Section: Pathology

Original Research Article

HISTOPATHOLOGICAL SPECTRUM OF COLONIC LESIONS IN COLONOSCOPIC BIOPSIES: A RETROSPECTIVE STUDY FROM A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Colonoscopic biopsy is a crucial diagnostic tool for evaluating colonic pathologies ranging from inflammatory to neoplastic lesions. Accurate histopathological interpretation guides clinical management, therapeutic decisions, and prognosis. **Aim:** To analyse the histopathological spectrum of colonic lesions in colonoscopic biopsies received at a tertiary care hospital, correlate findings with clinical features, and determine the relative frequency of non-neoplastic and neoplastic lesions. **Materials and Methods:** A retrospective observational study was conducted on 431 colonoscopic biopsy specimens received from January 2003 to December 2012. Biopsies were processed using standard histopathological techniques and evaluated using hematoxylin and eosin stains, with special stains (PAS, ZN, mucicarmine) used when necessary. Clinical data and colonoscopic findings were retrieved from hospital records. Descriptive statistics were applied. **Results:** Among 431 biopsies, 38 (8.8%) were normal, 288 (66.8%) were non-neoplastic inflammatory lesions, and 105 (24.4%) were neoplastic lesions. Chronic nonspecific colitis was the most common inflammatory lesion (230 cases; 82% of all inflammatory lesions). Ulcerative colitis accounted for 49 cases (15%), granulomatous inflammation for 5 cases (2%), and rectal mucosal prolapse syndrome for 4 cases (1%). Among neoplastic lesions, adenomas and adenocarcinomas formed the majority. The most common presenting symptoms were diarrhoea (70.5%), abdominal pain (64.7%), and rectal bleeding (55.7%). Most patients were males (58%), and the maximum number belonged to the 61–70 years age group. **Conclusion:** Chronic nonspecific colitis constituted the majority of colonic lesions, followed by ulcerative colitis and neoplastic lesions. Histopathological evaluation remains indispensable for distinguishing between various colonic pathologies, allowing early diagnosis and better clinical management.

INTRODUCTION

Gastrointestinal disorders are a major cause of morbidity worldwide, and endoscopic evaluation plays a central role in their diagnostic workflow. Colonoscopy is considered the gold standard for assessing colonic mucosal diseases and is the most accurate method for detecting inflammatory, premalignant, and malignant lesions of the colon.[1,2] When combined with endoscopic visualisation, colonoscopic biopsy greatly increases diagnostic precision, allowing for early identification of disease patterns and prompt therapy decisions.[3,4]

Histopathological examination of biopsy specimens remains essential in differentiating among the wide spectrum of colonic diseases. Biopsies are essential for diagnosing and evaluating the activity of inflammatory bowel disorders (IBD), such as Crohn's disease and ulcerative colitis, because these conditions frequently exhibit similar clinical and endoscopic characteristics.[5,6] IBD can be mistaken for non-specific colitides, infectious colitis, microscopic colitis, and ischaemic damage, and histology offers important hints for precise diagnosis.[7,8]

Colorectal neoplasia is becoming more common both worldwide and in India, particularly in elderly

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persons and increasingly in younger age groups.[9,10] Adenomas and serrated lesions are known to be precursors in the adenoma–carcinoma sequence and serrated route of colorectal carcinogenesis, and colonoscopic biopsy is essential for their early diagnosis.[11,12] Additionally, histological assessment helps differentiate sessile serrated lesions, which have a higher propensity for malignancy and hence need proper monitoring, from hyperplastic polyps.[13] Histopathological assessment of colonoscopic samples continues to be the mainstay of diagnostic evaluation due to the variety of clinical presentations and overlapping morphological markers. In order to better understand disease trends in the study population, this retrospective analysis correlates the range of histopathological results from colonoscopic samples during a ten-year period at a tertiary care hospital with clinical and demographic characteristics.

