



## **Acute Diarrhea: Food Poisoning or Infection?**

The causes of acute diarrhea are myriad. This course will help you develop a differential diagnosis for acute diarrhea and will include a discussion of traveler's diarrhea, dysentery, and viral etiologies. The current recommendations for workup and treatment will be discussed.

- Describe the characteristics of diarrheal illnesses.
- Develop a differential diagnosis of acute diarrhea.
- List current recommendations for the treatment of acute diarrhea.

WE-170  
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4:00 PM - 4:55 PM  
Room # N250  
Las Vegas Convention Center

## **FACULTY**

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## + Acute Diarrhea: Food Poisoning or Diarrhea? TH-49

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  - **NorthBay** Medical Center, Fairfield, **California**
  - Attending Physician
  - **UCSF/** Highland General Hospital
- + Course Description
- Acute and chronic diarrhea are inconvenient at best, and potentially life threatening at worst. This course guides the emergency physician in cost effective evaluation, rapid diagnosis and treatment.
- + Course Objectives
- + Following the completion of this course, the emergency physician should be able to:
    - 1. Formulate a differential diagnosis for acute and chronic diarrhea.
    - 2. Explain the cost-effective evaluation of diarrhea.
    - 3. Recognize the different presentations of food poisoning and infectious causes of diarrhea.
    - 4. Decide what treatment, if any, is appropriate.
- Course Outline
- + Diarrhea (Definition)
- A change in the normal pattern of stool excretion for a given individual resulting in an increased frequency and volume of stool
  - Gastroenteritis: nausea, vomiting
  - Dysentery: blood, pus, mucus
- + Goals of the emergency physician in the management of acute diarrhea
- Differentiate serious cases from benign
  - Identify patients with serious systemic effects
  - Rapidly detect infectious/invasive Vs. Toxigenic cases
  - Institute supportive, symptomatic, and specific therapy
- + Normal GI tract physiology
- Normal oral intake ~ 1.5 L/day
  - Stomach delivers ~ **9L/day** to small bowel
  - Normal large bowel absorption capacity ~ **4L/day** (Osmotic **gradient/Na**)
  - Normal stool output ~ 0.15 L **stool/day**
- + Classification of diarrhea<sup>1</sup> illness
- Osmotic diarrhea
  - Secretory diarrhea
  - Motility derangements
  - Mucosal alterations
- + Osmotic diarrhea
- Increased osmotic **activity** in intestinal lumen
  - ingestion of nonabsorbable osmotically active agents ( Sorbitol, Mg)
  - Interference with water resorption
  - Increased fluid delivery to colon

- + Secretory diarrhea
  - Disruption of small bowel transport mechanisms (Na absorption)
  - Active secretion of fluid into bowel lumen
  - Enterotoxins
  - Protozoal infections (alt. **metab.** of intestinal cells)
  - Endocrine disorders ( vasoactive intestinal peptides)
- + Motility derangements
  - Increased transit time
  - Stool moves too quick for normal mechanisms
  - Irritable bowel syndrome, cholinergic drugs, caffeine
- + Mucosal alterations
  - Loss of luminal cellular components results in poor absorptive qualities
  - Invasive bacterial infections
  - Viral Infections (HIV)
  - Tropical / Nontropical sprue
  - Surgical / radiation therapy
- + Basic facts regarding etiology of diarrhea
  - **50-70%:** Viral
  - **15-20%:** Bacterial
  - **10-15%:** Parasite
  - **5-15%:** Unknown
- + You **gotta** ask yourself:
  - Is the patient seriously ill?
  - Is a diagnostic investigation necessary?
  - Is a specific cause evident?
  - Is treatment required?
- + Approach to the patient with diarrhea
  - + History
    - Character of stools (amount, consistency, color, odor, mucus, blood)
    - Temporal characteristics (acute vs. chronic, frequency/duration, meals)
    - Exogenous factors (diet, medications, travel, ill **expos/day** care, stress)
    - Associated **symptoms**(fever, anorexia, abd pain, constipation, fluid status)
    - Related past history (HIV, GI disease, endocrine, irradiation, postvagotomy)
- + Approach to the patient with diarrhea
  - + Physical exam
    - Dehydration ( vitals, ALOC, skin / muc. membranes)
    - Bacteremia / sepsis (fever, chills, **tachy**)
    - Cachectic
    - Rectal exam ( pus, blood, fissure)
- + Differential diagnosis of diarrhea
  - Infectious / invasive diarrhea
  - Toxigenic diarrhea
  - Ulcerative colitis
  - **Crohn's** disease
  - Diet / drugs
- + Infectious / invasive diarrhea

