Innovations

Histomorphological study of malignancy through upper gastro endoscopic biopsies in a tertiary care hospital -A cross sectional study

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Abstract

Introduction*: Incidence of Upper Gastro-Intestinal tract (UGI) malignancy is in rise in India over the past few decades. With the advent of UGI Endoscopy direct visualization of the UGI tract and biopsy sampling of the pathological area is made possible at an early stage of the disease.* ***AIM****: To study the histomorphological spectrum of UGI endoscopic biopsy and the incidence of malignancy in the biopsy samples.* ***Materials and Method****:This cross sectional study was conducted in pathology department of Trichy SRM Medical College, Tiruchirappalli, Tamil nadu with 115 UGI endoscopic biopsies received between January2020 to December 2021.Demographic details like age,sex,site,presenting complaints were collected from histopathology requisition form. Samples were processed, stained with Hematoxylin and Eosin. PAS and Giemsa staining were done for requested samples. Data were analyzed using excel sheets.****Results****: The most common age group affected was 51 years to 60 years with male:female sex ratio 1.34:1. Stomach was the most common biopsy site and abdominal pain was the most common presenting complaint. Malignancy predominate over benign lesions. The most common esophageal lesion was squamous cell carcinoma, in stomach was adenocarcinoma and in duodenum was chronic non-specific duodenitis.* ***Conclusion****: Endoscopy is a cost effective tool to visualize the UGI tract. UGI endoscopy and biopsy evaluation have made revolution in early diagnosis and in management of UGI pathology.*

Keywords: *1.Endoscopy 2.Histopathology 3.Neoplasm 4.Upper Gastrointestinal Tract 5.Adenocarcinoma*

Introduction

Anatomically UGI tract starts from the oral cavity and ends in second part of duodenum (Theresa *etal.,* 2019).Wide spectrum of disease can affect the UGI tract which are broadly classified as neoplastic and non-neoplastic lesions. Non neoplastic lesions include congenital anomaly, infections and inflammatory conditions. Neoplastic lesions can be classified as benign and malignant conditions. In day to day practice, there is an increase in incidence of the cases presenting the outpatient department with UGI symptoms like vomiting, abdominal pain, dysphagia, loss of weight, loss of appetite etc.

In 2020 gastric cancer was the fifth common cancer worldwide and the fourth leading cause of death due to malignancy. (Ilic *et al., 2022*). Worldwideesophageal cancer was the eight most common cancer with a steady rise in incidence. (Uhlenhopp *et al., 2020*) Thus in recent times malignancy arising from the UGI have increased and there is a need for early diagnosis, proper timely management to decrease the mortality.

With the advent of UGI flexible fibreoptic endoscope in 1968 (Blackstone ., 1984) direct visualization of the diseased area in UGI tract was made possible. UGI endoscopy is an easy, convenient outpatient procedure tovisualize esophagus, stomach and 1^{st},2^{nd} part of duodenum. (Devendrappa*et al., 2020*).Through endoscopy, biopsy can be taken from the diseased area and histopathological studies can be done to reduce the mortality and morbidity.

UGI endoscopy helps not only in diagnosis of the disease but also in monitoring the disease progression, to assess the treatment status, to identify the complications as well as the recurrence. Thus endoscopic evaluation combined with the histopathological biopsy examination is the gold standard in the management of UGI disease. (Hirachand *et al*., 2018).

Objectives

To study the histomorphological spectrum of UGI endoscopic biopsy taken from esophagus, stomach, first and second part of duodenum

To study the malignancy arising from the UGI tract

Materials and methods

Setting of the Study: This cross sectional study was conducted in the Department of Pathology, Trichy SRM Medical College Hospital and Research Center, Tiruchirappalli, Tamil Nadu during April 2022 to June 2022 after obtaining Institutional Ethical Committee clearance.

Sample Size:115 endoscopic biopsy samples received in the Department of Pathology between January 2020 to December 2021 (2 years).

