



DIAGNOSIS OF *HELICOBACTER PYLORI* USING THE RAPID UREASE TEST IN PATIENTS WITH DYSPEPSIA

General Surgery

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ABSTRACT

Helicobacter pylori (*H. pylori*) is a major human pathogen which causes progressive gastroduodenal damage. Guidelines recommend that, unless there are compelling reasons to delay, treatment is indicated for all patients in whom the infection is diagnosed. The rapid urease test (RUT) is a popular diagnostic test in that it is a rapid, cheap and simple test that detects the presence of urease in or on the gastric mucosa. The sensitivity and specificity are generally high and many versions have been approved for use in humans. Best results are obtained if biopsies are obtained from both the antrum and corpus. The tissue sample embedded in the RUT gel can also be utilized for other tests such as for molecular based tests of microbial susceptibility or for host factors. False-positive results are rare if the RUT contains an antibacterial agent to prevent growth of urease-containing contaminants and the tests are discarded at 24 hours. The use of antimicrobial drugs and proton pump inhibitors as well as the presence of intestinal metaplasia may result in false-negative results. A negative test should not be used as the criteria for cure or in cases where accuracy is important for patient management such as in upper gastrointestinal bleeding. Interpretation of the test should take into account the pretest probability and the prevalence of *H. pylori* in the population.

KEYWORDS

DYSPEPSIA, *H. PYLORI*, RAPID UREASE TEST

INTRODUCTION

To study the prevalence of *Helicobacter pylori* in patients with dyspepsia undergoing upper GI endoscopy with RUT-test.

Helicobacter pylori (*H. pylori*) is an important human pathogen involved in the pathogenesis of atrophic gastritis, gastroduodenal ulcer, gastric cancer, MALT lymphoma, idiopathic thrombocytopenic purpura, iron deficiency anemia and vitamin B12 deficiency. *H. pylori* is not a commensal organism in that the infection always causes gastric mucosal inflammation and damage. The basic lesion is progressive mucosal inflammation which may result in preneoplastic atrophic changes. A number of methods to *H. pylori* infection have been developed and they are generally grouped as being "invasive" meaning that they require gastric tissue or mucus, or "non-invasive" requiring only blood, breath or stool or analysis. Here, we discuss the rapid urease test (RUT) or RUT which is an invasive test in that it requires sampling of the gastric mucosa. The test provides indirect evidence of the infection by identifying the presence of a non-mammalian enzyme, urease, in or on the gastric mucosa.

METHODS

25 cases of dyspepsia, studied clinically over a period of 6 months from JULY2023to JANUARY 2024. They were subjected for upper gastrointestinal endoscopy under topical anaesthesia, during which, 2 biopsies from the pathological area were taken. Biopsy specimens, were immediately inoculated on RUT-TEST KIT. Positive test for *Helicobacter pylori* was indicated by the change in the colour of the medium from yellow to pink or red.

Test	Sensitivity	Specificity	Availability
Histology	88-95%	90-95%	++++
Culture	80-90%	95-100%	++
Urease test	90-95%	80-90%	++++
13 C- UBT	90-95%	90-95%	++++
14 C-UBT	86-95%	86-95%	+++
ELISA	80-95%	80-95%	+++
Stool antigen	90-95%	90-95%	++

RESULTS

Out of 25 patients, 22 patients were diagnosed to have *Helicobacter pylori*. The rapid urease test (RUT) is a popular diagnostic test in that it is a rapid, cheap and simple test that detects the presence of urease in or

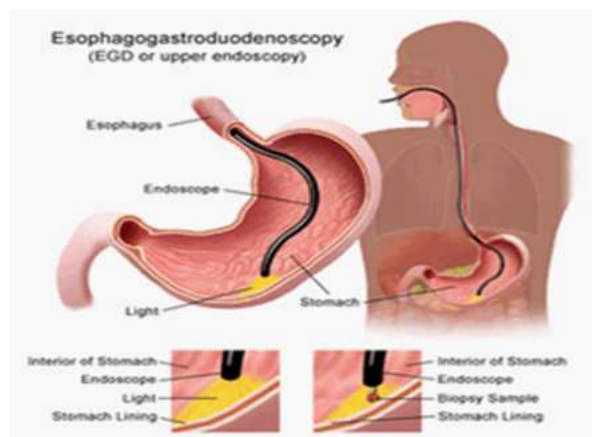
on the gastric mucosa. The sensitivity and specificity are generally high and many versions have been approved for use in humans. Best results are obtained if biopsies are obtained from both the antrum and corpus. False-positive results are rare if the RUT contains an antibacterial agent to prevent growth of urease-containing contaminants and the tests are discarded at 24 hours. The use of antimicrobial drugs and proton pump inhibitors as well as the presence of intestinal metaplasia may result in false-negative results.

DISCUSSION & CONCLUSION

The RUT is an indirect test of the presence of *H. pylori* based on the presence of urease in or on the gastric mucosa. It has an advantage over serology in that it only detects the presence of an active infection. The test requires a sample of gastric mucosa or mucus that is added to a tube, gel, or other device which brings that sample into contact with urea and a method to detect the products of urea hydrolysis, ammonia or carbon dioxide. Different tests have been developed to assess the presence of gastric urease activity and have been based on probably every possible component of the reaction including those that assess changes in labeled CO₂ in serum or breath, breath ammonia, and pH change induced by the ammonia either as a color change or directly using a pH meter.

A positive RUT requires approximately 10⁵ *H. pylori* in the biopsy sample to change the color using an agar-based test. The first requirement is that the biopsy sample must come from a site where the organisms are present. Two samples, one from the antrum avoiding areas of ulceration and obvious intestinal metaplasia, and one from normal appearing corpus are sufficient and provide the highest yield.





Commercially available RUT kits suggest that the decision be made (positive vs. negative) within 24 hours. The time the test turns positive depends on the concentration of bacteria and the temperature. Most will turn positive within 120 to 180 minutes but it is best to hold those that appear negative for 24 hours. After 24 hours the test may turn positive from the presence non-*H. pylori* urease containing organisms. Positive results after 24 hours are most often false positive and should not be used for treatment decisions.

Clinical interpretation of the RUT results :

The interpretation of RUT, like any diagnostic test, depends in part on the pretest probability of an infection. Thus, in a patient with a duodenal ulcer, a single positive RUT would be considered confirmative of the diagnosis whereas a negative test would need to confirm by the results of another test such as histology (e.g., no evidence of gastric inflammation).

It has also been recommended that RUT should not be used as the sole arbiter of the results of *H. pylori* eradication therapy because the sensitivity of the RUT is not 100% and thus a negative test does not fully exclude the presence of an active infection.

CONCLUSION:

In this study, we found that *Helicobacter pylori* was consistently associated with gastritis and diagnosed early by rapid urease test. so RUT-test with endoscopy can be used as primary diagnostic test for dyspepsia and treatment can be started accordingly but it is not a gold standard.

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