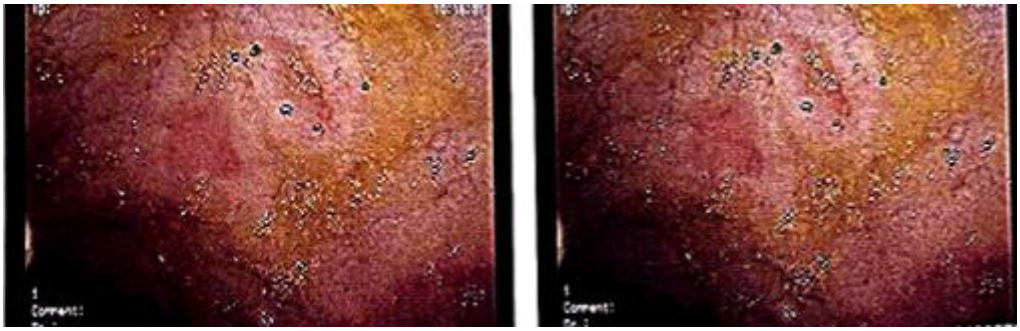


Figure 1. Endoscopy image –? Inflammatory Bowel Disease

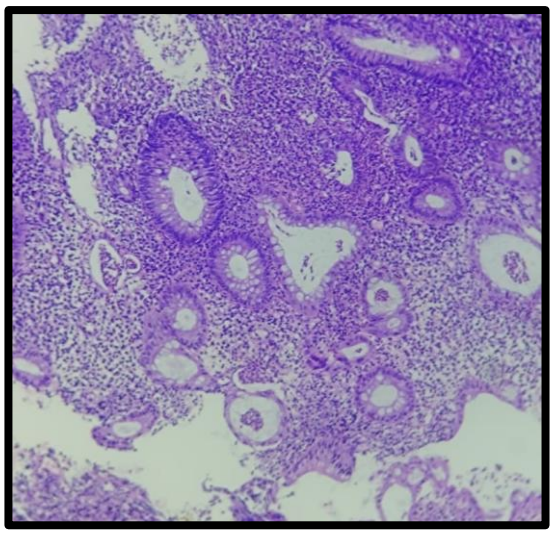


Figure 2. Ulcerative colitis (40x, H & E)

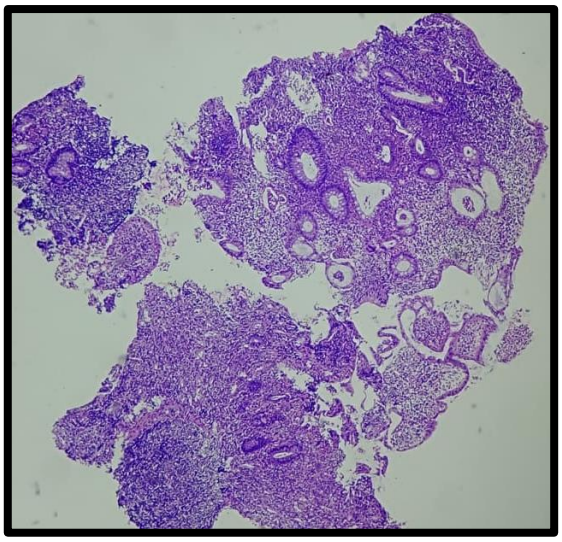


Figure 3. Ulcerative colitis (40x, H & E)

