Original Research Article

Endoscopic biopsies - A boon to diagnose gastrointestinal tract diseases

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International Archives of Integrated Medicine, Vol. 6, Issue 12, December, 2019.

Available online at http://iaimjournal.com/
ISSN: 2394-0026 (P) **ISSN: 2394-0034 (O)**
Received on: 24-11-2019 **Accepted on:** 30-11-2019
Source of support: Nil **Conflict of interest:** None declared.
How to cite this article: Shilpi Sahu, Wani Ajay Suryakant, Ritika Jaiswal. Endoscopic biopsies - A boon to diagnose gastrointestinal tract diseases. IAIM, 2019; 6(12): 47-56.

Abstract

Background: Human gastrointestinal tract (GIT) is long and tortuous. Endoscopy has evolved as a useful diagnostic tool for gastrointestinal tract diseases. Endoscopic appearances although being highly suggestive are not pathognomonic and thereby need histopathological confirmation for a definitive diagnosis.

Aim: Correlation of endoscopic findings with histopathological diagnosis greatly enhances the diagnostic value and hence better patient management.

Materials and methods: An institution based cross sectional observational study was done in a tertiary hospital in Navi Mumbai over two years among 100 endoscopic biopsies of gastrointestinal tract received in the Department of Pathology sent from Department of Surgery. Sections from formalin fixed, paraffin-embedded blocks were routinely stained with Hematoxylin and Eosin, Giemsa, PAS, GMS and Alcian Blue. The lesions were divided into 2 broad groups; one was based on anatomical location into upper GIT and lower GIT and the other division was non-neoplastic and neoplastic.

Results: Maximum biopsies were obtained from colorectal region (42%) followed by stomach (24%), esophagus (15%), duodenum (8%), colon (5%) and rectum (4%). Majority of the lesions encountered in the study were non-neoplastic (72%). Squamous cell carcinoma (SCC) was the most common neoplastic lesion (39.23%) followed by adenocarcinoma (17.83%).

Conclusion: Endoscopy is incomplete without biopsy and so the combination of methods provides a powerful diagnostic tool for better patient management.

Key words

Endoscopic biopsies, Histopathology, GIT, Non- neoplastic, Neoplastic.

Introduction

To facilitate the diagnosis of different GIT lesions, endoscopy and histology are complimentary. In cases of Barrett's Oesophagus, Chronic Gastritis, Colonic diseases like inflammatory bowel diseases, tuberculosis etc. can strongly be suspected on the basis of endoscopic findings and hence definitive diagnosis can be made based on biopsied specimens after histopathological study [1-4]. Many times severity of the lesion is seen more on endoscopy but biopsy from that shows only mild inflammation e.g. gastritis or duodenitis [5]. Without biopsy significant number of inflammatory bowel disease may go unrecognized [6]. Hence correlation of histopathological diagnosis with endoscopic findings enhances the diagnostic value of endoscopic biopsy reporting. In majority of the conditions histological diagnosis is corroborative and hence for the final diagnosis good dialogue between clinician, endoscopist, radiologist and pathologist is required [7]. Gastroenterologist heavily relies on the results of biopsy for correct diagnosis [8].

Materials and methods

An institutional based cross sectional observational study was conducted in a tertiary care centre of Navi Mumbai from May 2011-May 2013 in the Department of Pathology in collaboration with Department of General Surgery. The work was initiated after obtaining ethical clearance from Institutional Ethical Committee and informed consent from the study population. The study included endoscopic biopsies of both upper GIT and lower GIT irrespective of age and sex with the exclusion of biopsies of oral cavity and oropharynx, autolysed specimen and inadequate biopsy in terms of no gland or only fibrocollagenous tissue. Endoscopic biopsies were received by punch biopsy, snare polypectomy and endoscopic mucosal resection.

