Utility of Anti-Helicobacter pylori IgG Estimation in the Diagnosis of Acid Peptic Diseases: A Comparison of Serum IgG Level with Rapid Urease Test

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ABSTRACT

Introduction: The mode of treatment of APD is changed radically ever since the role of *H.pylori* is proved for this condition. The study was aimed to detect the utility of anti *H.pylori* IgG estimation in the diagnosis of acid peptic diseases.

Material and methods: Endoscopic examination of stomach followed by Rapid Urease Test on the biopsy material and the anti-*Helicobacter pylori* IgG quantitative estimation were done in 85 patients with history suggestive of acid peptic disease.

Results: 46 (100%) patients with gastritis showed positive Rapid Urease Test within 30 minutes and had serum IgG >30 IU/ml. 10 patients with peptic ulcer, 12 patients with non ulcer dyspepsia and 2 patients with carcinoma stomach gave positive Rapid Urease Test after 30minutes and serum IgG level was < 30 IU/ml for these patients. Of the 70 Rapid Urease Test positive in the study, 2 of the 12 non ulcer dyspepsia patients were negative for antibody. Endoscopy findings in 15 subjects were normal and negative for Rapid Urease Test and anti-*Helicobacter pylori* IgG antibody.

Conclusion: Estimation of Serum anti-*Helicobacter pylori* IgG may be useful as a non invasive method in the diagnosis of gastritis.

Keywords: Anti-*Helicobacter pylori* Antibody, Endoscopy, Gastritis, *Helicobacter pylori*, Rapid Urease Test

INTRODUCTION

Helicobacter pylori (*H.pylori*) is known to be a major pathogen responsible for acid peptic diseases (APD).[1] Invasive and noninvasive methods of diagnosis have been developed to identify the infection by *H.pylori*. Endoscopy followed by biopsy and histopathological examination is the most important diagnostic method followed now. The RUT is utilized by the gastroenterologists during the endoscopic examination and it is popular and cheap.[2] Being a microaerophilic bacterium *H.pylori* needs optimum conditions to grow in culture and is not usually used as a modality of diagnosis. Non-invasive methods like demonstration of IgG in the serum and Urea breath test do not need any invasive procedure and have been found to be useful.[3] Serological tests have been frequently used for epidemiological studies because they are inexpensive, rapid and acceptable to patients.[4,5] The objective of this study was to determine the utility of anti *H.pylori* IgG estimation in the diagnosis of acid peptic diseases by comparing with a more specific invasive diagnostic method, the RUT.

MATERIAL AND METHODS

Following the approval from ethical and research committee a total of 85 subjects with complaints suggestive of APD were selected.

Inclusion/exclusion criteria: Patients in 20-60 age group with history of abdominal pain, nausea and vomiting and patients with previous history of peptic ulcer were included Children and those on antibiotic treatment for the above conditions were excluded.

Collection of Samples

Biopsy specimen: After getting consent the patients were subject to upper gastrointestinal endoscopy. During the endoscopy tissue samples were taken from the antrum near the angulus of stomach.

Rapid Urease Test

A buffer solution was prepared by using sodium dihydrogen orthophosphate and disodium hydrogen orthophosphate dihydrate. Urea solution (10%, w/v) was prepared by dissolving urea crystals in the buffer solution. Phenol red was used as the indicator. The pH of the solution was adjusted to 6.8 with 0.1N sodium hydroxide.

A bit of the gastric biopsy was put directly into the urea solution. A change in color of the solution from golden yellow to pink was taken as positive RUT and time taken for color change was noted.

Estimation of Serum anti-*H.pylori* IgG antibody

Venous blood (5ml) was collected from each patient prior to the endoscopy and serum was separated after half an hour. Quantitative estimation of anti *H.pylori* IgG antibody was done with serum sample by ELISA method according to the manufacturer's instructions. After interpolating the OD values of the 5 calibrators, quantity of IgG in the sample was calculated from the calibration curve.

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Test	Positive	Percentage (%)	Negative	Percentage (%)	Total
Rapid Urease Test	70	82.35	15	17.64	85

Table-1: Percentage of positive and negative Rapid Urease Test

Test	Positive	Percentage(%)	Negative	Percentage (%)	Total
Serum IgG	68	80	17	20	85

Table-2: Result of Serum IgG estimation

Clinical group	No	RUT positive within 30min	Serum IgG positive >30 IU/ml	RUT positive after 30min & within 24hr	Serum IgG positive < 30 IU/ml
Gastritis	46	46	46	0	0
Peptic Ulcer	10	0	0	10	10
Non Ulcer Dyspepsia	12	0	0	12	10
Cancer stomach	2	0	0	2	2

