The Management Of Acute Diarrhea
In Adult

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Diarrhea

Normal:

- **Stool weight**: 100 ~ 200 g
- **bowel frequency**: 3 times a week ~ 3 times a day
Diarrhea

• An increase in the *volume* of stool or *frequency* of defecation

• It is one of the most common clinical signs of gastrointestinal disease

• Also can reflect primary disorders outside of the digestive system
Definition

Diarrhea

• Having 3 or more **loose or liquid** stools per day
• Or having more stools than is normal for that person

--- World Health Organization
• Acute diarrhea — <14 d in duration
• Persistent diarrhea — ≥14 d in duration
• Chronic diarrhea — >30 d in duration
Definition

Acute Diarrhea

• An abnormally frequent discharge of semisolid or fluid fecal matter from the bowel
• Lasting less than 14 d

--- World Gastroenterology Organisation
Epidemiology

• In industrialized countries, the incidence of acute diarrhea is estimated to average 0.5–2 episodes per person per year.

• In the USA, about 99 million episodes of acute diarrhea occur every year in adults.

• Estimated prevalence of diarrhea among adults was 3%–7% with the rate being age-dependent.

• Disease incidence is highest among children <5 years.
Not a "nuisance disease"?
Epidemiology

• Common cause of death in developing countries
• Diarrheal diseases represent one of the 5 leading causes of death and the second most common cause of infant deaths worldwide
• The percentages of hospitalization and death are highest in persons 65 years or older
A major public health issue!
**ETIOLOGY**

**Infectious agents**
- Bacteria *Escherichia coli*, *Salmonella*, and *Clostridium difficile*
- Parasites *Entamoeba histolytica*
- Viruses *Adenovirus*, *Rotavirus*

**Malabsorption**
- Ischemic bowel disease
- Ulcerative colitis
- Crohn's disease

**Inflammatory bowel disease**
- Ulcerative colitis
- Crohn's disease

**Medications & Toxins**
- Ischemic bowel disease
- Allergies to certain foods
- Chronic alcohol ingestion
- Bile salt malabsorption
- Thyrotoxicosis & Carcinoid syndrom

**Irritable bowel syndrome**

**Other cause**
Infections

• **Most** cases of acute infectious gastroenteritis are probably **viral**, in most studies, stool culture has been positive in only 1.5 to 5.6 percent of cases.

• In contrast, **bacterial** causes are responsible for most cases of **severe** diarrhea.

• **Parasites** are less commonly identified as the etiologic agents of acute GI illness.
Infections

• In industrialized countries: *viruses* are the predominant cause of acute diarrhea and show distinct winter seasonality.

• In developing countries: enteric *bacteria* and *parasites* are more prevalent than viruses and typically peak during the summer months.
Infections

- **Norovirus** is the most common cause of viral diarrhea in adults, while **rotavirus** is the most common cause in children under 5 years old.

- **Bacterium Campylobacter** is a common cause of bacterial diarrhea, but infections by **Salmonellae**, **Shigellae** and some strains of **Escherichia coli (E.coli)** are also frequent.
Malabsorption

- Inability to absorb food fully
- Mostly from disorders in the small bowel
- But also due to maldigestion from diseases of the pancreas
Malabsorption

Causes include:

- **Enzyme deficiencies or mucosal abnormality** (celiac disease, lactose intolerance, and fructose malabsorption).
- **Pernicious anemia** (impaired bowel function due to the inability to absorb vitamin $B_{12}$)
- **Loss of pancreatic secretions** (pancreatitis)
- **Structural defects** (short bowel syndrome, radiation fibrosis)
- **Certain medications** (like orlistat, which inhibits the absorption of fat)
Pathophysiology of Malabsorption

Approximately 9 L of fluid enters the intestines daily.
Absorb sites in GI track

6 to 7 L absorbed

1 to 2 L absorbed
Pathophysiology of Malabsorption
Diarrhea Mechanisms

- Osmotic
- Secretory
- Exudation
- Abnormal motility
Osmotic Diarrhea

**Cause**: unabsorbable or poorly absorbable solutes

- **Ingestion of a poorly absorbed substrate**
  - Sugars (sorbitol, mannitol)
  - Magnesium sulfate
  - Magnesium-containing antacids

