(RESEARCH ARTICLE)

Histopathological patterns of gastrointestinal lesions: Insights from a Tertiary Care Centre

Meghna Yadav *, Anjana Arya and Nitesh Mohan

Department of Pathology, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India.

Abstract

Gastrointestinal (GI) lesions are a common clinical concern with significant implications for patient health, particularly in cases involving malignancies. Understanding the histopathological spectrum of these lesions is crucial for improving diagnosis and treatment strategies. This study aimed to investigate the histopathological spectrum of gastrointestinal lesions at a tertiary care center, focusing on the prevalence of different types of lesions and their distribution according to clinicopathological parameters. Methods: This cross-sectional study was conducted over a one-year period, from November 2022, to October 2023, at the Department of Pathology, Rohilkhand Medical College and Hospital, Bareilly, UP. A total of 100 patients with clinically suspected GI lesions were included. Biopsy specimens were collected and analyzed using standard histopathological techniques. The data were analyzed to determine the frequency of different types of GI lesions and their correlation with clinical features. Results: The study found that inflammatory lesions were the most prevalent, accounting for 57% of the cases. Malignant lesions were identified in 35% of the patients, with adenocarcinoma being the most common malignancy, especially in the colon, representing 57.14% of malignant cases. The small intestine was the most frequently affected anatomical site, involved in 33% of the cases, followed by the appendix at 22%. The majority of patients were middle-aged males, with a significant correlation between the type of lesion and gender. Conclusion: This study highlights the significant burden of gastrointestinal lesions, particularly inflammatory and malignant lesions, in the studied population. The findings underscore the importance of early detection and intervention to prevent the progression of these lesions, particularly in high-risk groups such as older males. Enhanced clinical management strategies are needed to address the substantial impact of GI pathologies on patient health.

Keywords: Histopathology; Adenocarcinoma; Gastrointestinal Lesions; Biopsy

1. Introduction

Gastrointestinal (GI) disorders represent some of the most prevalent conditions encountered in clinical practice. The GI tract, comprising anatomically distinct segments such as the esophagus, stomach, small intestine, colon, rectum, and anus, is susceptible to a wide range of pathologies, including neoplastic, inflammatory, and congenital disorders.[1] These conditions can manifest independently or affect multiple segments of the GI tract concurrently. Globally, gastrointestinal cancers are a significant cause of morbidity and mortality, accounting for approximately 12.9% of all malignancies.[2] The incidence of GI cancers is on the rise, with gastric cancer ranking as the fourth most common cancer worldwide and esophageal cancer as the ninth. In India, GI malignancies contribute to 182,000 of the approximately 682,000 annual cancer-related deaths.[3] The stomach, a distensible organ responsible for the mechanical and chemical breakdown of food into chyme, is frequently affected by various lesions, including gastritis and neoplastic tumors. The most common type of neoplastic tumor found in the stomach is adenocarcinoma.[4] The early detection and management of GI lesions, particularly malignancies, are crucial for improving patient outcomes. Histopathology remains the gold standard for the diagnosis and prognostication of GI tract lesions [5], enabling the detection of early mucosal changes, such as dysplasia

---

* Corresponding author: Meghna Yadav

and metaplasia, which are critical for preventing disease progression. This study aims to explore the histopathological spectrum of gastrointestinal lesions, providing valuable insights into the prevalence and types of GI disorders encountered in a tertiary care setting. By analyzing these lesions, the study seeks to enhance the understanding of GI pathologies and contribute to the optimization of clinical management strategies.

Aim and Objectives

The study was carried out to determine the spectrum of histopathological lesions of the gastrointestinal tract and to document the prevalence and distribution of gastrointestinal lesions according to clinicopathological parameters.

2. Methodology

2.1. Study Design, Place and Duration

A Cross-sectional study was carried out on 100 cases at Department of Pathology, Rohilkhand Medical College and Hospital, Bareilly, UP for One year (November 2022 - October 2023).

