

Histopathological Evaluation of Prevalent *H. pylori* Induced Gastro Intestinal Diseases According to Updated Sydney Classification

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Abstract

Objective: To determine the prevalence of *H. pylori* induced gastritis and its association with development of chronic inflammation and carcinoma with reference to updated Sydney classification, to ensure the proper diagnosis and timely treatment. **Methods:** This was a cross sectional study conducted at the Department of Pathology, Dow Diagnostic Reference and Research Laboratory for the year 2018. Analysis of about 726 gastric biopsy specimens was performed to identify the epidemiological status of the disease. On the other hand, 100 of the specimens were analysed according to Sydney classification to ensure the accurate diagnosis of the gastritis and related disorders. Out of 726 biopsy samples positive samples for carcinoma were investigated in detail histological features. Giemsa stain was used to visualize the *h pylori* bacteria and the sections of biopsies were subjected to haematoxylin and eosin staining for histological analysis. **Results:** Out of 727 cases, *H. pylori* was found in 492 (67.8%) patients. About 1.79% (13) cases were identified as adenocarcinoma, 0.27% (2) squamous cell carcinoma and 0.13% (1) as B cell non Hodgkin lymphoma. Results of Sydney classification. The degree of chronic inflammatory activity was 57% mild; 38% moderate and 3% severe out of a total of 67% cases in an active phase of Hp gastritis. Hp-associated gastritis was the most common form of chronic gastritis, without intestinal metaplasia and with mild activity. The association of *h pylori* with mild inflammation and Neutrophilic infiltrates of the lamina propria, pits, or surface epithelium was statistically significant (p value < 0.05). **Conclusion:** The frequency of *H. pylori* infection is common in our population but the infection is mild to moderate and its Sydney classification reveals that early diagnosis may pre-

vent the later complication.

Keywords

Helicobacter pylori, Sydney Classification, Histology, Gastritis

1. Introduction

Helicobacter pylori (*H. pylori*) is the main etiological agent for antral gastritis, and plays a leading pathogenic role in duodenal ulcers and majority of non-NSAID gastric ulcers. There is high prevalence of *H. pylori* in the developing world where people have low socio-economic status and live in an unhygienic environment. Therefore, it is one of the most important causes or prerequisites of peptic and duodenal ulcer disease in Pakistani population [1] [2] [3]. A recent study revealed an early colonization/infection of infants with *H. pylori* and a prevalence of 67% at 9 months of age in a peri-urban community in Karachi, Pakistan [4]. In addition, some studies also revealed that gastritis among Pakistani population associated with pylori is estimated to be 51% - 78% due to *H. pylori* infection [5]. Undiagnosed infection may lead to other associated diseases particularly there is a significant association between *H. pylori* infection and mucosa associated lymphoid tissue lymphomas (MALTomas) [6] and gastric cancer [5]. Interestingly, *H. pylori* could be present in a significant number of dyspeptic patients with endoscopically normal stomach [7] which may cause peptic ulcer disease. However, it is more common in duodenal ulcer than gastric ulcer and frequency of bacterial load increases with the increasing age [8]. Invasive tests have been considered as gold standard and timely diagnosis of *H. pylori* infection is crucial for eradication of infection to prevent atrophic gastritis and GC which are consequences of peptic ulcer [9].

However current picture is quite different instead of being elimination of the disease the incidence of *H. pylori* induced gastritis is getting higher, so there is a dire need to identify the current status of the prevalence of the disease in our country so that socioeconomic burden can be reduced. Therefore, objective of the current study is to audit the prevalence of *H. pylori* associated gastritis among Pakistani population with the severity of the disease and other associated diseases like carcinomas.

2. Methods

2.1. Specimen Collection

A total of 726 samples of Dyspeptic patients underwent upper gastrointestinal endoscopy in DUHS, Karachi, Pakistan and analysis of clinical features and epidemiological analysis was done. Out of 726 samples, 100 samples were selected for the details investigation according to Sydney grading. Therefore four biopsies were collected from each patient (two each from body and antrum of the stom-

ach). The histopathological confirmation of *H. pylori* infection was accomplished by H & E and where required by Giemsa staining. The presence of *H. pylori* was graded as absent or present based on the Sydney system.

