



HISTOMORPHOLOGICAL SPECTRUM OF GASTROINTESTINAL LESIONS IN A TERTIARY CARE CENTRE: A RETROSPECTIVE STUDY

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ABSTRACT

Background: Gastrointestinal (GIT) lesions comprise a wide spectrum of conditions ranging from inflammatory and benign disorders to premalignant and malignant neoplasms. These lesions significantly contribute to global morbidity and mortality. Due to overlapping clinical and radiological features, histopathological examination remains the gold standard for accurate diagnosis. **Aim:** To evaluate the histo-morphological spectrum of gastrointestinal lesions in a tertiary care centre (Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh) over a period of four years, with emphasis on their frequency, distribution, and pathological characteristics. **Methods:** This retrospective study included 518 gastrointestinal specimens received in the Department of Pathology over four years. Relevant clinical details were obtained from hospital records. Specimens were fixed in 10% formalin, routinely processed and embedded in paraffin. Sections were stained with hematoxylin and eosin and examined microscopically. Special stains were applied wherever necessary. **Results:** Non-neoplastic lesions constituted the majority of cases, reflecting the high prevalence of inflammatory conditions. The large intestine and anorectum constituted the most frequently represented combined anatomical site (212 cases), closely followed by the appendix (210 cases). Neoplastic lesions were fewer but clinically significant, with adenocarcinoma of the colon and rectum being the most frequent malignancy. Other lesions included benign polyps and rare tumors such as neuroendocrine tumors. Lesion distribution varied with anatomical site and age group. **Conclusion:** A wide spectrum of gastrointestinal lesions was observed in this study. Histopathological evaluation remains essential for definitive diagnosis and management. Early detection of premalignant and malignant lesions is crucial for improving patient outcomes.

KEYWORDS : Gastrointestinal Lesions; Adenocarcinoma; Appendicitis; Hemorrhoids

INTRODUCTION

Gastrointestinal (GIT) lesions represent a wide range of conditions, from common inflammatory and infective diseases to benign growths and malignant tumors [1,2]. Due to the complex structure of the gastrointestinal tract, these lesions can arise from epithelial, mesenchymal, lymphoid, or neuroendocrine tissues, each showing distinct morphological and biological behavior [3,4].

With the increasing use of endoscopy and colonoscopy, early detection of GIT lesions has improved significantly. Endoscopic biopsy plays a key role in identifying mucosal abnormalities and detecting premalignant and malignant changes at an early stage [3,5]. However, histopathological examination continues to be the gold standard for definitive diagnosis, as it enables accurate classification and guides appropriate clinical management [6,7].

Gastrointestinal malignancies contribute substantially to the global cancer burden. Colorectal carcinoma, in particular, is among the most commonly diagnosed cancers and a leading cause of cancer-related deaths worldwide [8,9]. In developing countries such as India, its incidence is rising, possibly due to changing dietary habits, urbanization, and lifestyle factors [1,2].

Studies from tertiary care centres have shown that non-neoplastic lesions such as appendicitis and gastritis are more frequently encountered, whereas neoplastic lesions, though fewer, are clinically significant [1,2,5]. Among malignant tumors, adenocarcinoma is the most common histological subtype, especially involving the colon and rectum [6,10].

In this context, the present study was undertaken to evaluate the histomorphological spectrum of gastrointestinal lesions over a four-year period in a tertiary care centre (Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh), with

emphasis on age distribution, site predilection, and histopathological patterns.

MATERIALS AND METHODS

Study Design and Setting

This retrospective descriptive study was conducted in the Department of Pathology, Chhattisgarh Institute of Medical Sciences (CIMS), Bilaspur, Chhattisgarh, India, over a four-year period from March 2021 to March 2025. All consecutive gastrointestinal tract and gallbladder specimens received for histopathological examination during the study period were assessed for eligibility.

A total of 530 cases were assessed for eligibility. After application of the predefined inclusion and exclusion criteria, 12 cases with inadequate or insufficient tissue were excluded, and 518 cases were included in the final analysis.

