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Research Article

Panorama of neoplasms of upper GI tract: a 5 year research study

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ABSTRACT

Background: The diseases of the gastrointestinal tract (GIT) are the most common and leading cause of morbidity and mortality than the disorders of any other systems of the body. Gastrointestinal (GI) tract tumors are one of the most common cancers accounting for 11% of all cancers. Among these tumors, upper gastrointestinal tract malignancies are quite aggressive with a dismal prognosis. Malignant tumors are most common than benign. The most common carcinoma of the esophagus is Squamous cell carcinoma (SCC). Incidence of SCC is less than 5 per 100,000 populations in males and 1 per 100,000 populations in females. Gastric cancer was the second most common cancer in the World and 60% of them occurred in developing countries. The most common carcinoma of the Stomach is Adenocarcinoma.
Aim & Objectives: To study the spectrum of neoplastic lesions of the upper gastrointestinal tract by the examination of endoscopic biopsies and surgically resected specimens. To determine the degree of severity of the malignancies by assessing the depth of invasion, Lymph nodal & Omental spread.
Methods: The present study is both retrospective & prospective study for a period of 5 years from January 2007 to December 2011. The sample size includes all the endoscopic biopsies & surgically resected specimens of gastrointestinal tract received at Department of Pathology, S.V. Medical College, Tirupati. The study also obtained clearance from the ethical committee of the institution. The biopsy specimens thus obtained were fixed in 10% buffered neutral formalin. The sections were stained routinely with H & E. Special stains and IHC done wherever necessary.
Results: we have received 120 specimens regarding the upper gastrointestinal system. Among these 120 specimens, 71 specimens were endoscopic biopsies & 49 specimens were surgically resected specimens. Out of 71 Endoscopic biopsies 28 biopsies were malignant among which 2 was esophagus and 26 were stomach. Out of 49 surgically resected specimens 1 was benign and 32 were malignant tumors. Out of 59 neoplasms of stomach there were single cases each of Sub mucosal Lipoma, Malignant lymphoma, GIST & 56 cases of Adenocarcinoma & its variants were noted.
Conclusion: Most of the neoplasms are of stomach (97%). All the neoplasms are malignant except one benign lesion sub mucous lipoma of stomach. Most of the neoplasms of stomach were Adenocarcinoma (96.5%). Both tumors of esophagus were squamous cell carcinoma occurred after 50 years of age.

Keywords: Upper GI tract, Neoplasms, Research, Study

INTRODUCTION

Upper gastrointestinal tumors include those arising from the esophagus, stomach, and first and second part of duodenum. Esophageal cancer is the 6th most frequent tumor disease worldwide. It is characterized by rapid development and fatal prognosis in most cases. The highest incidence age group is 50–70 years. The disease

