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A Study of Histopathological Spectrum of Gastrointestinal Endoscopic Biopsies in a Tertiary Care Centre

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Abstract: Endoscopy with endoscopic biopsy is currently the major method of diagnosis of gastrointestinal (GI) neoplasms. A total of 60 endoscopic biopsy specimens from upper and lower gastrointestinal tract were studied in the laboratory from November 2013 to October 2014 in the department of pathology, Acharya Shree Chander College of Medical Sciences and Hospital (ASCOMS), Jammu. Of these gastrointestinal biopsies 25 (41.66%) were from upper gastrointestinal tract and 35 (58.33%) were from the lower gastrointestinal tract. Among these upper and lower GI biopsies a total of 35 (58.33%) suspected neoplastic lesions were included in the present study. The biopsies that were included in the study comprised of 6 (10%) esophageal biopsies, 12 (20 %) gastric biopsies, 3 (5%) from GEJ, 4 (6.66%) from duodenum, 2(3.33%) from pyloro-duodenum, 1 (1.66%) from jejunum, 2 (3.33%) from ileum, 14 (23.24%) from colon, 12 (20%) from rectum, 4 (15%) from anus. There are only few studies on histopathological spectrum on GI endoscopic biopsies in Jammu region. ASCOMS is a tertiary care hospital where patients come from all over Jammu region. Analysis of biopsied material therefore can provide a fairly good estimate of spectrum of various gastrointestinal lesions (neoplastic/non-neoplastic/pre-neoplastic) in Jammu region as well as comparison of our results with similar studies in other institutions.
Keywords: Endoscopy, gastrointestinal, pathology, laboratory, esophageal, biopsies.

INTRODUCTION

The gastrointestinal tract which extends from esophagus to anus, spanning a length of 8 meters, is a common site for numerous pathological processes from non-neoplastic, pre-neoplastic to neoplastic[1] Gastrointestinal tumors constitute one of the major causes of morbidity and mortality worldwide and include both benign and malignant tumors. Gastrointestinal malignancies account for 12.9% of all malignant diseases[2]. They continue to be the second leading cause of cancer related deaths in the developed world. The early detection and treatment of gastrointestinal neoplasms has been shown to improve patient's survival significantly.

Endoscopy is a minimally invasive diagnostic medical procedure directly visualizing any part of the inside of the body, using an endoscope. Histopathological studies of biopsy specimens are used to confirm endoscopic diagnosis in suspected malignancy or to rule out in the endoscopically benign appearing lesion. Endoscopy in combination with endoscopic biopsy plays an important role in detecting early cancers and/or high-grade dysplasia and in the diagnosis of upper and lower gastrointestinal tract (GIT) neoplasms and therefore aids in their early management. Distinguishing hyperplasic from neoplastic polyps, differentiating malignant from benign ulcers and detecting mucosal dysplasia in patients with UC or Barrett's esophagus remains within the preview of GI pathologist.

Thus, endoscopic biopsies are performed not only for the diagnosis of the disease but also for monitoring the course, determining the extent of a disease, in responses to therapy and for the early detection of complications.

There are only few studies on histopathological spectrum on GI endoscopic biopsies in Jammu region. ASCOMS is a tertiary care hospital where patients come from all over Jammu region. Analysis of biopsied

material therefore can provide a fairly good estimate of spectrum of various gastrointestinal lesions (neoplastic/non-neoplastic/pre-neoplastic) in Jammu region as well as comparison of our results with similar studies in other institutions.

Aims and Objectives

- To study the patterns of various histopathological lesions of upper and lower gastrointestinal tract in endoscopic biopsy.
- To study the age and sex distribution of various gastrointestinal tract lesions.
- To find the frequency of benign and malignant gastrointestinal tract tumors.

MATERIALS AND METHODS

This prospective study was conducted in the Department of Pathology, Acharya Shree Chander College of Medical Sciences and Hospital, Jammu from 1st November 2013 to 31st October 2014. A total 60 gastrointestinal endoscopic biopsies were evaluated. All the biopsy samples were filter paper mounted and fixed in toto in 10% formalin, followed by conventional tissue processing and embedding. Five micron thick sections were cut and slides were prepared. Each section were stained with Haematoxylin and Eosin and studied. All tumors were classified according to the WHO classification.