MATERIALS AND METHODS

Study Design
A retrospective observational descriptive study.
Study Setting
Department of Pathology in a Tertiary Care Hospital.
Study Duration
January 2003 to December 2012.
Study Population
Colonoscopic biopsies of **431 patients**.

Inclusion Criteria
- Adequate colonoscopic biopsy samples.
- Biopsies obtained from representative colonic sites.
- Cases with complete clinical records.

Exclusion Criteria
- Inadequately preserved or insufficient biopsies.
- Specimens with incomplete clinical information.

Data Collection
- Patients presenting with gastrointestinal symptoms underwent colonoscopy using FUJINON EC-201WL endoscope.
- Clinical information and colonoscopic findings were retrieved from hospital records.
- Biopsy specimens were fixed in 10% buffered formalin, processed, embedded in paraffin, and sectioned at 3–5 µm thickness.
- Routine staining with hematoxylin and eosin was performed.
- PAS, mucicarmine, and Ziehl–Neelsen stains were used when required.

Histopathological Evaluation
Slides were independently reviewed. Additional sections were taken when necessary.
Lesions were grouped as:
1. **Normal**
2. **Non-neoplastic (Inflammatory)**
3. **Neoplastic**

Statistical Analysis
Data were analyzed using Microsoft Excel. Findings were expressed as frequencies and percentages.

RESULTS

Table 1: Sex distribution of all cases

Sr. no	Sex	No. of cases	Percentage
1	Males	250	58%
2	Females	181	42%
Total		**431**	**100%**

Table 1 shows the sex-wise distribution of the 431 patients who underwent colonoscopic biopsy in the study period. Of the total cases, males accounted for 250 cases (58%), while females comprised 181 cases (42%). This indicates a male predominance in the study population. The higher proportion of male patients suggests either increased healthcare-seeking behaviour among males or a higher prevalence of gastrointestinal symptoms requiring colonoscopic evaluation in this group.

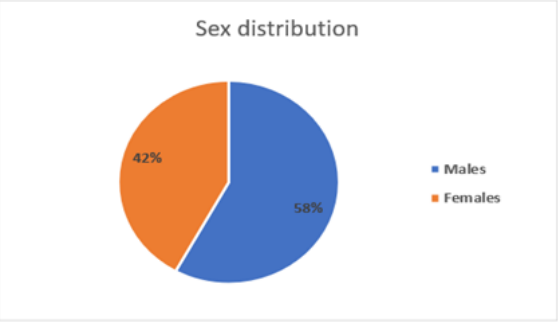

Figure 1: Sex distribution

Table 2: Age distribution of all cases

Age group	No. of cases	Percentage
0–10	3	0.60%
11–20	19	4.30%
21–30	36	8.30%
31–40	49	11.50%
41–50	71	16.50%
51–60	97	22.50%
61–70	101	23.40%
71–80	49	12%
81–90	5	1%

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91–100	1	0.20%
Total	**431**	**100%**

Table 2 summarizes the age-wise distribution of the 431 patients included in the study. The majority of cases were seen in older adults, with the 61–70-year age group accounting for the highest proportion (23.4%), followed closely by the 51–60-year group (22.5%). Younger age groups contributed progressively fewer cases, with individuals below 20 years comprising only 4.9% of the study population. Very elderly patients above 80 years constituted less than 1.2% of cases. Overall, the data indicate that colonic symptoms warranting colonoscopic biopsy were most prevalent in the 5th to 7th decades of life, reflecting the age-related increase in colonic pathology.

