Original Article

Comparison between Helicobacter Pylori Fecal Antigen Detection and Endoscopic Gastric Biopsy in Diagnosis of H. Pylori Infection in 50 Adult Cases

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ABSTRACT

OBJECTIVE: To compare the effectiveness of fecal antigen detection test with gastric biopsy via upper GI endoscopy for H pylori.
DESIGN: Comparative, observational, non- randomized.
PLACE AND DURATION OF STUDY: Sultan Qaboos University Hospital, Oman. February 2005 - February 2006.
PATIENTS AND METHODS: Fifty patients with epigastric pain and heart burn were subjected to upper GI endoscopy and gastric biopsy for H. pylori and at the same time stool was sent for fecal antigen detection for H. pylori.
RESULTS: Out of 30 females, 12 had biopsy proven H. pylori while 5 had positive fecal antigen test.
In 20 male patients, 15 had positive biopsy while 12 had fecal antigen proven H. pylori.
CONCLUSION: This study doesn't prove the effectiveness of fecal antigen detection test in comparison with upper GI endoscopy and biopsy, which is the gold standard test for H. pylori. Hence we cannot recommend the test to replace upper GI endoscopy and biopsy despite of the low cost and less trouble to the patient.

KEY WORDS: H. pylori, Endoscopy, Fecal Antigen Detection Test, Epigastric pain, Heart burn.

INTRODUCTION

Helicobacter pylori was first isolated by Warren and Marshall in 1983 (1). This gram negative, spiral shaped bacterium is a common human pathogen associated with gastritis, peptic ulcer and gastric carcinoma (2). The disease involves different genes, and studies suggest Cag A gene is more virulent than other genes (3). It is one of the most common infections around the world, affecting almost half of the world population (4). The highest rates of H. pylori prevalence are in Western Europe, Asia and in lower socioeconomic groups of developed countries like America (4).

Infection mainly occurs in childhood and shows lifelong persistence in the gastric mucosa (5). Infection is contracted by drinking contaminated water or by contact with fecal matter and vomitus. H. pylori has been strongly associated with gastritis, duodenal ulcer, gastric ulcer and both, gastric adenocarcinoma and lymphoma (6).

Nearly all patients with gastritis are infected with H. pylori. From 80-90% of duodenal ulcers and 60-80% of gastric ulcers are associated with H. pylori along with the use of NSAIDS (7,8). The association of gastric carcinoma with H. pylori is strong and about 85-95% of cases has this etiology (9).

Several diagnostic tests are available for determining the presence of H. pylori infection (10). They fall into 2 major categories: invasive/endoscopic and non-invasive/non-endoscopic.

Test that requires endoscopy include the biopsy urease test, histology, culture, PCR based methods and phase contrast microscopy of gastric tissue.

Diagnostic tests that do not require endoscopy include [^{13}C] and [^{14}C] urea breath test, serology with string test and stool antigen detection by enzyme immunoassay (EIA) (11).

Molecular methods such as PCR and southern blot hyberdization have the capability to sensitively and accurately determine the presence of infection and the genotype of the bacteria.

Fecal antigen detection is a newer test, which has reported sensitivity and specificity of 90% in the earlier studies. It is more accurate than antibody testing and less costly than urea breath test (12). Since it is non-invasive, this method for diagnosing infection would be of particular importance for very young paediatric patients (13). Due to invasiveness of the upper GI endoscopy, H. pylori fecal antigen detection test can be used as alternative if showed the sensitivity and specificity comparable to upper GI endoscopy and biopsy in adults as well.

Treatment for H. pylori includes proton pump inhibi-

tors depending on the severity of the symptoms and the choice of the antibiotic depending upon the prevalence of resistance of H. pylori to antibiotic in a particular community (14).

This study was aimed to compare the effectiveness of fecal antigen detection test with gastric biopsy via upper GI endoscopy for H. pylori as fecal antigen detection test for H. pylori is cheaper, easy to perform and can avoid the endoscopy.

PATIENTS AND METHODS

This study was conducted at Sultan Qaboos University Hospital Oman from February 2005 to February 2006. It was a comparative, observational, non-randomized study. The histopathologist and microbiologist were not aware about the tests result of fecal antigen detection test and upper GI endoscopy and biopsy. Gastric biopsies were taken from all four quadrant of gastric antrum.

All patients seen in the gastroenterology out patient clinic with complaints of epigastric pain and heart burn and not responding to standard anti-ulcer treatment were included in the study.

