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 alchols: 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
- S/S of infection depending on Etiology
- **Local**
- Cramping or abd pain
- Steatorrhea
- Hematochezia
- Mucus
- Eggs (Ova)

Diarrhea

- **Evaluation**
- History & Physical
- FOBT, Stool culture & examinations
- ABD radiology
- Colonoscopy
- Electrolytes
- **Treatment**
- Conservative
  - Restore fluid and electrolyte imbalances
  - Nutritional supplements
  - Bulk fiber
- Advanced
  - Antibiotics if C. diff
  - Antidiarrheal Drugs

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

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

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, tachycarida, 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

Laxatives

- Contraindications
  - Severe abd pain, nausea, cramps
  - S/S apendicitis, 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, methylcelluluose, 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, -biphospate
- 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
- Azithromcyin