Inclusion and Exclusion Criteria

All endoscopic biopsies and surgically resected specimens from the gastrointestinal tract and gallbladder with adequate representative tissue, satisfactory preservation, and sufficient clinical information for histopathological assessment were included.

Specimens with insufficient or non-representative tissue precluding a definitive histopathological diagnosis, marked autolysis or poor preservation, or inadequate essential clinical information were excluded.

Anatomical Scope

The study included specimens from the appendix, gallbladder, stomach, small intestine, large intestine, and anorectal region. The study cohort comprised 210 appendiceal, 62 gallbladder, 18 gastric, 16 small intestinal, and 212 large intestinal/anorectal specimens.

Specimens from the esophagus, liver, pancreas, and jejunum were not represented because no eligible biopsy or surgical specimens from these sites were received during the study period. Similarly, uncommon mesenchymal neoplasms, including gastrointestinal stromal tumours, were not represented in the available study material.

Specimen Processing and Histopathological Examination

Specimens were fixed in 10% neutral buffered formalin and subjected to routine gross examination. Gross examination included assessment of specimen dimensions, external surface, cut-surface characteristics, wall thickness, and pathological lesions such as masses, ulceration, mucosal abnormalities, or areas of wall thickening.

Representative sections were taken from the lesion, surgical margins in resection specimens, and adjacent uninvolved tissue wherever appropriate. The tissues were processed routinely and embedded in paraffin. Sections of 4-5 micrometre thickness were prepared and stained with hematoxylin and eosin (H&E). Available special-stain and immunohistochemistry slides and reports were reviewed in cases in which these ancillary investigations had been performed for diagnostic confirmation.

Histopathological Classification and Terminology

Histopathological diagnoses were established from microscopic morphological features and, where available, supported by special stains and immunohistochemistry. Neoplastic lesions were categorised according to the 2019 World Health Organization Classification of Tumours of the Digestive System. Lesions designated as neoplasms in the final histopathology diagnosis, including low-grade appendiceal mucinous neoplasm and intracholecystic papillary-tubular neoplasm, were included in the neoplastic category.

Slide Review

Available H&E-stained slides were retrieved and re-reviewed by the study pathologists in conjunction with the clinical information and original histopathology reports. Available special-stain and immunohistochemistry slides were also reviewed where performed. The diagnosis recorded after slide review was used for categorisation and analysis.

Data Collection and Statistical Analysis

Clinical and demographic details, including age, sex, anatomical site, clinical diagnosis, and final histopathological diagnosis, were obtained from histopathology requisition forms, histopathology records, and available hospital records. Data were entered in Microsoft Excel and analysed using IBM SPSS Statistics, version 25.0 (IBM Corp., Armonk, NY, USA).

Categorical variables were summarised as frequencies and percentages. Lesion distributions were described by anatomical site, age group, sex, and histopathological category. No inferential statistical tests were performed.

RESULTS

A total of 518 gastrointestinal specimens were analyzed over a period of four years. Non-neoplastic lesions constituted the majority of cases, while neoplastic lesions, although fewer, were clinically significant.

Age Distribution

The highest number of cases was observed in the 20–30 years age group, followed by 30–40 and 40–50 years. Cases at the extremes of age were relatively uncommon. Non-neoplastic lesions were more frequently seen in younger individuals, whereas neoplastic lesions showed a higher prevalence in middle-aged and elderly patients.

Site-wise Distribution

The large intestine and anorectum constituted the most frequently represented combined anatomical site, comprising 212 cases (40.9%), closely followed by the appendix with 210 cases (40.5%). Other sites included the gallbladder (62 cases, 12.0%), stomach (18 cases, 3.5%), and small intestine (16 cases, 3.1%).

Appendix

Among 210 appendiceal specimens, 207 were non-neoplastic, predominantly acute appendicitis. Only 3 cases were neoplastic, including two low-grade appendiceal mucinous neoplasms (LAMN) and one Appendiceal neuroendocrine tumour (NET). Most cases occurred in the second and third decades of life.

