

## Clinical Scenario of *Helicobacter pylori* associated dyspepsia among rural population in a tertiary health care centre

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### ABSTRACT

*Helicobacter pylori* (*H. pylori*) is a major infectious agent, transmitted mainly by the oral route and primarily involving the upper gastrointestinal tract. The prevalence of *H. pylori* infection varies significantly worldwide, being higher in developing countries, indicating an important role of socioeconomic milieu in its transmission. There are invasive and non-invasive tests to diagnose *H. pylori* infection. This study was undertaken to determine the prevalence of *H. pylori* infection and its role in the pathogenesis of various gastrointestinal disorders including peptic ulcer disease and gastric carcinoma. **MATERIALS AND METHODS:** The laboratory methods employed in this study were rapid urease test (RUT) and histopathological examination by Giemsa staining, using endoscopy guided biopsy samples of the gastric corpus and antrum. Diagnostic confirmation of the presence of *H. pylori* was made if either of the two tests were positive. **RESULTS:** A total of 36 (48.0%) and 32 (42.7%) patients were diagnosed to be infected with *H. pylori* by the histology and RUT respectively. Gastritis (37.3%) was the most common endoscopy abnormality and pathologic feature identified. Patients exhibited varied presentation of symptoms such as epigastric pain, nausea, vomiting, bloating, regurgitation, postprandial fullness, early satiety, melena, loss of weight and appetite. **Conclusion:** Early detection of *H. pylori* and prompt eradication therapy are essential in preventing serious consequences. *H. pylori* infection is a health care issue which requires public health interventions.

**Key words:** *Helicobacter pylori*, rapid urease test, histopathology, gastrointestinal diseases, endoscopy.

### INTRODUCTION

*Helicobacter pylori* (*H. pylori*) is one of the most common bacterial pathogens in human. *H. pylori* infection is now considered as a worldwide problem, infecting more than 50% of the world population. It causes chronic gastritis, peptic ulcer disease, lymphoproliferative disorders, and also a major risk factor for gastric cancer. It is typically acquired in childhood, and once established, commonly persists lifelong unless treated<sup>1</sup>. *H. pylori* is a spiral, Gram negative, microaerophilic, urease producing bacteria that lies in the interface between the gastric epithelial cell surface and overlying mucus layer.<sup>2</sup> The discovery of *H. pylori* in 1982 was the starting point of a revolution concerning the concepts and management of gastroduodenal diseases. The public health importance of the discovery of *H. pylori* and its role in stomach diseases was recognized in 2005<sup>3</sup>.

The prevalence of the *H. pylori* infection varies worldwide being as low as 10% in developed western nations to higher as 80% among the indigent populations of many developing countries. India is also the prototypical developing country with a vast rural population living in poverty.

The prevalence of *H. pylori* in the Indian subcontinent can be as high as 80% or more in rural areas<sup>4</sup>. Age, ethnicity, gender, geography, socioeconomic status are the factors that influence the prevalence of *H. pylori* infection. Transmission of this bacterial infection is largely by the oral-oral or fecal-oral route. Lack of proper sanitation, safe drinking water and basic hygiene, as well as poor diet and overcrowding, all play a role in determining the prevalence of *H. pylori* infection, being high in developing countries and lower in developed world<sup>5</sup>. The first step in managing *H. pylori* infection is to establish the diagnosis. There are invasive and non-invasive strategies for diagnosis. Invasive methods requiring endoscopic evaluation includes bacteriologic culture and susceptibility testing, histopathologic studies, molecular diagnostics and rapid urease testing. Noninvasive methods include fecal antigen detection, serologic testing and urea breath testing. Esophagogastroduodenal endoscopy permits gross visualization and localization of ulcerative lesions, mucosal nodularity associated with MALT lymphomas and other malignant lesions. Infection with *H. pylori* can be patchy, and as a result, multiple biopsy specimens may be necessary for diagnosis. Two gastric mucosal biopsy specimens (antrum and corpus) may be necessary for the histologic diagnosis of *H. pylori* infection. Organisms usually require special stains (eg. Rapid Romanowsky, Giemsa, Genta or silver stains). *H. pylori* produces copious amount of cell-surface associated urease. Assessment of urease activity is the basis for detection of the presence of the organism by biopsy- based Rapid Urease Test. The enzyme urease elevates the local intragastric pH by catalyzing urea breakdown and ammonia production. The presence of urease activity represents an important factor for survival of *H. pylori* in the stomach<sup>6</sup>. The present study was undertaken to determine the prevalence of *H. pylori* infection among patients with dyspepsia using rapid urease test and histology, and its relationship with different upper gastrointestinal disorders.