All cases meeting the inclusion criteria within the study period were included. Hence a total of 100 cases were enrolled. A minimum of 4-6 bits were studied in each case. The endoscopic biopsy specimens thus obtained were fixed in 10% formalin. Multiple serial sections 4-6 microns thickness was obtained from paraffin block and was stained routinely with Hematoxylin and Eosin. In cases of gastritis, dysplasia and carcinomas additional sections were stained with Giemsa to show the presence of H. pylori. PAS stain and Alcian Blue were performed wherever necessary. An attempt was made to diagnose the lesion during gross visualization on endoscopy and colonoscopy and to confirm them histopathologically. Data was collected using a pre-designed, pretested semi-structured schedule on variables like clinicopathological profile including age, sex, dietary history, presenting complaints, endoscopic findings and clinical diagnosis. Data was collected by interview, observations, record review and laboratory techniques including histopathology and histochemistry (**Figure – 1 to 6**).

Figure - 1: Endoscope.

Results

The study was divided according to segmental distribution of the anatomical site of biopsies as lower GI biopsies (52 %) more than upper GI biopsies (48%) (**Graph – 1**). The study included 100 biopsies out of which maximum number of biopsies (42%) was from colorectal region. Stomach, esophagus and duodenum comprised 24%, 14% and 8% respectively. The endoscopic biopsies were divided as non-neoplastic (72%) and neoplastic (28%) (**Graph – 2**). Correlation

with age, sex, presenting complaints and endoscopic findings was calculated separately for both these categories.

Figure - 2: Moderately differentiated SCC of esophagus.

Figure - 2A: Endoscopic view of ulceroproliferative growth of SCC of esophagus.

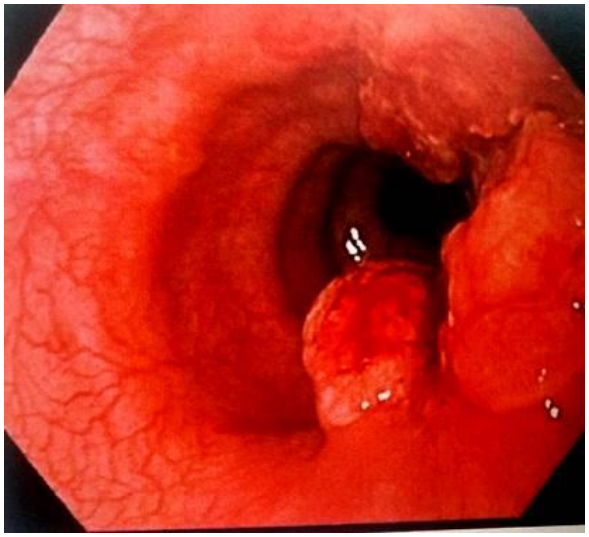
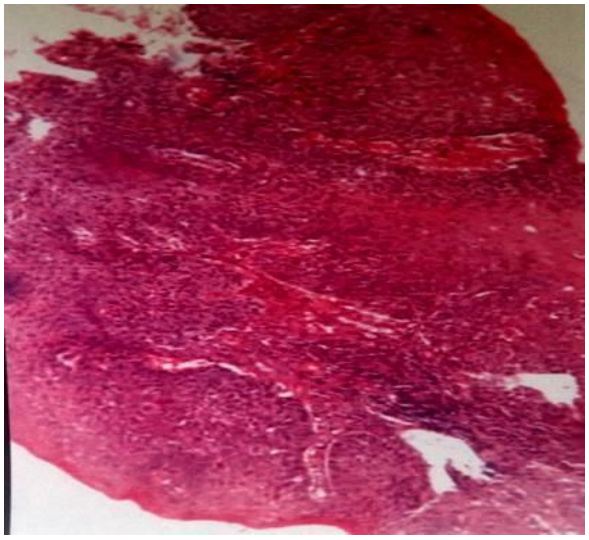


Figure - 2B: Photomicrograph of moderately differentiated SCC of esophagus (H&E, 100X).