is more common in males with male, female ratio of 3–5:1. The most frequent histological type is squamous cell carcinoma. Nearly 90% of the risk of SCC can be attributed to tobacco and alcohol.[1] Five-year survival is less than 5%.[2] Squamous Cell Carcinoma: The gross appearance varies according to whether it is detected in an early or an advanced stage of the disease. Among early SCC, polypoid, plaque-like, depressed and occult lesions have been described. According to Ming there are three major macroscopic patterns of advanced oesophageal SCC: fungating, ulcerative, and infiltrating. Similar types of macroscopic growth patterns have been defined in the classification of the Japanese Society for Esophageal Diseases.[3, 4] The majority of primary adenocarcinomas arise in the lower third of the esophagus within a segment of Barrett mucosa. Adjacent to the tumor, the typical salmon-pink mucosa of Barrett esophagus may be evident. Gastric cancer was the second commonest cancer in the world in 1990. Intestinal type of Adenocarcinoma is more common in high-risk areas, while the diffuse type is relatively more common in low-risk areas. Gastric carcinoma is extremely rare below the age of 30 with highest rates in the older age groups, both in males and females. Diffuse carcinoma tends to affect younger individuals, mainly females, whereas intestinal type common in old age with male preponderance.[5] Most gastric adenocarcinomas involve the gastric antrum & the lesser curvature is involved more than the greater curvature. Intestinal type of Gastric tumors form bulky tumors composed of glandular structures may penetrate the gastric wall forming an exophytic mass or an ulcerated tumor. Diffuse gastric cancers evoke a desmoplastic reaction that stiffens the gastric wall with large areas of infitration, diffuse rugal flattening and a rigid, thickened wall giving a leather bottle appearance termed linitis plastica. The Borrmann classification is based on gross appearance.[6] According to Borrmann, ulcerating types II or III are more common. Diffuse (infiltrative) tumors (type IV) results in linitis plastica or leather bottle stomach. Mucinous adenocarcinomas appear gelatinous with a glistening cut surface.[7] Superficial-spreading cancer is a subtype of early cancer and is defined as a tumor >4 cm in diameter that is confined to the mucosa or with minimal invasion of the submucosa. Nodal metastases may accompany early gastric cancers & their frequency correlates with the depth of tumor penetration into the submucosa . Nodal metastases also directly relate to tumor size and the presence of ulceration. Early" gastric carcinoma is defined by the Japanese authors as a carcinoma confined to the mucosa or to the mucosa and submucosa regardless of the status of the regional lymph nodes. Advanced Lymphomas mostly MALT Lymphomas present as giant convolutions mimicking hypertrophic gastritis or gastric polyps. Mantle cell lymphoma (MCL) typically present as an isolated mass or as multiple polyps.[8] Small gastric GISTs appear as serosal, submucosal or intramural nodules. Some of them may ulcerate & the larger tumors protrude intraluminally or to the serosal side, and may have a massive extragastric component.

Endoscopy is a visual examination of the gastrointestinal tract using a lighted, flexible fiberoptic or video endoscope. This was most sensitive and specific diagnostic method for the early detection of gastrointestinal cancers. These neoplasms are often diagnosed by endoscopy in combination with biopsy.[9, 10] Histopathological examination of resected specimens will aid in confirmatory diagnosis, Type of tumor, Staging & Grading of tumor and predicting the prognosis after surgical resection.

METHODS

The present study is both retrospective & prospective study for a period of 5 years from January 2007 to December 2011. The sample size includes all the endoscopic biopsies & Surgically resected specimens of gastrointestinal tract received at Department of Pathology, S.V. Medical College, Tirupati. Brief clinical data was noted from the case records, which included the age and sex of the patients, relevant habits if any, presenting symptoms, endoscopic findings and diagnosis. The study also obtained clearance from the ethical committee of the institution. The biopsy specimens thus obtained were fixed in 10% buffered neutral formalin. Surgically resected specimens are described by mentioning the site, measurement, appearance, location and size of the growth/ lesion, number of Lymph nodes identified and their cut section. All the endoscopic bits from each case were embedded together for ideal visualization. Sections were taken from resected margins, different areas of the lesion, each lymph node and omentum of 2-3 millimeters thick and subjected to tissue processing. The sections were stained routinely with Hematoxylin and Eosin. Other special stains like Periodic acid Schiff (PAS), Mucicarmine, Alcian blue and Reticulin stains were performed wherever necessary for the additional sections. Immunohistochemistry (IHC) done for gastrointestinal stromal tumor & malignant lymphoma of Stomach. The lesions were diagnosed as per WHO classification of tumors. The clinical and histological data so obtained were analyzed.

RESULTS

From January 2007 to December 2011, we have received 120 specimens regarding the upper gastrointestinal system. Among these 120 specimens, 71 specimens were endoscopic biopsies & 49 specimens were surgically resected specimens. Out of 71 Endoscopic biopsies 28 biopsies were malignant among which 2 was esophagus and 26 were stomach. Out of 49 surgically resected specimens 1 was benign and 32 were malignant tumors (Table 1).

Both the tumors in esophagus were squamous cell carcinomas (Figure 1). Out of 59 neoplasms of stomach there were single cases each of Sub mucosal Lipoma (Figure 10), malignant lymphoma (Figures 7 and 8), GIST (Figures 4 and 5) & 56 cases of Adenocarcinoma & its variants were noted.

Table 1: Types of specimens received.

