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THE MOST COMMON ENEMY - HELICOBACTER PYLORI

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ABSTRACT

Background: Helicobacter pylori (H. pylori) colonise nearly half of the world's population and thus, is one of the most frequent and persistent bacterial infections worldwide. H. pylori are associated with chronic recurrent gastritis, peptic ulcer disease, gastric ulcers, mucosa-associated lymphoid tissue lymphoma, and gastric cancer and rarely even in otherwise normal mucosa. Various diagnostic methods exist to detect infection, and the choice of one method or another depends on several factors, such as accessibility, advantages and disadvantages of each method, cost, and the age of patients. Once H. pylori infection is diagnosed by endoscopy, the clinician decides whether treatment is necessity, according to the patient's clinical condition. Typically, eradication of H. pylori is recommended for treatment and prevention of the infection. In this work, we review the prevalence of H. pylori in local rural population ,simple and main diagnostic methods used to identify H. pylori infection and also to identify the common manifestation of H. pylori infection in the local population by upper G I endoscopy.

Objectives

1.To identify the prevalence of H. Pylori infection in local population.
2.To identify the common manifestation of H. Pylori infection by upper gastrointestinal endoscopy
3.To identify the cost effective and simple test for identification of H. Pylori infection

Methods: Prospective study done in the Department of General Surgery by a single unit from January 2016 to December 2016. Total of 129 patients were included in the study. All these patients were subjected to upper gastrointestinal endoscopy. Multiple biopsy specimens were taken from the gastric antrum. Rapid urease test were done for all these patients and other biopsy was sent for Culture. Results of the above tests are collected and analyzed and documented. Statistical analysis was done using Student chi - square test. All these patients were followed up for a period of 6 months to 1 year.

Results: A total 129 patients subjected to upper gastrointestinal endoscopy based upon their symptoms and severity of pain abdomen. Multiple biopsies were taken and send for rapid urease test and for Culture. Of the total 129 patients tested for h .pylori after endoscopy 104 patients were found positive for H. pylori infection. A total of 91 males and 38 females were included in the study. Of the 91 males 74 males and 30 out of 38 females were found positive for H. Pylori infection by both Rapid Urease test and Culture. Rapid urease test was positive for H. pylori infection in 80.6 %(n= 104) of the patients and Culture report was positive in 79.06 % (n=102) of the patients.

Conclusion: There is high prevalence of H. Pylori in patients with acid peptic disorders and with history of dyspepsia in the local population. Chronic gastritis is the commonest manifestation of h pylori infection and endoscopy confirmed the diagnosis. Rapid urease test was found to be cost effective and is the test of choice for diagnosing Helicobacter pylori infection when endoscopy is used.

INTRODUCTION

Helicobacter pylori is the micro-organism responsible for the most frequent and persistent bacterial infection worldwide[1]. *H. Pylori* infection affects nearly half of the world's population. In developing countries, the prevalence of infection is as high as 90%, whereas in developed countries, excluding Japan, the prevalence is below 40%[1]. Diagnostic methods to detect *H. Pylori* infection are diverse, and the choice of one method or another depends on several factors, such as the availability of diagnostic tests, need to perform an endoscopy, cost, accessibility, advantages and disadvantages of each method[7]. The sole source of *H. Pylori* is the human gastric mucosa. The exact mechanism of transmission is not clear and it is likely to

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be oral–oral or fecal–oral, and environmental spread the most likely routes of infection. Poverty, overcrowding, limited education and poor hygiene favours transmission[14]. Risk factors for *H. Pylori* infection are 1) birth or residence in a developing country, 2) domestic crowding, 3) unsanitary living conditions, 4) unclean food or water, and 5) exposure to gastric contents of an infected individual[14].

MATERIALS AND METHODS

Prospective study done in the Department of General Surgery from a single Surgical unit from January 2016 to December 2016. Total of 129 patients were included in the study after upper gastrointestinal endoscopy. The inclusion and exclusion criteria were as follows

Inclusion Criteria

1. Patients with dyspepsia and acid peptic disorders aged above 13 years
2. Patients with upper G I symptoms for more than 6 months.
3. Both sexes were included in our study

Exclusion Criteria

1. Age less than 13 years
2. Patients with gall bladder or pancreatic diseases
3. Patients not willing , not co-operative and unfit for endoscopy
4. Patients on treatment for H pylori infection

Demographic data such as age, sex, religion, occupation and address of the patients were obtained. Patients presenting to General Surgery OPD in a single Surgical unit with clinical features suggestive of acid peptic disorders and history of dyspepsia[1] were subjected to upper G.I endoscopy. This patients on endoscopy showing features of acid peptic disorders were subjected to multiple endoscopic biopsy. These biopsies were taken from highly suspicious areas in the gastric antrum. The study was approved by the Ethical and Research committee of the institute. All patients after selection were explained about the nature of the study and a written informed consent was obtained.