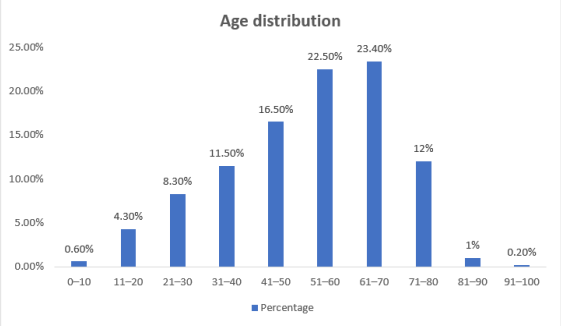

Figure 2: Age distribution

Table 3: Dietary habits

Diet	No. of cases	Percentage
Vegetarian	235	55%
Non-vegetarian	196	45%
Total	**431**	**100%**

Table 3 depicts the distribution of patients based on dietary habits. A slight predominance of vegetarian individuals (55%) was observed compared to non-vegetarians (45%). This distribution may reflect the general dietary pattern of the population attending the tertiary care center rather than an association with specific colonic lesions. However, it highlights that colonoscopic indications span individuals of diverse dietary backgrounds.

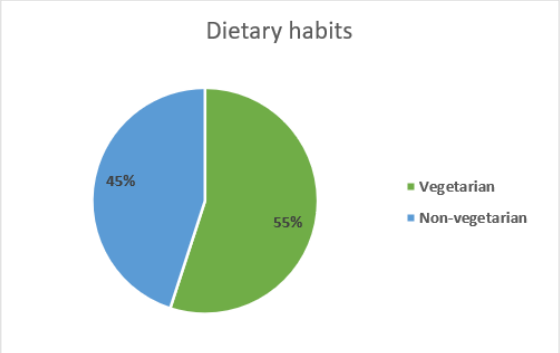

Figure 3: Dietary habits

Table 4: Clinical features

Clinical feature	No. of cases	Percentage
Diarrhoea	304	70.5%
Abdominal pain	279	64.7%
Rectal bleeding	240	55.7%
Constipation	142	33%
Weight loss	81	18.8%

Table 4 presents the clinical symptoms prompting colonoscopic evaluation. Diarrhoea was the most common presenting complaint, seen in 70.5% of patients, followed by abdominal pain (64.7%), and rectal bleeding (55.7%). One-third of the patients (33%) had constipation, and 18.8% had lost weight for no apparent reason. These results highlight the significance of colonoscopy in assessing nonspecific gastrointestinal symptoms by showing that changed bowel habits and abdominal pain were the most common clinical signs.

A variety of histological patterns were seen in the 431 colonoscopic samples that were examined. The largest group was non-neoplastic inflammatory lesions (66.8%), with neoplastic lesions coming in second (24.4%). Only 8.8% of samples revealed normal intestinal mucosa. The large burden of chronic colitis and associated disorders in the population under study is shown by the preponderance of inflammatory lesions.

A. Non-neoplastic (Inflammatory) Lesions

Table 5: Non-neoplastic lesions

Diagnosis	No. of cases	Percentage
Chronic nonspecific colitis	230	82%
Ulcerative colitis	49	15%
Granulomatous inflammation	5	2%
Rectal mucosal prolapse	4	1%

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Table 5 outlines the distribution of non-neoplastic lesions, which comprised 288 cases. Chronic nonspecific colitis was the most frequent entity, accounting for 82% of inflammatory lesions, indicating that many patients presented with non-specific chronic mucosal inflammation without distinctive features of specific diseases. Ulcerative colitis constituted 15% of cases, reflecting its chronic relapsing nature and significance in colonic pathology. Granulomatous inflammation (2%) included cases consistent with Crohn's disease and intestinal tuberculosis. Rectal mucosal prolapse syndrome (1%) represented a minor fraction of biopsies. Overall, the findings underscore that non-specific chronic colitis forms the bulk of inflammatory colonic pathology observed in routine practice.

Neoplastic lesions constituted 105 cases (24.4%) of all biopsies, reflecting the considerable prevalence of both benign and malignant colonic neoplasms in the studied population. The neoplastic spectrum included hyperplastic polyps, various types of adenomas (tubular, villous, and tubulo-villous), sessile serrated lesions, and adenocarcinomas. Rare cases of neuroendocrine tumors were also identified. The presence of a substantial proportion of premalignant lesions such as adenomas and serrated lesions highlights the critical role of colonoscopy and biopsy in early detection and cancer prevention, while the diagnosis of adenocarcinoma emphasizes the importance of timely evaluation in symptomatic individuals.

