

A study of histopathology of H. Pylori gastritis in relation To H. pylori density in gastric biopsies

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Abstract

Introduction: Helicobacter pylori (H. pylori) is of major concern today and is characterized by mucosal infiltration by neutrophils, mononuclear cells and can cause atrophy and intestinal metaplasia which in long term can predispose to gastric carcinoma or lymphoma. **Aims of the study:** To evaluate the various histopathological parameters in H. pylori induced gastritis and to correlate with H. pylori density. **Materials and Methods:** This is a Cross sectional descriptive study conducted in the Department of Pathology and Medicine, which included 50 gastric biopsies that was diagnosed as H. Pylori gastritis for a period of 1 year from January 2017 to December 2017. Histopathological variables like Mononuclear cell infiltration, neutrophilic infiltrate, Atrophy, Density of H. pylori were graded according to updated Sydney system. statistical analysis was done using spearman rank correlation test. **Results:** There were 50 cases of H. pylori gastritis diagnosed during the study period. The age of the patients ranged from 9 to 75 years with male: female ratio of 2.3:1. Atrophy was seen in 25 cases (50%). Mononuclear cell infiltration was seen in all 50 cases (100%). Neutrophilic activity was seen in all 50 cases (100%). Mild activity was seen in 27 (54%) cases. Moderate activity in 10 (20%) cases and severe activity in 13 (26%) cases. H. pylori density was mild in 29 (58%) cases, moderate in 10 (20%) cases and severe in 11 (22%) cases. H. pylori density showed significant correlation with neutrophilic activity. **Conclusion:** H. pylori density has significant correlation with severity of neutrophilic activity. Chronic inflammation, metaplasia and atrophy did not show significant correlation with H. pylori density.

Key words: Gastritis, H. pylori density, Modified Sydney system, Neutrophilic activity

Introduction

Gastritis is a common condition with many etiologies and classifications. Helicobacter pylori (H. pylori) is of major concern today because it is proven that H. pylori is the principal cause of chronic gastritis, peptic ulcer diseases, gastric cancer and lymphoproliferative disorders [1]. One-half of the world's population has H. pylori infection, with an estimated prevalence of more than 90% in developing countries [2]. In our country, the reported prevalence of H. pylori ranged from 30% to 67% [2]. H. pylori strains can induce interleukin release from gastric epithelial cells which is a chemotactic factor for neutrophils that infiltrates the mucosa. H. pylori infection is characterized by mucosal infiltration by neutrophils, mononuclear cells and can cause atrophy and intestinal metaplasia which in long term can predispose to gastric carcinoma.

Aims of the Study

1. To evaluate the various histopathological parameters in H. pylori induced gastritis.
2. To correlate the H.pylori density with the various histopathological parameters associated with H.pylori gastritis.

Materials and Methods

Setting: Department of Pathology and Medicine

Duration: 1 year from January 2017 to December 2017.

Type of study: Cross sectional descriptive study.

Sampling Methods: All consecutive samples of endoscopic gastric biopsies were included during the study period

Inclusion criteria: Endoscopic gastric biopsies positive for H. pylori.

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Exclusion criteria: Endoscopic biopsies negative for H.pylori, Malignancy

Data Analysis: Statistical analysis was done using SPSS software version 24. The frequency of distribution of various histopathological parameters were tabulated. The correlation of H. pylori density was done with other histopathological parameters using spearman rank correlation test.

Ethical consideration: Ethical clearance was obtained from Institutional ethical committee.

The biopsy specimens received were fixed in 10% buffered formalin, processed, oriented on edge and embedded in paraffin wax. Sections were cut in sequential 4mm sections and were stained with Hematoxylin and Eosin and modified Giemsa stains.

Gastric biopsies which are negative for H. pylori were excluded from the study.

The histopathological evaluation was done and following features were evaluated:

Mononuclear cell infiltration, neutrophilic infiltrate, Atrophy, Density of H. pylori.

All variables were graded according to updated Sydney system. [3-5]

Mononuclear cell infiltration was scored as follows:

0= Occasional lymphocytes and plasma cells or at a level considered normal (upto 5/HPF).

Results

There were 50 cases of H. pylori gastritis diagnosed during the study period. The age of the patients ranged from 9 to 75 years. There were 35 males and 15 females with male: female ratio of 2.3:1. Endoscopic examination revealed 44 (88%) cases involving the antropyloric region with erosions and ulcer, two (4%) cases involved lesser curvature, two (4%) cases involved body of stomach and two (4%) cases presented as pangastritis. Scoring done according to updated Sydney system is tabulated in Table 1.

Table-1: Modified Sydney scoring of histopathological parameters in H. pylori induced gastritis.

	Mononuclearcell infiltration (%)	Neutrophilicactivity (%)	Atrophy (%)	H. pyloridensity (%)
Score 0	0	0	50	0
Score 1	2	54	28	58
Score 2	12.3	20	20	20
Score 3	85.7	26	2	22

Atrophy was seen in 25 cases (50%). No atrophy was seen in 25 cases (50%). Mild atrophy was seen in 14 (28%) cases. Moderate atrophy in 10 (20%) cases and severe atrophy in 1 (2%) case. Five cases (10%) were associated with intestinal metaplasia.

1 =Mild increase in mononuclear cells (6-10/HPF).
 2 =Moderate increase in mononuclear cells (10-20/HPF).
 3 =Diffuse increase in mononuclear cells (>20/HPF).