Inclusion criteria: Endoscopy biopsy samples taken from esophagus, stomach, first and second part of duodenum

Exclusion criteria:1.Inadequate biopsy samples2. Biopsy from oral cavity and pharynx 3. Biopsy taken beyond the second part of duodenum

Methodology:

Biopsies were taken from the patients who attended the outpatient department with UGI symptoms and were indicated for endoscopy. Thefibro optic endoscopy of make OLYMPUS GIF TYPE Q150 2122519 was used for obtaining esophageal biopsy, OLYMPUS CF TYPE Q150L 2404320 was used for stomach biopsy and OLYMPUS TJF TYPE 150 2401336 was used for duodenal biopsy.Clinical details like age, sex andclinical features were collected from the histopathology requisition form which were received along with the biopsy samples.

Endoscopic biopsies thus received were fixed in 10 percent neutral buffered formalin and processed in automatic tissue processer. Tissues were counted for the number of biopsy fragments and embedded with mucosal surface facing upwards. Sections were cut perpendicularly at 5 micron thickness using Leica microtome RM 2255and stained using Hematoxylin and Eosin stain. Special stains like Giemsa were used for identifying the microorganism Helicobacter pylori and Periodic acid-Schiff (PAS) stain for identifying fungal organism in suspected cases.

Histopathological examination was done by two pathologists and were broadly divided into neoplastic and non-neoplastic conditions. Sydney system was followed for reporting stomach biopsies (**Rosai.2011**), andWorld Health Organization (WHO) classification of gastrointestinal tumour for reportingmalignancy (Bosman *et al*.,2012).

Statistical analysis

All the data (age, sex, site of biopsy, clinicalfeatures, and histopathologicaldiagnosis) were entered in Microsoft Excel 2013 and the results were expressed in percentage.

Results

115 endoscopic biopsy samples were analyzed in this study. Out of 115 cases, 66 cases (57%) were males and 49 (43%) were females with the male to female sex ratio 1.34:1. In this study, age of the cases varied from 22 years to 79 years. Maximum number of biopsies i.e. 42 cases (37%) were taken from the patients of age group 51 to 60 years ,which was followed by 27 cases (23%) from the patients of age 41 to 50 years . Lowest number of biopsies (4 cases, 3%) were taken from the patients of age group 21 to 30 years.**(Table 1)**

Out of 115 biopsies, 63 cases (55%) were taken from the stomach, 27 cases (23%) from the esophagus,and 22 cases (19%) from the duodenum. Least number of biopsies, only 3cases (3%) were taken from the esophagogastric junction.**(Figure 1)**

In this study out of 115 biopsies, 37(32%) cases were non-neoplastic and 78(68%) were neoplastic lesions. Out of 37(32%) non-neoplastic cases, 6(5%) were esophageal biopsies,15(13%)were stomach biopsies and 16 biopsies (14%) were taken from duodenum. Out of 78(68%) neoplastic samples,21 cases (18%) were taken from esophagus,3 cases (3%) from esophagogastric junction,48(42%) biopsies from stomach and 6(5%) biopsies from the duodenum. **(Table 2)**

In this study majority of the cases(39) presented with abdominal pain(34%),followed by dyspepsia (27 cases, 23%), dysphagia (25 cases, 22%), loss of appetite (13 cases, 11%) and vomiting (11 cases, 10%). **(Figure 2)**

Distribution of Esophageal biopsies based on Histopathological diagnosis

Out of 27 esophageal biopsies, only 6 cases (22%) were non-neoplastic with the features of chronic esophagitis. Rest of the 21 cases (78%) were malignancy with one case (4%) of Squamous cell carcinoma grade I, 14 cases (52%) were Squamous cell carcinoma grade II and 6 cases (22%) were

Squamous cell carcinoma grade III.**(Table 3).**Histopathological image of Esophageal Squamous cell carcinoma grade II was mentioned in **Figure 3**

Only 3 biopsies were taken from the esophagogastric junction and all the 3 cases were malignancy with the diagnosis of Adenocarcinoma grade II.

Distribution of Gastric biopsies based on Histopathological diagnosis

Out of 63 gastric biopsies, 15 cases (24%) were non-neoplastic and 48 cases (76%) were neoplastic lesions. Non-neoplastic gastric lesions reported in this study were chronic non-specific gastritis with 10 cases (16%), Helicobacter pylori induced gastritis (3 cases, 5%) and 2 cases (3%) of Hyperplastic polyp. Among the 48 neoplastic cases (76%), 7 cases (11%) were histopathologically diagnosed as Adenocarcinoma grade I, 32 cases (51%) as Adenocarcinoma grade II, 6 cases (9%) as Adenocarcinoma grade III, 2 cases (3%) as low grade lymphoma and 1 case (2%) as Gastro Intestinal Stromal Tumour. **(Figure 4).** Histopathological image ofgastric adenocarcinoma grade II was given in **figure 5**.

