Effect of Helicobacter Pylori Density on Inflammatory Activity in Stomach

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Abstract

Aim: To assess the relationship of H. pylori density on inflammatory activity in different parts of stomach.
Materials and Methods: Endoscopic biopsies were taken from gastric antrum, corpus and cardia of 150 dyspeptic patients in a prospective analysis. A semiquantitative scoring was done according to updated Sydney system in accordance with the variables like H. pylon density, neutrophil activity and mononuclear cell infiltrate. Glandular atrophy and intestinal metaplasia was also noted. Statistical analysis was done using Spearman rank correlation test.
Result: One hundred and fifty patients, 94 males and 56 females (with a mean age of 35.4) were analyzed. Morphologically within stomach 82.7% of antral, 74% of corpus and 68% of cardia biopsies were positive for H. pylori. Correlation coefficient of H. pylon density and neutrophil activity was 0.542, 0.644 and 0.729 for antrum, corpus and cardia respectively (P=0.00); while the correlation coefficient of mononuclear cell infiltrate with H. pylon density was 0.173, 0.245 and 0.326 for antrurn, corpus and cardia respectively (P=0.035, 0.003, 0.000). H. Pylon density in corpus and cardia was proportional to its density in antrum.
Conclusion: Density of H. pylori is more in the antrum due to its alkaline pH and the neutrophil activity shows a direct association with H. pylon density (JPMA 50:148, 2000).

Introduction

H. pylori, a gram negative microaerophilic spiral bacterium, was first isolated in 1982[1] It is reported to be involved in the pathogenesis of chronic gastritis, gastric ulcer, non ulcer dyspepsia (NUD), gastric cancer and gastric lymphoproliferative disorders[2-9].
Several invasive and non-invasive techniques are currently used for detecting H. pylori infection[2,3,10,11]. Histology and rapid urease CLO test are the most widely used invasive methods. The endoscopic biopsy dependent urease test is a rapid diagnostic test based on the presence of the preformed urease enzyme in H. pylon, present in biopsy specimen[2,3]. Many workers have reported 100% specificity of the urease test, but it has been observed that false positive result can he seen due to other urease producing bacteria in the gastric biopsy specimen. Similarly, a false negative result is observed when, the number of H. pylon are vety scanty[12,13]. Density (population) of H. pylori in gastric biopsy specimen is directly proportional to ui-ease content and a positive urease test and vice versa is true.
Gastric acid production is the major determinant of colonization of H. pylon in the stomach. As the production of acid is low in antrum and cardia as compared to corpus, density of H. pylori is more in antrum and cardia[14].
It has been demonstrated that cytotoxic H. pylon strains can induce interleukin B release from gastric epithelial cells, which could be a chemotactic mediator for polymorphoneutrophilic infi Iterate 1 It is believed that H. pylori associated gastritis is fundamentally a bacterial infection of the gastric mucosal surface and is characterized by mucosal infiltration by polymorphoneutrophils and mononuclear cells[16].
The aim of the present study is to assess the H pylori density on inflammatory activity in different parts

of stomach, in endoscopically proved symptomatic gastritis.

Patients and Methods

A prospective study was carried out on 150 patients with dyspepsia. Subjects were scoped and biopsies were taken, three from antrum and two each from corpus and cardia of stomach. Patients, who were on proton pump inhibitors, had recently taken anti ulcer treatment or antibiotics, had oesophageal varices, bleeding tendency and those who refused endoscopy, were not included in the study.
The biopsy specimens were fixed in 10% buffered tormahn, processed, oriented on edge and embedded in paraffinwax. Sections were cut in sequential 4mm sections and stained with haematoxylin and eosin (H&E) and modified Giemsa stains. Three to five serial sections were done for one specimen and multiple high power fields were examined.
The histopathologic evaluation was done and following features were evaluated:
Mononuclear cell infiltration and Polymorphoneutrophilic infiltrate Density of H. pyloi.i. All variables were graded for each morphological site according to updated Sydney system[7].
Mononuclear cell infiltration was scored as follows:
0 Occasional lymphocytes and plasma cells or at a level considered normal (upto 5/HPF).
1 =Mild increase in mononuclear cells (6-l0/HPF).
2 =Moderate increase in mononuclear cells (I0-20/HPF).
3 =Diffuse increase in mononuclear cells (>20/HPF).
Polymorphoneutrophilic infiltrate was scored as follows:
0 =No extravascular neutrophils.
1 =Scattered in the lamina propria only.
2 =Neutrophils infilterating a minority of gastric pits.
3 =Neutrophils infiltrating majority of gastric pits/infiltrate with in foveolar lumen.
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 dry fields (40x).
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. Spearman correlation test was used for statistical analysis.

