Research Paper

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A STUDY ON THE RATE OF OCCURRENCE OF H. PYLORI IN DYSPEPTIC PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT **INTRODUCTION:** Helicobacter pylori (H. pylori) chronically infect more than half of all people worldwide. We explore the rate of occurrence of H pylori in dyspeptic patients and its causal association with peptic ulcer disease, non-autoimmune gastritis, non peptic ulcer dyspepsia and gastric carcinoma. Objectives: To find out the rate of occurrence of H. pylori in dyspeptic patients and to emphasize the diagnosis of H. pylori by rapid urease test, serology, Giemsa stain of biopsy specimens and to correlate all these diagnostic tests with biopsy. Methods: An observational prospective cohort study was performed on 60 selected cases. Detail clinical history, laboratory tests and histopathological examination were done. Findings were recorded and analyzed statistically. Results: The comparison of patient's age group, socio-economic status and association of H. pylori showed statistically significant. Dyspepsia was more common in male (68.3%) and the sex ratio was 2.15:1. The rate of occurrence of H. pylori in dyspeptic patients was 68.33% and for functional dyspepsia was 61.29%. Majority of dyspeptic patients were positive for IgG ELISA test, 65% were positive for the biopsy urease test and 55% in modified Giemsa stain for H. pylori in tissue sections. Incidence of chronic superficial gastritis, benign gastric ulcer and duodenitis/duodenal ulceration were noted and association with H. pylori was statistically significant. Conclusion: Early diagnosis may prevent dyspepsia and complications of H. pylori infection like chronic superficial gastritis, benign gastric ulcer, duodenitis/duodenal ulceration even adenocarcinoma.

KEYWORDS

Dyspepsia, H. Pylori, Endoscopy, Histopathology

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Introduction:

Dyspepsia is a symptom complex which is characterized by pain, discomfort or nausea referable to upper alimentary tract, which may be intermittent or continuous in nature. Dyspepsia is a major health problem; prevalence ranges from 20-30% in general population [1]. Dyspepsia is mainly divided into two main groups- functional dyspepsia, accounting for 60% of total cases and dyspepsia with organic causes [2]. H. pylori (formerly Campylobacter pylori) is a gram negative, flagellated, microaerophilic, spiral organism that chronically infects more than half of all people worldwide. In developing countries like India, 70-90% of the population carries H. pylori; almost all of these acquire infection before the age of 10 years [3, 4]. Its role has been established in chronic antral gastritis, duodenal ulcer, chronic gastric ulcer, dyspepsia, gastric carcinoma and gastric lymphoma. The risk of gastric cancer has been estimated to be six-fold higher in H.pylori infected populations than in uninfected populations [5]. Biopsy urease test has a sensitivity of 80-99% and a specificity of 92-100% [6, 7]. H. pylori specific IgG antibody levels in serum by enzyme linked immunosorbant assays (ELISA) with a high sensitivity and specificity. The present study was undertaken to find out the rate of occurrence of H. pylori from endoscopic biopsy based tests (urease test and histology) and serology.

Objectives:

1. To find out the rate of occurrence of H. pylori in dyspeptic patients, using biopsy based tests and serology.2. Evaluation of different diagnostic tests for H. pylori. 3. To find out the spectrum of histopathological changes that occurs in the gastro-duodenal mucosa in cases of dyspepsia

Materials and methods:

Study Type: Cross-sectional, hospital based observational study

Study Design: Prospective cohort study

Study setting/area, Population and Period: The study was conducted in the Department of Pathology, Rajendra Institute of Medical Sciences, Ranchi, from May 2014 to September 2015.

Sampling:

Selection of cohort of patient with dyspepsia

The Institutional Ethics Committee approved the protocol of the study. 60 adult dyspeptic patients attending the gastroenterology clinic and undergoing endoscopy, in our hospital and other hospitals in and around Ranchi, were included in the study. All the patients were enrolled in the study after an informed consent. Patient's personal identification, socio-economic status, detailed clinical history and physical findings were noted.

Sampling technique: Consecutive non probability technique used, consensus sampling.

