Original Article

Histopathological Spectrum of Upper Gastrointestinal Endoscopic Biopsies in a Tertiary Care Hospital

Farah Siraj, Noshaba Rahat, Humera Shahzad, Mohammad Anwar, Asma Jalbani and Zamrud Momin

ABSTRACT

Objective: Upper gastrointestinal (UGI) tract disorders are common and can be difficult to diagnose based on clinical examination alone. Endoscopic examination and biopsy of the affected area is used for diagnosis of these disorders. The study aims to assess the histopathological spectrum of UGI tract disorders in a tertiary care center in Pakistan and investigate any possible correlations.

Study Design: Retrospective observational study

Place and Duration of Study: This study was conducted at the Department of Histopathology at the Basic Medical Sciences Institute in Karachi, Pakistan from January 2017 to December 2021.

Materials and Methods: The biopsy specimens were processed and stained with Hematoxylin and Eosin and additional staining was performed as needed. Grading for gastric and duodenal biopsies was done according to the updated revised Sydney and modified Marsh classifications.

Results: This study includes 357 UGI biopsies and found that gastric biopsies were the most common, comprising 63% of all UGI endoscopic biopsies. Chronic gastritis, chronic nonspecific duodenitis, and esophageal squamous cell carcinoma are the most common diagnoses observed at their respective sites. Stomach cancer constitutes less than 1% of the total gastric biopsies.

Conclusion: Our data reveals discrepancies, with a higher frequency of esophageal carcinoma and a lower frequency of gastric carcinoma, compared to previous literature. These findings emphasize the necessity of establishing a national or state-level provincial registry to monitor regional histopathological data of patients undergoing UGI endoscopic biopsy for various UGI disorders in Pakistan.

Key Words: Upper gastrointestinal disorders; endoscopy; biopsy; histopathology; Pakistan.

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INTRODUCTION

Upper gastrointestinal (UGI) tract disorders are a common problem in clinical practice worldwide, resulting in significant morbidity and poor quality of life. The symptoms of these disorders are often similar, making it difficult to reach a confirmed diagnosis solely on the basis of clinical examination.

Endoscopic examination of the UGI tract with concomitant biopsy of the affected area is often used for diagnosis and management of these disorders.[1,2]

An UGI endoscopy is a simple procedure that is safe, well-tolerated, and easily performed as an outpatient basis. A variety of histopathological diagnoses, ranging from mild inflammation to invasive carcinoma, are easily made with the help of UGI endoscopic biopsy in patients with UGI tract symptoms[1,2] Since gastrointestinal carcinomas are the top most cause of cancer in our population,[3] the timely diagnosis and management of these cases can prove to be life-saving and cost-effective.[4] Apart from the initial diagnosis, the UGI endoscopy and biopsy are also performed to monitor the disease course, therapeutical response, and early detection of complications.[5,6].

In Pakistan, unfortunately, we do not have a national or a state-level provincial registry to monitor our regional histopathological data of patients undergoing UGI endoscopic biopsy for various UGI disorders. It is important to highlight that the incidence of UGI tract disorders varies geographically and is affected by several factors, including environmental, genetic, and lifestyle factors. Therefore, it is essential to comprehend the regional histopathological spectrum of UGI disorders to establish effective strategies for their treatment and management. The aim of this study is to assess the histopathological spectrum of UGI tract disorders presenting in our tertiary care center in Pakistan and to investigate any possible correlations.

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MATERIALS AND METHODS

This is a retrospective observational study conducted in the Department of Histopathology at the Basic Medical Sciences Institute (BMSI), Jinnah Postgraduate Medical Center (JPMC), in Karachi, Pakistan. All UGI tract endoscopic biopsies sent to the department from January 2017 to December 2021 were included in the study, excluding biopsies beyond the second part of the duodenum. The biopsy specimens were fixed in 10% formalin solution, processed and embedded conventionally, and sections were cut and stained with Hematoxylin and Eosin (H&E). Additional staining, such as Giemsa for H. pylori and Periodic Acid Schiff (PAS), was performed as necessary. Grading for gastric and duodenal biopsies was done according to the updated revised Sydney[7] and modified Marsh classifications.

