Effective Health Care

Isotonic versus Hypotonic Maintenance Intravenous (IV) Fluids in Children

Nomination Summary Document

Results of Topic Selection Process & Next Steps

- The topic, *Isotonic versus Hypotonic Maintenance Intravenous (IV) Fluids in Children,* was found to be addressed by a meta-analysis titled, *Isotonic versus hypotonic maintenance IV fluids in hospitalized children: a meta-analysis* and a systematic review with a meta-analysis titled, *Hypotonic versus Isotonic Fluids in Hospitalized Children: A Systematic Review and Meta-Analysis*. Given that the existing reports cover this nomination, no further activity will be undertaken on this topic.
  - Wang J, Xu E, Xiao Y. Isotonic versus hypotonic maintenance IV fluids in hospitalized children: a meta-analysis. Pediatrics. 2014 Jan; 133(1):105-13. Epub 2013 Dec 30. PMID: 24379232
  - Foster BA, Tom D, Hill V. Hypotonic versus Isotonic Fluids in Hospitalized Children: A Systematic Review and Meta-Analysis. J Pediatr. 2014 Feb 27. PMID: 24582105

Topic Description

Nominator(s): Health care professional association

Nomination Summary: The nominator is interested in understanding the safety of isotonic versus hypotonic maintenance IV fluid therapy in children.

Staff-Generated PICO *[or* **PICO from Nomination** *if supplied in nomination]*
Population(s): Infants, children, and adolescents (28 days to 21 years or age) requiring maintenance IV fluid.
Intervention(s): Isotonic IV fluid
Comparator(s): Hypotonic IV fluid
Outcome(s): Prevention of hospital-acquired or aggravated hyponatremia, neurological complications, death

Key Questions from Nominator: What is the safety of isotonic versus hypotonic maintenance intravenous (IV) fluid therapy in hospitalized children with regards to the prevention of hyponatremia?

Considerations

- The topic meets EHC Program appropriateness and importance criteria. (For more information, see http://effectivehealthcare.ahrq.gov/index.cfm/submit-a-suggestion-for-research/how-are-research-topics-chosen/.)
- There are millions of hospital stays for children under the age of 17 in the US each year, many of whom receive maintenance intravenous (IV) fluid therapy during their stay. Over the last 50 years, hypotonic solutions have been the standard approach for IV fluid maintenance in hospitalized children. There are concerns that the routine use of hypotonic fluids contributes to the development of hyponatremia and its complications in some children, while the use of isotonic fluids may prevent the development hyponatremia. Hyponatremia manifests as central nervous system symptoms such as lethargy, vomiting, irritability, muscle weakness, confusion, seizures, and coma, or in severe cases, can lead to death.
- There are two recent 2014 publications: A meta-analysis titled, *Isotonic versus hypotonic maintenance IV fluids in hospitalized children: a meta-analysis* and *a* systematic review titled *Hypotonic versus Isotonic Fluids in Hospitalized Children: A Systematic Review and Meta-Analysis*. These publications examined the risk of developing hyponatremia with isotonic versus hypotonic maintenance IV fluids in hospitalized children.
- Searches did not identify any additional studies that were published since the last search dates of the 2014 reviews; therefore, at this time, an additional systematic review on this topic would be duplicative.