ECHO Summary, 26/APR/2024

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Approach to Cholera, Typhoid, and Other Diarrheal Illnesses in Adults

ECHO Session Panelists:
Experts

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4. Dr. Anthony Ochanit, IM Resident, Makerere University

Patient Case Presenter
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Moderator
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Definitions

- Diarrhea refers to the passage of ≥ 3 loose stools per day
- Dysentery refers to bloody diarrhea, with visible blood and mucus
- Persistent diarrhea refers to diarrhea lasting ≥ 14 days [1]

Epidemiology

- The global burden is as high as 3 billion cases per year

    - Africa has the highest incidence rate at 724.6 cases per 100,000 people per year
- More common among children under 5, with the most common cause being rotavirus
- Diarrhea occurs commonly in under-resourced parts of the world with low-income levels, poor sanitation, and poor immunization rates
- Travelers' diarrhea is commonest among adults with *E. coli* being the most implicated organism
- Causes
    - Viruses: Rotavirus, Norovirus, adenovirus, measles, hepatitis A virus, hepatitis E virus, Ebola, measles
    - Bacteria: *Vibrio cholera, Escherichia coli, Salmonella, Shigella, Campylobacter*
    - Protozoa: giardiasis, malaria, cryptosporidia
    - Heliminthes: strongyloidiasis, schistosomiasis
    - Malnutrition/kwashiorkor
    - Drugs: prolonged use of purgatives and broad-spectrum antibiotics
    - Unhygienic feeding methods
    - Malabsorption syndrome
    - Lactose intolerance
    - HIV associated-diarrhea
    - Irritable bowel syndrome
    - Metabolic: diabetes, thyroid disease
    - Travellers’ diarrhoea
    - Inflammatory bowel disease (usually bloody) [1]

Risk Factors

- Low socioeconomic status
- Extremes of age (the young and very elderly)
- Recent travel to endemic settings
- Poor hygiene
- Overcrowding
- Lack of routine immunization programs

Clinical features

- **AIRWAY**: Usually normal except in cases of shock where it could be threatened by a decreased level of consciousness. In these situations, intubate after hemodynamic stabilization (i.e. “resuscitate before you intubate”)
- **BREATHING**: May exhibit tachypnea if they are acidotic secondary to dehydration. Patients should not be hypoxic unless they are in shock
- **CIRCULATION**: May exhibit dehydration and features of shock
    - Categorize the dehydration into mild, moderate or severe dehydration

Signs	Mild < 3% Body Weight Lost	Moderate 3-9% Body Weight Lost	Severe > 9% Body Weight Lost
Mental Status	Normal	Fatigued, Irritable	Lethargic, Unconscious
Breathing	Normal	Increased	Tachypnea
Mucous membranes	Moist	Dry	Parched
Tears	Normal	Decreased	Absent
Capillary refill	< 2 seconds	Prolonged	Minimal

Clinical Sign	LR + [95% CI]
<u>Two or more of following 4 signs:</u> • Capillary refill time • Dry mucous membranes • Absence of tears • Abnormal overall appearance	**6.1** [3.8 to 9.8]

Gorelick MH et al. Validity and reliability of clinical signs in the diagnosis of dehydration in children. *Pediatrics.* 1997; 99(5):E6

Source for images: https://www.emdocs.net/pem-playbook-diarrhea/

- **DISABILITY**: Check glucose levels and level of consciousness
    - Remember that hypoglycemia can lead to seizures
- **EXPOSURE**: Assess dehydration, take temperature

Diagnostics

- Stool analysis (stool sample or rectal swab) - the gold standard to assess for a specific causative agent. Studies that should be sent include a gram stain, microscopy, and culture)
    - Remember to consider testing for opportunistic infections in patients with HIV or other immunocompromise, particularly with CD4 <100 cells/µL
    - In patients with a CD4 <50 cells/µL, consider testing for CMV immunoglobulin M and acid-fast staining for *Mycobacterium avium* complex [2]
- Blood workup - complete blood count (CBC), blood culture and sensitivity, electrolytes, lactate, and rapid antibody tests for typhoid and cholera
- Imaging - for severe infections to complications such as gastrointestinal tract (GIT) perforation or malignant causes of diarrhea

Treatment

- The initial approach includes resuscitation - i.e. assess and address the ABCDEs, provide oral rehydration solution (ORS)

Dehydration Type	Treatment Recommendation	Administration Method		
Severe dehydration	IV LR or, if not available, NS and ORS. Avoid dextrose and water solutions	Administer as follows:		
		Age <1 year	Timeframe	Total volume
			0–60 min	30 ml/kg
			60 min–6 h	70 ml/kg
			6 h–24 h	100 ml/kg
		Administer as follows:		
		Age ≥1 year	Timeframe	Total volume
			0–30 min	30 ml/kg
			30 min–3 h	70 ml/kg
Moderate Dehydration	ORS	Administer as follows:		
		Age All ages	Volume of ORS	
			75 ml/kg in the first 4 hours, then repeat if the patient still shows signs of dehydration. If not, use ORS to replace ongoing diarrheal losses using the treatment plan for mild dehydration below	
Mild Dehydration	ORS	Administer after each loose stool:		
		Age	Volume of ORS	
		<2 years	50–100 ml	
		2–9 years	100–200 ml	
		≥10 years	As much as patient wants	

