Original article

Histopathological Patterns of Gastric Mucosal Biopsies in Functional Dyspepsia in Tertiary Care Hospital

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ABSTRACT

Background: Functional Dyspepsia is a common symptom with a wide range of potential diagnoses. Objective of this study is to determine the spectrum of histopathological patterns of gastric mucosal biopsies in patients of functional dyspepsia to help diagnose underlying disease and its treatment.

Methods: This cross-sectional study was conducted in Histopathology Department at Services Hospital, Lahore from September 2023 till September 2024. Gastric mucosal biopsy samples of 284 patients who presented to 3 medical units of the hospital, were submitted. Samples received in formalin fixative were embedded in paraffin to prepare blocks. Hematoxylin and eosin were used to stain the slides. To see *Helicobacter pylori* (*H. pylori*), May-Grunwald-Giemsa stain was utilized. Intestinal metaplasia was detected using the Alcian blue stain.

Results: Total 284 gastric mucosal biopsy samples of patients presenting to 3 medical units of the hospital were examined. Histopathological patterns of gastric mucosal biopsies in functional dyspepsia were as follows: Chronic active gastritis in 154 samples (54.58%). *H. pylori* chronic gastritis in 105 samples (37%) and non- *Helicobacter pylori* associated gastritis (Non Specific) in 50 samples (17.58%), mucosal ulceration in 49 samples (17.25%), normal biopsies in 24 samples (8.45%), metaplasia in 21 samples (7.39%), neutrophilic activity in 19 samples (6.69%), fundic gland polyp in 8 samples (2.82%), adenocarcinoma in 5 samples (1.76%) and mucosal atrophy in 3 samples (1.1 %).

Conclusion: Chronic active gastritis was the most frequent finding on gastric mucosal biopsy samples of patients with functional dyspepsia, followed by intestinal metaplasia, neutrophilic activity, fundic gland polyp and gastric adenocarcinoma. These finding help diagnose the most common diseases like *Helicobacter pylori* associated gastritis, intestinal metaplasia and carcinoma and timely treat the underlying diseases, ultimately reducing the disease burden and complications.

Keywords:
Gastritis, endoscopic biopsy, dyspepsia, and histopathological pattern.

INTRODUCTION

A common symptom with a wide range of potential diagnoses is dyspepsia. In roughly 15% to 30% of instances, endoscopy by alone may fail to detect significant mucosal lesions.[1] *H. pylori* infection and inflammation of the gastric mucosa are common in patients with this illness.[2] Although *H. pylori* infection is a major factor, the exact course of treatment and prognosis are determined by the underlying etiology.[3]

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The most frequent finding is moderate chronic gastritis, which is detected and graded by the histopathologist in cases of functional dyspepsia with normal endoscopy.[1] Majority of functional dyspepsia cases have histological evidence of gastritis, while a sizable portion of patients had no abnormalities in the histology of the stomach mucosa. Functional dyspepsia can harber underlying diseases like *Helicobacter pylori* (*H. pylori*) infection showing chronic gastritis characterized by increased mononuclear inflammatory cells, increased eosinophils and mast cells in gastric mucosa in food allergies, intestinal metaplasia and carcinoma and timely treat the underlying diseases reducing disease burden.

The notably reduced frequency of *H. pylori* in gastric biopsies observed in functional dyspepsia cases may be the result of general practitioners using antibiotics and acid-suppressant medications more frequently at some point during the illness.[4] According to a study, nonspecific chronic gastritis without an *H. pylori* infection was present in around 35.2% of cases. *Helicobacter pylori* associated gastritis was present in 53.8% cases, neutrophilic infiltration activity was seen in 5.09%, intestinal metaplasia foci were seen in 2.2% cases, mild atrophy was

seen in 0.9%, fundic gland polyps were present in 0.5% and adenocarcinoma was identified in 0.5% cases.[5] According to another study, histology showed different severity of ulceration (18.6%), metaplasia (8.5%), adenocarcinoma (1.69%), dysplasia (1.69%), active gastritis (69.5%), and chronic gastritis with or without *H. pylori* (57.6%).[6] According to a Saudi Arabian study, normal biopsies were found in 7.85% of cases and benign polyps in 2.75% of cases. In 32.5% of the patients, *H. pylori* was found. In 82.5% of patients, there was *H. pylori* associated active gastritis; in 0.9%, it was atrophic; and in 2.7%, it was metaplastic.[7]

Objective of this study is to determine the spectrum of histopathological patterns of gastric mucosal biopsies in functional dyspepsia patients and correlate microscopic findings with symptoms of patients to help diagnose underlying diseases and targeted therapy.

