Helicobacter Pylori in Adult and Pediatric Patients

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Helicobacter Pylori

- Initially discovered in the 1980s
- 50% of the world's population is affected
- Stimulates an Inflammatory and Immune response, meanwhile H. pylori produces an enzyme, catalase, which in turn downregulates the inflammation and therefore H. pylori can live on and proliferate
- Recurrence
  - Socioeconomic Status
  - Sanitary Conditions
- Transmission route unknown
  - Fecal/Oral
  - Oral/Oral

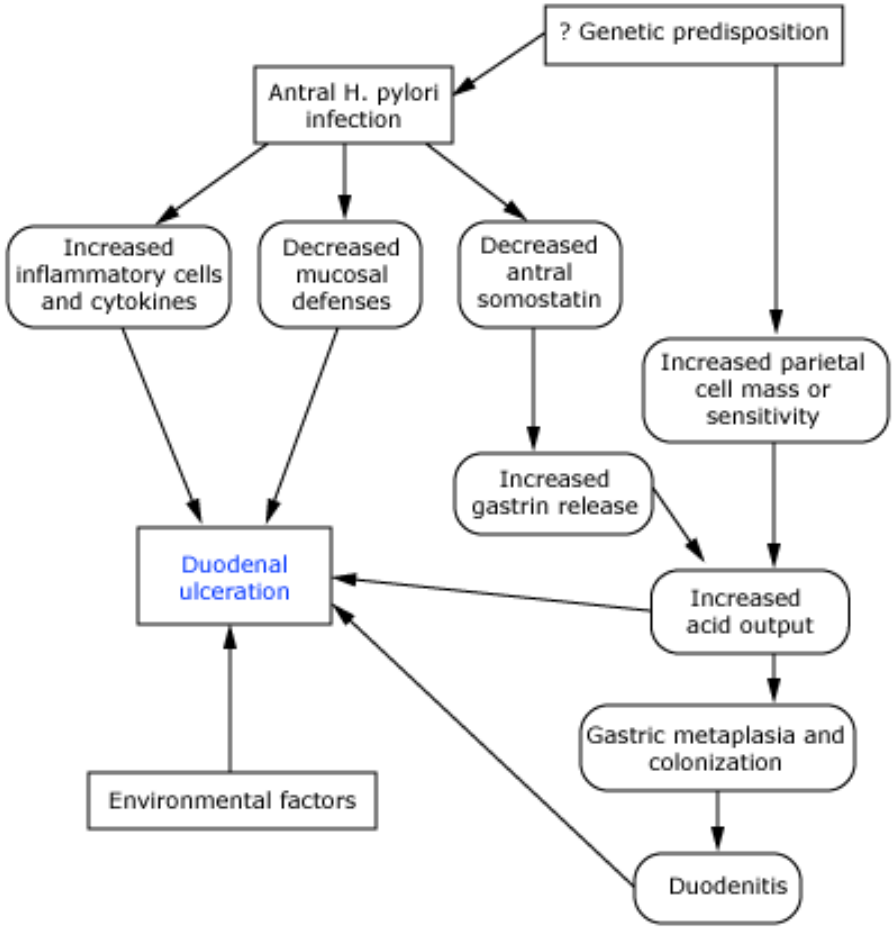
Vaccination

- Over 20 years of research without a definitive answer
- A vaccine did show decreased incidence after 1 year of having been vaccinated but not as effective after 2 to 3 years.
- Therapeutic Immunization
  - Assists in possible spontaneous eradication
  - Aid in providing a more efficacious antibiotic regimen

Helicobacter Pylori Infection

- Acute Gastritis
  - Gastric Antrum
- Chronic Gastritis
  - Gastric Antrum and Body of Stomach
    - Peptic Ulcer Disease
    - Gastric Cancer
    - MALT Lymphoma
- GERD
- Iron and Vitamin B12 deficiency
  - Corrected after H.pylori eradication
- Gastric Adenocarcinoma
  - 36% of gastric cancers in developed countries are due to H. pylori
- Duodenal ulcer
  - Eradication prevents ulcer recurrence
  - H. pylori is the cause of 50%-75% of Duodenal Ulcers in the U.S. that are not related to NSAID use
  - Only 10%-15% of those infected with H.pylori develop ulcer disease
  - Ulcers do not increase risk of gastric cancer