Gallbladder

Of the 62 gallbladder specimens, 59 showed chronic cholecystitis. Three cases were neoplastic, comprising two adenocarcinomas (pancreatobiliary type) and one intracholecystic papillary-tubular neoplasm (ICPN). A clear female predominance was observed.

Stomach

Out of 18 gastric cases, 15 were inflammatory (gastritis), while 3 were malignant. The malignant lesions included two diffuse-type adenocarcinomas and one case of gastric mucosa-associated lymphoid tissue (MALT) lymphoma. Most cases were seen in the 40–60 years age group.

Small Intestine

Among 16 small intestinal specimens, 13 cases were Meckel's diverticulitis. The remaining included three ileal neuro-endocrine tumors.

Large Intestine and Anorectum

A total of 212 cases were reported from this region. Hemorrhoids accounted for the majority (170 cases), followed by sigmoid volvulus (7 cases). The remaining cases were neoplastic, including well-differentiated, moderately differentiated and mucinous adenocarcinomas, along with neuro-endocrine tumors. These lesions were more common in middle-aged and elderly individuals.

Histopathological Figures

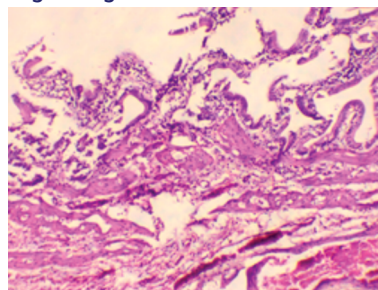


Figure 1: Gallbladder Adenocarcinoma (H&E, 40x) Showing Dysplastic Mucoid Epithelium with Tumor Invasion.

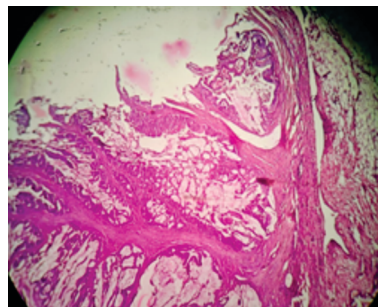


Figure 2: Gallbladder Adenocarcinoma (H&E, 10x)

Showing Irregular, Crowded and Angulated Malignant Glands Infiltrating the Fibrovascular Stroma, with architectural distortion and cytological atypia

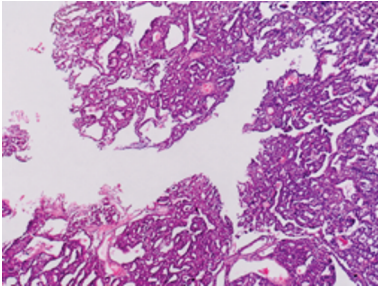


Figure 3: Mucinous Adenocarcinoma of the Colon (H&E, 10×) Showing Abundant Extracellular Mucin Pools Containing Malignant Glandular Epithelial Cells with Infiltrative Growth.

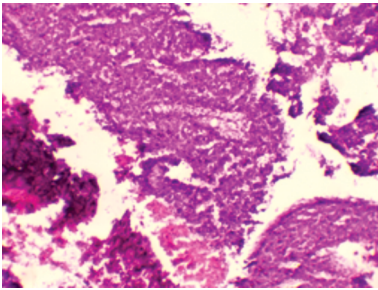


Figure 4: Mucinous Adenocarcinoma (H&E, 40×) Showing Malignant Glands and Cells within Abundant Extracellular Mucin.

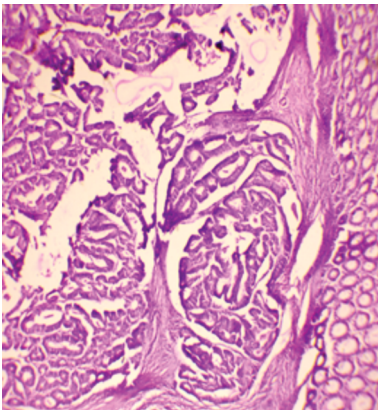


Figure 5: Well-differentiated Adenocarcinoma of Sigmoid Colon (H&E, 40×) Showing Closely Packed Malignant Glands with Infiltrative Growth



Figure 6: Well-differentiated Adenocarcinoma of Sigmoid Colon (H&E, 10×) Showing Closely Packed Malignant Glands with Infiltrative Growth.