RESULTS

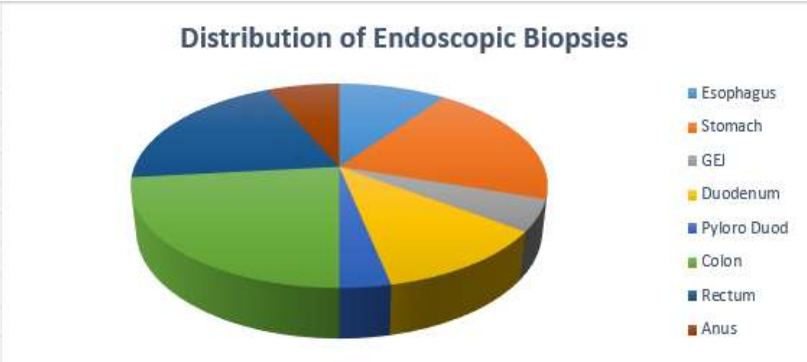
The present study was carried out for a period of 1 year, from to 1st November 2013 to 31st October 2014, at the Acharya Shri Chander College of Medical Sciences and Hospital, Jammu (J&K) in Department of Pathology.

Table-1: Distribution of GI Endoscopic Biopsies

Site	No of Biopsy	Number (%)
Esophagus	6	10.00%
Stomach	12	20.00%
GEJ	3	5.00%
Duodenum	7	11.67%
Pyloro Duod	2	3.33%
Colon	14	23.33%
Rectum	12	20.00%
Anus	4	6.67%
Total	**60**	**100.00%**

DISTRIBUTION OF ENDOSCOPIC BIOPSIES

The study included 60 GI endoscopic biopsies. The upper gastrointestinal tract biopsies were 30 (50 %) out of which 6 were esophageal, 12 were from stomach, 3 from esophagogastric junction, 7 biopsies were from duodenum and 2 from the Pyloro-duodenum. The lower gastrointestinal biopsies were 30 (50%) out of which 14 were from the colon, 12 from rectum, 4 biopsies from anus.



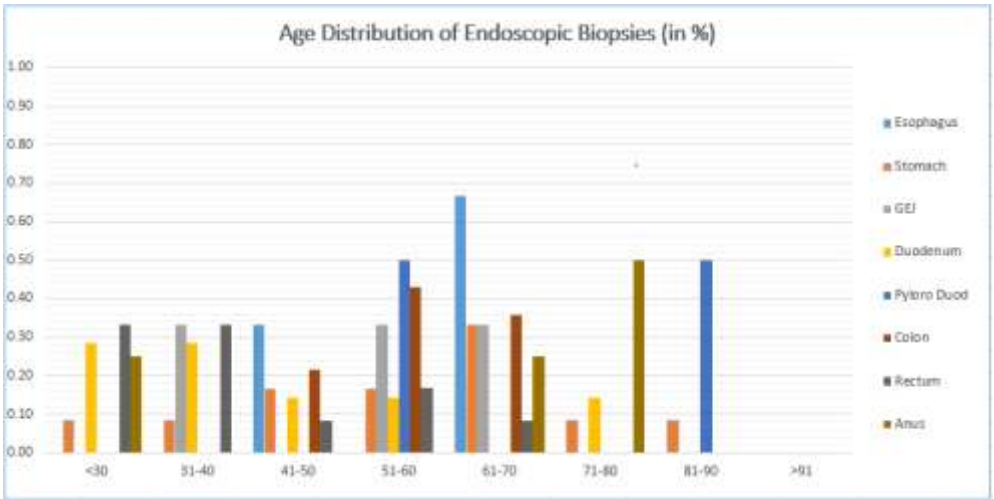
Graph-1: Distribution of GI Endoscopic Biopsies

Table-2: Age distribution of endoscopic biopsies

Age (in yrs)	SITE								
	Esophagus	Stomach	GEJ	Duodenum	Pyloro Duod	Colon	Rectum	Anus	Total
<30		1		2			4	1	8
31-40		1	1	2			4		8
41-50	2	2		1		3	1		9
51-60		2	1	1	1	6	2		13
61-70	4	4	1			5	1	1	16
71-80		1		1				2	4
81-90		1			1				2
>91									0
Total	6	12	3	7	2	14	12	4	60

The age of the patients ranged from 2 days to 86 years. The peak age incidence for patients with esophageal cancer was the 7 th decade. The youngest patient with esophageal cancer was 43 yrs and oldest was 72 yrs of age.

