Gastrointestinal System: Motility and Gastric Disorders

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Motility Disorders
Dysphagia

Definition
– Difficulty swallowing

Causes
– Mechanical obstruction
  • Intrinsic – tumor, strictures, herniations
  • Extrinsic - tumors
– Functional
  • Neural or muscular disorders
Motility Disorders
Gastroesophageal Reflux Disease (GERD)

Definition
– Reflux of chyme from stomach to esophagus

Pathophysiology
– Abnormal relaxation of lower esophageal sphincter
– Other contributors:
  • ↑ pressure in abdomen – vomiting, coughing, lifting
  • Delayed gastric emptying

Effects
– Severity depends on gastric contents
– Local inflammatory responses in esophageal wall
– Asthma trigger
Motility Disorders

Hiatal Hernia

Protrusion of the upper portion of the stomach through the diaphragm

– Sliding (90%)
  • Stomach and section of esophagus that joins stomach slide through diaphragm

– Paraesophageal
  • Esophagus and stomach stay in normal locations, but a portion of the greater curvature of the stomach herniates through diaphragm.

McCance & Huether, 2010, Figure 39-3
Motility Disorders
Pyloric Obstruction

Definition
– Narrowing or blockage of opening between stomach and duodenum
– Congenital
  • Pyloric hypertrophy / pyloric stenosis (M:F – 5:1)
  • Projectile vomiting
– Acquired
  • Peptic ulcer disease
  • Pyloric carcinoma

Effects
– Initial – vague epigastric fullness
– Progressive – transient nausea and epigastric pain
– Severe – gastric distention, fullness, vomiting
Motility Disorders
Intestinal Obstruction

Definition

– Any condition that prevents flow of chyme through intestinal lumen

– Location
  • Small intestine most common – small lumen

– Simple obstruction
  • Mechanical blockage

– Ileus (paralytic)
  • Failure of intestinal motility
Motility Disorders
Intestinal Obstruction

Common Causes

– Herniation
– Intussusception (telescoping) (infants)
– Torsion (twisting)
– Diverticulosis
– Tumors
– Paralytic ileus
– Fibrous adhesions
Motility Disorders
Intestinal Obstruction

Pathophysiology

– Severity depends on cause and location
– Alterations in acid/base balance
  • Changes in secretion or reabsorption of HCO₃ or HCl acid (location dependent)
– Severe pain
– Constipation/diarrhea
– Ischemia → infarction
Gastritis

Inflammatory disorder of gastric mucosa

- **Acute** - Injury of gastric mucosa
  - Drugs, chemicals, or *H. pylori* infection

- **Chronic** - Chronic inflammation, mucosal atrophy, epithelial metaplasia
  - Antral (more common)
    - Irritating substances or *H. pylori*
    - No ↓ HCl or pernicious anemia
  - Fundal
    - Chronic inflammation - Gastric atrophy - epithelial metaplasia
    - Insufficient acid secretion (loss of chief and parietal cells)
    - Elevated gastrin levels (no HCl = no feedback)
    - Loss of intrinsic factor → ↓ B12 absorption → pernicious anemia
Peptic Ulcer Disease

Break or ulceration in mucosal lining
- Esophagus
- Stomach
- Duodenum

Risk Factors
- H. pylori
- Chronic NSAID use

Types
- Erosions – superficial
- True – extend through muscularis mucosa, damage blood vessels ➔ GI bleeding
Peptic Ulcer Disease: Duodenal Ulcers

Characteristics

– Most frequent type of peptic ulcer
– Generally caused by *H. pylori* or *NSAIDS* use

Other pathophysiology

– ↑ HCl production
  • ↑ mass of gastric parietal cells
– ↑ HCl secretion
  • ↑ serum gastrin levels
  • Smoking
– ↑ HCl in duodenum
  • Rapid gastric emptying
– ↓ duodenal mucosal bicarbonate secretion
Peptic Ulcer Disease: Gastric Ulcers

Pathophysiology

– Generally in antral region
– Caused by *H. pylori*
– ↑ mucosal barrier permeability to H⁺ ion
– Associated with duodenal reflux of bile
– Pain immediately after eating
Peptic Ulcer Disease: Stress-Related Mucosal Disease

Acute peptic ulcers accompanying physiologic stress

– Ischemic
  • Ischemia of gastric and duodenal mucosa
  • Develop rapidly

– Curling ulcers
  • Stress ulcers 2° burn injuries
  • Reduced plasma volume → sloughing of gastric mucosa

– Cushing ulcer
  • Severe head trauma or brain surgery
  • ↓ mucosal perfusion
  • ↑ vagal stimulation → ↑ HCl
Gastrointestinal System Disorders