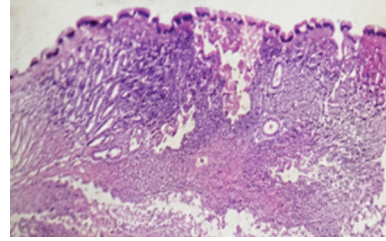


Figure 7: Gastric MALT Lymphoma (H&E, 10×) Showing Dense Lymphoid Infiltration of the Gastric Mucosa with Architectural Effacement.

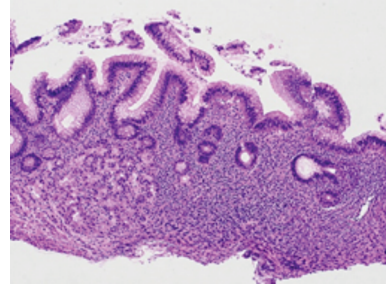


Figure 8: Gastric MALT Lymphoma (H&E, 40×) Showing Dense Monomorphic Lymphoid Infiltration of the Lamina Propria with Lymphoepithelial Lesions.

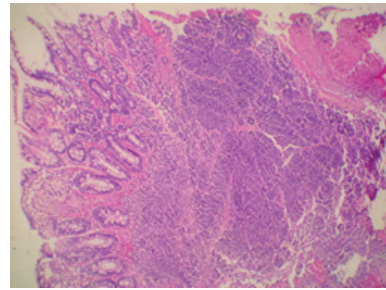


Figure 9: Ileal Neuroendocrine Tumor (H&E, 10×) Showing Nests and Trabeculae of Tumor Cells Infiltrating the Intestinal Wall.

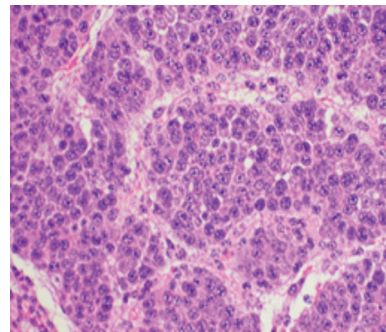


Figure 10: Ileal Neuroendocrine Tumor (H&E, 40×) Showing Nests and Trabeculae of Uniform Tumor Cells with Round Nuclei and Finely Granular ("Salt-and-Pepper") Chromatin

Table - 1: Age-wise Distribution of Gastrointestinal Lesions

Age Group (Years)	Ap-pendix	Gall- bladder	Sto- mach	Small Intestine	Large Intestine & Anorectum	Total
1-09	2	0	0	1	0	3
10-19	65	5	0	0	5	75
20-29	57	10	2	2	55	126
30-39	43	15	0	2	38	98
40-49	25	20	7	0	33	85
50-59	13	3	5	1	30	52
60-69	5	7	3	1	38	54
>70	0	2	0	0	13	15
Total	210	62	18	16	212	518

Table - 2: Age and Sex Distribution by Major Site

Site	Total, n	Age distribution	Male, n (%)	Female, n (%)	Sex pattern
Appendix	210	Pre-dominantly in the second and third decades	125 (59.5%)	85 (40.5%)	Male predominance
Gall-bladder	62	Most cases in 20–50 years	24 (38.7%)	38 (61.3%)	Female predominance
Stomach	18	Most cases in 40–60 years	11 (61.1%)	7 (38.9%)	Male predominance
Small intestine	16	Most cases in 20–40 years	10 (62.5%)	6 (37.5%)	Male predominance
Large intestine and anorectum	212	Higher incidence in middle-aged and elderly individuals	140 (66.0%)	72 (34.0%)	Male predominance
Total	518	—	310 (59.8%)	208 (40.2%)	-

Table - 3: Distribution of GIT Lesions According to Site and Type

Site	Total Cases	Non-Neoplastic Lesions	Neoplastic Lesions
Appendix	210	207 (Appendicitis)	3
Gallbladder	62	59 (Cholecystitis)	3
Stomach	18	15 (Gastritis)	3
Small Intestine	16	14	2
Large Intestine & Anorectum	212	177	35
Total	518	472 (91.1%)	46 (8.9%)