Site	Endoscopic biopsies			Surgically resected specimens		
	Received	Benign	Malignant	Received	Benign	Malignant
Esophagus	4	0	2	0	0	0
Stomach	60	0	26	49	1	32
Duodenum	7	0	0	0	0	0
Total (120)	71	0	28	49	1	32

Table 2: Site wise distribution of upper GI neoplasms.

S.No	Site	No of specimens	Benign tumours	Malignant tumors	Total no. of tumors
1	Esophagus	4	…	2	2 (1.6%)
2	Stomach	109	1	58	59 (49.1%)
3	Duodenum	7	…	…	
	Total	120	1	60	61 (50.8%)

Table 3: Histopathological types of upper GI neoplasms.

S. No	Location	Benign type	No. of lesions	Malignant type	No. of lesions
1	Esophagus	…	…	MDSCC	1
2			…	PDSCC	1
3	Stomach	Lipoma	1	WDAC	10
4				MDAC	20
5				PDAC	11
6				MAC	5
7				SRAC	5
8				PAC	4
9				TAC	1
10				ML	1
11				GIST	1
	Total (61)		1		60

MDSCC = moderately differentiated squamous cell carcinoma
PDSCC = poorly differentiated squamous cell carcinoma
WDAC = Well differentiated adenocarcinoma
MDAC = moderately differentiated adenocarcinoma
PDAC = poorly differentiated adenocarcinoma
MAC = Mucinous adenocarcinoma
SRAC = Signet ring cell adenocarcinoma
PAC = Papillary type adenocarcinoma
TAC = Trabecular type adenocarcinoma
ML = Malignant lymphoma
GIST = Gastrointestinal stromal tumor

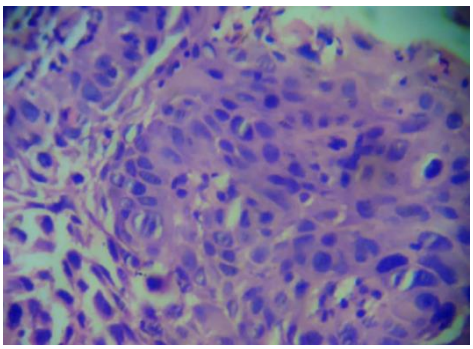

Figure 1: Endoscopic Biopsy of Esophagus showing moderately differentiated Squamous cell Carcinoma, H&E - 40X.

Out of 61 Upper GI neoplasms (Esophagus - 2 & Stomach - 59) , 14 (22.9%) neoplasms occurred between 41 to 50 years of age group & 39 (64%) neoplasms occurred in more than 50 years of age group (Table 4). Both the Squamous cell carcinomas of Esophagus occurred after 50 years of age.

IHC Profile

IHC was done for 1 case of gastrointestinal stromal tumor & 1 case of malignant lymphoma of stomach. The GIST case showed CD 117 +ve (Figure 6A), CD 34 +ve, Actin +ve (Figure 6B), PDGFR-β +ve (Figure 6C), Vimentin +ve (Figure 6D) & Desmin -ve. Malignant Lymphoma case showed LCA +ve (Figure 9A), L 26 +ve (Figure

9B), Cytokeratin -ve, EMA -ve & VCHL-1 -ve and was confirmed as Non Hodgkins Lymphoma of B cell type.

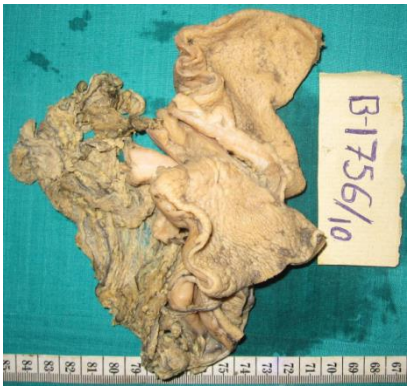

Figure 2: Signet ring cell carcinoma of Stomach presenting as Linitis plastic.