Procedure

Patients were asked to come for endoscopy as outpatient procedure and were kept nil oral after 10 pm on the previous day of endoscopy. Upper gastrointestinal endoscopy was done and findings were noted (Fig.1&2). Multiple biopsy were taken from the antrum and also from the suspicious lesions and areas. The biopsy specimens were sent for Rapid urease test (Fig.3) and for Culture. *H. Pylori* infection was determined based on Rapid Urease test and Culture. Patients were considered positive even if one of the two tests or even if both tests are positive. The data obtained was documented and Statistical analysis was done using student chi-square test. Patients in our study group as per the upper GI endoscopy were divided and categorized into following groups

1. Normal study
2. Chronic antral gastritis
3. Duodenitis
4. Duodenal ulcer
5. Gastric ulcer

RESULTS

A total 129 patients subjected to upper gastrointestinal endoscopy based upon their symptoms and severity of pain

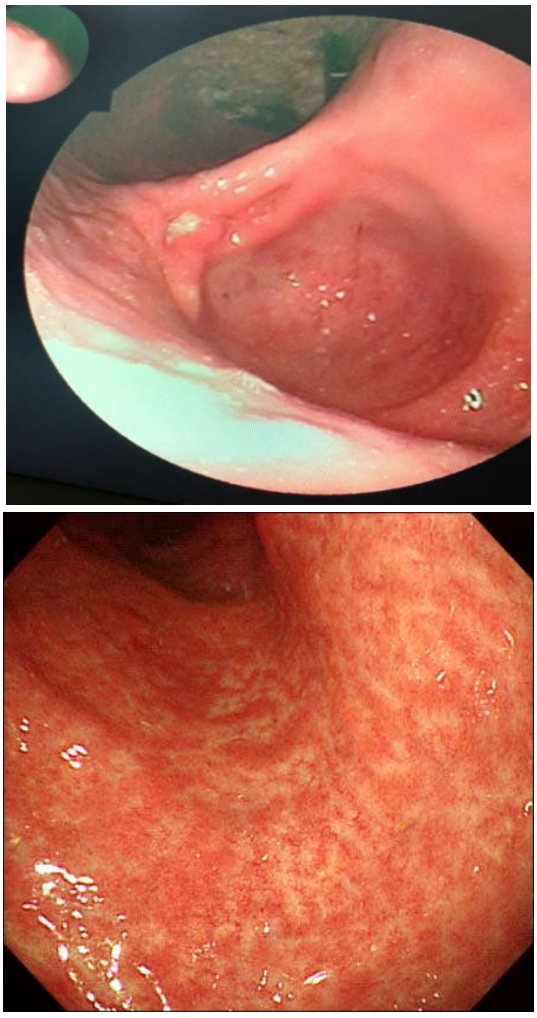


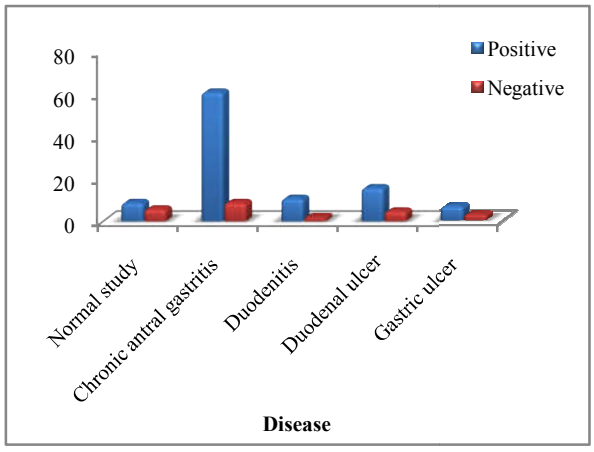
Fig 1 & 2 Upper Gastrointestinal Endoscopy Showing Active Gastric Ulcer and Chronic Gastritis