Table - 4: Distribution of Lower GIT (Jejunum to Anal Canal) Neoplasms By Histological Type

Histological Type	Number of Cases
Well-differentiated adenocarcinoma (colon)	10
Moderately differentiated adenocarcinoma (colon)	8
Well-differentiated adenocarcinoma (rectum)	4
Moderately differentiated adenocarcinoma (rectum)	3
Mucinous adenocarcinoma (rectum)	3
Adenocarcinoma with Squamous Intraepithelial lesions (SIL) II/III (anal canal)	1
Neuroendocrine tumor (ileum)	3
Invasive neoplasia (sigmoid colon)	3
Total	35

DISCUSSION

The present study provides a comprehensive overview of the histomorphological spectrum of gastrointestinal (GIT) lesions encountered in a tertiary care centre (Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh) over a four-year period. The findings highlight the predominance of non-neoplastic lesions, with neoplastic lesions forming a smaller but clinically important subset. This pattern is consistent with observations from several similar studies, where inflammatory conditions constitute the bulk of gastrointestinal pathology.

In the current study, non-neoplastic lesions accounted for 91.1% of cases, emphasizing the high burden of inflammatory and infective conditions in routine clinical practice. Appendicitis and hemorrhoids were the most common lesions, reflecting their frequent occurrence in the general population.

Similar findings have been reported in studies by Krishnappa et al. and Thakur et al., where appendiceal and colorectal inflammatory conditions were the leading diagnoses. The high frequency of these lesions may be attributed to dietary habits, infections and lifestyle-related factors prevalent in developing regions.

Age-wise distribution in this study showed that the majority of cases occurred in younger age groups (20–40 years), predominantly representing non-neoplastic conditions such as appendicitis. In contrast, neoplastic lesions were more commonly observed in middle-aged and elderly individuals. This age-related shift is well documented in the literature and reflects the cumulative effect of genetic mutations, environmental exposures and chronic inflammation in carcinogenesis.

Site-wise analysis revealed that the large intestine and anorectum constituted the most frequently represented combined anatomical site, with 212 cases (40.9%), closely followed by the appendix with 210 cases (40.5%). The high representation of appendiceal specimens was largely attributable to the frequent occurrence of appendicitis, whereas hemorrhoids constituted the predominant lesion within the large intestine and anorectum. Notably, the large intestine and anorectum accounted for the highest number of neoplastic lesions in the present study. Adenocarcinoma emerged as the predominant malignant histological subtype, particularly involving the colon and rectum, consistent with previously reported patterns.

Gallbladder lesions in the present study were largely non-neoplastic, with chronic cholecystitis being the most frequent finding and a notable female predominance. This observation aligns with the known higher incidence of gallbladder disease in females, often related to hormonal and metabolic factors. Although neoplastic lesions were relatively few, the presence of adenocarcinoma highlights the need for careful histopathological evaluation of all cholecystectomy specimens.

Gastric lesions were predominantly inflammatory, with a smaller proportion of malignant cases, including diffuse-type adenocarcinoma and MALT lymphoma. The occurrence of gastric malignancies in the 40–60 years age group is in agreement with previously published studies. Similarly, small intestinal lesions were uncommon and mostly non-neoplastic, with occasional neuroendocrine tumors, which are known for their relatively indolent but clinically significant behavior.

An important finding of this study is the diverse histological spectrum of neoplastic lesions, including adenocarcinomas of varying differentiation, mucinous variants and neuroendocrine tumors. Although these lesions constituted only 8.9% of cases, their clinical significance lies in their potential for morbidity and mortality. Early detection through histopathological examination plays a crucial role in improving patient outcomes.

The present study reinforces the importance of histopathology as the gold standard for diagnosis of gastrointestinal lesions. Despite advances in endoscopic and imaging techniques, definitive diagnosis and classification rely on microscopic evaluation. Furthermore, the study highlights the need for routine examination of all surgical specimens, as even clinically unsuspected neoplastic lesions may be detected.

