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Histopathological spectrum with clinical correlation of lower gastrointestinal tract endoscopic biopsies

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Abstract
Introduction: The gastrointestinal tract extends from oral cavity to anus, spanning a length of >8 meters and oral cavity along with oropharynx forming the upper portion. The large intestine and anal canal are sites for broad array of non-neoplastic and neoplastic diseases which at times can lead to serious complications. Biopsy provides an opportunity to correlate the clinical data, endoscopic findings and pathological lesions. Histopathological study is the gold standard for diagnosis of endoscopically detected lesions. It is also used for monitoring the course, extent of the disease, response to the given therapy and early detection of complications.
Aim & Objectives: To study and clinically correlate the histopathological spectrum of lower gastrointestinal tract lesions and also to study the endoscopy related artifacts.
Materials and Methods: A 2-year prospective study was conducted in the Department of Pathology at Subharti Medical College & associated hospitals, Meerut. A total of 164 lower gastrointestinal endoscopic biopsies were included. The histopathological sections were studied and the results were recorded.
Results: A total of 164 biopsies were studies. Male to female ratio was 1.78:1. Most common site of biopsy was colon (52.5%) followed by rectum (21.9%), ileum (20.1%), jejunum (4.9%) and anal canal (0.6%). 89.7% biopsies were non-neoplastic lesions, 9.7% were neoplastic lesions & 0.6% cases were premalignant. Endoscopy related artifacts were found in 25% cases.
Conclusion: The main objective of gastrointestinal biopsies is clinical & endoscopic correlation to find out the true pathology.

Keywords: Endoscopic biopsies, GIT, histopathology, artifacts

Introduction

The gastrointestinal tract spans >8 meters from the oral cavity to the anus, with the oral cavity and oropharynx representing the upper portion [1]. The large intestine and anal canal are home to a wide range of non-neoplastic and neoplastic disorders, some of which can have serious complications. Infections, vascular problems, ulcers, different inflammatory illnesses, and neoplasms [2] can all affect them. Lower gastrointestinal tract lesions are a significant source of morbidity and mortality [3].

South Asian countries have a relatively low incidence of epithelial tumors [4]. The annual incidence rates (AARs) for colon cancer and rectal cancer in men in India, on the other hand, are 4.4 and 4.1 per 100000, respectively. In women, the AAR for colon cancer is 3.9 per 100000 [5]. Colorectal cancer is the fourth most frequent cancer in the world, after breast, prostate, and lung cancer, with a 9.8% incidence rate and 1.24 million new cases identified in 2008 [6].

Any lower gastrointestinal bleeding appears as rectal bleeding, indicating that the bleeding is occurring somewhere other than the Treitz ligament. Proctosigmoidoscopy and colonoscopy are the examinations of choice for diagnosing and treating patients with haematochezia [7].

The endoscopic examination along with histopathology is the gold standard medical approach for diagnosing and treating mucosal pathology in the lower gastrointestinal system [8]. Endoscopy is a minimally invasive diagnostic medical treatment that uses an endoscope to directly visualise any portion of the inside of the body [9]. Adults and children now prefer endoscopy to contrast X-rays, which were regularly utilized prior to its introduction [10].

Histopathology is the gold standard for diagnosing endoscopically identified lesions, and endoscopy is incomplete without biopsy [11, 12].

Endoscopic biopsies aid in the detection of early malignancies and/or high-grade dysplasia of the lower gastrointestinal tract, the differentiation of hyperplastic from neoplastic polyps, the differentiation of malignant from benign ulcers, and the detection of dysplasia in ulcerative colitis patients [1].

The accurate microscopic diagnosis of various lesions requires preparation of tissue sections, usually stained, that represents as closely as possible their structures in life. The preparation of high-quality sections requires skill and experience in the field of laboratory discipline. Often, pathologists encounter sections that are either improperly fixed or mishandled during tissue processing, resulting in alterations in tissue details. Such changes are classified as "artifacts." Artifact refers to "An artificial structure or tissue alteration on a prepared microscopic slide as a result of an extraneous factor [13].

