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# A COMPREHENSIVE ANALYSIS OF THE SPECTRUM OF NON-NEOPLASTIC LESIONS OF THE GASTROINTESTINAL TRACT.

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## Abstract.

### Introduction.

The small and large intestines constitute a significant portion of the gastrointestinal tract. Numerous benign, malignant, and congenital disorders manifest from this anatomical region. Benign aetiologies primarily encompass inflammatory and infectious pathologies. The colon represents the predominant anatomical location for the occurrence of gastrointestinal neoplasia within Western populations.

Aim:To ascertain the pattern, frequency, and location of non-neoplastic lesions impacting the intestine, to increase clinicians' awareness of their occurrence within this particular region.

### Methods.

A comprehensive analysis was conducted on a total of 500 nonneoplastic gastrointestinal tract (GIT) lesions. The histopathological findings were meticulously examined, in conjunction with an analysis of the spatial distribution of lesions, and a correlation was established between the histopathological findings and the clinical parameters.

### Results.

The predominant type of specimens obtained for analysis consisted of bowel resection samples, accounting for 433 cases (86.68% of the total). The remaining specimens were comprised of endoscopic biopsies, totaling 66 cases (13.33%). Non-neoplastic lesions were found to be more prevalent, accounting for 125 cases (83.33%), compared to neoplastic lesions, which accounted for 83 cases (16.67%).

### Conclusion.

The meticulous evaluation of specimens, both at a macroscopic and microscopic level, in conjunction with relevant clinical data, serves as a valuable approach to achieving precise objectives and enhancing the patient's overall well-being.

### Recommendation.

Lesions that are not considered malignant need to be followed up every year or every two years with the help of EUS or endoscopy to rule out malignancy.

***Keywords:*** Non-malignant, GIT, IBD, Inflammation, Gastrointestinal lesion, Submitted: 2023-08-25 Accepted: 2023-09-14

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## 1. INTRODUCTION.

The gastrointestinal tract is predominantly comprised of the small and large intestine. Benign, malignant, and congenital disorders can manifest within the small and large intestines. Benign aetiologies predominantly encompass Inflammatory and infectious disorders are conditions characterized by an abnormal immune response and the presence of pathogens, respectively. These disorders involve the activation of inflammatory pathways and the invasion of microorganisms, leading to tissue damage and dysfunction. In Western populations, the colon is widely recognized as the predominant anatomical location for the occurrence of gastrointestinal neoplasia [1]. Gastrointestinal disorders often present with nonspecific signs and symptoms. Upon the manifestation of signs and symptoms, it is indicative that the disorders have progressed to an advanced stage [1,2].

The wide array of diseases that can manifest individually or in conjunction with different segments encompasses congenital anomalies, inflammatory conditions, and neoplastic conditions, which encompass both benign and malignant lesions [3]. Histopathological analysis yields essential data derived from the biopsy specimen, thereby facilitating the establishment of a definitive diagnosis. Histopathological examination reveals early-stage mucosal lesions, including various metaplasia and dysplasia, thereby facilitating the prevention of subsequent progression to invasive carcinoma or enabling prompt intervention. This, in turn, enhances the likelihood of successful treatment and cure. India is currently hosting 0.31% of the global burden of cancer, with colorectal carcinomas ranking as the fourth most prevalent form of cancer, affecting 0.03% of the global population. Gastric cancers, on the other hand, rank eighth in terms of pre-Congenital disorders, such as Hirschsprung's disease and Meckel's diverticulum of the intestine, exert a greater impact on morbidity among pediatric populations compared to adults' valence, impacting 0.01% of the world population [4].

In the upper gastrointestinal (GI) tract, the esophagus and stomach are commonly afflicted by bacterial and fungal infections, vascular disorders, caustic injuries, and neoplasms [5]. Likewise, the lower gastrointestinal (GI) tract serves as a location for a multitude of infectious, inflammatory, idiopathic, and polypoidal conditions, in addition to neoplasms [6,7]. Hirschsprung disease, acute and/or chronic inflammatory conditions, benign or malignant polyps, inflammatory bowel diseases, and benign and malignant neoplasms are among the various pathological entities that may manifest within the lower gastrointestinal (GI) tract, primarily [8]. Congenital disorders, such as Hirschsprung's disease and Meckel's diverticulum of the intestine, exert a greater impact on morbidity among pediatric populations compared to adults [9]. To optimize patient outcomes, it is imperative to promptly establish an accurate diagnosis and initiate timely intervention. The meticulous macroscopic and microscopic analysis of specimens, in conjunction with relevant clinical data, enables us to achieve our ultimate objective of enhancing patient outcomes. The current study was conducted to determine the pattern, frequency, and location of non-neoplastic lesions in the large bowel. The objective was to increase awareness among clinicians in this region regarding the incidence of such lesions.