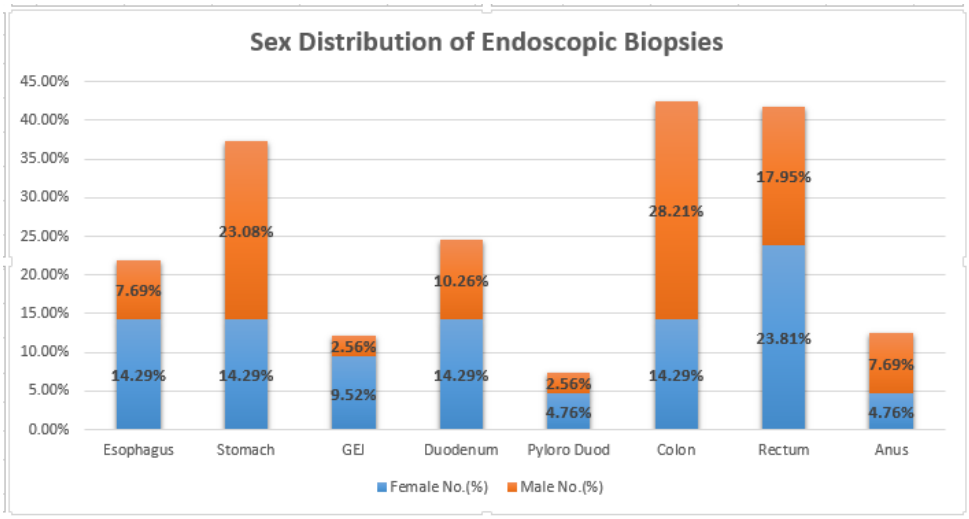
The maximum number of gastic cancer was in 6th and 7 th decade with peak incidence in 7th decade (33.33%). The youngest patient with gastric cancer was 45 yrs and oldest was 87 yrs. The maximum number of colon carcinoma was in 6th decade and 7th decade with peak in 6th decade with age ranging from 45yrs to 70yrs.



Graph-2: Age Distribution of Endoscopic Biopsies

Table-3: Sex distribution of GI Endoscopic Biopsies

Site	Sex		Total
	Female No.	Male No.	
Esophagus	3	3	6
Stomach	3	9	12
GEJ	2	1	3
Duodenum	3	4	7
Pyloro Duod	1	1	2
Colon	3	11	14
Rectum	5	7	12
Anus	1	3	4
Total	**21 (35%)**	**39 (65%)**	**60 (100%)**



Graph-3: **Sex Distribution of GI Endoscopic Biopsies**

The study, which included 60 patients, showed male preponderance for all sites in

The upper and lower gastrointestinal tract with 39 (65%) male patients and 21 (35%). female patients. The male: female ratio was 1.8:1.

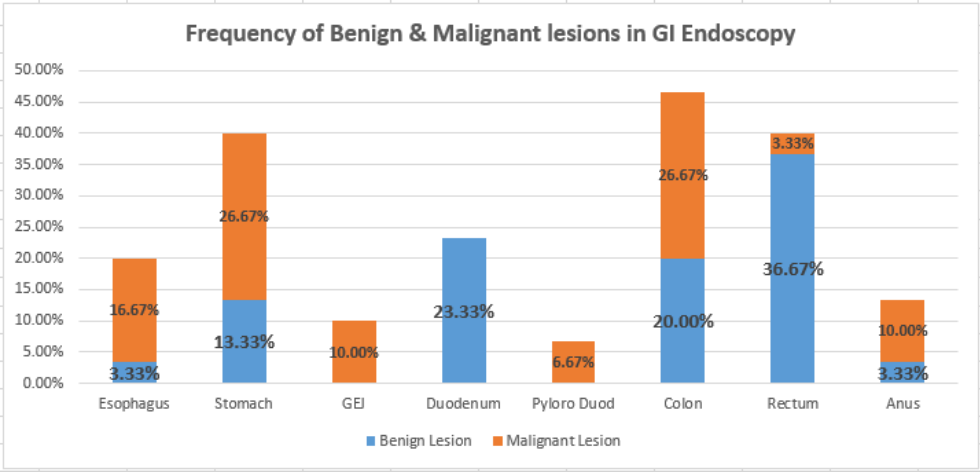
The male: female ratio for esophageal cancer was 1:1.