Table-3: Status of RUT and IgG in different clinical presentations

Age group	Number of RUT positive	Percentage (%)	Number of serum IgG positive	Percentage (%)
21-30	5	7.14	5	7.14
31-40	40	57.14	38	54.25
41-50	20	28.57	20	28.57
51-60	5	7.14	5	7.14
Total	70			

Table-4:

RESULTS

85 patients were selected for the study. Of this Rapid Urease Test was positive in 70 **(**82.35%) (Table 1). 68 patients (80%) showed positive serology for anti *H.pylori* IgG (Table 2). 46 patients with RUT positive within 30 minutes had Serum IgG >30 IU/ml. 24 patients with RUT positive after 30 minutes but within 24 hours had Serum IgG < 30 IU/ml. Two cases were positive by RUT but had insignificant IgG levels. No case detected in which RUT negative but serology was positive. 46 patients who showed positive RUT within 30minutes and serum *H.pylori* IgG level more than >30 IU/ml were suffering from gastritis (100%) (Table 3). On analysis of the age distribution, highest number of patients were seen belonging to the age group 31-40; 40 (57.14%) patients were from this age group (Table 4).

DISCUSSION

For the diagnosis of *H.pylori* infection, invasive and noninvasive methods are available. Selection of the investigative methods depends on the cost, sensitivity and specificity of the tests and physical status and compliance of the patients. In the circumstances where the invasive procedure is not possible an equally dependable non invasive method can be chosen by the treating physician. Of these non invasive methods the estimation of serum anti *H.pylori* IgG is easily available, cheap and easy to be done.

In this study a comparison was done between serological estimation of anti *H.pylori* IgG by ELISA and RUT with gastric biopsy samples in different clinical settings. Of the 85 patients, who underwent endoscopy and biopsy examination, 70 (82.35%) were found to be positive for RUT. In our study according to the endoscopic examination 46 patients were diagnosed as suffering from gastritis. All of them (100%) showed positive RUT within 30 minutes. Serum samples of these patients (100%) showed high concentration of IgG (>30 IU/ml). We could find an association between the highly positive RUT and the concentration of serum IgG in this clinical condition. The sensitivity and specificity of IgG estimation range from 60% to 100%.[6] In the present study the sensitivity and specificity was 100% for the gastritis patients. The factors important in the evaluation of the quality of serology tests for the detection of active *H. pylori* infection include the prevalence of infection, variations in geography and characteristics of the study populations.[6] There are different studies comparing the effectiveness of RUT and Serum IgG for the diagnosis of *H. pylori* infection.[7,8] According to a study by Karnes et al in atrophic gastritis where negative staining for *H.pylori* in the biopsy, positive serology was seen.[8] Serum antibody testing is a rapid, accurate and cost-effective mean for establishing *H. pylori* status in RUT-negative patients and serum rapid antibody testing should substitute for histology when the patient has not been previously treated for *H.pylori*.[7] But serum IgG response develops in *H. pylori* colonized persons also.[9] This highlights the need of establishing the base line antibody level in the particular geographical area. In our study all the patients with gastritis showed high concentration of serum IgG (>30 IU/ml). In the other clinical presentations like peptic ulcer, non ulcer dyspepsia and carcinoma stomach serum IgG level was < 30 IU/ml and gave positive RUT only after 30 minutes. This might be due to the less number of bacteria present in the lesions. According to some studies the serologic analysis may be more sensitive than biopsies because biopsy samples only a small region and inflammatory

process may be patchy.[10] So for the patients with symptoms of gastritis during the first visit in outpatient department, serum IgG estimation may be a useful tool to assess the severity of infection and need of medical treatment. The patients between 31-40 years of age were found to be highly positive for RUT as well as serum IgG (Table 4) in this study. So the patients in the above age group may be treated for *H. pylori* infection after serological estimation of IgG if it is found highly positive. In children histopathologic studies are practiced less often because of the need to perform an endoscopy. Serological study also may not be satisfactory because the seroconversion rate may increase according to the age.[11] Separate study is needed to find out the prevalence rate of seropositivity in children in the area. In a Cochrane data base analysis authors emphasize the uncertainty about the diagnostic accuracy of non-invasive tests for diagnosis of *H. pylori*.[12] This also emphasizes the need of prespecifying the threshold values of serology. Limitation of this study is the less number of the patients enrolled and the lack of knowledge on the base line level of serum IgG against *H.pylori* in the population.

CONCLUSION

For the patients who are visiting the outpatient department for the first time with symptoms suggestive of gastritis the estimation of serum anti *H.pylori* IgG will definitely help the physician to decide the further management.

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