Patients with upper GIT lesions presented in the age range of 2nd to 8th decade, the youngest patient being 17 years of age & oldest being 80 years. The mean age group was 40.77 years. Patients with Lower GI lesions presented in the age range of 2nd to 7th decade, the youngest patient being 18 years of age & oldest being 78 years. The mean age group was 54.31 years. Among the neoplastic lesions, the most common was Adenocarcinoma constituting 17 cases followed by 11 cases of SCC. The most common age group was again 56-65 years for both squamous cell carcinoma and Adenocarcinoma, the lowest age being 25 years and highest 80 years.

Figure - 3: Barrett's Esophagus.

Figure - 3A: Endoscopic appearance showing a) Area of red mucosa projecting like a tongue (Barrett's), b) Normal esophagus

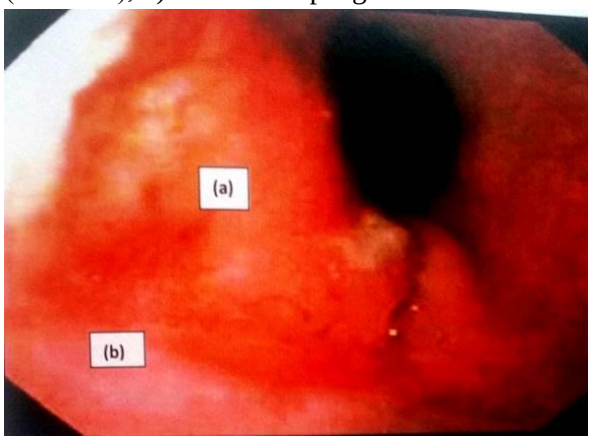
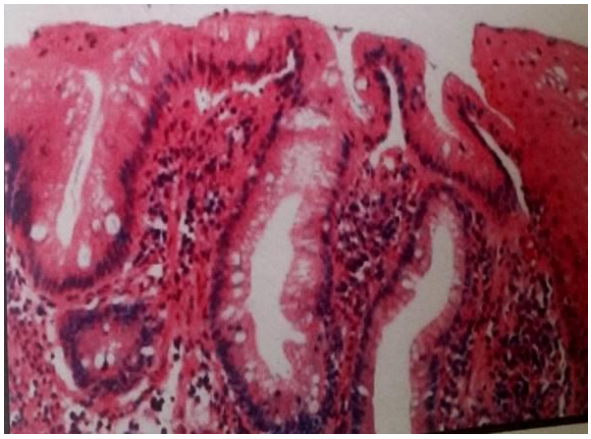


Figure - 3B: Photomicrograph showing typical Barrett's mucosa with columnar epithelium to the left and squamous epithelium to the right. There is intestinal metaplasia (goblet cells in the columnar mucosa) (H&E, 400X).



GIT lesions are more common in males in upper GIT (47.1%) as well as in lower GIT (52.9%) (**Graph – 3**). The non-neoplastic lesions including gastritis and colitis (72%) as well as neoplastic lesions including squamous cell carcinoma & adenocarcinoma (57%) were also commonly seen in males.

Figure - 4: Gastric Adenocarcinoma.

Figure - 4A: Endoscopy shows ulcerative growth of gastric adenocarcinoma.

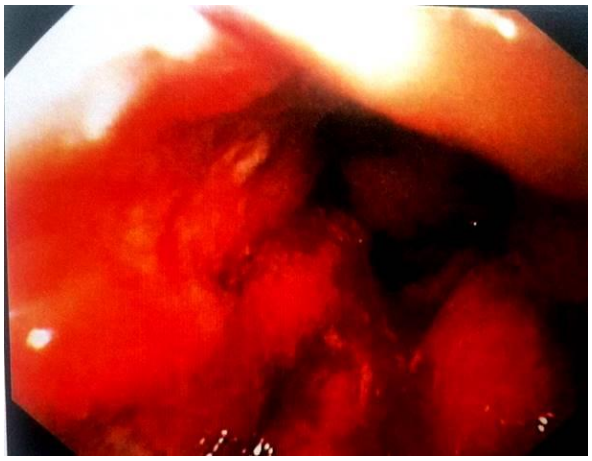


Figure - 4B: Photomicrograph showing gastric adenocarcinoma with atypical glands infiltrating the stroma (H&E X 100).