Method of Staining Hematoxylin and Eosin: Time given to stain the following sections:

1. 10 minutes for Xylene I.
2. 10 minutes for Xylene II.
3. 5 minutes for Absolute alcohol.
4. 5 minutes for 95% alcohol.
5. 5 minutes for 80% alcohol
6. 5 minutes for 70% alcohol.
7. 2 minutes for rinsing in tap water.
8. 5 minutes for Hematoxylin stain.
9. 3-5 dips of 1% Hydrochloric acid and then rinsed in tap water for 10-15 minutes.
10. Swift 3-5 dips of slides in ammonia water 1%.
11. Then for 10-15 minutes Rinsed in tap water.
12. 5 Swift dips to dehydrate in 70% alcohol.
13. 5 Swift dips in 80% alcohol.
14. 5 Swift dips in 95 % alcohol.
15. 2 minutes for Eosin
16. 5 Swift dips in absolute alcohol two changes.
17. 5 minutes each. Xylene for two changes.
18. Dehydrate, Clear and mount in DPX

Nuclei: Stained blue.
Cytoplasm: Varying shades of pink.

Inclusion criteria:

1. All endoscopic biopsies of the upper gastrointestinal tract.

Exclusion criteria:

1. All lesions of the mouth
2. All lesions below the duodenum

RESULTS

A total of 357 UGI biopsies were included in the study, with a mean age of 43.9 years and a standard deviation of 11.2 years. Males comprised the majority, with 59% (n=211) compared to females at 41% (n=146), in a ratio of 1.44:1. Among the biopsies, gastric biopsies were the most frequent, accounting for 63% (n=226) of all UGI endoscopic biopsies. Duodenal biopsies made up 34% (n=120), while esophageal biopsies represented 3% (n=11) of the total. (Figure No. 1).

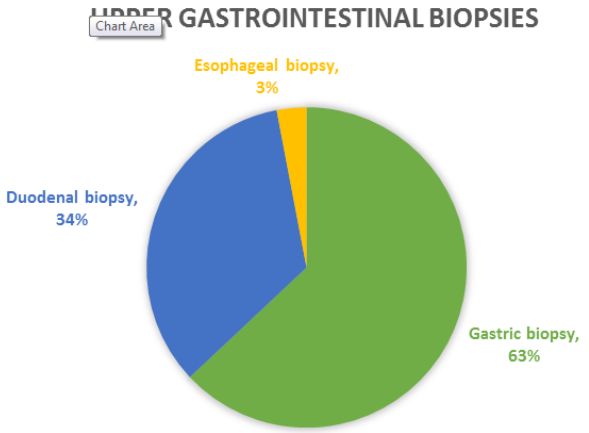

Figure No. 1: A pie chart showing frequency of different UGI biopsies.

Among gastric biopsies, 49% (n=111) had chronic gastritis that was negative for H. pylori, whereas 32% (n=72) of patients had chronic gastritis that was positive for H. pylori. Chronic active gastritis was observed in 39 (17.2%) patients, with 22 patients testing negative for H. pylori and 17 testing positive. Only 2 patients (0.9%) were diagnosed with gastric adenocarcinoma (Table No. 1).

Table No. 1: Histopathological findings in gastric biopsies

Lesions	No. of cases	Percentage (%)
Chronic active gastritis with H.Pylori positive	17	7.5
Chronic active gastritis with H.pylori negative	22	9.7
Chronic gastritis with H.Pylori positive	72	32
Chronic gastritis with H.Pylori negative	111	49
Benign gastric ulcer	2	0.9
Gastric adenocarcinoma	2	0.9
Total	226	100

Table No. 2: Histopathological findings in duodenal biopsies

Lesions	No. of cases	Percentage (%)
Chronic nonspecific duodenitis	116	96.7
Giardiasis	1	0.8
Benign ulcer	3	2.5
Total	120	100

The most prevalent diagnosis among duodenal biopsies was chronic nonspecific duodenitis, making up 96.7% (n=116) of all cases. Only three cases of benign duodenal ulcers were reported, and no cases of

duodenal carcinoma were found during the study period. A single patient was diagnosed with giardiasis, and giardial trophozoites were observed on the surface of duodenal epithelial cells (Figures 2). The results are shown in Table No. 2.

