

Dehydration/Oral Rehydration Clinical Practice Guidelines

This guideline has been developed to ensure proper rehydration in patients 1 to 60 months of age with acute gastroenteritis (diarrheal illness of rapid onset with or without nausea, vomiting, fever, abdominal pain) and with no other diagnosed disorders. The guideline is not to be used in patients with diarrhea for over 10 days, diarrhea associated failure to thrive, or vomiting without diarrhea. The recommendation to withhold antibiotics should be modified if a protozoal illness is suspected or if dysenteric signs and symptoms (fever, bloody stool, pus in stool) are present. **Contra-indications to oral rehydration are outlined on page 2.** Please direct questions to Dr. Jennifer Jewell, BBCH Pediatric Hospitalist, at 207-662-2541.

EVALUATION OF DEHYDRATION

The most accurate way to estimate dehydration is to compare a recent weight (when the patient was well) and the current weight. Clinical parameters to assess hydration status are outlined below. The appropriate method of rehydration depends on the percent dehydration.

	Mild (3-5%)	Moderate (6-9%)	Severe ($\geq 10\%$)
General	Alert	Restless, Irritable	Lethargic/unconscious
Blood Pressure	Normal	Normal	Normal, decreased
Quality of Pulse	Normal	Normal, slightly decreased	Moderately decreased
Heart Rate	Normal	Increased	Increased
Skin Turgor	Normal	Decreased	Decreased
Fontanelle	Normal	Sunken	Sunken
Mucus Membranes	Slightly dry	Dry	Dry
Eyes	Normal	Sunken	Deeply sunken
Extremities	Warm, normal cap refill	Delayed cap refill	Cool, mottled
Urine Output	Slightly decreased	< 1 ml/kg/hr	<< 1 ml/kg/hr
Thirst	Slightly Increased	Moderately increased	Increased/Decreased

ORAL REHYDRATION THERAPY (ORT) is appropriate for patients with mild and moderate dehydration. Compared to IV rehydration, ORT is safer, less costly, and able to be administered in various clinical settings.

Oral rehydration solutions (ORS) should contain 45-90 mmol/L of sodium and 74-140 mmol/L of glucose. Acceptable, commercially available ORS include: Naturalyte, Pedialyte, Infalyte, Rehydralyte, WHO Oral Rehydration Salts, and Pediatric Electrolytes. Cereal-based ORS is also available and has been shown to decrease diarrhea by 20-30% compared to glucose-containing ORS. Rehydralyte is the most appropriate ORS that is easily available.

Fluid replacement should be accomplished over 3-4 hours; additionally, 10 ml/kg for each episode of vomiting or watery stool will prevent further dehydration. For patients who are vomiting, 5 ml of ORS every 1-2 minutes should be attempted. For patients who refuse to take ORS orally or who continue to vomit, continuous nasogastric tube (NGT) rehydration should be considered.

Less than 3% dehydration (determined by weight or estimation): Encourage PO liquids and solids. Milk products and breastfeeding should be continued. There is little indication for ORS. Close monitoring for worsening dehydration is recommended and ORS to replace ongoing losses may be recommended (10ml/kg for each episode of vomiting or watery diarrhea).

MILD = 3-5% dehydration (determined by weight or estimation): Use ORS (orally or by NGT) to replace 50 ml/kg (or the exact losses if known by weight change) plus ongoing losses (10 ml/kg for each episode of vomiting or watery diarrhea) over 4 hours. Reevaluate every 2 hours. Begin age-appropriate diet after rehydration is accomplished. Continue to replace ongoing losses with ORS (10ml/kg for each episode of vomiting or watery diarrhea).

MODERATE = 6-9% dehydration (determined by weight or estimation): Use ORS (orally or by NGT) to replace 100 ml/kg (or the exact losses if known by weight change) plus ongoing losses (10 ml/kg for each episode of vomiting or watery diarrhea) over 4 hours. Reevaluate every hour. Begin age-appropriate diet after rehydration is accomplished. Continue to replace ongoing losses with ORS (10ml/kg for each episode of vomiting or watery diarrhea).