The male: female ratio for stomach cancer was 3:1.

The male: female ratio for colon cancer was 3.7:1.

Table-4: Frequency of Benign and Malignant Lesions in GI Endoscopic Biopsies

Site	Benign Lesion	Malignant Lesion	Total
Esophagus	1	5	6
Stomach	4	8	12
GEJ	0	3	3
Duodenum	7	0	7
Pyloro Duod	0	2	2
Colon	6	8	14
Rectum	11	1	12
Anus	1	3	4
Total	30	30	60



Graph-4: **Frequency of Benign and Malignant lesions in GI Endoscopic Biopsies**

In the present study the total number of malignant lesions were higher in esophagus (16.67%), stomach (26.67%) and colon (26.67%) in GI endoscopic biopsies, colon cancers and stomach cancers constituted more than half (53.34%) of the malignant lesions of GI

biopsies whereas rectal biopsies and duodenal biopsies constituted 60% of all the benign GI lesions.

Table-5: Histopathological Spectrum of Upper and Lower GI Endoscopic Biopsies

	Site	Lesion	No.	Total
Upper GI lesions	Esophagus	Squamous Cell Carcinoma	4	6
		Basosquamous Carcinoma	1	
		Non specific inflammation	1	
	Stomach	Adenocarcinoma , Intestinal type	2	12
		Adenocarcinoma , Diffuse type	2	
		GIST	2	
		Carcinoid	1	
		MALToma	1	
		Gastric Ulcers	3	
		Non specific inflammation	1	
	GEJ	Adenocarcinoma , Intestinal type	2	3
		Adenocarcinoma , Diffuse type	1	
	Duodenum	Duodenal Ulcer	1	7
		Villious Atropy	2	
		Non specific inflammation	1	
		Villous Adenoma	1	
		Tuberculosis	1	
		Normal Biopsy	1	
	Pyloro Duod	Signet ring cell carcinoma	1	2
		Adenocarcinoma , diffuse type	1	
	Colon	Adeno Carcinoma	5	14
		Signet ring cell Carcinoma	1	
		Carcinoid	1	
		Hyperplastic polyp	1	
		Serrated Adenoma	1	
		Tubular Adenoma	2	
		Necrotizing Colitis	1	
		Ulcerative Colitis	1	
		Intraepithelial Neoplasia	1	
	Rectum	Rectal Polyp / Polyposis	5	12
		Chronic Proctitis	2	
		Aganglionosis	1	
		Adenocarcinoma	1	
		Villous Adenoma	1	
		IBD	1	
		Normal Biopsy	1	
	Anus	Round Cell Tumors	2	4
		Squamous Cell Carcinoma	1	
		Hyperplastic polyp	1	

Table-6: Frequency of Benign Vs Malignant Tumors in GI Endoscopic Biopsies

Site	Total No. of Biopsy	Benign Tumor	Malignant Tumors
Esophagus	6	-	Squamous Cell Carcinoma (4)
			Basosquamous Carcinoma (1)
Stomach	12	-	Adenocarcinoma , Diffuse type (2)
			GIST (2)
			Adeno Carcinoma (2)
			Carcinoid Intestinal (1)
			MALToma (1)
GEJ	3	-	Adenocarcinoma , Diffuse type (1)
			Adenocarcinoma , Intestinal type (2)
Duodenum	7	Villous Adenoma (1)	-
Pyloro Duod	2	-	Adenocarcinoma , Diffuse type (1)
			Signet ring cell Carcinoma (1)
Colon	14	Tubular Adenoma (2)	Adeno Carcinoma (5)
		Serrated Adenoma (1)	Signet ring cell Carcinoma (1)
			Carcinoid (1)
Rectum	12	Villous Adenoma (1)	Adeno Carcinoma (1)
Anus	4	-	Round Cell Tumors (2)
			Squamous Cell Carcinoma (1)
Total	60	5	28

