

Helicobacter pylori

Clinical Background

Previously known as *Campylobacter pylori*, *Helicobacter pylori* (*H. pylori*) is one of the most common bacterial pathogens in humans.

Epidemiology

- Prevalence – depends on age, socioeconomic status and ethnic group
 - Approximately 35% in U.S. population
 - Highest prevalence – lower income, non-Caucasian population
 - Lowest prevalence – middle to upper income, Caucasian population
- Transmission – probably fecal-oral

Organism

- *H. pylori* is a gram-negative, spiral-shaped, urease-positive, microaerophilic bacterium that infects the gastric epithelium
- Causes chronic inflammation in most infected hosts, up to one-half of the world's population
- Implicated as risk factor for gastric adenocarcinoma and gastric B-cell lymphoma

Risk Factors

- Socioeconomic status – highest in lower income, non-Caucasian population
- Age – lowest in young children
- Ethnicity – lowest in Caucasians

Clinical Presentation

- Dyspepsia – chronic and recurrent pain or discomfort centered in the upper abdomen (epigastrium)
- Gastritis
- Abdominal pain
- Peptic ulcer disease – gastric, duodenal
- Cancer
 - Gastric mucosa-associated lymphoid tissue lymphoma (MALT)
 - Gastric cancer

Treatment

- Test and treat strategy is recommended for patients with uninvestigated persistent dyspepsia by the American College of Gastroenterology (Chey 2007) for patients <45 years of age who have none of the following “alarm” symptoms
 - Bleeding
 - Anemia
 - Early satiety
 - Unexplained weight loss
 - Progressive dysphagia
 - Odynophagia
 - Recurrent vomiting
 - Family history of upper gastrointestinal cancer
 - Previous esophogastric malignancy
- Eradication of bacteria recommended in the following
 - *H. pylori*-related ulcers

- Gastric B-cell lymphomas
- Patients with family history of gastric cancer

Diagnosis

- Invasive diagnostic tests
 - Endoscopy with gastric biopsy
 - Gold standard for investigation of upper gastrointestinal tract
 - Demonstration of organisms by histology or by rapid urease activity
- Noninvasive tests for initial diagnosis in all patients ≤ 55 years with dyspepsia
 - Urea breath test using orally administered ^{14}C - or ^{13}C -labeled urea – highly sensitive (95%) and specific (95%)
 - Stool antigen – alternative for urea breath test (sensitivity 92.4% and specificity 91.9%)
 - Serology for antibodies to *H. pylori* antigens
 - Per the American College of Gastroenterologists guidelines, this test should probably only be used as first-line testing if the test has been validated with high predictive value and the prevalence of *H. pylori* in the patient's community is not very low or very high; otherwise, a high rate of false positives may result

Differential Diagnosis

- Esophagitis
- Functional dyspepsia
- Gastroesophageal reflux disease (GERD)
- Cholecystitis
- Pancreatitis
- Ischemic heart disease
- Drug-induced dyspepsia

Screening

- General population screening of asymptomatic patients not recommended
- Patients with family history of gastrointestinal cancer should have screening if symptomatic (endoscopy with biopsy)
- Patients without “alarm” symptoms a dyspepsia that does not respond to anti-reflux treatment may be candidates for *H. pylori* testing

Monitoring

- Eradication of bacteria recommended for
 - *H. pylori*-related ulcers
 - Gastric B-cell lymphomas
 - Patients with family history of gastric cancer
- Confirmation of therapeutic eradication of *H. pylori*
 - Histologic examination of urease testing of gastric biopsy
 - Breath test with ^{14}C -labeled urea
 - C-urea breath test is the only appropriate test for past eradication testing
 - Stool antigen

Lab Tests

Indications for Laboratory Testing

Tests generally appear in the order most useful for common clinical situations. For test-specific information, refer to the test number in the ARUP Laboratory Test Directory on the ARUP Web site at www.aruplab.com.

Test Name and Number	Recommended Use	Limitations	Follow Up
<p><i>Helicobacter pylori</i> Breath Test 0020646 Method: Infrared Spectrophotometric</p>	<p>Initial test to determine if <i>H. pylori</i> is causing active infection</p> <p>Monitor <i>H. pylori</i> infection in adult patient post treatment</p>	<p>Negative result does not rule out possibility of <i>H. pylori</i> infection; if clinical signs suggest <i>H. pylori</i> infection, retest with new sample or alternate method</p> <p>Known causes of false-negative results include:</p> <ul style="list-style-type: none"> - Use of antimicrobials, proton pump inhibitors and bismuth preparations within 2 weeks preceding test - Administration of breath test < 4 weeks after completion of therapy to eradicate <i>H. pylori</i> - Premature or late collection of post-dose sample <p>Known causes of false-positive results include:</p> <ul style="list-style-type: none"> - Patient with achlorhydria - Procedures for test administration not followed correctly - Presence of other gastric spiral organisms such as <i>Helicobacter heilmannii</i> <p>¹³C and ¹⁴C breath tests are noninvasive, but expensive due to need for special equipment</p>	