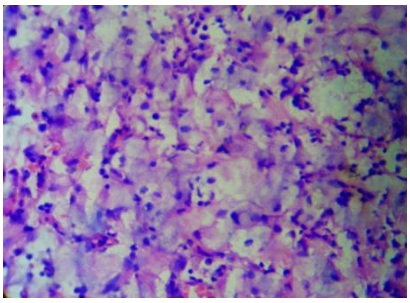

Figure 3: Signet ring cell carcinoma of Stomach H&E - 40X.

Figure 4: GIST of Stomach presenting with thickening of wall & loss of rugosity.

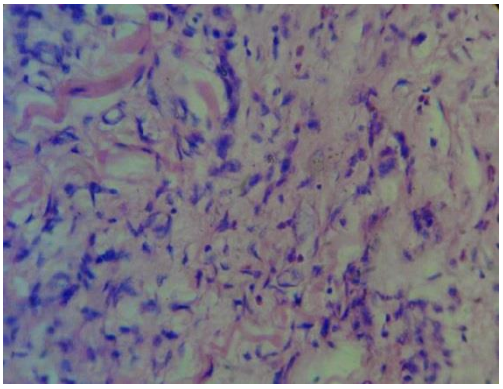

Figure 5: GIST of Stomach showing plump to spindle shaped cells exhibiting pleomorphism H&E - 40X.

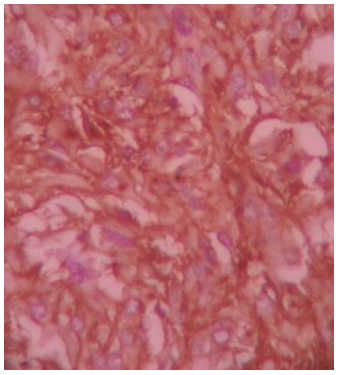

Figure 6 (a): CD117+VE X40.

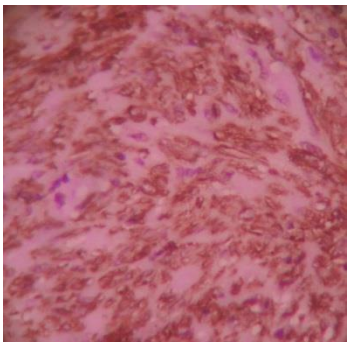

Figure 6 (b): ACTIN+VE - 40X.

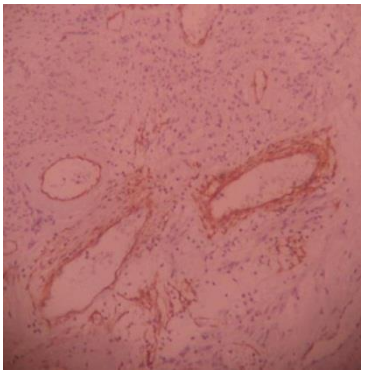

Figure 6 (c): PDGFRβ +ve - 40X.

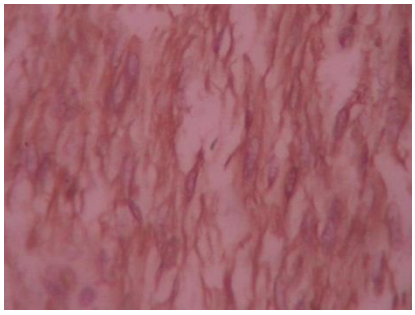

Figure 6 (d): VIMENTIN+ve X40.

Figure 6: GIST of stomach - IHC Profile.

Table 4: Age wise incidence of upper GI neoplasms.

S.No	Age	Lipoma	AC	SCC	GIST	ML	Total
1	21-30	…	1	…	…	…	1 (1.6%)
2	31-40	…	7	…	…	…	7 (11.4%)
3	41-50	…	14	…	…	…	14 (22.9%)
4	51-60	…	23	1	1	1	26 (42.6%)
5	>60	1	11	1	…	…	13 (21.3%)

Table 5: Sex wise incidence of upper GI neoplasms.