2.2. Histology

Giemsa stain was done to visualize *H. pylori* and biopsy specimens were fixed in 10% formalin embedded in paraffin wax before staining with Haematoxylin and eosin (H & E) for histopathology [10]. The level of acute and chronic inflammation was measured according to an increase in lymphocytes and plasma cells in the lamina propria. *H. pylori* density on the basis of colonization was scored. Activity was scored by expansion of lamina propria pits and surface epithelium with neutrophilic polymorph infiltration. Atrophy was observed as the loss of inherent glandular tissue. Intestinal Metaplasia was classified according to their presence in individual biopsy specimens into grade 1 (focal) and grade 2 (occupying the entire width). All the pathologies were scored as none; mild; moderate and sever. For optimal histological evaluation, all gastric biopsy specimens included surface epithelium and muscularis mucosae.

2.3. Statistical Analysis

The statistical package for social science SPSS (Release 16, standard version, copyright® SPSS; 2007) was used for data analysis. The descriptive analysis was done for demographic and clinical features. Results were presented as mean for quantitative variables and number (percentage) for qualitative variables.

3. Results

3.1. Clinical Features and Endoscopic Analysis

The symptoms of the patients included abdominal pain 70%, weight loss 17.5%, vomiting 12.5%, bloating 10%, anaemia 17.5% and diarrhoea 15% epigastric pain 42.5%, dyspepsia 27.5%, and flatulence 10%. The endoscopic findings of gastritis in patients with Non Ulcer dyspepsia (NUD) 50%, gastric carcinoma in 3.5%, gastric ulcer in 7.2% and duodenal ulcer in 10% was identified.

3.2. Demographic and Epidemiological Analysis

In current study about 726 samples were analysed and it was identifying on the basis of Giemsa stain that about 492 (67.8%) having *H. pylori* associated gastritis whereas 234 (32.2%) patients were having nonspecific gastritis. Out of 726 patients 58 (6%) cases were of duodenal ulcer and only 16 (2%) patients were diagnosed with carcinoma among which about 1.79% (13) cases were identified as adenocarcinoma, 0.27% (2) squamous cell carcinoma and 0.13% (1) as B cell non Hodgkin lymphoma.

The male to female was ratio was 1:1.02 for the prevalence of the disease. According to age group, the *H. Pylori* infection was more prevalent among middle age group 44.1% whereas it was least prevalent among elderly 21.1%.

3.3. Morphological Variables According to Sydney Grading System of Chronic Gastritis

The degree of chronic inflammatory activity was assessed and graded as follows: 57% mild; 38% moderate and 3% severe out of a total of 67% cases in an active phase of Hp gastritis (Table 1). Hp-associated gastritis was the most common form of chronic gastritis, while there was no association found between *H. pylori* infection and metaplasia. The gastric atrophy of lower antral mucosa was not found in 53.8% patients however the mild atrophy was noticed in 46.15% patients. The presence of *H. pylori* as significant pathological factor in mild cases was 84.6% however around 11.53 percent of cases have secondary reasons for gastritis other than *H. pylori* around 38% of population with gastritis showed no activity while 61.53% (50% + 11.5%) showed mild to moderate Neutrophilic infiltrates of the lamina propria, pits, or surface epithelium (Table 1).

Table 1. Shows the Sydney grading classification on *H. pylori* associated gastritis.

