Diarrhea

A messy subject
A 1 year old girl is brought to clinic with 3 days of watery brown diarrhea, vomiting, and irritability. On exam the child is lethargic, afebrile, with sunken eyes and a weak pulse of 140/minute. Which of the following is the best management plan?

A) Check CBC and stool tests for pathogens
B) Prescribe oral rehydration solution
C) Prescribe oral antibiotics
D) Begin IV fluids and hospitalize
“More than 70 per cent of almost 11 million child deaths every year are attributable to six causes: diarrhoea, malaria, neonatal infection, pneumonia, preterm delivery, or lack of oxygen at birth.”

- UNICEF
Deaths per year from diarrheal illness

- United States: 6,000
- Developing world: 1.5 to 2 million (children < 5 years old)

World Gastroenterology Organization (WGO) Practice Guideline
Acute Diarrhea (March 2008)
Classification of diarrhea

- **Acute diarrhea**
  - Presence of three or more loose, watery stools within 24-hours

- **Dysentery**
  - Bloody diarrhea, visible blood and mucous present

- **Persistent diarrhea**
  - Episodes of diarrhea lasting more than 14 days
Acute diarrhea is usually a self-limited infectious illness.

Usually viral (Norwalk) or bacterial.

Vomiting: - Viral - Ingestion of a pre-formed toxin

Profuse watery diarrhea: - Viral - Cholera - Giardia - Ingestion of a pre-formed toxin

Risk factors for death: - Extremes of age, malnutrition, immunocompromise

http://bepast.org/docs/photos/cholera/rice-water%2520stool.jpg
Acute diarrhea: clinical priorities

- Look at the stool
  - rice water stool: cholera
  - bloody stool: dysentery

- Assess severity
  - signs of dehydration, malnutrition
  - abdominal exam
  - body temperature

- O + P exam for moderate/severe illness

- Hgb if pt looks anemic

http://spirochetesunwound.blogspot.com

http://biology.unm.edu/ccouncil/Biology_203/Images
Exam: nutritional and volume status
Kwashiorkor: lack of protein

Marasmus: protein + calorie malnutrition

Malnutrition is a major risk factor for diarrhea mortality
Exam: volume status

• Adults and Children
  • Tachycardia, postural hypotension
  • Jugular venous distension
  • Mucous membranes

• Children
  • Urine output, dry mouth/eyes
  • Sunken fontanelle
  • Skin turgor
  • Irritable or lethargic, drinking poorly
No dehydration
- alertness normal
- no sunken eyes
- normal drinking
- immediate skin pinch

Mild dehydration (>2 signs)
- restless or irritable
- sunken eyes
- drinks eagerly
- slow skin pinch (<2 seconds)

Severe dehydration (>2 signs)
- abnormally sleepy or lethargic
- sunken eyes
- drinking poorly or not at all
- very slow skin pinch (>2 seconds)
If the gut works, use it
Oral rehydration saves lives

Fig. 1  Inverse association between coverage rates of oral rehydration solution (ORS) use and rates of mortality from diarrhea in various countries.
Oral rehydration solution (ORS)

Rice-based ORS is superior to glucose-based ORS in patients with cholera.

WGO Practice Guideline – Acute Diarrhea March 2008

<table>
<thead>
<tr>
<th>Constituent</th>
<th>mmol/L</th>
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<tbody>
<tr>
<td>Sodium</td>
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</tr>
<tr>
<td>Chloride</td>
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<tr>
<td>Glucose, anhydrous</td>
<td>75</td>
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<tr>
<td>Potassium</td>
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<tr>
<td>Citrate</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total osmolarity</strong></td>
<td><strong>245</strong></td>
</tr>
</tbody>
</table>

Table 4 Oral rehydration solution (ORS) constituents
Rx of mild/moderate dehydration

Rehydration therapy
ORS 50-100 mL/kg body weight over 3-4 hours

Replacement of losses
<10 kg body weight: 60-120 mL ORS for each diarrheal stool or vomiting episode

Nutrition
Continue breastfeeding, or resume normal diet after initial hydration

WGO Practice Guideline – Acute Diarrhea March 2008
Rx of severe dehydration

Rehydration therapy
Rehydrate with Ringer’s lactate (100 mg/kg) intravenously within 4-6 hours then administer ORS to maintain hydration until patient recovers