SEVERE = Over 9% dehydration (determined by weight or estimation): Arrange hospital admission, initiate IV fluids (20ml/kg lactated Ringer's or normal saline), order appropriate laboratory studies, begin ORT when patient is stable and improved. Age-appropriate feedings may be resumed after rehydration is accomplished.

EARLY REFEEDING is recommended. Patients who are not dehydrated may continue their typical age-appropriate diet. Dehydrated patients may resume their typical age-appropriate diet after being rehydrated. Most patients tolerate lactose-containing milk/formula safely. If a patient has worsening diarrhea with the resumption of lactose-containing products, consider checking stool for pH and reducing substances and instituting a lactose-free diet for 2 weeks. Breastfeeding should be continued during acute diarrheal illnesses. Foods that are well tolerated include: rice, wheat, potatoes, bread, cereal, lean meat, fruit, yogurt, vegetables. Poorly tolerated foods include: fatty foods, food or drinks high in simple sugars (juice, soft drinks/soda).

TYPICAL COURSE: The usual course of a diarrheal illness includes one to two days of fever and vomiting, followed by three to four days of diarrhea. Even severely dehydrated children are willing to attempt PO intake on the second or third day of illness. Discharge criteria from an in-patient hospital stay should include rehydration accomplished, oral intake of fluids adequate to maintain hydration status and follow-up arranged. For patients rehydrated in the ED or out-patient setting, follow-up should include: a phone call by the primary care provider the following day for cases of mild dehydration or a phone call the same day and an office visit the following day for moderate dehydration.

HYPERNATREMIC DEHYDRATION is dehydration associated with serum sodium over 150 mEq/L. It is associated with a doughy feeling of the skin and mental status changes. Patients with hypernatremic dehydration can be safely rehydrated orally. However, if the patient requires IV rehydration, the sodium deficit should be replaced slowly (over 48 hours) to prevent CNS complications. Frequent serum sodium levels are indicated.

SERUM ELECTROLYTES are helpful in patients with: signs and symptoms of hypernatremic dehydration, severe dehydration, or a history/physical exam that is inconsistent with straightforward acute gastroenteritis. **STOOL STUDIES** may be considered based on the clinical situation; **C. diff toxin, culture, WBC, O&P, Giardia antigen** may be considered but are not recommended if a virus is the most obvious source. **Rotavirus antigen** testing is rarely required, except for epidemiology studies and cohorting purposes.

CONTRA-INDICATIONS TO ORAL REHYDRATION AND ADMISSION CRITERIA

Over 9% dehydrated (determined by weight or estimation)	Signs of shock
Ileus or intestinal obstruction (proven or suspected)	Comatose or unconscious
Unable to tolerate ORT/NGT rehydration (persistent vomiting)	Unclear diagnosis
Significant psychosocial situation	

ANTI-DIARRHEAL THERAPIES are not recommended. **ANTI-EMETIC THERAPIES** are not routinely recommended; however, studies have demonstrated short-term benefits with PO or IV **ONDANSETRON**.

ANTIBIOTICS are not typically recommended for acute gastroenteritis except for patients with a proven or highly suspicious diagnosis of a parasite/Giardia or patients with dysentery and the following: less than 6 months of age, systemic illness, proven or high suspicion of Shigella.

REFERENCES

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3. Nager AL, Wang VJ. Comparison of nasogastric and intravenous methods of rehydration in pediatric patients with acute dehydration. *Pediatrics* 2002;109:566-72.
4. Ramsook C, Sahagun-Carreón I, Kozinetz CA, Moro-Sutherland D. A randomized clinical trial comparing oral ondansetron with placebo in children with vomiting from acute gastroenteritis. *Annals of Emergency Medicine* 2002;39:397-403.
5. Sandhu BK. Practical guidelines for the management of gastroenteritis in children. *Journal of Pediatric Gastroenterology and Nutrition* 2001;33:S36-9.

Algorithms are not intended to replace providers' clinical judgement or to establish a single protocol. Some clinical problems may not be adequately addressed in this guideline. As always, clinicians are urged to document management strategies. *Last revised May 2014.*