Patient inclusion Criteria:

1. Dyspeptic patients in the age group of 18 years to 60 years.
2. Patient who had given informed consent.

Patient Exclusion Criteria:

(i) Age < 18 years or > 60 years, (ii) patients who has taken anti-H. pylori antibiotics within 1 month, (iii) proton pump inhibitors (PPI) within 2 weeks or H2 receptor blocker drugs within 1 week prior to endoscopy, (iv) patients with ischemic heart disease, chronic lung

disease, diabetes mellitus, thyroid disease and on long standing NSAID therapy, (v) pregnant or lactating females and (vi) patients with known malignancy.

Study Techniques:
Case history and clinical examination, collection & testing of specimens followed by statistical analysis done.

Techniques in details: Case history and clinical examination of patients were done; cases selected maintaining the inclusion and exclusion criteria. 2 ml venous blood collected in plain vial for Anti H .pylori IgG ELISA. The serum samples labeled and brought to the laboratory keeping in an ice-lined chamber then allowed freezing in the deep freezer at -20ºC for 2 days for future testing. . Endoscopic biopsy was taken from the stomach: 4 quadrant antral biopsy, from corpus, fundus and from areas with endoscopic evidence of any other pathology. For biopsy urease test three endoscopic tissue bits-2 bits from the antrum and 1 from the corpus were taken and put in a numbered vial containing freshly prepared urea solution and change of colour was observed. Immediate change of colour from yellow to pink and considered as positive for urease test. A test tube containing urea solution was taken as control for colour change. Three endoscopic tissue bits collected in 10% buffered neutral formalin for histopathological diagnosis by H & E stain. Modified Giemsa stain used for demonstration of H.pylori in tissue sections; H.pylori is seen as spiral shaped bacteria, stained dark blue, seen in or near adherent mucus on the luminal side of the gastric surface and pit epithelial cells.

Data analysis: All data collected were tabulated on a grand chart and the statistical tests were performed by using the Statistical Package for Social Sciences (SPSS), Version 16 software for windows. The tests of significance were done by Chi-square test (X2) and p value <0.05 was taken as significant.

Statistical methods: Percentage, prevalence, Pearson Chi-Square Test etc .were calculated using SPSS.

Result and analysis:
Dyspepsia was more common in male (68.3%) than females (31.66%). The sex ratio was 2.15:1. In our study, three diagnostic tests for H.pylori were performed, namely- (i) anti-H.pylori IgG ELISA, (ii) biopsy urease test, and (iii) modified Giemsa stain for the demonstration of the organism in biopsy specimen. Majority of the patients (65%) were positive for the biopsy urease test. Modified Giemsa stain for H .pylori in tissue section was positive in 33 cases (55%).

Table 1: Rate of occurrence of H.pylori in dyspepsia.

			+ve for H.pylori (Total 41)	-ve for H.pylori(Total
Urease +ve (n = 39)	Giemsa +ve	31	31	-
	Giemsa -ve	8	8	-
Urease –ve (n =21)	Giemsa +ve	2	2	-
	Giemsa -ve	19	-	19

Table 1 shows that the rate of occurrence of H.pylori in dyspeptic patients is = (41/60) X 100 % = 68.33%. Case definition: A case of Helicobacter pylori infection was defined as those patients who presented with dyspeptic symptoms and were positive for at least one of the two diagnostic tests- biopsy urease test and/or modified Giemsa stain.

Table 2: Analysis of the test of significance between socio-economic status, age, sex and dietary habits.

		H. pylori Positive: Count (%)	H. pylori Negative: Count (%)	Pearson Chi Square Test (X2)
Socio-Economic Status	Lower	20(80.0%)	5(20.0%)	Value: 6.837, Df: 2, Asymp. Sig. (2-sided): 0.033
	Middle	17(70.8%)	7(29.2%)	
	Upper	4(36.4%)	7(63.6%)	
Age	< 30 Years	15(53.5%)	13(46.4%)	Value: 5.287, Df: 1,Asymp. Sig. (2-
	>30 Years	26(81.2%)	6(18.7%)	
Sex	Male	26(63.4%)	15(36.6%)	Value:1 .448,Df:1 Asymp. Sig. (2-sided) :0.229
	Female	15(78.9%)	4(21.1%)	
Dietary Habits	Vegetarian	8(57.1%)	6(42.8%)	Value:1.057 Df:1 Asymp. Sig. (2-sided):0.303
	Non-Vegetarian	33(71.7%)	13(28.2%)	

Table2: Shows that highest numbers of dyspeptic patients were in the 'lower' socio-economic group (as per Kuppuswamy's Socioeconomic Status Scale) [8]. 80.0% were positive for H. pylori infection which is statistically significant. 41 dyspeptic patients were male and majority of them were positive for H. pylori. Positivity for H. pylori in female patients (78.9%), which is statistically not significant. Among non-vegetarian cases 71.7% and among vegetarian cases 57.1% were positive for H. pylori infection which is statistically not significant.

