Research Article

Prevalence of *Helicobacter pylori* infection in gastric and duodenal lesions as diagnosed by endoscopic biopsy

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Abstract

Background: *Helicobacter pylori* is associated with various diseases, mainly, many benign, premalignant, and malignant lesions of the digestive system. Colonization of stomach by *H. pylori* and chronic active gastritis present a cause-and-effect relationship. Endoscopic biopsy allows the detection of *H. pylori*, which determines the treatment for peptic ulcer disease.

Objective: To study the various spectrums of pathological lesions in patients with dyspepsia and the incidence of *H. pylori* in various pathological lesions.

Materials and Methods: Seventy consecutive endoscopic gastric biopsies, which were received from patients presenting with symptoms of dyspepsia, were included in the study. Routine hematoxylin and eosin stain and Giemsa-stained sections were examined for the histomorphological parameters associated with *H. pylori* infection and correlated with the incidence of *H. pylori* infection in each case.

Result: Of the 70 cases, 40 cases (57.5%) were positive for *H. pylori*, maximum positivity (66.6%) in specimens with histological evidence of gastric ulcer, followed by positivity in chronic superficial gastritis with activity cases (61.5%). Adenocarcinoma of intestinal type was associated with more positivity [4 of 5 (80%)] cases than that of adenocarcinoma of diffuse type [1 of 4 (25%)] cases. The presence of *H. pylori* is directly proportional to the degree of inflammation in chronic superficial gastritis.

Conclusion: The frequency of *H. pylori* infection is common in dyspeptic patients in our population. Association between various gastric diseases such as benign, premalignant, and malignant and *H. pylori* is significant.

KEY WORDS: *H. pylori*, chronic gastritis, dyspepsia

Introduction

Helicobacter pylori is associated with various diseases, mainly, many benign, premalignant, and malignant lesions of the digestive system including chronic gastritis, peptic ulcers, atrophic gastritis, intestinal metaplasia, gastric adenomas, gastric hyperplastic polyps, adenocarcinomas of the distal part of the stomach, and lymphomas of mucosa-associated lymphoid tissue.[1,2] Colonization of stomach by *H. pylori* and chronic active gastritis present a cause-and-effect relationship. Healing of gastric inflammatory lesions using eradication therapy, as a remedial measure of gastric inflammatory lesions may be deficient in immediate clinical benefits; however, it yields positive results such as thearrest and reversal of gastric histological lesions, and long term consequences such as reduction in gastric atrophy and intestinal metaplasia, which are precursors of gastric carcinoma.[3] Methods of detection are divided into invasive and noninvasive tests. Noninvasive tests include serology and carbon-labeled urea breath test. The invasive tests include the rapid urease test, histological examination, and culture. Among the invasive tests,

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histological examination is important in the assessment of *H. pylori* status. Endoscopic biopsy allows the detection of *H. pylori*, which determines the treatment for peptic ulcer disease.[4] For most studies, histological examination is the standard for detection, because the objective is the determination of the presence of organisms and prevalence of gastritis.[5,6]

Materials and Methods

This prospective study was undertaken in the Department of Pathology, New Civil Hospital, Government Medical College, Surat, Gujarat, India, from September 2011 to October 2013. Seventy consecutive endoscopic gastric biopsies, which were received from the surgical outpatient department, of the patients presenting with symptoms of dyspepsia were included in the study. Clinical details were noted including age, sex, and clinical diagnosis. These properly labeled tissues were then put in 10% formalin for 24 h. After fixation, the bits were washed in running tap water for 30 min, sent for preparation of formalin-fixed paraffin-embedded blocks and, then, tissue sections with 4-μm thickness were obtained. Routine hematoxylin and eosin stain on one slide and Giemsa stain on the other slide for the demonstration of *H. pylori* were done in each case. The biopsies were evaluated for the histomorphological parameters associated with *H. pylori* infection namely, lymphoid aggregates, chronic inflammatory infiltrate (mild, moderate, and severe), activity (neutrophils), and intestinal metaplasia. Various predominant histopathological diagnoses in each case were noted down and correlated with the incidence of *H. pylori* infection in each case.

H. pylori in HE stain: Light pink curved rods.
H. pylori in Giemsa stain: Dark blue curved rods.

Result

A total of 70 consecutive patients who underwent endoscopic gastric biopsies for various gastric lesions were studied, of which 40 cases revealed *H. pylori* positivity.