S.No	Sex	Lipoma	AC	SCC	GIST	ML	Total
1	Male	1	38	…	…	…	39 (63.9%)
2	Female	…	18	2	1	1	22 (36.0%)

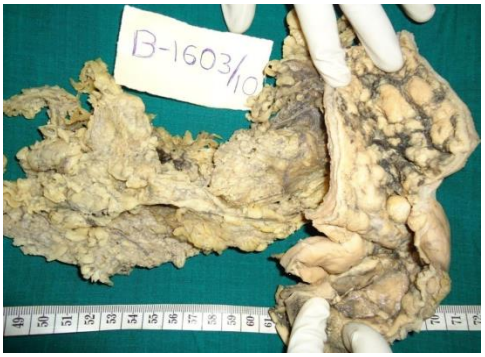

Figure 7: Malignant Lymphoma of Stomach presenting with multiple Nodules.

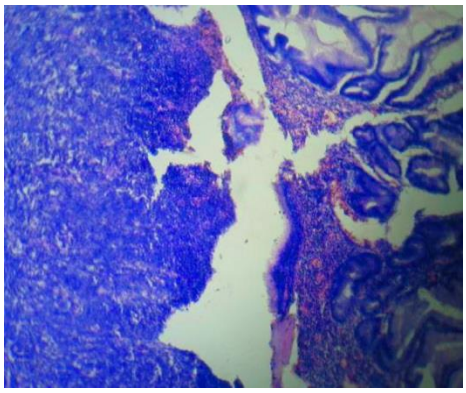

Figure 8: Malignant Lymphoma showing atypical lymphocytes extending from sub mucosa into deeper layers H&E - 10X.

Out of 34 malignancies of stomach 27 (79.4%) cases showed invasion up to Serosa, 6 (17.6%) cases up to Muscularis & 1 (2.9%) case was up to Sub mucosa (Table 6).

Table 6: Histopathological pattern of involvement of gastric malignancies.

Site	No of lesions with submucosal invasion	Muscularis invasion	Serosa invasion	Total
Stomach	1 (2.9%)	6 (17.6%)	27 (79.4%)	34
	No of specimens with lymph nodes	Positive- 25 (78.1%)	Negative- 7 (21.8%)	32
	No of specimens with omental metastasis	Positive-14 (41.1%)	Negative- 20 (58.8%)	34

Out of 32 malignancies of stomach presented with lymphadenopathy 25 (78.1%) cases showed secondary tumor cell deposits (Table 6).

Out of 39 (63.9%) male patients with Upper GI malignancies 37 (94.8%) were smokers. Out of 61 Upper GI neoplasms, 33 (84.6%) out of 39 male patients & 2 (9.0%) out of 22 female patients were alcoholics (Table 7).

Table 7: Association of smoking & alcoholism with malignancies.

Site	Personal habit	Male		Female		Total
		Yes	No	Yes	No	
Upper GI	Smoking	37 (94.8%)	2		22	61
	Alcoholism	33 (84.6%)	6	2 (9.0%)	20	61

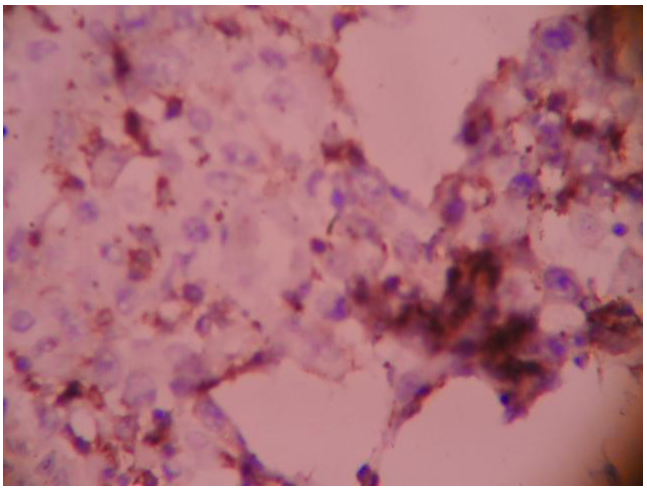

Figure 9(a): LCA +ve X40.