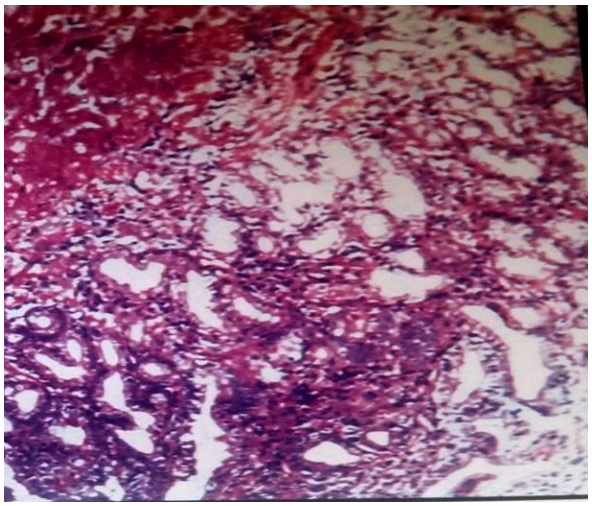


Figure - 5: Villous Adenoma of Colon.

Figure - 5A: Endoscopic appearance of villous adenoma of colon.

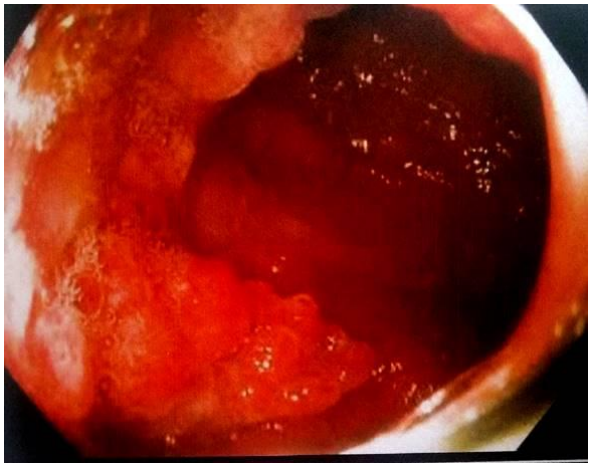


Figure - 5B: Photomicrograph showing villous adenoma showing villi lined by dysplastic cells showing nuclear stratification and pleomorphism (H&E X 100).

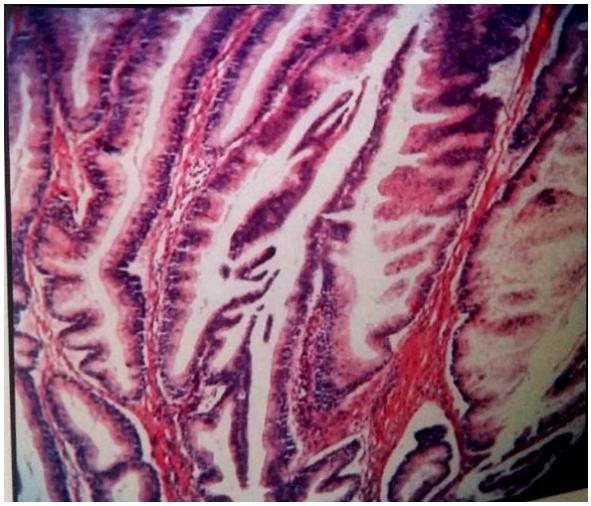


Figure - 6: Adenocarcinoma of colon.

Figure - 6A: Endoscopy showing ulceroproliferative growth of adenocarcinoma colon.