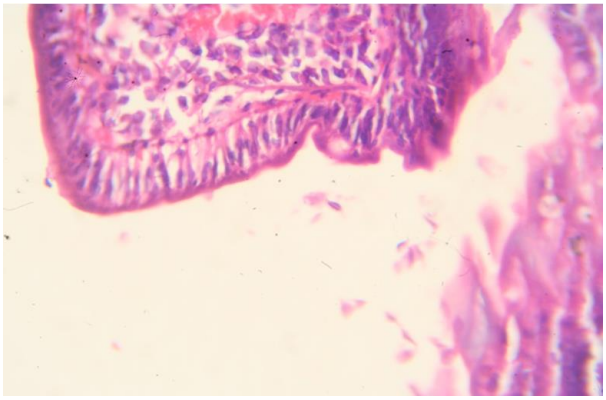

Figure 2: Duodenal Biopsy histopathology showing moderate chronic non-specific inflammation with numerous giardia trophozites.

Out of 11 esophageal biopsies, 9 were identified as esophageal squamous cell carcinoma, while the remaining 2 were diagnosed with chronic non-specific esophagitis (Table No. 3)

Table No. 3: Histopathological findings in esophageal biopsies

Lesions	No. of cases	Percentage (%)
Esophageal squamous cell carcinoma	9	81.8
Chronic non-specific esophagitis	2	18.2
Total	11	100

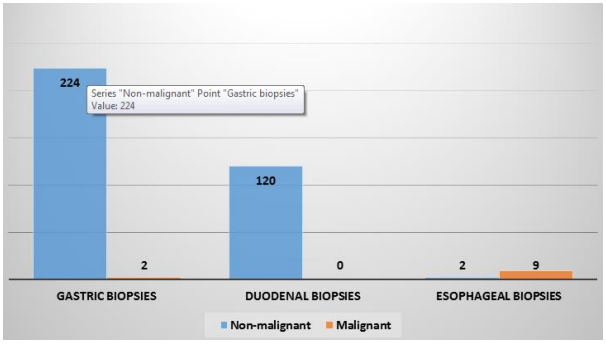

Figure: Non-Malignant vs. Malignant Pathologies

DISCUSSION

Gastrointestinal cancers are among the leading causes of cancer-related mortality in Pakistan.[3,8] In 2020, a total of 23,220 new gastrointestinal cancer cases were diagnosed, accounting for 14.87% of all cancer cases in our country. Additionally, 21,077 people lost their lives, representing 18.08% of all cancer-related deaths in Pakistan.[3,8] The confirmation of these cases typically necessitates endoscopic procedures and biopsies, making the timely performance of endoscopic biopsies crucial for accurate diagnosis and comprehensive care.

In our study, which included 357 UGI biopsies, we observed a higher male to female ratio of 1.4, which is consistent with other previous studies.[1-2,8-10] However, another study from Pakistan reported a higher prevalence of UGI endoscopies in females.[11] There is a possibility that men in our region are more susceptible to gastrointestinal issues because of several reasons, such as oral tobacco use, smoking, alcohol use, occupational exposures, and the consumption of high-fat, spicy foods, as well as restaurant food.[12]

The stomach was the most frequent site for UGI endoscopic biopsy, which is in agreement with other studies.[1-2,9-11] However, our study also included a substantial number of duodenal biopsies (n=120), compared to a smaller number of esophageal biopsies (n=11), which is different from other studies that have reported a higher number of esophageal biopsies compared to duodenal biopsies[1,9,11] It is interesting to note that although our study had a small number of esophageal biopsies, a majority of these were diagnosed with an esophageal squamous cell carcinoma (81.8%). A similar high frequency of esophageal cancer (78.6%) was also reported by another Pakistani study among their esophageal biopsy cases.[12] These numbers are particularly high when compared to studies from other Asian regions, which have reported esophageal neoplasms varying from 20% to 47.7% of their esophageal biopsy cases.[1-2] The high incidence of esophageal carcinoma in our study could be due to the limited number of total esophageal biopsies, but it's worth investigating in future studies across various institutions in Pakistan. Moreover, we recommend exploring potential risk factors for esophageal neoplasms in other regional centers if a similar high prevalence is found.

