Original Article

Histomorphological Spectrum of Colonic Biopsies: A Three-Year Retrospective Study at Two Diagnostic Centers

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Abstract

Background: Histopathological examination of colonic mucosal biopsies is crucial for the identification of a number of conditions, including inflammatory and infectious disorders, as well as benign and malignant neoplasms. Examining the histomorphological range of colonic samples taken from two important diagnostic centers in Gazipur, Bangladesh, is the aim of this study.

Materials and Methods: A retrospective analysis of 350 colonoscopic biopsy specimens obtained from Tairunnessa Memorial Medical College and Popular Diagnostic Center, Gazipur Branch, over a three-year period (January 2022–March 2025) was carried out. Hematoxylin and eosin staining and standard processing were applied to the specimens. Age, sex, lesion distribution, and histological findings were examined in these instances.

Results: Out of the 350 cases, 259 were male and the rest were female. The cases ranged in age from 20 to 78. The rectosigmoid area was the site of the majority of the biopsies. Adenomatous polyps, tubulovillous adenomas with dysplasia, and adenocarcinomas were among the neoplastic lesions, but nonspecific colitis and ulcerative colitis accounted for the majority of the observations. There were also a few isolated incidences of Crohn's disease and TB.

Conclusion: Variety of gastrointestinal illnesses can be diagnosed with the help of colonic biopsies. Managing patients requires accurate histomorphological assessment, particularly when separating benign, infectious, and malignant disorders.

Keyword: Colonic biopsies, Histomorphology, Colonic pathology, Retrospective study.

Introduction

Colorectal diseases are expensive for healthcare systems worldwide because they cause both acute and chronic morbidity.[1] Due to dietary changes, urbanization, and better access to healthcare, more colonoscopic procedures are being performed in Bangladesh and other developing countries.[2] Samples of the colon obtained during these operations are crucial for the diagnosis of a variety of diseases, ranging from nonspecific inflammation to malignancy.[3]

For assessing colonic lesions, histopathological investigation is still the gold standard, especially when endoscopic findings and clinical symptoms coincide.[3] Clinically and endoscopically, conditions including Crohn's disease, ulcerative colitis, and infectious colitis frequently exhibit identical symptoms.[4] Similarly, the early stages of cancer might resemble benign illnesses, therefore histological confirmation is essential.[5]

Accurate diagnosis is hampered by a number of issues despite technical developments. Sampling inaccuracy is a significant issue.[2] Frequently, only two or three biopsy fragments are presented, particularly when cancer is suspected. The deeper layers required to

evaluate submucosal invasion may not be present when tissue is just taken from ulcerated surfaces.[1] This may cause inconclusive reports or false-negative results, which would postpone diagnosis and treatment.

At least well-oriented biopsy samples must be obtained from questionable locations in order to reduce diagnostic mistakes.[6] Additionally, supplementary methods like immunohistochemistry, specific stains, and molecular diagnostics like GeneXpert should be used in addition to histological examination.[7] In addition to increasing diagnostic precision, these methods aid in distinguishing between neoplastic and infectious processes, especially in difficult situations.

The purpose of this study is to compare the location and type of lesions with results from related published studies and provide a thorough analysis of the histomorphological spectrum of colonic biopsies taken over a three-year period. Particular emphasis is placed on the significance of adequate biopsies and communication between the pathologist and the clinician.

Materials and Methods

This retrospective study was conducted at the Department of Pathology, Tairunnessa Memorial Medical College and Popular Diagnostic Centre, Gazipur Branch, from January 2022 to March 2025. A total of 350 colonoscopic biopsy reports that fulfilled the inclusion and exclusion criteria were analyzed for the study. Relevant clinical and demographic data were recorded.

Inclusion criteria: Adequate colonoscopic biopsies received during the study period. Exclusion criteria: Inadequate or poorly preserved samples. Data were tabulated and analyzed with respect to age, sex, type of lesion, and histological features.

Ethical consideration

The study was done in accordance with the ethical guidelines of the Declaration of Helsinki. Informed consent was not required and not obtained for the study as the identity of the study subjects was not disclosed. Ethical approval was obtained from the Tairunnesa Memmorial Medical College Institutional review board.