Patients excluded from the study were those who were already diagnosed with peptic ulcer disease by previous endoscopy, H. pylori infection, liver cirrhosis, pancreatitis and cholecystitis; because these patients can present with epigastric pain and heart-burn and patients with confirmed clinical diagnosis of pancreatitis and cholecystitis are not subjected to upper G1 endoscopy and biopsy. Cases of alcoholism were also not included in the study.

The sensitivity of HpSA in all subjects was calculated by:

Sensitivity=No. of diseased patients with positive tests/No. of diseased patient=TP/TP+FN

Where TP is true positive, FN is false negative

The specificity of HpSA can be calculated as follows

No. of Non-diseased patients with negative tests/No. of non diseased patients=TN/TN+FP.

Where TN means total negative and FP means false positive.

Informed consent was obtained from all patients for upper GI endoscopy and fecal antigen detection test and the study was approved by ethical committee of SQUH.

Upper GI endoscopy and fecal antigen detection test were performed on same day on every patient.

HpSA is a rapid lateral flow immmunoassay that utilizes a monoclonal anti-H. pylori antibody as the capture and detector antibody. A diluent stool sample was dispensed into the sample part of the test device and the appearance of a pink red line in the reading window next to the letter T after 5 minutes of incubation at room temperature indicate a positive result.

All the standard precautions recommended by the manufacturer were followed.

RESULTS

Total 50 patients were included in the study, in which 30 were females and 20 were males. The average age for female was 52±5 years and for males it was 46±5 years. Out of 30 females, 12 had biopsy proven H pylori, while 5 patients had fecal antigen positive for H. pylori. Sensitivity of HpSA for the female patients was 41.66% and specificity was 94.44%.

In 20 male patients, 15 had positive biopsy while 12 had fecal antigen positive. The sensitivity of HpSA in male patients was 80% and specificity was 100%. The rest of the patients in each group had both tests negative for H. pylori.

In our study true positive are considered those patients who were biopsy proven cases of H. pylori, hence 27/27+10= 72.97%.

In our study 23 patients were biopsy negative for H. pylori and equal to TN, and only 1 patient was false positive with HpSA. Therefore it was 23/23+1=95.833%.

Post test probability after the positive tests was calculated by formula TP/TP+ FP

Where TP is total positive and FP is false positive. Hence it was 27/27+1=96.42%.

DISCUSSION

Many diagnostic tests are available for diagnosis of H. pylori infection. They can be categorized as invasive and non-invasive. Among invasive test, biopsy of gastric mucosa taken through upper GI endoscopy, then examined microscopically, is still the most accurate and gold standard test for the diagnosis of H. pylori (15-17). This is also recommended in several H. pylori committee experts from Europe (15) and North America (16,17). The invasiveness of this method has prompted the search for an alternative and non-invasive diagnostic method especially in paediatric patients. Among those test the urea breath test (UBT), the serological test based on detection of IgG for H. pylori and fecal antigen detection test by enzyme immunoassay (EIA) or by PCR.

The ^{13}C UBT was developed to detect the H. pylori organism by measuring the radiolabelled carbon in the breath of infected children and the studies from Europe and Canada showed a high accuracy (18-20). It is also recommended by expert guidelines for monitoring H. pylori eradication after therapy (15). Despite of its effectiveness UBT has got the disadvantages of being cumbersome technically, time consuming, expensive, not available widely and of questionable reliability in very young children i.e. less than two years of age (15, 21).

Initially the detection of antibody against H. pylori was considered an adequate standard test, and was recommended for screen to treat strategy (22,23). But with advancement of technology it was evident that it is not of adequate sensitivity. Serum IgG antibody level may stay in circulation for a long period of time, and because of low immunologic response in young children the accuracy is doubtful for the population (24,25).

The stool antigen detection test (polyclonal, monoclonal) for H. pylori holds promise for the detection of infection in children and adults, as well as assessing cure. However, studies have shown the positive predictive value of 54% (26) and 87% (27) which may limit the test reliability. The negative predictive values of these stool antigen tests were high 100% and 94.9% respectively, as were the sensitivity 89-100% and specificity 70-94% (26-30). Our study showed the sensitivity of the HpSA 72.97% and specificity of 95.83% with a post test probability after a positive test of 96.42%, which is almost in the same range reported in other studies. However, because of the small size of the study, larger study is recommended to get a definitive opinion.

CONCLUSION

In our study, we do find some correlation between histopathology of gastric mucosa and fecal antigen excretion for the diagnosis of H. pylori, being less sensitive but more specific with high post test probability. However we recommend a larger study to reach a definitive conclusion. For this reason we advice a larger, multi-centre, randomized trial in order to establish the validity of the test i.e. H. pylori fecal antigen assessment, as it is less expensive, non-invasive and convenient test than other available tests for H. pylori.

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