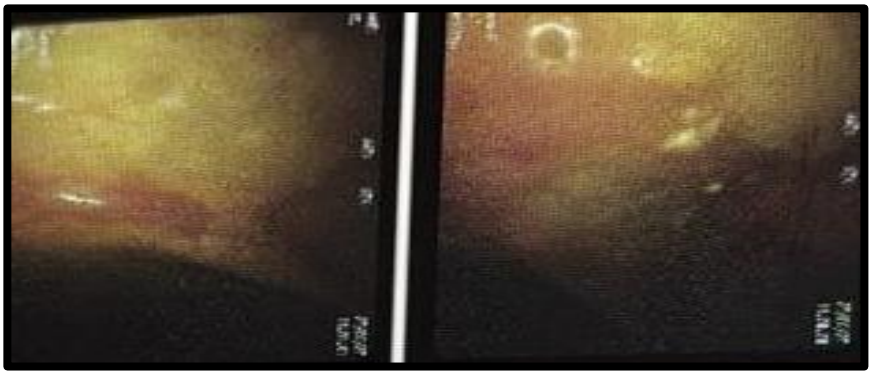


Figure 4. Endoscopy image –Inflammatory Ascending and Sigmoid colon

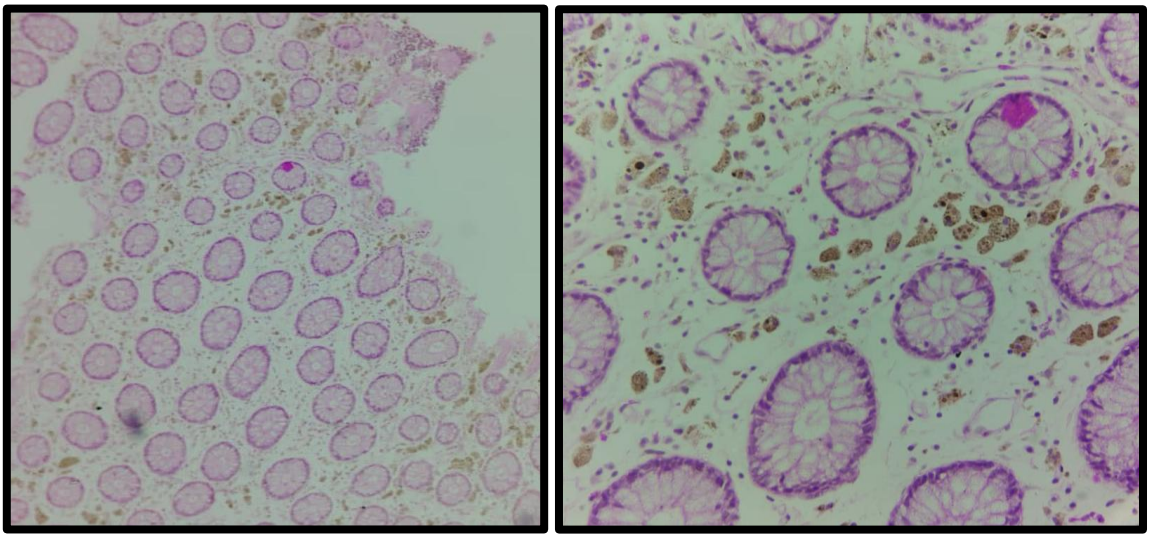
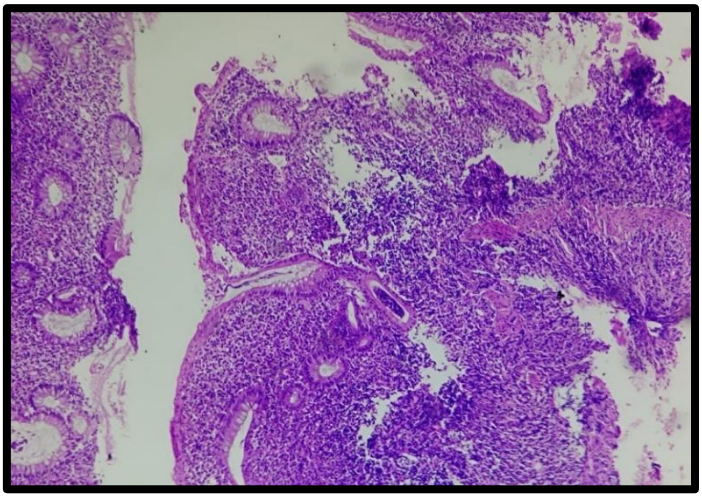


Figure 5.and 6. Pseudomelanosis coli (10x and 40x, H & E)

Figure 7. Endoscopy image –Moderate to severe left sided colitis? Ulcerative Colitis



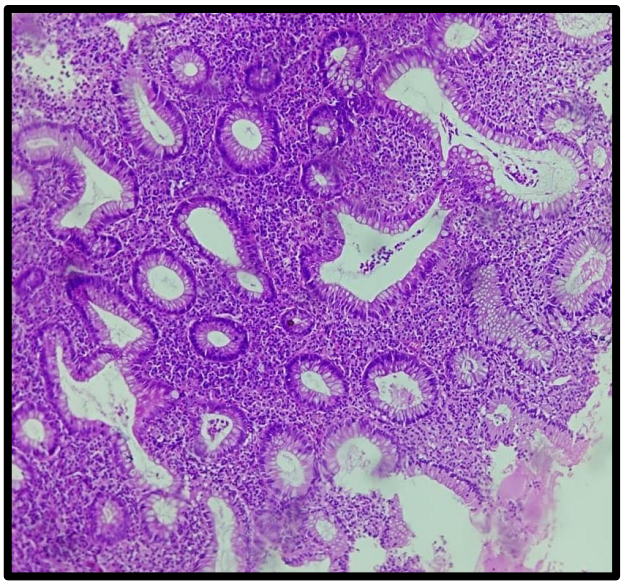


Figure 8. Inflammatory Bowel Disease (10x, H & E)