### MATERIALS AND METHODS

This prospective study was conducted on 75 patients, aged 20-70 years, with dyspepsia, who has visited Gastroenterology department in Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, during the period of 3 months from August 2012 to October 2012. Patients with prior *H. pylori* eradication treatment, or those treated with antibiotics, proton pump inhibitors or H2 receptor blocker within four weeks before endoscopy, pregnant and lactating females, were excluded from the study. Informed consent from all patients and approval from Institutional Ethics Committee were obtained. Information on demographic and clinical data was collected using a structured questionnaire. Gastroenterologist performed esophagogastroduodenoscopy for all patients and obtained four biopsy fragments; two each from the gastric antrum and the body of stomach. Two biopsy specimens, one from the antrum and the other from the corpus were employed immediately for rapid urease test. The other two biopsy specimens were sent for histopathological evaluation using Giemsa staining.

**STATISTICAL ANALYSIS:** Data documented and analysed using Statistical Package for Social Sciences [SPSS], Pearson's Chi Square Analysis test and Fisher exact probability test.

### BIOCHEMICAL ASSAY:

**Rapid Urease Test (RUT):** Urea broth was prepared by dissolving 10 grams of urea in 80 ml of distilled water. The final volume was made upto 100 ml by further adding distilled water. 0.002 grams of phenol red indicator was added to the urea solution, and the pH was adjusted to 6.4 to 6.8 using N HCl. The solution was sterilized by steaming at 100 degree Celsius for 20 minutes. 2ml of the urea broth was dispensed into each aliquot. The biopsy specimen was inoculated into the urea broth and incubated at 37 degree Celsius for one to one and half hours. Positive result was indicated by the development of pink colour in the pale yellow broth<sup>7</sup>. Diagnosis of *H. pylori* infection was made if the histological assessment and/or RUT showed *H. pylori* positivity.

### RESULTS

A total of 75 patients of 20-70 years of age, including 47 males and 28 females, subjected to upper gastrointestinal endoscopy were studied. Giemsa staining method detected *H. pylori* in 36 (48.0%) patients. *H. pylori* was diagnosed in 32 (42.7%) patients by rapid urease test. The mean and standard deviation for age was 47.0 and 11.7 respectively. The age distribution and *H. pylori* status was given in

Table 1. *H. pylori* infection was found to be common in the age group of 41 to 50 years. The p-value obtained by statistical analysis was 0.36 (<0.05 is statistically significant). Statistically, there is no significant difference between age and *H. pylori* infection.

**Table 1: Age distribution and *Helicobacter pylori* infection ( n=75)**

| AGE IN YEARS | NO. OF PATIENTS | <i>H. pylori</i> +ve | <i>H. pylori</i> -ve |
|--------------|-----------------|----------------------|----------------------|
| 20 to 30     | 8 (10.7%)       | 3 (4.0%)             | 5 (6.7%)             |
| 31 to 40     | 11 (14.7%)      | 4 (5.3%)             | 7 (9.3%)             |
| 41 to 50     | 30 (40.0%)      | 13 (17.3%)           | 17 (22.7%)           |
| 51 to 60     | 14 (18.7%)      | 9 (12.0%)            | 5 (6.7%)             |
| 61 to 70     | 12 (16.0%)      | 7 (9.3%)             | 5 (6.7%)             |

**Legend :1** Infection rate of *H. pylori* was found to be higher in males compared to that of females. Comparison of gender distribution and *H. pylori* infectivity was given in Table 2. Statistical analysis showed no significant difference between male and female patients, with a p-value of 0.7.

**Table 2: Gender distribution and *Helicobacter pylori* infection ( n=75)**

| SEX    | NO. OF PATIENTS | <i>H. pylori</i> +ve | <i>H. pylori</i> -ve |
|--------|-----------------|----------------------|----------------------|
| MALE   | 47 (62.7%)      | 22 (29.3%)           | 25 (33.3%)           |
| FEMALE | 28 (37.3%)      | 14 (18.7%)           | 14 (18.7%)           |

**Table 3: Frequency of various symptoms**

| S. No. | SYMPTOMS              | PERCENTAGE |
|--------|-----------------------|------------|
| 1      | EPIGASTRIC PAIN       | 90%        |
| 2      | NAUSEA                | 82%        |
| 3      | VOMITING              | 79%        |
| 4      | EARLY SATIETY         | 60%        |
| 5      | BLOATING              | 71%        |
| 6      | POSTPRANDIAL FULLNESS | 65%        |
| 7      | REGURGITATION         | 81%        |
| 8      | WEIGHT LOSS           | 9%         |
| 9      | LOSS OF APPETITE      | 18%        |
| 10     | MELENA                | 4%         |

**Legend :2** The presence of various risk factors for peptic ulcer disease as shown in Table 4, like use of nonsteroidal anti-inflammatory drugs (NSAID), smoking and alcohol intake were also assessed from the patients enrolled in this study. The p-value (0.04) predicted them to be significant risk factors in association with *H. pylori* infection.

