

Research Article

Histopathological Spectrum of various gastroduodenal lesions in North India and prevalence of *Helicobacter pylori* infection in these lesions: a prospective study

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ABSTRACT

Background: Gastroduodenal diseases are perhaps the commonest diseases in adult population worldwide. *Helicobacter pylori* (*H. pylori*) represent one of the most common gastroduodenal infections and have been established as the etiologic factor in the development of various gastroduodenal diseases. Spectrum of *H. pylori* associated gastroduodenal diseases have not been systematically investigated in North India. So this study was carried out to determine the spectrum of gastroduodenal lesions on upper Gastro-Intestinal (GI) endoscopic biopsies and to determine the prevalence of *H. pylori* in gastric mucosa in these lesions.

Methods: Gastroduodenal mucosal biopsies of 100 patients from November 2012 to October 2013 in a tertiary care centre in north India were evaluated by routine histopathological methods and the presence of *H. pylori* in gastric mucosa in these lesions was determined.

Results: An age range of 17 years to 80 years was observed with maximum cases in the 4th decade and a male to female ratio of 1.86:1. The most frequently observed lesions were chronic gastritis followed by duodenitis, duodenal ulcer and gastric carcinoma. 5% cases showed unremarkable mucosa. *H. pylori* positivity was seen in 47% cases. 80% cases of duodenal ulcer, 68.75% cases of duodenitis, 50.56% cases of chronic gastritis, 50% cases of gastric ulcer & 40% cases of gastric carcinoma were positive for *H. pylori* infection.

Conclusion: Endoscopic gastroduodenal biopsies help to detect benign and malignant gastroduodenal diseases and to rule out *H. pylori* infection. Chronic gastritis was the most common gastroduodenal lesion followed by duodenitis, duodenal ulcer and gastric carcinoma. Duodenal ulcer, duodenitis, chronic gastritis and gastric ulcer showed strong positivity for *H. pylori* highlighting the role of this microorganism in the pathogenesis of these diseases.

Keywords: *Helicobacter pylori*, Gastritis, Duodenal ulcer, Gastric carcinoma

INTRODUCTION

Gastroduodenal diseases are perhaps the commonest diseases in adult population worldwide.¹ Disorders of the stomach and duodenum are a frequent cause of clinical disease, with inflammatory and neoplastic lesions being

particularly common. The gastroduodenal lesions have symptomatology which range from dyspepsia to altered bowel movements and dysphagia to GI bleed.²

Upper GI endoscopy is regarded as the investigation of choice in patients with upper GI tract disorders who often

present with dyspepsia.³ It also offers the opportunity for biopsy for histology in various gastroduodenal lesions including malignant disease, and histology, culture and urease test in *H. pylori* infection.⁴ Biopsy provides an excellent opportunity for the clinician and pathologist to correlate the clinical data, endoscopic findings and pathological lesions.

H. pylori represent one of the most common and medically important infections which survive on the surface of the mucosa in the layer of mucin and in gastric pits.⁵ Infection with this micro-aerobic, gram negative bacterium has been established as the etiologic factor in the development of peptic ulcer disease. In addition, *H. pylori* infection has been established firmly with the development of gastric neoplasias, including gastric adenocarcinoma and gastric mucosa associated lymphoid tissue lymphoma (MALToma).⁶

The rate of *H. pylori* infection in north India is high and the spectrum of *H. pylori* associated gastroduodenal diseases has not been systematically investigated. Hence the present study was done to determine the spectrum of gastroduodenal lesions on upper GI endoscopic biopsies and to determine the prevalence of *H. pylori* in these lesions.

METHODS

This prospective study was conducted in the department of pathology, government medical college, Jammu from 1st November 2012 to 31st October 2013, which is the largest tertiary care hospital in the region.

Patients with upper GI symptoms referred for endoscopy from outdoor/indoor patient departments of this hospital were taken up for the study.

All patients had given informed consent for the study and a local ethics committee had approved the protocol. Detailed clinical history was elicited from each patient. Complete general physical and systemic examination was done followed by evaluation of relevant investigations. After overnight fasting, upper GI endoscopy was performed on selected patients using Fujinon EG-265WR fiber-optic gastroscope under local anaesthesia with 10% xylocaine spray. The oesophagus, stomach and duodenum were visualized and mucosal findings noticed. Endoscopic mucosal biopsies were obtained from suspected lesions. Gastric mucosal biopsies from body and antrum were also taken in each case for detection of *H. pylori*.