DISCUSSION

Age and sex incidence age incidence

Patients with upper gastrointestinal neoplasms presented between ages ranging from 2 days to 8th decade. The youngest patient was 2 days old and the oldest was 87 yrs old. The mean age of the patients was 52 yrs. The peak age incidence was seen in the 6th and 7th decade (56.31%). (Table 2, Graph 2). Patients with esophageal cancer presented with ages ranging from the 3rd to 8th decade. The youngest patient was 43 yrs and the oldest was 68 yrs. The mean age of the patients was 59.5 yrs with a peak (66.66%) between the 6th to 7th decades. The observations were similar in studies carried out by Gauri-Bazaz-Malik[3]. Which showed a peak (83.32%) between the 5th to 7th decades (Table 7).

However, in the present study the age distribution of esophageal cancer was seen to be a decade earlier (4th decade) when compared to the GBM studies. The earlier age at presentation of patients with esophageal cancer could be attributed to the role of dietary, environmental and genetic factors. Patients with gastric cancer presented with ages ranging from the 2nd to 9th decade.

The youngest patient was 28 yrs and the oldest was 87 yrs. The mean age of the patients was 58.66 yrs with a peak (33.33%) in the 6th to 7th decade. The observations were similar to those seen in studies carried out by Gauri-Bazaz- Malik which showed a peak (56.44%) in the 5th and 6th decades (Table 11) However, other studies carried out report a peak in the 7th decade. The earlier peak of the age incidence in the present study could be attributed to the role of dietary, environmental and genetic factors. The occurrence of gastric cancer at later age groups could be attributed to the increased longevity of the general population due to improved medical care[4]. Cancers of the EGJ presented with a mean age of 55.66 yrs and were found to be evenly distributed (33.33% each) from the 3rd to the 7th decade. Patients with duodenal neoplasms presented with a mean age of 47.75yrs and were seen to be distributed equally (25 % each) in between the 2nd and the 8th decade.

Table-7: Showing age and site distribution of esophago gastric malignancies

Age (in years)	Esophagus		Stomach	
	GBM study (%)	Present study (%)	GBM study (%)	Present study (%)
11-20	-	-	-	-
21-30	-	-	11.29	8.33
31-40	16.66	-	17.74	8.33
41-50	30.55	33.33	32.25	16.66
51-60	25	-	24.19	16.66
61-70	27.77	66.66	12.9	33.33
71-80	-	-	1.61	8.33
81-90	-	-	-	8.33
91-100	-	-	-	-

Patients with pyloro-duodenal neoplasms presented with a mean age of 73 yrs and were seen to be distributed equally (50% each) in the 5th and the 8th decade, one patient (100%) with malaborption in jejunum presented with age of 18 years, patient with ileal neoplasms presented with age between 3rd to 5th decade. Patients with colonic lesions and neoplasms presents with ages ranging from 42 to 70 yrs mean age of 52.75 yrs, 3 (21.42%) between 4th-5th decade, 6 (42.85%) between 5th-6th decade and 5 (35.71%) between 6th-7th decade. Patients with rectal biopsies ranged from less than 3rd decade to 7th decade with youngest patient of 2 days and oldest age of 62 yrs. The mean age of rectal biopsy lesions was 49 yrs with peak distribution in 4 (33.33%) less than 3rd decade, 4 (33.33%) in 3rd to 4th decade. Patients with anal biopsy ranged from 18 yrs to 78 yrs with a mean age of 42.5yrs.

SEX INCIDENCE

The gastrointestinal tract lesions including benign, malignant and pre-malignant were more common in males (65%) than females (35 %). The male: female ratio was 1:0.65 (Table 3, Graph 3) esophageal cancers showed an equal male and female preponderance with 3 (50%) male and 3 (50%) female patients. The male: female ratio for was 1:1 (3 male patients and 3 female patients). Gastric cancer was more common in males (75%) as compared to females (25%). The male: female ratio was 3:1 (9 males and 3 females). Other studies on gastric cancer observed that, it had a male: female ratio of 2:1. The slight difference in the incidence could be attributed to differences in habits, dietary factors, and role of genetic factors or presence of a low socioeconomic status [5,6]. Patients with EGJ cancers showed a female preponderance (66.66%) and duodenal and pyloro-duodenal and ileal neoplasms showed an equal male and female preponderance. Patients with colonic lesions showed a male

preponderance (78.57%), rectum (58.33%) and anus (75%).

