Epidemiology of Peptic Ulcer Disease
Introduction

- Peptic Ulcer Disease (PUD) is disruption of the mucosal integrity of the stomach and/or duodenum leading to a local defect or excavation due to active inflammation.
- The most important contributing factors are *H pylori*, NSAIDs, acid, and pepsin.
- Additional aggressive factors include aspirin, ethanol, smoking, bile acids, steroids, and stress.
- Important protective factors are mucus, bicarbonate, mucosal blood flow, prostaglandins, hydrophobic layer, and epithelial renewal.
  - Increased risk when older than 50 yrs. \(\rightarrow\) decrease protection
- When an imbalance occurs, PUD might develop.

Valle JD. Harrisons principal of internl medicine 19th ed.2015; p.1911
Peptic Ulcers Disease (PUD):

- Gastric Ulcer (GU)
- Duodenal Ulcer (DU)
Gastric Ulcers (GU)

- Incidence increases with age, peak incidence reported in the sixth decade.
- Male > female.
- More common in patients with blood group O.
- Use of NSAIDs - associated with a three- to four-fold increase in risk of gastric ulcer.
- Less related to H. pylori than duodenal ulcers.
- 10 - 20% of patients with a gastric ulcer have a concomitant duodenal ulcer.

Valle JD. Harrisons principal of internl medicine 19th ed.2015; p.1911
Duodenal Ulcers (DU)

- Duodenal sites are **4x** as common as gastric sites.
- Most common in middle age → peak **30-50** years.
- **Male** to female ratio = **2-3:1**
- Genetic link: 3x more common in **1st degree** relatives.
- More common in patients with **blood group O**.
- Associated with increased **serum pepsinogen**.
- **Smoking** is twice as common.
- **H. pylori infection** common → up to 95%.

PUD: global prevalence

- The **annual incidence rates** of PUD were **0.10-0.19%** for physician-diagnosed PUD and **0.03-0.17%** when based on hospitalization data.
- The 1-year **prevalence** based on physician diagnosis was **0.12-1.50%** and that based on hospitalization data was **0.10-0.19%**.
- The majority of studies reported a **decrease in the incidence or prevalence of PUD** over time.
- Incidence of peptic ulcer **increases with age**; gastric ulcers peak in the **fifth to seventh decades** and duodenal ulcers 10 to 20 years earlier. Both sexes are similarly affected.

PUD: Global Prevalence

- The epidemiology of peptic ulcer disease largely reflects the epidemiology of the **2 major aetiologic factors**, *Helicobacter pylori* infection and use of non-steroidal anti-inflammatory drugs (NSAIDs).
- In the developed world, *H pylori* incidence has been slowly declining over the past 50 years and NSAID use has increased. This has resulted in a **decline in duodenal ulcers** and an **increase in gastric ulcers**.
- Peptic ulcers remain common worldwide, especially in the developing world where *H pylori* infection is highly prevalent.

Epidemiology PUD in USA

- **Lifetime prevalence** of PUD is ~10%
  → affects ~4.5 million annually.

- **Age-adjusted hospitalization rate** for PUD decreased 21%: from 71.1/100,000 population (95% CI 68.9–73.4) in 1998 to 56.5/100,000 in 2005 (95% CI 54.6–58.3).

- The hospitalization rate for PUD was **highest** for adults >65 years, **higher for men** than for women.

- The **age-adjusted rate** was **lowest for whites** and **declined for all ethnic** groups, except Hispanics.

- The age-adjusted *H. pylori* hospitalization rate also decreased.

- **Mortality rate has decreased** dramatically in the past 20 years → approximately 1 death per 100,000 cases.

Feinstein LB. Emer Infect Dis. 2010; 16(9):1410.
Epidemiology of PUD in Sweden

- The **prevalence** of PUD was 4.1% (20 GU and 21 DU).
- Epigastric pain/discomfort was *not significant* predictors of peptic ulcer disease.
- Six persons with GU and two persons with DU were **asymptomatic**.
- Eight subjects with DU (38%) lacked evidence of current H. pylori infection.
- Five (25%) of the GU and four (19%) of the DU were **idiopathic** (no use of aspirin or NSAIDs, no H. Pylori infection).
- Smoking, aspirin use, and obesity were risk factors for gastric ulcer; smoking, low-dose (160 mg) aspirin, and H. pylori infection were risk factors for duodenal ulcer.

Population-based endoscopic study in North West of Iran. Gastric and duodenal ulcers were identified in 33 (3.26%) and 50 (4.94%) participants, making an overall prevalence of 8.20%.

Risk factors for gastric ulcer: *H. pylori* (OR 3.1, 95% CI: 2.1-4.7), Smoking (OR 1.8, 95% CI: 1.1-6.8), and NSAIDs (OR 2.8, 95% CI: 1.3-4.4).

Risk factors for duodenal ulcer, in addition to *H. pylori* (OR 5.6, 95% CI: 1.9-8.8), Smoking (OR 2.3, 95% CI: 1.4-6.5), male gender (OR 3.6, 95% CI: 1.2-5.8) and living in an urban area (OR 1.9, 95% CI: 1.1-5.2).

