Altered Bowel Habits

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Educational Objectives

• Recognize the impact of diarrhea on world health
• Distinguish between the several types of diarrhea
• Recognize the alarm signs that prompt a more immediate evaluation of diarrhea and constipation
• Describe appropriate therapies for Irritable Bowel Syndrome

Name that movie:
“Your lower intestine!”
Diarrhea

• In the USA, most diarrheas cause inconvenience to the patient

• Worldwide:
  • 1 in 9 child deaths
  • 2nd leading cause of death in children
  • ~2200 child deaths/day, more than AIDS, malaria and measles combined (CDC)
  • Diarrhea kills 760,000 children under age 5 every year (WHO)

Anatomy

• Small intestine has a surface area the size of a tennis court, responsible for absorption of water and electrolytes
• Surface area is created by villi and microvilli
• Duodenum (shortest portion) assists with chemical digestion
• Jejunum absorbs nutrients
• Ileum absorbs bile salts, water, B12 and electrolytes
• Water/electrolytes
  • 9 L/day delivered to duodenum
  • 2 L food
  • 7 L saliva/bile/gastric/pancreatic
  • Small intestine absorbs~7.5 L
  • 1-1.5 L delivered to colon
  • ~90% absorbed by colon
  • ~100 gm-200 gm stool/day

• Small intestine/colon needs normal anatomy with intact mucosa and normal blood flow
• Normal intestinal motility necessary to move intraluminal contents from stomach to rectum
• Motility coordinated by the enteric nervous system (ENS)
• Sphincters: LES, PS, SO, AS (pivotal)

Definition of diarrhea
• High stool frequency (>3/day)
• >200g of stool/day
• Abnormally loose stool
• Not related to incontinence
• Acute < 4 weeks duration
  • Most cases of diarrhea in developed countries are “acute”
• Chronic > 4 weeks duration
Evaluation and Management – Acute Diarrhea

- Self-limited
  - Resolves within 1 week
- Viral gastroenteritis or foodborne illness
  - 90% caused by infection
  - 10% caused by medications, toxins, ischemia
- Supportive care
- Medication review
- Further evaluation if diarrhea fails to resolve in one week
- Antibiotics – generally ciprofloxacin and/or flagyl

5 High Risk Groups

- Travelers – 40% of travelers to Latin America, Asia and Africa develop traveler’s diarrhea
  - Campylobacter
  - Shigella
  - Aeromonas
  - Coronavirus
  - Salmonella
  - Norwalk Virus (think cruise ships)
  - Giardia – Campers, hikers, swimmers

5 High Risk Groups

- Consumers of certain foods
  - Picnic, banquet, restaurant
    - Chicken
      - Salmonella
      - Campylobacter
      - Shigella
    - Hamburger
      - *E. coli* (O157:H7)
    - Rice
      - *B. cereus*
    - Mayonnaise, Eggs
      - Salmonella
      - Seafood
      - *Vibrio*
5 High Risk Groups

- Immunodeficient Persons
  - Common pathogens may cause more severe, protracted illnesses
- AIDS
  - *Mycobacterium*
  - CMV, adenovirus, herpes
  - Cryptosporidium, Isospora

5 High Risk Groups

- Daycare attendess and family members
  - *Shigella*
  - *Giardia*
  - *Cryptosporidium*
  - rotavirus

5 High Risk Groups

- Institutionalized Persons
  - *C. difficile*
Special Features

• Ingestion of preformed toxins or enteroxin producing organisms – profuse diarrhea within hours of ingestion
  • *B. cereus, Vibrio, enterotoxigenic E. coli*, etc.
• Bloody diarrhea (dysentery)
  • *Entamoeba histolytica*
• Reiter’s syndrome
  • Arthritis, urethritis, conjunctivitis
  • *Salmonella, Shigella, Campylobacter, Yersinia*
• Hemolytic-uremic Syndrome
  • *Enterohemorrhagic E. coli* and *Shigella*

Alarm signs

• Severe abdominal pain
• Fevers
• Recent hospitalization or antimicrobial use
• Special populations
  • Elderly
  • Immunocompromised
  • Inflammatory Bowel Disease
  • Pregnant patients

E&M – acute diarrhea, cont.

• Stool culture
• Stool ova and parasite
• Stool leukocytes
• *Clostridium difficile*
• Possible endoscopy
Evaluation and Management – Chronic Diarrhea

- History is key
  - Diarrhea appearance, pattern and duration
  - Changes in diet, medications
  - Recent travel
  - Sick contacts
- Infectious causes of chronic diarrhea are uncommon in immunocompetent people
  - Consider Giardia in patients exposed to young children, or contact with lakes/streams
- 48-72 hour fecal fat collection
- Colonoscopy

Classification of Chronic Diarrhea

<table>
<thead>
<tr>
<th>Category</th>
<th>Clinical Features</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretory</td>
<td>Loose, watery stools</td>
<td>Malabsorption, celiac disease, lactase deficiency</td>
</tr>
<tr>
<td>Steatorrhea</td>
<td>Loose, greasy stools with offensive odor</td>
<td>Small intestine bacterial overgrowth, gastric bypass, achlorhydria, Celiac disease, Whipple’s disease, pancreatic insufficiency</td>
</tr>
<tr>
<td>Inflammatory</td>
<td>Bloody, mucoid, tenacious stools</td>
<td>Infectious (Shigella, Salmonella), inflammatory bowel disease</td>
</tr>
</tbody>
</table>