It is critical to have a good understanding of artifacts in order to take preventative efforts to limit or minimize their occurrence [14]. The current investigation was conducted with the goal of establishing a correlation between clinical and histological findings as well as identifying endoscopy-related artifacts, keeping in mind the vast spectrum of disease in the lower gastrointestinal tract.

Materials and Methods: This was a prospective study conducted on lower gastrointestinal endoscopic biopsies from July 2019 to June 2021. All patients who underwent endoscopic biopsies from jejunum to anal canal were included. The Institutional Ethical clearance and patients informed written consent was obtained. Clinical data like age, sex and site of biopsy was obtained through requisition form submitted along with tissue specimens received and the biopsy specimens were routinely processed after proper fixation and were embedded in paraffin wax. The sections cut were then stained with H & E through an automatic stainer and microscopic study was done. Clinical & histopathological correlation was done. Endoscopy related artifacts were recorded wherever encountered. Special stains were applied if required. The lesions were classified according to the site involved and were also categorized on basis of their morphological features on histopathological examination.

Inclusion criteria: All endoscopic biopsies from jejunum till anal canal.

Exclusion criteria: 1. Inadequate and poorly preserved biopsies. 2. Wrongly embedded biopsies (specially with reference to small intestine) 3. Absence of relevant clinical data.

Results

A total of 164 endoscopic biopsies were studied. Mean age is 37.7 years. Maximum number of cases were found in the 3rd and 4th decade: 37.8% (62/164) and the least number of cases were observed in >80 years age group 1.2% (2/164). Male to female ratio was 1.78:1, male being 64% and female were 36%.