Results

The total number of patients studied were 150. male 94 and female 56 with a mean age of 35.4±13.7 years and range of 15 to 85. H pylori was present in 82.7% (124) of antral biopsies, 74% (111) of corpus biopsies and 68% (102) of cardiac biopsies. Neutrophil activity was correlated to H pylon density in the antrum. corpus and cardia with correlation coefficients (CC) of 0.542, 0.644 and 0.729 respectively (P=0.00). Correlation coefficients of mononuclear cell infiltration with H pylon density in antrum, corpus and candia were 0.173, 0.245 and 0.326 with P values of 0.035, 0.003 and 0.000 (Table). H pylon density in corpus and cardia was related to its deiisity in antrum (CC of 0.63 8 and 0.595 respectively, P0.OO). Absolute density of H. pylon decreased as we move from antrum to cardia. Mean values were 1 .69, 1 .33 and 1 . I I in antrum, corpus and cardia respectively at a scale of 0-3. Atrophic changes and intestinal metaplasia were present only in few cases.

Discussion

The introduction and universal use of endoscopy and targeted biopsy has increased the documentation of gastritis[19]. For many years it had been a dilemma to have a large population suffering from gastritis without identifying the pathogenic mechanism, until the recent recognition of H pylori[1-7,18,19]. The identification of H pylon as the major cause of chronic inflammation of the human gastric antral

mucosa has partly solved the problem[1-7,19].
Although a variety of commercial kits are increasingly made available for the detection of H pylon in the endoscopic biopsy specimens of which urease test is the most popular, yet histological evaluation and culture have always proved their worth and are the gold standard[2,12,20].
Quantification / grading of H pylon in a gastric biopsy specimen has shown that higher the grade/number, the more likely the biopsy urease test is to be positive and vice versa. The presence of small number of H pylori in gastric biopsy specimen, is the main determinant of a false negative urease test[12]. It thus proves that histological examination of biopsy sections using a variety of stains[21-28] has shown to be quicker, simpler and more reliable even when the number of organism is small[12]. Culture of organisms which is a gold standard has 100% sensitivity and specificity but takes a longer duration for the results to be known.[19]
It is observed that local acid production in the stomach, effects the colonization of H pylon. As the production of acid is low in antrum and carida, H. pylon should also colonize the cardia. In our study we investigated the prevalence of H. pylori in different parts of' stomach. It was observed that the density of H pylon was more in the antrum and corpus as compared to cardia. which is in contradiction to many studies[14].
H. pylon associated gastritis is fundamentall a bacterial infection of the gastroduodenal mucosal surface and as such is characterized by mucosal infiltrate of polymorphonuclear leucocytes and mononuclear cells[16,30]. In Sydney system of grading if neutrophils are the dominant inflammatory cell, it is regarded as acute, while if the chronic inflammatory cells are seen to be more in number it is taken as chronic. The activity is ascertained by the presence of neutrophil polys in the lamina propria, in intraepithelial sites or both[18]. In the present study the same protocol was observed. A number of studies have investigated interleukin 8, which is known to be a neutrophil chernotactic factor31,32[31,32]. Various studies have shown an association between levels of H pylon infection and interleukin 8 messenger RNA or interleukin 8 protein[33-38]. In our study inflammatory activity was correlated to Helicobacter density iii the antrum, corpus and candia. It was seen that the neutnophilic activity was the most in the antrum and least in the cardia thus providing a direct correlation of neutrophilic activity with the density of H. pylon.
It is concluded that due to alkaline pH in the antrum the density of H. pylon is more in this part of the stomach. and neutrophilic activity shows a direct association with the levels of H. pylori infectioin.

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