2.2. Procedure

Specimen were fixed in 10% NBF, Gross examination was done following standard protocols and subsequently tissue processing, embedding and sectioning, deparaffinization and rehydration done and finally sections were stained with HandE Staining technique.

2.3. Inclusion Criteria

All small and large specimens of GI lesions, including those of the oesophagus, stomach, and intestines, from patients of any age and gender received in department of pathology, RMCH, Bareilly for histopathological examination.

2.4. Exclusion Criteria

Inadequate biopsies or those previously reported and the biopsies from the oral cavity, pharynx, and anus.

2.5. Ethical Approval

The study was conducted after obtaining approval from the Institutional Ethics Committee of Rohilkhand Medical College and Hospital, Bareilly, UP. Informed consent was obtained from all patients before the collection of biopsy specimens.

2.6. Statistical Analysis

The data collected were analysed using SPSS software (version 23.0). Appropriate statistical tests were applied to assess the significance of the associations between variables. A p-value of less than 0.05 was considered statistically significant.

3. Results

3.1. Overview

The study included patients with various GI lesions, compared with relevant parameters such as age, sex, type of biopsy, clinical symptoms, type of lesion, clinical diagnosis, and histopathological impression. The age of patients ranged from less than 1 year to 90 years, with the majority of cases falling between 40-60 years. The mean age of the population was 43.62 years. The most common presenting symptom was abdominal pain, reported by 85% of the patients. Vomiting was the second most common symptom (27%), while diarrhea was the least common (4%). Acute appendicitis was the most frequent diagnosis, accounting for 17% of cases, followed by intestinal perforation (15%). GI ulcer and intestinal inflammation were the least common diagnosis, each affecting 4% of the studied population. Inflammatory lesions were the most common type of GI lesion, observed in 57% of the cases. Malignant lesions were the second most common (35%), while benign lesions were the least common, constituting just 2% of the cases. Gender distribution analysis revealed that the small intestine was the most commonly involved site, with 72.73% of male and 27.27% of female patients out of a total of 33 cases. The appendix was the second most common site, with 77.27% male and 22.73% female involvement out of 22 cases. The correlation between gender and different types of GI lesions was statistically significant, with a p-value of 0.001.

Table 1 Percentage and frequency distribution of Clinical Symptoms

Symptoms	Frequency	Percent (%)
Pain Abdomen	85	85
Abdominal Distention	18	18
Vomiting	27	27
Difficulty In Swallowing	12	12
Constipation	9	9
Bleeding Per Rectum	4	4
Fever	24	24
Acute/Chronic Diarrhoea	4	4
Heartburn/Acid Reflux	5	5
Others	4	4

Table 1 depicts the Percentage and frequency distribution of Clinical Symptoms. The maximum number of patients presented with pain abdomen reaching up to 85% of the total studied population. The second most common symptom is Vomiting with 27% of the population presenting with vomiting while Diarrhea being the least common with just 4% of the population.

Table 2 Percentage and frequency distribution of Clinical diagnosis

Clinical diagnosis	Frequency	Percent (%)
Intestinal obstruction	9	9
Gastric ulcer	4	4
Intestinal perforation	15	15
Intestinal inflammation	4	4
Carcinoma oesophagus	12	12
Carcinoma stomach	9	9
Carcinoma intestine	11	11
Acute gastritis	6	6
Abdominal tuberculosis	4	4
Acute appendicitis	17	17
Others	9	9
Total	100	100

Table 2 depicts the Percentage and frequency distribution of Clinical diagnosis. Maximum number of patients diagnosed with Acute Appendicitis reaching up to 17% of the total studied population. The second most common diagnosis is Intestinal Perforation with 15% of the population while Gastric Ulcer and Intestinal Inflammation being the least common diagnosis with just 4% of patients diagnosed with each.