- **Maldigestion**
  - lactose intolerance
  - celiac disease
  - pancreatic insufficiency
Osmotic diarrhea
It caused by accumulation of the followings in the gut lumen
being osmotically active

poorly absorbable solutes
malabsorption of ingested food
failure to transport an osmotically active dietary nonelectrolyte
(E: glucose)

water
salts

intestinal Lumen

diarrhea

Stool volume decreases with fasting
Causes of diarrhea in enteral nutrition

Lumen
- Excess volume
- Osmotic load
- Formulas
- Medication
- Contamination

Intestinal mucosa
- Edema
- Disaccharidases or transport mechanisms
- Atrophy

Bacteria
Secretory Diarrhea

Cause: An increase in the active secretion, usually coupled with inhibition of absorption

• Clinical features
  – stools very watery
  – stool volume large
  – fasting does not stop diarrhea
Secretory Diarrhea

- **Bacterial toxins**: cholera, enterotoxigenic E coli
- **Laxatives abuse**: phenolphthalein, cascara, senna
- **Hormones mediated**: VIPoma, carcinoid, medullary carcinoma of thyroid (calcitonin), Zollinger-Ellison syndrome (gastrin)
- **Bile salt malabsorption**
- **Medications, Certain metals, organic toxins, and plant products**
Additionally, cholera toxin affects the enteric nervous system, resulting in an independent stimulus of secretion.
Exudative Diarrhea

• Destruction of the epithelium results not only in exudation of serum and blood into the lumen, but often is associated with widespread destruction of absorptive epithelium.

• Cause:
  - Infective conditions (e.g. dysentery due to Shigella)
  - Inflammatory conditions (e.g. ulcerative colitis, Crohn’s disease and celiac disease)
Exudative Diarrhea

The immune response to inflammatory conditions:

- Activation of white blood cells leads them to secrete inflammatory mediators and cytokines which can stimulate secretion (Excessive inflammatory reaction)

- Reactive oxygen species from leukocytes can damage or kill intestinal epithelial cells (Oxidative stress)
Enhanced motility:

- Cause:
  1. **Postsurgical:** vagotomy, partial gastrectomy, blind loop with bacterial overgrowth
  2. **Systemic disorders:** diabetic neuropathy, hyperthyroidism
  3. **Irritable bowel syndrome**
Altered Motility

*Slow motility:*

- Cause: scleroderma
- Mechanisms: bacterial overgrowth, which causes deconjugation of bile acids and results in diarrhea
More than one mechanism may coexist.

In infectious and inflammatory conditions, malabsorption leading to osmotic diarrhea, active secretion and even exudation can coexist.
Diagnostic approach

• Careful history taking to determine the duration of symptoms
• The frequency & characteristics of the stool
• Evidence of extracellular volume depletion
• Clues of infection with an invasive enteric pathogen
History Taking

• Age
• Onset and duration of diarrhea
• Frequency and volume of stool
• Characteristics of the stool (watery, loose or bloody)
• Associated symptoms
  • Presence and severity of vomiting
  • Presence of fever, its severity and duration
  • Abdominal pain and its location and character
Potential Exposures

• Food history or occupational exposure

• Time interval between ingestion and development of diarrhea

• Occurrence of illness in others who also partook of the meal *(a bacterial cause?)*

• Location in which the patient develops diarrhea

• History of recent travel and the area travelled
A detailed clinical and exposure history should be obtained from people with diarrhea, under any circumstances, including when there is a history of similar illness in others.
History Taking

- **Medications or substances that can cause diarrhea** (laxatives, antacids containing calcium or magnesium, colchicine, antibiotics, alcoholic beverages and sorbitol containing gums).

- **Underlying diseases** (diabetes, hypertension, heart disease, chronic lung disease, chronic renal failure or cirrhosis) could complicate the management of diarrhea.

- Condition that affects the patient’s **immune status**
Clinical manifestations

• Watery, loose or bloody stools
• Nausea and Vomiting
• Abdominal pain (bloating or cramps)
• Fever
• Sense of urgency to have a bowel movement
**Infectious diarrhea**: nausea, vomiting, abdominal pain, fever, and frequent stools, which may be watery, malabsorptive, or bloody depending on the specific pathogen.