The biopsy specimens were put into a small labelled bottle containing 10% buffered formalin and brought to the laboratory in the department of pathology. The biopsies were then processed, cut into sections of 4 micrometer thickness and stained with Haematoxylin and Eosin (H&E) and modified Giemsa techniques.

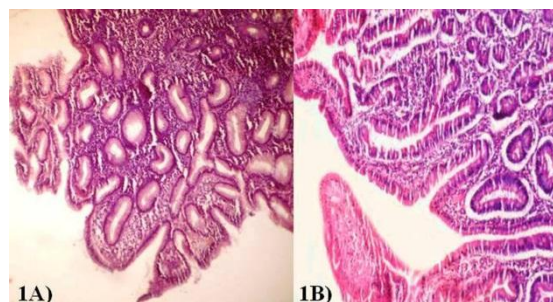


Figure 1: Photomicrographs A) and B) showing chronic antral gastritis and chronic duodenitis respectively (H&E, 20x).

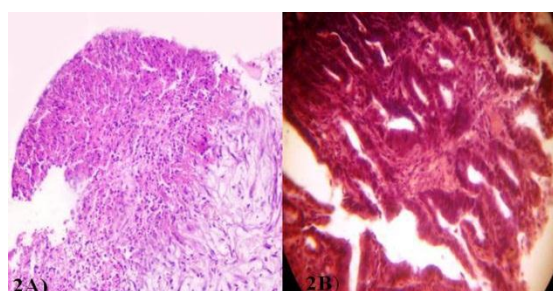


Figure 2: Photomicrographs A) and B) showing benign gastric ulcer and gastric adenocarcinoma - intestinal type respectively (H&E, 20x).

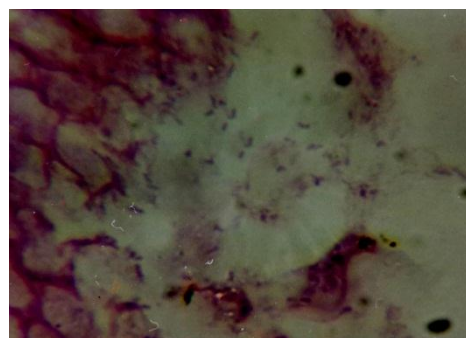


Figure 3: Photomicrograph showing numerous *H. pylori* in the gastric mucosa (H&E, 100x).

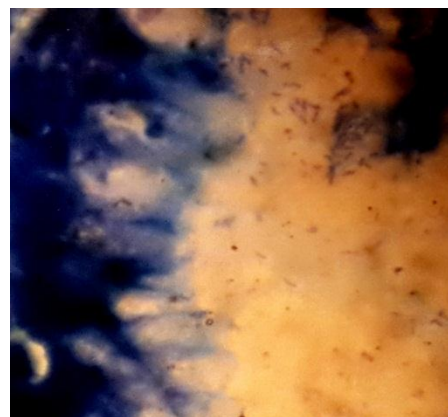


Figure 4: Photomicrograph showing numerous *H. Pylori* in the gastric mucosa (Modified Giemsa, 100x).

RESULTS

Endoscopic gastroduodenal mucosal biopsies of 100 patients were evaluated from November 2012 to October 2013. The age of patients varied from 17 years to 80 years. The majority of the patients belonged to 4th decade (33%) followed by 5th and 6th decades (Table 1). Out of these 100 patients, 65% were males and 35% were females with an M:F ratio of 1.86:1. On histopathological examination of biopsy specimens, different combinations of lesions were seen in the same patient. The various gastroduodenal lesions comprised of chronic gastritis only (64%), duodenitis and chronic gastritis (16%), benign duodenal ulcer and chronic gastritis (5%) and benign gastric ulcer and chronic gastritis (4%). Five cases of gastric carcinoma (5%), 1 case of MALToma (1%) and 5 cases with normal gastric mucosal histology (5%) were also seen (Table 2). So overall, chronic gastritis was the most common lesion seen in 89 % cases, in 64% cases as the solitary lesion, whereas in combination with duodenitis, benign duodenal ulcer and benign gastric ulcer in 16%, 5% and 4% cases respectively.

Table 1: Age distribution of patients with gastroduodenal lesions.

Age groups (years)	No. of cases	Percentage (%)
11-20	6	6
21-30	11	11
31-40	33	33
41-50	27	27
51-60	18	18
>60	5	5

Table 2: Spectrum of various gastroduodenal lesions on endoscopic biopsy.

