



Chapter 31 - Diarrhea

Episode Overview:

- 1) Define Acute, Persistent, Chronic Diarrhea
- 2) Describe the 4 mechanisms of diarrhea
- 3) List 15 historical factors that increase the risk of probability of non-benign diarrhea
- 4) What are the indications for empiric antibiotic treatment?
- 5) List 6 organisms that cause bloody diarrhea

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- 1) When is Loperamide indicated?
- 2) When should you use stool cultures / O&P
- 3) Best way to give children pedialyte?

Rosens in Perspective:

Diarrhea accounts for 5% of all ED visits (6 patients / week / provider)

- 4% of all deaths worldwide
- Infectious vs. Non-infectious
 - Infectious (85%)
 - 70% viral
 - 24% bacterial
 - 6% parasitic
 - Non-infectious (15%)

1) Define Acute, Persistent, Chronic Diarrhea

Diarrhea - Greek from *dia-* (through) and *-rhein* (to flow)

- **Acute** - 14 days or less (usually infectious viral or bacterial)
- **Persistent** - 14 days or more (usually bacterial or protozoan)
- **Chronic** - 30 days or more (usually non-infectious)

2) Describe 4 mechanisms of diarrhea

Rule of NUMBER 2 (POO):

- 2 fast
- 2 strong
- 2 broken
- 2 confused

Too fast: **Abnormal Motility**

- Hypermotility decreases contact time, limiting water and electrolyte absorption
 - Example: heroin withdrawal (also component of almost every acute diarrhea)



Too strong: **Osmotic diarrhea**

- Highly osmotic solutes induce strong osmotic gradient favouring stool, overcoming transporter's ability to absorb.
 - Examples: laxatives and steatorrhea

Too broken: **Inflammatory diarrhea**

- Direct damage or toxicity to cells, decreasing the ability to absorb
 - Examples: Chemotherapy, radiation, infection - continues *despite* fasting

Too confused: **Secretory diarrhea**

- Cellular confusion by cytotoxic chemicals cause secretion rather than absorption
 - Example: Cholera

3) List 15 historical factors that increase the risk of probability of non-benign diarrhea

What are the so-called 'red-flags' of diarrhea?

[1] Location: Encounters with hospital system, travel, day care, and wilderness

[2] Exposure: Antibiotic exposure, strange animals (shellfish, farm animals, amphibians), sick contacts, known contaminated meats or dairy

[3] Symptoms: Vomiting immediately after suspicious food, ***pain/n/v/blood/fever/tenesmus***, greater than one week of diarrhea

[4] Signs and Labs:

- HUS (HGB < 80 with peripheral smear schistocytes and helmets, plt < 140, AKI)
- Stool WBCs (not sensitive or specific)
- Colonic ulcerations and pseudomembranes
- Proctitis

[5] Patient factors: Immune-compromised (Organs, HIV, other)

