Upper GI: Esophagus and Stomach

Dysphagia

- **Etiology**
  - Obstructions
    - Intrinsic: tumors, strictures, herniations
    - Extrinsic: tumors, ascites, morbid obesity
  - Achalasia: LES dysfunction
  - Functional dysphagia: Neural problems

- **Clinical Manifestations**
  - Discomfort with swallowing
  - Solids or liquids
  - Choking/aspiration

Dysphagia

- **Evaluation**
  - History
  - Barium swallow
  - Manometry
  - Endoscopy

- **Treatment**
  - Behavioral
  - Dilatation/Surgery
  - Thickened diet

Gastroesophageal Reflux Disease

- **Etiology**
  - LES relaxation
  - LES defects
  - Delayed gastric emptying

- **Morphologic changes**
  - Symptoms do not correlate to damage
  - No damage
  - Esophagitis
    - Sustained leads to Barret's esophagus
    - 10% of Barret's leads to esophageal cancer

GERD

- **Clinical Manifestations**
  - Heartburn
  - Regurgitation
  - Chest pain
  - Cough, sinusitis
  - Risk factors
    - Obesity
    - Acidic foods, Foods that relax LES

GERD

- **Evaluation**
  - Barium Swallow
  - pH study
  - Endoscopy

- **Treatment**
  - Lifestyle changes
  - Acid lowering drugs
  - Motility enhancing agents
  - Surgery
Pyloric Obstruction

- **Etiology**
  - Congenital
  - Acquired
    - PUD
    - Duodenitis
    - Cancer
- **Manifestations**
  - Fullness
  - Pain/distension
  - Projectile vomiting

Pyloric Obstruction

- **Evaluation**
  - Manifestations
  - Endoscopy
- **Treatment**
  - Gastric suction
  - Treat PUD
  - Surgery
  - TPN

Gastritis

- **Acute**
  - **Etiology**
    - Helicobacter pylori
    - Drugs, esp NSAIDS
  - **Manifestations**
    - Vague abd pain
    - Tenderness Bleeding
    - Healing occurs spontaneously if conditions are removed
- **Chronic**
  - Usually in older adults
  - Thinning and degeneration of stomach lining
  - Immune
    - Destruction of chief and parietal cells
  - Non-immune types
    - H. pylori
    - Hot liquids

Gastritis

- **Manifestations**
  - Vague
  - Discomfort with food
  - Bleeding
- **Treatment**
  - Underlying conditions
  - Diet
  - Antibiotics

Peptic Ulcer Disease (PUD)

- **Terminology**
  - Superficial ulcers: erosions, no involvement of muscularis
  - True ulcers extend through muscularis; hemorrhage
- **Etiology**
  - NSAIDS
  - H. pylori
  - ETOH
  - Stress

PUD

- Duodenal ulcers – most common
- **Manifestations**
  - Pain begins 30 min - 2 hours after eating
  - Stomach is empty
  - Food-pain-relief
  - Bleeding
  - Remission-exacerbation
PUD

- Duodenal Ulcers
  - Evaluation
    - Barium swallow
    - Endoscopy
    - H. pylori detection
  - Treatment
    - lower acid
    - Treat H. pylori

- Gastric ulcers
  - Similar to duodenal ulcers
  - Usually chronic
  - Often associated with chronic gastritis
  - Sometimes associated with
    - Anorexia
    - Vomiting
    - weightloss

- Stress ulcers
  - Acute peptic ulcers associated with severe illness or systemic trauma
    - Ischemic ulcers: post hemorrhage, burns, heart failure, sepsis, ventilation
    - Curling ulcers: from burns
    - Cushing ulcer: head trauma, brain surgery
  - Surgical treatment of Ulcers

- Post-Gastrectomy Syndrome
  - Dumping syndrome
    - Sudden gastric emptying
    - Decrease in blood volume
    - Manage with diet
  - Alkaline Reflux Gastritis
  - Afferent loop obstruction
  - Diarrhea
  - Weightloss
  - Anemia – Supplement

PUD Risk Factors

- Defensive factors
  - Mucus
  - Bicarbonate
  - Blood flow
  - Prostaglandins

- Offensive factors
  - Helicobacter pylori
  - NSAIDS
  - Gastric acid
  - Pepsin
  - Smoking

Drugs for PUD, GERD
# Overview of drug choices

- **Antibacterials**
- **Antisecretory agents**
  - H2 blockers
  - Proton Pump Inhibitors (PPIs)
- **Mucosal protectants**
  - Sucralfate
  - Misoprostol
- **Antacids**

## Antibacterials

- **H. pylori tests**
  - Breath test
  - Blood test
  - Stool test
  - Biopsy test

- **Antibiotics**
  - Bismuth
  - Clarithromycin
  - Amoxicillin
  - Tetracycline
  - Metronidazole

## H2 Blockers

- Cimetidine (Tagamet)
- Ranitidine (Zantac)
- Famotidine (Pepcid)
- Nizatidine (Axid)

### Mechanism of action
- H2 histamine receptors stimulate gastric acid secretion
- Inhibition causes decreased gastric juices and decreased acid content