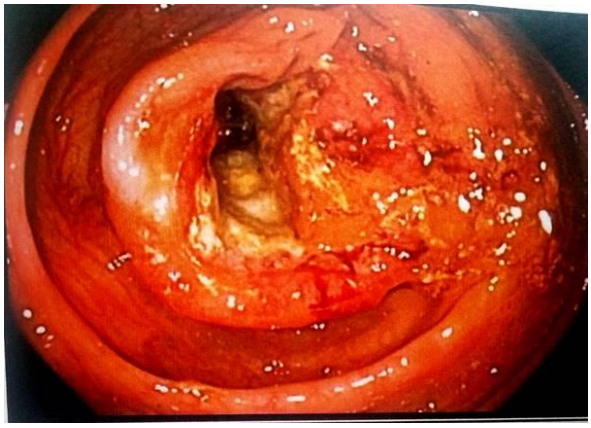
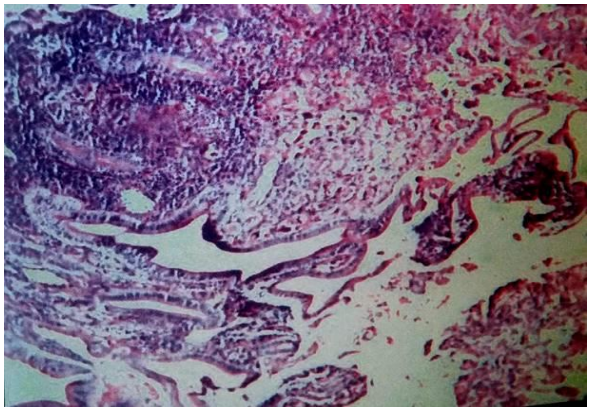
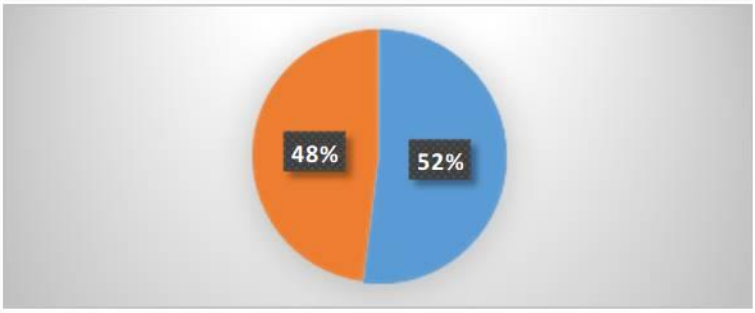


Figure - 6B: Photomicrograph showing histological section of adenocarcinoma colon showing atypical glands infiltrating the stroma (H&E X 100).

