



HISTOPATHOLOGICAL SPECTRUM AND DISTRIBUTION OF NEOPLASTIC AND NON-NEOPLASTIC INTESTINAL LESIONS: A STUDY FROM A TERTIARY CARE CENTER PUNJAB PAKISTAN

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Abstract

Background and Objective

Intestinal lesions represent a heterogeneous group of pathological entities ranging from inflammatory and infectious processes to benign and malignant neoplasms. Colorectal carcinoma is among the leading causes of cancer related mortality worldwide. In developing countries, infectious intestinal disorders coexist with increasing neoplastic burden. This study aimed to evaluate the histopathological spectrum and distribution of neoplastic and non-neoplastic intestinal lesions at a tertiary care center in Punjab, Pakistan.

Material & Methods

This retrospective descriptive study was conducted at the Department of Pathology, Services Institute of Medical Sciences, Lahore, from January 2024 to June 2025. All intestinal biopsy and resection specimens were included. Histological sections were stained with hematoxylin and eosin. Special stains were applied where required. Lesions were categorized as non-neoplastic and neoplastic. Statistical analysis was performed using SPSS version 25.

Results

A total of 420 specimens were evaluated. Non-neoplastic lesions constituted 62%, while neoplastic lesions accounted for 38%. Chronic nonspecific enteritis was the most frequent non-neoplastic lesion. Adenocarcinoma was the predominant malignancy (72% of neoplastic cases). Large intestine involvement was more common than small intestine. Peak incidence of malignancy occurred in the fifth and sixth decades.

Conclusion

Non-neoplastic intestinal lesions were more common; however, a significant malignant burden was observed. Histopathology remains indispensable for diagnosis and management. Early detection and screening strategies are essential to reduce colorectal cancer burden in this region.

Keywords: Intestinal lesions, Colorectal carcinoma, Adenocarcinoma, Inflammatory bowel disease, Histopathology

Introduction

Intestinal diseases constitute a significant proportion of gastrointestinal pathology worldwide. The intestinal tract is continuously exposed to dietary antigens, microbial flora, environmental toxins, and immune stimuli. Disruption of epithelial integrity, immune dysregulation, or chronic inflammatory stimulation can lead to a wide spectrum of pathological conditions [1].

Colorectal cancer is currently the third most commonly diagnosed cancer and the second leading cause of cancer related mortality globally [2]. Recent global cancer statistics estimate more than 1.9 million new colorectal cancer cases annually [2]. The burden is rising in developing countries due to westernized diet, reduced physical activity, obesity, and increased life expectancy [3]. Epidemiological data from South Asia indicate increasing incidence trends over recent decades [4]. Carcinogenesis in the intestine involves multiple molecular pathways. The classical adenoma carcinoma sequence involves sequential accumulation of genetic alterations in APC, KRAS, and TP53 genes [5]. An alternative pathway involves microsatellite instability resulting from defective DNA mismatch repair [6]. Chronic inflammation is a recognized driver of malignant transformation, promoting oxidative stress and genomic instability [7].

Inflammatory bowel disease, including ulcerative colitis and Crohn disease, is associated with increased risk of colorectal carcinoma, particularly in long standing disease [8]. Although historically uncommon in Asia, recent systematic reviews demonstrate rising incidence across developing regions [9]. Environmental factors and microbiome alterations have been implicated in disease pathogenesis [10].

Infectious intestinal diseases remain highly prevalent in developing countries. Intestinal tuberculosis continues to be a major health problem in endemic areas and often mimics malignancy clinically [11]. Granulomatous inflammation may resemble Crohn disease, requiring careful histopathological differentiation.

Non-neoplastic lesions such as nonspecific enteritis, ischemic colitis, and diverticular disease represent a substantial proportion of intestinal biopsies [12]. While often benign, some conditions predispose to dysplasia and carcinoma. Adenomatous polyps are well established precursors in colorectal carcinogenesis [13].

Neoplastic lesions include epithelial, mesenchymal, neuroendocrine, and lymphoid tumors. Adenocarcinoma constitutes the majority of malignant intestinal tumors worldwide [2]. Neuroendocrine tumors demonstrate increasing detection rates due to improved endoscopic screening [14]. Gastrointestinal stromal tumors are characterized by KIT or PDGFRA mutations and require immunohistochemical confirmation [15].