**Ingesting toxins**: nausea and vomiting as prominent symptoms along with watery diarrhea but rarely have a high fever. Vomiting that begins within several hours of ingesting a food should suggest food poisoning due to preformed toxin.
Other symptoms:

Parasites that do not invade the intestinal mucosa, usually cause only mild abdominal discomfort, associated with mild bloating.

Invasive bacteria & organisms that produce cytotoxins cause severe intestinal inflammation, abdominal pain, and often fever.
Bacterial infection

• Occurs 2–7 h after eating contaminated food
• Usually present with intense nausea and severe vomiting
• Abdominal pain may also be present and is usually colicky in nature
• Most patients are not severely dehydrated
• Most symptoms subside within 48–72 h
Viral gastroenteritis

• Abrupt onset of nausea and abdominal cramps followed by vomiting and/or diarrhea
• Low-grade fever
• Headache, myalgia, upper respiratory tract symptoms are common
• Red & white cells are not normally found in stool
• Usually mild and self-limiting, last 24–48 h
Clinical evaluation

The initial clinical evaluation of the patient should focus on:

• Assessing the severity of the illness
• Assessing the need for rehydration
• Identifying likely causes on the basis of the history and clinical findings
The **severity of diarrhea** may be assessed in adults by the degree of

- Disturbance of daily life and activities
- Debility
- Thirst
- Dizziness
- Syncope
Signs of Severe illness

- Profuse watery diarrhea with signs of hypovolemia
- Bloody diarrhea
- Temperature ≥38.5°C
- Passage of ≥6/24h unformed stools or duration of illness >48 h
- Severe abdominal pain
- Hospitalized patients or recent use of antibiotics
- Diarrhea in the elderly (> 65y) or the immunocompromised host
- Systemic illness with diarrhea, especially in pregnant women
Physical Examination

• Vital signs – hypovolemic shock?
• Signs of dehydration – need rehydration?
• Abdominal examination
• Rectal examination
Evidence of hypovolemic shock

- Diminished consciousness
- Lack of urine output
- Rapid and feeble pulse
- Low or undetectable blood pressure
- Cool moist extremities
- Peripheral cyanosis

*Death follows soon if rehydration is not started quickly.*
Dehydration

• Dehydration increases the risk of life-threatening illness and death, especially among the young and older patients

• People of all ages with acute diarrhea should be evaluated for dehydration
Dehydration

- severe diarrhea
- limited oral intake

Particularly in very young and elderly patients.

- increased thirst, decreased urinary output, dark urine, inability to sweat, and orthostatic changes

- acute renal failure and mental status changes like confusion and drowsiness
Signs of Dehydration

- Pulse
- Blood pressure (standing and sitting)
- Central venous pressure
- Skin turgor
- Mucosal dryness (mouth and lips)
- Sunken eye balls and capillary filling
Signs of Dehydration in children

- Sunken Fontanelle
- Sunken Eyes and Cheeks
- Few or No Tears
- Decreased Skin Turgor
- Dry Mouth or Tongue
- Sunken Abdomen
Signs of dehydration in adults

- Pulse rate > 90 bpm
- Postural hypotension
- Supine hypotension and absence of palpable pulse
- Dry tongue
- Sunken eyeballs
- Decreased skin turgor
Sunken eye balls and cheeks
Decreased skin turgor
Changed mental status
Dry mouth and tongue
Sunken abdomen
The Degree of Dehydration

In the early stages of dehydration, there are no signs or symptoms. Early features are difficult to detect but include dryness of mouth and thirst.
Early or mild dehydration

- Thirst
- Headaches
- Sleepy or irritable
- Dizziness, made worse when standing
- Flushed face, warm skin
- Dry mouth and tongue; with thick saliva
- Cramping in the arms and legs
- Crying with few or no tears
- Reduced urine amounts, dark, yellow
Moderate to severe dehydration

- Fainting
- Convulsions
- Low blood pressure; weak pulse; rapid and deep breathing
- Heart failure
- Sunken fontanelle; sunken dry eyes with few or no tears
- Decreased skin turgor
Sunken eyes