Possible mechanisms of ulcerogenesis in Helicobacter pylori infection



H. pylori: Helicobacter pylori.

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Testing for Helicobacter Pylori

Indications

- Low Grade Gastric Mucosa associated with MALT Lymphoma
- Active PUD or h/o PUD
- Early Gastric Cancer

Other possible indications

- <60 y.o. with dyspepsia and no alarm features
- ITP in adults
- Iron deficiency anemia
  - Due to iron absorption interference by H. pylori

My Clinical Suspicion for Helicobacter pylori

Adults

- Abdominal Bloating
- Halitosis/Thrush
- Regular BMs and low fiber diet
- Acid reflux and/or Heartburn despite avoidance of gastritis triggers
  - Difficult due to common ingestion of coffee

Pediatrics

- Malodorous Flatulence
- Halitosis/Thrush
- Decrease in Appetite
- Weight loss or Deceleration in weight gain on growth chart

Testing for Helicobacter Pylori
Antibodies are Non-Diagnostic

Urea Breath Test

- Subjective
- Off PPI/antacids 2 weeks and off Bismuth for 4 weeks- lack of patient compliance

Stool Antigen

- Inconvenience for patients
- Off PPI/antacids 2 weeks and off Bismuth for 4 weeks- lack of patient compliance

Testing for Helicobacter Pylori

- Upper Endoscopy
  - Endoscopic Abnormality
  - Active bleeding during endoscopy
  - Recent PPI/Bismuth/Antibiotic Use

  - Gastric Biopsy
    - Histology
    - Urease Test
    - Culture and Antibiotic Sensitivity Testing

First-line therapies for *H. pylori* infection

Regimen	Drugs (doses)	Dosing frequency	Duration (days)	FDA approval
Clarithromycin triple‡	PPI (standard* or double dose)	Twice daily	14	Yes¶
	Clarithromycin (500 mg)	Twice daily		
	Amoxicillin (1 gram) **or** Metronidazole (500 mg)	Twice daily (amoxicillin) Three times daily (metronidazole)		
Bismuth quadruple	PPI (standard dose*)	Twice daily	10 to 14Δ	No◇
	Bismuth subcitrate (120 to 300 mg [not available in US] or 420 mg [available in North America and elsewhere as part of Pylera combination pill])[1] **or** Bismuth subsalicylate (300 or 524 mg)[1]	Four times daily		
	Tetracycline (500 mg)	Four times daily		
	Metronidazole (250 to 500 mg)	Four times daily (250 mg)		
		Three to four times daily (500 mg)		
Clarithromycin-based concomitant‡	PPI (standard dose*)	Twice daily	10 to 14	No
	Clarithromycin (500 mg)	Twice daily		
	Amoxicillin (1 gram)	Twice daily		
	Metronidazole or tinidazole (500 mg)	Twice daily		
Clarithromycin-based sequential§‡	PPI (standard dose*) plus amoxicillin (1 gram) for 5 days followed by:	Twice daily	10 (total)	No
	PPI, clarithromycin (500 mg) plus either metronidazole or tinidazole (500 mg) for an additional 5 days	Twice daily		
Clarithromycin-based hybrid¥‡	PPI (standard dose*) plus amoxicillin (1 gram) for 7 days followed by:	Twice daily	14 (total)	No
	PPI, amoxicillin, clarithromycin (500 mg), plus either metronidazole or tinidazole (500 mg) for an additional 7 days	Twice daily		