Histopathology remains the gold standard for diagnosis. It provides definitive classification, grading, staging, and evaluation of resection margins [16]. Despite advances in imaging, tissue diagnosis remains essential for management decisions.

Regional data regarding intestinal pathology in South Punjab are scarce. Understanding local disease patterns is critical for healthcare planning and preventive strategies. Therefore, this study was conducted to evaluate the histopathological spectrum of intestinal lesions in a tertiary care hospital in Punjab, Pakistan.

Material & Methods

This retrospective descriptive study was conducted at the Department of Pathology, Services Institute of Medical Sciences, Lahore, a tertiary care teaching hospital serving South Punjab, Pakistan. The study duration extended over four years from January 2024 to June 2025. The hospital receives surgical and endoscopic specimens from both in-patient and out-patient departments, catering to urban and rural populations.

A retrospective cross-sectional design was adopted to evaluate the histopathological spectrum of intestinal lesions. All intestinal biopsy and resection specimens received during the study period were reviewed. The study was conducted after approval from the institutional ethical review committee. Patient confidentiality was maintained, and no identifying information was disclosed.

Inclusion Criteria

- All small and large intestinal biopsy specimens
- All intestinal resection specimens received during the study period
- Specimens with adequate tissue for histopathological evaluation

Exclusion Criteria

- Autolyzed or poorly preserved specimens
- Inadequate biopsies lacking representative mucosa
- Duplicate specimens from the same lesion
- Cases with incomplete demographic data

All specimens were received in 10 percent neutral buffered formalin. Gross examination was performed according to standard surgical pathology protocols [23]. For resection specimens, details including length, tumor location, size, appearance, depth of invasion, presence of perforation, and lymph node status were recorded.

Data was entered into SPSS version 25.0 for statistical analysis. Descriptive statistics were applied:

- Mean and standard deviation for continuous variables
- Frequencies and percentages for categorical variables

Chi square test was applied to determine association between age, gender, and lesion type. A p value of less than 0.05 was considered statistically significant. Results were presented in tabular form for clarity and comparison.

Results

A total of 420 intestinal specimens were received and analyzed during the study period from January 2020 to December 2023. These included both endoscopic biopsies and surgical resection specimens. The study population demonstrated a broad age distribution ranging from 5 to 85 years, with a mean age of 46.8 ± 17.2 years. The highest number of cases was observed in the 51–60 years age group (24.8%), followed by the 41–50 years group (22.9%). Pediatric cases (≤ 20 years) constituted only 6.7% of the total cohort.

There was a noticeable male predominance. Out of 420 patients, 244 (58.1%) were males and 176 (41.9%) were females, yielding a male to female ratio of approximately 1.4:1.

Among the total specimens examined, non-neoplastic lesions constituted the majority with 260 cases (61.9%), whereas neoplastic lesions accounted for 160 cases (38.1%). This indicates that inflammatory and non-tumorous conditions were more frequently encountered in the studied population. However, the proportion of neoplastic pathology remains clinically significant.

Table 1: Overall Distribution of Intestinal Lesions (n=420)

Category	Number	Percentage
Non-Neoplastic	260	61.9%
Neoplastic	160	38.1%

Among the 260 non-neoplastic cases, chronic inflammatory conditions were predominant. Chronic nonspecific enteritis was the most common diagnosis, comprising 78 cases (30% of non-neoplastic lesions). These cases showed mucosal inflammatory infiltrate without definitive features of inflammatory bowel disease or specific infection.

Inflammatory bowel disease was diagnosed in 47 cases (18%). Histologically, these cases demonstrated architectural distortion, crypt abscess formation, and chronic inflammatory infiltrates consistent with ulcerative colitis and Crohn disease patterns. Intestinal tuberculosis was identified in 18 cases (7%), characterized by granulomatous inflammation with caseation necrosis. Ziehl Neelsen staining confirmed acid fast bacilli in selected cases.

Ischemic colitis accounted for 32 cases (12%), showing mucosal necrosis and hemorrhage. Acute enteritis was observed in 40 cases (15%), whereas diverticular disease constituted 25 cases (10%). The remaining 20 cases (8%) included reactive changes and other miscellaneous inflammatory conditions. Non-neoplastic lesions were more frequently observed in younger and middle aged individuals compared to malignant lesions.

