Acute Diarrhea

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Diarrhea Definition

- **Formal definition: Stool weight >200g/day**
- **Practical definition:**
  - **≥ 3 loose/watery stools/day**
  - **Decrease in consistency AND increase in frequency *from the patient's norm***
    - **Acute: 2 weeks or less**
    - **Persistent: 2-4 weeks**
    - **Chronic: > 4 weeks**

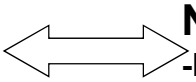
Normal Bowel Frequency

3 times/day → 3 times/week

Acute Diarrhea

INFECTIOUS (GASTROENTERITIS)

-Self-limited
1. Viruses
2. Bacteria
3. Protozoa



Non-Infectious (5%)

-Persistent/chronic
1. Drugs
2. Food allergy/intolerance
3. Other disease states
4. Primary GI disease

Initial Evaluation

- Duration of symptoms
- Frequency
- Stool characteristics
- Signs/symptoms of volume depletion
- Fever
- Peritoneal signs
- Extraintestinal symptoms

Food History

- Exposure to particular type of food associated with foodborne disease (in the week preceding illness)
- Time interval between exposure and onset of symptoms

Social History

- Quit smoking (UC flare, OTC nicotine)
- Alcohol
- Illicit drugs
- Sexual history: MSM, anal intercourse
- Occupation (exposures)
- Travel
- Pets
- Recreational activities

Important Clues in Acute Diarrhea

Small bowel vs Large Bowel

- Small Bowel
  - Large volume
  - Watery
  - Abdominal cramping, bloating, gas
  - Weight loss
  - Rarely fever
  - Negative occult blood and stool WBC
- Large Bowel
  - Small volume
  - Frequent
  - Painful bowel movements
  - Bloody/mucoid
  - Fever
  - Positive occult blood and stool WBC

Differential Diagnosis of Bloody Diarrhea

1. Shiga toxin producing E.coli (O157:H7)
2. Shigella
3. Salmonella
4. Campylobacter
5. Clostridium difficile
6. Ischemic colitis
7. Inflammatory Bowel Disease
8. Entamoeba Histolytica

Acute Diarrhea with Fever

Indicates intestinal inflammation

1. **Invasive Bacteria**
   -Salmonella, Campylobacter, Shigella
2. **Enteric viruses**
   -Norovirus, Rotavirus, Adenovirus
3. **Cytotoxic organism**
   -C. diff, E. histolytica

   ***Enterohemorrhagic E. coli fever is absent or low grade (EHEC/STEC)**
4. **Inflammatory bowel disease**
5. **Severe ischemic colitis**

Indications for Medical Evaluation of Diarrhea: Severe Illness

- **Profuse watery diarrhea with dehydration**
- **Passage of many small volume stools with visible blood and mucus (dysentery)**
- **Fever (≥38.5°C or 101.3°F)**
- **≥6 unformed stools/24h or >48h duration**
- **Severe abdominal pain**

Indications for Medical Evaluation of Diarrhea

- Elderly (≥ 70yo)
- Immunocompromised
- Signs/symptoms of systemic illness along with diarrhea (esp. pregnant women—suspect listeriosis)
- Hospitalized patients or recent use of antibiotics

When to Obtain Stool Cultures

- Severe Illness
- Patients with comorbidities that increase the risk for complications
- Underlying IBD
- Occupation (daycare workers or food handlers) requires negative cultures to return to work
- Untreated persistent diarrhea
- (+) stool WBC, lactoferrin, or occult blood

Ordering Stool Cultures

- **Routine**
  - **Salmonella**
  - **Shigella**
  - **Campylobacter**
  - **Yersinia (most strains) ***
  - **E.coli O157:H7****
  - **Aeromonas and Plesiomonas ***

***Grow on routine culture but notify lab as frequently overlooked**

****Specific order for other Shiga toxin producing E.coli**

Ordering Stool Cultures

- **One time is sufficient**
  - **Continuous excretion of pathogens**
- **Require specific orders:**
  - **Shiga toxin producing E.coli**
  - **Vibrio**
  - **Listeria**

Bacterial Gastroenteritis (Foodborne Illness)