FDA: United States Food and Drug Administration; PPI: proton pump inhibitor.
* Standard dosing of orally administered proton pump inhibitors include: Lansoprazole 30 mg twice daily, omeprazole 20 mg twice daily, pantoprazole 40 mg twice daily, rabeprazole 20 mg twice daily, or esomeprazole 20 mg twice daily or 40 mg once daily.
¶ Several PPI, clarithromycin, and amoxicillin combinations have achieved FDA approval. PPI, clarithromycin, and metronidazole is not an FDA-approved treatment regimen.
Δ 14 days is recommended. Refer to UpToDate topic on treatment for *H. pylori* infection.
◇ PPI, bismuth, tetracycline, and metronidazole prescribed separately is not an FDA-approved treatment regimen. However, Pylera, a combination product containing bismuth subcitrate, tetracycline, and metronidazole combined with a PPI for 10 days is an FDA-approved treatment regimen.
§ Some North American guidelines do not support the use of sequential therapy.
¥ Hybrid therapy has not been universally endorsed as an option for first-line therapy.
‡ In patients with risk factors for macrolide resistance, clarithromycin-based therapy should be avoided.

Reference:
1. *Fallone CA, Chiba N, Van Zanteri et al. The Toronto Consensus for Treatment of Helicobacter pylori infection in Adults. Gastro 2016; 15:51.*

Salvage therapies for *H. pylori* infection

Regimen	Drugs (doses)*	Dosing frequency	Duration (days)	FDA approval
Bismuth quadruple	PPI (standard dose¶)	Twice daily	14	No△
	Bismuth subcitrate (120 to 300 mg [not available in US] or 420 mg [available in North America and elsewhere as part of Pylera combination pill])[1] **or** Bismuth subsalicylate (300 or 524 mg)[1]	Four times daily		
	Tetracycline (500 mg)	Four times daily		
	Metronidazole (250 to 500 mg)	Three to four times daily		
Levofloxacin triple	PPI (standard dose¶)	Twice daily	14	No
	Levofloxacin (500 mg)	Once daily		
	Amoxicillin (1 gram)	Twice daily		
Concomitant	PPI (standard dose¶)	Twice daily	10 to 14	No
	Clarithromycin (500 mg)	Twice daily		
	Amoxicillin (1 gram)	Twice daily		
	Metronidazole or tinidazole (500 mg)	Two or three times daily		
Rifabutin triple◇	PPI (standard dose¶)	Twice daily	10	No
	Rifabutin (300 mg)	Once daily		
	Amoxicillin (1 gram)	Twice daily		
High-dose dual	PPI (standard to double dose¶)	Three to four times daily	14	No
	Amoxicillin (1 gram three times daily or 750 mg four times daily)	Three to four times daily		

FDA: United States Food and Drug Administration; PPI: proton pump inhibitor.
* Doses are for adults with normal renal function. Dose adjustment is warranted in patients with renal impairment for certain antibiotics (eg, levofloxacin, rifabutin, clarithromycin if end-stage disease).
¶ Standard dosing of orally administered proton pump inhibitors include: Lansoprazole 30 mg twice daily, omeprazole 20 mg twice daily, pantoprazole 40 mg twice daily, rabeprazole 20 mg twice daily, or esomeprazole 20 mg twice daily or 40 mg once daily.
△ PPI, bismuth, tetracycline, and metronidazole prescribed separately is not an FDA-approved treatment regimen. However, Pylera, a combination product containing bismuth subcitrate, tetracycline, and metronidazole combined with a PPI for 10 days is an FDA-approved treatment regimen.
◇ Rifabutin-containing regimens should be reserved for patients with ≥3 previous eradication failures.

Reference:
1. *Fallone CA, Chiba N, van Zanten SV, et al. The Toronto Consensus for the Treatment of Helicobacter pylori Infection in Adults. Gastro 2016; 151:51.*

Adverse Reactions of H. pylori treatments

- Nausea/Vomiting
  - Zofran 4mg PO BID x 14 days
- Diarrhea
- Indigestion
- Abdominal Cramps
- Candidal vaginitis
  - Fluconazole 150mg PO q week x 21 days

Eradication Testing for Helicobacter pylori

- 4 weeks after completion of treatment and 2 weeks after being off PPIs
- Stool Antigen
- Urea Breath Test
- Endoscopy

Questions?