**Table 4: The risk factors and *Helicobacter pylori* infection( n=75)**

| RISK FACTOR | NO. OF PATIENTS | <i>H. pylori</i> +ve | <i>H. pylori</i> -ve |
|-------------|-----------------|----------------------|----------------------|
| NSAID       | 48 (64.0%)      | 22 (29.3%)           | 26 (34.7%)           |
| SMOKING     | 30 (40.0%)      | 21 (28.0%)           | 9 (12.0%)            |
| ALCOHOL     | 25 (33.3%)      | 18 (24.0%)           | 7 (9.3%)             |

**Table 5: Endoscopy findings and *Helicobacter pylori* infection status ( n=75)**

| S.NO. | ENDOSCOPY FINDING       | NO. OF PATIENTS | <i>H. pylori</i> +ve | <i>H. pylori</i> -ve |
|-------|-------------------------|-----------------|----------------------|----------------------|
| 1     | Normal gastric mucosa   | 9 (12.0%)       | 3 (4.0%)             | 6 (8.0%)             |
| 2     | Incompetent OG junction | 6 (8.0%)        | 2 (2.7%)             | 4 (5.3%)             |
| 3     | Gastritis               | 28 (37.3%)      | 19 (25.3%)           | 9 (12.0%)            |
| 4     | Duodenitis              | 10 (13.3%)      | 4 (5.3%)             | 6 (8.0%)             |
| 5     | Gastric ulcer           | 8 (10.7%)       | 5 (6.7%)             | 3 (4.0%)             |
| 6     | Duodenal ulcer          | 3 (4.0%)        | 2 (2.7%)             | 1 (1.3%)             |
| 7     | Gastric adenocarcinoma  | 1 (1.3%)        | 1 (1.3%)             | 0                    |

**Legend :3** Histopathological results obtained in this study correlated with the endoscopy findings. The various pathological features were as follows: normal gastric mucosa (20%), gastritis/duodenitis (50.7%), gastric/duodenal ulcer (14.7%) and adenocarcinoma (1.3%).

### DISCUSSION

Infection with *H. pylori* has been established as an etiological factor in the development of peptic ulcer disease and gastric neoplasia. Sensitive and accurate diagnostic approaches are required for effective antimicrobial therapy. Numerous epidemiological studies have shown significant differences in the prevalence of *H. pylori* infection across the world, which is dependent mainly on socioeconomic conditions like overcrowding, poor sanitation and hygiene. The prevalence of *H. pylori* infection observed in our study was 48.0%, which is in concordance with the studies done by DO Whittle *et al.*<sup>8</sup>, Saravanan P S *et al.*<sup>9</sup> and Rahul S Mhaskar *et al.*<sup>10</sup>. Our study showed that *H.pylori* detection rate by rapid urease test and histological assessment were 42.7.0% and 48.0% respectively. The variation in the detection rate of the diagnostic tests may be due to patchy distribution of *H. pylori* in the submucosa, and depends on the organism load in the biopsy specimen and the number of biopsy samples. The sensitivity of histopathology was found to higher than RUT. This is in broad agreement with the study done by Vishwapriya M Godkhindi *et al.*<sup>11</sup>.

An insight into the age distribution of *H. pylori* positivity, in this present study, revealed the highest prevalence among the patients in the age group of 41-50 years and subsequently followed by 51-60 years of age. This may be explained by the presence of a greater proportion of participants in the particular age group seeking medical care. A similar finding was also observed in the study done by S Adlekha et al in Kerala.<sup>12</sup> The infection rate was significantly higher among males (62.7%) compared with females (37.3%). This result is in accordance with the study by S Adlekha *et al.*<sup>12</sup>. The male predilection observed was due to the differences in lifestyle between the genders and presence of abusive habits like alcohol consumption and smoking in male community. Evaluation of the risk factors like NSAID use, smoking and alcohol intake proved the synergistic effect between these factors and *H. pylori* infection in the development of ulcer dyspepsia. Statistical analysis depicted a significant association between the risk factors and *H. pylori* with a p-value of 0.04. The studies done by Zapata-Colindes JC *et al.*<sup>13</sup> and Sreenivasan Sasidharan *et al.*<sup>14</sup> also showed a strong correlation between the predisposing factors (NSAID intake, smoking and alcohol abuse) and *H. pylori* in causing peptic ulcer disease. The most common clinical presentation of the dyspepsia patients was epigastric pain (90%) followed by nausea (82%). Vishwapriya M Godkhindi *et al.*<sup>11</sup> observed similar finding in their study done in Nanded. Endoscopy findings and histopathology reports obtained in this present study showed concordant results. In the current study, the commonest abnormality visualized by endoscopy was gastritis (37.3%), of which 25.3% tested positive for *H. pylori* by histology. These results are supported by the findings observed in the study by S Adlekha *et al.*<sup>12</sup>. The complex interplay of host, environmental and bacterial factors including the virulence of the bacilli leads to differences in the expression of *H. pylori* infection<sup>4</sup>. The present study provided significant advantages by estimating the prevalence rate of *H. pylori* infection among our patients, and also computed its association with the various gastrointestinal lesions.