Salmonellosis

- Non-typhoidal salmonella
- Leading foodborne disease in the U.S.
- Transmission: poultry, eggs, milk products, produce, raw meats, pets/animals
- Incubation: 8-72 hrs

Salmonellosis

- Symptoms: watery diarrhea, fever, cramps, vomiting (colitis less common)
- Duration: 4-10 days
- Treatment in healthy persons with mild symptoms may prolong excretion

Salmonellosis Complications

- Bacteremia (5%)
  - Endovascular infections (arteritis, aortitis, mycotic aneurysms, stent/graft infections)
  - Orthopedic prostheses
  - Prosthetic heart valves
  - Osteomyelitis in sickle cell patients

Campylobacter

- C. jejuni or C. coli
- 2nd leading cause foodborne disease U.S.
- Transmission: poultry/cross-contamination, unpasteurized milk, animals

Campylobacter

- Incubation: 2-5 days
- Symptoms: Watery or hemorrhagic, fever, cramps, vomiting
- Duration: 2-7 days
- Complications: reactive arthritis and Guillain-Barré syndrome

Shigellosis

- S. sonnei or S. flexneri
- Transmission: person to person; contaminated water or food (raw vegetables, salads, sandwiches)
- Increased risk: children (toddlers); daycares and institutional settings

Shigellosis

- Incubation: 3 days (1-7)
- Symptoms: watery progressing to dysentery (bloody/mucoid), fever, tenesmus, N/V
- Duration: 2-7 days
- Complications: HUS and TTP (children)

Enterohemorrhagic E.coli (Shiga-toxin producing E.coli)

- (EHEC/STEC)
  - O157:H7 most common serotype
- Transmission: undercooked ground beef, unpasteurized, cattle, petting zoos/exhibits
- Two-thirds cases June-September
- Incubation: 1-7 days

EHEC

- Symptoms:
  - Watery diarrhea→hemorrhagic
  - Abdominal pain
  - Absent/low grade fever
- Few or no fecal leukocytes
- Rx: NO ANTIBIOTCS OR ANTI-PERISTALTIC AGENTS

HUS and TTP

- **Life threatening complication of STEC**
  - **5-10%**
  - **Children, elderly (40% mortality)**
- **Clinical diagnosis**
  - **Bloody diarrhea**
  - **Microangiopathic Hemolytic Anemia**
  - **Purpura/thrombocytopenia**
  - **Anuria/Acute renal failure**
  - **Neurologic symptoms**

Rx: supportive care, dialysis/plasmapheresis (<10% mortality)

Yersinia

- **Y. enterocolitica (U.S), Y. pseudotuberculosis (Europe)**
- **Uncommon; undercooked pork, unpasteurized milk, contaminated water**
- **Self-limiting enterocolitis**
  - **Watery or bloody diarrhea**
  - **Fever**
- **Self-limiting terminal ileitis (pseudoappendicitis)**
- **Increased risk of infection in hereditary hemochromatosis (siderophilic bacteria)**

Empiric AntibioticTreatment for Acute Diarrhea

- Fever and bloody stools
- Fever and hemoccult, fecal leukocyte or lactoferrin positive stools
- >8 stools/d
- Volume depletion
- >1 week duration
- Hospitalization being considered
- Immuncompromised

Empiric Antibiotic Treatment

- *Fluoroquinolone x 3-5 days
  - Cipro 500mg BID
  - Norfloxacin 400mg BID
  - Levofloxacin 500mg qd

* Avoid in EHEC

- If suspect campylobacter:
  - Azithromycin 500mg qd x 3d
  - Erythromycin 500mg po qd x 5d

Anti-Diarrheal Agents

Loperamide

- **Drug of Choice when stools are nonbloody and fever is low grade or absent and low suspicion of C. diff**
  - **Significant reduction in stools when combined with cipro**
  - **Dose: 2 tabs initially (4mg), then 2mg *after each* unformed stool (max 16mg/d) for <= 2 days**

***Could facilitate HUS in EHEC**

****Aggresively hydrate as fluid loss may be masked by pooling in the intestine**

Lomotil (Diphenoxylate and Atropine)