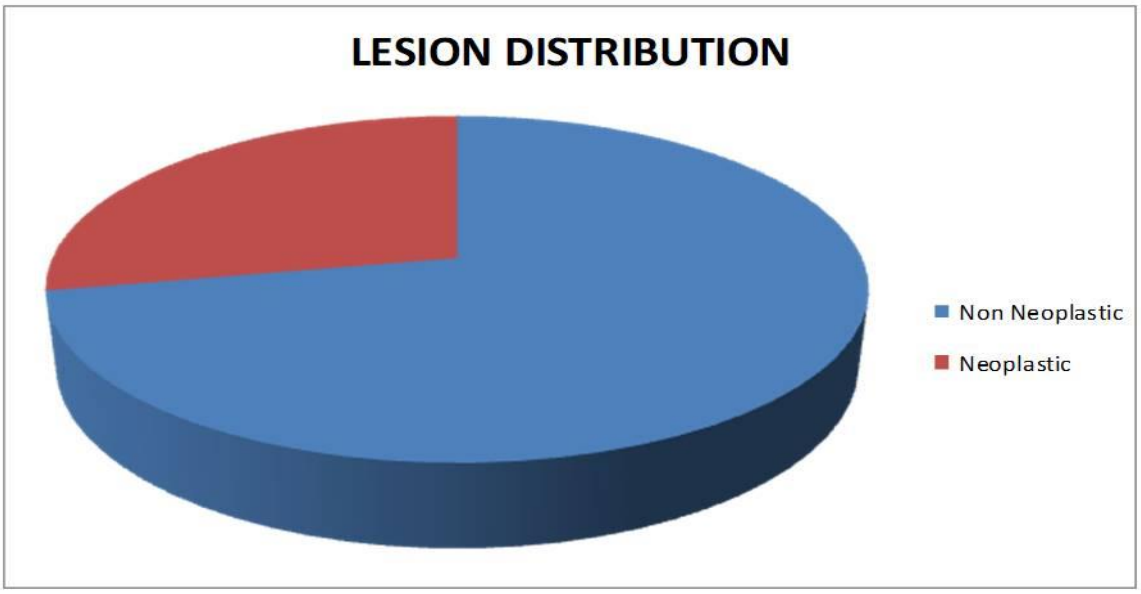


Graph - 1: Segmental distribution of lesions of GIT.



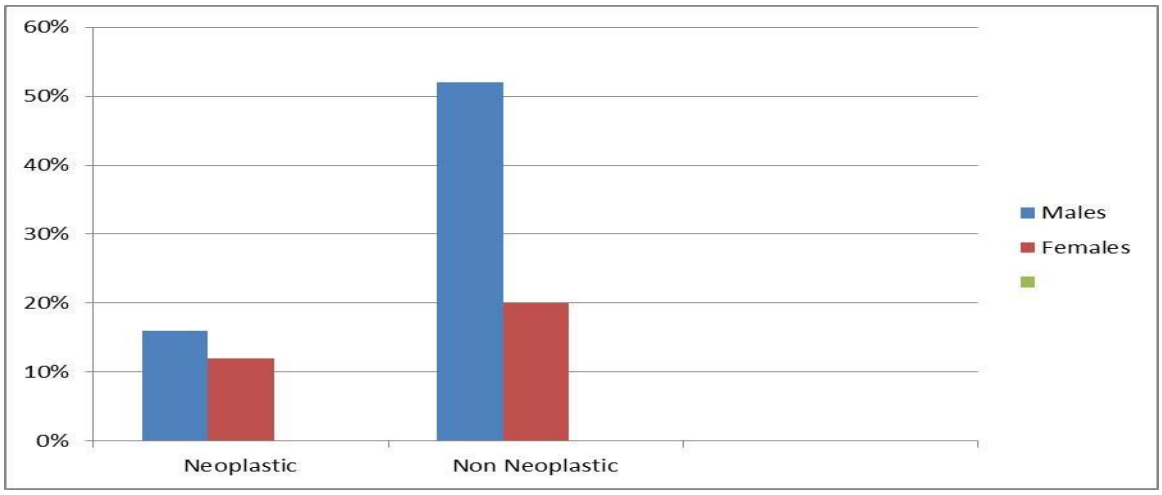
The study was divided according to segmental distribution of the anatomical site of biopsies which included lower GI biopsies (52 %) more than upper GI biopsies (48%).

Graph - 2: Distribution according to lesions of GIT.



The endoscopic biopsies were divided as non-neoplastic (72%) and neoplastic (28%).

Graph - 3: Sex distribution of lesions of GIT.



GI lesions were more common in males in upper GIT (47.1%) as well as in lower GIT (52.9%). The non-neoplastic lesions (72%) as well as neoplastic lesions including (57%) were also commonly seen in males.

Table - 1: Correlation of Endoscopic and Histological findings of Non neoplastic lesions of GIT.

Histopathology diagnosis	Endoscopic Findings				
	Congested mucosa	Polypoidal lesion	Stricture	Ulcerative lesion	Total cases
Barrett's esophagus	0	1	0	0	1
Gastric ulcer	0	0	0	3	3
Chronic Gastritis	0	0	1	6	7
Gastric Polyp	0	1	0	0	1
Duodenitis	0	2	1	1	4
Duodenal polyp	0	1	0	0	1
Duodenal Ulcer	0	0	0	2	2
Ulcerative colitis	0	0	0	11	11
Non-specific colitis	16	0	0	18	34
Proctitis	1	0	0	0	1
T.B Ileum	0	0	1	0	1
Sigmoid Polyp	0	01	0	0	1
Villous Adenoma Colon	0	1	0	0	1
Total	17	7	3	41	68

The most common endoscopic finding in non-neoplastic lesions in GIT was ulcerative lesions 60.29% followed by congested mucosa 25%.