abdomen. Multiple biopsies were taken and send for rapid urease test and for Culture. Of the total 129 patients tested for h .pylori after endoscopy 104 patients were found positive for *H. Pylori* infection by Rapid Urease test and 102 patients were found positive by culture test. Table no.3 shows that a total of 91 males and 38 females were included in the study. Of the 91 males 74 males and 30 out of 38 females were found positive for *H. Pylori* infection by both Rapid Urease test and Culture. Rapid urease test was positive for *H. Pylori* infection in 80.6 % (n= 104) of the patients and Culture report was positive in 79.06 % (n=102) of the patients which was found statistically insignificant. Maximum numbers of positive cases 32 out of 104 cases (30.7%) was found in the age group of 31-40 years, whereas least number of positive cases (4 cases) (3.8%) was found in the age group of 12 to 20 years. In our study 59% patients presented as chronic antral gastritis endoscopically and was the commonest manifestation found to be positive by rapid urease test by endoscopic findings and biopsy also proved the same. Males were more commonly affected compared to females.

Fig 3 Urease Test: Urease Solution with Biopsy Bit Inoculated and Phenol Red Added (Pink Colour Indicates Positive Result)

Table 1 Relation of Endoscopic finding and Helicobacter Pylori Positivity by Rapid Urease Test

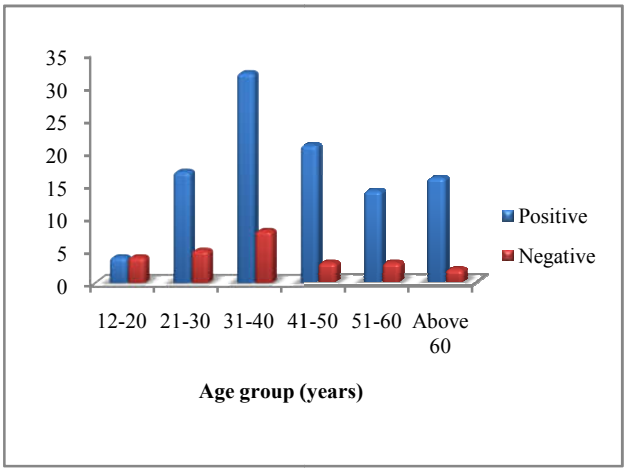
S.No	Disease	Positive	Negative
1	Normal study	9	6
2	Chronic antral gastritis	61	9
3	Duodenitis	11	2
4	Duodenal ulcer	16	5
5	Gastric ulcer	7	3
	Total	104	25



Graph 1 Relation of Endoscopic finding and Helicobacter Pylori Positivity by Rapid Urease Test

Table 2 Age Distribution

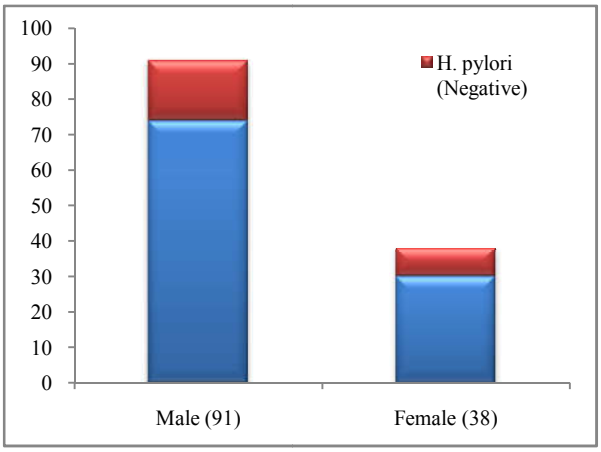
Age group (years)	Positive	Negative
12-20	4	4
21-30	17	5
31-40	32	8
41-50	21	3
51-60	14	3
Above 60	16	2
Total	104	25



Graph 2 Age Distribution

Table 3 Prevalence of *H. Pylori* Infection in Relation to Sex

Sex	Number tested	*H. pylori* (Positive)	*H. pylori* (Negative)
Male	91	74(81.3%)	17(18.6%)
Female	38	30(78.9%)	8(21.05%)
Total	129	104(80.6%)	25(19.3%)



Graph 3 Prevalence of *H. Pylori* Infection in Relation to Sex

DISCUSSION

H. Pylori has been associated with peptic ulcer disease and cancers of the human gastrointestinal track. Warren and Marshall first proposed the association of *Helicobacter pylori* with peptic ulcer disease and gastric cancer[3]. Approximately 50% of the World's population is estimated to be infected with *H. Pylori*. Seroprevalance of *H. Pylori* varies from 20% in young adults in developed countries to more than 50%in developing countries[4].