Results

Table I: Age and Gender Distribution (N=350)

Age Group (Years)	Male	Female	Total	Percentage (%)
20–29	32	12	44	12.57
30–39	48	15	63	18
40–49	66	20	86	24.57
50–59	58	23	81	23.14
60–69	42	14	56	16
70–78	13	7	20	5.72
Total	259	91	350	100

Out of 350 patients, the majority (259) were male, suggesting a distinct gender predisposition toward colonic diseases in this demographic. The age distribution showed a peak in the 40–60 years range, which is consistent with the rising incidence of both inflammatory and neoplastic conditions in middle-aged individuals.

Table II: Distribution of Lesions by Type (N=350)

Lesion Type	Number of Cases	Percentage (%)
Nonspecific colitis	110	31.4
Ulcerative colitis	46	13.1
Hyperplastic polyp	30	8.6
Adenomatous polyp	38	10.9
Tubulovillous adenoma (HGD)	24	6.9
Adenocarcinoma	70	20
Tubercular colitis	16	4.6
Crohn's disease	6	1.7
Others	10	2.8

Presents the lesion-wise distribution, demonstrating that non-neoplastic lesions were more frequent than neoplastic ones. The most common diagnosis was nonspecific colitis (31.4%), followed by ulcerative colitis (13.1%) and adenocarcinoma (20%).

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Table III: Age Distribution of Lesions (N=350)

Lesion Type	20–39	40–59	60–78	Total
Nonspecific colitis	28	62	20	110
Ulcerative colitis	10	28	8	46
Hyperplastic polyp	6	18	6	30
Adenomatous polyp	4	20	14	38
Tubulovillous adenoma (HGD)	3	15	6	24
Adenocarcinom a	2	32	36	70
Tubercular colitis	5	8	3	16
Crohn's disease	3	3	0	6

Stratifies lesion types by age. Notably, adenocarcinomas were most prevalent in older age groups, particularly among patients aged 60–78 years (36 out of 70 cases). This age shift toward malignancy is well-documented in both national and international studies.

Table IV: Distribution of Non-Neoplastic Lesions (N=188)

Diagnosis	Number of Cases	Percentage (%)
Nonspecific colitis	110	55.8
Ulcerative colitis	46	23.3
Tubercular colitis	16	8.1
Crohn's disease	6	3.0
Others	10	5.1
Total	188	100

Non-neoplastic lesions were more prevalent, comprising 188 cases. Nonspecific colitis was the most common diagnosis in this category, observed in 110 cases. Ulcerative colitis, found in 46 cases, showed typical histological patterns such as crypt distortion, basal plasmacytosis, and crypt abscesses. Tubercular colitis, seen in 16 patients, was confirmed with granulomas, caseous necrosis, and acid-fast bacilli on ZN staining. Crohn's disease, although rare (6 cases), exhibited classic transmural inflammation and non-caseating granulomas.

Table V: Distribution of Neoplastic Lesions (N=162)

Diagnosis	Number of Cases	Percentage (%)
Hyperplastic polyp	30	24.2
Adenomatous polyp	38	30.6
Tubulovillous adenoma (HGD)	24	19.4
Adenocarcinoma	70	56.5
Total	162	100

Neoplastic lesions accounted for 162 cases (46.3%). Hyperplastic polyps and adenomatous polyps were common incidental findings. A significant concern was adenocarcinoma, diagnosed in 70 cases (20%).

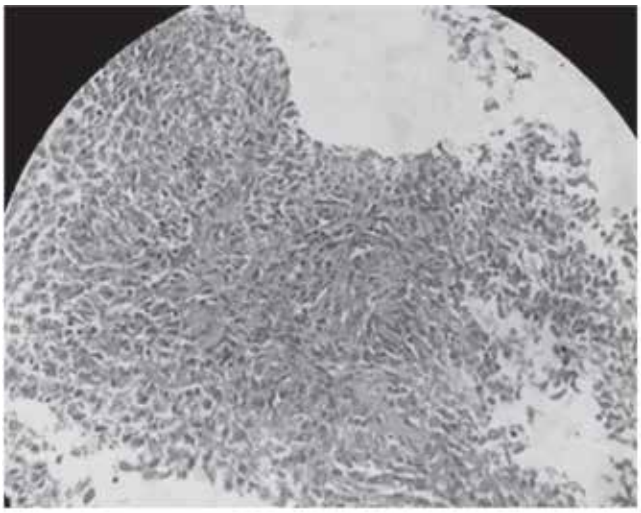

Figure 1: Ileal tuberculosis showing well-formed granulomas with central caseous necrosis (H&E, high power).