Table source: https://www.emdocs.net/cholera-ed-presentation-evaluation-and-management/. Adapted from: Centers for Disease Control and Prevention (U.S.). Rehydration Therapy. Published online November 14, 2022. Accessed February 27, 2024.https://www.cdc.gov/cholera/treatment/rehydration-therapy.html

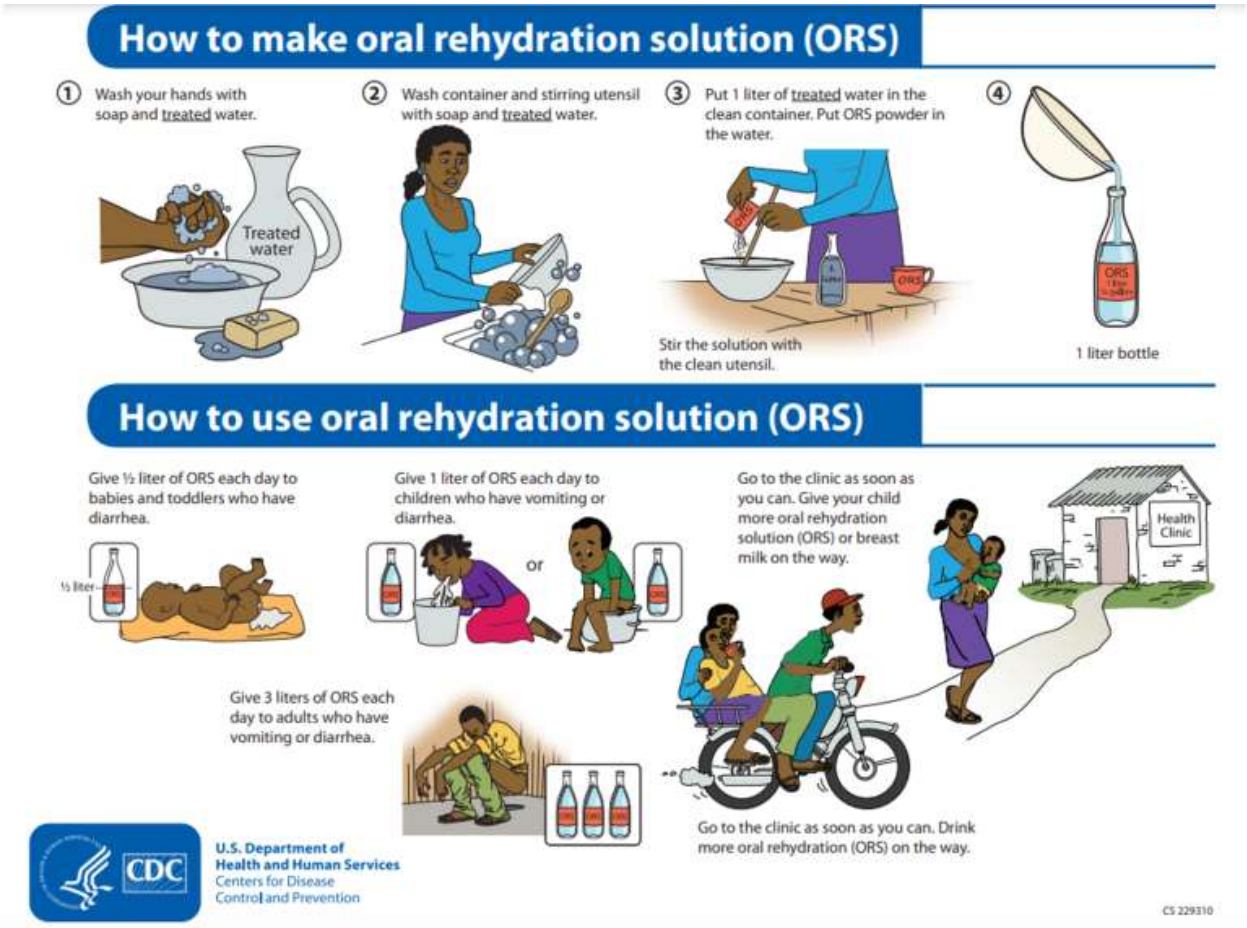
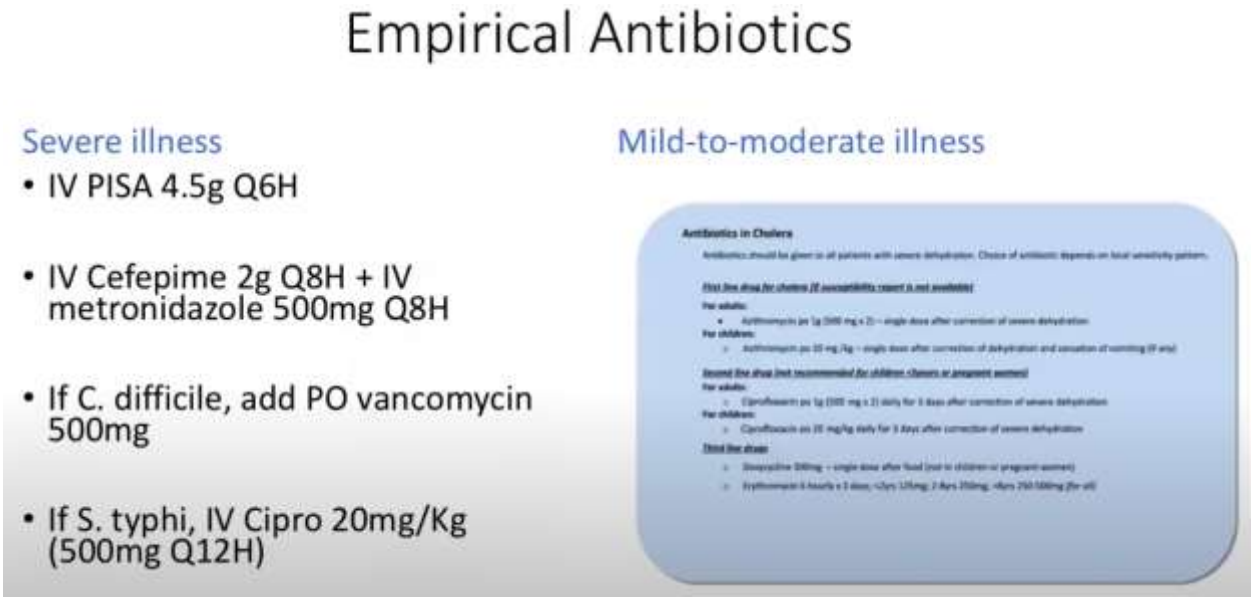


