

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

What is the best way to evaluate and manage diarrhea in the febrile infant?

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■ EVIDENCE-BASED ANSWER

Routine infant diarrhea requires no lab work or cultures (strength of recommendation [SOR]: **C**); the degree of dehydration can be determined reliably by percent body weight change (SOR: **B**). However, bicarbonate may help rule out dehydration (SOR: **B**); electrolytes and blood urea nitrogen may be useful in evaluating complicated diarrhea with severe dehydration or when intravenous fluids are required; stool cultures are indicated for bloody or prolonged diarrhea, suspected food poisoning, or recent travel abroad (SOR: **C**).

Oral rehydrating solution is adequate fluid replacement for diarrhea associated with mild to moderate dehydration, followed by prompt refeeding with an age-appropriate diet (SOR: **A**); intravenous fluids are recommended for severe dehydration (SOR: **C**). Probiotics have been shown to safely reduce the duration and frequency of diarrhea (SOR: **A**).

■ EVIDENCE SUMMARY

Evidence is summarized in the **Table**. Evaluation of an infant with diarrhea usually requires only a thorough history and physical exam. While no clinical trials have tested the impact of blood or stool testing on patient outcome, a recent systematic review suggested the only blood test reliable for ruling out dehydration is a serum bicarbonate greater than 15 to 17 mEq/L.¹ Consensus reports have suggested laboratory studies are unnecessary unless dehydration is severe or IV fluids are required; stool cultures are necessary only for bloody or prolonged diarrhea, systemically ill infants, suspected food poisoning, or recent travel abroad.^{2,3}

Effective management of infant diarrhea is based on the degree of dehydration, which can be estimated by percent body weight loss—the difference between the baseline and acute weights, divided by the baseline weight.³ If the baseline weight is not known, prolonged capillary refill time, abnormal skin turgor, and abnormal respiratory pattern are more reliable indicators of dehydration; other physical findings are less precise.¹

Infants with diarrhea who are not dehydrated should continue age-appropriate nutrition.⁴ For infants with mild to moderate dehydration, however, rehydration using oral rehydrating solution is the initial therapy, followed by continued hydration to replace ongoing losses.^{2,3} A meta-analysis of randomized controlled trials (RCTs) in developed countries demonstrated equivalent efficacy of oral fluids compared with IV fluids, with an overall failure rate of only 3.6% for infants and children treated with oral rehydrating solution (95% confidence interval [CI], 1.4–5.8). There was no significant difference between oral rehydrating solution of varying sodium concentrations, and no increased risk of hypernatremia or hyponatremia compared with the IV treatment arm.⁵ Continued breastfeeding during the rehydrating phase significantly reduced dehydration (based on case control studies; odds ratio [OR]=5.23; 95% CI, 1.37–19.99; $P=.016$, limited by sample size).^{3,6} Breastfeeding also significantly reduced the number of diarrheal stools (found in a small-scale RCT).⁷ For obtunded or severely dehydrated infants, or those with an ileus or persistent vomiting, expert opinion suggested IV fluids.^{2,4}

In a systematic review of RCTs comparing lower-concentration oral rehydrating solution with standard World Health Organization solution, lower-concentration solution showed superior efficacy. These resulted in fewer unscheduled infusions of IV fluids (OR=0.59; 95% CI, 0.45–0.79) and less stool output without increasing the incidence of hyponatremia.⁸

Unrestricted diets may reduce the duration of diarrhea compared with oral or IV fluids alone, and age-appropriate diets should be resumed immediately after hydration (based on a review of variable-quality RCTs and prospective trials or case series).² No studies supported the effectiveness of BRAT (bananas, rice cereal, applesauce, toast) diets over the infant's usual diet.^{2,4} A meta-analysis of variable-quality RCTs demonstrated no significant difference in stool frequency between lactose-containing and lactose-free diets.⁹ Comparisons of undiluted lactose-milk with diluted milk or delayed reintroduction of milk revealed no significant differences in treatment failure or duration of diarrhea, although stool output increased slightly with the undiluted diet. However, undiluted milk was superior for restoring body weight.⁹

Multiple RCTs showed that *Lactobacillus* supplementation shortened the duration of diarrhea for infants and young children^{10,11} and reduced the risk of diarrhea persisting more than 3 days (relative risk [RR]=0.43; 95% CI, 0.34–0.53; $P<.001$; number needed to treat [NNT]=4).¹¹ This probiotic can be reconstituted in oral rehydrating solution and administered 1 to 8 times daily, depending on the formulation.

Antidiarrheal agents are not recommended (based on limited reviews and consensus reports).^{2-4,12}

Evaluative strategies and therapeutic interventions for infant diarrhea

		Routine diarrhea*		Complicated diarrhea†		S O R
		Recomm ended	Not recomm ended	Recomm ended	Not recomm ended	
Evaluation	Serology		X	X		B 1

						C 2-3
	Stool culture		X	X		C 2-3
Intervention	WHO ORS (Osm 311 mmol/L)		X	X [‡]		A 8
	ORS (Osm 250 mmol/L)	X		X		A 8
	Age-appropriate diet after hydration	X		X		C 2
	Continued breast-feeding	X		X		B 6,7
	BRAT diet		X		X	C 2,4
	Lactose-free or dilute lactose diet		X		X	B 9
	Lactobacillus (probiotic)	X		X		A 10, 11
	Antidiarrheal agents		X		X	C 2,4, 12

* Mild to moderate dehydration, diarrhea of short duration without bloody stools, severe systemic illness, suspected food poisoning, or recent foreign travel.
† Severe dehydration, prolonged diarrhea, or diarrhea with bloody stools, severe systemic illness, suspected food poisoning, or recent foreign travel.
‡ Recommended for treatment of cholera.
ORS, oral rehydration solution; SOR, strength of recommendation; BRAT, bananas, rice cereal, applesauce, and toast.

■ RECOMMENDATIONS FROM OTHERS

The Centers for Disease Control and Prevention (CDC) recommends oral rehydrating solution for mild to moderate dehydration, and boluses of normal saline or Lactated Ringer's (20 cc/kg) for severe dehydration. For frail or malnourished infants, boluses of 10 cc/kg should be given until hydrated.

The CDC also recommended against nutrition containing simple sugars (soft drinks, juice, gelatin desserts) due to high osmotic loads, but noted that diets containing some fats may have a beneficial effect on intestinal motility. They also recommended age-appropriate use of complex carbohydrates, meats, yogurt, fruits and vegetables. Zinc supplementation may also be beneficial (SOR: **C**).¹²

CLINICAL COMMENTARY

Exam should note fever, weight loss, abdominal tenderness, blood in the stool

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The evaluation and management of an infant with diarrhea as always, begins with history. The length and severity of the illness, sick contacts, oral intake, travel, and characteristics of the stool are all important factors to consider. The physical exam should note presence of fever, weight loss, abdominal tenderness, and blood in the stool. Laboratory studies such as electrolytes, stool culture, and Wright stain are really only indicated if the child is severely dehydrated, unable to maintain hydration with oral intake and requires IV fluids, or if the episode is unusually protracted or the stool bloody.

A regular age-appropriate diet is essential, but parents should be counseled to avoid adding too much juice to the diet in an effort to rehydrate.

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