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Research Article

Histomorphological Profile of Lower Gastrointestinal Tract Endoscopic Biopsies in a Tertiary Care Hospital-An Observational Study

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Article Info

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ABSTRACT:

Introduction: A wide spectrum of disease can affect the lower gastrointestinal tract ranging from infections, inflammatory conditions, neoplastic lesions to premalignant and cancerous growth. Lower gastrointestinal endoscopic study is a safe, readily available technique which helps in visualizing the lesions directly and aid in sampling the tissue from the lesions. When these tissues are subjected to histopathological examination accurate diagnosis can be made out. Early correct diagnosis helps in improving the patient's treatment modality and hence increase their lifespan.

Objectives: To study the histo-morphological spectrum of lesions of lower gastrointestinal tract on endoscopic biopsies.

Methods: This observational retrospective study was done in the Department of Pathology, Trichy SRM Medical College, Trichy, Tamil Nadu, India based on the histopathological diagnosis of the lower gastrointestinal endoscopy biopsy samples taken from colon, rectum and anus between June 2023 – May 2025(24 months, 102 cases).Due importance was given to age, sex, biopsy site, histopathological diagnosis and analyzed by descriptive statistics.

Results: Neoplastic lesions (58%) were more common than non-neoplastic lesions (42%). Lesions were maximum in the 7th decade (32%) with male preponderance (62%). Rectum was the most common site of biopsy (39%). Among the non- neoplastic lesions, majority were chronic non- specific colitis. Moderately differentiated adenocarcinoma was the most common malignancy studied.

Conclusions: Endoscopy is a safe tool for initial diagnosis of the lower gastrointestinal lesions. However histopathological examination of the biopsy is paramount to distinguish the neoplastic from non-neoplastic lesions which helps in early accurate management.

Keywords: Colon, Polyp, Anus, Carcinoma, Rectum, Non-neoplastic.

Introduction

Gastrointestinal (GI) tract is anatomically divided into upper gastrointestinal tract and lower gastrointestinal tract with the landmark of insertion of ligament of Treitz [1]. Lower gastrointestinal tract can be affected with a wide spectrum of disease including infection, inflammatory disease, ischemia, vascular pathology, non-neoplastic and neoplastic conditions [2]. Disease affecting the lower gastrointestinal tract leads to more morbidity than mortality [3]. The incidence of colorectal cancer is in rise in the developing countries and their early detection helps in reducing the mortality [4]. Endoscopy is a safe non-invasive procedure which helps in direct visualization of the intestinal mucosa and localize the abnormal area. Biopsy from those abnormal area when subjected to histopathological examination will results in early and accurate diagnosis. Thus histopathological examination of the lower gastrointestinal biopsy helps not only in classification of disease and its progression but also in early detection of malignant transformation of the lesions [5]. Owing to its diagnostic precision, colonoscopic biopsy when combined with histopathological interpretation is said to be the gold standard in the management of lower GI lesions [4]. This study was conducted to emphasize the importance of histopathological examination of lower GI endoscopic biopsies for accurate diagnosis of the lesions which in turn helps the clinicians for further timely management of the patients.

Objectives

To study the gender wise, site wise, age wise distribution of the lower gastrointestinal endoscopic biopsies and also various spectrum of disease arising from lower GI tract based on histomorphology.

Methods

This observational retrospective study was based on the lower GI tract endoscopy biopsy samples sent to the Department of Pathology , Trichy SRM Medical College Hospital & Research Centre, Trichy, Tamilnadu, India for histopathological examination between the period of June 2023 – May 2025(24 months).Study analysis was done in October 2025 after obtaining Institutional Ethical Committee clearance. Ref.No:949/TSRMMCH&RC/ME-1/2025-IEC NO: 227 dated 30.08.2025.102 biopsy samples were included in this study.

Inclusion criteria: Endoscopic biopsy samples taken from colon, rectum and anus.

Exclusion criteria included inadequate biopsy samples, autolyzed samples and all lower gastrointestinal tract resection specimens**.**

Anonymized data retrieved from the electronic record of pathology department of those 102 samples including age, sex, biopsy site and histopathological diagnosis were used in this study.

All 102 biopsies which were fixed in 10 percent neutral buffered formalin were examined grossly and then subjected to tissue processing in automatic tissue processor. In the processor, the specimens were allowed to pass through grades of alcohol, followed by xylene and then the paraffin wax. Tissue fragments were counted and embedded in paraffin wax with mucosal surface facing upwards. Leica microtome RM 2255 were used to cut the blocks perpendicularly at 5 micron thickness. Sections were stained using Haematoxylin and Eosin stain. Stained sections were examined under light microscope by two histopathologists and classified broadly into non-neoplastic and neoplastic conditions. Neoplastic lesions were further classified into benign, premalignant and malignant lesions based on the WHO Classification of tumours of the digestive system-5th edition [6].