However, the study has certain limitations. Being a retrospective, single-centre study, it may not fully represent the broader population. Additionally, the lack of follow-up data limits assessment of clinical outcomes and prognostic correlations.

Comparison with Other Studies

The findings of the present study were compared with previously published studies conducted in tertiary care centres. Similar to the observations reported by Bamanikar et al., Prasaad et al. and Das et al. [2,5,11], non-neoplastic lesions constituted the majority of gastrointestinal pathology specimens in our study. Adenocarcinoma was consistently

identified as the most common malignant lesion across most studies, particularly involving the colon and rectum. The present study also demonstrated similar demographic and histopathological patterns, thereby reinforcing the reliability and reproducibility of these observations in different populations.

Table - 5: Comparison of Present Study with Other Published Studies

Study	Study Period / Sample Size	Predominant Site Involved	Most Common Non-Neoplastic Lesion	Most Common Malignant Lesion	Key Findings	Correlation with Present Study
Prasaad et al. ² (2016)	4 years / 510 cases	Gallbladder & Colon	Cholecystitis	Adeno-carcinoma	Majority lesions were non-neoplastic. Malignant lesions were predominantly colorectal adenocarcinoma.	Similar findings were observed in our study with inflammatory lesions outnumbering neoplastic lesions.
Thakur et al. ⁵ (2016)	Rural tertiary centre / Variable cases	Large intestine	Inflammatory lesions	Adeno-carcinoma	Higher frequency of colorectal lesions with male predominance.	Present study also showed male predominance in lower GIT malignancies.
Das et al. ¹³ (2016)	4 years / Large epidemiological study	Colon & Rectum	Polyps and inflammatory lesions	Adeno-carcinoma	Colorectal region constituted major burden of neoplastic lesions.	Present study similarly demonstrated adenocarcinoma as the predominant lower GIT malignancy.
Bamanikar et al. ³ (2019)	4 years / 3738 cases	Appendix	Appendicitis	Adeno-carcinoma	Non-neoplastic lesions constituted majority (94.5%). Adenocarcinoma was most common malignancy.	Present study also demonstrated predominance of inflammatory lesions with adenocarcinoma as the commonest malignancy.
Parvathidevi et al. ¹⁴ (2023)	2 years / 510 cases	Gallbladder	Chronic cholecystitis	Adeno-carcinoma	Non-neoplastic lesions formed 89.3% of cases. Adenocarcinoma predominated among malignancies.	Comparable distribution pattern was observed in present study.
Present Study	4 years / 518 cases	Large intestine & anorectum, followed closely by appendix	Appendicitis and hemorrhoids	Adeno-carcinoma of colon and rectum	Non-neoplastic lesions constituted 91.1% of cases. Large intestine and anorectum was the most frequently represented combined anatomical site, closely followed by the appendix. Rare lesions such as appendiceal neuroendocrine tumour (NET), low-grade appendiceal mucinous neoplasm (LAMN), intracholecystic papillary-tubular neoplasm (ICPN), and ileal neuroendocrine tumours were also identified.	—

CONCLUSION

The present study highlights the wide histomorphological spectrum of gastrointestinal lesions encountered in a tertiary care setting, with non-neoplastic conditions accounting for the majority of cases. The large intestine and anorectum constituted the most frequently represented combined anatomical site, closely followed by the appendix. Appendicitis and hemorrhoids were the most commonly observed individual lesions, while adenocarcinoma, particularly involving the colon and rectum, was the predominant malignant tumour. Although less frequent, clinically significant lesions such as appendiceal neuroendocrine tumour (NET), low-grade appendiceal mucinous neoplasm (LAMN), intracholecystic papillary-tubular neoplasm (ICPN), ileal neuroendocrine tumours, and

gastric MALT lymphoma were also identified. These findings emphasize the important role of histopathological examination in establishing accurate diagnoses and detecting clinically significant neoplastic lesions. Further multicentric studies with larger patient populations and longer follow-up are warranted to better characterize the spectrum and clinical significance of gastrointestinal lesions.

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