

Teaching Script

Author: Katelyn Cushmanick, MD & Sara Sanders, MD

Topic: Maintenance IV fluids

Identify the Trigger <i>Based on patient situation/learner</i>	<ul style="list-style-type: none">• A 4-month-old with bronchiolitis is admitted due to respiratory distress and poor feeding.• Learner states, "I would like to start the patient on D5 1/2 NS at maintenance rate to prevent dehydration".
High Yield Teaching Point <i>What do they need to know that will impact their care of patients?</i>	<ul style="list-style-type: none">• According to the AAP clinical practice guideline, isotonic fluids (NS) are the safest IV fluid option for most children over 1 month of age who are admitted to the hospital when enteral feeding is not possible.• ADH levels are physiologically increased in response to numerous stressors including pain, fever, and respiratory illness. Increased ADH leads to the retention of free water, diluting the serum and resulting in a relative hyponatremia. The tendency towards hyponatremia can be worsened when hypotonic IV fluids are administered.
Identify EBM <i>Find your sources and specific evidence</i>	<p>Feld LG, Neuspiel DR, Foster BA, et al. Clinical Practice Guideline: Maintenance Intravenous Fluids in Children. <i>Pediatrics</i>. 2018;142(6).</p> <ul style="list-style-type: none">• Hyponatremia is present in 15-30% of hospitalized children• "Symptoms of hyponatremia can be nonspecific, including fussiness, headache, vomiting, confusion, lethargy, and muscle cramps, making prompt diagnosis difficult"• "Patients 28 days to 18 years of age requiring maintenance IVFs should receive isotonic solutions with appropriate potassium chloride and dextrose because they significantly decrease the risk of developing hyponatremia"• Goal of maintenance IVF: "preserve extracellular volume while minimizing the risk of developing volume depletion, fluid overload, or electrolyte disturbances" <p>Moritz ML & Ayus JC. Maintenance Intravenous Fluids in Acutely Ill Patients. <i>NEJM</i>. 2015; 373:1350-1360.</p> <ul style="list-style-type: none">• Conditions that increase ADH- volume depletion, pain, stress, nausea, hypoxemia, hypotension, hypoglycemia, infection, sepsis, post-op state, inflammation, pulmonary diseases, CNS disease, medications, etc.• Hyponatremia often develops acutely (<48h), leaving little time for brain adaptation• Children are at higher risk for hyponatremic encephalopathy due to increased ratio of brain to intracranial volume. Children therefore may be symptomatic at milder hyponatremic levels than adults. <p>Wang J, Xu E, & Xiao Y. Isotonic Versus Hypotonic Maintenance IV Fluids in Hospitalized Children: A Meta-Analysis. <i>Pediatrics</i>. 2014; 133:105-113.</p> <ul style="list-style-type: none">• Meta-Analysis included 10 RCTs. Found that hypotonic IV fluids resulted in significantly increased risk of hyponatremia in hospitalized children.

Describe Strategy <i>Interactive, analogies, visuals</i>	One Minute Preceptor
Keep Script Brief <i>3-5 minutes; what are your key points</i>	<p><u>Get Commitment:</u> “Which type of IV fluid would you like to start?”</p> <ul style="list-style-type: none"> • Learner either responds with correct answer (isotonic fluid-D5NS) or incorrect answer (hypotonic fluid-D5 ½ or ¼ NS) <p><u>Probe for Understanding:</u> “Why did you choose that type of fluid?”</p> <ul style="list-style-type: none"> • Even if correct answer is given, probe to ensure learner understands the reason behind our current practice. <p><u>Teach General Rule:</u> Isotonic fluids are generally safer than hypotonic fluids in most children admitted to the hospital for acute illness.</p> <ul style="list-style-type: none"> • Summarize above articles as they apply to learner’s level of training and patient scenario <p><u>Reinforce What Was Right and Correct Mistakes:</u></p> <ul style="list-style-type: none"> • Dependent on learner response <p><u>Additional Script:</u> When should we consider using ½ NS or ¼ NS?</p> <ul style="list-style-type: none"> • Conditions that may require specialized IV fluid management include: CNS disorders, edematous states such as congestive heart failure and nephrotic syndrome, hepatic disorders, cancer, endocrinologic disorders such as diabetes insipidus, adrenal insufficiency, and diabetic ketoacidosis, and severe burns, etc. • Children under 28-days-old may have renal concentrating immaturity and were excluded from the AAP Guideline. • If a child presents with hypernatremia, slow correction is preferred (< 1 mmol/L/hr) to decrease risk for cerebral edema.

Adapted from Lang, et al. Collaborative development of teaching scripts: an efficient faculty development approach for a busy clinical teaching unit. J Hosp Med. 2012; Oct 7(8): 644-8

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