

A 9-month-old infant is brought to the emergency department with lethargy and tachypnea. He was healthy before developing fever and diarrhea four days ago. He has been taking some formula, but has had two to three episodes of diarrhea with each bottle. He has lost three pounds (1.4 kg) since his routine check-up two weeks ago. He has had one wet diaper in the past twenty four hours. On examination, his temperature is 102.5° F (39.1° C), pulse is 200/min, respiratory rate is 42/min, and blood pressure is 70/45 mm Hg. He is lethargic with decreased tone and decreased deep tendon reflexes. His mucous membranes are dry. Cardiopulmonary exam reveals tachycardia and tachypnea. His abdominal exam is unremarkable. Capillary refill is four seconds. Laboratory results are shown below.

Chemistry panel

Serum sodium	165 mEq/L
Serum potassium	4.5 mEq/L
Chloride	108 mEq/L
Bicarbonate	14 mEq/L
Blood urea nitrogen (BUN)	20 mg/dL
Serum creatinine	0.8 mg/dL
Calcium	10.0 mg/dL
Blood glucose	98 mg/dL

Which of the following fluids should be used as a bolus in the resuscitation of this infant?

- ☐ A. 0.9% saline
- ☐ B. 0.45% saline
- ☐ C. 5% dextrose
- ☐ D. 5% albumin
- ☐ E. Packed red blood cells

A 9-month-old infant is brought to the emergency department with lethargy and tachypnea. He was healthy before developing fever and diarrhea four days ago. He has been taking some formula, but has had two to three episodes of diarrhea with each bottle. He has lost three pounds (1.4 kg) since his routine check-up two weeks ago. He has had one wet diaper in the past twenty four hours. On examination, his temperature is 102.5° F (39.1° C), pulse is 200/min, respiratory rate is 42/min, and blood pressure is 70/45 mm Hg. He is lethargic with decreased tone and decreased deep tendon reflexes. His mucous membranes are dry. Cardiopulmonary exam reveals tachycardia and tachypnea. His abdominal exam is unremarkable. Capillary refill is four seconds. Laboratory results are shown below.

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Which of the following fluids should be used as a bolus in the resuscitation of this infant?

- ☒ A. 0.9% saline [67%]
- ☐ B. 0.45% saline [24%]
- ☐ C. 5% dextrose [7%]
- ☐ D. 5% albumin [1%]
- ☐ E. Packed red blood cells [1%]

- ☐ A. 0.9% saline [51%]
- ☐ B. 0.45% saline [24%]
- ☐ C. 5% dextrose [7%]
- ☐ D. 5% albumin [1%]
- ☐ E. Packed red blood cells [1%]

[Proceed to Next Item](#)**Explanation:**User Id: 

The signs and symptoms of hypernatremia are mainly neurologic and include lethargy, altered mental status, irritability, and seizures. Hypernatremia can also cause muscle cramps, muscle weakness, and decreased deep tendon reflexes.

Hypovolemic hypernatremia develops secondary to renal losses (eg, diuretic use, glycosuria) or extrarenal losses (eg, gastrointestinal upset, excessive sweating). Hypervolemic hypernatremia occurs due to exogenous sodium intake or mineralocorticoid excess (eg, hyperaldosteronism).

When treating a patient with hypernatremia, the sodium must be slowly returned to normal. In this infant with hypernatremia and dehydration, the initial goal is to stabilize him with fluid resuscitation as needed. When giving intravenous fluid boluses, only isotonic solutions such as normal saline or lactated Ringer's should be used.

(Choices B and C) Half normal saline and 5% dextrose are hypotonic solutions. As such, they should never be used for initial resuscitation because they quickly exit the intravascular system and lower the sodium too rapidly. Precipitous drops in sodium levels can cause cerebral edema.

(Choice D) Multiple studies have demonstrated that the expensive colloid solutions are no better than crystalloids at fluid resuscitation.

(Choice E) Packed red blood cells may be appropriate in initial fluid resuscitation when bleeding is a major issue. Because of the limited availability of packed red blood cells on short notice, however, isotonic solutions remain the mainstay of initial fluid resuscitation (even in individuals with massive bleeding).

Educational objective:

Isotonic solutions such as normal saline are the fluid of choice for initial resuscitation in severe hypovolemic hypernatremia.

Time Spent: 2 seconds

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