Table 3 Percentage and frequency distribution of Anatomical site involved

Site		Frequency		Percent (%)	
Oesophagus		12		12	
Stomach/part of stomach		18		18	
Small intestine	Duodenum	4	Total 33	4	Total 33%
	Jejunum	4		4	
	Ileum	25		25	
Appendix		22		22	
Colon		15		15	
Total		100		100	

Table 3 depicts the Percentage and frequency distribution of the Anatomical site involved. The maximum time the Anatomical site is involved in the small intestine with 33% of the studied population. The second most common Anatomical site involved is Appendix with 22% of the studied population while Duodenum and Jejunum are least involved with 4% of the population each.

Table 4 Percentage and frequency distribution of Histological findings

Histological findings	Frequency n=100	Percent (%)
Adenocarcinoma	20	20
Squamous cell carcinoma	12	12
Acute/chronic appendicitis	22	22
Acute/chronic ileitis	13	13
Non-specific inflammation	10	10
Poorly differentiated malignancy/carcinoma	4	4
Tuberculosis	5	5
Glandular dysplasia	3	3
Colitis	3	3
Acute/chronic gastritis	2	2
Coeliac sprue	2	2
Others	4	4
Total	100	100

Table 4 depicts the Percentage and frequency distribution of Histological findings. The maximum number of histological findings suggestive of Acute or Chronic Appendicitis with 22% of the studied population. The second most common histological finding is Adenocarcinoma with 20% of the studied population while Coeliac sprue and Acute or Chronic Gastritis stand last in the queue.

Table 5 Percentage and frequency distribution of type of lesion

Type of lesion	Number of cases	Percent (%)
Inflammatory	57	57
Malignant	35	35
Benign	2	2
Miscellaneous	6	6
Total	100	100

Table 5 depicts the Percentage and frequency distribution of the type of lesion. The maximum number of cases presented with Inflammatory Lesions reaching up to 57% of the studied population. The second most common type of lesion is Malignant with 35% of population suffering from Malignant lesions while Benign type of lesion is least common with just 2% of the population.

Table 6 Gender-wise distribution of GI lesions with respect to Anatomical site

| Site		Sex male		Percent (%)	Sex female		Percent (%)	P value
Oesophagus		5		41.66	7		58.33	
Stomach/part of stomach		11		61.11	7		38.88	0.001
Small intestine	Duodenum	4	Total 24	100	0	Total 9	0	
	Jejunum	3		75	1		25	
	Ileum	17		68	8		32	
Appendix		17		77.27	5		22.73	
Colon		10		66.66	5		33.34	
Total		67			33			

Table 6 depicts Gender gender-wise distribution of GI lesions with respect to the Anatomical site. The maximum number of cases are seen involving small intestines with 72.73% male and 27.27% female out of a total of 33 cases of small intestine followed by Appendix where 77.27% are male and 22.73% are female out of 22 cases of Appendix. Also, the correlation between gender type and different types of GI lesions is found to be significant with a P value of 0.001 (< 0.05).