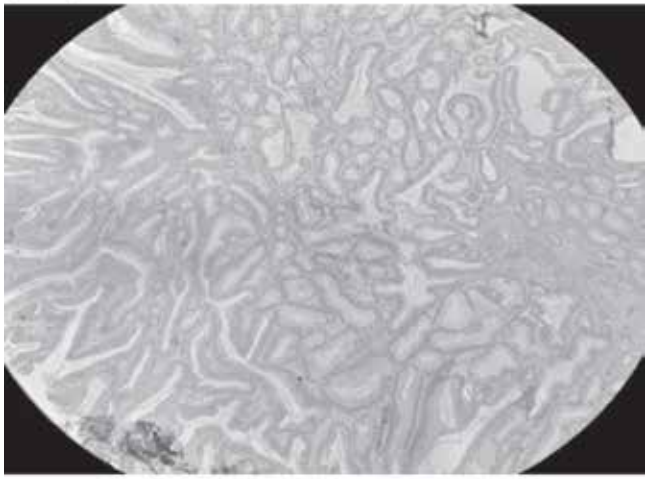

Figure 2: Tubulovillous adenoma with low-grade dysplasia demonstrating glandular crowding and mild cytologic atypia (H&E, low power).

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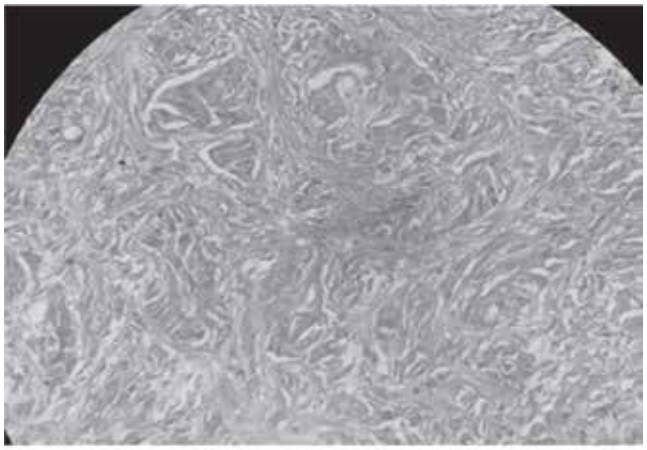

Figure 3: Poorly differentiated adenocarcinoma of colon with solid sheets of pleomorphic cells lacking gland formation (H&E, high power).

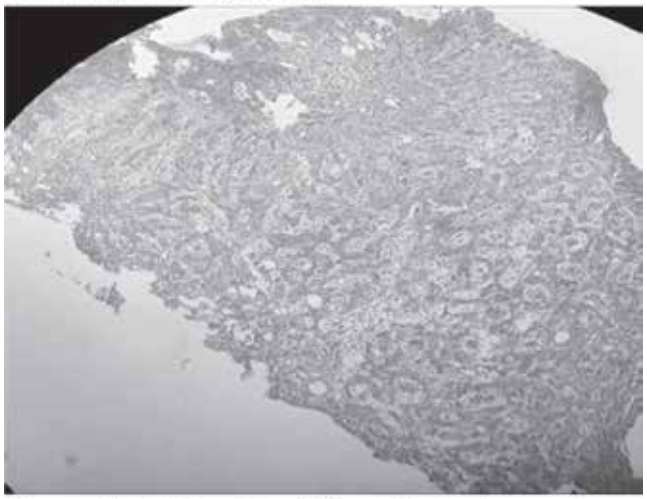

Figure 4: Moderately differentiated adenocarcinoma showing irregular gland formation with nuclear atypia and desmoplastic stroma (H&E, medium power).