Of 70 cases, 49 (70%) cases were male and 21 (30%) cases female subjects, with a male to female ratio of 2.3:1. Among the 40 cases of *H. pylori*, 28 (70%) cases were male (n = 26) and 12 (30%) cases female subjects (n = 14), with a ratio of 2.33:1. This indicates the preponderance of *H. pylori* in male subjects.

The age of patients ranged from 20 to 80 years, with a mean age of 55.9 years. The age distribution of *H. pylori* shows a gradual increase in the *H. pylori* positivity with increasing age, reaching a maximum at the sixth decade.

As shown in Table 1, of the total 70 cases, 39 cases of chronic superficial gastritis, 9 cases of gastric ulcer, 9 cases of adenocarcinoma, 8 cases of nonulcer dyspepsia, and 5 cases of atrophic gastritis with intestinal metaplasia were observed. Of the 39 cases of chronic superficial gastritis studied, 24 (61.5%) cases were positive for *H. pylori*. Of the nine cases of gastric ulcer studied, six (66.6%) cases were positive for *H. pylori*. In five cases of intestinal metaplasia, three (60%) cases were positive for *H. pylori*. In nine cases of adenocarcinoma studied, five (55.5%) cases were positive for *H. pylori*. Of the eight cases that showed nonulcer dyspepsia, two (25%) cases were positive for *H. pylori*.

H. pylori are seen in sections, usually, in close contact with the mucosa within gastric pits entrapped within the overlying mucus or in the lumen of the gastric glands. In hematoxylin-and-eosin–stained sections, they are faintly eosinophilic, whereas in Giemsa-stained sections, they are better appreciated as blue or violet organisms.

Of the nine cases of gastric adenocarcinomas, five cases were of intestinal type and four cases diffuse type. Of the five cases of adenocarcinoma of intestinal type, four (80%) cases were positive for *H. pylori*, and of the four cases of adenocarcinoma of diffuse type, one (25%) case was positive for *H. pylori* [Table 2].

Among the 39 cases of chronic superficial gastritis, histological grading according to revised Sydney system was done. Chronic inflammatory infiltrate was composed of lymphocytes, plasma cells, and eosinophils, which were seen in the lamina propria in varying degrees. Mild degree of infiltrate was seen in 10 (25.67%) cases, moderate degree in

Table 1: *H. pylori* positivity in different gastric lesions by Giemsa stain

	Nonulcer dyspesia	Chronic superficial gastritis	Gastric ulcer	Atrophic gastritis with intestinal metaplasia	Adenocarcinoma	Total
Total no. of cases	8	39	9	5	9	70
Positivity of *H. pylori*	2	24	6	3	5	40
Percentage of positivity	25	61.5	66.6	60	55	57.1

Table 2: Types of adenocarcinoma and *H. pylori* positivity

H. pylori	Adenocarcinoma intestinal type (5), *n* (%)	Adenocarcinoma diffuse type (4), *n* (%)	Total (9), *n* (%)
Positive	4 (80)	1 (25)	5 (55.5)
Negative	1 (20)	3 (75)	4 (44.5)

Table 3: Association of *H. pylori* with activity, lymphoid aggregates, intestinal metaplasia, and atrophy in 39 cases of chronic superficial gastritis

Mucosal changes	Total cases	*H. pylori* positivity	Percentage
Activity	10	8	80
Lymphoid aggregates	13	9	69.2
Intestinal metaplasia	8	4	50
Atrophy	6	4	66.6

Table 4: Comparative studies showing *H. pylori* positivity and gastric cancer

Study	No. of cases	*H. pylori* positive (%)
Misra et al.[17]	29	69
Parsonnet[16]	109	84
Kim et al.[18]	194	84
Our study	9	55.5

Table 5: Comparative studies showing *H. pylori* positivity in different types of gastric adenocarcinoma

Study	Intestinal type (%)	Diffuse type (%)
Parsonnet[16]	89.2	31.8
Craanen et al.[15]	61.3	54.5
Misra et al.[17]	68	86
Our study	80	25

12 (30.7%) cases, and severe in 17 (43.5%) cases. Activity characterized by neutrophilic infiltrate, decreased mucus, and cuboidal epithelium were seen in 10 (25.6%) of the 39 cases of chronic superficial gastritis. Lymphoid aggregates and lymphoid follicles were noted in13 (33.3%) cases. Intestinal metaplasia with goblet cells was seen in eight (20.5%) cases. Atrophy with a decrease in the number of glands was noted in six (15.3%) cases.

