Helicobacter Pylori Infections — Differential Diagnosis and Medical Treatment

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Helicobacter pylori is a type of bacteria, which results in gastric infection. It is estimated to be found in more than 50% of the international population. It is not sure how exactly the bacteria can be spread; however, unclean food or water may aid in the spreading of the infection and result in different gastric diseases or conditions, including peptic ulcer disease or gastric cancer in severe complications.

Definition and Background of Helicobacter Pylori Infections

Helicobacter pylori (H. pylori) bacterium is involved in many diseases other than peptic ulcer disease, such as coronary artery inflammation, gastroesophageal reflux disease, skin disease, iron deficiency anemia, rheumatologic issues and lymphoid tissue lymphomas associated with mucosa. It has also been reported that there is a strong association between gastric adenocarcinoma and lymphoma and H. pylori bacterium.
Etiology of Helicobacter Pylori Infections

Causes of Helicobacter pylori

The main changes caused by H. pylori bacteria are **gastric metaplastic** and **atrophic** changes. There is a direct **decrease** in the mucosal levels of **glutathione** as a result of the **adhesion** of H. pylori bacteria to the cells of the stomach. Some studies and reports show that there is a correlation between **low-grade MALTomas** of the stomach and H. pylori infection. **Tyrosine phosphorylation** of the gastric cells may be caused by the H. pylori bacteria adhesions as well.
Epidemiology of Helicobacter Pylori Infections

Spread of Helicobacter pylori in the United States

It appears that race plays an important role in the epidemiology of H. pylori infections in the United States, as 60% of the cases are patients from Hispanic origins. White patients account for approximately 29% of cases.

International spread of Helicobacter pylori

90% of people affected with peptic ulcer disease appear to be positive for H. pylori infection. There are not enough international data about the bacterium, but it appears that about 50% of people are infected with H. pylori bacteria.

Presentation of Helicobacter Pylori Infections

History of Helicobacter pylori

Generally, 30% to 35% of patients infected with H. pylori bacteria may be asymptomatic. However, when symptoms appear they include:

- Vomiting
- Abdominal pain
- Nausea
- Heartburn
- Morning hunger
- Halitosis
- Diarrhea

There is no difference in the presence or the frequency of symptoms between gastritis patients who are infected with H. pylori and the ones who are not infected.

Physical examination of Helicobacter pylori

Patients infected with H. pylori appear to not have specific or different signs than other gastritis patients who are not infected with the bacteria. The main signs that may be present in these patients include dyspepsia and abdominal discomfort.

Differential Diagnosis of Helicobacter Pylori Infections

Clinical pictures similar to Helicobacter pylori

- Atrophic gastritis
- Acute gastritis
- Chronic gastritis
- Gastrinoma
- Gastric cancer
- Non-Hodgkin lymphoma
- Peptic ulcer disease
Diagnosis of Helicobacter Pylori Infections

Laboratory studies

Several laboratory studies may aid in the diagnosis of patients with suspected H. pylori infection. These tests include:

- **H. pylori serology**: serology testing is useful to detect the infection in new patients; however, it is not as useful in the follow up of already diagnosed patients. It has high sensitivity and specificity of over 90%.

- **Fecal antigen test of H. pylori**: it is useful in detecting the infection in the initial stages, as well as to detect eradication after treatment. It has a very high sensitivity of 94% and specificity of 98%.

- **Carbon-13 urea breath test**: urease is present in the stomach during H. pylori infections, which increases the concentration of the labeled carbon.

- **Antibiogram**: clarithromycin and metronidazole are not recommended as first-line medications in areas of high resistance for these antibiotics. Antibiogram testing is useful in these areas.

Imaging studies

- **Electron micrograph of H. pylori possessing multiple flagella** by Yutaka Tsutsumi, M.D. License: Public Domain

- **H. pylori colonized on the surface of regenerative epithelium** by Yutaka Tsutsumi, M.D. License: Public Domain
Patients with H. pylori infections may not require imaging studies, and they may not be useful in them. However, these studies may be useful in patients with more complicated diseases such as gastric cancer, MALToma or ulcer disease.