- 2 tabs (4mg) qid <= 2 days
- Central opiate effects
- Cholinergic side effects

*Could facilitate HUS in EHEC

**Aggresively hydrate as fluid loss may be masked by pooling in the intestine

Bismuth Subsalicylate (Pepto-Bismol)

- Consider in patients with febrile bloody diarrhea
- Improves vomiting
- 30mL or 2 tabs q 30 min x 8 doses

Clostridium difficile

- Antibiotic associated colitis
- Most common nosocomial infection
  - > 3 million hospital infections U.S/yr
  - 10% patients hospital admission >48hrs
- Rising incidence
- Occuring outside hospitals (20,000/yr)
- IBD patients without antibiotics

Risk Factors for C.diff

- Antibiotics
- Advanced age
- Hospitalization
- Severe illness
- Cancer chemotherapy
- Gastric acid suppression

Severe CDAD

- Systemic toxicity
  - Fever
  - Abdominal tenderness
  - Acute mental status changes
- WBC >15k
- Albumin <2.5
- Elevated Cr
- Age >60

C.Diff Testing

- One time testing is sufficient
- C. diff toxin PCR:
  - Highly sensitive and specific
  - Rapid
- EIA C.diff toxin A/B
  - Less sensitive
  - Variation: GDH +, cytotoxicity on + samples only
  - Only repeat if neg and clinical suspicion remains high

C.Diff Treatment

- Stop inciting abx ASAP
- Mild/Moderate: Flagyl 500mg PO TID x 10-14d
  - IV only when not able to tolerate po
- If severe: Vancomycin 125mg po qid x 10-14d (enemas if ileus) +/- IV Flagyl
  - Consult ID
- If underlying infection requiring abx
  - Continue for additional week after completion
- Repeat initial antibiotic for initial recurrence if of same severity
- Tapered or pulse regimen vancomycin for 2nd or later recurrences

C. Diff and PPI Use

- FDA warning Feb. 2012
  - Evaluate the clinical necessity
  - Use lowest dose and shortest duration
  - H2B being reviewed

Traveler's Diarrhea (TD)

- **Low risk: US, Canada, Australia, Northern and Western Europe**
- **Intermediate risk: Eastern Europe, Carribean, S. Africa, China, Russia**
- **High risk: Africa, Asia, Middle East, Central and South America**

TD Preventive Measures

- **Eat freshly cooked foods that are steaming hot (avoid buffets and street vendors)**
- **Avoid salads (washed in water)**
- **Avoid unpeeled fruits and veggies**
- **Avoid tap water, ice/beverages diluted with water**
- **Safe beverages: bottled and sealed, carbonated**
- **Carry alcohol-based (60%) hand cleaner**

Traveler's Diarrhea

- 80-90% bacterial
- Enterotoxigenic E. coli
- 80% watery diarrhea
- 5-10% dysentery (Shigellosis, Campy)
- Course: 1-2 -7 days
- Important cause of post-infectious IBS

TD Prophylaxis

- High risk hosts
- Critical trips
- High risk areas

1) Bismuth 2 tabs qid (<3 weeks)
2) Antibiotic prophylaxis
   - Ciprofloxacin 500mg once daily
   - Rifaximin ?
3) Insufficient evidence for probiotics

TD EmpiricTreatment

- **Loperamide +**
  - **Ciprofloxacin 500mg bid 3-5 days**
  - **Norfloxacin 400mg bid 3-5 days**
  - **Azithromycin 1000mg x 1 or 500mg day 1, 250mg day 2-4**
  - **Rifaximin 200mg TID x 3d***

***Approved for noninvasive E.coli**

VIRAL GASTROENTERITIS

Norovirus (Norwalk-like)

- Most common cause of GE in U.S. (stomach flu)
  - Familial and community outbreaks
- Acute explosive vomiting (children) and watery diarrhea (adults)
- Transmssion: person to person, prepared foods, produce, shellfish
- Incubation: 12-48hrs
- Duration: 2-3 days

Parasites

Giardiasis

- Giardia lamblia
- Most common parasitic cause of diarrhea in the U.S.
- Risk factors:
  - campers/hikers/travelers
  - Institutional exposure (nursing homes, day cares)
  - Food/waterborne
  - Unprotected anal sex, MSM
  - HIV/AIDS

