Diarrhea

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Digestive Diseases

Test-taking reminders

- Pay attention to the demographics!
  - Most info is there for a reason
  - Pt demographics will represent a typical or common presentation of diseases, not a rare or exceptional form
- Look at the answers early
- Eliminate the obvious wrong answers
- 2 very similar answers: choose one
- Criteria for “best” includes high-yield, noninvasive, cost-effectiveness
- Go back and check your answer against the case

Clinical classifications of diarrhea

- Time: acute vs chronic
- Volume: large vs small
- Pathophysiology: secretory vs osmotic
- Epidemiology: epidemic vs travel vs immunosuppressed
- Stool characteristics: watery vs fatty vs inflammatory

Acute vs chronic

- Acute diarrhea lasts < 4 weeks
- Usually infectious
  - Rarely are infections chronic, eg Giardia, immunocompromised pts
- Medications
- Toxins
- Beginning of a chronic disease

Large vs small volume

- Frequent small volume stools imply distal inflammation or functional disease
  - Limited to morning => IBS
  - All day + nocturnal => inflammation (proctitis)
- Somewhat less frequent but large volume implies proximal colon or small bowel source, perhaps secretory in nature
- Patients’ estimates are often high but clinical dehydration occurs with >1L daily losses

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Figure 12
Osmotic vs secretory

- Osmotic diarrhea results from the ingestion of some poorly absorbed substance
  - Usually stops with fasting
  - Most of the stool osmolality is due to the substance
- Secretory diarrhea is due to secretion of electrolytes (Cl\(^-\), Na\(^+\)) into the lumen
  - Most of the stool osmolality is due to the electrolytes

Ddx—Acute diarrhea

- Infection—most likely clinically
  - Bacterial (think of C. diff, E. coli, exposures)
  - Viral (Norwalk agent in adults)
  - Protozoal: identify by exposure, epidemiology
  - Parastic: and immune status
- Food poisoning—know the timing/toxins
- Medications—know the common ones
- Initial presentation of chronic diarrhea

Ddx—Chronic diarrhea

- Watery
  - Osmotic
    - Laxatives—all forms of Mg, Phos, Sulfates
    - Carbohydrate malabsorption
      - Dietary sugar alcohols: xylitol, mannitol, sorbitol
      - Acquired forms such as lactose intolerance
      - Stool osm\(=290-2(\text{[Na]}+\text{[K]})\)
      - Large osmotic gap (>100) implies that most of the osmolality is due to an unmeasured (nonelectrolyte) substance

Ddx—Chronic diarrhea

- Secretory
  - IBD
  - Bile acid malabsorption (post surgical)
  - Abnormal motility: IBS, diabetic autonomic neuropathy, medication related, scleroderma
  - Endocrinopathies: hyperthyroidism, carcinoid, other rare neuroendocrine tumors

Ddx—Chronic diarrhea

- Inflammatory
  - IBD: UC, Crohn ds, lymphocytic colitis, collagenous colitis
- Infectious
  - Invasive bacteria such as C. diff, Tb, Yersinia
  - Ulcerating viral ds: CMV, HSV
  - Parasites: Giardia, amebiasis
Ddx—Chronic diarrhea

- **Steatorrhea**
  - Malabsorption syndromes: usually SB
    - Mucosal diseases: Celiac, Crohn, Whipple
    - Bacterial overgrowth
    - Lack of surface area or fast transit
  - Malabsorption syndromes
    - Pancreatic exocrine insufficiency: chronic pancreatitis, cystic fibrosis, post-surgical
    - Lack of bile acids: post-cholecystectomy, chronic cholestatic disease

Case 1

* A 32 yo woman c/o intermittent loose stools, abd bloating and discomfort for 6 mos.
  - Chronic
  - Intermittent makes infection, tumor unlikely
  - Bloating suggests IBS, carbohydrate malabsorption

- **Labs**
  - Hb 10.8 Hct 31, WBC 6.0
  - Fe sat 11%, ferritin 8; folate & B12 wnl
  - Colonoscopy: nl appearance throughout.
  - Bx: terminal ileum nl; right and left colon show slightly increased intraepithelial lymphocytes, nl architecture, no PMN or eosinophils

- **What is the most likely dx?**
- **Which test is most likely to give the correct dx?**
  - ASCA and ANCA serologies
  - Abd CT with pancreatic protocol
  - Serum Anti-gliadin Ab
  - Serum tissue transglutaminase
  - Stool studies for WBC, O & P, culture

Case 1

* PMH: includes anemia and osteopenia
  * FH: one sister has "stomach problems"
  * SH: no Tobacco or EtOH
  * ROS: no fevers, wt loss, joint sx
  * PE: petite, BMI 14. Abd exam unremarkable, rectal nl, heme -, extrem-slight rash left leg