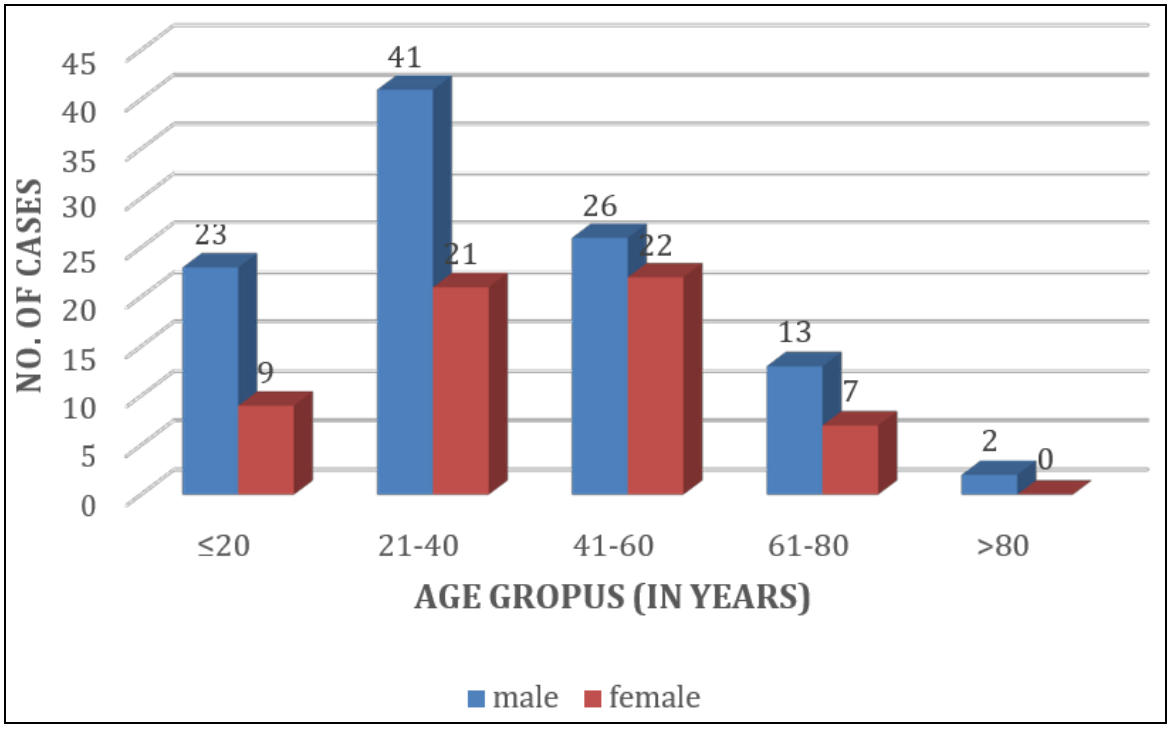

Fig 1: Bar diagram: Age & Sex wise distribution

Maximum number of biopsies were from colon (52.5%) followed by rectum (21.9%), ileum (20.1%), jejunum (4.9%) and anal canal (0.6%).

Studied biopsies were classified as non-neoplastic (89.7%), Neoplastic (9.7%) and pre-malignant (0.6%) (Table 1)

Table 1: Histopathological Diagnostic Category of lower gastrointestinal tract Biopsies (n=164)

Histopathological Diagnostic Category			Number of cases (n=164)		Percentage
Non-Neoplastic (89.7%)	Inflammatory	Non-specific	100	124	75.7
		Specific	07		
		IBD	17		
	Hirschsprung disease			03	1.8
	Polyps			11	6.7
	Others			09	5.5
Neoplastic (9.7%)	Malignant			16	9.7
Premalignant (0.6%)				01	0.6
Total				164	100

Table 2: Site wise distribution of Non-neoplastic, Neoplastic & Premalignant lesions (n=164)

Site	Non-Neoplastic	Neoplastic		Premalignant	Total
		Benign	Malignant		
Jejunum	06	-	02	-	08
Ileum	33	-	-	-	33
Colon	76	-	10	-	86
Rectum	32	-	03	01	36
Anal canal	-	-	01	-	01
Total	147	-	16	01	164

In jejunum 04 cases were of chronic non-specific jejunitis, 01 case of Tubercular jejunitis & perforation each and 02 cases of Adenocarcinoma.

Ileum had 26 cases of chronic non-specific inflammation, 01 case of granulomatous ileitis & tubercular ileitis each. Crohn's disease was found in 01. 03 polyps (02 lymphoid & 01 hyperplastic) and one case showed no significant pathology.

Colon had 67 inflammatory lesions, 05 polyp, 02 cases of Hirschsprung disease were seen, one in a 3- month male child & other in a 5-month female child. 10 lesions were malignant- all Adenocarcinomas. Remaining 02 cases had no significant pathology. (Table 3)

Table 3: Histopathological spectrum of Colon (n=86)

Histopathological Category			Histopathological Spectrum	Number of cases (n=86)	Percentage (%)
Non-Neoplastic (88.3%)	Inflammatory (67)	Non-specific	Nonspecific colitis	36	77.9
			Nonspecific typhilitis	11	
			Suppurative	02	
			Granulation tissue	02	
		Specific	Tubercular typhilitis	03	
			Pseudomembranous colitis	01	
			Amoebic Dysentry	01	
		IBD	Crohn's	1	
			Ulcerative colitis	10	
	Polyp (5)		Juvenile polyp	03	5.8
			Hyperplastic polyp	01	
			Inflammatory polyp	01	
	Hirschsprung disease (2)			02	2.3
	Others (2)		No significant pathology	02	2.3
Neoplastic (11.7%)	Malignant (10)		Adenocarcinoma	10	11.7
Total				86	100

36 rectal biopsies were received, 88.9% were Non-neoplastic, 8.3% were Neoplastic & 2.8% were Premalignant. (Table 4)

Table 4: Histopathological spectrum of Rectum (n=36)

Histopathological Category		Histopathological Spectrum		Number of cases (n=36)	Percentage (%)
Non-Neoplastic (88.9%)	Non-specific	Nonspecific proctitis		16	61.1
		Granulomatous Proctitis		01	
	Inflammatory (22)	*IBD*	Ulcerative colitis	05	
Polyp (3)		Juvenile polyp		03	8.3
Hirschsprung disease (1)		SRUS		01	2.8
Others (6)				06	16.7
Neoplastic (8.3%)	Malignant (03)	Adenocarcinoma		02	8.3
		Poorly differentiated malignant tumor		01	
Premalignant (2.8)		Low grade dysplasia		1	2.8
Total				**36**	**100**

Single anal canal biopsy was received and it was a neoplastic lesion-Malignant melanoma, Melanin bleach special stain was done for this case.