Figure 1 Gross specimen of intestinal segment shows grey white hard growth reaching up to serosa
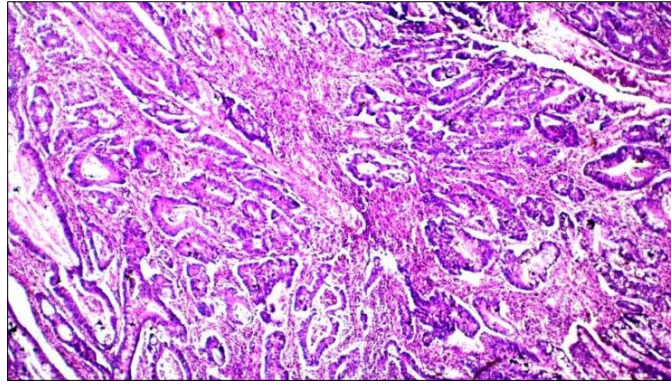
Figure 2 HandE section shows tumour cells forming crowded variably sized glands with intervening stroma (Low power view 10x)
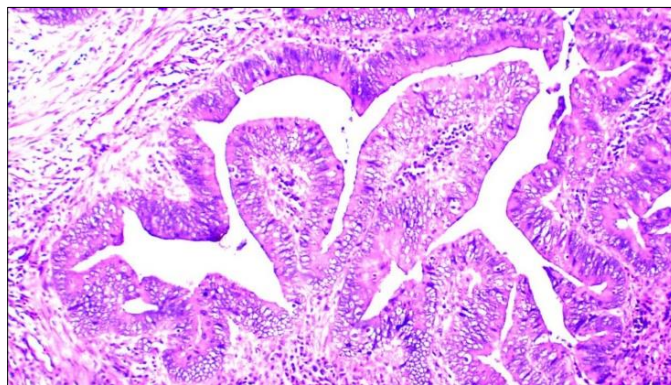
Figure 3 HandE section shows invading neoplastic glands lined by tall columnar cells, with extracellular pools of mucin (low power view 40x)

4. Discussion

The majority of patients were between 40-60 years of age, with an average age of 43.62 years. This is consistent with previous studies, such as those by Sharma S et al [6] and Malik G et al [7], which also reported a peak incidence in the fifth decade of life. The observation that gastrointestinal lesions are more common in this age group could be attributed to the decline in immune function and the accumulation of gene mutations associated with aging, which increase the risk of various gastrointestinal disorders and malignancies. In terms of gender distribution, males constituted 67% of the study population, which is in line with studies by Chappa S et al [8] and Sheikh BA et al [9], who reported similar male predominance. This could be due to higher exposure to risk factors such as smoking and alcohol consumption among males, as well as greater attendance of male patients in clinical settings. Clinically, the most common presenting symptom was abdominal pain (85%), followed by vomiting (27%) and diarrhea (4%). These findings are consistent with the studies by Prasad G et al [10] and Khan Z et al [11], where abdominal pain was also the predominant complaint. Acute appendicitis was the most frequent clinical diagnosis, observed in 17% of the cases, followed by intestinal perforation in 15% of the patients. This contrasts with the study by Anand S et al [12], where esophageal varices and gastritis were more common. The variation in clinical diagnoses might be due to differences in study populations or regional variations in disease prevalence. Histologically, inflammatory lesions were the most common, accounting for 57% of the cases, followed by malignant lesions (35%). This aligns with findings from studies by Sunita B, et al.[5] and Thakur RY et al [13], where inflammatory lesions were predominant. Chronic inflammation can be a precursor to malignancy, particularly in the gastrointestinal tract, where long-standing inflammation can lead to neoplastic transformation. Among the inflammatory lesions, appendicitis was the most frequent, consistent with findings from Thakur RY et al. and Jasani J et al [14] The appendix's anatomical position near the ileocecal junction and its role in the transition between the small and large intestines may contribute to its susceptibility to infection and inflammation. Adenocarcinoma was the most common type of malignancy observed, accounting for 57.14% of the malignant cases. This finding is in agreement with studies by Sunita B. et al. [5] and Ekta et al [15] where adenocarcinoma was also the predominant malignancy. The high prevalence of adenocarcinoma, particularly in the colon, may be linked to genetic mutations such as APC and p53, as well as environmental factors like diet and lifestyle. The small intestine was the most

frequently involved anatomical site in our study, representing 33% of cases, followed by the appendix among 22% of cases. This is consistent with the study by Meenakshi M et al [16] which also found a high incidence of small intestinal lesions. The dense collection of lymphoid tissue in the ileum, part of the small intestine, may make it more prone to infection and subsequent inflammation.

5. Conclusion

In conclusion, this study highlights the significant burden of gastrointestinal lesions, particularly inflammatory and malignant lesions. The findings highlight the importance of early diagnosis and intervention to prevent progression to malignancy, particularly in high-risk groups such as older males and it was found that maximum number of patients in this study were of age 40 – 60 years, gender male, suffering acute/chronic appendicitis and most common histological finding was inflammatory type.