SPECTRUM OF NEOPLASMS

ESOPHAGEAL NEOPLASMS

Of the 6 esophageal biopsies studied, 5 (83.33 %) were malignant neoplasms, and 1 (16.67%) was nonspecific inflammation. SCC was the most common malignancy in the esophagus- 3 (50%) cases. The other malignant neoplasms were Basosquamous (16.66%), dysplasia (16.66%), and a benign nonspecific inflammation. SCCs and basosquamous carcinoma formed 66.66 % of the total esophageal cancers (Table 6). Other studies showed similar findings where more than 90% of esophageal cancers were squamous cell carcinomas and adenocarcinomas [7].

SQUAMOUS CELL CARCINOMA

Among the patients presenting with SCC esophagus, the most common type of presentation was infiltrative growth in 50 %, followed by polypoidal and nodular (25%) each. Other studies noted that esophageal SCC is commonly seen in the middle and lower third[8] with most of them presenting as circumferential, often ulcerated lesions[9]. In the present study moderately differentiated SCC accounted for 100 % (>66.66%) of all cases, while well differentiated and poorly differentiated SCC cases were not seen. The well differentiated tumors were characterized histologically by high proportion of large, differentiated, keratinocyte like squamous cells and a low proportion of basal-type cells, which are located in the periphery of the cancer cell nests. Poorly differentiated tumors predominantly consist of basal-type cells, which usually exhibit a high mitotic rate. Moderately differentiated carcinomas are characterized histologically by intermediate features between the well and poorly differentiated types. Esophageal SCCs are most often well differentiated or moderately differentiated [8] and moderately differentiated SCC accounts for 60% of all cases of SCC [9].

BASALOID SQUAMOUS CELL CARCINOMA

The term Basaloid SCC was first proposed by Wain et al in 1986[10]. The present study had 1 case of Basaloid squamous cell carcinoma, with the commonest location being the mid third of esophagus. The commonest type of presentation was an infiltrative growth; it was characterized histologically by the presence of a basaloid pattern, intimately associated with SCC, dysplasia or focal squamous differentiation. Xin Hua *et al*. [12] in his study on 16 cases of BSC found that most neoplasms were in the mid third of the esophagus the common presentations being protuberant, ulcerative and infiltrative growths [11].

GASTRIC NEOPLASMS

The present study included 12 gastric biopsies of which 8 (66.66%) were neoplastic. All the neoplasms were malignant. The 8 neoplasms comprised of cases of diffuse (25%) and tubular (25 %) adenocarcinoma, two cases of GIST (25%) and a single case of carcinoid tumor and MALToma (12.5% each). Of the 4 remaining cases there were 3 cases of gastric ulcer and a benign case negative for neoplasia (Table 5). Various studies have noted that adenocarcinomas account for 90-95% of gastric cancers [12]. This did not much correlate with the present study where adenocarcinomas constituted 50% of all gastric cancers. 2 cases of GIST on gross examination the mucosa showed a polypoidal growth measuring 8 cms across, with the cut surface appearing gray- white and showing areas of necrosis, hemorrhage and cystic change. Microscopic examination revealed, a submucosal lesion comprising of fascicles of spindle cells with pale eosinophilic cytoplasm and spindle shaped nuclei. Focal areas of nuclear palisading were seen. There were 10 mitotic figures per 50 HPF. A diagnosis of Malignant GIST was given.

GASTRIC ADENOCARCINOMA

The commonest site of presentation of gastric adenocarcinoma was the antrum and prepylorus. One case showed involvement of the entire stomach. There were 2 cases of recurrence, where involvement of gastrojejunostomy stoma was seen. The types of growth encountered more ulcerative in 50 %, infiltrative in 50 %. Similar findings were noted in other studies with the commonest site being the antrum and the commonest type of presentation being ulceration[13].When the histopathological types of gastric adenocarcinomas were considered- 50 % were tubular adenocarcinomas, 50 % were diffuse carcinomas. The tubular adenocarcinomas were characterized histologically by the presence of branching tubules of varying sizes lined by columnar to cuboidal cells with eosinophilic cytoplasm and hyperchromatic nuclei. Moderately differentiated tubular adenocarcinoma accounted for 77.77% of the cases while the well differentiated and poorly differentiated forms each accounted for 11.11% cases. The diffuse adenocarcinomas were characterized histologically by the presence of poorly cohesive small round cells diffusely infiltrating the gastric wall either singly or in a reticular fashion. There was little or no gland formation.