- 1- 3D incubation period, gradual onset
- 1-7 day duration
- Fever, nausea, vomiting, fever, headache, malaise
- Toxic appearing, abdominal pain / tenderness severe
- Stool blood, mucous, WBC's present
- + Toxigenic diarrhea
  - 2-12hr incubation, sudden onset
  - 1 day duration
  - Fever and other systemic symptoms less common
  - Non toxic appearing, minimal abdominal complaints
  - Stool blood, mucous, **WBC's** absent
- + Who needs a diagnostic **workk** up?
  - + 'Das Boot'
    - Acute clinical toxigenic appearing diarrhea
    - Not significantly ill or dehydrated
  - + Diagnostic testing
    - Acute invasive appearing diarrhea
    - Seriously ill or dehydrated
    - Bloody stools or persistent diarrhea
- + Laboratory studies
  - + Stool specimen
    - Gross examination (Blood I pus)
    - Microscopic examination
    - Stool culture I O&P
  - + Blood work
    - CBC I Serum electrolytes
    - Blood cultures
- + Microscopic stool examination
  - Methylene blue / Wright's stain
  - Polymorphonuclear leukocytes
  - Invasive bacterial infection Vs. toxigenic
  - **20-30%** of patients with invasive diarrhea have neg WBC's
  - Presence of fecal WBC's correlate with isolation of bacterial **enteric pathogen** (specificity/sensitivity 85%)
- + Fecal leukocytes present in acute diarrhea
  - Campylobacter
  - Salmonella / Shigella
  - Yersinia
  - Clostridium Difficile
  - Amoebic dysentery
  - Ulcerative colitis / Chron's
- + Fecal leukocytes absent in acute diarrhea
  - Viruses
  - Enterogenic E. Coli
  - Cryptosporidium
  - Giardia

- C. Diff occasionally
- All toxin -induced bacterial food poisoning
- + Stool culture
  - Usually unnecessary I not cost effective
  - Only when infectious etiology is highly suspected
  - Public health implications (Shigella, **Salmonella**)
  - Yield from ED is small
  - Appropriate outpatient setting
- + **Stool O & P**
  - Parasitic infection suspected by history
  - Patient immunocompromised
  - Clinical Assessment of infectious diarrhea + public health concern
  - Chronic or persistent diarrhea
  - Diarrhea not responsive to appropriate antibiotics
- + Factors which decrease yield of stool O & P
  - Bismuth, Kaolpectin
  - Antibiotics
  - Antacids
  - Barium Sulfate
  - Enema contents
- + Blood work
  - + Serum electrolytes
    - Patients who are clinically ill (Fever, chills, **significant** dehydration)
  - + CBC
    - Nonsoecific. & Insensitive
    - Invasive diarrhea (leukocytosis) (eosinophilia)
    - Toxiogenic (**Nml** WBC)
- + Approach to the patient with diarrhea
  - + Blood culture
    - + Bacteremia or systemic infection suspected
      - Salmonella
    - Patients ill enough to be admitted
- + Treatment of acute diarrhea
  - + General objectives
    - Rehydration and electrolyte repletion (Oral Vs. Parenteral)
    - Symptomatic therapy (Antimotility agents)
    - Prevention of spread of infection (Hygiene)
    - Specific treatment of underlying cause (Antibiotics)
- + Rehydration & electrolyte repletion
  - + Oral route (no vomiting)
    - Pedialyte / Rehydralyte
  - + WHO oral rehydration solution
    - **90mEq/L Na<sup>+</sup>, 20mEq/L K<sup>+</sup>, 80mEq/L Cl<sup>-</sup>, 20gm/L glucose**
    - Home remedies
- + Oral rehydration and “Solvent drag”