## 2. MATERIALS AND METHODS.

A cross-sectional prospective study was undertaken, encompassing a cohort of 500 patients who provided informed consent and presented with signs and symptoms indicative of intestinal lesions. These patients underwent surgical intervention at our esteemed quaternary care center, under the supervision of the Department of General Surgery, Dr. Rajendra Prasad Government Medical College, Tanda, Kangra.

### *2.1. Inclusion criteria.*

The study included individuals of both genders across all age groups who present with intestinal lesions. Specifically, it includes patients

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who have undergone surgical intervention for their intestinal lesions under the care of the surgery department. Furthermore, the study incorporates the entirety of intestinal specimens or biopsies received by the histopathology section of the Pathology department.

### *2.2. Exclusion criteria.*

The study excluded cases with insufficient biopsy material and specimens obtained from appendicectomy procedures were not incorporated in the analysis.

### *2.3. Study procedure.*

A concise account of the patient's medical background and the results of diagnostic assessments were obtained for every individual case. The age of the patient, along with their presenting clinical signs and symptoms, were thoroughly assessed. Additionally, a careful evaluation of the indications for biopsies was conducted, as well as a comprehensive analysis of the specific types of biopsies performed. A singular, prevailing diagnosis of an intestinal lesion was duly acknowledged and recorded as the primary indication for the aforementioned procedure.

The specimens obtained from bowel resection and endoscopic biopsy were subjected to both macroscopic and microscopic examination. Upon receipt of the surgical specimens in a 10% formalin solution at the Department of Pathology, a comprehensive macroscopic evaluation of the entire specimen was performed. To facilitate fixation, supplementary incisions were performed according to the dimensions of the specimen. The morphology of selected incised sections was subsequently documented. Tissue specimens obtained from a representative area were collected for subsequent tissue processing. Subsequently, paraffin blocks were meticulously prepared. The specimens were subjected to sectioning and subsequently underwent routine staining using the Haematoxylin and Eosin (H&E) stain. A comprehensive assessment of the findings and microscopic characteristics was conducted and meticulously documented.

The histopathology requisition forms, which were submitted alongside the specimen, underwent review by the surgeon responsible for the intraoperative findings.

If there were any deficiencies in the patient's medical history, the attending surgeon was consulted to obtain additional information. The final report included documentation of microscopic and macroscopic findings, as well as any incidental findings.

Subsequently, a comprehensive collection of data was obtained from specimens of bowel resection and endoscopic biopsies. This encompassed diverse indications for conducting biopsies, identification of different types of lesions through histopathological examination, determination of the proportion of cases in which the clinical diagnosis correlated with the histopathological findings, assessment of the frequency of unforeseen diseases or pathologies, and analysis of the various patterns of occurrence of different pathologies about the age and mode of presentation of patients.

### *2.4. Statistical analysis.*

The analysis was conducted using the Statistical Package of Social Sciences software (version 15.0; SPSS). The statistical analysis of the study involved the utilization of Microsoft Excel 2007 and a descriptive methodology.

## 3. RESULTS.

A total of 500 patients were included in this study. At the initial stage, several 602 patients were examined for eligibility, however, 102 patients were excluded from this study due to not being eligible. The gender distribution is depicted in Figure 1. There was observed variability in the occurrence of intestinal lesions, with the highest prevalence of intestinal lesions observed within the age range of 41-50 years, subsequently followed by the age range of the individuals in question falls within two categories: 31-40 years and 51-60 years. The age group with the lowest patient count was observed among individuals aged 80 years and above (Table 1, Figure 2).

Table 1: **Intestinal lesions distribution according to the age of patients.**

| Age (years) | Lesions | Percentage |
|---|---|---|
| 11 to 20 | 17 | 3.39 |
| 21 to 30 | 54 | 10.79 |
| 31 to 40 | 81 | 16.19 |
| 41 to 50 | 74 | 14.79 |
| 51 to 60 | 113 | 22.59 |
| 61 to 70 | 81 | 16.19 |
| 71 to 80 | 46 | 9.1 |
| 81 to 100 | 34 | 6.79 |

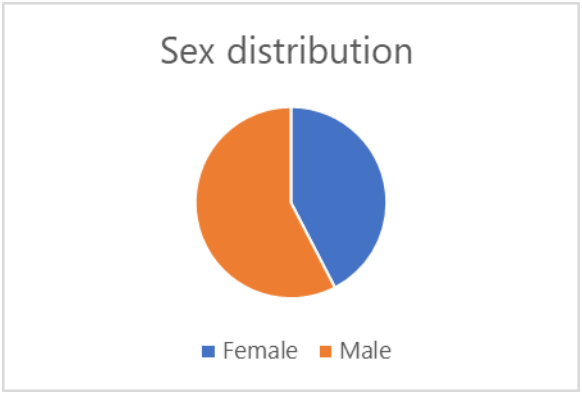


Figure 1: **Distribution of sex among patients.**

Table 2 presents the distribution of patients based on the classification of intestinal lesions. Of the overall cases, the predominant findings were inflammatory lesions (73.38%), with malignant lesions (16.59%) being the subsequent most prevalent.

