

Helicobacter pylori infections

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Abstract

Helicobacter pylori is a Gram-negative intracellular bacterium. It is implicated in many infections like peptic ulcer disease and can also cause gastric carcinoma. Diagnosis relies on various methods. Treatment can be done by various pharmacological methods.

Key Words: *Helicobacter pylori*; gastritis; antrum

Introduction

Helicobacter pylori is a spiral Gram-negative bacterium. It is implicated in gastritis, gastric ulcer and gastric lymphoma [1]. Apart from this, it is also implicated in other infections, like a potential trigger of gastric autoimmunity, and in particular of autoimmune gastritis [2]. *H. pylori* may spread by unclean food and water, or through contact with an infected person's saliva and other body fluids [1].

Materials and methods:

Scientific literature search was carried out to collate available information about epidemiology, clinical features, diagnosis and treatment of infections caused by this bacterium.

Epidemiology:

This bacterium was discovered by Barry J Marshall and Robin Warren who also proposed its roles in peptic ulcer disease and gastritis [3]. Barry J Marshall inoculated himself with oral suspension or 'brew' of *Helicobacter pylori* to establish his idea that *H. pylori* indeed caused gastritis [4]. Before that, it was believed that stress and lifestyle related factors were the major drivers of peptic ulcer disease. After their discovery, it was established that *H. pylori*, causes more than 90% of duodenal ulcers and also up to 80% of gastric ulcers. *H. pylori* infection may be found in more than half the people in the world [5]. *H. pylori* infection is responsible for 74.7% of all non-cardia gastric cancer cases [6]. The bacterium spreads from man to man via vomitus and saliva, and can also possibly spread by houseflies [7]. Infections are more commonly seen in countries with low socioeconomic status.

Besides the above-listed conditions, *Helicobacter pylori* is also believed to cause a substantial percentage of ITP or Idiopathic thrombocytopenic purpura.

Pathogenesis:

H. pylori produces urease enzyme which produces Ammonia from urea, and neutralises gastric acid. CagA gene of *Helicobacter pylori* helps in the

intracellular persistence of the bacterium and causes severe disease. Vac A gene produces the vacuolating cytotoxin which also helps in pathogenesis by inducing inflammation and vacuole formation.

Laboratory diagnosis:

Urea breath test can be done to detect the bacterium. PCR can also be done from stool samples for detecting *Helicobacter pylori* [5]. Stool antigen tests can also be done. Antibiotics can interfere with the accuracy of testing. In general, retesting is done only after antibiotics have been stopped for four weeks, if possible.

Acid-suppressing drugs known as PPI and Bismuth salicylate can also interfere with accuracy of these tests.

In the routine clinical practice, rapid urease test (RUT) has been the most useful test for the diagnosis of *H. pylori* infection. This is because it is cheap, rapid, easy to do, highly specific and also widely available. Based on the activity of the urease enzyme of *H. pylori*, the presence of *H. pylori* in biopsy specimen convert the urea test reagent to ammonia, leading to an increase in the pH and a color change on the pH monitor. Many commercial urease tests like gel-based tests (CLOtest, HpFast), paper-based tests (like PyloriTek, ProntoDry) and liquid-based tests (like UFT300, EndoschHp) are available now.

Upper gut Endoscopy can also be done. Antrum is the preferred site for biopsy. The sensitivity and specificity for predicting *H. pylori*-positive corporal gastritis by magnifying endoscopy with indigo carmine staining are 97.6% and 100%, respectively. Peptide nucleic acid fluorescent in situ hybridization (PNA-FISH), which can be used on histological preparations, is a highly sensitive (97% sensitivity) and specific (100% specificity) technique for the diagnosis of *H. pylori* infection [6].

Treatment:

Treatment is usually instituted by at least a combination of two antibiotics to avoid development of resistance. Along with this, a Proton pump inhibitor is

also administered to heal the lesion quickly. Triple as well as quadruple therapy may be given. Quadruple therapy, consisting of a proton pump inhibitor, Tetracycline, metronidazole and a bismuth salt, is a very effective regimen, even in areas with high prevalence of antibiotic resistance, and this may be an alternative first-line treatment. [8]. Triple therapy consists of Proton pump inhibitor, Amoxicillin and Clarithromycin. Amoxicillin may be replaced here with an imidazole.

Prevention:

Improved modalities of food preservation and food transportation has diminished prevalence of *H. pylori* in the USA [9]. Vaccines are in early stage of development. All *H. pylori* vaccines currently in development are very early stage. They are in Phase I or preclinical stages. These vaccines are mainly composed of purified or recombinant components of *H. pylori* antigens with an adjuvant [10].

Discussion:

Helicobacter pylori is the bacterium which is responsible for most of the cases of peptic ulcer disease. This bacterium is also implicated now in many other infections. Diagnostic and treatment methods may be cumbersome.

Conclusion:

This bacterium is notorious for gastroduodenal disease, and more public health awareness is needed in order to build knowledge among general public about this pathogen.

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