Procedures

- **Esophagogastroduodenoscopy (EGD):** patients who present with symptoms of peptic ulcer disease usually require this procedure in order to view the mucosal lining condition of the duodenum and the stomach.
- **Esophagogastroduodenoscopy (EGD) plus biopsy:** this procedure is used to obtain gastric antrum biopsy specimens for histological examination.
- **Esophagogastroduodenoscopy (EGD) plus echography:** it is mandatory to perform this procedure in patients who have positive biopsy results of MALTomas in order to allow a better staging of the condition.

Staging

H. pylori infections do not have a staging system. However, the process of the disease may be described in the following steps:

1. Chronic gastritis
2. Atrophic gastritis
3. Metaplasia of the intestine, which may evolve into dysplasia
4. Adenocarcinoma of the stomach

Treatment of Helicobacter Pylori Infections

Only patients who show positive results of H. pylori infection should be treated. When choosing the treatment regimen, it is important to consider antibiotic resistance.

Pharmacotherapy of Helicobacter pylori

Several triple therapy regimens have been approved for the treatment of duodenal and gastric ulcer disease in patients with positive H. pylori infection test results, these regimens include:

<table>
<thead>
<tr>
<th>Medications</th>
<th>Duration</th>
</tr>
</thead>
</table>
| • Amoxicillin
  • Omeprazole
  • Clarithromycin | 10 days |
| • Metronidazole
  • Tetracycline
  • Bismuth subsalicylate | 14 days |
| • Amoxicillin
  • Lansoprazole
  • Clarithromycin | 10 or 14 days |

All these treatments and medications have a high risk of developing certain side effects, including:

- Nausea
- Metallic taste
- Skin rash
- Vomiting
- Diarrhea

Treatment should be discontinued if any of the last three side effects appear. H2-
receptor blockers, such as famotidine and ranitidine, may also be involved in the
treatment of H. pylori infections.

Surgical intervention of Helicobacter pylori

Generally, patients who suffer from H. pylori infections do not require any surgical interventions. However, in severe complications, such as cancer, it may be required.

Review Questions

The correct answers can be found below the references.

1. A 43-year-old gentleman who underwent a total hip replacement three
weeks ago presents today to the clinic complaining of epigastric pain, chronic
nausea, and occasional melena. According to him, since his hip replacement
surgery, he has been taking celecoxib for pain control. What is the most
recommended treatment for this man?

A. Amoxicillin, clarithromycin, and omeprazole
B. Discontinue celecoxib
C. Corticosteroid therapy plus sulfasalazine
D. Injection of intramuscular intrinsic factor
E. Gluten-free diet

2. A 42-year-old lady presented to your office complaining of worsening
epigastric pain, which was present for a long time but it was mild. According to
her, the pain is aggravated and very severe a few hours after a meal, and it is
relieved when using over-the-counter antacids. The pain does not radiate to
any other areas of the body and she does not feel any abnormal tastes in her
mouth. There is no history of anemia, unexplained weight loss, or bleeding. She
does not take any other medications except for over-the-counter antacids.
There is no history of gastrointestinal malignancy in her family. What is the
most appropriate next step in her management?

A. Upper endoscopy with gastric mucosa biopsy
B. Barium swallow
C. Urease breath test
D. Esophageal pH monitoring
E. Empiric therapy with proton pump inhibitor

3. A 25-year-old man, who is previously healthy, is admitted to the intensive
care unit (ICU) because of a motorcycle accident. Emergency craniotomy was
performed because he had head trauma. More than 30% of his body is burned
and he has a fractured humerus. Continuous infusion of fentanyl is used in
order to manage his pain. He developed severe hematemesis after two days of
admission to the ICU. Which of the following describes the mechanism
underlying the development of hematemesis?

A. Infection with H. pylori
B. The overuse of fentanyl
C. Disruption of gastric mucosa
D. Increased production of gastric acid
E. Both C and D
References


Luigi Santacroce. Helicobacter Pylori Infection, via Medscape

Helicobacter Pylori Infections via MedlinePlus


Sean P. Caufield, Theodore W. Schafer. Peptic Ulcer Disease, American College of Gastroenterology.

Correct answers: 1A, 2C, 3E

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