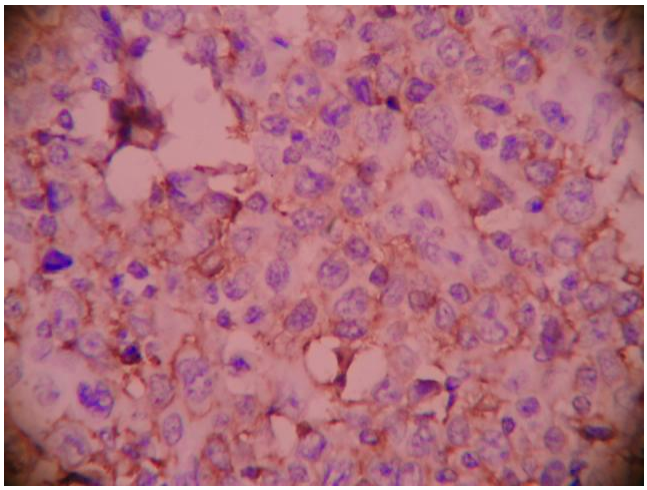

Figure 9(b): L26 +ve X40.

Figure 9: Malignant Lymphoma of Stomach - IHC Profile.

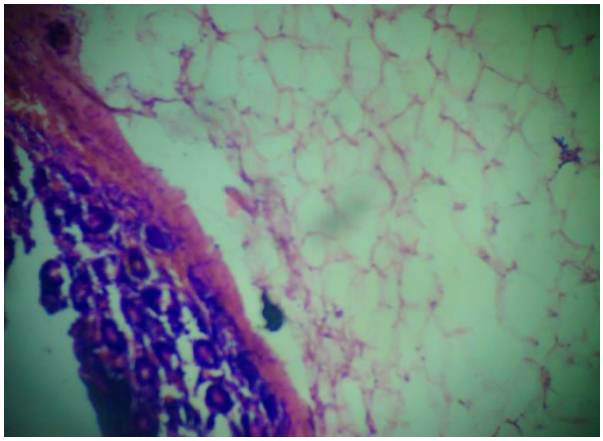

Figure 10: Sub Mucosal Lipoma of Stomach H & E X10.

DISCUSSION

Present study is a both prospective & retrospective study for a period of 5 years on different neoplasms in upper gastrointestinal tract, their benign & malignant nature, Site wise distribution, Age & Sex wise incidence, Depth of invasion, Lymph nodal & Omental spread of these neoplasms and correlation with certain personal habits like Smoking & Alcoholism where ever feasible. Special stains like PAS, Mucicarmine, Alcian blue & Reticulin were applied where ever possible. IHC was done for gastrointestinal stromal tumor (Figure 6a,b,c,d) & Malignant Lymphoma of Stomach (Figures 9a,b).

In the present study most of the malignancies occurred in Upper GI Tract (50.7%), these findings were in concordance with the study of Basnet et al[11] & R Kalyani et al[12] (Table 8).

Table 8: Comparison of site wise proportions of upper GI malignancies.

Site	% of malignancies		
	Present study (n=60)	Basnet et al[11] (n=168)	R.Kalyani et al[12] (n=568)
Upper GI	50.7%	51.2%	84.5%

In the present study Adenocarcinoma & its variants were the most common malignancies among Upper GI tract accounting for 93.3%, followed by squamous cell carcinoma (3.3%), the rest includes malignant lymphoma & Gastrointestinal stromal tumors (1.6%) respectively (Table 9). No Carcinoids were encountered in this study. In comparison with Basnet et al[11] study, the most common malignancy was Adenocarcinoma (80.3%) was followed by gastrointestinal stromal tumors (8.3%). There were Carcinoid tumors in his study sample. The variations may be due to differences in duration, period & place of study.

Table 9: Comparison of type of malignancy of upper GI tract.

S. No	Type of malignancy	Present study (n=60)	Basnet et al [11] (n=168).
1	Adenocarcinoma	93.3%	80.3%
2	SCC	3.3%	4.8%
3	ML	1.6%	5.4%
4	GIST	1.6%	8.3%
5	Carcinoid	…	1.2%

In comparison with R Kalyani et al[12] and present study most of the malignancies of the GI tract occurred after 50

years of age group and there was an overall male preponderance in GI tract malignancies. In the present study only two carcinomas were encountered from Esophagus both were Squamous cell carcinomas (Table 10).