Changed mental status

Sunken abdomen
lack of elasticity of the skin
<table>
<thead>
<tr>
<th>Subjective</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>General state</td>
<td>Alert, active, up and about</td>
<td>Weak, lethargic. Able to sit and walk</td>
<td>Dull, inactive. Unable to sit or walk</td>
</tr>
<tr>
<td>Ability to perform daily activities</td>
<td>Able to perform daily activities without difficulty</td>
<td>Able to perform daily activities with some difficulty, e.g. stays away from work, needs support</td>
<td>Unable to perform daily activities, stays in bed or needs hospitalization</td>
</tr>
<tr>
<td>Thirst</td>
<td>Not increased</td>
<td>Increased thirst</td>
<td>Feels very thirsty</td>
</tr>
<tr>
<td>Objective signs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>Normal</td>
<td>Tachycardia</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Normal</td>
<td>Normal or decrease 10–20 mmHg systolic</td>
<td>Decrease &gt; 20 mmHg systolic</td>
</tr>
<tr>
<td>Postural hypotension</td>
<td>No</td>
<td>Yes or no</td>
<td>Yes</td>
</tr>
<tr>
<td>Jugular venous pressure</td>
<td>Normal</td>
<td>Normal or slightly flat</td>
<td>Flat</td>
</tr>
<tr>
<td>Dry mucosa (mouth, tongue)</td>
<td>No</td>
<td>Slight</td>
<td>Severe</td>
</tr>
<tr>
<td>Skin turgor</td>
<td>Good</td>
<td>Fair</td>
<td>Poor</td>
</tr>
<tr>
<td>Sunken eye balls</td>
<td>No</td>
<td>Minimal</td>
<td>Sunken</td>
</tr>
</tbody>
</table>
Abdominal examination

• Light & deep palpation: exclude signs of peritonitis

• Minimal tenderness to deep palpation can be found in dysentery, but need to exclude some surgical or serious medical conditions

• In acute diarrhea, guarding, rigidity and rebound tenderness should not be present
Conditions that should be excluded in a patient presenting with acute diarrhea

Appendicitis
Adnexitis
Diverticulitis
Peritonitis secondary to bowel perforation
Systemic infections: for example malaria, measles, typhoid, etc.
Inflammatory bowel disease
Ischemic enterocolitis
Mesenteric artery/venous occlusion
Rectal examination

• Should be part of the initial examination in every case, especially in patients over 50 years of age
• Allows the physician to see with certainty the character of stool and accurately assess the type of diarrhea
Laboratory evaluation

• Not routinely warranted for most acute diarrhea patients

• If substantial volume depletion is present, serum electrolytes should be measured to screen for hypokalemia or renal dysfunction

• Complete blood count *does not* reliably distinguish bacterial etiologies from others but may be helpful in suggesting severe disease
• Determination of the precise cause of diarrhea is not always necessary.

• Assessment of a stool specimen to determine the cause should be performed on patients at high risk of severe illness and for whom identification of a pathogen would be important for the patient or for public health reasons.
Stool evaluation

- **Stool examination** for fecal white and red blood cells
- **Stool culture** for microorganism
Stool examination

• **Watery diarrhea with dehydration** or **bloody diarrhea**

• Dark-field microscopy (or fine adjustment of light microscopic examination) to look for active motile ‘shooting’ bacteria is strongly recommended in all patients with watery diarrhea with dehydration----**Vibrio cholera**

• Presence of stool ova and parasites
Stool culture

- Bloody diarrhea
- Moderate to severe diarrhea with objective evidence of dehydration
- Diarrhea that does not subside after a few days
Recommendations

• Stool testing should be performed in people with diarrhea accompanied by fever, bloody or mucoid stools, severe abdominal cramping or tenderness, or signs of sepsis.

2017 IDSA Guidelines for the Diagnosis and Management of Infectious Diarrhea
Stool specimens

• Should be transported to the microbiology department ideally within 2h after the passage, but 8-12 h would also be acceptable.

• For ova and parasites, 3 specimens should be sent on consecutive days, since parasite excretion may be intermittent in contrast to bacterial pathogens.

• In cases in which stool specimens are not available, rectal swabs should be obtained and put in transport media until culture.
Blood cultures

- Infants <3 months of age
- With signs of septicemia or when enteric fever is suspected
- With systemic manifestations of infection
- Immunocompromised
- With certain high-risk conditions such as hemolytic anemia
- Traveled to or have had contact with travelers from enteric fever–endemic areas with a febrile illness of unknown etiology

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Further investigation

• Including sigmoidoscopy or colonoscopy, colonic biopsy together with culture

• Considered in cases of bloody diarrhea without an identifiable pathogen, which do not improve after empiric treatment
Experience

- The presence of blood in stool suggests infection by invasive organisms, inflammation, ischemia, or neoplasm.