Epidemiology of PUD in China

- PUD were identified in **17.2%** of participants, 62 with GU; 136 with DU.
- The prevalence of *H. pylori* infection was **73.3%** in the total population and **92.6%** among those with PUD.
- H. pylori infection was associated with the presence of PUD (OR **6.77**; 95% CI: 2.85-16.10).
- The majority (72.2%) of individuals with PUD had **none of the upper gastrointestinal symptoms** assessed by the RDQ.
- PUD was not significantly associated with symptom-defined gastroesophageal reflux disease (GERD) (OR **0.80**; 95% CI, 0.32-2.03), reflux esophagitis (OR 1.46; 95% CI, 0.76-2.79) or dyspepsia (OR, 1.69; 95% CI, 0.94-3.04).

Health Impact of PUD in Indonesia

2013:
- Annual Mortality Rate 4.6 / 100,000 people
- Annual Years of Healthy Life Lost 124.4 / 100,000 people
- Change in Annual Years of Healthy Life Lost - 32.6% in the past 20 years

http://global-disease-burden.healthgrove.com/l/51262/Peptic-Ulcer-Disease-in-Indonesia
Kasus PUD di RSUD Dr. Soetomo, 2016

- Jumlah pasien EGD baru = 767 orang
- Jumlah pasien PUD = 131 (17,08%)
- Jumlah pasien dengan GU = 108 (82,44%)
- Jumlah pasien dengan DU = 23 (17,56%)

http://global-disease-burden.healthgrove.com/l/51262/Peptic-Ulcer-Disease-in-Indonesia
Complications of peptic ulcer disease

- **Gastrointestinal bleeding (15%)**
  First manifestation in 20%
  Tarry stools or coffee-ground emesis

- **Perforation (6 – 7%)**
  Sudden onset of severe, generalized abdominal pain
  Penetration into adjacent organ: pancreatitis – gastro-colic fist

- **Gastric outlet obstruction (1 – 2%)**
  Pain worsening with meals, vomiting of undigested food
  Inflammation & edema: resolves with ulcer healing
  Mechanical: endoscopic balloon dilation – surgery

thank you
Comparing Duodenal and Gastric Ulcers
Subjective Data

- Pain—”gnawing”, “aching”, or “burning”
  - Duodenal ulcers: occurs 1-3 hours after a meal and may awaken patient from sleep. Pain is relieved by food, antacids, or vomiting.
  - Gastric ulcers: food may exacerbate the pain while vomiting relieves it.

- Nausea, vomiting, belching, dyspepsia, bloating, chest discomfort, anorexia, hematemesis, &/or melena may also occur.
  - nausea, vomiting, & weight loss more common with Gastric ulcers
Objective Data

- Epigastric tenderness
- **Guaic-positive stool** resulting from occult blood loss
- **Succussion splash** resulting from scarring or edema due to partial or complete gastric outlet obstruction
  - A succussion splash describes the sound obtained by shaking an individual who has free fluid and air or gas in a hollow organ or body cavity.
  - Usually elicited to confirm intestinal or pyloric obstruction.
  - Done by gently shaking the abdomen by holding either side of the pelvis. A positive test occurs when a splashing noise is heard, either with or without a stethoscope. It is not valid if the pt has eaten or drunk fluid within the last three hours.
Differential Diagnosis

- Neoplasm of the stomach
- Pancreatitis
- Pancreatic cancer
- Diverticulitis
- Nonulcer dyspepsia (also called functional dyspepsia)
- Cholecystitis
- Gastritis
- GERD
- MI—not to be missed if having chest pain
Diagnostic Plan

- Stool for fecal occult blood
- Labs: CBC (R/O bleeding), liver function test, amylase, and lipase.
- H. Pylori can be diagnosed by urea breath test, blood test, stool antigen assays, & rapid urease test on a biopsy sample.
- Upper GI Endoscopy: Any pt >50 yo with new onset of symptoms or those with alarm markings including anemia, weight loss, or GI bleeding.
  - Preferred diagnostic test b/c its highly sensitive for dx of ulcers and allows for biopsy to rule out malignancy and rapid urease tests for testing for H. Pylori.
Treatment Plan: H. Pylori

- Medications: **Triple therapy** for 14 days is considered the treatment of choice.
  - Proton Pump Inhibitor + clarithromycin and amoxicillin
    - Omeprazole (Prilosec): 20 mg PO bid for 14 d or
    - Lansoprazole (Prevacid): 30 mg PO bid for 14 d or
    - Rabeprazole (Aciphex): 20 mg PO bid for 14 d or
    - Esomeprazole (Nexium): 40 mg PO qd for 14 d **plus**
    - Clarithromycin (Biaxin): 500 mg PO bid for 14 d **and**
    - Amoxicillin (Amoxil): 1 g PO bid for 14 d
  - Can substitute Flagyl 500 mg PO bid for 14 d if allergic to PCN
  - In the setting of an active ulcer, continue qd proton pump inhibitor therapy for additional 2 weeks.
- Goal: complete elimination of H. Pylori. Once achieved reinfection rates are low. Compliance!
Treatment Plan: Not H. Pylori