1. Acute gastritis (abdominal pain, nausea, vomiting) within 2 weeks following infection.
2. *H. pylori* establishes in chronic infection, represented an antrally predominant chronic active gastritis in the majority of infected individuals.

3. Many patients infected with *H. pylori* have recurrent abdominal symptoms (non ulcer dyspepsia) without ulcer disease.
4. Inflammation of duodenum (duodenitis) often occurs with *H. pylori* infection and duodenal ulcers develop in as many as 16% of infected individuals[4].
5. *H. pylori* infection has been associated with more than 90%. of duodenal ulcers and the majority of gastric ulcers (65%).
6. In patients with long standing infection persistent inflammation can lead to chronic atrophic gastritis. Chronic atrophic gastritis is a recognized precursor state of gastric disease and gastric adeno carcinoma.
7. Chronic Gastritis and gastric cancer

However, the typical course of disease in infected patients begins with chronic superficial gastritis, eventually progressing to atrophic gastritis. This progression appears to be a key event in the cellular cascade that results in the development of gastric carcinoma. Existing data indicate a 90-fold increase in rates of gastric carcinoma in patients with severe, multifocal atrophic gastritis, compared with normal controls.

Peptic ulcer disease

The relationship between *Helicobacter pylori* infection and peptic ulcer disease has been studied exhaustively, and it is now accepted that the organism is the major cause, but not the only cause, of peptic ulcer disease worldwide. Eradicating the infection can alter the natural course of peptic ulcer disease by dramatically reducing its recurrence rate in treated patients, compared with untreated patients. The mechanism by which *Helicobacter pylori* induces peptic ulcer disease is incompletely understood but most likely involves a combination of genetic predisposition of the host, virulence factors of the organism, mechanical damage to the mucosa, and alterations of gastric and duodenal secretions.

Non-ulcer dyspepsia

Many possible causes have been suggested for non-ulcer dyspepsia, including lifestyle factors, stress, altered visceral sensation, increased serotonin sensitivity, alterations in gastric acid secretion and gastric emptying, and Helicobacter pylori infection. Currently, there are several popular methods for detecting the presence of *Helicobacter pylori* infection, each having its own advantages, disadvantages, and limitations. Basically, the tests available for diagnosis can be separated according to whether or not endoscopic biopsy is necessary. Histological evaluation, culture, polymerase chain reaction (PCR), and rapid urease tests are typically performed on tissue obtained at endoscopy. Alternatively, simple breath tests, serology, and stool assays are sometimes used as non-invasive procedures.

Histology [8,11]

Histologic evaluation has traditionally been the gold standard method for diagnosing *Helicobacter pylori* infection. The disadvantage of this technique is the need for endoscopy to obtain tissue. Limitations also arise at times because of an inadequate number of biopsy specimens obtained or failure to obtain specimens from different areas of the stomach. In some cases, different staining techniques may be necessary, which can involve longer processing times and higher costs. However, histologic sampling does allow for definitive diagnosis of infection, as well as of the degree of inflammation or metaplasia and the presence/absence of MALT lymphoma or other gastric cancers in high-risk patients.

Culture

Because *Helicobacter pylori* is difficult to grow on culture media, the role of culture in diagnosis of the infection is limited mostly to research and epidemiologic considerations. Although costly, time-consuming, and labor intensive, culture does have a role in antibiotic susceptibility studies and studies of growth factors and metabolism.

Polymerase chain reaction

With the advent of PCR, many exciting possibilities emerged for diagnosing and classifying *Helicobacter pylori* infection. PCR allows identification of the organism in small samples with few bacteria present and entails no special requirements in processing and transport. Moreover, PCR can be performed rapidly and cost- effectively, and it can be used to identify different strains of bacteria for pathogenic and epidemiologic studies[7,11].

Rapid urease testing[8,11]

H. Pylori is considered as one among the bacterias which are potent producers of the enzyme urease. Urease splits urea converting it into ammonia and bicarbonate. This creates an environment that is alkaline around itself in the setting of an environment of gastric acid. This organism is microaerophilic in nature. The temperature required for isolation of this organism around is 36° C to 38° C. time taken for growth of the organism ranges from about 3 days to 6 days.