Giardiasis

- Symptoms:
  - Abdominal pain
  - Profuse watery diarrhea
  - Excess flatulence
  - Sulfur tasting burps
  - Distended abdomen/bloating
  - Loss of appetite
  - Nausea
  - Vomiting
  - Low grade fever
  - Headache

Giardiasis

- Incubation: 7-14 days
- Duration: One to several weeks
- Long term complications: malabsorption (steatorrhea) and weight loss
- Dx: stool antigen (EIA), O&P (cysts)
- Rx: metronidazole 250mg TID x 5 days

Giardiasis: Persistent Diarrhea

- Consider empiric treatment for Giardiasis in immunocompetent hosts
  - *Flagyl may also be affecive against small bowel bacterial overgrowth syndrome—seen after enteric infections and also a cause of persistent diarrhea

Cryptosporidiosis

- C. parvum
- Transmission
  - contaminated drinking or swimming water or food
  - person to person (households, sexual partners, daycares, healthcare workers)
- Incubation: 1 week (up to 4 weeks)

Cryptosporidiosis

- Self-limited (1-2 weeks)
  - severely dehydrating watery diarrhea
- Dx: Stool Ag (EIA), acid fast staining of stools
- Rx: usually symptomatic
  - Nitazoxanide 500mg po BID x 3 days

Cyclosporosis

- C. cayetanensis
- Transmission: contaminated food and water; outbreaks (raspberries and basil) and sporadic
- Nepal, Peru, Haiti, Guatemala
- Incubation: 7 days (2-14)

Cyclosporosis

- Sx:
  - Watery diarrhea
  - Intense fatigue and malaise
  - Loss of appetite
  - Wt loss
  - Abdominal cramping
  - Nausea
  - Gas/flatulence
- Duration: can last more than 3 weeks
- Relapses
- Dx: Acid fast O&P (specific request)
- DOC: TMP/SMX 160/800 bid x 7-10 days

Amebiasis

- Entamoeba histolytica
- Risk factors:
  - Migrants and travelers
    - Crowded tropical areas (Africa, Mexico, India, parts S. America)
  - Institutionalized patients
  - MSM
- Incubation: 7-10 days
- Duration: 2 weeks, relapses if untreated

Amebiasis

- Mild diarrhea
  - 3-8 semiformed stools
  - Occasional passage of blood and mucus
  - Fatigue
  - Gas
  - Tenesmus
- Severe dysentery (alcoholics, corticosteroids, pregnancy, young/elderly, cancer, malnourished)
  - 10-20 bloody liquid stools/day
  - Abdominal tenderness
  - Fever
  - Vomiting
- Hematologic spread:
  - Liver
  - Lungs
  - Brain

Amebiasis

- **Dysentery with few leukocytes**
- **Dx: stool antigen EIA, trophozoites stool**
- **Rx: Metronidazole**

Indications for Stool O&P

	Giardia lamblia	Cryptosporidium	Entamoeba	Cyclospora
Persistent diarrhea	X	X	X	
Travel to Russia, Nepal, or mountainous regions	X	X		X
Exposure to infants in daycare	X	X		
MSM	X		X	
Waterborne outbreak	X	X		
Bloody diarrhea, few or no fecal leukocytes			X	

Ordering Ova & Parasite

- **Screen: EIA stool antigens**
  - **Giardia**
  - **Cryptosporidium**
  - **E. histolytica**
- **Comprehensive: Travel hx or Immunocompromised**
  - **Smears**
  - **Wet preps**
  - **Stains**
- **Three specimens separated by 24 hrs (intermittent excretion)**

Food Handlers

All known causes of infectious diarrhea require rx or additional testing after cessation of diarrhea:

1) Salmonella, Shigella, STEC, Yersnia : 2 neg. stool samples

2) Campylobacter: 2 neg. samples or 48h rx

3) Giardia: 72hrs of Rx or 3 neg. stool samples

4) Cryptosporidium: 3 neg. samples

5) Amebiasis: 3 negative stool samples

6) Cyclospora: Rx begun

Other High Risk Occupations

- Daycare (child/adult)
- Health Care
- Same rules as food handlers except no Rx or stool testing required:
  - Salmonella
  - Campylobacter
  - Yersinia
  - Cryptosporidium

