Helicobacter Pylori Prevalence in Population & Rationale of Empirical HP-Kit Therapy

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Abstract

Aim: To identify high risk groups for consideration of Empirical HP kit therapy based on prevalence of H. pylori amongst population. **Material & Method:** A prospective study of 50 cases of dyspepsia, studied clinically as per the proforma over a period of 10 months from January to October 2019 at civil hospital, Ahmedabad. They were subjected for upper gastrointestinal endoscopy under topical anaesthesia, during which, biopsy from the antral area was 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. **Results:** Out of 50 patients, 45 patients were diagnosed to have Helicobacter pylori with more prevalence amongst adult male, smokers, low socio-economic class. The rapid urease test (RUT) is a popular diagnostic test in that it is a rapid and simple test that detects the presence of urease in or on the gastric mucosa. The sensitivity and specificity are generally high. The use of antimicrobial drugs and proton pump inhibitors as well as the presence of intestinal metaplasia may result in false-negative results. False positive can be there because of other urease containing micro-organisms. **Conclusion:** In this study,we found that very high % of Helicobacter pylori postive cases was consistently associated with gastritis with high prevalence in low socio-economic male smoker patient and diagnosed early by rapid urease test.So, we recommend to start HP-kit therapy empirically in these patients to reduce treatment cost and avoid Proton Pump Inhibitors abuse

Keywords : Campylobacter-like organism (CLO), Helicobacter pylori (H. pylori), Rapid urease test (RUT), Urease

Introduction:

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 are 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 samplingof 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. Aim of present study was to identify high risk groups for consideration of Empirical HP kit therapy based on prevalence of H. pylori amongst population.

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Materials and methods:

A prospective study of 50 cases of dyspepsia, studied clinically as per the proforma over a period of 10 monthsfrom January to October 2019 at civil hospital, Ahmedabad. They were subjected for upper

gastrointestinal endoscopy under topical anaesthesia, during which, biopsy from the antral area was taken. Biopsy specimenswere 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.

Inclusion criteria:

- Patient between 20 to 60 year of age
- Patient showing symptom of dyspepsia
- Patient with past history of PPI use at least for 1 month

Exclusion criteria :

- Patient below 20 year and above 60 years of age
- Pregnant and lactating woman
- Patient currently on PPI
- Patient unfit for endoscopy

Figure 1: RUT kit indicating negative test.

Figure 2: RUT kit indicating positive test.

Results:

Out of 50 patients, 45 patients were diagnosed to have Helicobacter pylori with more prevalence amongst adult male, smokers, low socio-economic class. The rapid urease test (RUT) is a popular diagnostic test in that it is a rapid and simple test that detects the presence of urease in or on the gastric mucosa. The sensitivity and specificity are generally high. The use of antimicrobial drugs and proton pump inhibitors as well as the presence of intestinal metaplasia may result in false-negative results. False positive can be there because of other urease containing micro-organisms.

The prevalence of H. pylori is more in 20-40 years age group with around 68% cases among them. More males are infected than females, i.e., about 35 out of total 45 positive were males. H.pylori shows a direct association with tobacco use as out total 45 positive 36 cases history of tobacco use in form either smoking or chewing. There are more chances of person belonging to lower or upper lower socio-economic class to get an H.pylori infection as our study shows that out of 45 cases 20 were from lower,11 was from upper lower and 7 were from lower middle socio-economic class. So, there are more chances of H.pylori if person belongs to lower socio-economic class, with h/o of tobacco use and male gender in an age group of 20-40 years.

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Table 1: Incidence of H pylori in different age group

Age group (yr)	Positive	Percentage
20-30	12	24
30-40	22	44
40-50	7	14
50-60	4	8

Table 2: Incidence of H pylori in different socio-economic class*

Socio-economic class	Positive	Percentage
Upper	2	4
Upper middle	5	10
Lower middle	7	14
Upper lower	11	22
Lower	20	40

*According to Modified Kuppuswamy Classification

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Table 3: Gender predilection of H. Pylori

Gender	Positive	Negative	Total
Male	35	2	37
Female	10	3	13
Total	45	5	50

Table 4: Incidence of H. Pylori in cases with h/o tobacco use

Tobacco use	Positive	Negative	Total
Yes	36	4	40
No	9	1	10
Total	45	5	50

Discussion:

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. A positive RUT requires approximately 105 H. pylori in the biopsy sample to change the color using an agar-based test.[1]

Commercially available RUT kits suggest that the decision can 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.[2-4] 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.