### CONCLUSION

The results of this study sheds light on many important aspects of *H. pylori*. The association of *H. pylori* with multiple gastric diseases has emphasized the importance of accurate and prompt diagnosis of symptomatic patients. There is an increasing thrust for universal eradication of *H. pylori*.

### REFERENCES

1. Philippe Lehours, Ozlem Yilmaz., Epidemiology of *Helicobacter pylori* infection. *Helicobacter*, **12(1)**: 1-3 (2007)
2. Mojgan Forouton, Behnam Loloei, Shahrokh Irvani, Ezanollah Azargashb., Accuracy of Rapid Urease Test in diagnosing *Helicobacter pylori* infection in patients using NSAIDs. *Saudi J Gastroenterol*, **16(2)**: 110-112 (2010)
3. Francis Megraud, Philippe Lehours., *Helicobacter Pylori* Detection and Antimicrobial Susceptibility Testing. *Clin. Microbiol. Rev.*, **20**: 280-322 (2007)
4. Selvi Thirumurthi, David Y Graham., *Helicobacter pylori* infection in India from a western perspective. *Indian J Med Res.*, **136**: 549-562 (2012)
5. World Gastroenterology Organisation Global Guidelines. August 2010.
6. James Versalovic., *Helicobacter pylori* Pathology and Diagnostic Strategies. *Am J Clin Pathol*, **119**: 403-412 (2003)
7. Vandana Berry, Vidya Sagar., Rapid Urease Test to diagnose *Helicobacter Pylori* infection. *JK SCIENCE*, **8(2)**: 86-88 (2006)
8. Whittle, D.O. Ewing, R. Lee, M.G., The prevalence of *Helicobacter pylori* infection in patients undergoing upper gastrointestinal endoscopy in the Turks and Caicos islands. *West Indian med. j.*, **59(3)**: (2010)
9. Saravanan, P.S. Ravinthar, A. Dinesh babu, K., A Comparative Study of *Helicobacter Pylori*. In Patients Undergoing Upper Gastrointestinal Endoscopy In Benign and Malignant Conditions of upper Gastrointestine Tract in Meenakshi Medical College Hospital & Research Institute. *Int J Biol Med Res.*, **5(2)**: 4098-4103 (2014)
10. Rahul, S. Mhaskar, Izurieta Ricardo, Azizan Azliyati, Rajaram Laxminarayan., Assessment of risk factors of *Helicobacter Pylori* infection and peptic ulcer disease. *Journal of Global Infectious Diseases*, **5**: 60-67 (2013)
11. Vishwapriya, M. Godkhindi, Darshan, P. Meshram, Deshpande, S.A. Kadam, et al., The Histopathological Study of Various Gastro-duodenal Lesions and Their Association with *Helicobacter pylori* Infection. *Journal of Dental and Medical Sciences*, **4**: 51-55 (2013)
12. Adlekha, S. Chadha, T. Krishnan, P. Sumangala, B Prevalence of *Helicobacter pylori* Infection Among Patients Undergoing Gastrointestinal Endoscopy in a Medical College Hospital in Kerala, India. *Ann Med Health Sci Res.*, **3(4)**: 559-563 (2013)
13. Zapata-Colindres, J.C. Zepeda-Gomez, S. Montano-Loza, A., The association of *Helicobacter pylori* infection and nonsteroidal anti-inflammatory drugs in peptic ulcer disease. *Can J Gastroenterol*, **20(4)**: 277-280 (2006)
14. Sreenivasan Sasidharan, Batumanathan Ghayethry, Manickam Ravichandran et al., Prevalence of *Helicobacter pylori* infection among patients referred for endoscopy: Gender and ethnic differences in Kedah, Malaysia. *Asian Pacific Journal of Tropical Disease*, 55-59 (2012)