Distribution of Duodenal biopsies based on Histopathological diagnosis

Out of 22 duodenal biopsies, 16 were non-neoplastic and 6 were neoplastic. Non-neoplastic lesions diagnosed were 14 cases (64%) of chronic non-specific duodenitis and 2 cases (9%) of celiac disease.All the 6 neoplastic lesions (27%) were diagnosed as Adenocarcinoma grade II. **(Table 4)**

Discussion:

Beforethe advent of UGI endoscopy, the diseased area could not be visualized directly and there was a delay in diagnosing cancer. The trend had been changed after the invention of UGI endoscopy. UGI endoscopy can identify the exact site of the tumour growth, the ulcer area and biopsy can be taken from the affected area accurately. Thus the management of the UGI pathology had improved a lot with the combined endoscopic and histopathological examination.

Gender distribution

In the present study 115 endoscopic biopsy samples were studied with predominance of male. Male: female sex ratio was 1.34:1. This could be due to more number of male patients attending the hospitals than female patients. Similar findings were observed in other studies by Theresa *etal.,* 2019,Devendrappa*et al., 2020,*Bala *et al., 2017* andMeshram *et al., 2020.*

Age distribution

In the present study, patient age range from 22 years to 79 years with peak incidence in 5th decade of life. Similar findings was observed in studies done byDevendrappa*et al., 2020,* Aparajita *et al.,2016,*Qureshi *et al.,2007*and Nazrin *et al.,2019.*

Biopsy distribution

In the present study, majority were gastric biopsies (55%), followed by esophageal biopsies (23%), duodenal biopsy (19%) and esophagogastric junction biopsy (3%). Similar results were seen in studies byTheresa *etal.,* 2019, Krishnappa *et al.,*2013 and Suvarna*et al.,* 2020.

In this study majority of the biopsies were neoplastic(68%) and only 32% of biopsies were non-neoplastic. Similar findings was seen in study done bySuvarna*et al.,* 2020 and Aparajita *et al.,2016,*.But in other studies byKrishnappa *et al.,*2013,Theresa *etal.,* 2019 and Hirachand *et al.,* 2018non-neoplastic lesions were higher than neoplastic lesions. This could be due to selection bias in

performing biopsy for all malignancy suspected cases on endoscopy and not performing biopsy in unsuspected benign looking cases.

Abdominal pain was the most common presenting complaints in this study which was similar to the study done bySharma*et al.,2020.*

Esophageal biopsy:

In this study majority of the esophageal biopsy (78%) were malignant and reported as Squamous cell carcinoma (21 cases). One case (4%) was Squamous cell carcinoma grade I, 14 cases (52%) were Squamous cell carcinoma grade II and 6 cases (22%) were Squamous cell carcinoma grade III. Similar findings were seen in the study bySuvarna*et al.,* 2020.

In this study only 3 biopsies were from the esophagogastric junction and all were malignancy with the diagnosis of Adenocarcinoma grade II. This might be gastric adenocarcinoma extending into the esophagogastric junction.

Gastric biopsy:

In this study 63 gastric biopsies were analyzed. Out of which 15 cases (24%) were non-neoplastic and 48 cases (76%) were neoplastic lesions. Non-neoplastic gastric lesions reported were chronic non-specific gastritis with 10 cases (16%), Helicobacter pylori induced gastritis with 3 cases (5%) and 2 cases (3%) of Hyperplastic polyp.

Out of 48 neoplastic cases (76%), 7 cases (11%) were histopathologically diagnosed as Adenocarcinoma grade I, 32 cases (51%) as Adenocarcinoma grade II, 6 cases (9%) as Adenocarcinoma grade III, 2 cases (3%) as low grade lymphoma and 1 case (2%) as Gastro Intestinal Stromal Tumour. Adenocarcinoma was the most common gastric lesion observed in this study. Similar results were observed in studies by Suvarna*et al.,* 2020,Sharma *et al*., 2019 and Jawalkar *et al*., 2015.