Table 5: Different H.Pylori diagnostic tests

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	86-955	86-95%	+++
ELISA	80-95%	80-95%	+++
Stool antigen	90-95%	90-95%	++

False negative and false positive results:

The actual results will depend on the gastric disease and the likelihood of atrophic changes or exogenous factors that reduce the bacterial load and thus produce false negative results. False positive results can occur if other urease containing organisms are present in sufficient quantity or if one allows contact of the specimen and the media for a prolonged period, typically longer than 24 hours. Anything that reduces the bacterial density such as the use of antibiotics, bismuth-containing compounds, or proton pump inhibitors may result in false-negative results.[5 - 7] The two most common reasons for false negative results are the recent use of proton pump inhibitors and the presence of intestinal metaplasia. H_2-receptor antagonists do not reduce the bacterial density and can be used up to the day of the test.[8] It is unclear how long one must wait after stopping proton pump inhibitors before the possibility of a false negative result becomes unlikely. The recommendation of two weeks is commonly given based on being on the safe side[9]; however, the organisms typically recover rapidly from

inhibition with a proton pump inhibitor. Nonetheless, all of the tests for active infection including RUT, histology, urea breath test, and culture may become false negative during proton pump inhibitor use or after bismuth or antibiotic use.

False-positives are rare and when present may be due to the presence of other urease containing organisms such as Proteus mirabilis, Citrobactor freundii, Klebsiella pneumoniae, Enterobactor cloacae and Staphylococcus aureus. However, unless the patient has achlorhydria or hypochlorhydria, non-H.pylori organisms are unlikely to be present in sufficient concentration to produce a positive test.

Clinical interpretation of the RUT results:

The interpretation of RUT, like any diagnostic test, depends in part on the pre-test 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). Generally speaking, upper endoscopy is an expensive test associated with a small but definite risk and unless there are specific contraindications, biopsy for examination of the mucosal histology is generally indicated. RUT testing can also be done and is especially helpful in difficult diagnostic situations when the physician would like to start treatment soon. It has been postulated that blood leads to decrease sensitivity of RUT possibly related to the presence of albumin, H. pylori killing factors in human plasma or blood in gastric lumen.[10-13] False negative tests are also common after partial gastrectomy probably because of reduced bacterial load often related on the presence of bile.[14-16] As such false negative results have little clinical importance unless they are accepted as proof of the absence of an H. pylori infection.

H. pylori as an Indian problem:

India is the prototypical developing country with a vast rural population living in poverty. The prevalence of H. pylori in the Indian subcontinent can be as high as 80 per cent or more in rural areas. The most commonly recognized manifestation of H. pylori infection in India is peptic ulcer disease, particularly duodenal ulcer disease, which outnumbers gastric ulcers between 8:1 and 30:1.[17] Singh et al[18] calculated the point prevalence of active peptic ulcer disease at 3% with a lifetime prevalence of 9%. As in other regions, the actual risk of a particular outcome from an H. pylori infection is predicated on the pattern of gastritis.[7] Antral predominant gastritis leaves an intact gastric corpus, poorly controlled acid secretion and promotes duodenal ulcer formation. In contrast, with pangastritis acid secretion often falls below the level needed to produce and sustain duodenal ulcer disease (e.g., approximately 12 mmol/h), gastric ulcer becomes more common than duodenal ulcer and the incidence of gastric cancer rises. Finally, atrophic pangastritis is the main precursor lesion associated with gastric cancer.[19]

Environmental factors, especially diet, play a role in the pattern of gastritis and this likely underlies the differences in the prevalence of H. pylori diseases in India. Tropical diets with plentiful fruits and vegetables year-round promote antral predominant non-atrophic gastritis and duodenal ulcer disease.[20, 21] Seasonal diets where fresh fruits and vegetables are not available during the winter or dry season and food is commonly preserved with salt promote pangastritis, a lower incidence of duodenal ulcer disease and more gastric ulcers. These environmental factors are likely responsible for the higher prevalence of duodenal ulcer in the south and for the wide range in the age-adjusted incidence rate of gastric cancer (range from 2 to 57 per 100,000).[22] The population of India is approximately 1.2 billion people. If the H. pylori prevalence was 60%, more than 726 million individuals would be infected with H. pylori. The estimated prevalence of duodenal ulcers in India is 3% and means that at least 18 million people could need anti-H. pylori therapy (approximately 50,000 per day if treated over one year).[23] The enormity of the task of treating H. pylori infection is daunting and might dissuade some physicians and the government from aggressively

managing the infection. However, when one considers the problem one patient at a time, the issue becomes much simpler.

Conclusion:

In this study, we found that Helicobacter pylori was consistently associated with gastritis and diagnosed early by rapid urease test with high prevalence in low socio-economic male smoker patients. So, we recommend to start HP kit therapy empirically in these patients to reduce treatment cost and avoid Proton Pump Inhibitors overuse.

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