All the data (age, gender, biopsy site and histopathological diagnosis) were entered in

Microsoft 365 Excel. Results were expressed in percentage and presented in tabulation.

Results

102 cases were analyzed in this study. Out of these 102 cases 63(62%) were male and 39 (38%) were female (Figure 1).The male to female ratio is 1.6:1.

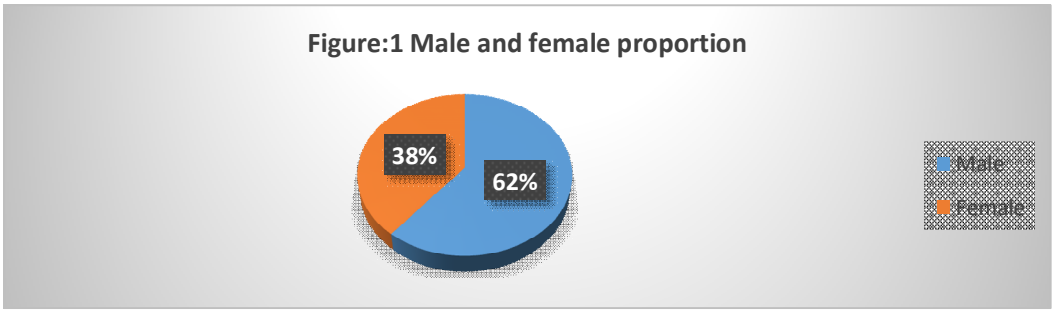


Figure 1: Proportion of male and female in this study.

Age wise distribution of cases in this study varied from 12 years to78 years. Maximum number of cases were reported in the age group of 61-70 years (33 cases, 32%) followed by 51-60 years (25 cases, 24%). Lowest number of cases were reported in the age group of 11-20 years (2 cases,2%) (Table 1).

Table: 1 Age wise distribution of Lower GI endoscopic biopsy samples (n=102)

Age in years	**No. of cases (%)**
11-20	2(2%)
21-30	9(9%)
31-40	14(14%)
41-50	14(14%)
51-60	25(24%)
61-70	33(32%)
71-80	5(5%)
TOTAL	**102(100%)**

Out of 102 cases studied 4 cases (4%) were biopsied from cecum, 22 (21%) from ascending colon, 3 (3%) from transverse colon, 10 cases (10%) from descending colon, 10(10%) from sigmoid colon, 6 (6%) from recto-sigmoid junction, 40 biopsies (39%) from rectum and 7 cases (7%) from anal canal (Figure 2, Table 2).

Figure: 2 Site wise distribution of Lower GI endoscopic biopsy samples (n=102)