Rapid urease testing takes advantage of the fact that *Helicobacter pylori* is a urease producing organism. Samples obtained on endoscopy are placed in urea-containing medium; if urease is present, the urea will be broken down to carbon dioxide and ammonia, with a resultant increase in the pH of the medium and a subsequent color change in the pH dependent indicator. This test has the advantages of being inexpensive, fast, and widely available. It is limited, however, by the possibility of false positive results; decreased urease activity, caused either by recent ingestion of antibiotic agents, bismuth compounds, proton pump inhibitors, or sucralfate or by bile reflux, can contribute to these false-positive results[11,12].

Urea breath test[11]

A urea breath test similarly relies on the urease activity of *Helicobacter pylori* to detect the presence of active infection. In this test, a patient with suspected infection ingests either ^{14}C-labeled or ^{13}C- labeled urea; ^{13}C- labeled urea has the advantage of being non radioactive and thus safer (theoretically) for children and women of childbearing age. Urease, if present, splits the urea into ammonia and isotope-labeled carbon dioxide; the carbon dioxide is absorbed and eventually expired in the breath, where it is detected. In our study the majority patients belonged to the age group between 30 to 50 years. The males were most commonly affected and age group was contrast to incidence in western world (Gill HH *et al*.)[6] and USA as the patients here belonged to low socio economic status with poor hygienic environment (Graham Dy *et al*.)[5] Most patients belonged to low socio-economic group and they were consuming unsafe water.

CONCLUSION

1. There is high prevalence of *H. Pylori* in patients with acid peptic disorders and with history of dyspepsia in the local population
2. Chronic gastritis is the commonest manifestation of *H. pylori* infection and endoscopy confirmed the diagnosis.
3. Rapid urease test was found to be cost effective and is the test of choice for diagnosing *Helicobacter pylori* infection when endoscopy is used.

Infection by *H. Pylori* remains the most frequent and per-sistent bacterial infection worldwide; therefore, accurate diagnosis of infection is imperati

References

1. Daniel T. Dempsey, Chapter 26, 9th Edition, Schwartz principles of surgery, 2010; 904-906.
2. Robbins & cotran pathologic basis of disease-8th edition.
3. Suerbaum S, Michetti P "*Helicobacter pylori* infections." *N Engl. J. Med.* 2002; 347: 1175-86.
4. Makola D, Peura D, Crowe S "*Helicobacter pylori* infection and related gastrointestinal diseases." *J. Clin. Gastroenterol.* 2007; 41:548-58.
5. Graham DY., Malaty HM., Evans D.G., Klein P.D., Adam E,; Epidemiology of helicobacterpylori in an asymptomatic population in United States. Effect of age, race and socioeconomic status Gastroenterol, 1991; 100:1495-501.
6. Gill H.H., Majumdar P., Shankaran K, Desai H.G,; Agerelated prevalence of *Helicobacter pylori* antibodies in Indian subjects. *Ind. J. Gastroenterol*, 1994;13;92-94.
7. Hardin FJ, Wright RA. "Helicobacter pylori: Review and Update." Hospital Physician May 2002; 23-31.
8. Vandana Berry, Vidya Sagar "Rapid Urease Test to Diagnose *Helicobacter pylori* Infection." *J.K. Science,* April-June 2006, Vol.8 No. 2, 86-88.
9. Kumar R, Bano G, Kapoor B, Sharma S, Gupta Y. "Clinical Profile in *H. Pylori* Positive Patients in Jammu" *J. K. Sci.* 2006; 8 (3): 148-50.
10. Muhammad Zubair, Mujammad Ali Channa *et al*, "Is biopsy is needed in every gastritis found during endoscopy?", *Pak. J. Med. Sci.* 2009;25(5):849-51.
11. Jeh-En Tzeng, Ying-Lung Lin, "Comparison of Four Diagnostic Methods for Helicobacter pylori" *Tzu Chi. Med. J.* 2005(17) No. 5:339-42.
12. Tokunaga Y, Shirahase H. "*Helicobacter pylori* and modified urease test", *Journal of gastroenterology and hepatology* 2000; 15:617-21.
13. E. N. Nwodo, S.E 1 1. Yakubu *et al*. "Seroprevalence of *Helicobacter pylori* Infection in Patients with Gastritis and Peptic Ulcer Disease in Kaduna, Kaduna State, Nigeria" *African Journal of Basic & Applied Sciences* 2009 1 (5-6); 123-128.
14. Ahmed K S, Khan A A, Ahmed I "Impact of household hygiene and water source on the prevalence and transmission of Helicobacter pylori: a south Indian perspective." *Singapore Med. J.* 2007;48 (6):543.

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