Steatorrhea

- Fat excretion > 14g/day
- Bulky, oily, malodorous stools
- Weight loss
- Causes:
  - Small intestine bacterial overgrowth
  - Gastric bypass
  - Dysmotility (diabetic enteropathy, etc.)
  - Achlorhydria
  - Diagnosed with hydrogen breath test
  - Treat with antimicrobials
  - Celiac disease – autoimmune disorder
  - Whipple’s disease – infection with T. Whipple
  - Pancreatic insufficiency
Secretory Diarrhea
- Bile acid malabsorption
- Medications
  - NSAIDS, colchicine
- Noninvasive infections (Cholera!)
- Hormone producing tumors (VIPoma, metastatic carcinoid, etc.)
- Key: fails to improve with fasting
- Stool osmotic gap < 50, no steatorrhea

Osmotic Diarrhea
- Usually malabsorption of carbohydrates
  - Lactose intolerance (most common)
  - Also fructose, sorbitol, etc.
  - Laxatives
- Bloating, flatulence
- Key: improves with fasting
- Stool osmotic gap > 100, no steatorrhea

Inflammatory Diarrhea
- Inflammatory Bowel Disease
- Ischemia
- Radiation injury
- Abdominal pain, bleeding, fever, weight loss
Motility-related Diarrhea
- Hyperthyroidism
- Diabetes
- Irritable bowel syndrome
- Rapid transit decreases the amount of time for water absorption

Special considerations in children
- Intussusception
- Hemolytic-uremic syndrome
- Pseudomembranous colitis
  - Community-associated infections reported!
- Appendicitis
  - Kids under 5 are more likely to have diarrhea as presenting symptom
  - Congenital secretory diarrheas
- Antibiotic-associated diarrhea

Constipation
Definition of constipation

- straining during defecation
- passage of lumpy or hard stool
- sensation of incomplete defecation
- use of manual maneuvers to facilitate a bowel movement
- frequency of less than three bowel movements per week
- 16% of Americans use laxatives
- Chronic constipation - symptoms > 3 months

Evaluation and Management of Constipation

- H&P
- Medication review
- Labs (BMP, CBC, TSH)
- Evaluate for secondary causes
  - Transit studies
  - Anorectal manometry
  - Consider colonoscopy or other imaging
  - Alarm signs trigger imaging/scope more rapidly

<table>
<thead>
<tr>
<th>Types of Constipation and Causes</th>
<th>Examples</th>
</tr>
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<tbody>
<tr>
<td>Recent onset</td>
<td>Colonic obstruction, anal fissure</td>
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<tr>
<td></td>
<td>Hemorrhoids, pelvic floor disease, inflammatory bowel disease, irritable bowel syndrome</td>
</tr>
<tr>
<td>Chronic constipation</td>
<td>Constipation-provocative, straining</td>
</tr>
<tr>
<td></td>
<td>Colonic pseudo-obstruction, functional constipation, irritable bowel syndrome, Crohn's disease</td>
</tr>
<tr>
<td>Bowel disorders</td>
<td>Diverticulitis, hemorrhoids, anorectal disease, irritable bowel syndrome</td>
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<tr>
<td>Obstetric disorders</td>
<td>Hypothyroidism, hypercalcemia, pregnancy</td>
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<tr>
<td>Neurologic diseases</td>
<td>Parkinson's disease, multiple sclerosis, spinal cord injury</td>
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<tr>
<td>Systemic diseases</td>
<td>Progressive systemic sclerosis</td>
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Alarm signs
• Age > 50
• New onset constipation in the elderly
• Weight loss
• Family history of colon cancer
• History of abdominal or pelvic cancer
• History of abdominal or pelvic radiation
• History of colonic resection
• Palpable mass on exam

E&M continued
• No cause found in 90% of cases
• Types of laxatives:
  • Bulk forming - psyllium
  • Osmotic – milk of magnesium, magnesium citrate, lactulose, polyethylene glycol
  • Prokinetic – lubiprostone, linactolide (severe constipation)
  • Secretory – castor oil
  • Stimulant - bisacodyl

Constipation in Children
• Common
• 95% related to "functional" constipation
• Diagnostic Criteria (meet at least 2 of the following)
  • 2 or fewer defecations/week
  • One episode of fecal incontinence/week
  • Retentive posturing or volitional stool retention
  • Pain or hard BMs
  • Large fecal mass in rectum
  • Large diameter stools which may obstruct toilet
Other causes

- Cow’s milk intolerance, celiac disease, hypothyroidism
- Urgent causes
  - Botulism, Hirschsprung disease, cystic fibrosis, lead poisoning, intestinal obstruction
- DRE usually not required
- History usually provides all needed info
- Abdominal imaging, enemas, etc as history dictates

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Irritable Bowel Syndrome
The worst of both worlds.

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IBS

- Effects 10-15% of population
- Criteria:
  - Recurrent abdominal pain 3 days/month
  - 2 or more of the following:
    - Improvement with defecation
    - Change in frequency of stool
    - Change in appearance of stool
- Further testing is unnecessary unless alarm symptoms
  - anemia; weight loss; and family history of colorectal cancer, IBD, or celiac disease
IBS Management

- Establish diagnosis
- Dietary changes (identify trigger foods)
- Pharmacologic therapy based on stool pattern
  - Constipation – psyllium, miralax
  - Diarrhea – loperamide
  - TCAs, SSRIs
- Cognitive behavioral therapy, probiotics

Adapted from Dr. Michael Klamut’s lecture Altered Bowel Habits