Table 10: Comparison of age wise proportions of upper GI tract malignancies.

S.No.	Age group	Present Study (n=60)	R Kalyani et al [12] (n=568)
1	<50 years	34.4%	25.8%
2	>50 years	64%	74.2%
3	M:F ratio	1:0.6	1:0.6

In comparison with Johnston Wakishi et al [13], the present studies esophageal carcinomas occurred after 50 years of age group and with the mean age in present study being 65 years & in his study being 58.69 years (Table 11). In his study there was male predominance but in present study both the case were occurred in females. The variation was due to small sample size & the results were statically not significant. In the present study there was only one benign neoplasm i.e., Sub mucosal Lipoma in Stomach. The mean, median & mode of the ages of incidence all Gastric Carcinomas were 54.7, 55 & 60 years respectively. 62.1% of malignancies of Stomach occurred after 50 years of age. The male: female ratio among Gastric malignancies was 1.9: 1 (Table 13). Most of the malignancies of Stomach i.e, 97% invaded up to Muscularis & Serosa. 78.1% of these Gastric malignancies presented with secondary tumor deposits in lymph nodes & 41.1% had secondary omental tumor deposits (Table 6). 94.8% of male patients were smokers & none of the female patients were smokers. 84.6% of male patients & 9% of female patients were alcoholic (Table 7). The variants of Adenocarcinomas encountered in my study were Signet ring cell adenocarcinoma (Figure 3), Mucinous adenocarcinoma, papillary adenocarcinoma & Tubular Adenocarcinoma. Single case each of gastrointestinal stromal tumor (Figure 5) & malignant lymphoma (Figure 8) reported (Table 3), which were confirmed with IHC study (Figures 9 a,b). According to Laurens classification, 67.2% of cases were intestinal type & 32.8% were diffuse type Table 12). Only 17.2% of Adenocarcinomas were well differentiated & remaining 53.4% were moderate to poorly differentiated (Table 3).

Table 11: Comparison of Esophageal malignancies.

S. No		Present study (n=2)	Johnston Wakishi et al [13] (n=468)
1	Mean age (years)	65	58.69
2	Male : Female ratio	0:2	1.5:1

Table 12: Comparison of Laurens types of Gastric malignancies.

S.No	Laurens type	Present study (n=58)	Jae yun Ro et al [14] (n=556)	Lopez Carillo L et al [15] (n=193)
1	Intestinal type	67.2%	59.6%	50.8%
2	Diffuse type	32.8%	40.4%	49.2%

Table 13: Comparison of sex wise distribution of Gastric malignancies.

S.No.	Sex	Present study (n=58)	Jae yun Ro et al [14] (n=556)	Lopez Carillo L et al [15] (n=193)	Sambasivaiah K et al [16] (n=151)
1	Male	65.5%	68.3%	55.9%	121
2	Female	34.5%	31.7%	44.1%	30
3	M:F	1.9:1	2.2:1	1.3:1	4:1

Table 14: Comparison of Gastric malignancies.

S.No		Present study (n=58)	Sambasivaiah K et al [16] (n=151)
1	Median age	55 years	55 years
2	Adenocarcinoma	96.6%	98%
3	GIST	1.7%	1.3%
4	Malignant lymphoma	1.7%	0.7%

CONCLUSIONS

Most of the neoplasms are of stomach (97%). No malignancies from duodenum.

All malignancies of esophagus occurred after 50 years of age. Both tumors of esophagus were squamous cell carcinoma

62% of the neoplasms of stomach occurred after 50 years of age. All the neoplasms are malignant except one benign lesion of sub mucous lipoma of stomach.

Most of the neoplasms of stomach were Adenocarcinoma (96.5%), most common in males (65%).

Most of these neoplasms presented late in the course of the disease as Lymphnodal and omental deposits seen in 67% of cases.

53% of malignancies are moderate to poorly differentiated types, 67% of malignancies are advanced type.

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