Histopathological findings	No. of cases	Percentage (%)
Normal	5	5
Chronic gastritis only	64	64
Benign gastric ulcer + Chronic gastritis	4	4
Duodenitis + Chronic gastritis	16	16
Benign duodenal ulcer + Chronic gastritis	5	5
Gastric carcinoma	5	5
MALToma	1	1

All the lesions were evaluated for the presence of *H. pylori* infection. *H. pylori* were seen in 47 cases (47%) based on H&E and modified Giemsa stained sections (Table 3). Maximum number of *H. pylori* positive patients (34.04%) were seen in the 4th decade (Table 4). Out of *H. pylori* positive cases, 28 (59.57%) were males and 19 (40.43%) were females with an M:F ratio of 1.47:1. 45 out of 89 cases with chronic gastritis (50.56%),

2 out of 4 cases with gastric ulcer (50%), 11 out of 16 cases with duodenitis (68.75%), 4 out of 5 cases with duodenal ulcer (80%) and 2 out of 5 cases with gastric carcinoma (40%) were positive for *H. pylori*. No case depicting normal histology and MALToma showed positivity for *H. pylori* (Table 5). Out of 5 cases of gastric carcinoma, 4 were of intestinal type and 1 was of diffuse type. 2 cases (50%) of intestinal type were positive for *H. pylori*. The single case of diffuse type of gastric adenocarcinoma was negative for *H. pylori*.

Table 3: Presence of *H. pylori* in gastroduodenal lesions.

<i>H. pylori</i>	No. of cases	Percentage (%)
Positive	47	47
Negative	53	53

Table 4: *H. pylori* and age distribution.

Age group (years)	<i>H. pylori</i> positive	Percentage (%)
11-20	1	2.13
21-30	3	6.38
31-40	16	34.04
41-50	14	29.79
51-60	9	19.14
>60	4	6.51

Table 5: *H. pylori* positivity in various gastroduodenal lesions.

	No. of cases	<i>H. pylori</i> positive	Percentage (%)
Normal	5	0	0
Chronic gastritis	89	45	50.56
Gastric ulcer	4	2	50
Duodenitis	16	11	68.75
Duodenal ulcer	5	4	80
Gastric carcinoma	5	2	40
MALToma	1	0	0

DISCUSSION

In 1968, the upper GI flexible fiberoptic endoscope was first used and it proved to be a major breakthrough in the diagnosis of oesophago-gastro-duodenal lesions.⁷ Endoscopic screening may detect gastroduodenal lesions at an early stage especially atrophy, intestinal metaplasia and dysplasia so as to prevent progress of these lesions to invasive cancer.⁸ The upper GI endoscopic biopsy not only permits exact diagnosis of gastroduodenal lesions but also provides an opportunity to see *H. pylori* status and plan for specific medical or surgical therapy.

Marshall BJ et al.⁹ observed small curved and S-shaped bacilli in gastric biopsies which were later named as

H. pylori by Goodwin CS et al.¹⁰ *H. pylori* are Gram negative, microaerophilic, spiral and motile bacteria. Infection with *H. pylori* is more common in developing countries where prevalence is over 80% in middle aged adults as compared to 20-50% in industrialized countries. In some countries, 50% of infants are infected which increases to 90% by 5 years.¹¹

Endoscopic features associated with *H. pylori* infection are a vascular pattern, edema, rugal hypertrophy, nodularity, rugal atrophy, erythema with reddish streaks excluded, flat erosions, and exudates.¹² However it has been established that the endoscopy findings in *H. pylori* gastritis do not correlate with histological changes.¹³

H. pylori infection has been established firmly with the development of peptic ulcer, chronic active gastritis, chronic persistent gastritis, atrophic gastritis and gastric neoplasia including gastric adenocarcinoma and gastric mucosa associated lymphoid tissue lymphoma.⁶ It is widely accepted that colonization of the gastric surface epithelium by *H. pylori* is commonly associated with type B chronic gastritis. *H. pylori* were seen in 77% cases of patients with gastritis in a study by Kate V et al.¹⁴ The prevalence of *H. pylori* infection in duodenal ulcer patients has been consistently found to be between 95% and 100%.¹⁵ Two cancers are associated with *H. pylori* infection - gastric carcinoma and lymphoma of the mucosa-associated lymphoid tissue. Cross-sectional studies reveal infection rates between 50% and 100% in people with adenocarcinoma.¹⁶ MALTomas are associated with *H. pylori* in 90% of cases.¹⁷

Several diagnostic strategies are available for the diagnosis of *H. pylori*. Invasive methods requiring endoscopic evaluation include bacteriologic culture and susceptibility testing, histological studies, molecular diagnostics and rapid urease testing. Non-invasive approaches include fecal antigen detection, serological testing, and urea breath testing.⁶ Histology of endoscopically taken biopsy has a very high sensitivity and specificity of 96% and 98.8% respectively for diagnosing *H. pylori*.¹⁸