Table 2: Spectrum of Non-Neoplastic Lesions (n=260)

Diagnosis	Number	Percentage
Chronic Nonspecific Enteritis	78	30%
Inflammatory Bowel Disease	47	18%
Intestinal Tuberculosis	18	7%
Ischemic Colitis	32	12%
Acute Enteritis	40	15%
Diverticular Disease	25	10%
Others	20	8%

Out of 160 neoplastic cases, 153 (95.6%) were malignant and only 7 cases (4.4%) were benign tumors. This demonstrates that most neoplastic intestinal lesions presenting to the tertiary care center were malignant at the time of diagnosis.

Adenocarcinoma was the predominant malignancy, accounting for 115 cases (71.9% of neoplastic lesions). Most adenocarcinomas were moderately differentiated on histological grading. Neuroendocrine tumors comprised 18 cases (11.3%), while lymphomas accounted for 12 cases (7.5%). Gastrointestinal stromal tumors were identified in 8 cases (5%). Adenomatous polyps represented 7 benign neoplastic lesions (4.4%).

Table 3: Spectrum of Neoplastic Lesions (n=160)

Diagnosis	Number	Percentage
Adenocarcinoma	115	71.9%
Neuroendocrine Tumor	18	11.3%
Lymphoma	12	7.5%
Gastrointestinal Stromal Tumor	8	5%
Adenomatous Polyp	7	4.4%

Among malignant tumors, the large intestine was more frequently involved than the small intestine. Of the 153 malignant cases, 107 (70%) involved the large intestine, while 46 (30%) were located in the small intestine.

Within the large intestine, the colon was the most commonly affected site with 78 cases (51% of malignant lesions), followed by rectum with 29 cases (19%). Among small intestinal malignancies, ileum accounted for 28 cases (18%) and jejunum for 18 cases (12%).

Table 4: Site Distribution of Malignant Lesions (n=153)

Site	Number	Percentage
Colon	78	51%
Rectum	29	19%
Ileum	28	18%
Jejunum	18	12%

Malignant lesions showed peak incidence in the 51–60 years age group, whereas benign neoplastic lesions were more common in relatively younger patients.

When analyzed according to age groups, non-neoplastic lesions were more common in patients below 40 years of age. In contrast, malignant neoplasms were predominantly diagnosed in individuals older than 50 years. Statistical analysis demonstrated a significant association between increasing age and occurrence of malignant intestinal lesions ($p < 0.05$).

Discussion

The present study demonstrates that non-neoplastic lesions constitute the majority of intestinal pathology in our tertiary care center. However, the proportion of malignant cases remains significant. Globally, colorectal carcinoma is a leading cause of cancer mortality [2]. Increasing incidence in developing countries has been attributed to lifestyle and dietary changes [3,4]. Adenocarcinoma was the predominant malignancy in our study, consistent with international reports indicating that over 90% of colorectal cancers are adenocarcinomas [2,17].

The adenoma carcinoma sequence explains transformation from benign adenomatous polyp to invasive carcinoma [5,13]. Microsatellite instability represents an alternative pathway associated with distinct clinical features [6,18]. Chronic inflammation promotes carcinogenesis through oxidative DNA damage and cytokine mediated proliferation [7]. Inflammatory bowel disease identified in our cohort carries established malignancy risk [8]. Rising incidence of inflammatory bowel disease in Asia has been documented in systematic reviews [9,10].

Intestinal tuberculosis remains prevalent in endemic areas [11]. Its coexistence with neoplastic pathology highlights dual disease burden in Pakistan. Neuroendocrine tumors demonstrated moderate frequency. Global studies report increasing detection rates due to improved endoscopy [14]. Gastrointestinal stromal tumors require immunohistochemical confirmation and molecular testing for targeted therapy [15,19]. Male predominance observed in our study aligns with global cancer epidemiology [2]. Risk factors such as smoking, red meat intake, and obesity may contribute [20].

Screening colonoscopy has significantly reduced colorectal cancer mortality in developed nations [21]. Lack of organized screening programs in Pakistan may contribute to late presentation. Histopathological examination remains essential for accurate classification, staging, and prognostication [16,22]. Limitations include retrospective design and absence of molecular profiling. Nevertheless, this study provides valuable regional data regarding intestinal pathology.

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