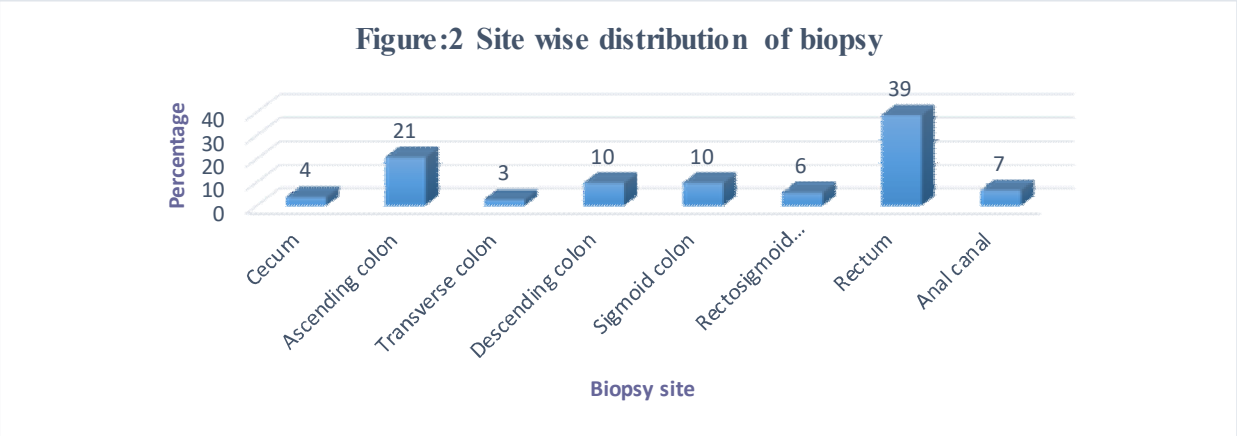
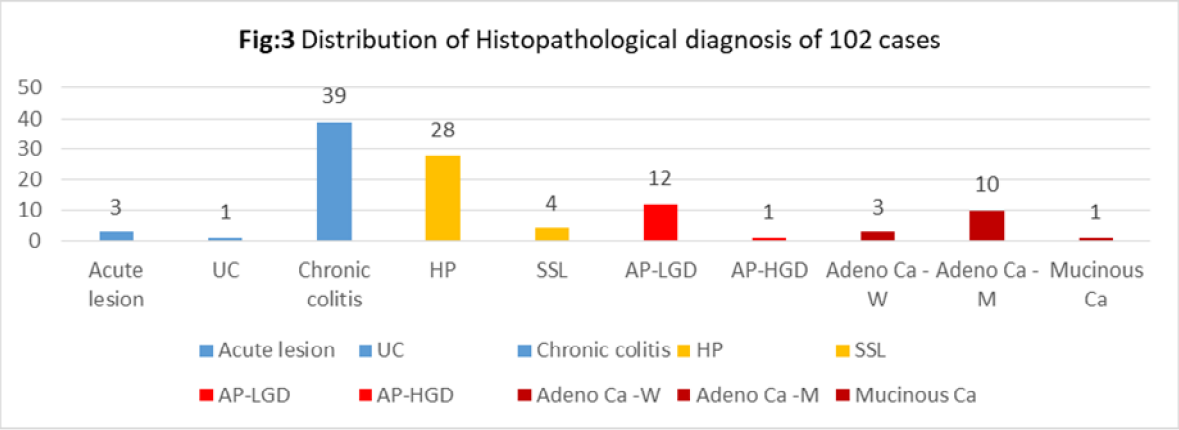


Table: 2 Distribution of number of cases (n=102)

Biopsy site	Non-Neoplastic	Neoplastic			Total (%)
		Benign	Premalignant	Malignant	
Cecum	4	0	0	0	4(4%)
Ascending Colon	9	8	5	0	22(21%)
Transverse	2	0	1	0	3(3%)
Descending	6	2	1	1	10(10%)
Sigmoid	5	4	1	0	10(10%)
Recto-sigmoid junction	4	0	0	2	6((6%)
Rectum	10	16	4	10	40(39%)
Anal canal	3	2	1	1	7(7%)
Total (%)	**43**	**32**	**13**	**14**	**102(100%)**

Out of 102 biopsies 43 cases (42%) were non-neoplastic and 59 cases (58%) were neoplastic in etiology (Figure 3).



(UC-Ulcerative Colitis, HP-Hyperplastic Polyp, SSL-Sessile Serrated Lesion, AP-LGD Adenomatous Polyp with Low Grade Dysplasia, AP-HGD- Adenomatous Polyp with High Grade Dysplasia, Adeno Ca

W-Adeno Carcinoma-Well differentiated, Adeno Ca M- Adeno Carcinoma Moderately differentiated, Mucinous Ca-Mucinous Carcinoma).

The most common biopsy site was rectum with 40 cases (39%) and the least was cecum with 4 cases (4%). Only 4 biopsies were from cecum and all 4 were non-neoplastic with the histopathological diagnosis of chronic non-specific colitis (Table 2).

Distribution of ascending colon biopsies based on histopathological diagnosis:
Among 102 samples 22 were from ascending colon. Out of 22 biopsies 9(41%) were non-neoplastic with the features of chronic nonspecific colitis. 8(36%) were hyperplastic polyp, 5(23%) were tubular adenomatous polyp with low grade dysplasia (Table 3).

Table 3. Distribution of ascending colon biopsies based on histopathological diagnosis (n=22)

Non neoplastic	**Neoplastic-Benign**	**Neoplastic - Premalignant**	**Total (%)**
Chronic nonspecific colitis (%)	Hyperplastic polyp (%)	Tubular adenomatous polyp with low grade dysplasia (%)	
9(41%)	8(36%)	5(23%)	22(100%)

Distribution of transverse colon biopsies based on histopathological diagnosis:
Among 102 cases, only 3 cases were taken from transverse colon out of which 2 cases were chronic non-specific colitis and 1 was tubular adenomatous polyp with low grade dysplasia. (Table 4).
Table 4. Distribution of transverse colon biopsies based on histopathological diagnosis (n=3)

Non neoplastic	**Neoplastic -Premalignant**	**Total (%)**
Chronic nonspecific colitis (%)	Tubular adenomatous polyp with low grade dysplasia (%)	
2(67%)	1(33%)	3(100%)

Distribution of descending colon biopsies based on histopathological diagnosis:
Out of 10 biopsies from descending colon 6(60%) were chronic nonspecific colitis. 2(20%) were hyperplastic polyp, one (10%) was villous adenoma with low grade dysplasia and 1 (10%) was moderately differentiated adenocarcinoma (Table 5).