- presence of glucose stimulates absorption of solutes and water by small intestine
- Glucose/sodium transport mechanism relatively unaltered by infectious or toxin mediated diarrheas
- + Rehydration & electrolyte repletion
  - + Parenteral replacement
    - + Moderate to severe dehydration
      - 1 liter **D5/0.5NS**, 50meq **NaHCO**, 10-20meq **KCL**
- + Antimotility agents
  - **Hardline** history
  - Loperamide ( Imodium) (Non bloody diarrhea)
  - Pepto-Bismol (traveller's diarrhea)
  - Diphenoxylate with atropine (Lomotil) ?
- + Prevent spread of infection
  - Good hygiene
  - School / day care issues
  - Food workers
  - Public health notification
- + Antibiotics
  - + Identify patients at risk for infectious diarrhea
    - History and physical
    - Stool examination
    - Patient subgroups
    - Ability to ID single agent is poor
- + Acute infectious diarrhea- US subgroups / Specific pathogens
  - College students (Campylobacter)
  - Day care ( Giardia, Shigella. Rota, Crypto)
  - Homosexual men ( Gonorrhea, herpes, Amebiasis)
  - HIV (Crypto. Mycobacterium)
  - Chronic care ( C. diff, C. perfringens)
  - Travelers (E. Coli)
- + Antibiotics
  - + Doxycycline / Bactrim
    - Resistance of Salmonella & Shigella
    - Increased carrier state in Salmonella
    - Ineffective against Campylobacter
- + Oral Quinolones (Ciprofloxacin, Ofloxacin)
  - + Agents of choice in infectious diarrhea in adults
    - Safe / effective / few side effects/ wide spectrum
    - No increase in carrier state
  - + Contraindications
    - Pregnancy
    - Children
- + Acute diarrhea- specific situations
  - Drug associated diarrhea
  - Traveller's diarrhea

- Foodborne diarrhea
- HIV disease
- + Drug associated diarrhea
  - Antibiotics
  - Laxatives
  - Antacids (Mg )
  - Antihypertensives
  - Colchicine
  - Quinidine
- + Drug associated diarrhea
  - + Antibiotics
    - Side effect possible with most antibiotics
    - **Noninflammatory** diarrhea
    - Alteration of normal bowel flora
- + Pseudomembranous colitis
  - Overgrowth of Clostridium difficile
  - Abdominal pain, fever, profuse foul diarrhea
  - Stool may be bloody with **WBC's** / C. dif stool assay
  - Elderly & debilitated (Mortality 20%)
  - RX: **IVF's** and oral Vancomycin or Metronidazole
- + Traveller's diarrhea
  - **30-50%** of visitors to developing countries acquire diarrhea
  - Onset of sx's usually within one week of arrival
  - Combination of diarrhea, cramps, nausea, malaise
  - Rarely fever, vomiting, or bloody stools
  - Stool exam and culture usually not helpful
- + Traveller's diarrhea
  - + Etiology
    - Bacteria (**Toxigenic** E. Coli, Shigella, Salmonella, Campy, Vibrio)
    - Viruses (Norwalk, Rotavirus)
    - Parasites ( Giardia, E. Histolytica, Crypto, **Blasto**, Strongyloides)
- + Traveller's diarrhea
  - Untreated usually resolves in 3-4 days
  - Treatment early in course will decrease duration
  - Special smears for delayed **prst.**, no relief with empiric abx
  - Consider C. diff in those taking prophylactic abxs
- + Foodborne diarrhea
  - + Invasive pathogens
    - Campylobacter
    - Salmonella
    - Shigellosis
    - Vibrio parahaemolyticus
    - Yersinia enterocolitici
    - Hemorrhagic escherichia coli
- + Campylobacter
  - Most common cause of bacterial diarrhea