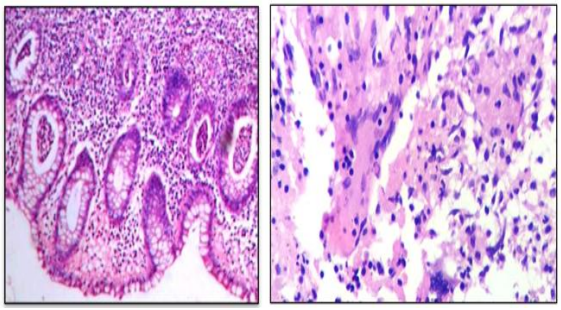

Figure 1: Ulcerative colitis – Active phase showing crypt architectural distortion and crypt abscesses (H&E X 100)

Figure 2: Crohn's disease showing epithelioid cell microgranulomas (H&E X 400)

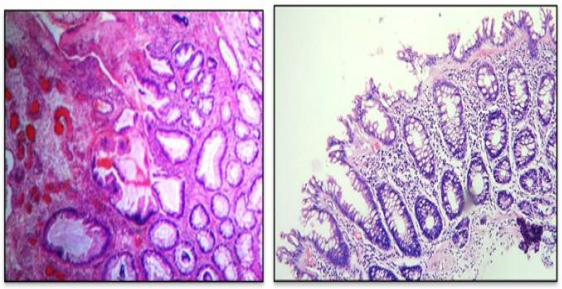

Figure 3: Rectal mucosal prolapse syndrome showing mucosal architectural distortion with fibromuscular obliteration of the lamina propria and ecstatic blood vessels. (H&E X 100)

Figure 4: Hyperplastic polyp showing serrated epithelium towards the surface. (H&E X 100)

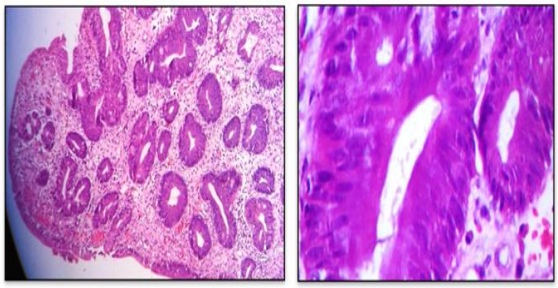

Figure 5: Tubular adenoma showing neoplastic glands forming tubules (H&E X 100)

Figure 6: Tubular adenoma with low grade dysplasia showing elongated nuclei, nuclear palisading and hyperchromasia

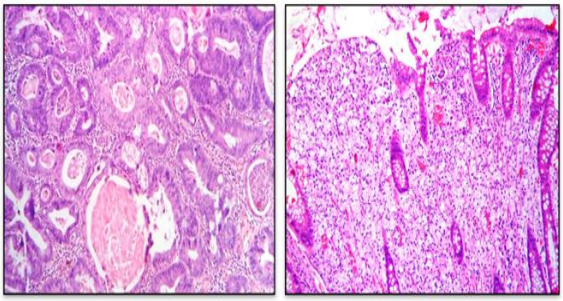

Figure 7: Moderately-differentiated Adenocarcinoma showing necrotic debris within the lumina of malignant glands and elongated stratified nuclei. (H&E X 100)

Figure 8: Signet ring cell carcinoma showing tumour cells arranged in sheets in the lamina propria. (H&E X 100)

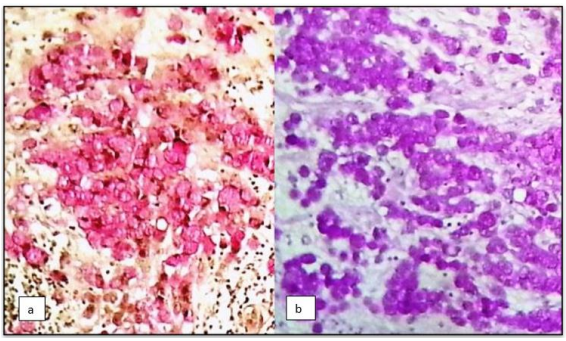

Figure 9: Signet ring cell carcinoma: a. Mucicarmine stain positive in the cytoplasm of tumour cells. (Mucicarmine X 400), b. PAS stain positive in the cytoplasm of tumour cells. (PAS X 400)