Table - 2: Endoscopic and Histopathological findings of Neoplastic Lesions of GIT.

Histopathology Diagnosis	Endoscopic Findings				
	Polypoidal growth	Proliferative growth	Ulcerative growth	Ulceroproliferative growth	Total Cases
Carcinoma in situ esophagus	1	0	0	0	1
Carcinoma in situ at cardio-esophageal junction	0	0	1	0	1
SCC esophagus	1	1	3	6	11
Adenocarcinoma stomach	2	0	5	2	9
Adenocarcinoma Duodenum	0	1	0	0	1
Adenocarcinoma Colon	1	0	1	1	3
Adenocarcinoma Rectum	1	0	0	1	2
Total	6	2	10	10	28

The neoplastic lesions most commonly presented as ulceroproliferative lesions and ulcerative lesions on endoscopy (35.7%) each followed by polypoid growth (21.4%). Ulceroproliferative findings were most commonly seen in squamous cell carcinoma patients.

Graph - 4: Overall correlation of Endoscopic Diagnosis with Histopathological Diagnosis.

Out of 100 endoscopic cases; 4 cases had no endoscopic findings from endoscopist therefore 96 cases with endoscopic diagnosis was compared with histopathological diagnosis; out of which 63 cases (66%) correlated with final histopathological diagnosis ($p < 0.001$).

Table - 3: Overall correlation of Endoscopic Diagnosis with Histopathological Diagnosis.

Final histopathological diagnosis	Endoscopic findings	Percentage (%)
Correlated	63	66
Not correlated	33	34
Total no of cases	96	100

The most common endoscopic finding in non-neoplastic lesions in GIT was ulcerative lesions 60.29% followed by congested mucosa 25% (**Table – 1**). The neoplastic lesions most commonly presented as ulceroproliferative lesions & ulcerative lesions on endoscopy (35.7%) each followed by polypoid growth (21.4%) (**Table – 2**). Ulceroproliferative findings were most commonly seen in squamous cell carcinoma patients.

Out of 100 endoscopic cases; 4 cases had no endoscopic findings from endoscopist therefore 96 cases with endoscopic diagnosis was compared with histopathological diagnosis; out of which 63 cases (66%) correlated with final histopathological diagnosis (**Graph – 4**, **Table – 3**).

The most common presenting complaint in the non-neoplastic category was pain in epigastrium followed by dyspepsia. In lower GIT the most common presenting complaints were irregular bowel habits followed by bleeding per rectum. The most common oesophageal biopsies were from middle third among which the most common diagnosis was SCC. The bulk of gastric biopsies were received from pylorus followed by body and antrum, majority of which were adenocarcinomas (37.5%). Most common site for small intestinal biopsies was duodenum. Among the duodenal biopsies, majority were from the first part of duodenum with the most common lesion being non-specific duodenitis (33.33%). Most common site for large intestinal biopsies was colorectal region. The most common lesion reported was non-specific colitis (63.46%) followed by ulcerative colitis (21.15%).

Discussion

Biopsy sampling of GI mucosa at endoscopy and colonoscopy provides useful information that helps in the diagnosis of various lesions [9]. In view of this a total of 100 endoscopic biopsies from GIT were included in the study. Majority of biopsies was obtained from colorectal region (**Graph – 2**). The cases were further classified as non-neoplastic lesions which comprised 72% & neoplastic which comprised 28% (**Graph – 3**). According to the study of Fiocca, et al. on endoscopic biopsies; inflammatory lesions outnumbered neoplastic diseases in endoscopic biopsy material which is comparable to the present study [10]. The age and sex distribution,

