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# Prevalence of Helicobacter Pylori Infection in North Indian Population, By Two Different Diagnostic Modalities

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***Abstract***
***Introduction:*** *Helicobacter pylori, a spiral shaped pathogenic bacterium found in the human gastric mucosa, It was first isolated by Warren and Marshall in 1982[(1)] and soon after was linked with chronic antral gastritis and peptic ulceration.[(2)] The prevalence of Helicobacter pylori is variable in different parts of the world. It is more common in developing nations. Detection of H. pylori infection is done by different modalities. None of the testing methods are considered gold standard. The yield is higher if more than one modality is used.*
***Aims and Objectives:*** *To study the prevalence of Helicobacter pylori infection in patients of dyspepsia undergoing upper GI endoscopy by (a)-Rapid Urease Test (RUT) and (b)-Serology (IgG and IgM ELISA).*
***Materials and Methods:****182 patients undergoing Upper GI Endoscopy were screened for H. pylori infection using Rapid Urease Test (RUT) and serology (IgM and IgG ELISA) in the Endoscopy Unit of Department of Surgery, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh between 2017-2019.*
***Results and Observations:****H. pylori infection was detected in 141 (77.47%) patients by RUT & 33 (34.62%) patients by Serology.*
***Conclusions:*** *From the study we concluded that the prevalence of H. pylori infection by Rapid urease test is 77.47%. The prevalence of H. pylori infection by serology was 34.62%. The reason for this difference could be*
*a)-False positive test in Rapid urease test*
*b)-Sero-conversion takes 2-3 weeks after infection, hence non detection by serology.*
*c)- Technical errors in performing these tests.*
***Keywords:*** *Helicobacter Pylori, Immunoglobulin*

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## I. Introduction

Helicobacter pylori, a spiral shaped pathogenic bacterium found in the human gastric mucosa, It was first isolated by Warren and Marshall in 1982[(1)] and soon after was linked with chronic antral gastritis and peptic ulceration.[(2)]

Initially this bacterium was classified as campylobacter pylori but in 1989 was included in a new genus, Helicobacter and renamed Helicobacter pylori.[(3)] H. pylori is one of the commonest bacterial pathogen in humans[(4)] affecting more than 50% of the world population.[(5,6,7)] H. pylori is the first formally recognized bacterial carcinogen, leading to the development of various upper GI Disorders including gastritis, gastroduodenal ulcer diseases and gastric cancer.[(8)]

H. pylori infection can be diagnosed by a number of invasive and non-invasive investigations. Serology (IgG and IgM) is the non-invasive technique of diagnosing patients with H. pylori infection.

H. pylori infection is a chronic condition and immunoglobulin G (IgG) [subclass 1 and 4] is the predominant immunoglobulin class, even in children.[(9)] IgM Antibody denotes acute infection with H. pylori whereas IgG Antibody signifies chronic infection with H. pylori.

## II. Aims and Objectives

Jawaharlal Nehru medical college is one of the premier institutes of Aligarh muslim university, located in North India, about 130 kms from the national capital, New Delhi. This was conducted to know the prevalence of Helicobacter pylori infection in patients undergoing upper GI endoscopy by (invasive) Rapid Urease Test (RUT) and (non-invasive) Serology (IgG and IgM ELISA).

## III. Materials and Methods

182 patients undergoing Upper GI Endoscopy for dyspepsia were screened for H. pylori infection using Rapid Urease Test (RUT) and Serology (IgM and IgG ELISA) in the Endoscopy Unit of Department of Surgery, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh between oct 2017 to nov 2019.

**Inclusion Criteria**

- Patients undergoing upper GI endoscopy for upper GI symptoms.
- Patients who gave consent for endoscopy and for inclusion in the study.
- ASA grade I,II,III.

**Exclusion Criteria**

- Patients not giving consent.
- Patients who have taken treatment for H. pylori eradication in the past 3 months.
- Patients with acute GI bleed.
- Patients in shock.

**Biopsy:**

Biopsy specimens were obtainedendoscopically from the Antral region of the stomach and **Rapid Urease Test** was done.Rapid Urease Test was done using **Pylo-Day Rapid Urease Test Kit** manufactured and marketed by **HALIFAX RESEARCH LABORATORY KOLKATA, INDIA.**

No Colour change indicated a Negative Urease Test.

Colour change from yellow to pink indicated a positive urease test.