Limitations of the Study

- **Small Sample Size**: The study's findings are limited by the relatively small sample size, which may affect the generalizability of the results to a broader population.
- **Lack of Follow-Up**: Due to the wide geographical distribution of the patients and the lack of direct contact for post-surgery follow-up, long-term outcomes of the patients could not be assessed. This limitation precluded the inclusion of follow-up data in the study design, which could have provided valuable insights into the prognosis and treatment efficacy.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1]   M Khatib, et al. Histopathological Spectrum of Non-Malignant Lesions of Gastrointestinal Tract- An Institutional Study. IOSR J Dent Med Sci. 2016;15(10):113-6.

[2]   Monal T Goswami KC, Khajuria A. A study of histopathological spectrum of gastrointestinal endoscopic biopsies in a tertiary care center. S J Pathology   Microbiology. 2018;3(8):226-34.

[3]   Nikhil Suresh G, Supriya C, Prachi P, Ashwin D, Avanish S. Gastrointestinal cancers in India: Treatment perspective. South Asian J Cancer. 2016;5(3):126-36.

[4]   Morson and Dawson Gastrointestinal pathology.5th ed. Blackwell publication .2012: 98-103.

[5]   Sunita B et al .Histopathological Spectrum of Gastrointestinal Lesions in A Tertiary Care Centre .Acta Scientific Cancer Biology 3.12(2019);04-11

[6]   Sharma S, Kumari K, Sharad S, Shah G, Neelam N. Histopathological spectrum of lesions in gastrointestinal endoscopic biopsy: A prospective study of 500 cases. Indian J Pathology and Oncology. 2020;7(3):284–91

[7]   Malik G, Lal N. Malignant lesions of the digestive tract. A twenty year study. Indian J Pathology and Microbiology . 1989;32(3): 179-85

[8]   Chappa S, Dasari MM, Das B, Molli M, Sangeet S. Histopathological spectrum of lesions in gastro-intestinal endoscopic biopsies – A retrospective study in a tertiary care center. IOSR J Dent Med Sci. 2022;21(02):32-7

[9]   Sheikh BA, Hamdani SM, Malik R. Histopathological spectrum of lesions of upper gastrointestinal tract– A study of endoscopic biopsies. Glob J Med Public Health.2015;4(4):415-20

[10]   Prasad G,. et al. A Histopathological Study of Small Intestinal Lesions. National J Lab Med. 2017;6(2): 14-20

[11]   Khan Z, Khan R, Usman SI, Afroz N, Harris SH. Spectrum of intestinal lesion: A clinicopathological study in a tertiary care center. IP Arch Cytol Histopathology Res 2023;8(4):236-40

[12]   Anand S, Unique S, Chaturvedi N Spectrum of Lesions on Upper GI Endoscopy at a Tertiary Care Centre of Central India. Int J ToxicolPharmacolRes.2022; 12(9); 333-8.

[13]   Thakur RY, Nikumbh DB, Swami SY. Clinical- histopathological overview of git lesions in a rural hospital. Indian J Pathology and Oncology 2016;3(2):305-14

[14]   Jasani J, Vora S, Patel N. Histopathological Study of Lower Gastrointestinal Tract Biopsies in 600 Cases. J Clin Diagnostic   Research. 2021;5(3):23-5

[15]   Ekta, Bansal N, Roychoudhury AK, A histopathological spectrum of gastrointestinal tract lesions in a tertiary care center in south western part of India: an epidemiological study .J Krishna Inst Sci Uni. 2018;7(3):43-7

[16]   Meenakshi M, Vishali V, Patil AG, Am A. Histopathological spectrum of intestinal lesions. IP Journal of Diagnostic Pathology and Oncology. 2020;3(4):330-4