correlation with presenting complaints and endoscopic findings were calculated separately for both these categories. Patients with upper GIT lesions presented with the mean age of 54.31 years. Patients with lower GIT lesions presented with the mean age of 40.77 years. Mean age of upper GIT lesions was almost similar to the study of Krishnappa, et al. in which there was a predominance of upper GI disease [5]. Age group of non-neoplastic lesions was in younger age range of 2nd to 4th decade. Dysplasia was common in 50-70 year age group, seen in esophagus, stomach and rectum. These findings were similar to the study done by Wei, et al. where mean age group of patients with esophageal dysplasia was 56 years [11]. The neoplastic lesions were most commonly seen in 30-60 years age group similar to a study done by Vidyavathi, et al. and Malik, et al. where the peak age group of upper GIT neoplasms was found to be 51-60 years and 31-60 years respectively [12]. The observations were similar in studies carried out by Bukhari, et al [13].

Over all GIT lesions are more common in males both in upper GIT (47.1%) as well as in lower GIT (52.9%). These findings were similar to the study of Krishnappa, et al. and Shennak, et al. on upper GI lesions [3, 14]. This gender ratio favoring males could be reflective of the fact that males are exposed to more risk factors than females and gastrointestinal malignancies are more common in males according to Paymaster, et al. [15].

Distribution According To Endoscopic Findings

Non-neoplastic lesions (Table – 1)

Non-neoplastic lesions were classified as congested mucosa, polypoidal lesion, stricture formation and ulcerative lesion. The most common endoscopic finding in non-neoplastic lesion was ulcerative (60.29%) followed by congested mucosa (25%).

Neoplastic Lesions (Table – 2)

In the present study, majority of the neoplastic lesions presented as ulceroproliferative lesions and ulcerative lesions on endoscopy (35.7%) followed by polypoid growth (21.4%) (**Table – 2**).

Ulceroproliferative lesions were most commonly seen in SCC of esophagus. This was similar to that found in study by Vidyavathi, et al. [12] and Krishnappa, et al. [3] where SCC of esophagus endoscopically presented mostly as ulceroproliferative lesions.

Esophageal carcinoma presents late in the disease course and hence can be picked up by endoscopy easily and stomach malignancies present mostly as ulcers or flat lesions especially in the younger individuals with diffuse type of carcinoma which may lead to misinterpretation endoscopically [1].

Endoscopic correlation with histopathology

In our study out of 100 endoscopic cases; 96 cases with endoscopic diagnosis was compared with histopathological diagnosis; out of which 63 cases (66%) correlated with final histopathological diagnosis. There was 100% correlation of endoscopic findings of neoplastic lesions of esophagus, stomach and colon to final histopathological diagnosis. This finding differed with mild variation to the study of Krishnappa, et al. where the correlation between endoscopy and histopathology in esophageal carcinoma was 91% and in gastric carcinoma as only 74% [3].

Out of 41 non-neoplasic ulcerative lesions 23 cases matched histopathologically to endoscopic findings. Remaining 18 cases that were endoscopically diagnosed as ulcerative colitis turned out to be non-specific colitis on histopathology. These findings were supported by the study of Mantzaris, et al. which suggested that non-specific colitis can also be used in these biopsies where sometimes gastroenterologist has actually found endoscopic features of colitis but has failed to obtain proper biopsies that would otherwise have given clues to the histological diagnosis and timing of biopsies in relation to the natural history of certain forms of colitis may also be important [16].

P value calculated was < 0.001 which indicates significant correlation of histopathological diagnosis of biopsy with endoscopic/ colonoscopic findings and diagnosis.

Conclusion

Choosing the correct site of biopsy, with adequate clinical information along with meticulous processing of the tissue and reporting by the pathologist in order not to miss any premalignant and malignant lesions is quite important. Diagnostic limitations of endoscopic biopsies are encountered at times due to tiny biopsy material, handling and processing artefacts. Multiple bits of endoscopic biopsies in abnormal looking mucosa are recommended to be obtained to establish a conclusive diagnosis. We therefore conclude that endoscopy is incomplete without biopsy and so the combination of methods provides a powerful diagnostic tool for better patient management.

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