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Celiac disease

- Prevalence 1 in 100 to 1 in 150 in US
- Immune response to wheat gluten results in destruction of SB villi
- Duodenum is most involved
- Strong association with other autoimmune diseases such as DM, thyroid ds
- Associated with dermatitis herpetiformis
- May also have abnormal liver tests, infertility, CNS disease, arthritis

Case 2

- A 72 yo man c/o diarrhea, diffuse abd pain and malaise for 3 days.
  - He underwent cholecystectomy one week ago. He is on multiple new medications post-op.
  - He has no other GI hx

Case 2

- PE: moderately ill appearing, afebrile abd slightly distended, active BS, slightly tender (nonfocal), FOBT –
- Labs: Hb 13.4, Hct 39, WBC 25,000
- Chemistry nl

What is your Dx?

What should you do next?
- Order HIDA to look for post-cholecystectomy bile leak
- Order angiogram to evaluate intestinal blood flow
- Send stool for C. diff toxin
- Panculture and start broad spectrum IV abts
- Stop all new meds, start imodium
**Clostridium difficile infection**

- Most often after antibiotics but increasingly no obvious risk factors
- Guidelines recommend:
  - Metronidazole 500mg po tid x 10-14d for mild disease
  - Vancomycin 125mg po qid x 10-14d for moderate or second episode
  - Can add IV metronidazole and vanco enemas for severe disease
  - Reports of successful treatment with fecal transplantation (need IND)

**Infectious causes of diarrhea**

- **Bacteria**
  - E. coli (ETEC, EHEC)
  - Campylobacter
  - Salmonella
  - Shigella
  - Clostridium difficile
  - Yersinia
  - Aeromonas

- **Viruses**
  - Norovirus
  - Adenovirus
  - Rotavirus
  - CMV (HSV)

- **Parasites**
  - Entamoeba histolytica
  - Giardia lamblia
  - Cryptosporidium
  - Cyclospora
  - Microsporidia

**Medications associated with diarrhea**

- Antacids (esp Mg)
- Antiarrhythmics
- Antibiotics (most)
  - Esp ampicillin, erythromycin
- Anti-inflammatory
  - Esp NSAIDs, 5ASA
- Antiretrovirals
- Chemotherapies
- Antidepressants
  - Esp SSRIs
- Acid suppressors
  - Esp PPIs
- Colchicine
- Misoprostol
- Vitamin and herbal supplements

**Specific patient populations**

- **Travelers**
  - Acute bacterial infxn
  - Protozoa, esp Giardia and Amoeba

- **Epidemics/outbreaks**
  - Food=>bacterial
  - Viral=>rotavirus, Norwalk agent
  - Cryptosporidiosis

- **Pts with AIDS**
  - Opportunistics
  - Meds
  - SB Lymphoma

- **Diabetic patients**
  - Altered motility
  - SB overgrowth
  - Meds, esp acarbose and metformin

- **Institutionalized or hospitalized pts**
  - Medications
  - C. diff colitis
  - Tube feeding
  - Ischemic colitis
  - Fecal impaction with overflow

**Food-associated enteric infections**

<table>
<thead>
<tr>
<th>Organism</th>
<th>Common vehicles</th>
<th>Median incubtn</th>
<th>Median duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacillus cereus</td>
<td>Fried rice, cream, meat</td>
<td>2 hr</td>
<td>1/2-1 d</td>
</tr>
<tr>
<td>Campylobacter jejuni</td>
<td>Milk, beef, chicken</td>
<td>48 hr</td>
<td>7 d</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>Beef, turkey, chicken</td>
<td>12 hr</td>
<td>1 d</td>
</tr>
<tr>
<td>E. coli</td>
<td>Salads, beef</td>
<td>24 hr</td>
<td>3 d</td>
</tr>
</tbody>
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<tbody>
<tr>
<td>Listeria monocyt.</td>
<td>Milk, dairy raw veggies, slaw</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Salmonella</td>
<td>Eggs, meat, poultry</td>
<td>24 hr</td>
<td>3 d</td>
</tr>
<tr>
<td>Shigella</td>
<td>Milk, salads (tuna, chicken)</td>
<td>24 hr</td>
<td>3 d</td>
</tr>
<tr>
<td>Staph aureus</td>
<td>Ham, pork, canned beef, cream pastry</td>
<td>3 hr</td>
<td>1 d</td>
</tr>
<tr>
<td>Yersinia enterocol.</td>
<td>Chocolate, raw milk pork</td>
<td>72 hr</td>
<td>7 d</td>
</tr>
</tbody>
</table>
C diff Treatment Guidelines

- Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 Update by the Society of Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (ISDA).
- Infection Control and Hospital Epidemiology May 2010, Vol 31, No 5, pages 432-455.

Questions?

- Thanks very much and good luck!