Helicobacter Pylori (*H.pylori*) Infection

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The History of Helicobacter Pylori (*H.pylori*)

A peptic ulcer is an open sore found on the lining of the stomach or duodenum. Peptic ulcers can lead to significant bleeding or rupture of the wall of the stomach or *duodenum*. In the past, healthcare providers felt that ulcers were created due to an overproduction of acid in the stomach. This led to treatment aimed towards neutralizing, or reducing, acid production. It was recommended to drink milk and eat eggs to neutralize that acid. They even created the "Doll's milk drip" where a tube was inserted into the stomach and dripped milk directly into it. As time went on, therapies such as cutting the *vagus nerve* and medications called *anticholinergics* to help treat peptic ulcer disease were created.

The **duodenum** is the beginning or first part of the small intestine.

The **vagus nerve** is the nerve responsible for stimulating the cells in the stomach that produce gastric acid secretion.

Anticholinergics are a group of medications that block a nervous system chemical, called acetylcholine. Acetylcholine plays a vital role in smooth, cardiac, and skeletal muscle contractions as well as some mental functions.

The **mucous lining** is a protective lining of the stomach that helps lubricate food to facilitate movement within the stomach.

Over time, it became more apparent that these therapies were not successful. It wasn't until 1982 when Robin Warren and Barry Marshall suggested that the primary cause of peptic ulcers was infection of the stomach by a newly discovered species of bacteria called Helicobacter pylori (*H. pylori*). *H. Pylori* is a spiral shaped bacteria that lives in the *mucous lining* of the stomach to protect itself from the harsh acid environment. It is one of the most common infections worldwide affecting more than half the world. It can cause peptic ulcers and several other potentially serious conditions, such as:

- Inflammation of the stomach (gastritis)
- Stomach and duodenal ulcers - About 10-15% of patients who have *H. pylori* will develop an ulcer.
- Stomach cancer - While only a small percentage of patients with *H. pylori* will develop gastric cancer, one of the most common causes of gastric cancer is *H.pylori* infection.

Spread of *H. Pylori*

H. pylori infection occurs when *H. pylori* bacteria infect the stomach. It is a bacterium and can be spread from person to person via bowel movements, through infected surfaces or contaminated food and water. Individuals who live in crowded conditions, lack clean water, or have unsanitary living conditions are at a greater risk for getting *H. pylori*. Both children and adults can become infected with *H. pylori* bacteria; however, children are at a greater risk of getting an *H. pylori* infection.

Symptoms

Most people with *H. pylori* infection will not experience any signs or symptoms. Why certain individuals do so remain uncertain. If an individual does have symptoms, they may include:

- An ache or burning pain in the upper abdomen
- Abdominal pain that becomes worse on an empty stomach
- Nausea
- Loss of appetite
- Frequent burping
- Bloating
- Unintentional weight loss

Symptoms that are cause for alarm and require an immediate appointment with your healthcare provider include:

- Severe abdominal pain
- Difficulty swallowing
- Bloody or black tarry stools
- Bloody, or grainy black vomit

Diagnosis

There are a range of diagnostic tests which can identify the *H. pylori* infection. In the past, the most common was a simple procedure called an endoscopy that investigates the stomach using a long flexible tube called an endoscope. The endoscope is placed into the mouth, down the esophagus, and into the stomach and beginning of the small intestine. This tube has a camera and light on the end which allows your healthcare provider to see inside your gastrointestinal (GI) tract during the test. Endoscopic tests for *H. pylori* can include a *histology*, *rapid urease test (RUT)*, or a *culture*.

- Histology - The study of tissues and cells under a microscope.
- Rapid urease test (RUT) - A biopsy of tissue from the stomach that is mixed with urea to detect the level of ammonia (an H. pylori product)
- A culture test is when the healthcare provider removes a tissue sample from the body (in this case, the stomach) and puts it in a special dish. If H. pylori bacteria are present in the sample, they will grow until they can be seen under a microscope or in a liquid solution.

Currently, most healthcare providers are beginning to use non-endoscopic procedures. This includes the *urea breath test* and *stool testing* (fecal antigen tests). These are currently the most recommended tests to detect an *H. pylori* infection.

- Urea Breath Test- non-invasive test where the patient will drink urea and breathe into a bag to test the level of CO2. Urea produces exhaled CO2 only when H. pylori is present in the stomach,
- Stool Test – A sample of the individuals bowel movement is collected and tested for excreted H. pylori proteins. This can be done at home, in the healthcare provider's office, at a medical clinic or hospital.

Your healthcare provider should test for a *H. pylori* infection if you have:

- *Either* active peptic ulcer disease OR a history of documented, untreated peptic ulcer disease. Peptic ulcers are open sores that develop on the inside lining of your stomach and the upper portion of your small intestine.
- Gastric mucosa-associated lymphoid tissue (MALT) lymphoma is a rare disease which is often associated with Helicobacter pylori (*H. pylori*) infection. It occurs when there is an abnormal and excessive growth of tissue within lymphoid tissue in the stomach. It is usually the result of chronic immune stimulation due to infections, such as *H. pylori*.
- After endoscopic resection of early gastric cancer. Gastrointestinal endoscopic mucosal resection (EMR) is a procedure to remove pre-cancerous, early-stage cancer or other abnormal tissues (lesions) from the digestive tract.
- Dyspepsia. Pain or discomfort centered in the upper abdomen, often referred to as dyspepsia, is a common disorder that affects up to 30% of the general population. Symptoms of dyspepsia include upper abdominal pain or discomfort, early feeling of fullness (satiety), nausea, belching, and bloating. Patients can also experience symptoms of burning, pressure, or fullness often, but not necessarily, related to meals.
    - Uninvestigated dyspepsia. Uninvestigated dyspepsia means that these symptoms have not been addressed and no diagnostic testing has occurred. *H.pylori* has many of the same symptoms as dyspepsia, so the healthcare provider will want to rule out this infection as the cause of the symptoms.
    - Functional dyspepsia (with a normal upper endoscopy). Functional Dyspepsia is a disorder where a group of dyspeptic symptoms exist and after diagnostic testing for possible causes has occurred, but no structural or metabolic disease is present to explain them.
- Unexplained iron deficiency anemia. Iron-deficiency anemia is a lack of healthy red blood cells in blood that develops if you do not have enough iron in your body. It is the most common type of anemia.
- Idiopathic thrombocytopenic purpura. Thrombocytopenic purpura is a blood disorder where there is abnormal decrease in the number of platelets in the blood. It is considered idiopathic if it occurs suddenly with no identifiable cause.

Treatment

H.pylori is often treated using 2-4 drugs at the same time. This can include ***Proton Pump Inhibitors (PPIs)* (Examples: Omeprazole, Esomeprazole, Lansoprazole, Rabeprazole, Pantoprazole, Dexlansoprazole) along with 1-3 antibiotics (Examples: amoxicillin, clarithromycin, Tetracycline, metronidazole, levofloxacin, rifabutin)

**It's important to avoid antibiotics that you have previously received as your body may become resistant to that antibiotic. **

Proton Pump Inhibitor (PPI) - Proton pump inhibitors (PPIs) are the most commonly prescribed class of medication for the treatment of heartburn and acid-related disorders. They work by blocking the site of acid production in the parietal cell of the stomach.

Potassium- competitive Acid Blockers (PCAB) – Potassium-competitive acid blockers block acid secretion in the stomach.

Generally, treatment lasts 14 days (should not be less than 10). It is *critically* important that you take the medications as prescribed for the proper duration of therapy. The best chance to get rid of the infection is the first try. If you are not able to get rid of the infection on the first try, it becomes harder to get rid of with subsequent forms of therapy. *After finishing treatment, it is important to follow up with a breath or stool test to make sure the H. pylori is cured.*

Combination Therapy Treatment:

Several treatments have been developed as a prepackaged combination to make it easier for patients to take these complex regimens.

- Helidac® is a combination package of an antidiarrheal agent (bismuth subsalicylate), and two antibiotics (metronidazole and tetracycline), taken together with a PPI.
- Pylera™ contains a combination of minerals (Bismuth, potassium and citrate also known as bismuth subcitrate) and two antibiotics (metronidazole and tetracycline) in the same capsules, again taken with a PPI.
- Talicia® is a combination of two antibiotics (rifabutin and amoxicillin) and a PPI (omeprazole) requiring no additional pills.

In May 2022, the FDA approved two novel combination therapy treatments for *H. pylori* infection.

- Voquenza™ Triple Pak™
- Voquenza™ Dual Pack™

In both of these FDA approved treatments, *vonoprazan* is co-packaged with either one or two antibiotic(s). Vonoprazan is an oral small molecule potassium-competitive acid blocker (PCAB). This therapy helps suppress acid secretion in the stomach while increasing the effectiveness of the antibiotic(s).

The Food and Drug Administration (FDA) is one of the U.S. government's regulatory agencies. This agency oversees a broad range of topics that pertain to food, drugs and other products used on a daily basis.

The FDA works to protect public health by assuring that foods and drugs for humans and animals are safe and properly labeled. The FDA also ensures that vaccines, other biological products, and medical devices intended for human use are safe and effective.

Products approved by the FDA have been deemed safe, with benefits that are worth the possible risks. This is done after reviewing studies and tests that have been done on a product.

Recrudescence or Reinfection

The same individual can have an *H. pylori* infection more than once. This generally occurs as either *recrudescence* or *reinfection*. In countries that have a highly advanced economy and technological infrastructure, recrudescence (recurrence of the initial infection) is more common than reinfection (infection with a completely new *H. pylori* type). In developing countries reinfection is more common, with a significant chance of infection that continues for the rest of the individual's life.

Recrudescence is the recolonization of the same strain within 12 months after effective treatment.

Reinfection is the colonization with a new strain, more than 12 months after effective treatment.

It is also important to note that Individuals who are struggling with *H. pylori* infection and beginning treatment for another health issue using either aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) are at a greater risk for later developing an ulcer.

Conclusion

H. pylori is one of the most common human infections. It is a common cause of inflammation in the stomach (gastritis), peptic ulcers, and gastric cancer, and unexplained upper gastrointestinal symptoms. There are blood, breath, stool, and endoscopic tests to identify this infection. Treatments consist of a 2-4 drug regimen given for 14 days. Patients treated for *H. pylori* should undergo a follow up test 4 weeks after the course of treatment to determine if it was successful.

About IFFGD

The International Foundation for Gastrointestinal Disorders (IFFGD) is a 501(c)(3) nonprofit education and research organization. We work to promote awareness, scientific advancement, and improved care for people affected by chronic digestive conditions. Our mission is to inform, assist, and support people affected by gastrointestinal disorders. Founded in 1991, we rely on donors to carry out our mission. Visit our website at: www.iffgd.org.

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