Table 5. Distribution of descending colon biopsies based on histopathological diagnosis (n=10)

Non neoplastic	Neoplastic-Benign	**Neoplastic- Pre-malignant**	**Neoplastic - Malignant**	**Total (%)**
Chronic nonspecific colitis (%)	Hyperplastic polyp (%)	Villous adenoma with low grade dysplasia (%)	Moderately differentiated adenocarcinoma (%)	
6(60%)	2(20%)	1(10%)	1(10%)	10(100%)

Out of 10 biopsies from sigmoid colon 5(50%) were chronic nonspecific colitis. 4(40%) were hyperplastic polyp and one (10%) was adenomatous polyp with low grade dysplasia (Table 6).

Table 6. Distribution of sigmoid colon biopsies based on histopathological diagnosis (n=10)

Non neoplastic	**Neoplastic -Benign**	**Neoplastic - Premalignant**	**Total (%)**
Chronic nonspecific colitis (%)	Hyperplastic polyp (%)	Adenomatous polyp with low grade dysplasia (%)	
5(50%)	4(40%)	1(10%)	10(100%)

A total of 6 biopsies were sampled from recto-sigmoid junction. Of which 4 (67%) were chronic nonspecific colitis. One (16.5%) was well differentiated adenocarcinoma and one (16.5%) was moderately differentiated adenocarcinoma (Table 7).

Table 7. Distribution of recto-sigmoid junction biopsies based on histopathological diagnosis (n=6).

Non neoplastic	Neoplastic -Malignant		**Total (%)**
Chronic nonspecific colitis (%)	Well differentiated adenocarcinoma (%)	Moderately differentiated adenocarcinoma (%)	
4(67%)	1(16.5%)	1(16.5%)	6(100%)

40 biopsies were sampled from rectum.10 out of 40 biopsies were non-neoplastic. Among those 10(25%) non-neoplastic cases 9(22.5%) were diagnosed as chronic non-specific proctitis and 1(2.5%) was ulcerative colitis without any evidence of dysplasia.16 cases(40%) were reported as benign and among those benign conditions 12 cases (30%) were reported as hyperplastic polyp,4 (10%) were diagnosed as sessile serrated lesion without any dysplasia.

Premalignant cases diagnosed were only 4(10%) of which 3(7.5%) were tubulo-villous adenoma with low grade dysplasia and 1(2.5%) was tubulo-villous adenoma with high grade dysplasia.

A total of 10 cases (25%) were diagnosed as malignant of which 2 cases (5%) were well differentiated adenocarcinoma, 7(17.5%) were moderately differentiated adenocarcinoma and 1(2.5%) was mucinous adenocarcinoma. (Table 8).

Table 8. Distribution of rectal biopsies based on histopathological diagnosis (n=40)

Category	**Histopathological diagnosis**	**Number of cases (%)**	**Total (%)**
Non neoplastic	Chronic nonspecific proctitis	9 (22.5%)	10(25%)
	Ulcerative colitis	1 (2.5%)	
Neoplastic-Benign	Hyperplastic polyp	12 (30%)	16(40%)
	Sessile Serrated Lesion without dysplasia	4 (10%)	
Neoplastic -	Tubulo-villous adenoma –low grade	3 (7.5%)	

Pre-malignant	dysplasia		4(10%)
	Tubulo-villous adenoma –high grade dysplasia	1 (2.5%)	
Neoplastic-Malignant	Well differentiated adenocarcinoma	2 (5%)	10(25%)
	Moderately differentiated adenocarcinoma	7 (17.5%)	
	Mucinous adenocarcinoma	1(2.5%)	
Total		**40 (100%)**	**40 (100%)**

7 biopsies were taken from the anal canal. 3 (43%) were reported as acute suppurative lesion, 2(29%) were diagnosed as hyperplastic polyp, 1 case (14%) was adenomatous polyp with low grade dysplasia and one (14%) was moderately differentiated adenocarcinoma (Table.9).