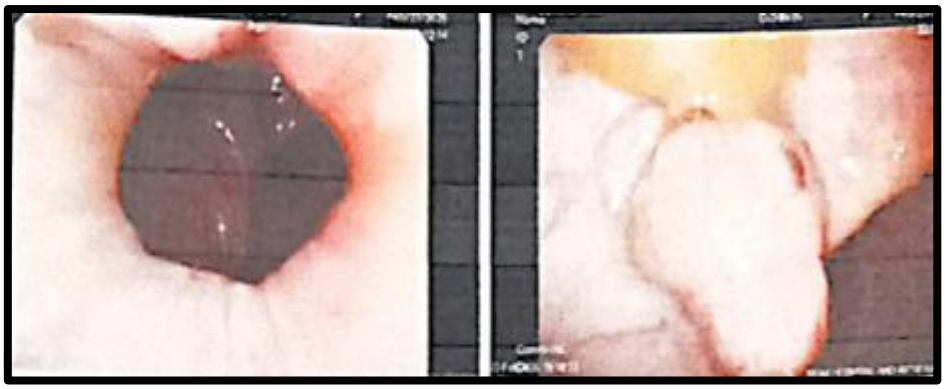


Figure 9. Endoscopy image –Rectal polyp and multiple colonic polyp

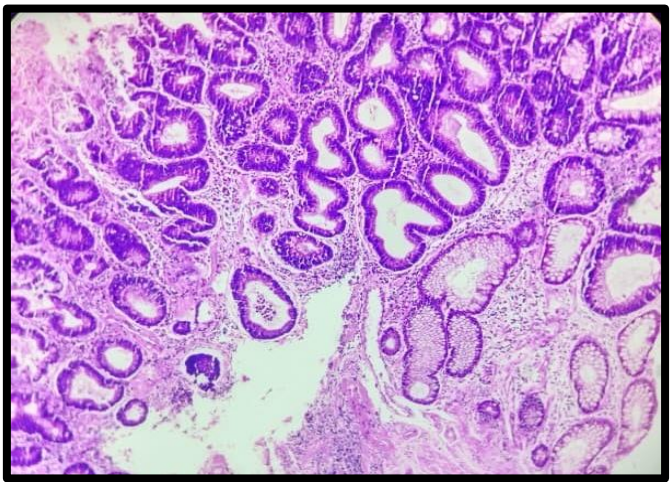


Figure 11. Adenomatous Polyp (40x, H & E)

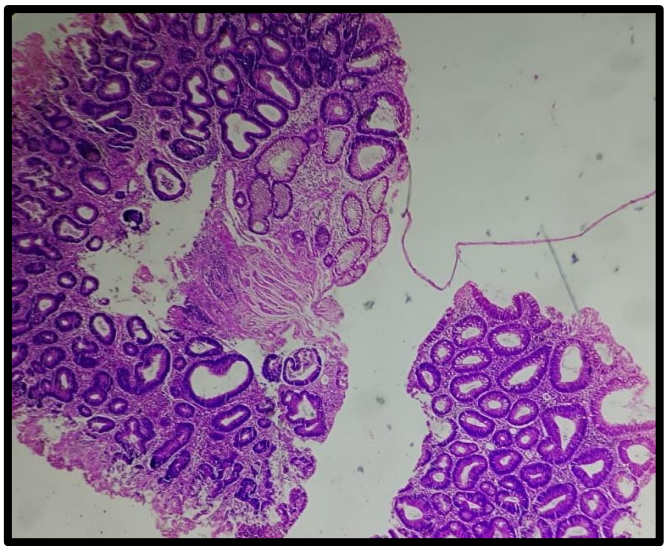


Figure 12. Adenomatous Polyp (10x, H & E)

DISCUSSION

The present study evaluates the histopathological spectrum of 25 large intestine lesions based on colonoscopy biopsies and correlates them with clinical and endoscopic findings.

Age wise distribution -

The age group of 41–60 years had the highest number of cases in this study, accounting for 11 of the 25 biopsies (44%), followed by the 21–40 year group (7 cases). Non-neoplastic, inflammatory lesions predominated in patients under 40 years, while all six premalignant and neoplastic lesions occurred in patients above 40 years, with one exception in the 61–80 year bracket. This pattern is consistent with the generally accepted view that inflammatory and infective colonic

disorders present earlier in life, whereas dysplastic and malignant transformation accumulates with advancing age. No cases were recorded beyond 80 years in this series, likely reflecting the smaller number of very elderly patients referred for colonoscopic biopsy at this centre.