**Blood:**

3ml of venous blood was collected from each patient of the study group in a sterile vial for serological tests. Samples were collected on the day of endoscopy and immediately transported to the Microbiology department. Blood was allowed to clot and plasma was centrifuged for 15 minutes. The sera separated was stored at -20°C in sterile vial until tested by the H. pylori IgG and IgM ELISA kit.

**Serology {IgG and IgM} of H. pylori by ELISA Test Kit**

The test was done using Calbiotech ELISA kit.

## IV. Observations and Results

Mean Age of the patients was 34.3 years with a standard deviation of 15.3 years (SD-15.3) Maximum number of patients were in the age group of 20-29 years. There is slight Male preponderance with 95 (52.2%) male patients as compared to 87 (47.8%) female patients. Male to female ratio was 1.09:1

Heart Burn was the commonest indication for referral (41.8%) while generalized pain in abdomen was second most common reason for referral to endoscopy unit for UGI Endoscopy. The gastritis was present in maximum no of patients with incidence of 90.7%. 141 patients were positive for rapid urease test (77.47%) done on gastric biopsy specimen & 33 (34.62%) patients by Serology (IgM and IgG ELISA).

## V. Discussion

Dyspepsia is a very common presentation of upper gastrointestinal disorders. Endoscopy is frequently performed to know the cause of dyspepsia. Helicobacter pylori infection is frequently found to be associated with dyspepsia which may progress to Antral gastritis, Pan gastritis, peptic ulcer or gastric carcinoma.The age of patients ranged from 10 years to 75 years with a mean age of 34.3 years ±15.3 years. The majority of patients were in their 3rd and 4th decade of life. In a similar study by **Ramis IB et al (2012).**[10]144 patients underwent upper gastrointestinal endoscopy there were 99 (68.75%) females and 45 (31.25%) males. Their ages were between 14 and 80 years (mean age 46.5, SD 15.5 years). In **KK Mishra et al (2002).**[11]studied 116 patients of which 52 (44.82%) were males and 64 (55.18%) were females having mean age of 54 years. The age range in our study is similar to other studies.(**Ramis, I.B. et al (2012). KK Mishra et al (2002).**)[10,11]

In the current study, 95 (52.2%) patients were Males and 87 (47.8%) patients were Females with M:F ratio of 1.09:1. In our study, the most common endoscopic finding was Gastritis present in 165 patients (90.66%). In a study done by **Mihara et al (1999).**[12] gastritis was present in 60.9% of the endoscopies.

In our study, 182 patients were tested by Rapid Urease Test out of which 141 (77.47%) patients were found to be positive. In a study done by **Udhayakumar et al (2009).**[13] 98 patients were tested by Rapid Urease Test for H.pylori infection. They found RUT was positive in 85% of cases (83/98). **YaseminCosgun et al (2016).**[14] studied 126 patients in which RAPID UREASE TEST was positive in 105 (83.3%) patients.**Ramis IB et al (2012).**[10] studied 144 patients undergoing upper gastrointestinal endoscopy, found 33.3% of patients

(48/144) positive for H. pylori infection by rapid urease test. **KK Mishra et al (2002).**[11] reported Rapid Urease Test positivity in 50 patients (43%) out of 116 patients.

In our study, out of 182 patients, 33 (18.13%) patients were positive for IgM ELISA, 26 (14.29%) patients were positive for IgG ELISA and 4 (2.2%) patients were both IgM and IgG positive. So total 63 (34.62%) patients were found to be positive for H. pylori infection by Serology (IgM and IgG ELISA).

In a study done by **Nordenstedt H, Graham DY et al (2013).**[15], Serology (IgG) was done in culture negative 148 patients of gastritis and positive results were found in only 22 patients (34.9%).

**Alem Mehdi et al (2002).**[16] evaluated Serum samples from 9043 symptomatic and asymptomatic individuals by ELISA for the presence of anti-H. pylori IgG, IgM, and IgA. The prevalence of IgM antibodies to H. pylori in tested sera was significantly higher in symptomatic patients (10.4%) than in asymptomatic individuals (1.1%). They concluded that by using a relatively large number of patient specimens, IgM antibodies to H. pylori was present in 10.4% of clinically confirmed positive specimens, 1.1% of a random population, and 8.6% of sera suspected for H. pylori infection.