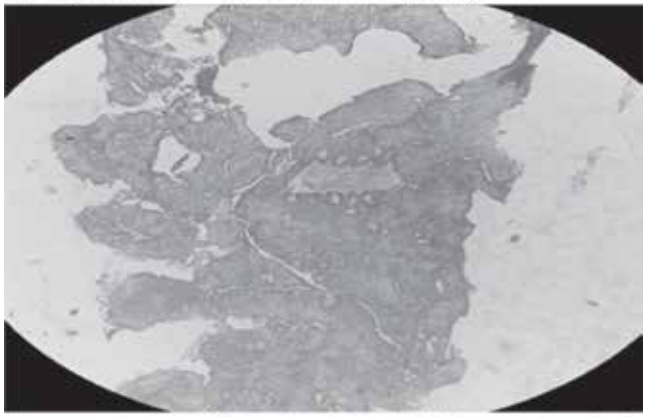

Figure 5: Tubulovillous adenoma with high-grade dysplasia exhibiting complex glandular architecture and marked nuclear atypia (H&E, medium power).

Discussion

The histomorphological spectrum observed in this study reflects the diversity of colonic pathologies encountered in clinical practice. A predominance of inflammatory conditions, particularly nonspecific colitis and ulcerative colitis, highlights the common burden of non-neoplastic colonic diseases in this region. The findings are consistent with several studies conducted in South Asia, where dietary changes, environmental exposure, and socioeconomic factors may influence the inflammatory profile of colonic lesions.[4, 5]

Table I shows the age and gender distribution of the 350 cases, revealing a clear male predominance (74%), and the highest case concentration between 40–60 years. This pattern mirrors the demographic trends seen in Sharma et al.[4] and Gupta et al.[3] indicating a higher vulnerability to both inflammatory and neoplastic lesions among middle-aged males.

Table II presents the lesion-wise distribution, demonstrating that non-neoplastic lesions were more frequent (53.7%) than neoplastic ones. The most common diagnosis was nonspecific colitis (31.4%), followed by ulcerative colitis (13.1%) and adenocarcinoma (20%). Similar distributions were reported by Das et al.and Khan et al.[5] with comparable[8] adenocarcinoma frequencies (19.7% and 18.5%, respectively), reinforcing the diagnostic significance of mucosal biopsies in the Bangladeshi population.

Table III stratifies lesion types by age. Notably, adenocarcinomas were most prevalent in older age groups, particularly among patients aged 60–78 years (36 out of 70 cases). This age shift toward malignancy is well-documented in both national and international studies.[2,7,8] In contrast, nonspecific colitis and ulcerative colitis occurred across age groups but peaked between 40–59 years, aligning with trends in IBD epidemiology reported in the Lancet review by Ng et al.[1]

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The detailed analysis of non-neoplastic lesions in Table IV reveals that ulcerative colitis accounted for 23.3%, and tubercular colitis for 8.1%. While ulcerative colitis is increasingly recognized in urban populations, intestinal tuberculosis remains endemic in South Asia. Confirmatory features such as granulomas and caseous necrosis were supported by Ziehl-Neelsen staining and GeneXpert, as recommended by Yadav et al.[6] and Banerjee et al.[9] Crohn's disease was rare (3%), but its histological overlap with TB necessitated careful [10,11] clinico-pathological correlation.

In Table V, neoplastic lesions are further characterized. Adenocarcinoma (56.5%) was the most common, followed by adenomatous polyps (30.6%) and tubulovillous adenomas (19.4%). This pattern highlights the adenoma-carcinoma sequence, where dysplastic adenomas act as precursors to invasive carcinoma. This has been extensively discussed in studies by Dhingra et al.[12] and Jain et al.[13], emphasizing early detection during colonoscopic screening.

Several cases of adenocarcinoma were initially reported as inconclusive due to limited or superficial biopsies. In such instances, repeat biopsy and immunohistochemistry (IHC) proved indispensable. Markers like CK20, CDX2, and SATB2 aided in establishing colorectal origin, while CEA provided additional clinical relevance. This multidisciplinary approach[14,15] reflects best practices advocated by Ahmed et al.[14,15] and Bhattacharya et al.