Ohio Reportable Diseases

- Notify your local health department
  - By the end of the next business day:
    - Salmonella
    - Shigella
    - Shiga toxin producing E.coli
    - Hemolytic uremic syndrome
    - Cyclosporiasis
  - By the end of the work week
    - Campylobacter
    - Cryptosporidiosis
    - Giardiasis
    - Non-cholera vibrio

Indications for Endoscopy in Acute Diarrhea

- Colonoscopy:
  - Distinguish IBD from infectious diarrhea
  - Unclear colitis, evaluate ischemia
  - Aid in diagnosis of C. diff (not as common)
  - Colitis in immunocompromised (CMV, HSV)
  - Suspicion of amebiasis with negative stool
  - GVHD in bone marrow transplant patients

Indications for Endoscopy in Acute Diarrhea

- EGD/flex sig:

  -Immunocompromised to evaluate for opportunistic infections (- stool cx, - o&p)

  -Persistent diarrhea not responsive to empiric rx or negative stool pathogens

CAREFUL HANDWASHING WITH SOAP AND WATER FOR 20 SECONDS ESPECIALLY AFTER USING BATHROOM FACILITIES

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Chronic Diarrhea

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Chronic Diarrhea

- **Chronic diarrhea is a clinical challenge, and can be frustrating to evaluate, and the differential diagnosis can be vast.**
- **Definition: Presence of decreased stool consistency for more than 4 weeks duration.**
  - **Greater than 200 grams of stool daily.**
  - **Greater than 3 stools/daily that are of a loose consistency.**

Fine KD, Gastroenterology 1999

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Chronic Diarrhea

- **Epidemiology:**
  - **There is a lack of robust data demonstrating the relative incidence and cost of chronic diarrhea in the Developed World.**
    - **Estimates suggest that 3-5% of the population have chronic diarrhea.**
    - **Estimates of work related loss of revenue are $350,000,000 annually, not including the medical evaluation and work-up/treatment.**

Fine KD, Gastroenterology 1999

Chronic Diarrhea

- **The effects of chronic diarrhea also significantly impacts on a patient's quality of life.**
  - **Leading to: Depression, anxiety, and loss/quitting work.**

Siddiqui et.al, J.Clin Gastro 2007

Chronic Diarrhea

- Approach to Chronic Diarrhea.
- Is it:
  - Bloody ?
  - Fatty ?
  - Watery/Liquid?
    - Osmotic vs Secretory vs Functional

Bloody Diarrhea

- Differential Diagnosis:
  - Infection
  - Inflammatory Bowel Disease (IBD)
  - Ischemia
  - Medications
  - SCAD: Segmental Colitis Associated Diverticulosis
  - Radiation
  - Post-operative

Bloody Diarrhea

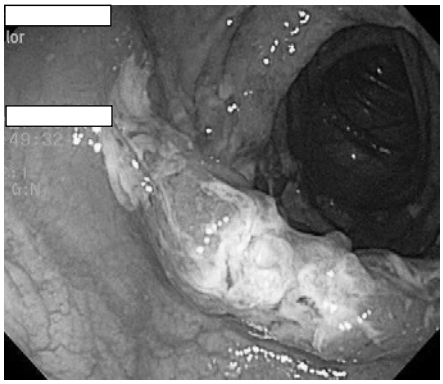
- Infection is an uncommon cause of chronic diarrhea:
  - Stool culture:
    - Salmonella, Campylobacter, Yersinia, Aeromonas, Plesiomonas, and C.Difficile
  - Ova & Parasites

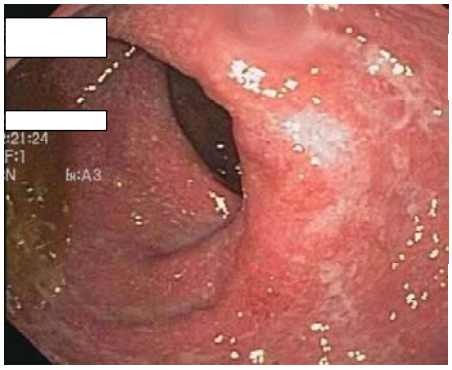
Bloody Diarrhea

- Work-up of Bloody Diarrhea:
  - Colonoscopy is the primary mode of diagnosis.
    - Referral to a Gastroenterologist should be made when bloody diarrhea occurs, to differentiate IBD from ischemic and infectious etiologies.