Replacement of losses
<10 kg body weight: 60-120 mL ORS for each diarrheal stool or vomiting episode

Nutrition
Continue breastfeeding, or resume age-appropriate normal diet after initial hydration

WGO Practice Guideline – Acute Diarrhea March 2008
Acute diarrhea Rx - children

- Admit to hospital if malnourished, severely dehydrated, age < 1 year, recent measles
- ORS if dehydrated; IV fluids (RL, NS) if severely dehydrated; rehydrate over 3 to 6 hours
- Re-feed as soon as rehydration is accomplished
- Zinc 20 mg daily x 14 days
- Antibiotics not usually indicated
- Give antibx for:
  - Dysentery
  - Suspicion of cholera or enteric fever
  - Giardiasis or amebiasis
Acute diarrhea Rx - adults

- ORS or IV fluids (RL, NS) if severely dehydrated
- Bismuth or loperamide (contraindicated if there is fever or bloody stool)
- Antibiotics not usually indicated
- Give antibx for:
  - Dysentery (some cases)
  - Suspicion of cholera or enteric fever
  - Giardiasis or amebiasis
Dysentery

- Bloody stools
- Shigella, enterohemorrhagic E.coli (EHEC), other bacteria – often with fever
- Enteric fever (salmonella typhi)
- Amebiasis – no fever (unless in liver)
- Less likely causes: ischemic colitis or inflammatory bowel disease
- Infectious dysentery is usually a self-limited disease that does not require antibiotic therapy
Dysentery: Antibiotics

- Antibiotics recommended for:
  - Salmonella typhi, ameoba
  - Extremes of age
  - Immunocompromised or malnourished patients
  - Toxic patients, suspicion of sepsis

- Antibiotic Rx may precipitate hemolytic-uremic syndrome in children, especially in industrialized countries

library.thinkquest.org/26260/pg1.html
## Antimicrobials

| **Cholera** | Adults: doxycycline 300 mg once, or tetracycline 500 mg daily x 3 days  
| Children: azithromycin, TMP/SMX, furazolidone, norfloxacin |
| **Shigellosis** | Adults: ciprofloxacin 500 BID x 2 days, or azithromycin or ceftriaxone  
| Children: ciprofloxacin 15 mg/kg BID x 2 days, or azithromycin, or ceftriaxone 50-100 mg/kg daily i.m. x 2-5 days  
| Resistance is common |
| **Giardia** | Metronidazole, tinidazole, nitazoxanide, or paromomycin |
| **Ameoba** | Metronidazole followed by iodoquinol or paromomycin |
Persistent diarrhea - children

• Among infants in developing countries, 20% of acute diarrheal illnesses become chronic
• Enteropathogenic E coli (EPEC), Giardia
• Vicious cycle of diarrhea and malabsorption leading to death
• Consider HIV
• Rx is largely nutritional:
  • Iso-osmolar carbohydrate porridge, via feeding tube if needed
  • MVI and zinc
  • Antibiotics
Persistent diarrhea - adults

- Consider HIV
- Campylobacter ileitis: chronic diarrhea, RLQ tenderness, signs of inflammation
- TB enteritis: doughy abdomen
- Parasites: Giardia, ameoba, cryptosporidium, isospora belli, cyclospora
- Wasting, or fat in stool? Consider sprue, chronic pancreatitis
- Inflammatory bowel disease or malignancy

http://scanned.files.wordpress.com/2007/10/aidspatient2.jpg
### Lab tests

- **Stool for ova and parasites**
  - Especially in severe or persistent diarrhea
- **Fecal leukocytes**
  - Suggests colitis, invasive organism
- **CBC**
  - Won’t alter acute Rx, unless there are signs of severe anemia
- **Stool culture**
  - Usually not available or required
- **Stool Sudan stain (fecal fat)**
  - In chronic diarrhea with weight loss
- **X-Ray**: if concern for toxic megacolon
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Resources


Cincinnati Children’s Hospital Medical Center. Evidence-based clinical care guideline for acute gastroenteritis (AGE) in children aged 2 months through 5 years. Cincinnati, OH: Cincinnati Children’s Hospital Medical Center — Hospital/Medical Center, 1999 (revised 2005 Oct 31; reviewed 2006 May).