A particularly important observation in our study was the impact of clinicianpathologist communication. Several cases initially labeled as "indeterminate" or "suggestive" were later clarified following clinical feedback or endoscopic re-evaluation. This emphasizes the role of clinico-pathological dialogue in maximizing diagnostic accuracy, as also stressed by Verma.[16,17]

The study also reinforces the necessity of adequate biopsy sampling. Suboptimal specimens led to missed or delayed diagnoses, especially in adenocarcinoma cases where submucosal invasion could not be assessed. As Kakar et al[11,18] emphasized, at least 6–7 oriented samples from suspicious areas should be taken, and when warranted, molecular studies and ancillary tests should be employed to enhance diagnostic yield.

Ultimately, while histopathology remains the gold standard, its value is magnified when combined with endoscopic findings, clinical judgment, molecular diagnostics, and IHC techniques. This integrated model fosters earlier diagnosis, better patient stratification, and improved therapeutic planning.

Conclusion

For the diagnosis of inflammatory and malignant gastrointestinal disorders, colonic mucosal biopsies continue to be an essential investigative technique. The use of ancillary tests, sample adequacy, and correlation between histology and clinical and endoscopic findings can all greatly improve diagnostic precision and avoid false negatives or needless procedures.

References

1. Ng SC, Shi HY, Hamidi N, et al. Worldwide incidence and time trends of inflammatory bowel disease in the 21st century: a systematic review of population-based studies. Lancet. 2017; 390(10114): 2769-2778.
2. World Health Organization. Global Cancer Observatory – Colorectal Cancer Factsheet.2021.
3. Gupta A, Varshney S, Mishra R, Srivastava M. Spectrum of colonic pathologies in biopsies: A study of 200 cases. J Med Sci Clin Res. 2017;5(4):20599-20604.
4. Sharma S, Gupta S, Kumari R, Singh P. Histomorphological spectrum of colonic biopsies: A two-year study. Indian J Pathol Oncol. 2018;5(2):230-234.

5. Khan R, Akhtar S, Ahmad A. Histopathological spectrum of colonic biopsies. Int J Contemp Med Res. 2019;6(1):B1-B5.
6. Yadav D, Kedia S, Ahuja V. Tuberculous colitis: Clinical and histological features. Trop Gastroenterol. 2018;39(1):24-29.
7. Bandyopadhyay R, Ghosh S, Nag D. Histopathological evaluation of colonic mucosal biopsies: An institutional experience. Indian J Pathol Microbiol. 2016;59(2):195-200.
8. Das A, Bhattacharya B, Roy S. Pattern of colonic mucosal biopsies: A tertiary center experience. J Clin Diagn Res. 2020;14(5):EC01-EC04.
9. Banerjee S, Khanduri S, Kumar R. Diagnostic utility of GeneXpert in GI tuberculosis. J Lab Physicians. 2019;11(1):34-38.
10. Weinstock LB, Freeman AJ, Terdiman JP. Improving Crohn's disease diagnostic accuracy. Gastroenterology. 2020;158(6):1459-1470.
11. Kakar S, Burgart LJ, Smyrk TC. Diagnostic challenges in inflammatory bowel disease. Mod Pathol. 2019;32(Suppl 1):38-45.
12. Dhingra S, Kumar S, Sharma P. Evaluation of adenomatous polyps: Histology and outcome. J Cancer Res Ther. 2019;15(3):612-615.
13. Jain R, Aggarwal N, Dhingra S. Pitfalls in gastrointestinal biopsy interpretation. Arch Pathol Lab Med. 2018;142(6):699-706.
14. Ahmed F, Rahman Z, Sultana N. Utility of immunohistochemistry in colon pathology. J Pathol Transl Med. 2021;55(2):134-140.
15. Bhattacharya A, Ghosh M, Mitra S. Histopathology in colorectal cancer screening. J Cancer Epidemiol. 2020;2020:1-7.
16. Verma S, Jha AK, Mehrotra A. Improving diagnostic yield in colonic biopsies. J Clin Gastroenterol. 2023;57(1):45-50.
17. Sinha SK, Sharma M, Gupta V. Importance of repeat biopsy in GI pathology. Int J Surg Pathol. 2022;30(2):152-158.
18. Dey P, Das A. Role of ancillary tests in GI biopsies. J Gastrointest Oncol. 2017;8(1):E1-E8.

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