

CLOTEST (RAPID UREASE TEST) IN THE DIAGNOSIS OF HELICOBACTER PYLORI INFECTION

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ABSTRACT

Over a period of 3 months, 85 patients who underwent gastroscopy had antral biopsy taken for Clotest, histology and/or culture for *Helicobacter pylori* (HP). The sensitivity and specificity of Clotest were found to be 77% and 96% respectively with negative predictive value of 63% and positive predictive value of 98%. Ninety-two percent of the positive Clotests were positive within 20 minutes, thus giving rapid result. Therefore, Clotest is a rapid, sensitive and highly specific test for HP infection. A high correlation between HP infection and chronic gastritis was noted and the prevalence of HP infection in patients with duodenal ulcer (90%) was higher than that of gastric ulcer (64%) or non-ulcer group (65%).

Keywords: *Helicobacter pylori*, chronic gastritis, Clotest.

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INTRODUCTION

Helicobacter pylori (HP) colonisation of the stomach has been incriminated as an etiological factor in chronic gastritis and peptic ulceration⁽¹⁻⁵⁾. Its role in non-ulcer dyspepsia is still unclear although some studies have shown that it may play an important role⁽⁶⁻⁸⁾. It is associated with relapses of duodenal ulcer, and its eradication reduces the relapse rate⁽⁹⁻¹¹⁾. Therefore, diagnosis of HP infection is of clinical relevance in the management of recurrent duodenal ulcer where there may be a role for anti-*Helicobacter pylori* treatment.

HP produces large amount of urease and its presence in gastric mucosa usually indicate HP infection. This enzyme can be detected rapidly by Clotest within 20 minutes as in contrast to culture which takes at least 4 days and histology, one day

before the histology report is available in our hospital. Moreover it is relatively cheap.

Clotest consists of an agar gel containing urea, phenol red (pH indicator), buffer and a bacteriostatic agent in a sealed plastic slide. In the presence of urease enzymes the urea is converted to ammonia and bicarbonate which raise the pH of the medium to more than 6, therefore changing the pH indicator from yellow to pink⁽¹²⁾.

The aim of this study is to determine if Clotest is as reliable as histology or culture in the diagnosis of HP infection.

METHODS

Patients who underwent gastroscopy from the period of October 1990 to December 1990 had an antral biopsy taken for Clotest, histology and/or culture for HP. The biopsy was taken midway between the incisura and pylorus on the lesser curve. The specimens were placed fully embedded in the agar gel of the Clotests which were examined at 20 minutes, 1, 3 and 24 hours at the endoscopic room's temperature of 22°C. A pink coloration was interpreted as positive. The biopsies for histology were examined under haematoxylin and eosin stain. Giemsa stains were used only if HP were not detected by the haematoxylin and eosin stain. The classification of gastritis was based on the Sydney System⁽¹³⁾. The specimens for culture were transported as soon as possible in normal saline packed in ice to the laboratory and were incubated for 7 days before they are considered as negative for HP.

A HP positive case was defined as a patient who had spiral bacteria typical of HP detected on histological sections or a positive culture.

Statistical analyses were done using Fisher's Exact Test or Chi square test, where relevant.

RESULTS

Over a 3-month period, 85 patients were studied. The age range of the patients was 15 to 81 years with a mean age of 47.6 years. Of the 85 patients, 45 were males and 40 were females (Table I). The prevalence of HP infection in the male and female patients were 73% and 68% respectively (Table I). The difference was not significant.