Table 3: Endoscopic findings in cases of dyspepsia

ENDOSCOPIC FINDINGS	NUMBER OF CASES (% 0F TOTAL)	+ve for H. pylori (% OF EACH GROUP)	-ve for H. pylori (% OF EACH GROUP)
Normal UGI study	31 (51.6%)	19 (61.2%)	12 (38.7%)
Non-erosive antral gastritis	9 (15.0%)	9 (100.0%)	0 (0.0%)
Deformed pylorus	5 (8.3%)	3 (60.0%)	2 (40.0%)
Erosive gastritis	4 (6.6%)	4 (100%)	0 (0.0%)
Duodenal ulceration	4 (6.6%)	4 (100%)	0 (0.0%)
Active gastric ulcer	3 (5.0%)	2 (66.6%)	1 (33.3%)
Neoplastic ulcerated lesion	2 (3.3%)	0 (0.0%)	2 (100%)
Oesophagitis	2 (3.3%)	0 (0.0%)	2 (100%)
TOTAL	60	41	19

Table 3 shows that out of 31 dyspeptic patients with a normal upper gastro-intestinal endoscopy, 19 patients (61.2%) were positive for H. pylori infection. Hence, the rate of occurrence of H. pylori in functional dyspepsia in this study is = (19/31) X 100% = 61.29%.

Table 4: Histopathological findings in dyspepsia.

Histopathological Findings	Number Of Cases	+Ve For H. Pylori (% Of Each Group)	-Ve For H. Pylori (% Of Each Group)
Chronic superficial gastritis	44 (73.3%)	31 (70.4%)	13 (29.5%)
Normal histopathological findings	4 (6.6%)	2 (50.0%)	2 (50.0%)
Duodenitis/duodenal ulceration	4 (6.6%)	4 (100.0%)	0 (0.0%)
Benign gastric ulcer	3 (5.0%)	2 (66.6%)	1 (33.3%)
Well differentiated adenocarcinoma	2 (3.3%)	0 (0.0%)	2 (100%)
Atrophic gastritis	1 (1.6%)	1 (100%)	0 (0.0%)
Intestinal metaplasia	1 (1.6%)	1 (100%)	0 (0.0%)
Barrett's oesophagus	1 (1.6%)	0 (0.0%)	1 (100%)
TOTAL	60	41	19

Table 4 shows that out of 60 cases 41 were positive for H. pylori and the commonest histological finding was chronic superficial gastritis followed by normal histopathological findings and duodenitis/duodenal ulceration.

Table 5: Sensitivity and specificity of IgG ELISA

Ig G ELISA	Modified Giemsa stain		Parameter
	Positive (n=33)	Negative (n=27)	
Positive (n=35)	30	5	Sensitivity: 90.91% Specificity: 81.48% Positive Predictive Value: 85.71%, Negative Predictive Value: 88%, Method: Wilson Score.
Negative (n=25)	3	22	

Table 5 shows that IgG ELISA has a high sensitivity (90.91%) and good specificity (81.48%). This present study assesses the sensitivity and specificity of IgG ELISA by taking the histological demonstration of the

organism by modified Giemsa stain as the 'Gold standard'

