Saliva or serum, which is better for the diagnosis of gastric Helicobacter pylori infection?

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ABSTRACT

Background: Helicobacter pylori is known as an agent which may involve in the occurrence of peptic ulcer, gastric cancer and also other known and unknown diseases. Treatment of the infection with antibiotics eradicates the disease and prevents its pathologic effects. A noninvasive and inexpensive method for detection of the infection is needed. In this study the diagnostic values of serum and saliva anti H. pylori IgG was evaluated.

Patients and methods: The saliva and blood samples were collected from 114 patients who underwent upper GI endoscopy and gastric biopsy. Tissue samples were examined by rapid urease test and microscopic study. Saliva and serum samples were tested by ELISA-based test for anti H. pylori IgG, using a commercial kit.

Results: From 114 cases, 61 (53.5%) patients were positive for H. pylori in rapid urease test and microscopic study and 53 (46.5%) were negative in both tests. Rates of positive result for H. pylori in patients with and without peptic ulcer were almost similar. Mean values of anti H. pylori IgG in saliva and serum of H. pylori positive patients were higher than H. pylori negative patients. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of tests in saliva were 83.6%, 71.7%, 77.3%, 79.1%, 78.1% and in serum were 90.2%, 86.8%, 88.7%, 88.4% and 88.6% respectively.

Conclusion: It was concluded that ELISA-based anti H. pylori IgG test in saliva could be used as an alternative diagnostic test in the absence of other invasive procedures.

Keywords: Anti-H. pylori IgG, ELISA, Saliva.

INTRODUCTION

Helicobacter pylori (H. pylori) infection induces gastric inflammation in virtually all hosts, and such gastritis increases the risk for gastric and duodenal ulceration, distal gastric adenocarcinoma, and gastric mucosal lymphoproliferative disease (1-4). Marshall and Warren succeeded in culturing H. pylori in 1983 (1). Although H. pylori infection can be treated, the organism still infects approximately one half of the world’s population (5). The treatment of H. pylori is complicated,
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requiring at least two different antibiotics plus gastric acid suppression for successful H. pylori eradication (6). The high prevalence and the association with peptic ulceration and gastric cancer indicate that simple, noninvasive methods should be chosen to diagnose H. pylori infection. The tests for the diagnosis of H. pylori infection fall into two categories. The invasive methods are biopsy-based including culture, rapid urease test (RUT) and histology and non-invasive testing like urea breath test (UBT) (7), serology and body materials analyzing (feces, urine and saliva). Enzyme immunoassays, which are simple, reproducible and inexpensive, can detect either antigen or antibody. Although serum-based enzyme immunoassay has been used to detect H. pylori infection (8,9), it can not distinguish between past and present infections as antibody titers decline very slowly even after successful H. pylori eradication (10).

The assay requires blood sample collection, which is not always suitable for children. Human body materials such as feces, urine and saliva, which are collected by totally non-invasive procedures, have been subjected to ELISA for the diagnosis of H. pylori infection (11,12). In this study the value of salivary test for H. pylori infection was assessed by comparing its results with those obtained by gold standard methods.

**RESULTS**

A total of 114 patients [59 male (51.8%), 55 female (48.2%)] with the mean age of 44.68 years (15-85 years old) were participated in this study. Fifty three cases (46.5%) who were negative for H. pylori by either urease rapid test or histological study. H. pylori was detected in 61 patients (53.5%) by the two tests. H. pylori-positive patients showed significantly higher titers of anti H. pylori IgG (1.77 ± 0.950) in serum samples than H. pylori negative subjects (0.547 ± 0.443) (p<0.001). H. pylori-positive patients also showed significantly higher titers of anti H. pylori IgG (0.55 ± 0.238) in saliva samples than H. pylori negative subjects (0.279 ± 0.274) (p<0.001) (figure 1).
Figure 1. Optic density (Index of anti-H pylori IgG titer) in serum and saliva in the H pylori positive and negative subject.

Figure 2. The values of Anti-H pylori IgG (optical density) in serum (Panel A) and saliva (Panel B) in 114 patients. H pylori positive and negative patients are shown by red circles and blue squares. Dotted lines represent the cut off points.

True-positive rates (sensitivity) and false-positive rates (1-specificity) were calculated at different cut-off values and plotted to obtain a receiver operating characteristic (ROC) curve (figures 2 and 3). Commercially kit cut off was 20 U/ml with OD near 0.8 for sera and 8 U/ml with OD near 0.33 for saliva.

In this analysis, the point that enclosed the largest area, represented the best compromise between sensitivity and specificity and was chosen for our initial analysis. At this cut off rate, the salivary IgG test was considered positive for 51 of 61 H. pylori positive patients (sensitivity 83.6%) and 15 of 53 H. pylori negative patients (specificity 71.7%) (table1).
The salivary IgG is mainly derived by transudation from blood to gingival fluid (12). In this study, we measured salivary and serum H. pylori IgG with commercially-ELISA kit. We attempted to assess the value of measuring salivary H. pylori antibodies in confirming the presence of infection in patients. Collection and testing salivary specimens is non-invasive, painless, convenient, and fast and carries no risk of needle stick injury. Specificity and sensitivity of ELISA sera were 83.6% and 71.7% for saliva and 86.8% and 90% for sera, respectively. There was a good correlation between levels of salivary and serum IgG antibodies, and there was no significant different between them regarding specificity and sensitivity (p> 0.05).

Results of this study are comparable with majority of other similar studies. The specificity and sensitivity of ELISA in detection of H. pylori in saliva samples were reported 71% and 82% respectively (7), which were similar to our results. On the other hand, our results are also in agreement with those reported by Simor et al in the case of detection of H. pylori infection by analyzing saliva (16).

It was concluded that ELISA for detection of salivary anti H. pylori IgG is a rapid, non-invasive, inexpensive test that may be considered as an alternative to the serum IgG test when blood samples are not available or in pediatric population (17,18). While endoscopy and tissue biopsies remain irreplaceable for the definitive confirmation of the H. pylori status, present study supports a role for the salivary IgG antibody response in screening patients with dyspepsia.

Although certain ulcers and gastritis occur independently of H. pylori infection, a negative anti H. pylori salivary IgG status may help in reducing the number of unnecessary endoscopies, especially in low-risk patients (13).
REFERENCES


