Lower GI: Large and Small Intestines

Abdominal Pain

- Parietal Pain
  - From parietal peritoneum
  - More intense and localized
  - Usually lateralized
- Visceral Pain
  - From an abdominal organ
  - Vague, usually midline, diffuse
  - May be accompanied by nausea
- Referred Pain
  - Gallbladder: typically back pain between scapulae
  - Worsens as the visceral pain worsens

Diarrhea

- Increase in frequency of defecation; usually accompanied by increase in water content
- >3/day is abnormal
- Other factors
  - Water content
  - Presence of unabsorbed food
  - Presence of unabsorbable materials
  - Bacteria content
  - Intestinal secretions/mucus
  - Children vs. adult

Diarrhea

- Large volume vs small volume
- Etiology
  - Osmotic (large volume)
  - Secretory (large volume)
  - Increased Motility (small or large)
  - Iatrogenic

Diarrhea

- Osmotic (large volume) - nonabsorbable fluid
  - Chemicals: Magnesium, Sulfate, Phosphate
  - Lactase deficiency
  - Loss of pancreatic enzymes
  - Synthetic sugars and sugar alcohols: sorbitol
- Secretory (large volume) - excessive secretion of chloride or bicarbonate fluid or inhibition of sodium absorption
  - Bacterial enterotoxins: cholera, E. coli
  - Neoplasms: gastrinoma, thyroid carcinoma

Diarrhea

- Increased Motility (small or large)
  - Large volume: usually from a lesion
    - Diabetic Neuropathy
  - Small volume: usually from inflammation
    - Ulcerative colitis
    - Crohn's disease
    - Irritable bowel syndrome
    - Fecal impaction
Diarrhea

- Iatrogenic Diarrhea
  - Laxatives
  - Antibiotics
  - Diuretics, Antihypertensives
  - Motility diarrhea (Special name): Surgical resection of the large intestines

Clinical Manifestations

- Acute or chronic
  - **Systemic**
    - Dehydration
    - Electrolyte imbalances
    - Metabolic acidosis (more common) or alkalosis
    - weight loss
  - **Local**
    - Cramping or abd pain
    - Steatorrhea
    - Hematochezia
    - Mucus
    - Eggs (Ova)

Diarrhea Evaluation

- History & Physical
- FOBT, Stool culture & examinations
- ABD radiology
- Colonoscopy
- Electrolytes

Diarrhea Treatment

- Conservative
  - Restore fluid and electrolyte imbalances
  - Nutritional supplements
  - Bulk fiber
- Advanced
  - Antibiotics if C. diff
  - Antidiarrheal Drugs

Diarrhea: Etiology

- Inadequate fiber intake
- Inadequate water intake
- Inadequate exercise
- Too much fiber
- Increased transit time
  - Antihistamines
  - Anticholinergics
  - Opioids
- Behavioral considerations (bowel training)

Constipation

- Normal colon function
  - Absorbs 90% of ~1500 ml of fluid that enters it daily
  - Stool 3x/day - 2x/week
    - Soft without straining
    - Decreased transport time can dehydrate/harden stool
    - Highly individual

Constipation: Role of fiber

- Increase fecal mass (bulk)
  - Absorbs water
    - Treats both diarrhea and constipation
  - Digested by flora
  - 20 - 60gm/day
    - Bran
    - Fruits and vegetables
    - Supplementation

Constipation: Etiology
**Constipation: Manifestations**
- Painful defecation
- Hard stool
- Complications
  - Vasovagal response
  - Hemorrhoids
  - Fecal impaction

**Constipation: Treatment**
- Treatment
  - Behavioral/lifestyle
  - Stool softeners
  - Laxatives
  - Enema
  - Manual disimpaction

**Intestinal Obstructions**
- Simple: mechanical
- Functional: paralysis of intestine
- Etiologies
  - Herniation
  - Intussusception
  - Torsion (volvulus)
  - Diverticulosis
  - Tumor
  - Paralytic ileus
  - Fibrous adhesions

**Intestinal Obstruction**
- Pathophysiology: depends on location, onset, length proximal, ischemia
- Small intestines
  - Accumulation of water and electrolytes proximal
  - Distension
  - Plasma diffusion into lumen
- Large intestines
  - Cecal competence

**Clinical Manifestations**
- Small intestine
  - Bowel sounds hyperactive if complete obstruction
  - Colicky pain 2° distension followed by vomiting
  - Constant if ischemic
  - Functional dehydration, increased hematocrit, hypotension, tachycardia, shock
- Complications
  - Malnourishment
  - Ischemia/necrosis
  - Perforation/sepsis

**Intestinal Obstructions**
- Evaluation
  - History & physical
  - Radiology/ultrasound
  - Replace electrolytes
  - Decompression
  - Surgery
Malabsorption Syndromes
- Maldigestion vs. malabsorption
- Pancreatic Insufficiency
- Lactose intolerance
- Bile Salt Deficiency
- Celiac disease

Pancreatic insufficiency
- Etiology
  - Chronic Pancreatitis
  - Pancreatic carcinoma
  - Pancreatic resection
  - Cystic fibrosis
- Pathophysiology: Maldigestion - particularly fats; loss of bicarb secretion
- Manifestations: Steatorrhea, weight loss
- Treatment: lipase supplementation, amylase

Lactose deficiency
- Etiology
  - Genetic: usually adult onset
  - Acquired: 2° to various intestinal diseases, esp gluten sensitive enteropathy
- Manifestations: bloating, osmotic diarrhea
- Treatment
  - avoidance
  - or lactase supplementation