=== SEE Table 31-1 Listed Below ===



Table 31-1 Factors Increasing Probability of Nonbenign Diarrhea

FACTOR	SPECIFIC PATHOGEN(S) AND OTHER CONSIDERATIONS
Presentation to a health care facility	Degree of illness overall greater in patients seeking evaluation; increased probability of “not norovirus” cause to 50%
Travel history	Especially foreign travel and to endemic areas of dysenteric disease
Recent hospitalization	<i>Clostridium difficile</i> from antibiotic exposure
Day care attendance	Rotavirus, <i>Shigella</i> , <i>Giardia</i>
Nursing home residence	<i>C. difficile</i> , medication side effects, tube feedings, ischemic colitis, fecal impaction, and overflow diarrhea
Wilderness exposure	<i>Giardia</i> or <i>Cryptosporidium</i>
Antibiotic therapy	<i>C. difficile</i> , antibiotic side effects
Raw shellfish, farm animals and fair livestock, pet reptiles or amphibians, petting zoos	<i>Salmonella</i> species, <i>Escherichia coli</i> O157:H7 and non-O157 Shiga toxin-producing <i>E. coli</i> , <i>Vibrio</i> species
Epidemic of multiple patients with a short time of onset	Norovirus; less commonly, <i>Campylobacter jejuni</i> , <i>Salmonella</i> species, <i>Cryptosporidium</i>
Acute vomiting and diarrhea after eating suspected contaminated food	<i>Bacillus cereus</i> , <i>Clostridium botulinum</i> , <i>Staphylococcus aureus</i>
Epidemic of severe gastroenteritis traced to eggs, poultry, meat, or dairy products	<i>C. jejuni</i> , <i>Salmonella</i> species
Homosexuality (males)	<i>Giardia lamblia</i> , <i>Entamoeba histolytica</i>
Abdominal pain Nausea, vomiting Bloody stool Fever Rectal pain Tenesmus	Severe bacterial infections: <i>Salmonella</i> , <i>Campylobacter</i> , <i>Shigella</i> , EPEC, <i>Yersinia</i> or <i>Vibrio</i> species Also consider surgical abdomen, GI bleeding Inflammatory bowel disease
Diarrhea >7-14 days' duration	Protozoa and microsporidia, <i>C. difficile</i> , <i>Campylobacter</i> , Shiga toxin-producing <i>E. coli</i>
Hemolytic uremic syndrome	<i>E. coli</i> O157:H7 or other species
Stool WBC count	Not reliable for diagnosis of bacterial cause
Colonic ulcerations	Inflammatory bowel disease
Proctitis	Bacterial cause highly probable
Pseudomembranes	Toxic megacolon, <i>C. difficile</i>
Chronic disease (e.g., cirrhosis, DM)	Complicated course expected with any form of diarrheal illness
Organ transplantation	Abnormally severe illness from rotavirus and adenovirus Increased frequency of cytomegalovirus Severe illness from dysenteric diarrhea Spore-forming protozoa and microsporidia
HIV infection, other immunodeficiency disorders	Severe illness from common bacteria, spore-forming protozoa, and microsporidia Increased frequency of cytomegalovirus and <i>Mycobacterium avium</i> complex

DM, diabetes mellitus; EPEC, enteropathogenic *E. coli*; GI, gastrointestinal; HIV, human immunodeficiency virus; WBC, white blood cell.

4) What are the indications for empiric antibiotic treatment?

Direct from Rosens:

“Antibiotic treatment is initiated in patients with a suspected invasive process and severe diarrhea, systemic symptoms, fever, or abdominal pain and in patients who appear toxic.”

If you decide to treat: Ciprofloxacin 500mg PO BID x 3-5 days is recommended

Caveats to this regime include:

- Pregnant women (crosses placenta)
- Children under 18 (supportive care until culture confirmed ETEC)



5) List 6 organisms that cause bloody diarrhea

- “Clotty salty excrement screws your vitals”

=== Campylobacter // Salmonella // EPEC // Shigella // Yersinia // Vibrio ===

From: <https://emlyceum.com/2015/11/02/diarrhea-answers/>.

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[1] When is Loperamide indicated?

- Controversial, but generally accepted to be safe if no fever and non-bloody. Probably OK
- However, *probably* okay if combined with antibiotics in the fever/bloody diarrhea
 - <http://www.ncbi.nlm.nih.gov/pubmed/8452323>
- **Avoid in pediatrics** (can provoke HUS, toxic megacolon)

Hippie granola tip of the week?

- Lactobacillus probiotics may also help with diarrhea and can be suggested

[2] Who, what, when, when, why of stool cultures?

- Ill-appearing
 - Immunocompromised (including young and old people)
 - Non-responders to treatment
 - Chronic course
- Know that **positive rate** is about 2%, which is astronomically low!

Ova & Parasites?

- Chronic, high risk locations
 - Rosens is *very specific* with this one: Russia and Nepal
- Exposure to infants in daycare (strangely non-specific)
- HIV (+) patients

[3] Best way to give children pedialyte?

It turns out we may not have too...

- Recent study in JAMA by Freedman et al (Effect of Dilute Apple Juice and Preferred Fluids vs. Electrolyte Maintenance Solution on Treatment Failure Among Children With **Mild** Gastroenteritis)
 - Suggested that children with mild gastro who were given dilute juice had less treatment failure than electrolyte solution and required less IV fluid / hospitalization