Neutrophilic infiltrate (Activity) was scored as follows:

0 =No extra vascular neutrophils.
 1 =Scattered in the lamina propria only.
 2 =Neutrophils infiltrating a minority of gastric pits.
 3 =Neutrophils infiltrating majority of gastric pits/ infiltrate with in foveolar lumen.

Atrophy is scored as the percentage of atrophic glands. Non-metaplastic and metaplastic subtypes are considered together.

0- No atrophy, 0%,
 1-Mild atrophy, 1–30%
 2- Moderate atrophy, 31–60%
 3- Severe atrophy, >60%,

The density of H pylori was scored as follows:

0 =Not identified.
 1 =Rare organisms present.
 2 =Organisms found in many but not all high fields.
 3 =Plentiful organisms in all fields.

If areas with widely different scores were present on the same specimen, an average based on the general evaluation of the sample was used.

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Mononuclear cell infiltration was seen in all 50 cases (100%). Mild inflammation was seen in 1 (2%) case. Moderate inflammation in 7 (12.3%) cases and severe inflammation in 42 (85.7%) cases. Neutrophilic activity was seen in all 50 cases (100%). Mild activity was seen in 27 (54%) case. Moderate activity in 10 (20%) cases and severe activity in 13 (26%) cases. H.Pylori density was mild in 29 (58%) cases, moderate in 10 (20%) cases and severe in 11 (22%) cases. H. pylori density showed significant correlation with neutrophilic activity ($p < 0.05$). Dysplasia was seen in 2(4%) cases, parietal cell hyperplasia was seen in 2(4%) cases.

Discussion

Helicobacter pylori is a gram-negative bacterium colonizing the human gastric mucosa, and causes a variety of clinical outcomes ranging from asymptomatic carriage to gastritis, peptic ulcers, cancer and lymphoproliferative disorders. *H. pylori* gastritis is characterized by mucosal infiltration by neutrophils and mononuclear cells. Although a variety of tests are available for rapid detection like rapid urease test, histomorphology and culture remains gold standard as rapid urease test can sometimes be negative in case of low bacilli load. And culture though highly sensitive and specific takes longer time duration [2].

H. pylori infection induce interleukin release from gastric epithelial cells especially interleukin 8 (IL- 8) which is a chemotactic mediator for neutrophilic infiltrate. Various studies have established a causal relationship between IL-8 and neutrophilic infiltration in *H. pylori* infection [6-9]. Taguchi et al [10] reported the association of the IL-8-251 A/T polymorphism with higher expression of IL-8 protein, severe neutrophil infiltration and increased risk of atrophic gastritis and gastric cancer.

In Sydney system of grading the histopathological parameters assessed are chronic inflammation (chronic gastritis), the activity of the gastritis measured by the presence of polymorphonuclear leucocytes alongside the mononuclear inflammatory infiltrate, intestinal metaplasia, atrophy manifested by the loss of the normal mucosal glands, and the presence of *H. pylori* organisms [3]. Fareed et al [5] correlated the inflammatory activity with *H.pylori* density in antrum, corpus and cardia and found neutrophilic activity was most in antrum and least in cardia and also found a direct correlation of neutrophilic activity with the density of *H. pylori*.

Few authors have found correlation between *H.pylori* density and chronic inflammation. Kim et al [11], correlated gastritis with *H. pylori* density in duodenal ulcer and benign gastric ulcer patients and found the inflammatory reaction to *H. pylori* is stronger in the antrum than in the body. The study also showed that there is a direct relationship between the severity of *H. pylori* infection and the degree of chronic gastritis. Similarly in a study by Yakoob et al [12], there was a

statistically significant correlation between the intensity of *H. pylori* colonization and chronic gastritis activity. In a study conducted by Ardakani et al [13], on 272 samples of gastric biopsy, there was no significant relationship between the density and volume of *H. pylori* and the severity of chronic gastritis activity. Choudhary et al [14], also Correlated *H. Pylori* density with grading of chronic gastritis in 251 patients and showed a lack of correlation. Park et al[15], in Korea, studied the relationship overall between the presence of *H. pylori* and histological grading of chronic gastritis, including activity, and no association was found between the quantitative grading of *H. pylori* and the histological grading of chronic gastritis which he attributed could be due to the genetic differences, nutritional habits, and environmental factors between the study populations [11].

In our study there was significant correlation between neutrophilic activity and *H. pylori* density as found by Fareed et al. But no correlation was observed with *H. pylori* density and chronic inflammation, atrophy and metaplasia. Those cases associated with intestinal metaplasia had low *H.pylori* density as explained by the alkaline environment by goblet cells. Otherwise most of the cases showed significant correlation between neutrophilic activity and *H.pylori* density.

Chronic inflammatory cells did not show any correlation. Presence of lymphoid follicles was observed to be clue to chronic *H.pylori* infection but did not correlate with density of organisms. Atrophy was also seen to be associated with severity of chronic inflammation than with *H.pylori* density and neutrophilic activity.

Conclusion

H.pylori density has significant correlation with severity of neutrophilic activity. Chronic inflammation, metaplasia and atrophy did not show correlation with *H.pylori* density.

What this study adds to existing knowledge?

This study highlights the fact that the intensity of neutrophilic infiltration correlates with the *H.pylori* density and so the disease activity

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- Dr. Kalaivani @ Selvi has involved in study design, data collection, analysis and manuscript writing
- Dr. Jeya Shambavi has involved in data collection, analysis and manuscript writing
- Dr. Vinoth has involved in study design, data collection and manuscript editing

Findings: Nil; **Conflict of Interest:** None initiated

Permission from IRB: Yes

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