Image source: Centers for Disease Control and Prevention (U.S.). Posters for the Prevention & Control of Cholera: How to Make Oral Rehydration Solution (ORS). Published online October 20, 2021. Accessed March 5, 2024. https://www.cdc.gov/healthywater/pdf/global/posters/11_229310-J_ORS_print-africa.pdf

    - If the patient is unable to take fluids by mouth, consider intravenous (IV) fluid bolus resuscitation (30 ml/kg)
    - Provide dextrose boluses if hypoglycemic
- Empiric antibiotics in all casees of severe dehydration, depending on local resistance patterns. Change antibiotics based on results of stool cultures or rapid antibody tests



PISA = piperacillin and tazobactam

- Adjunctive medications
    - Antipyretics (i.e. paracetamol) for fever
    - Antimotility agents (i.e. loperamide, bismuth salicylate) - these are controversial and should be avoided in suspected cases of bacterial infection leading to diarrhea
    - Anti-emetics for vomiting
    - Zinc therapy in cases of cholera, as this may shorten the duration and severity of diarrhea [3]
        - Dosage of 20 milligrams per day for children older than six months for 10–14 days [1]
    - For persistent/chronic diarrhea
        - Children: vitamin A should be considered. 6-11 months of age, give 100,000 IU; 1-6 years of age, give 200,000 IU [1]

Complications

- Severe dehydration and shock
- Electrolyte Imbalances such as hypokalemia, hyponatremia/hypernatremia, hypocalcemia, acidosis/alkalosis
- Hypoglycemia
- Gastrointestinal bleeding and GIT perforation.
- Acute renal failure (usually prerenal secondary to dehydration)

Disposition

- Discharge home after hours of stabilization in the ED if mild or moderate dehydration

- Admission to the patient floor if requiring large amounts of fluid resuscitation, having persistent loose stools, there is poor adherence to home remedies such as ORS, or extremes of age
- Isolation if the patient is suspected to have cholera, typhoid, or *Clostridium difficile*
- Critical care unit if in shock

Prevention

- Encourage handwashing, use of clean drinking water, and proper waste disposal
- Remind families about the importance of the following vaccinations: measles, rotavirus, polio, hepatitis A virus [1]

Special Notes

- Have a high index of suspicion for cholera, hepatitis A or E virus infections, Ebola, etc. isolate the patient, and notify public health authorities promptly [1]

Collaborating Partners

1. Ministry of Health of the Republic of Uganda
2. Seed Global Health
3. Techies Without Borders

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3. Omba G, Pelletier J. Cholera: ED presentation, evaluation, and management. Published March 11, 2024. Accessed March 11, 2024. https://www.emdocs.net/cholera-ed-presentation-evaluation-and-management/