- Large-volume diarrhea suggests small-bowel or proximal colonic disease.

- Small, frequent stools associated with urgency suggest left colon or rectal disease.
Small bowel origin

- Watery, large volume
- Associated with abdominal cramping, bloating, and gas
- Weight loss can occur if diarrhea becomes persistent
- Fever and occult blood or inflammatory cells in the stool are rare

Large intestinal origin

- Frequent, small volume
- Associated with painful bowel movements
- Fever and bloody or mucoid stools are common
- Red blood cells and inflammatory cells can be seen routinely on stool microscopy
Treatment

The principal components of the treatment of acute diarrhea:

- Fluid and electrolyte replacement
- Dietary modifications
- Drug therapy

Nonspecific ancillary treatment
Antimicrobials
Rehydration

• The most important thing is to begin preventing dehydration as early as possible.

• Replacement of water, electrolytes, and nutrients lost during diarrhea is essential in the management of diarrhea.

• Oral rehydration therapy (ORT) is the administration of fluid by mouth to prevent or correct dehydration that is a consequence of diarrhea.

• ORT is the standard for efficacious and cost-effective management of acute diarrhea.
Rehydration

- **Patients without dehydration**: adequate fluid intake
- **Patients with dehydration**: intravenous fluids or oral rehydration therapy with isotonic, electrolyte solutions containing glucose or starch
Inverse association between coverage rates of ORT use and rates of mortality from diarrhea in various countries
Oral Rehydration Solution (ORS)

- Reduced osmolarity ORS is recommended as the first-line therapy of mild to moderate dehydration in infants, children, and adults with acute diarrhea from any cause.

- Nasogastric administration of ORS may be considered in infants, children, and adults with moderate dehydration, who cannot tolerate oral intake, or in children with normal mental status who are too weak or refuse to drink adequately.
Oral Rehydration Salts Solution (ORS):
less expensive, just as effective, more practical

- Sodium chloride 3.5 g
- Sucrose 40 g (or glucose 20 g)
- Trisodium citrate dihydrate 2.9 g
  (or sodium bicarbonate 2.5 g)
- Potassium chloride 1.5 g

*Dissolved in one litre of drinking water*
• The amount to be taken should be approximately 1.5–2 times the estimated amount of deficit plus concurrent loss.

• In general, ORT should be taken by mouth slowly and intermittently by ‘sipping’ little by little
Mechanism

- Lower osmolarity
- Sodium-glucose cotransporter located in the small intestine
- Function of this cotransporter depends on the simultaneous presence of intraluminal glucose and sodium.
• In many small bowel diarrheal illnesses, intestinal glucose absorption via sodium-glucose cotransport remains intact.

• Thus, in diarrhea caused by any organism that depends on small bowel secretory processes, the intestine remains able to absorb water if glucose and salt are also present to assist in the transport of water from the intestinal lumen.
Intravenous fluid replacement

Who need?

• Severely dehydrated or hypovolemic shock
• Altered mental status
• Moderate or milder degree of dehydration with severe vomiting and are unable to drink ORS properly
• Ileus
• Failure of ORS therapy
Intravenous fluid replacement

- *Ringer’s lactate* is best recommended for all forms of acute diarrhea in adults.
- The total fluid deficit can be replaced safely within *the first 4h* of therapy, *half within the first hour*.
- The volume of fluid is determined by *the rate of stool loss* and *the degree of pre-existing dehydration*. 
For Severe Dehydration

Can you give intravenous (IV) fluids?

Yes
1. Give IV fluids.
2. After 4-6 hours, reassess and choose the suitable treatment plan.

No

Can the patient drink?

Yes
1. Start treatment with ORS
2. Send the patient for IV treatment

No

Are you trained to use a nasogastric tube for rehydration?

Yes
1. Start rehydration using the tube
2. If IV treatment is available nearby, send the patient for immediate IV treatment.