MATERIALS AND METHODS

This cross-sectional study was carried out at the Department of Histopathology, Services Hospital, Lahore. By using WHO calculator, sample size of 284 cases was calculated with 95% confidence level, 1.5% margin of error and percentage of adenocarcinoma i.e. 1.69% in patients with dyspepsia on gastric mucosal biopsy.[7] After informed consent, patients of age 20-70 years, both genders, diagnosed with functional dyspepsia based on Rome IV Criteria (discomfort or pain that occurs in the upper abdomen, often after eating or drinking including include bloating, discomfort, feeling too full, nausea, and gas for >3 months)[8] underwent gastric mucosal biopsy. Patients having history of NSAIDS intake, upper gastrointestinal symptoms who simultaneously had irritable bowel syndrome, metastatic disease, inappropriate samples and inadequately preserved samples as per exclusion criteria were excluded. Total gastric mucosal biopsy samples of 284 patients who presented to 3 medical units of the hospital, with the complaints of dyspepsia not improving with conventional treatment of proton pump inhibitors and underwent upper gastrointestinal endoscopy were submitted. Name, age, gender, BMI, duration of dyspepsia, history of smoking, alcoholism, diabetes (BSR >200 mg/dl), and hypertension (BP ≥140/90 mmHg) were among the demographic details that were recorded on study proforma. Following that, gastric mucosal biopsy samples that had been obtained in formalin fixative, were processed and paraffin embedded blocks were prepared. Hematoxylin and Eosin (H&E) stains were used to stain the sections. To visualize the presence of *H. pylori*, May-Grunwald-Giemsa stain was utilized. Intestinal metaplasia was detected using the Alcian blue stain. The slides were examined by two consultant histopathologists and histopathological findings were noted. Histopathological patterns were assessed according to Sydney System of scoring for gastritis[9]. According to the operational definition, "chronic gastritis" was defined as the presence of lymphocyte and plasma cell infiltration of the superficial and/or deep lamina propria. All of this data was documented on a prescribed proforma.

SPSS version 20 was utilized for data entry and analysis. To assess normality, the Shapiro-Wilk test was used. Descriptive statistics were used to obtain results. The mean and standard deviation of quantitative factors, such as age, BMI, and length of dyspepsia, were displayed. The frequency and percentage of qualitative factors such as gender, smoking, alcoholism, diabetes, hypertension, and histopathological findings (fundic gland polyp, adenocarcinoma, ulceration, *H. pylori* chronic gastritis, metaplasia, neutrophilic activity, mild atrophy) were described.

RESULTS

Out of 284 patients 195 (68.66%) were males and 89 (31.34%) were females with male to female ratio of 2.1:1. Age range was from 20 to 70 years with mean age of 51.52 ± 9.88 years. Distribution of patients with various study variables is summarized in Table 1. Mean duration of disease was 8.19 ± 15.31 months. Mean BMI was 27.89 ± 6.87 kg/m^2. Total 175 (61.62%) patients were smokers and 77 (27.11%) were taking some quantity of alcohol. Histopathological patterns were assessed according to Sydney System of scoring for gastritis[9].

Histopathological patterns of gastric mucosal biopsies in functional dyspepsia were as follows; chronic active gastritis was seen in 154 samples (54.58%). Among these samples, *H. pylori* chronic gastritis was seen in 105 samples (37%) and non-*Helicobacter pylori* associated gastritis (Non Specific) was seen in 50 samples (17.58%), mucosal ulceration seen in 49 samples (17.3%), normal biopsies were (8.45%), metaplasia seen in 21samples (7.39%), neutrophilic activity seen in 19 samples (6.69%), fundic gland polyp was seen in 8 samples (2.82%), adenocarcinoma was seen in 5 samples (1.76%) and mucosal atrophy seen in 3samples (1.1 %) as shown in Table 2.

DISCUSSION

Functional dyspepsia remains one of the most frequent causes of patients referred to clinicians and gastroenterologists. It is among the most significant health issues that affect people of all ages and genders. According to estimates, the annual incidence of functional dyspepsia is 1%, and its prevalence in the general population is between 20 to 30%.[10] In addition to being common, dyspepsia is also an expensive medical ailment to treat. Most of the time, the expenses of laboratory

Table 1: Distribution of patients with other confounding variables (N=284)

Study variables		Frequency	%age
Age (years)	20-45	101	35.56
	46-70	183	64.44
Gender	Male	195	68.66
	Female	89	31.34
Duration (months)	≤6	123	43.31
	>6	161	56.69
BMI (kg/m^2)	≤25	135	47.54
	>25	149	52.46
Smoking	Yes	175	61.62
	No	109	38.38
Alcohol addiction	Yes	77	27.11
	No	207	72.89
Diabetes mellitus	Yes	157	55.28
	No	127	44.72
Hypertension	Yes	149	52.46
	No	135	47.54