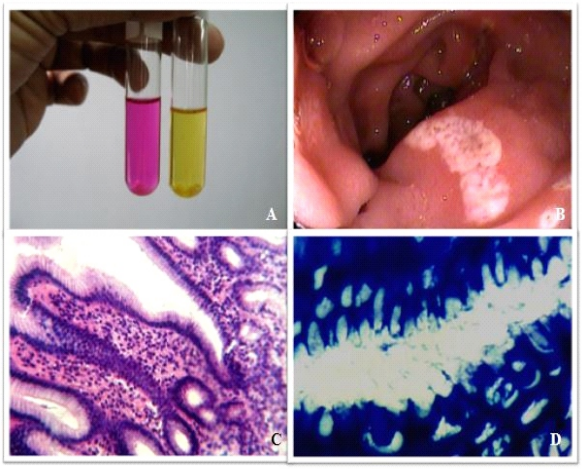

Fig A: Positive and negative biopsy urease test. Fig B: Gastric and duodenal erosion at endoscopy. Fig C: Chronic superficial gastritis with mild lymphomononuclear cell infiltrates in the lamina propria (H&E X 400). Fig D: H. pylori stained by modified Giemsa stain (X 1000).

Discussion:

The present study dyspepsia showed male preponderance and is consistent with studies done by Longman et al. and Raul V Destura et al who reported male: female ratio to be 2:1 [9]. Tests for H.pylori by IgG ELISA showed positive in 58.33% cases. A similar study done by Malik A et al. in 1999 showed IgG ELISA positivity in 53.3% cases [10]. Biopsy urease test was positive 39 (65%) cases. Malik A et al. found 61.2% urease test positivity; while Rao P et al. and Arora U et al. found 76.3% and 72% biopsy urease test positivity respectively [10,11,12]. With modified Giemsa stain for the organism in tissue sections, the bacterium could be demonstrated in 33 cases (55%). Rate of occurrence of H.pylori in dyspeptic patients in this study was 68.33%. Rao P et al observed 76.2% positivity for H.pylori among patients with gastroduodenal disorders as compared to 9.1% among asymptomatic individuals [11]. Shrivastava UK et al. in their study, showed 65% positivity for H.pylori in functional dyspepsia [13]. The socio-economic status analyzed by Kuppuswamy's Socio-economic Status Scale which was updated and modified in 2007 [8]. The 'lower' socio-economic group had the highest number of dyspeptic patients (25 cases); among them 20 cases (80%) were positive for H.pylori which is statistically significant. Studies done previously in India and outside, also observed similar association [14,15]. Highest percentage of H. pylori infection identified in >30 years age group. In a study by Rajesh Kumar et al. in 2006 in Jammu, India, maximum percentage of H. pylori positive cases were in the age group 36-45 years [14]. The present study results are consistent with earlier results. Relation between dietary habits and H. pylori showed p -value was 0.303 ($p > 0.05$) which was statistically insignificant. No previous study has observed such a relationship. The rate of occurrence of H.pylori in functional dyspepsia was 61.29% in our study. Similar studies in India, reported 65% prevalence of H.pylori in functional dyspepsia [13]. H & E stained tissue sections show 73.3% cases were diagnosed as chronic superficial gastritis. In a similar study, Rajesh Kumar et al. showed chronic superficial gastritis as the most common biopsy finding in dyspepsia [14]. Duodenitis/duodenal ulceration all cases (100%) were positive for H.pylori. Dayal VM et al.and Prasad S et al. have reported 75-100% association of H.pylori with duodenitis/duodenal ulceration [16,17]. Gastric carcinoma is a known complication of H.pylori infection, but any inference could not be drawn from the 2 cases of adenocarcinoma as the population was too small. The sensitivity and specificity of IgG ELISA was calculated. The results were- sensitivity 90.91% and specificity 81.48%. The results are consistent with previous studies [18]. IgG ELISA test cannot be used as a confirmatory test because of low specificity and positive predictive value. Rao P et al. had observed similar results in their study and recommended IgG ELISA as a very good screening test [11].

Conclusion:

Dyspepsia was more common in male and highest numbers of dyspeptic patients were in the 'lower' socio-economic group and in >30 years age group. .Majority were positive for H. pylori infection; diagnosed by biopsy urease test, modified Giemsa stain for H.pylori in tissue sections and IgG ELISA test. The rate of occurrence of H. pylori in dyspeptic patients was 68.33% and for functional dyspepsia was 61.29%.

Early diagnosis may prevent dyspepsia and complications of H. pylori infection like chronic superficial gastritis, benign gastric ulcer, duodenitis/duodenal ulceration even adenocarcinoma. The study was conducted in a tertiary health care with limited resources and smaller number of cases, may not reflect the actual scenario in general population.

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