DISCUSSION

In this retrospective study of 431 colonoscopic biopsies, inflammatory lesions emerged as the predominant finding, consistent with similar patterns observed in South Asian cohorts.[7,14] The majority of patients with gastrointestinal symptoms had chronic non-specific colitis, indicating the high prevalence of non-specific inflammatory diseases. In our study, 15% of inflammatory lesions were caused by ulcerative colitis. This is consistent with published epidemiological statistics showing that in the Indian subcontinent, ulcerative colitis is more prevalent than Crohn's disease.[6,15] The majority of patients in our

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analysis were between the ages of 51 and 70, which is consistent with global trends showing that middle-aged and older persons had the highest prevalence of IBD.[15]

Intestinal TB and Crohn's disease have been linked to granulomatous inflammation. In endemic areas like India, where TB is common, differentiating these entities continues to be a well-known diagnostic problem.[16] Although proper diagnosis requires integration of clinical, microbiologic, and radiologic data, histology plays a crucial role.[17]

24.4% of biopsies had neoplastic lesions, which is consistent with worldwide statistics showing an increasing frequency of colorectal neoplasia.[9,18] The adenoma–carcinoma sequence reported in traditional colorectal carcinogenesis models was supported by the prevalence of adenomas.[19] The necessity for precise histopathological diagnosis and surveillance is further reinforced by serrated lesions, which are becoming more well acknowledged for their propensity for malignancy through the serrated route.[13] The majority of adenocarcinoma cases occurred in older persons, which is consistent with global statistics indicating an exponential increase in the incidence of colon cancer beyond age 50.[9,18] Recent statistics from the cancer registry have shown that colorectal cancer is becoming more common in India, highlighting the significance of early detection procedures like colonoscopy and biopsy.[10]

Overall, the study demonstrates the importance of colonoscopic biopsy in the assessment of colonic disorders. In addition to facilitating a definite diagnosis, it also aids in the stratification of illness severity, directs treatment, and informs surveillance tactics.[3,4,11] Histopathological assessment continues to be the mainstay of gastrointestinal diagnosis due to the substantial overlap between clinical and endoscopic findings in colonic disorders.

CONCLUSION

The broad range of colonic abnormalities identified by colonoscopic biopsies is highlighted in this ten-year retrospective analysis. Most of the lesions were inflammatory, and the most prevalent kind was chronic non-specific colitis. Nearly one-fourth of all patients had neoplastic lesions, highlighting the critical role colonoscopic screening and biopsy play in early diagnosis. A definite diagnosis is made, overlapping entities are distinguished, and management options are guided by histopathological assessment. Thus, colonoscopy with biopsy continues to be a key component of the diagnostic process for colonic disorders.

Limitations of the Study

It is important to recognise the limitations of this study. First of all, because it is a retrospective examination, the correctness and completeness of the current medical and histological data are crucial. Certain instances may have been interpreted differently due to missing or inadequate clinical information. Second, because referral bias may affect the range of patients treated, the study was only carried out at one tertiary care facility, which may restrict the findings' applicability to a larger community. Third, underestimating of deeper or more diverse lesions may result from sample restrictions, such as tiny tissue pieces, superficial biopsies, and site-specific variability, despite the great value of colonoscopic biopsy. Fourth, certain inflammatory and neoplastic disorders may not have been accurately classified since special stains and auxiliary procedures like immunohistochemistry were not consistently applied to all biopsies and were only carried out when judged required. Lastly, because the study was conducted over a ten-year period, small differences in interpretation may have been introduced due to changes in reporting standards, endoscopic equipment, and diagnostic criteria.

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