Bile salt deficiency
- Etiology
  - Obstruction of bile duct
  - Intestinal stasis (bile is deconjugated by bacteria)
  - Diseases of ileum (prevents reabsorption)
- Pathophysiology
  - Bile salts form micelles around fat particles from food
  - Micelles can pass freely through ileum wall
  - Need minimum concentration to form bile salts

Bile Salt Deficiency
- Manifestations: Usually related to loss of fat soluble vitamins
  - A: night blindness
  - D: bone demineralization, fractures
  - E: uncertain effects
  - K: bleeding
- Treatment
  - Increase dietary medium chain triglycerides (cook with coconut oil)
  - Injection of A,D,K

Celiac Disease
- Allergy to Gluten
- Type III allergic reaction
- Inflammation of intestine causes malabsorption
Laxatives

• Indications
  – Constipation
  – Adjunct for Anorectal lesions
  – Adjunct to cardiovascular diseases
  – Antihelminthic therapy
  – Bowel prep
  – Prevent constipation/fecal impaction in at risk patients

• Contraindications
  – Severe abd pain, nausea, cramps
  – S/S appendicitis, enteritis, diverticulitis, ulcerative colitis
  – Acute surgical abdomen
  – Fecal impaction
  – Habitual use (abuse)

Laxative Classification

• Mechanism
  – Bulk forming
  – Surfactant
  – Stimulant
  – Osmotic

• Therapeutic effect
  – Group I: 2 - 6 hours: watery stool (bowel preps)
  – Group II: 6 - 12 hours: semifluid stool (most abused)
  – Group III: 1 - 3 days: soft but solid stool

Bulk forming laxatives: Fiber

• Psyllium, methylcellulose, polycarbophil

• Mechanism
  – Natural or synthetic polysaccharides
  – Form a gel in intestines
    • Traps water
    • Swelling increases peristalsis
  – Group III

Bulk forming laxatives: Fiber

• Indications
  – Temporary treatment of constipation
  – Diverticulosis, irritable bowel syndrome
  – Diarrhea, ileostomy, colostomy

• Adverse effects
  – Esophageal obstruction (take with minimum 8oz water)
  – Fecal impaction

Surfactant laxatives

• Docusate sodium

• Mechanism
  – Lower surface tension
  – Allows water to penetrate
  – Questionable action
    • a) Prevent intestinal water absorption
    • b) Promote water secretion

• Group III
Stimulant Laxatives

• Mechanism
  – Stimulate intestinal motility
  – Increase water in intestine

• Bisacodyl: PO, PR
  – Enteric coated: do not chew or crush; give at
    night for morning surprise; Group II
  – Suppository works in 60 minutes; may cause
    burning, proctitis; Group I

Stimulant Laxatives

• Castor oil
  – Works in small intestine
  – Group I
  – Only used as bowel prep

• Removed from market
  – Phenolphthalein (original Ex-lax)
  – Senna
  – Cascara sagrada
  – Aloe

Osmotic Laxatives

• Mechanism
  – Poorly absorbed substances
  – Cause water to enter the intestine
  – Group I – III depending on agent and dose

• Indications
  – Temporary relief of constipation
  – Bowel prep
  – Purge bowels to remove toxins or parasites

Osmotic Laxatives

• Abuse
  – Purging creates "constipation"
  – Diminish defecatory reflexes
  – Colitis
  – Electrolyte imbalances
  – Dehydration

• Laxative salts
• Polyethylene glycol
• Mineral oil
• Glycerine Suppository
• Lactulose

Laxative salts

• Magnesium citrate, -sulfate, -hydroxide
• Sodium phosphate, -biphosphate
• Potassium bitartrate, -phosphate

• Considerations
  – May cause dehydration
  – Take with fluids
  – Caution in renal patients and heart failure

Polyethylene glycol

• Alone: Miralax: 8 oz version for
  constipation (2-3 days)

• With electrolyte salts: CoLyte; GoLytely: 4
  liter versions for bowel prep (1 hour)
  – Preserves fluid and electrolyte imbalance
  – Can even be used safely in dehydrated
    patients
  – Take 250 - 300 ml q10 min X 2 - 3 hours
Lactulose

- Nonabsorbable sugar
- Digested by bacteria
- Forms mild osmotic
- Promotes secretion of ammonia
  - Used in patients with liver failure/encephalopathy
  - Lactulose and tap water enemas until clear

Antidiarrheals

- Nonspecific Antidiarrheals: reduce motility
  - Diphenoxylate-atropine (Lomotil)
    - Diphenoxylate-Opioid, insoluble in water
    - Very little effect on CNS
    - Only in combination with atropine (Schedule V)
  - Loperamide (Imodium)
    - Structural analog of meperidine
    - Does not absorb well; does not cross BBB
  - Bulk forming agents

Specific Antidiarrheals

- Infectious
  - Most infectious diarrhea does not need specific treatment
- C diff: Vanco and Metronidazole
- Infections that warrant treatment
  - Salmonella
  - Shigella
  - Campylobacter
  - Clostridium

Traveler's Diarrhea:

- E coli most common
- Prevention
  - Don't drink the water
  - Don't eat salads or fruit unless you peel it yourself
  - Pepto-bismol TID
- Treatment
  - Self limiting
  - Loperamide
  - Quinolone
  - Azithromycin