CARCINOID TUMORS

In the present study, we encountered one case (12.5%) of gastric carcinoid in a 75 year old female patient who presented with a small polypoid growth in the body (Table 6). It was characterized histologically by the presence of cells were arranged in acinar and trabecular pattern. The cells were small, uniform with finely granular eosinophilic cytoplasm and oval nuclei with stippled chromatin. Other studies have observed that gastric carcinoids make up <1% of all gastric neoplasms and that they are almost always located in the fundus and body[14].

Gastrointestinal stromal tumor

The 2 cases of GIST (25 %) in our study were seen in a 65 year old male and a 57 year old male who presented with a submucosal polypoidal growth in the body (Table 6). The microscopy showed fascicles of spindle shaped cells, with pale eosinophilic cytoplasm and spindle to ovoid nuclei with fine chromatin. Similar findings were observed in other studies where GISTs account for 2.2% of malignant gastric tumors, affecting adults between 6^{th} and 8^{th} decade and presenting commonly as serosal, submucosal or intramural nodules[15].

ESOPHAGOGASTRIC JUNCTION (EGJ) NEOPLASMS

The present study had 3 cases of adenocarcinoma of the esophagogastric junction, out of which 2 (75%) cases had a polypoid growth with 1 case (25%) having an infiltrative growth. The histology of the biopsies showed features of tubular adenocarcinoma with 1 case (33.33%) being moderately differentiated and other case well differentiated (33.33%) and one case (33.33%) of diffuse type. Adenocarcinomas of the EGJ are defined as those adenocarcinomas that straddle the junction of the esophagus and stomach. The definition includes many tumors formerly called cancers of the gastric cardia. These adenocarcinomas are graded microscopically as well differentiated, moderately differentiated or poorly differentiated tumors [16].

DUODENAL NEOPLASMS

The present study had 4 duodenal biopsies of which all the 4 (100%) were non neoplastic. Of these 4 neoplasms, 1 (25%) was case of duodenal ulcer, 1 (25%) was a case of malabsorption, 2 other cases showed nonspecific inflammation and a normal biopsy findings.

COLONIC LESIONS

The present study had 14 colonic biopsies showed a variable spectrum composed of both benign and malignant lesions. 11 (78.57%) out of 14 biopsies were neoplastic both premalignant and malignant. The most common malignant lesion studied was Adenocarcinoma Colon 5 cases (35.7%) most commonly well differentiated type. 1 (9.09%) Case of Signet ring cell carcinoma was seen in a 62 year male patient. A 45 year male showed featured of a Carcinoid. 3 (21.4%) cases were adenoma, one serrated type and two other tubular polyp, believed to be a neoplastic lesion. A 51year male presented with a case of Necrotizing Colitis and one patient (7.14%) presented with Ulcerative colitis and one (7.14%) with a Hyperplastic polyp.

RECTAL LESIONS

Out of the 12 rectal biopsies, 8 (66.66%) were non neoplastic with 5 (62.5%) diagnosed as rectal polyp/polyposis, 2 (25%) with chronic proctitis and one normal biopsy. A 2 days baby presented with features of Aganglionosis. The remaining 3 biopsies showed 2 pre neoplastic lesions, one was case of villious adenoma and other of IBD. 1 (16.66%) lesion was neoplastic showing features of Adenocarcinoma Ca Rectum.

ANAL LESIONS

Out of 4 anal biopsies, 3 (75%) were malignant lesions with 2 cases showing a round cell tumor with one having histomorphological features of alveolar rhabdomyosarcoma having round cells in nests or sheets , some dyscohesive cells with alveolar pattern and one case of squamous cell carcinoma, moderately differentiated .1 (25%) case of hyperplastic polyp in a 73 yr male.

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