- Wilderness water sources, animals (chickens) / Fecal - oral route
- Gram negative bacteria, invasive to bowel wall
- Fever, cramping abdominal pain, diarrhea, anorexia, malaise, myalgia
- Gross or occult blood in **60-90%** of patients
- + Salmonella
  - Largest outbreaks (**10-15%** of acute food poisoning)
  - Poultry and eggs (hen to egg), unpasteurized milk, household pets
  - 8-48 hr incubation leads to fever, colicky pain, and diarrhea
  - Self limited, recovery in 2-5 days
  - Complications in immunosuppressed
- + Shigellosis
  - Institutional settings, fecal-oral route, man as host
  - Superficial bowel wall invasion with exotoxin production
  - Generally self limited, can go to full dysentery
  - Most cases remain undiagnosed
  - Treatment decreases carrier state (Public health)
- + Yersinia enterocolitica
  - Gram negative organism in raw pork and milk
  - Fecal-oral transmission from variety of animals
  - Ileocectitis may mimic appy
  - Self limited, might treat if sxs at time of culture result
- + Vibrio parahaemolyticus
  - Gram negative marine vibrio
  - Undercooked shrimp, raw fish
  - No secondary spread to family members
  - Intense inflammatory response at bowel wall
  - Self limited, treat if sxs at time of culture result
- + Hemorrhagic escherichia **coli**
  - Contaminated raw ground beef and milk
  - One week incubation period
  - Person to person spread occurs
  - Hemolytic uremic syndrome and **TTP**
  - Children and elderly at risk
- + Foodborne diarrhea
  - + Noninvasive / toxin induced diarrhea
    - S. aureus
    - Clostridium perfringens
    - Bacillus cereus
    - Cholera
    - Giardia
- + Staph aureus
  - Protein rich food (milk & dairy)
  - Growth of staph and production of enterotoxin
  - Heat stable toxin which has direct CNS effect
  - Explosive onset, vomiting and abdominal pain
  - Clinical diagnosis, spontaneous recovery



- + Clostridium perfringens
  - Most common cause of acute food poisoning
  - Rewarmed meat and poultry
  - Germination of spores
  - Self limiting, no role for antibiotics
- + Bacillus cereus
  - Spore forming gram negative rod
  - Uncooked rice, heat resistant spores
  - Mild, self limited, no role for antibiotics
- + Take home messages for Food poisoning by preformed toxin
  - Stool analysis not useful
  - No role for antibiotics
- + Cholera
  - Endemic in Gulf of Mexico / undercooked shellfish in US
  - Severe watery stool, few **WBC's**
  - Rehydration
  - **Tetracycline** may shorten illness
- + Giardia
  - Waterborne, Hikers
  - Malabsorptive **sxs**, bloating, diarrhea
  - Trophozoites or cysts in stool
  - RX: Metronidazole
- + Acute diarrhea- Specific situations
  - + HIV disease
    - Common complaint in **AIDs** patients
    - Acute dysenteric syndrome as presenting symptom
    - Usual vs. unusual infectious pathogens
    - Lower threshold for stool culture O & P
- + Acute diarrhea- HIV disease
  - + Specific Etiologies
    - Invasive bacterial etiologies
    - Viral ( Cytomegalovirus, adenovirus, herpes simplex)
    - Protozoan ( Cryptosporidium, E. Histolytica, Giardia)
    - Mycobacterium ( **MAI**)
    - Primary HIV enteropathy
- + Treatment of acute diarrhea in HIV disease
  - Salmonella, Shigella, Campylobacter (Quinolones)
  - Clostridium Difficile (Metronidazole, **Vanco**)
  - Giardia. E. histolytica ( Metronidazole)
  - Herpes simplex (**Acyclovir**)
  - CMV (Ganciclovir)
  - Cryptosporidium I **MAI** (supportive care)
- + Take home messages **for treatment** of acute diarrhea
  - The etiology of acute diarrhea is viral or unknown in ~ 85% of cases
  - + There are only two types of patients with diarrhea
    - Those who look like stool and those who don't

- Use fecal leukocytes if the patient is borderline
- Extensive diagnostic work up of acute diarrhea is usually not indicated
- Toxigenic diarrhea require neither testing nor antibiotics
- Those at risk for infectious diarrhea are safely treated empirically with Cipro
- The work up of diarrhea in the HIV patient is **similar** to the immunocompetent pt

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## Bibliography

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