Bloody Diarrhea

- Ulcerative Colitis





- Crohn's Colitis

Fatty Diarrhea

- Fatty Diarrhea: Clues in the clinical setting
  - Steatorrhea
  - Weight loss
  - Stools:
    - Not always diarrhea
    - Hard to flush/float within toilet
    - Oily droplets

Fatty Diarrhea

- Steatorrhea:
  - Vitamin malabsorbtion
    - Vitamins A, D, E, and K
    - Vitamin A: Night blindness
    - Vitamin D: Osteomalacia
    - Vitamin K: Easy Bruising/Bleeding

Fatty Diarrhea

- Fecal Fat Analysis
- Qualitative:
  - Subjective:
- Quantitative:
  - 24hour collection while on a 100gram diet
  - Stool Weight; <200-300grams
  - Fat; <7gram/24hour period

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Fatty Diarrhea

- Caveats
  - High carbohydrate diet; increases stool volume to 300-400grams
  - Voluminous stools will raise fat excretion; up to 14g/24hrs
  - Correct for fat intake; ie low fat diets
  - False positives; Olestra and tree nuts
  - Pancreatic/Biliary sources; >9.5grams/100gm stool

Fatty Diarrhea

- Steatorrhea:
  - Luminal causes:
    - Pancreatic insufficiency
    - Bile Salt deficiency
    - Bacterial Overgrowth
  - Mucosal:
    - Celiac sprue
    - Crohn's Disease; especially small bowel disease

Fatty Diarrhea

- Pancreatic Insufficiency:
  - Indirect testing:
    - Serum Trypsin
    - Fecal Chymotrypsin
    - Fecal Elastase
    - All have poor sensitivity and specificity

Leeds et.al. Nature Rev Gastro Hep 2011

Fatty Diarrhea

- Pancreatic Insufficiency
- Evaluate and rule out mucosal disease first
  - Then consider trial of pancreatic enzyme replacement therapy
    - Monitor weight gain and fecal fat

Celiac Disease

- Diarrhea caused by gluten sensitivity.
- Epidemiology:
  - Prevalence is 1: 133 in the USA, increased to 1:22 if first degree relative with celiac disease. (Fasano A et.al, Arch Intern Med 2003
  - May also have associated features
    - Weight Loss, Abdominal Distension, Abnormal LFTs, Iron Deficiency, Infertility/Recurrent fetal loss, Microscopic Colitis, DM I, and Thyroid diseases.

Celiac Disease

- Celiac Disease: Test while on Gluten diet
  - Antibody Tests: IgA tTG or EMA and Serum IgA
    - 2-3% of Celiac patient are deficient in IgA
    - Preferable to have tTG testing
    - Use of Anti-gliaden Antibody is not recommended
  - Small bowel biopsies:
    - Consult GI for biopsies; still gold standard.
  - Genotype
    - HLADQ2, DQ8
    - If negative, rules our celiac disease
    - Not recommended for screening purposes

Malabsorbtion

- Parasites: Uncommon
  - Giardia
- Gastric surgery/Reflux surgery
- Chronic mesenteric ischemia
- Radiation
- Significant llietis/ileal resection
- Medications:
  - HAART

Malabsorption

- Malabsorption:
  - Small bowel diseases (uncommon)
    - Collagenous sprue
    - Whipple's disease
    - Eosinophillic enteritis
    - Lymphoma
    - Amyloid

Chronic Diarrhea: Medications

- Osmotic:
  - Citrates
  - Magnesium containing
  - Sugars; sorbitol, xylitol, mannitol
- Motility
  - Macrolides
  - Reglan
  - Laxatives; Bisacodyl
- Secretory:
  - Antibiotics
  - NSAIDs
  - Allopurinol/Colchicine
  - Antineoplastics
  - Metformin
  - Prostaglandins
  - Laxatives: Senna and Docusate