Table 2: Distribution of Histopathological Patterns by Gender

Histopathological Pattern	Male n (%)	Female n (%)	Total n (%)	p-value
H. pylori chronic active gastritis	70 (35.9%)	35 (39.3%)	105 (37.0%)	
Non–*H. pylori* chronic active gastritis (non-specific)	32 (16.4%)	18 (20.2%)	50 (17.6%)	
Mucosal Ulceration	34 (17.4%)	15 (16.9%)	49 (17.3%)	
Normal biopsy	19 (9.7%)	5 (5.6%)	24 (8.5%)	
Metaplasia	16 (8.2%)	5 (5.6%)	21 (7.4%)	0.945
Neutrophilic activity	13 (6.7%)	6 (6.7%)	19 (6.7%)	
Fundic gland polyp	6 (3.1%)	2 (2.2%)	8 (2.8%)	
Adenocarcinoma	3 (1.5%)	2 (2.2%)	5 (1.8%)	
Mild atrophy	2 (1.0%)	1 (1.1%)	3 (1.1%)	

There was no statistically significant association between histopathological pattern and gender (p = 0.945).

testing and the use of medications that inhibit the production of gastric acid are high, and they provide a genuine and time-consuming clinical problem for medical practitioners.[11] The mean age of the 284 individuals with functional dyspepsia who participated in this study was 51.52 ± 9.88 years. Total 31.34% of participants were female, while 68.66% were male. Demographic findings showed that the age range of 46–70 years had the highest prevalence of functional dyspepsia patients, with a decline in occurrence at extremes of ages. The histopathology analysis indicated that chronic gastritis and mucosal ulcerations were the most prevalent symptoms in both genders.

The most common pathological outcome in the current study was chronic gastritis (54.58%). Mucosal ulceration were seen in 17.4% of samples. Neutrophil infiltration was found in 6.69% of samples in the current investigation. Higher values from 22.8 to 68.5% are reported in other studies which could be secondary frequent use of antibiotics.[15-18] In another locally conducted study, Chronic gastritis was the major condition associated with dyspeptic patients[19]. One study reported that 72.34% of patients with an *H. pylori* infection and 23% of patients without an *H. pylori* infection had neutrophilic infiltration.[14] Atrophy was observed in 1.1% of participants in the current investigation. While others studies report 2 to 3.5% figures for atrophy.[14,20,21] Intestinal metaplasia was observed in 7.4% of the participants in this study. This figure is well within 5.7 to 8% quoted by other researchers.[12,14,16] Theresa and coworkers found intestinal metaplasia in 10% of individuals without an *H. pylori* infection and 11% of patients with an *H. pylori* infection.[13] Gender did not seem to be a significant risk factor for *H. pylori* infection or intestinal metaplasia development in the current investigation. These results differ from some previous reports who observed a greater prevalence in males, although they are consistent with earlier observations.[22,23-25] The very young age of the cases included in current analysis, with a median age of 34 years, can be used to explain the infection's notable trend toward the younger age group. This result is consistent with recent studies reporting this variable that found that patients between the ages of 20 and 40 experienced infections more frequently than those in the older age group.[22,23,25]

The sampling strategy was one of this study's most significant limitations. Furthermore, the lack of

comprehensive patient histories and information on the use of proton pump inhibitors and antibiotics prior to endoscopy were other limitation as these medications may have an impact on the calculation of the prevalence of *H. pylori*. Future studies without proton pump inhibitors and antibiotics before endoscopy can be done to better understand the histopathological results associated with functional dyspepsia.

CONCLUSION

Chronic active gastritis was the most frequent finding on gastric mucosal biopsy samples of patients with functional dyspepsia, followed by intestinal metaplasia, neutrophilic activity, fundic gland polyp and gastric adenocarcinoma. These finding help diagnose the most common diseases like *Helicobacter pylori* associated gastritis, intestinal metaplasia and carcinoma and timely treat the underlying diseases, ultimately reducing the disease burden and complications.

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Author Contributions

Dr. Tahira Liaquat: Senior Demonstrator Department of Pathology Services Institute of Medical Sciences, SIMS Lahire]:Conception and design, analysis and interpretation of data, drafting the article, critical revision for important intellectual content, final approval.
Dr. Amna Jahan: Associate Professor of Pathology, SIMS Lahore]: Conception and design, analysis and interpretation of data.
Dr. Hira Kareem: Senior Demonstrator Department of Pathology, SIMS Lahore]: Analysis and interpretation of data, drafting the article.
Dr. Roop-e-Zahra: Demonstrator Pathology, SIMS Lahore]: Acquisition of data, analysis and interpretation.

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