Duodenal Biopsy

In this study out of 22 duodenal biopsies, 16 cases (73%) were non-neoplastic and 6 cases (27%) were neoplastic. Majority were non-neoplastic lesions with 14 cases (64%) of chronic non-specific duodenitis and 2 cases (9%) of celiac disease. 6 neoplastic lesions (27%) were Adenocarcinoma grade II. Similar findings were observed in studies by Sharma *et al*., 2019 and Jawalkar *et al*., 2015 and Hirachand *et al*., 2018.

Thus in routine practice the number of patients suffering from UGI malignancy was in rise. This might be due to changes in lifestyle habits like smoking, tobacco chewing, alcoholism, consuming junk foods, preserved foods, stress etc.Avoiding these risk factors might prevent us from the cancer. In addition, timelypresentation to the hospital and undergoing necessary investigations like endoscopy and biopsy study can prevent the mortality.

Conclusion

UGI endoscopy is the easy technique, which is also cost effective for the patients visiting the outpatient department with UGI symptoms. Timely management can prevent the mortality and improve the patient quality of life. Both endoscopy and histopathological biopsy examination have their own significance which cannot be replaced with each other. Thus combined endoscopy and histopathology examination is the gold standard in the management of UGI pathology**.**

Abbreviation

UGI: Upper Gastro intestinal Tract

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Table: 1 Age wise distribution of UGI endoscopic biopsy samples (n=115)

Age in years	No. of cases (%)
21-30	4(3%)
31-40	9(8%)
41-50	27(23%)
51-60	42(37%)
61-70	26(23%)
71-80	7(6%)

Table: 2 Distribution of number of cases(n=115)

Biopsy site	Esophagus (%)	Esophagogastric junction (%)	Stomach (%)	Duodenum (%)	Total(%)
Non-Neoplastic	6(5%)	0(0%)	15(13%)	16(14%)	**37(32%)**
Neoplastic	21(18%)	3(3%)	48(42%)	6(5%)	**78(68%)**
Total	**27(23%)**	**3(3%)**	**63(55%)**	**22(19%)**	**115(100%)**

Table: 3Distribution of Esophageal biopsiesbased on Histopathological Diagnosis (n=27)

Esophagitis (%)	Squamous cell carcinoma Grade I (%)	Squamous cell carcinoma Grade II (%)	Squamous cell carcinoma Grade III (%)	Total (%)
6(22%)	1(4%)	14(52%)	6(22%)	27(100%)

Table: 4Distribution of Duodenal biopsies based on Histopathological Diagnosis (n=22)

Chronic non-specific duodenitis (%)	Celiac disease (%)	Adenocarcinoma grade II (%)	Total (%)
14 (64%)	2 (9%)	6 (27%)	**22 (100%)**

Figure: 1 Site wise distribution of UGI endoscopic biopsy samples (n=115)