As shown in Table 3, in chronic active gastritis, 8 of 10 cases of activity, 9 of 13 cases of lymphoid aggregates, 4 of 8 cases of intestinal metaplasia, and 4 of 6 cases of atrophy showed *H. pylori* positivity.

Considering the site of involvement, of the 40 positive cases, 18 (45%) cases showed colonization of *H .pylori* in incisura, 7 (17.5%) cases in lesser curvature of gastric antrum, 6 (15%) cases in greater curvature of gastric antrum, 5 (12.5%) cases in lesser curvature of corpus, and 4 (10%) cases in greater curvature of corpus.

Discussion

H. pylori is associated with many diseases, mainly, many benign, premalignant, and malignant lesions of the digestive system including chronic gastritis, atrophic gastritis, intestinal metaplasia, gastric adenomas, gastric hyperplastic polyps, adenocarcinomas of the distal part of the stomach, lymphoma of mucosa-associated lymphoid tissue, colonic adenomas, and colonic adenocarcinoma. Among them, the association between various gastric diseases and *H. pylori* is significant.

In our study, the incidence of increased with age. The maximum prevalence in our study was in the sixth decade. In our study, male subjects showed a higher prevalence of *H. pylori* infection when compared with females. There is no apparent reason as to why male subjects would have greater exposure or greater susceptibility to infection than female subjects. One reason suggested for the inconsistency in results is that, in certain populations, *H. pylori* infections may be inadvertently eliminated because of more frequent antimicrobial treatment of women for urogenital tract infection.[7]

Among 39cases of chronic superficial gastritis, 24 (55.7%) cases were found to be positive for *H. pylori*. In 1984, Marshall and Warren,[8] in their study showed that, among 20 cases of chronic gastritis, 12 were positive for *H. pylori* (60%). Our study showed a lesser positivity that may be because many biopsies may not have been taken from the representative site.

Atrophic gastritis and intestinal metaplasia are presumed to be important stages in the development of gastric adenocarcinoma.[9] In our study, five cases of gastric atrophy with intestinal metaplasia were diagnosed. Of them, three (60%) cases showed positivity for *H. pylori*. The study by Craanen et al.[10] have shown that yield for *H. pylori* infection is reduced when intestinal metaplasia is present, emphasizing the importance of obtaining biopsy specimen from antrum. In our study, atrophic gastritis was accompanied by fibrosis and paucity of glands, and the features were similar to the findings in a previous study done by Guarner et al.[11]

Our study showed a positivity of six (66.66%) cases of the nine cases of gastric ulcer, which is in concordance with the other studies shown in Table 4.[12]

In our study, five of nine cases of adenocarcinoma (55.5%) were reported to be *H. pylori* positive. Studies have shown that 60%–80% of gastric cancers are related to the long-term presence of *H. pylori*.[13] In a recent metaanalysis of *H. pylori* and gastric cancer, 79.2% of patients with noncardiac gastric carcinomas showed positivity for *H. pylori*.[14] Table 4 shows the association of *H. pylori* with gastric cancer in various studies and in our study.

Craanen et al.[15] showed *H pylori* in 61.3% of intestinal-type early gastric cancer and in 54.5% of diffuse-type early gastric cancer. Parsonnet[16] studied *H.pylori* positivity in gastric cancer and found a positivity of 89.2% of patients in intestinal-type when compared with 31.8% in diffuse type of gastric cancer, and it was concordant with our study [Table 5].[17]

Although histopathological examination is considered to be the gold standard, the reliability of detecting *H. pylori* infection depends on site, number, and the size of gastric

biopsy specimens, the stain used, and the expertise in staining and visualizing the bacteria.

Conclusion

The frequency of *H. pylori* infection is common in dyspeptic patients with a maximum positivity of 66.6% in gastric ulcer and 61.5% in chronic superficial gastritis. The association between various gastric disease, especially, benign, premalignant, and malignant, and *H. pylori* is significant.

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