No

URGENT:
Send the patient for IV treatment

Note: If there is a high fever, cool the patient with a wet cloth and fanning.
IV transfer to ORS

In severe dehydration, intravenous rehydration should be continued until:

• Pulse, perfusion, and mental status normalize
• Patient awakens
• Has no risk factors for aspiration
• Has no evidence of ileus

The remaining deficit can be replaced by using ORS
• Once the patient is rehydrated, maintenance fluids should be administered

• Replace ongoing losses in stools from infants, children, and adults with ORS, until diarrhea and vomiting are resolved
Dietary modifications

- Total food abstinence is unnecessary and not recommended
  - Adequate nutrition during an episode of acute diarrhea is important to facilitate enterocyte renewal
  - Encourage patients to frequent, small meals throughout the day (6 meals/d)
  - If patients are anorectic, a short period of consuming only liquids will also not be harmful
Avoid

Dairy products, because transient lactase deficiency can be caused by enteric viral and bacterial infections

Caffeinated products and alcohol, which can enhance intestinal motility and secretion and increase stool volume
Avoid Foods with high fat content, should also be avoided until the gut function returns to normal after a severe bout of diarrhea.

Lactose-containing foods, temporary avoidance may be reasonable, because secondary lactose malabsorption is common following infectious enteritis and may last for several weeks to months.
Ancillary treatment

• Ancillary treatment with antidiarrheal, antinausea, or antiemetic agents can be considered once the patient is adequately hydrated, but their use is not a substitute for fluid and electrolyte therapy.

• Antinausea and antiemetic may be given to facilitate tolerance of oral rehydration in children >4 years of age and in adolescents with acute gastroenteritis associated with vomiting.
Antidiarrheal Agents

May help in:

• Reducing amount of fluid loss, frequency and consistency of stool

• Shorten the clinical course of diarrhea

• Improves the quality of life
Antidiarrheal Agents

- Antimotility drugs
- Anticholinergics
- Adsorbents
- Antisecretory drugs
Antimotility drugs

loperamide, diphenoxylate, codeine, tincture opium and other opiates

• Helpful in mild to moderate secretory diarrhea

• Contraindicated in diarrhea caused by invasive pathogens (bloody stool with high fever), immunocompromised host

• Reduce the frequency, not to ‘stop’ diarrhea
Notice

• May mask the amount of fluid lost, since fluid may pool in the intestine. Thus, fluids should be used aggressively when antimotility agents are employed.

• May facilitate the development of the hemolytic-uremic syndrome (HUS) in patients infected with enterohemorrhagic Escherichia coli.
Notice

• Should not be given to children <18 years of age with acute diarrhea

• Should be avoided at any age in suspected or proven cases where toxic megacolon may result in inflammatory diarrhea or diarrhea with fever
Anticholinergics

atropine, hyoscine

• May have some value in selected cases in reducing pain from abdominal cramps
• Not effective in reducing the frequency and volume of stools
• High dose may cause dry mouth, urinary retention, blurred vision, palpitation, ileus and exacerbation of glaucoma
Adsorbents

activated charcoal, pectin, aluminum hydroxide

• Adsorb toxins produced by toxigenic bacteria and act by preventing their adherence to intestinal membranes

• Have to be given very early before the toxins are fixed to intestinal mucosa

• Increase stool consistency and decrease stool frequency, but cannot reduce the amount of fluid loss

• Maintain adequate hydration & proper diet, especially in elderly

• Not effective in patients with febrile bloody diarrhea
Antisecretory drugs

Bismuth salts preparations

- Reduce the number of stools passed by about 50%, with improvement in other associated symptomatology

