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ISMP Warns that IV Solutions Administered Post-Op Can Cause Low Sodium Levels and Death in Healthy Children

Horsham, Pa.—Following the recent tragic deaths of two young children from severe postoperative hyponatremia, or low sodium levels, the Institute for Safe Medication Practices (ISMP) is warning healthcare practitioners of the need for greater education about the causes, signs, and symptoms of this condition. Post-operative children are at high risk for developing hyponatremia, which is the most common electrolyte disorder among hospitalized patients and can be caused by the administration of IV fluids that contain inadequate amounts of sodium after surgery. If left untreated, hyponatremia can result in severe brain swelling and death.

Following is a brief account of the two recent cases as well as ISMP's recommendations for preventing errors in post-op fluid administration. For more details, see the cover article of the August 13, 2009 issue of the *ISMP Medication Safety Alert! newsletter* (www.ismp.org/Newsletters/acutecare/articles/20090813.asp).

Recent Deaths

In the first case, a child underwent an outpatient tonsillectomy. Postoperatively the child received an IV infusion of plain dextrose in water at a rate that was too high. The child developed vomiting and then seizures that were incorrectly assumed to be a reaction to an anti-nausea drug that had been administered. A pediatrician consulted about managing the child's seizures identified the error, and stat lab studies showed critically low sodium levels. A CT scan revealed cerebral edema, and despite treatment, the child subsequently died.

In the second case, a child underwent vascular surgery then did not receive enough sodium in IV fluids postoperatively. The child became hard to awaken and exhibited seizure-like activity, which was attributed to sleepiness from narcotics and fidgeting from pain. A critical care intensivist recognized the problem that evening. Despite treatment of hyponatremia and cerebral edema, the child died the next day.

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ISMP Safe Practice Recommendations

ISMP recommends that standards of practice be established for postoperative IV solutions used to hydrate patients—particularly children. The standards should clearly acknowledge that the administration of saline in maintenance parenteral fluids is the most important preventative measure that can be taken to prevent hyponatremia in children. If appropriate, criteria should include when lab studies need to be drawn to determine electrolyte levels in patients receiving post-op IV fluids over an extended period of time.

Protocols should be established to identify, treat, and monitor patients with hyponatremia as well as the related conditions of water intoxication and syndrome of inappropriate antidiuretic hormone (SIADH). Since clinically significant hyponatremia may be hard to identify, it should be included in the differential diagnoses for patients presenting with early symptoms or altered level of consciousness.

All physicians, nurses, and pharmacists need a thorough understanding of fluid and electrolyte balance and the pathophysiology of hyponatremia, water intoxication, and SIADH to increase their level of suspicion when symptoms appear, and to become more responsive to voiced concerns about the patient's condition.

All hospitals also should consider establishing a rapid response team (RRT) that allows any healthcare worker to summon in interdisciplinary team to a patient's bedside for a full evaluation when they fear something is seriously wrong with the patient and have expressed their concerns without an adequate response. RRTs can present a crucial opportunity for intervention before a tragedy occurs, especially with conditions such as hyponatremia that cause subtle changes which may be more readily identified as abnormal by family members than by healthcare providers.

About ISMP: The Institute for Safe Medication Practices (ISMP) is an independent, nonprofit organization that works closely with healthcare practitioners and institutions, regulatory agencies, consumers, and professional organizations to provide education about medication errors and their prevention. ISMP represents more than 35 years of experience in helping healthcare practitioners keep patients safe, and continues to lead efforts to improve the medication use process. ISMP is a federally certified patient safety organization (PSO), providing healthcare practitioners and organizations with the highest level of legal protection and confidentiality for patient safety data and error reports they submit to the Institute. For more information on ISMP, or its medication safety alert newsletters and other tools for healthcare professionals and consumers, visit www.ismp.org.

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