Table 9. Distribution of anal canal biopsies based on histopathological diagnosis (n=7)

Non neoplastic	**Neoplastic-Benign**	**Neoplastic-Premalignant**	**Neoplastic-Malignant**	**Total (%)**
Acute suppurative lesion (%)	Hyperplastic polyp (%)	Adenomatous polyp with low grade dysplasia (%)	Moderately differentiated adenocarcinoma (%)	
3(43%)	2(29%)	1(14%)	1(14%)	7(100%)

Discussion

Desormeaux coined the term endoscopy from Greek word “endo” means “within” and “skopein” meaning “to view” [7]. Endoscopy helps in direct visualization of the internal organs and to target the abnormal diseased area. Biopsy from the abnormal area when subjected to histopathological examination helps in correct diagnosis and proper management. Details like age, sex of the patient, exact site of biopsy and endoscopic findings are essential for the accurate histopathological diagnosis. Thus histopathological examination of the gastrointestinal biopsy is considered to be the gold standard method of diagnosing gastrointestinal pathology [8].

In this study lower gastrointestinal tract disease were more commonly seen in male (62%). Similar finding was observed in the study done by Binayke et al [3], Kulkarni P et al [8], Bhagyalaxmi et al [9] Vani B et al [10] and Sheikh B et al [11]. This shows that lower gastrointestinal disorders were more common in male when compared to female in the above mentioned study populations. Reason can be due to lifestyle and metabolic factors.

Lowest age involved in this study was 12 years and highest was 78 years. Peak incidence was seen in 61-70 years and the least in 11-20 years. However study by Binayke R et al [3] had peak incidence of 41-50 years. Study by Sharma V et al [12] showed peak incidence age of 31 -40 years. This shows that the incidence of lower gastrointestinal lesions in this study population had occurred little late than the other mentioned studies.

Rectum was the commonest site of biopsy in this study. Similar finding was observed in the study done by Binayke R et al [3]. However studies by Trisal M et al [13], Joshi H et al [14] and Sharma V et al [12] had colon as the most common site of biopsy.

This study had predominance of neoplastic cases (58%) than the non- neoplastic cases (42%). Similar findings were observed in study done by Vani B et al [10] and Sheikh B et al [11]. But studies by Geetha C et al [15] and Rajeswari et al [16] showed non-neoplastic lesions were more common than the neoplastic lesions. Reason can

be due to environments factors, food habits and the personal habits of the population involved in each study.

Chronic non-specific colitis was the commonest histopathological non-neoplastic diagnosis of the biopsies taken from ascending, transverse, descending and sigmoid colon. Only one case of ulcerative colitis was reported in rectal biopsy indicating that this study population are not vulnerable for ulcerative colitis. Ulcerative colitis is generally attributed to genetic and environmental factors. However changeover to western diet can increase the incidence of ulcerative colitis.

Majority of the cases were biopsied for polypoid/ulcerated growth and sent for histopathological examination. Hyperplastic polyp was the commonest benign epithelial polyp reported in this study. Small hyperplastic polyps have no substantial malignant potential [6]. Few cases of sessile serrated lesions without any evidence of dysplasia were also reported in this study. Hyperplastic polyps and sessile serrated lesions are classified under benign epithelial tumours and precursors as per WHO Classification of tumours of the digestive system based on the identification of BRAF mutation in the lesions [6, 17]. Adenomatous polyp with low grade dysplasia was the commonest premalignant case diagnosed in this study. Lower gastrointestinal endoscopic biopsy plays a vital role in diagnosing premalignant lesions. When the polyps are identified in pre-malignant phase, only excision of the polyp can cure the disease. However when it progressed to high grade dysplasia with invasion of the muscle layer, then treatment becomes extensive including colectomy depending upon the final stage of the tumor.

Only 14 cases of carcinoma were reported in this study and among these 14 cases moderately differentiated adenocarcinoma (10 cases) was the commonest malignancy reported. Similar observation was seen in studies done by Sheikh B et al [11], Laishram RS et al [18], Shefali .H. Karve et al [19]. Other tumors like lymphomas, neuroendocrine tumors, sarcomas and melanoma were not reported in this study.

Limitations: The limitations of this study were the sample size and the study population. Sample size was small (102 cases) and this study was performed in only one geographical area.

Conclusion:

Lower gastrointestinal tract have a wide spectrum of histomorphological profile ranging from inflammatory disease, infectious disease benign, premalignant to malignant lesions. This study emphasizes the importance of lower gastrointestinal endoscopy examination and histopathological study of those samples for accurate diagnosis. Correct histopathological diagnosis helps the clinicians to implement appropriate treatment plan for the patient which in turn improves the patient's lifespan.

Disclosure statements

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Conflict of Interest: The authors declare that there are no conflicts of interest

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Declaration of Non-Use of AI: The authors confirm that no artificial intelligence tools were used in this study.

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