The distribution of patients based on the type and site of intestinal lesions is presented in Table 3 and Table 4. Of all observed lesions, 65.38% were located within the small intestine, while 34.59% were the large intestine.

Table 5 presents the distribution of non-neoplastic lesions based on their histopathological characteristics. Among the observed cases, non-specific inflammations were found to be the most prevalent type, accounting for 47.97% of the total cases. Hirschsprung's disease and ulcerative colitis lesions exhibited the lowest prevalence rates of 1.76% and 3.28%, respectively, as observed in the current study (refer to Table 5). The predominant presenting complaint among patients with small intestinal lesions was abdominal pain, followed by jaundice and vomiting. Constipation emerged as the predominant manifestation of large intestinal lesions, accompanied by abdominal pain and weight loss, thereby constituting the most prevalent symptoms observed.

## 4. DISCUSSION.

Karve et al. conducted a study wherein the majority of cases were observed in individuals aged between 21 and 70 years. Notably, the highest proportion of cases (20.7%) was found in the age group of 31-40 years, followed closely by the age

Table 2: **Lesion distribution according to type.**

| Intestinal lesions | No. of cases | Percentage |
|---|---|---|
| Congenital | 30 | 5.9 |
| Inflammatory | 367 | 73.38 |
| Malignant | 83 | 16.59 |
| Benign | 20 | 3.9 |

Table 3: **Nonneoplastic site distribution of lesionaccording to histopathology.**

| Site | Nonneoplastic | Percentage |
|---|---|---|
| Small intestine | 327 | 65.38 |
| Large intestine | 173 | 34.59 |

Table 4: **Lesion distribution according to site.**

| Major site | lesion | Particular site | N |
|---|---|---|---|
| Small intestine | Acute necrotising inflammation | Ileum | 60 |
| | Acute suppurative inflammation | Ileum | 53 |
| | Gangrene | Ileum | 40 |
| | Peptic ulcer | Duodenum | 43 |
| | Peptic ulcer with perforation | Duodenum | 40 |
| | Acute infarction | Ileum | 3 |
| | Tuberculosis | Jejunum, Ileum | 27 |
| | Meckel's diverticulum | Distal Ileum | 33 |
| | Acute on chronic enteritis | Ileum | 18 |
| | Necrotising granulomatous inflammation | Jejunum, Ileum | 10 |
| Large intestine | Non specific inflammation | Colon | 33 |
| | Haemorrhoids | Anal canal | 27 |
| | Ulcerative colitis | Colon | 13 |
| | Fistula | Anal canal | 7 |
| | Amoebic colitis | Caecum with ascending colon | 70 |
| | Tuberculosis | Caecum | 13 |
| | Bacterial colitis | Colon | 3 |
| | Hirschsprung's disease | Colon | 7 |

Table 5: **Nonneoplastic lesion distribution according to histopathology.**

| type | No. of cases | Percentage |
|---|---|---|
| Nonspecific inflammation | 190 | 47.97 |
| Inflammation with gangrene | 40 | 10.10 |
| Inflammation with perforation | 40 | 10.10 |
| Inflammation with ulceration | 43 | 10.8 |
| Tuberculous inflammation | 40 | 10.10 |
| Meckel's Diverticulum | 23 | 5.80 |
| Ulcerative colitis | 13 | 3.28 |
| Hirschsprung's disease | 7 | 1.76 |

group of 41-50 years (20.1%). This observation aligns with the results obtained in the current investigation [10]. The study conducted by Al-Aquili HA et al. examined a significant number of cases within the age range of 21 to 60 years. The majority of cases were observed in the age groups of 21 to 30 years, accounting for 24.3% of the total cases, and 31 to 40 years, accounting for 23.2% of the total cases [11]. In the current investigation, it was observed that the highest incidence of 35 inflammatory lesions in the large intestine occurred during the fourth decade of life, which aligns with the findings reported by Monsen U [12]. The current study demonstrated a higher prevalence of males, consistent with previous investigations conducted by Monsen U and Gismera SC et al. [12,13].

In the current investigation, a total of 500 cases of intestinal lesions were examined. It was observed that the majority of these lesions were non-neoplastic, as compared to other types of intestinal lesions. This finding is consistent with the studies conducted by Chennakeshaviah GRP et al., Sulegaon R et al., and Rajbhandari M et al., [8,14,15]. In the current investigation, a total of 12 cases of tuberculosis were observed, demonstrating a slight male predominance (58.33%). This finding aligns with the study conducted by Leung VKS et al., where they reported a male predominance of 59.09% [16]. The age at which Hirschsprung's disease typically manifests is observed to be around 50-60% during the neonatal period and 40% during the postnatal period. In the current investigation, a total of two cases were evenly observed during both periods, aligning with the findings of Anupama B et al. and Jung PM et al., who also documented cases within a similar range [17,18].