Haematoxylin and Eosin (H&E) stain is routinely performed for the evaluation of upper GI biopsies. However sensitivity of the H&E stain for *H. Pylori* detection is low, probably due to lack of contrast between the bacteria and the surrounding tissues. Giemsa stain is the best stain for the detection of *H. pylori* due to its low cost, short hands on time required for staining and very high sensitivity (97%) and specificity (90%).¹⁹

In the present study, 100 patients presenting with upper GI symptoms over a period of one year were evaluated by endoscopic gastroduodenal biopsies for histopathological changes and *H. pylori* positivity. Various combinations of lesions were seen in the same patient. Maximum number of gastroduodenal lesions were seen in the 4th decade

with a male preponderance similar to studies by Kadam PN et al.,²⁰ Godkhindi VM et al.,²¹ and Gulia SP et al.²

Chronic gastritis was the most common lesion (89%) followed by duodenitis (16%), duodenal ulcer (5%), gastric carcinoma (5%), gastric ulcer (4%) and MALToma (1%). Despite careful selection of the patients having strong indications for biopsy, 5% cases had normal histology. This may be in part due to improper sampling wherein site and depth may not be representative of the clinically suspicious lesion. The results were similar to previously published studies in the literature.^{2,4,22-24} Gastric carcinomas were further classified as intestinal and diffuse type. Of the 5 cases of gastric carcinomas, 4 cases were of intestinal type and 1 was of diffuse type. The intestinal type of adenocarcinoma had tumour cells which were arranged predominantly in form of glandular arrangement whereas in the diffuse type, the tumour cells were arranged predominantly in sheets and individually scattered.

H. pylori were seen in 47% patients. Majority of cases were seen in 4th decade of life similar to study by Kumar R et al.²² Out of *H. pylori* positive cases, 59.57% were males and 40.43% were females with an M:F ratio of 1.47:1. There is no apparent reason as to why males would have greater exposure or greater susceptibility to infection than females. One reason for the inconsistency in results is that in certain populations *H. pylori* infection may be inadvertently eliminated because of more frequent antimicrobial treatment of women for urogenital tract infection.

50.56% cases with chronic gastritis and 68.75% cases with duodenitis were positive for *H. pylori* and the results were consistent with previously published studies.^{21,25-28} 80 % cases of duodenal ulcer and 50% cases of gastric ulcer were positive for *H. pylori* similar to the results of Mazlam MZ.²⁹ Some researchers^{3,21} have reported higher prevalence of *H. pylori* in various gastroduodenal lesions than in the present study. The reason could be that the patients who were *H. pylori* negative had ingested acid suppressant drug and/or antibiotics which are known to suppress the organism although chronic inflammatory cells are slow to disappear after eradication of *H. pylori* and may take a year or more to fall to normal levels. 40% (2/5) cases of gastric carcinoma were positive for *H. pylori* in our study similar to results of Prabhu SR et al.³⁰ who observed *H. pylori* in 38% cases of gastric carcinoma. Both of these cases belonged to intestinal type of gastric carcinoma. The single case of diffuse type of gastric carcinoma was negative for *H. pylori*.

The single case of MALToma observed in our study was *H. pylori* negative which may be due to sampling error or due to anti *H. pylori* treatment received by the patient.

In duodenal ulcer disease, it has been postulated that *H. Pylori* and endogenous acid production by gastric metaplasia of the duodenum play a synergistic role in the

pathophysiology of ulceration and there is little doubt that duodenal ulcers tend to recur more readily if this organism is not eradicated during treatment. It is therefore desirable to ensure eradication of this organism in sufferers of duodenal ulceration. *H. pylori* appear to be closely associated with acute and chronic gastritis and its eradication in these conditions is also desirable.

CONCLUSIONS

Endoscopic gastroduodenal biopsies help to detect benign and malignant lesions and to rule out *H. pylori* infection. Chronic gastritis was the most commonly diagnosed gastroduodenal lesion followed by duodenitis, duodenal ulcer and gastric carcinoma. Duodenal ulcer, duodenitis, chronic gastritis and gastric ulcer showed strong positivity for *H. pylori*, highlighting the importance of this bacterium in the pathogenesis of these gastroduodenal lesions. So the detection of *H. pylori* is important to help us plan treatment strategies and reduce the menace of this organism.

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Conflict of interest: None declared

Ethical approval: The study was approved by the local ethics committee

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