Comment to the Research by R.F. Tepaev "Hypernatremia in Children. Focus on the Neurological Complications"

Contact information:

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Dear Colleagues,

This article is concerned with the diagnosis and treatment of hypernatremia in children, which is an important issue. Hypernatremia is one of the most common disorders of electrolyte metabolism in hospitalized patients. Physiological features of the child's body are a large area of the body relative to the weight and height, the higher water content in the body, a significant loss of fluid from the body surface in comparison with older patients, and thus dehydration predispose and predispose to development of hypernatremia. The reasons vary, and this determines the interest of a wide range of specialists to this problem: fluid loss through the gastrointestinal tract with vomiting and diarrhea; perspiration water loss in hyperthermia, tachypnea, mechanical ventilation, also in patients having phototherapy in the neonatal period.

In nephrology practice there often arises a need for differential diagnosis between secondary and central hypernatremia or renal forms of diabetes insipidus. Hypernatremia in patients with diabetes is one of endocrinology problems. Hypervolemic hypernatremia is solely an iatrogenic problem caused by inadequate fluid therapy.

The brain is damaged greatly by hypernatremia. In the context of osmosis brain volume is regulated by equal osmolality of extracellular and intracellular fluid. In acute hypernatremia during the hours there is indicated an outflow of water into the extracellular space with the development of neurocytes atrophy, that further causes severe neurological complications, including strokes, seizures, coma. In case of slowly developing hypernatremia (i.e. within several days) adaptive processes occur in the brain, which are aimed at increasing intracellular osmolality.

The paradox of this situation is the possibility of damage to the central nervous system both at the stage of development of hypernatremia (wrinkling neurocytes), and on the background of inadequate (i.e. fast) drug correction (cerebral edema), with the development of convulsions, coma, up to a fatal outcome, in both cases.

This research provides guidelines for the diagnosis and treatment of hypernatremia, which allow to correct this condition effectively and to avoid iatrogenic lesions of the central nervous system.