- Medications—treat with Proton Pump Inhibitors or H2 receptor antagonists to assist ulcer healing
  - H2: Tagament, Pepcid, Axd, or Zantac for up to 8 weeks
  - PPI: Prilosec, Prevacid, Nexium, Protonix, or Aciphex for 4-8 weeks.
Lifestyle Changes

- Discontinue NSAIDs and use Acetaminophen for pain control if possible.
- Acid suppression—Antacids
- Smoking cessation
- No dietary restrictions unless certain foods are associated with problems.
- Alcohol in moderation
  - Men under 65: 2 drinks/day
  - Men over 65 and all women: 1 drink/day
- Stress reduction
Prevention

- Consider prophylactic therapy for the following patients:
  - Pts with NSAID-induced ulcers who require daily NSAID therapy
  - Pts older than 60 years
  - Pts with a history of PUD or a complication such as GI bleeding
  - Pts taking steroids or anticoagulants or patients with significant comorbid medical illnesses

- Prophylactic regimens that have been shown to dramatically reduce the risk of NSAID-induced gastric and duodenal ulcers include the use of a prostaglandin analogue or a proton pump inhibitor.
  - Misoprostol (Cytotec) 100-200 mcg PO 4 times per day
  - Omeprazole (Prilosec) 20-40 mg PO every day
  - Lansoprazole (Prevacid) 15-30 mg PO every day
Complications

- Perforation & Penetration—into pancreas, liver and retroperitoneal space
- Peritonitis
- Bowel obstruction, Gastric outflow obstruction, & Pyloric stenosis
- Bleeding--occurs in 25% to 33% of cases and accounts for 25% of ulcer deaths.
- Gastric CA
Surgery

- People who do not respond to medication, or who develop complications:
  - **Vagotomy** - cutting the vagus nerve to interrupt messages sent from the brain to the stomach to reducing acid secretion.
  - **Antrectomy** - remove the lower part of the stomach (antrum), which produces a hormone that stimulates the stomach to secrete digestive juices. A vagotomoy is usually done in conjunction with an antrectomy.
  - **Pyloroplasty** - the opening into the duodenum and small intestine (pylorus) are enlarged, enabling contents to pass more freely from the stomach. May be performed along with a vagotomoy.
Evaluation/Follow-up/Referrals

- **H. Pylori Positive:** retesting for tx efficacy
  - Urea breath test—no sooner than 4 weeks after therapy to avoid false negative results
  - Stool antigen test—an 8 week interval must be allowed after therapy.

- **H. Pylori Negative:** evaluate symptoms after one month. Patients who are controlled should cont. 2-4 more weeks.

- If symptoms persist then refer to specialist for additional diagnostic testing.
Peptic Ulcer is a circumscribed ulceration of the gastrointestinal mucosa occurring in areas exposed to acid and pepsin and most often caused by Helicobacter pylori infection.

(Uphold & Graham, 2003)
PUD Demographics in the US

2005:
- Lifetime prevalence is ~10%.
- PUD affects ~4.5 million annually.
- Age-adjusted hospitalization rate for PUD decreased 21% from 71.1/100,000 population (95% confidence interval [CI] 68.9–73.4) in 1998 to 56.5/100,000 in 2005 (95% CI 54.6–58.3).
- Mortality rate has decreased dramatically in the past 20 years
  - approximately 1 death per 100,000 cases

## Clinical comparison of Gastric ulcer and Duodenal ulcer

<table>
<thead>
<tr>
<th>Gastric Ulcer</th>
<th>Duodenal Ulcer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occur in the stomach</td>
<td>Occur in the duodenum</td>
</tr>
<tr>
<td>Epigastric pain 1-2 hours after eating</td>
<td>Epigastric pain 2-5 hours after eating</td>
</tr>
<tr>
<td>Can cause hematemesis or melena</td>
<td>Can cause melena or hematochezia</td>
</tr>
<tr>
<td>Heartburn, chest discomfort and early satiety are commonly seen</td>
<td>Heartburn, chest discomfort are less common but may be seen</td>
</tr>
<tr>
<td>Can cause gastric carcinoma (mostly in the elderly)</td>
<td>Pain may awaken patient during the night</td>
</tr>
</tbody>
</table>
Comparing Duodenal and Gastric Ulcers

- **DUODENAL ULCER**
  - Incidence
  - Age 30–60
  - Male: female 2–3:1
  - 80% of peptic ulcers are duodenal

- **GASTRIC ULCER**
  - Usually 50 and over
  - Male: female 1:1
  - 15% of peptic ulcers are gastric

Shabeel PN. https://www.slideshare.net/shabeelpn/gastic-and-duodenal-disorders
http://bestpractice.bmj.com/best-practice/monograph/80/basics/epidemiology.html