### Uses
- Gastric and duodenal ulcers
- GERD
- Zollinger-Ellison Syndrome (gastrin secreting tumor)
- Dyspepsia

### Routes
- Nizatidine can be given PO only
- All others PO and IV

## H2 Blockers

- **Metabolism**
  - Only cimetidine is metabolized by liver
  - Particularly: warfarin, phenytoin, theophylline, lidocaine

- **Adverse effects**
  - Again, cimetidine is only one with significant
  - Antiandrogenic: gynecomastia, impotence, decreased libido
  - CNS: confusion, hallucinations, CNS depression or excitation

- **Moral:** just say no to Cimetidine

## Proton Pump Inhibitors (PPI)

- Omeprazole (Prilosec)
- Lansoprazole (Prevacid)
- Rabeprazole (Aciphex)
- Pantoprazole (Protonix)
- Esomeprazole (Nexium)

### Mechanism
- Inhibits hydronium-potassium pump
- Prevents production of acid
- All cause irreversible inhibition except lansoprazole
PPIs

- **Uses**
  - PUD
  - GERD
  - Prevention of ulcer with NSAIDs
- **Kinetics**
  - PO: All; IV: pantoprazole, lansoprazole
- **Adverse effects**
  - Headaches
  - Nausea
  - Diarrhea
  - Food poisoning?
- **Interactions**
  - Only rabeprazole (digoxin)

Sucralfate

- **Mechanism of action:** forms a gel that adheres to ulcer and protects it
- **Kinetics:** PO with minimal systemic absorption
- **Uses:** Duodenal ulcer
- **Adverse effects:** constipation
- **Interactions:** antacids decrease action, impedes absorption of several other drugs

Misoprostol

- **Mechanism of Action**
  - Prostaglandin E1 analog
  - Stimulates mucus production
  - Reduces acid secretion
  - Maintenance of GI blood flow
  - Non GI: Induce termination; “ripen” cervix
- **Adverse effects:** diarrhea, ABD pain, dysmenorrhea

Antacids

- **Mechanism of Action**
  - Alkaline substances neutralize acid
  - May stimulate prostaglandins
- **Uses**
  - PUD
  - Dyspepsia (indigestion)
  - GERD (symptoms only; does not prevent Barrett’s esophagus)

Antacids

- **Adverse Effects**
  - Constipation and Diarrhea
  - Sodium loading
  - Check renal function before giving Mg containing antacids (CNS toxicity)
- **Interactions**
  - Inhibits absorption of many drugs

Magnesium hydroxide

- **Potent and long acting**
- **Solo:** MOM
- **Combo with ALOH common**
- **Causes diarrhea (often used as laxative)**
- **Avoid in patients with bowel obstruction or surgery**
- **Check renal function**
**Aluminum hydroxide**
- Weaker and slow acting
- Causes constipation
- Rarely used alone. Combine with MgOH
  - Maalox
  - Mylanta

**Calcium carbonate**
- Fast acting and potent
- Potential for rebound
- Calcium source
- Constipation
- Calcium Dioxide gas

**Vomit Reflex**
- Vomiting center
  - Cerebral cortex (fear, anxiety)
  - Sensory signals
  - Vestibular
- Chemoreceptor trigger zone (CTZ)
  - Stomach
  - Small intestine
  - Emetogenic substances
- Antiemetics better at preventing than stopping

**Serotonin receptor antagonists (-setrons)**
- Uses
  - Most effective at preventing chemotherapy vomiting
  - Radiology
  - Surgery
  - PO or IV
  - Effects augmented by adding dexamethasone

**Dopamine Agonists**
- Phenothiazines
  - Promethazine (Phenergan)
  - Chlorpromazine (Compazine)
- Butyrophenones
  - Haloperidol
  - Inapsine
- Metoclopramide
  - Prokinetic

**Serotonin receptor antagonists (-setrons)**
- Adverse effects
  - Headache, diarrhea, dizziness
  - Does not cause EPS
- Agents
  - Ondansetron (Zofran)
  - Granisetron (Kytril)
  - Dolasetron (Anzemet)
Dronabinol (Marinol)

- Nausea & vomiting associated with chemotherapy
- AIDS
- Adverse effects
  - Psychoactive: dysphoria, depersonalization, temporal dissociation
  - Hypotension, tachycardia
- Abuse potential: Schedule III

Other

- Glucocorticoids
  - Not FDA approved
  - Usually used in cancer patients
  - Used in combination, esp with -setrons
  - Methylprednisolone (Solu-medrol)
  - Dexamethasone
- Benzodiazepines
  - Not FDA approved
  - Lorazepam

Motion Sickness Drugs

- Anticholinergic
  - Scopolamine
- Antihistamines
  - Dimenhydrinate (Dramamine)
  - Meclizine (Antivert)
  - Cyclizine (Marezine)
- All work by making the patient drowsy
  - May increase risk of falls

Salicylates

- Sulfasalazine (sulfonamide)
  - Metabolized in intestine
    - 5-ASA
    - Sulfapyridine
- Mesalamine
  - 5-ASA
- Olslazine
- Balsalazide

Prokinetic

- Metoclopramide
  - Actions
    - Suppresses emesis (blocks serotonin)
    - Increases upper GI motility (enhances ACH)
  - Uses
    - Nausea, Postop emesis, Gastroparesis, GERD
  - Adverse effects
    - Sedation, Diarrhea, EPS
- Erythromycin – off label
  - (200mg QID, AC &HS)