The age group most frequently affected within the lower gastrointestinal tract was observed to be individuals between the ages of 21 and 51 years. The results of our investigation were consistent with the research conducted by Hassan Abdulla Al-Aquili and colleagues, which demonstrated that the age group most commonly affected was 21-60 years [19]. Although a definitive polypoidal diagnosis was not established, the observation of a higher prevalence of polyps in the large intestine aligns with existing literature indicating that both neoplastic and non-neoplastic polyps are frequently found in this anatomical region [20].

The observed quantity of polypectomy specimens is diminished by the findings of our study. This observation highlights the necessity for enhanced execution of colonoscopic and upper gastrointestinal (GI) endoscopic surveillance protocols. Inflammatory bowel disease, specifically Ulcerative colitis, is known to have a propensity to progress into malignancy. In addition to the aforementioned factors, it is noteworthy that ulcerative colitis exhibits the most pronounced predisposition [21]. Patients presenting with abdominal pain, emesis, diarrhea, with or without constipation, and exhibiting a lack of response to therapeutic interventions may be classified under the category of inflammatory bowel disease (IBD). The implementation of routine colonoscopic surveillance or targeted colonoscopy is of paramount significance when managing cases of this nature. In confirmed instances, the presence of dysplasia, particularly high-grade dysplasia, warrants the recommendation of colectomy as the subsequent immediate intervention [22]. Lymphoma has the potential to affect various segments of the gastrointestinal tract, with the stomach being the most frequently involved site, followed by the small intestine and the ileocecal region, in descending order of occurrence [23, 24]. Colorectal cancer ranks as the fourth most prevalent malignancy, with adenocarcinoma being the predominant histological subtype. Conversely, squamous cell carcinoma (SCC) of the colon represents a rare entity, with fewer than 100 documented cases in the existing medical literature [25].

The incidence of xanthogranulomatous cholecystitis in India is reported to be 9%. In the present study, we observed a single case of xanthogranulomatous cholecystitis, accounting for 0.5% of the total cases encountered. Adenocarcinoma, a malignant lesion, is frequently observed in the gall bladder. Within the scope of our study, we identified a total of six cases (1.1%) of ade-

nocarcinoma, with a notable predominance in females. A single instance of adenosquamous carcinoma has been observed, which represents a rare histological subtype comprising approximately 1 - 5% of all gall bladder carcinomas [26]. The current investigation reveals the lowest recorded occurrence of malignancies in the small intestine, a finding that aligns with previous studies conducted by Sabharwal et al. [27] and Prabhakar et al. [28].

The most frequently identified pathological abnormality in the current study was determined to be a peptic ulcer. This finding aligns with the research conducted by Patel P. and Bhalodia J. [29]. All patients diagnosed with gastric ulcers exhibited symptoms of acute abdominal pain. Upon microscopic examination, it was observed that there existed a necrotic zone, a superficial exudative zone, a granulation tissue zone, and a cicatrization zone. In the study conducted by Zaid F et al., it was observed that the age range most frequently associated with cases of Hirschsprung disease was from 1 day to 13 years. The incidence reaches its maximum during the neonatal period [30].

## 5. CONCLUSION.

Histopathological examination is imperative for the diagnosis of intestinal lesions due to the involvement of both the small and large intestines in a multitude of conditions, including infections, ulcerative diseases, inflammatory disorders, polyps, non-neoplastic growths, and neoplastic tumors, among others. The radiographic observations and clinical manifestations exhibited considerable variability among individuals, lacking specificity. Histopathological examinations are imperative for establishing a definitive diagnosis. Early diagnosis of ulcerative colitis holds significant clinical importance as it serves to mitigate the risk of subsequent development of colorectal carcinoma.

## 6. LIMITATIONS.

The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of a comparison group also poses a limitation for this study's findings.

## 7. RECOMMENDATION.

Lesions that are not considered malignant need to be followed up every year or every two years with the help of EUS or endoscopy to rule out malignancy.

## 8. ACKNOWLEDGEMENT.

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## 9. LIST OF ABBREVIATIONS.

GI/GIT- Gastrointestinal Tract
EUS- Endoscopic ultrasound
IBD- Inflammatory bowel disease
H&E- Haematoxylin and Eosin
SPSSS- Statistical Package of Social Sciences
SCC- Squamous cell carcinoma

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The study was not funded.

## 11. Conflict of interest.

The authors report no conflicts of interest in this work.

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