S. No	variables	% of Sydney grading			
		Nil	Mild	Moderate	Sever
1	Chronic Inflammation	0	57.69	38.46	3.84
2	Activity	38.46	50	11.53	0
3	Atrophy	53.84	46.15	0	0
4	Intestinal Metaplasia	100	0	0	0
5	<i>H. pylori</i> Density (gastritis)	3.84	84.6	11.53	0

Key of Variables' Grading that was used in this study listed below: 1. Chronic Inflammation—>5 lymphocytes/hpf, >2 plasma cells/hpf, >5 lymphocytes/100 epithelial nuclei (The density of mononuclear cells in the lamina propria is graded in areas away from lymphoid follicles and their surrounding marginal zone of small lymphocytes). 2. Activity—<1/3 = mild 2/3 = moderate; 2/3 = severe (expansion of lamina propria, pits, or surface epithelium with Neutrophilic infiltrates). 3. Atrophy—Mild, moderate, or severe (loss 3 to 4 glands). 4. Intestinal Metaplasia—Classified according to their presence in individual biopsy specimens into grade 1 (focal) and grade 2 (occupying the entire width). 5. *H. pylori* Density—Scattered orgs <1/3 of the surface = mild; large clusters/continuous layer >2/3 of surface = severe; intermediate numbers = moderate colonization.

4. Discussions

The study of *H. pylori* virulence factor is important as it is associated with considerable morbidity and mortality. In Pakistan, infection with *H. pylori* is frequent among the local population and is acquired at an early age. prevalence of *H. pylori* infection varies strongly worldwide more than 80% - 90% in developing countries [11]. The symptoms for *H. pylori* infection may vary from person to person and depending on chronicity as well as severity of infection. The most noticeable symptom in our population was found to be abdominal pain and epigastric pain followed by dyspepsia. Additionally, endoscopic findings of gastritis in patients revealed the highest percentage of non-ulcer dyspepsia.

In the present study, we found that the total prevalence of *H. pylori* infection was 67.8% in this region, which was similar to the countrywide average reported previously in the year 2012 that is 74.4% [12]. Our study showed that there was no association between the *H. pylori* infection and sex. Previous studies showed that the prevalence of *H. pylori* infection increased with age, and the prevalence was lower in subjects younger than 20 years old [13], but in our study the prevalence in middle age is higher among other study groups.

H. pylori screening among the general population and immediate treatment has potentially reduced development of *H. pylori* associated complications and gastric cancer mortality [14]. Our data show a significant percentage of positive histopathological features such as neutrophil infiltration activity, density and chronic inflammation in cases of Hp gastritis. Since the of *H. pylori* increases the chances of developing adenocarcinoma and MALT lymphoma, early detection and eradication of Hp gastritis is of great importance for our patients for our patients in order to prevent the development of precancerous changes and GC. Although the number of patients with critical symptom of carcinoma was least prevalent in our population with total cases of 1.79% suffering with adenocarcinoma, squamous cell carcinoma and B cell non Hodgkin lymphoma.

The sites of the biopsy and Giemsa staining is crucial in diagnosis of *H. pylori* microbes and gastric atrophy. According to the Updated Sydney Classification System, biopsies should be taken from the mid antrum and mid body. Thus the Sydney scale was applied in our biological samples, since histological evaluation of Hp gastritis could be of great value in evaluating the treatment efficacy [15]. The degree of chronic inflammatory activity was assessed and graded as Sydney classification; the chronic inflammation was mild to moderate in our samples, along with mild activity of Neutrophilic infiltrates. Hp-associated gastritis was the most common form of chronic gastritis; while intestinal metaplasia was absent in our study cases. It was found to be a strong association of gastritis with the presence of *H. pylori* in biopsy specimens, contrast, reasonable number of patients may have secondary reasons for gastritis other than *H. pylori* as reported earlier [16].

Thus the Sydney system-based grading scale in comparison with routine assessment methods methods for population suffering from gastritis could be a tool to provide an objective histological evaluation. This might help in treatment efficacy of gastritis either related to *H. Pylori* or secondary reasons for gastritis [17] [18] [19].

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Abbreviations

NUD = Non Ulcer Dyspepsia;

GU = Gastric Ulcer;

DU = Duodenal Ulcer;

GC = Gastric Carcinoma;

Hp = *Helicobacter pylori*.