- The side-effects include blackened stool, blackened tongue, tinnitus and fecal impaction
<table>
<thead>
<tr>
<th>Agent</th>
<th>Indication</th>
<th>Dosage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Loperamide</strong></td>
<td>Acute diarrhea; low-grade or no fever; no dysentery</td>
<td>2 tablets (4 mg) initially, then 2 mg after each unformed stool for (&lt;) 2 days; not to exceed 8 mg/day (OTC) or 16 mg/day (prescription)</td>
<td>Minimal central opiate effects; preferred agent for most afebrile, nondysenteric patients</td>
</tr>
<tr>
<td><strong>Diphenoxylate-Atropine</strong></td>
<td>Acute diarrhea; low-grade or no fever; no dysentery</td>
<td>2 tablets (4 mg) <em>qid</em> for (&lt;) 2 days</td>
<td>Central opiate effects; risk of overdose; atropine may cause side effects without providing antidiarrheal effects</td>
</tr>
<tr>
<td><strong>Tincture of Opium</strong></td>
<td>Acute diarrhea; low-grade or no fever; no dysentery</td>
<td>0.5-1 mL <em>po</em> every 4-6 hr for (&lt;) 2 days</td>
<td>Occasionally useful in HIV-infected patients</td>
</tr>
<tr>
<td><strong>Bismuth Subsalicylate</strong></td>
<td>Acute diarrhea of any form</td>
<td>30 mL or 2 tablets every 30 minutes for eight doses; may repeat on day 2</td>
<td>Less effective than loperamide in most patients; cannot be combined with antimicrobials; should not be used in HIV-infected patients</td>
</tr>
</tbody>
</table>
Probiotics

• Non-pathogenic organisms (Lactobacillus acidophilus)
• Multiply in intestine and produce metabolites
• Increase acidity of stool and prohibit the growth of enteropathogens
• Prevent the invasion of bacteria in intestine tissue
• Produce short chain fatty acids that are beneficial for intestine recovery
• Increase the rate of fluid and electrolyte absorption
Antimicrobial Therapy

• It is of benefit in less than 10% of patients with acute diarrhea

• Developing antibiotic resistance

• Cause antibiotic-associated diarrhea

• Generally not prescribed
Empiric antibiotic therapy

- Infants <3 months with suspicion of bacterial etiology
- Ill immunocompetent people with fever documented in a medical setting, abdominal pain, bloody diarrhea, and bacillary dysentery presumptively due to *Shigella*
- People who have recently traveled internationally with body temperatures ≥38.5°C and/or signs of sepsis

*2017 IDSA Guidelines for the Diagnosis and Management of Infectious Diarrhea*
Notice

• Clinicians should evaluate people for postinfectious and extraintestinal manifestations associated with enteric infections

• Empiric treatment should be avoided in people with persistent watery diarrhea lasting 14 days or more
Selection of antibiotics

• Follow **the antibacterial sensitivity** of the pathogen that was isolated

• If antibiogram is not available, follow **the available local or regional data regarding antibiotic susceptibility** in that region or country

• If no such information is available, use of conventional **recommended antibiotics**
Empiric antimicrobial therapy

• **In adults** should be either a **fluoroquinolone** such as ciprofloxacin, or **azithromycin**, depending on the local susceptibility patterns and travel history.

• **For children** includes a **third-generation cephalosporin** for infants <3 months of age and others with neurologic involvement, or **azithromycin**, depending on local susceptibility patterns and travel history.
People with clinical features of sepsis who are suspected of having enteric fever should be treated empirically with broad-spectrum antimicrobial therapy after blood, stool, and urine culture collection.

Antimicrobial therapy should be narrowed when antimicrobial susceptibility testing results become available.

If an isolate is unavailable and there is a clinical suspicion of enteric fever, antimicrobial choice may be tailored to susceptible patterns from the setting where acquisition occurred.
Bacterial diarrhea

• Rehydration therapy
• Dietary modifications
• Antiemetics (metoclopramide)
• Abdominal cramping pain may respond to antispasmodics (hyoscine, hyoscyamine and dicyclomine)
• Antibiotic therapy
Viral gastroenteritis

• Rehydration treatment
• Dietary modifications
• Bismuth salts preparations
Summary

From this class, you should know:

• What is acute diarrhea?
• How to evaluate a patient with acute diarrhea?
• The therapy for acute diarrhea
What is acute diarrhea?

• Definition (frequency, duration)

• Etiology (infectious/noninfectious)

• Mechanisms (Osmotic / Secretory / Exudation / Abnormal motility)
How to evaluate a patient with acute diarrhea?

• Assessing **the severity of the illness** : signs of hypovolemic shock

• Assessing **the need for rehydration** : signs of dehydration

• Identifying **the likely causes** on the basis of the history and clinical findings
The therapy for acute diarrhea

• Fluid and electrolyte replacement (oral VS IV)
• Dietary modifications
• Drug therapy
  Nonspecific ancillary treatment
  Antimicrobials
QUESTIONS?
THANKS!