The patients' diagnoses were as follows: 14 cases of gastric ulcers (GU, 17%), 19 cases of duodenal ulcers (DU, 22%),

Table I - Distribution Of HP Infection According To Gender

Sex	n	HP+	%
Male	45	33	73
Female	40	27	68
Total	85	60	71

Male vs Female, $p = NS$

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Table II - Endoscopic Diagnosis and HP Status

Diagnosis	n	HP+	%
D U	19	17	90
G U	14	9	64
N U D	52	34	65
Total	85	60	71

DU vs NUD : p<0.05
 GU vs NUD : p = NS

and 52 cases of non-ulcer dyspepsia (NUD, 61%). Patients with duodenal ulcer had a higher prevalence rate of HP infection than those with gastric ulcer and non-ulcer dyspepsia (Table II). This was statistically significant when duodenal ulcer group was compared with non-ulcer group (p < 0.05). However when the gastric ulcer group was compared with non-ulcer group, the difference was not significant. There was also a close correlation between HP infection and chronic gastritis. HP infection was seen in 83% cases of chronic gastritis whereas only 11% of histologically normal biopsies had HP infection (Table III). This was statistically significant with p < 0.0001.

Table III - Helicobacter Pylori and Type of Gastritis

	No.	HP+	%
Chronic Gastritis	71	59	83
Acute Gastritis	5	0	0
Normal Histology	9	1	11

Total Gastritis vs Normal p < 0.0001

The diagnosis of HP infection was found to be reliable using Clotest. Using histology or culture as the gold standard, there were 46 true positives, 24 true negatives, one false positive and 14 false negatives. The sensitivity and specificity were 77% and 96% respectively with negative predictive value of 63% and positive predictive value of 98%. Of those with positive reaction, 92% developed a pink tinge around the biopsy within 20 minutes. Thus results were obtainable on completion of the gastroscopy. The diagnosis of HP infection by different methods, ie Clotest, histology and culture were compared in 57 patients who had all the 3 tests done (Table IV). Clotest failed to detect 4 HP positive cases which were picked up by histology. The culture was only slightly better than Clotest in managing to detect one HP positive case that was missed by Clotest. The differences were not significant (Table IV).

DISCUSSION

Histology and culture of gastric biopsies for HP organisms have been the conventional as well as gold standards for the diagnosis of HP infection. Other tests available recently are serology, breath test and Clotest^(12,14,15). The sensitivity and specificity of Clotest in other studies range from 80-100%⁽¹²⁾. In this study Clotest was found to be more specific (96%) than sensitive (77%) in the diagnosis of HP infection, and the detection rate were comparable to those of culture and histology (Table IV).

The close association between chronic gastritis and HP infection was demonstrated in this study where 83% of patients with chronic gastritis had HP infection. This is compar-

Table IV - Comparison of Positivity of HP Infection by Clotest Histology and Culture.

	HP+	%	HP-	%
Clotest	30	53	27	47
Histology	34	60	23	40
Culture	31	54	26	46

Clotest vs culture : p = NS
 Clotest vs histology : p = NS

Table V - Endoscopic Diagnosis, Chronic Gastritis and HP Status

Diagnosis	n	CG	%	%HP+
D U	19	18	95	90
G U	14	13	93	64
N U D	52	40	77	65

CG = Chronic Gastritis

ble to those of other studies^(1,2,6) and in fact HP infection is now accepted as an etiological factor in type B chronic gastritis^(16,17).

The prevalence of HP infection varied with the different diagnostic groups. For instance, 90% of patients with duodenal ulcer had HP infection compared with 64% of patients with gastric ulcer and 65% of non-ulcer patients. These differences may be partly due to the different frequencies of gastritis in the different groups. Thus 95% of duodenal ulcer patients had histological chronic gastritis compared to 77% of the non-ulcer group (Table V).

In the gastric ulcer group, although 93% of them had histological chronic gastritis, only 64% were positive for HP (Table V). The difference may be related to other non-HP causes of chronic gastritis in gastric ulcer disease.

Studies have shown that eradication of HP infection in patients with duodenal ulcer drastically reduces the relapse rate at the end of one year, thereby altering its natural history⁽⁹⁻¹¹⁾. Therefore, the diagnosis of HP infection and its eradication may assume increasing consideration in the management of duodenal ulcer disease.

In conclusion, Clotest is a sensitive and highly specific indicator of HP infection. Its use enables rapid diagnosis of HP infection by gastroenterologists and it will serve as an useful aid to the management of patients with gastritis and duodenal ulcer disease.

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