

A 12-month-old baby girl is brought to the physician because of vomiting and diarrhea. She became ill three days ago when she developed a low-grade fever and diarrhea. She refuses to eat, but was drinking some until yesterday when she began vomiting. In the last 24 hours, she has had one wet diaper. Her temperature is 38°C (100.4°F), pulse is 110/min, respiratory rate is 25/min, and blood pressure is 90/50 mmHg. On examination, she is lethargic with sunken eyes. Her mucous membranes are dry and her capillary refill is 3-4 seconds. Which of the following is the next best step in the management of this patient?

- ☐ A. Oral rehydration
- ☐ B. 20 mL/kg of normal saline intravenously
- ☐ C. 20 mL/kg of D5 normal saline intravenously
- ☐ D. 20 mL/kg of 1/2 normal saline intravenously
- ☐ E. 20 mL/kg of 1/4 normal saline intravenously

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- ☐ A. Oral rehydration [3%]
- ☒ B. 20 mL/kg of normal saline intravenously [69%]
- ☐ C. 20 mL/kg of D5 normal saline intravenously [17%]
- ☐ D. 20 mL/kg of 1/2 normal saline intravenously [8%]
- ☐ E. 20 mL/kg of 1/4 normal saline intravenously [3%]

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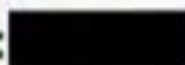
Explanation:

User Id: [REDACTED]

Children are at risk for intravascular volume depletion due to the high frequency of gastroenteritis, a higher surface area-to-volume ratio resulting in increased insensible losses, and an inability to access fluids themselves or communicate their needs. In gastroenteritis, volume depletion occurs when the extracellular losses exceed the fluid intake. As a result, oral or intravenous fluid therapy is required in order to replenish the normal intravascular volume.

The initial step in managing children with dehydration is to determine its severity. The ideal method of assessing dehydration is to determine the measured change in weight because 1 kg of acute weight loss equals 1 L of fluid loss. A child's weight, however, changes constantly, making it difficult to obtain an accurate recent "well" weight. Therefore, the degree of dehydration often has to be determined by the clinical history and physical examination, which can be divided into the following categories:

1. Mild dehydration (3-5% volume loss) presents with a history of decreased intake or increased fluid loss with minimal or no clinical symptoms.
2. Moderate dehydration (6-9% volume loss) presents with decreased skin turgor, dry mucus membranes, tachycardia, irritability, a delayed capillary refill (2-3 seconds), and decreased urine output.
3. Severe dehydration (10-15% volume loss) presents with cool, clammy skin, a

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3. Severe dehydration (10-15% volume loss) presents with cool, clammy skin, a delayed capillary refill (>3 seconds), cracked lips, dry mucous membranes, sunken eyes, sunken fontanelle (if still present), tachycardia, lethargy, and minimal or no urine output. Patients can present with hypotension and signs of shock when severely dehydrated.

Oral rehydration therapy should be the initial treatment in children with mild to moderate dehydration. Children with moderate to severe dehydration (which is the category that this patient is in) should be immediately resuscitated with intravenous fluids to restore perfusion and prevent end organ damage. Isotonic crystalloid is the only crystalloid solution recommended for intravenous fluid resuscitation in children, which explains why isotonic saline is the best answer of the choices given.

(Choice A) Oral rehydration is the initial treatment of choice in mild to moderate dehydration, but acts too slowly to adequately restore perfusion in patients with severe dehydration.

(Choice C) Dextrose containing fluids are not used for initial fluid resuscitation, but dextrose should be added to the maintenance fluid.

(Choices D and E) 1/2 Normal saline and 1/4 Normal saline are hypotonic fluids and should not be used for resuscitation because they can cause electrolyte abnormalities or

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(Choices D and E) 1/2 Normal saline and 1/4 Normal saline are hypotonic fluids and should not be used for resuscitation because they can cause electrolyte abnormalities or cerebral edema. Only isotonic solutions should be used for volume resuscitation.

Educational objective:

Moderate to severe dehydration in children should be treated with an intravenous bolus of isotonic fluid.

References:

1. [Simplified treatment strategies to fluid therapy in diarrhea.](#)