## VI. Conclusion

The prevalence of Helicobacter pylori infection in developing nations has been found to be high, ranging between 50-85%. However the detection of H. pylori possess a diagnostic challenge. There are a large number of available tests which include the non-invasive (Serology) and invasive methods (Rapid urease test). Other test such as culture, breath tests, and PCR are also helpful, but no single test is gold standard and yield increases when a number of tests are employed. However it is not feasible and cost effective to perform all the tests to detect the organism. Two commonly employed tests are RUT and Serology as they are easy to perform and reading available in most laboratories.

We at our institute have conducted these tests. But the overall results are variable. This could be attributed to a large number of factors. Rapid urease test shows active infection and seroconversion may take 2-3 weeks, hence may be seronegative at the time of testing.

High false positive tests have been reported by performing rapid urease test (RUT) which could be responsible for higher prevalence. Technical errors in performing the two tests may also be responsible for this difference.

Not withstanding the limitations of the study, the prevalence of Helicobacter pylori infection is high 77.47% in the North Indian Population (our study) which is in accordance with the other studies performed in developing nations.

From the study we concluded that there is slight male preponderance in patients undergoing upper GI Endoscopy. The prevalence of H. pylori infection as per Rapid urease test was 77.47% in patients undergoing endoscopy for Dyspepsia. Out of 182 patients undergoing upper GI Endoscopy for dyspepsia, 18.13% had Acute H. pylori infection (IgM positive), 14.29% had Chronic H. pylori infection (IgG positive) and 2.2% had Acute on Chronic H. pylori infection (Both IgM and IgG positive).The total number of patients found positive from ELISA were 22(34.9%).

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**Table-I Showing Age Distribution**

| Age (in years) | No of Cases (n=182) | % |
|---|---|---|
| **10-19** | 29 | 15.9 |
| **20-29** | 52 | 28.6 |
| **30-39** | 42 | 23.1 |
| **40-49** | 23 | 12.6 |
| **50-59** | 15 | 8.2 |
| **60 and above** | 21 | 11.5 |

**Table-II Showing Sex Distribution**

| Sex | No of Patients(n=182) | % |
|---|---|---|
| **Male** | 95 | 52.2 |
| **Female** | 87 | 47.8 |

**Table-III Endoscopic findings in patients undergoing UGI Endoscopy**

| Endoscopic Finding | No. of Patients | % |
|---|---|---|
| **Gastritis** | 80 | 44 |
| **Normal Study** | 5 | 2.7 |
| **Gastritis with Reflux Esophagitis** | 30 | 16.5 |
| **Gastritis with Hiatus Hernia** | 10 | 5.5 |
| **Gastritis with Reflux Esophagitis with Hiatus Hernia** | 31 | 17 |
| **Reflux Esophagitis with Hiatus Hernia** | 3 | 1.6 |
| **Gastritis with Reflux Esophagitis with Barrett's Esophagus** | 13 | 7.2 |
| **Other Findings** | 10 | 5.5 |

**Table-IV Rapid Urease Test Results**

| Rapid Urease Test | No of Patients | (%) |
|---|---|---|
| **Present** | 141 | 77.47 |
| **Absent** | 41 | 22.53 |

**Table-V Detection of H.pylori infection by IgM ELISA**

| IgM ELISA | No of Patients | % |
|---|---|---|
| **Positive** | 37 | 20.33 |
| **Negative** | 129 | 70.88 |
| **Borderline** | 16 | 8.79 |

**Table-VI Detection of H.pylori infection by IgG ELISA**

| IgG ELISA | No of Patients | % |
|---|---|---|
| **Positive** | 30 | 16.48 |
| **Negative** | 148 | 81.32 |
| **Borderline** | 4 | 2.20 |

**Table-VII Over all evidence of H. pylori infection by Serology (IgM and IgG ELISA)**

| Serology | No of Patients | % |
|---|---|---|
| **IgM Positive** | 33 | 18.13 |
| **IgG Positive** | 26 | 14.29 |
| **Both IgM and IgG Positive** | 4 | 2.20 |
| **Serology Negative** | 119 | 65.38 |
| **Total** | 182 | 100 |

**Table-VIII ComparisonBetween Methods of Detection of H. pylori**

| | RUT(n=182) | IgG+IgM ELISA |
|---|---|---|
| **Positive** | 141 (77.47%) | 63 (34.62%) |
| **Negative** | 41 (22.53%) | 119 (65.38%) |

**Table-IX Statistical Analysis**

| | | Serology (n=182) | | Total |
|---|---|---|---|---|
| | | Positive | Negative | |
| **RAPID UREASE TEST (n=182)** | **Positive** | 56 | 85 | 141 |
| | **Negative** | 7 | 34 | 41 |

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