<p><i>Helicobacter pylori</i> Antigen, Fecal by EIA 0065147</p> <p>Method: Enzyme Immunoassay</p>	<p>Determine whether <i>H. pylori</i> has been eradicated and not just temporarily suppressed, especially in adult patients with complicated, recurrent or refractory peptic ulcers</p> <p>Antigen testing should be performed no sooner than 1 month after all therapy stopped</p>		
<p><i>Helicobacter pylori</i> Antibodies, IgG & IgA 0050994</p> <p>Method: Enzyme Immunoassay</p>	<p>Determine if <i>H. pylori</i> is causing active infection</p>	<p>May require repeat testing if results are equivocal and clinical suspicion present</p>	
<p>Immunohistochemistry Stain Offering arup005</p> <p>Method: Immunohistochemistry</p>	<p>For fixed tissue samples, consultative services as well as immunohistochemical staining for the presence of <i>H. Pylori</i> are available</p>		

Additional Tests Available

Test Name and Number	Comments
<p><i>Helicobacter pylori</i> Antibody, IgA 0050995</p> <p>Method: Enzyme Immunoassay</p>	
<p><i>Helicobacter pylori</i> Antibody, IgG 0099359</p> <p>Method: Enzyme Immunoassay</p>	
<p><i>Helicobacter pylori</i> Antibody, IgM 0098392</p> <p>Method: Enzyme-Linked Immunosorbent Assay</p>	

Guidelines

Bourke B, Ceponis P, Chiba N, Czinn S, Ferraro R, Fischbach L, Gold B, Hyunh H, Jacobson K, Jones NL, Koletzko S, Lebel S, Moayyedi P, Ridell R, Sherman P, van Zanten S, Beck I, Best L, Boland M, Bursley F, Chaun H, Cooper G, Craig B, Creuzenet C, Critch J, Govender K, Hassall E, Kaplan A, Keelan M, Noad G, Robertson M, Smith L, Stein M, Taylor D, Walters T, Persaud R, Whitaker S, Woodland R. Canadian Helicobacter Study Group Consensus Conference: Update on the approach to Helicobacter pylori infection in children and adolescents--an evidence-based evaluation. *Can J Gastroenterol.* 2005; 19 (7) 399-408.

Talley NJ. American Gastroenterological Association medical position statement: evaluation of dyspepsia. *Gastroenterology.* 2005; 129 (5) 1753-1755.

Cited References

Chey WD, Fendrick AM. Noninvasive *Helicobacter pylori* testing for the "test-and-treat" strategy: a decision analysis to assess the effect of past infection on test choice. *Arch Intern Med*. 2001; 161 (17) 2129-2132.

General References

Cirak MY, Akyon Y, Megraud F. Diagnosis of *Helicobacter pylori*. *Helicobacter*. 2007; 12 Suppl 1 4-9.

Delaney BC, Moayyedi P, Forman D. Initial management strategies for dyspepsia. *Cochrane Database Syst Rev*. 2003; (2) CD001961.

Dzierzanowska-Fangrat K, Lehours P, Megraud F, Dzierzanowska D. Diagnosis of *Helicobacter pylori* infection. *Helicobacter*. 2006; 11 Suppl 1 6-13.

Grimpen F, Pavli P. Rational investigation of upper abdominal pain. *Aust Fam Physician*. 2008; 37 (8) 602-607.

Lehours P, Yilmaz O. Epidemiology of *Helicobacter pylori* infection. *Helicobacter*. 2007; 12 Suppl 1 1-3.

O'Brien SJ, Halder SL. GI Epidemiology: infection epidemiology and acute gastrointestinal infections. *Aliment Pharmacol Ther*. 2007; 25 (6) 669-674.

Plebani M, Basso D. Non-invasive assessment of chronic liver and gastric diseases. *Clin Chim Acta*. 2007; 381 (1) 39-49.

Pritchard DM, Crabtree JE. *Helicobacter pylori* and gastric cancer. *Curr Opin Gastroenterol*. 2006; 22 (6) 620-625.

Ricci C, Holton J, Vaira D. Diagnosis of *Helicobacter pylori*: invasive and non-invasive tests. *Best Pract Res Clin Gastroenterol*. 2007; 21 (2) 299-313.

Saad RJ, Chey WD. Breath tests for gastrointestinal disease: the real deal or just a lot of hot air?. *Gastroenterology*. 2007; 133 (6) 1763-1766.

Shah R. Dyspepsia and *Helicobacter pylori*. *BMJ*. 2007; 334 (7583) 41-43.

Stenstrom B, Mendis A, Marshall B. *Helicobacter pylori*--the latest in diagnosis and treatment. *Aust Fam Physician*. 2008; 37 (8) 608-612.

Talley NJ, Vakil NB, Moayyedi P. American gastroenterological association technical review on the evaluation of dyspepsia. *Gastroenterology*. 2005; 129 (5) 1756-1780.

Vilaichone RK, Mahachai V, Graham DY. *Helicobacter pylori* diagnosis and management. *Gastroenterol Clin North Am*. 2006; 35 (2) 229-247.

Zagari RM, Fuccio L, Bazzoli F. Investigating dyspepsia. *BMJ*. 2008; 337 a1400-.

Reviewed by

Grenache, David G., PhD. Medical Director, Special Chemistry at ARUP Laboratories; Assistant Professor of Pathology (Clinical), University of Utah

Litwin, Christine, MD. Medical Director, Immunology at ARUP; Professor of Pathology (Clinical), University of Utah

Petti, Cathy A., MD. Medical Director, Infectious Diseases at ARUP; Associate Professor of Pathology and Medicine, University of Utah

Diagnostic Algorithm(s)

PDF algorithm(s) available at www.arupconsult.com.

Helicobacter pylori Testing Algorithm

Related Content

Zollinger-Ellison Syndrome - Gastrinoma

Comprehensive Review: March 2009

Last Update: March 2009