Watery Diarrhea

- Dietary:
  - Alcohol
  - Dairy
  - Supplements
  - OTC medications
  - Herbals
  - Fructose/Sorbitol
- Medications:
  - 7% of all medication side effects

Watery Diarrhea

- Diseases:
  - Diabetes
  - Surgical:
    - Cholecystectomy
    - Gastric
    - Small intestinal
  - Family History:
    - Celiac
    - IBD
  - Sexual history:
    - HIV
    - Infections
  - Travel History:
    - High risk areas/activities

Watery Diarrhea

- Evaluation of Watery Diarrhea:
  - H&P
  - Labs:
    - CBC, CMP, Thyroid tests, Celiac serology, ESR/CRP, and Stool FOBT
    - Stool culture is low yield
    - Only several months of symptoms; consider:
      - Ameba, Giardia, Cryptosporidium/cyclospora, and Candida (Elderly)

Watery Diarrhea

- Evaluation: Send to Gastroenterology?
  - Secretory Diarrhea
  - Colonoscopy with biopsy; Evaluation
    - Crohn's Disease
    - Microscopic colitis
    - Colon cancer
  - EGD with Duodenal biopsy

Watery Diarrhea and Diabetes

- Visceral autonomic neuropathy
- Bacterial overgrowth
- Celiac sprue
- Pancreatic insufficiency
- Unabsorbed carbohydrates:
  - Sugarfree products

Watery Diarrhea after Cholecystectomy

- Cholecystectomy
  - Post-Cholecystectomy related diarrhea
    - Incidence 20%
    - Can be delayed
    - Rarely severe
  - Mechanism: Low bile acid absorption at terminal ileum; especially nocturnal.
    - Bile acids induce colonic salt and water secretion
  - Treatment: Bile acid binders

Microscopic Colitis

- Microscopic colitis:
  - Intermittent secretory type diarrhea.
  - Types:
    - Lymphocytic Colitis
    - Collagenous Colitis

Watery Diarrhea

- **Watery Diarrhea:**
  - **Fecal fat testing**
  - **Laxative screen**
  - **Osmotic Gap**

Stool Osmotic Gap

- **Osmotic Gap**
  - **Normal: 290 – 2(Na + K)**
  - **Secretory Diarrhea: <50**
  - **Osmotic Diarrhea: >100-125**
  - **Contamination: >375**
  - **FYI: Labs do not test stool that is solid; used to indirectly confirm that patient is having diarrhea**

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Secretory Diarrhea

- Continues despite fasting.
- Hormonally Induced:
  - Zollinger-Ellisison Syndome: Elevated Gastrin (off PPI therapy)
  - VIPoma: Elevated VIP
  - Carcinoid: 5-HIAA (24hr urine collection)
  - Medullary Thyroid Carcinoma: Calcitonin
  - Idiopathic Secretory Diarrhea

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Osmotic Diarrhea

- Related to ingested foods/medications:
  - Close examination of ingested materials assists in diagnosis.
  - Resolves with fasting.
  - Most common cause: Lactase Deficiency
    - Wanes over time, and increased symptoms with advancing age.

Fine KD, Gastroenterology 1999
Sleisenger and Fortran 9th Edition 2010

Chronic Diarrhea

- **Functional:**
  - **Irritable Bowel Syndrome (IBS) is the most common cause of functional diarrhea in adults in the developed world.**
    - **3-20% of the USA population has IBS**
    - **Women affected more than Men**
    - **Ages 15-35 most commonly**
  - **Diagnosis of exclusion:**
    - **Do they respond to dietary changes, fiber, and exercise?**
  - **Watch for RED FLAGS:**
    - **Bleeding, substantial weight loss, abnormal imaging and/or nocturnal symptoms**

Fine KD, Gastroenterology 1999
Sleisenger and Fortran 9th Edition 2010
Lembo AL Practical Gastroenterology 2007

When to send to GI?

- **<u>In General</u>, any diarrhea that is suspected to be Fatty, Inflammatory, or Secretory should be sent to Gastroenterology for endoscopic biopsy or specific radiographic testing sooner than later.**

- **Any diarrhea with "warning features"; ie progressive pain, significant weight loss, bleeding/iron deficiency anemia, and severe metabolic abnormalities.**