Endoscopy related artifacts were observed in 41 cases of our study. Majority (78%) of them were crush artifact and remaining (22%) cases showed cautery artifacts. Colonic biopsies showed the maximum number of artifacts. (Table 5)

Table 5: Distribution of Endoscopy related artefacts according to site (n=41)

Artefact	Site of biopsy				Total (%)
	Jejunum	Ileum	Colon	Rectum	
Crush	3	7	15	7	32(78)
Cautery	-	1	8	-	9(22)
Total	3	8	23	7	41(100)

Discussion

Gastrointestinal tumours, which comprise both benign and malignant tumours, are one of the leading causes of morbidity and mortality globally.1 Malignancies of the gastrointestinal tract account for 12.9 percent of all cancers [2].

In present study maximum number of cases were found in 3rd and 4th decade (21 – 40 years of age group) (37.8and the mean age of the studied patients was 37.7±19.87 years with age of patients ranging from 3 months to 90 years. However, Umana IO *et al.* [15] reported the mean age as 53.8 ± 14.3 years and age ranged from 18 to 96 years. Siddiqui B *et al.* [16] reported the maximum number (72%) of cases in the adult age group (13-59 years).

In our study the maximum number of biopsies were from colon (52.5%), followed by rectum (21.9%), ileum (20.1%), and jejunum (4.9%); while minimum number of biopsies was taken from anal canal of only one patient (0.6%). These findings are comparable as with the studies done by Trisal M *et al.* [1] and Joshi H *et al.* [17] who also received maximum number of biopsies from colon; 40% & 23.33% respectively. In our study lesions were: Non-neoplastic: 89.7%, Neoplastic: 9.7%, Pre-malignant: 0.6%. Suvernakar SV *et al.* [3], Masgal M *et al.* [18] in their respective studies observed maximum number of cases as Non-neoplastic 59% and 75% and 87.75% in small and large intestine. However contradicting data has been reported by Sulegaon R *et al.* [2] who found majority of the cases Neoplastic (62.09%) followed by Non-neoplastic cases (30.65%) and inadequate biopsies in 7.26% cases. This contradiction may be due to inclusion criteria where resected specimens were also included in the study. Another reason for such discrepancy could be attributed to the diet of the study population, which varies regionally. Non- vegetarian diet and higher spice consumption in southern parts of India increases the risk of neoplastic lesion.

Artifacts related to the endoscopy were observed in 41 cases of our study. Majority (78%) of them were crush artifact and remaining (22%) cases showed cautery artifact. One author [19] from Spain observed similar findings in their study on artifacts in oral incisional biopsy in general dental practice where they encountered crush artifact in most of the cases (72.9%).

Majority of the artifacts (23/41) were encountered in colonic biopsies in our study. It could be due to difficult manipulation of the lesion due to their anatomic location, especially in cases of right sided colonic biopsies, near flexures and presence of strictures. However, to the best of our knowledge very limited data is available to compare our findings with other studies.

Conclusion

Lower gastrointestinal endoscopic biopsy is an important and effective diagnostic as well as monitoring tool for the course and extent of the disease along with response to the given therapy. The key principle of gastrointestinal biopsy interpretation is correlation with clinical data and endoscopic information in order to identify the exact/true pathology. Endoscopic findings and histo-pathological examination are complementary to each other. Through a consistent systemic approach, interpretation of gastrointestinal biopsies can provide important information which can be life-saving in certain conditions and often can be reassuring to the patients undergoing lower GI tract biopsies.

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