Sex wise distribution -
A male predominance was observed in the present series, with a male-to-female ratio of approximately 2:1 (17 vs. 8 cases). This predominance was more pronounced among premalignant and neoplastic lesions, where males accounted for five of the six cases. This finding is in keeping with the widely reported higher incidence of colorectal neoplasia in men, which has been attributed to a combination of lifestyle factors and differences in healthcare-seeking behaviour, though the small sample size in this study limits the strength of this inference.

Spectrum of non neoplastic lesions -
Non-neoplastic, inflammatory lesions constituted the largest category in this study (76% of cases), with mild to moderate colitis (16%) and ulcerative colitis (12%) being the most frequent diagnoses. This predominance of inflammatory pathology reflects the common clinical presentation of colonic biopsies performed for diarrhoea, mucus in stool, and bleeding per rectum, symptoms that are frequently attributable to infective or idiopathic inflammatory bowel disease rather than neoplasia. The presence of a case of pseudomelanosis coli, a benign pigmentary change usually associated with chronic laxative use, and a case of eosinophil-rich colitis further illustrates the diagnostic breadth that histopathology can resolve beyond a nonspecific endoscopic impression of "colitis."

Spectrum of premalignant and neoplastic lesions -
Premalignant lesions were identified in 16% of cases, predominantly adenomatous polyps with low-grade or focal dysplasia, along with a single case of adenocarcinoma in situ. Neoplastic lesions accounted for 8% of cases, comprising one poorly differentiated adenocarcinoma and one case of high-grade dysplasia with foci of invasive adenocarcinoma. Although numerically small, this combined premalignant-to-malignant fraction (24% of all cases) underscores the importance of biopsy in every colonoscopically abnormal mucosa, since dysplastic and early malignant lesions cannot be reliably distinguished from benign polyps or inflammatory lesions on gross endoscopic appearance alone.

Endoscopic histopathological correlation -
Correlation between endoscopic impression and final histopathological diagnosis was generally good for mass lesions and polypoidal growths, where endoscopic suspicion of malignancy was consistently confirmed on histology. Correlation was comparatively weaker for inflammatory lesions, where endoscopic descriptors such as "colitis" or "suspected inflammatory bowel disease" were often nonspecific and required histopathological examination to differentiate infective colitis, chronic non-specific colitis, and ulcerative colitis from one another. This reinforces the established principle that colonoscopy is primarily a tool for lesion detection and localization, while histopathology provides the definitive diagnostic categorization necessary for clinical decision-making.

Clinico - pathological correlation -
Bowel-related symptoms — diarrhoea, abdominal pain, mucus in stool, and bleeding per rectum — were the predominant presenting complaints across the cohort and were most closely associated with non-neoplastic inflammatory lesions. Premalignant lesions more often presented with subtler features such as altered bowel habits and occult blood loss, while malignant lesions were associated with more alarming features, including weight loss, malena, and persistent rectal bleeding. This gradient of symptom severity across the non-neoplastic–premalignant–neoplastic spectrum is consistent with the natural history of colorectal disease and supports a low threshold for biopsy in patients presenting with these warning features, particularly in the middle-aged and elderly population.

CONCLUSION

This prospective study of 25 large intestine and rectal endoscopic biopsies demonstrates that non-neoplastic inflammatory lesions form the predominant histopathological category (76%), with mild to moderate colitis and ulcerative colitis being the most common diagnoses. Premalignant and neoplastic lesions, though less frequent (24% combined), occurred predominantly in males and in patients above 40 years of age, highlighting these as higher-risk groups warranting careful endoscopic and histopathological evaluation. While colonoscopic impression correlated well with histopathology for mass and polypoidal lesions, it was frequently nonspecific for inflammatory conditions. These findings reaffirm that histopathological examination of colonoscopic biopsies remains indispensable for accurate diagnosis, appropriate risk stratification, and timely management of colorectal disease, and that endoscopy and histopathology should be regarded as complementary rather than interchangeable diagnostic tools.

Ethics approval and consent to participate
The study was approved by the Institutional Ethics Committee prior to commencement.

List of abbreviations
CRC: Colorectal Carcinoma; DPX: Dibutyl Phthalate Polystyrene Xylene; GI: Gastrointestinal; H&E: Hematoxylin and Eosin; IBD: Inflammatory Bowel Disease; M:F: Male to Female Ratio; SD: Standard Deviation

Data Availability
The data sets used and analyzed during the current study are available from the corresponding author on reasonable request

Conflicts of Interest
None declared.

Funding Statement
Nil.

Authors' contributions
UM conceived and supervised the study, served as lab director, and reviewed slide morphologies. AA performed tissue preparation, H&E staining, data analysis, and drafted the manuscript. VS assisted in tissue processing and critical analysis. All authors read and approved the final manuscript

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