Among gastric biopsies (n=226), chronic gastritis was the most common diagnosis (81%), followed by chronic active gastritis (17.2%). H. pylori was present in 39% of all gastric biopsy cases, but the number of gastric adenocarcinomas was unexpectedly low. Only two cases out of 226 gastric biopsies were diagnosed with gastric adenocarcinoma, which is less than 1%. Another Indian study, examining 1539 stomach biopsy cases, reported a low incidence of stomach cancer, with only 20 cases (1.3%) being diagnosed as such.[14] Our finding contrasts with previous studies that have reported a prevalence of gastric neoplasms ranging from 4.9% to 45.2% in gastric biopsies.[1,10-11,14] The low incidence of gastric carcinoma in our study is puzzling, considering the relatively large number of gastric biopsies.

Among duodenal biopsies, 97.5% of the cases were diagnosed with chronic non-specific duodenitis, and no

cases of duodenal neoplasm were found. This is consistent with the fact that duodenal neoplasms are less prevalent than other types of UGI neoplasms. Our study also revealed only one case of giardiasis, and no other malabsorption cases were identified.

There are several limitations to our study that must be taken into consideration while interpreting the findings. Firstly, the retrospective design of the study may have introduced biases and confounding factors, which may have influenced the results. Secondly, the study was conducted at a single center, which may limit the generalizability of our findings to other populations, especially those in different healthcare settings. The tertiary care hospital setting in which the study was conducted may also have led to selection bias. Another important limitation of our study is the small number of esophageal biopsies included. A very high frequency of esophageal neoplasms in our study may not be representative of the actual prevalence of esophageal neoplasms in the population. Additionally, our study did not investigate potential risk factors for UGI neoplasms, such as smoking, alcohol consumption, or dietary habits. This information could help to identify populations at higher risk and guide targeted screening and prevention strategies.

In light of our study's limitations and findings, we suggest that similar research should be conducted in other histopathology departments throughout Pakistan to gain a more comprehensive understanding of UGI neoplasms and disorders' prevalence and incidence in different regions and populations. It would be beneficial to establish a national database to collect data on UGI disorders and neoplasms. Furthermore, prospective studies investigating potential risk factors, specific for our population, for UGI disorders and neoplasms should be a priority for future research.

CONCLUSION

Our study uncovered noteworthy insights into the prevalence and incidence of UGI neoplasms and disorders in our population. Chronic gastritis was the most common histopathological diagnosis among UGI biopsies, with H. pylori-negative chronic gastritis being the most prevalent subtype. Additionally, chronic nonspecific duodenitis was also frequently observed. Notably, we found a high frequency of esophageal squamous cell carcinoma and a low frequency of stomach adenocarcinoma.

Our study also highlights the need for similar studies to be conducted in other histopathology departments throughout Pakistan and the establishment of a national or state-level registry to track regional histopathological data of patients undergoing UGI endoscopic biopsy for various UGI disorders.

Abbreviations:

- H. pylori - Helicobacter pylori
- H&E - Hematoxylin and Eosin
- PAS - Periodic Acid Schiff
- UGI - Upper gastrointestinal

Author's Contribution:

Concept & Design of Study:	Farah Siraj
Drafting:	Noshaba Rahat, Humera Shahzad
Data Analysis:	Mohammad Anwar, Asma Jalbani, Zamrud Momin
Revisiting Critically:	Farah Siraj, Noshaba Rahat
Final Approval of version:	Farah Siraj

Conflict of Interest: The study has no conflict of interest to declare by any author.

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