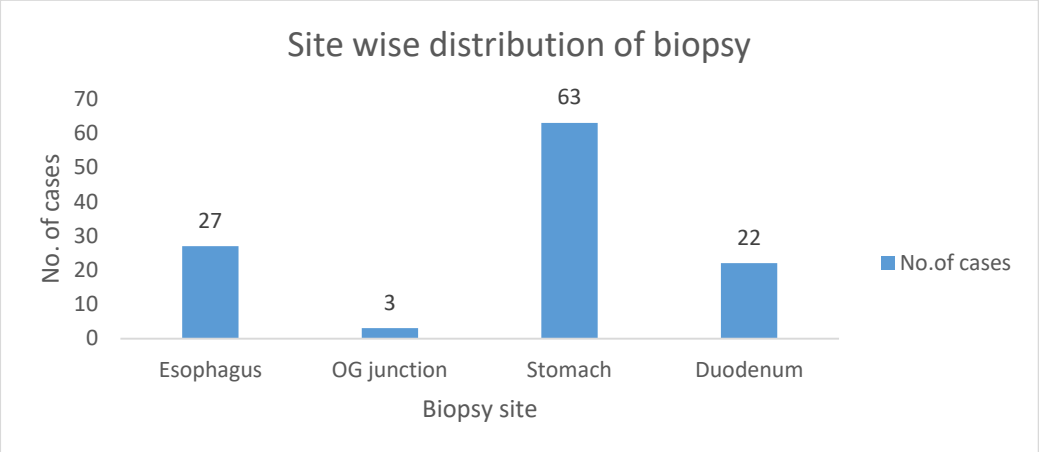

Figure: 2 Presenting Complaints of the cases

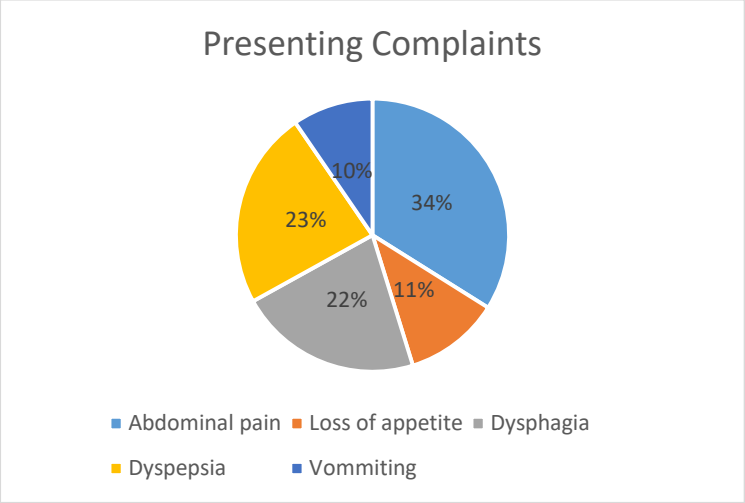

Figure 3: Histopathological image of Esophageal Squamous cell carcinoma grade II.(10X)

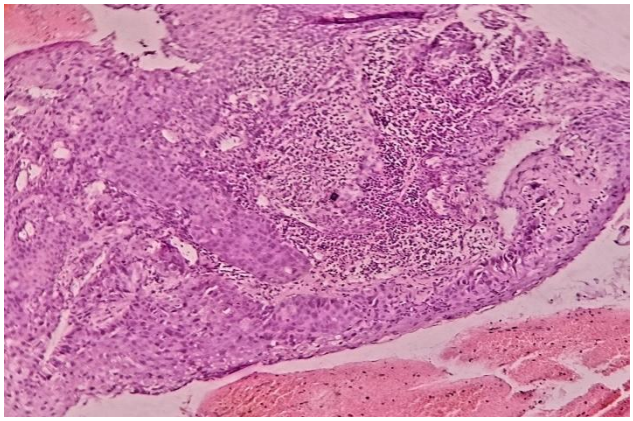

Fig 3

Figure: 4Distribution of Gastric biopsies based on Histopathological Diagnosis (n=63)

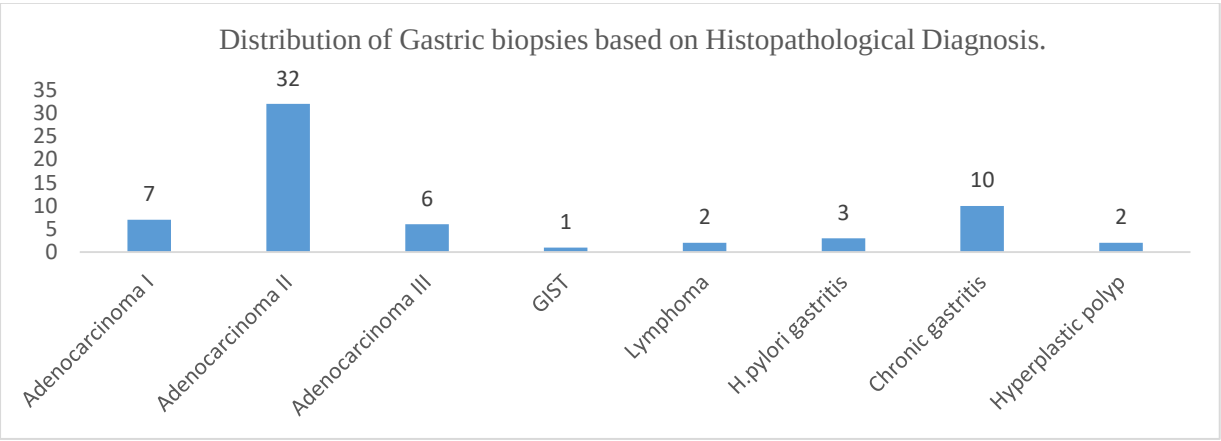

Figure 5: Histopathological image of gastric adenocarcinoma grade II.(10x)