FLUID AND ELECTROLYTE DISTURBANCE

HYPONATREMIA AND HYPERNATREMIA

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Abstract: *Dysnatremias occur due to imbalance either in total body water (TBW) or in sodium balance or both. Volume of extracellular fluid compartment helps us to assess the total body sodium status while serum sodium levels suggest TBW status. The kidney regulates serum sodium concentration between 135-145mEq/L primarily by its ability to regulate free water excretion especially in hyponatremia. The primary prevention from developing hypernatremia is thirst. It is important to find out the etiology of dysnatremias to guide treatment for appropriate corrections in serum sodium levels per hour to prevent morbidity and mortality.*

Keywords: *Dysnatremias, Total body water, Total body sodium.*

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Points to Remember

- ***Sodium homeostasis is essential for maintaining intravascular volume and is tightly linked to water balance.***
- ***The diagnosis of true hyponatremia is made after ruling out pseudohyponatremia and hyponatremia with hyperosmolality.***
- ***The symptoms of hyponatremia correlate directly with the degree of intracellular overhydration in brain.***
- ***The treatment of hyponatremia depends on the underlying cause, duration of hyponatremia and presence or absence of symptoms.***
- ***In the child with hypernatremic dehydration the first priority is restoration of intravascular volume with isotonic fluid. During treatment fall of serum sodium should not be more than 0.5mEq/L/hour and serial serum sodium monitoring 4 hourly should guide the treatment.***

References

1. Ruth JL, Wassner SJ. Body composition: salt and water. Pediatr Rev 2006; 27(5): 181-187; quiz 188.
2. Bianchetti MG, Bettinelli A. Differential diagnosis and management of fluid, electrolyte, and acid-base disorders. In: Comprehensive Pediatric Nephrology 1st edn. Geary DF, Schaefer F, eds. Philadelphia, : Mosby; 2008. pp 395-431.
3. Preston RA. Book name Acid-Base, Fluids and Electrolytes made ridiculously simple. 2nd edn. Eds Kundli: Jaypee Brothers Medical Publishers (P) Ltd, New Delhi; 2011. pp 3-68.
4. Adrogue HJ, Madias NE. Hyponatremia. N Engl J Med 2000; 342: 1581-1589.
5. Khurana M. Disorders of salt and water balance. In: Kiessling SG, Goebel J, Somers MJG, eds. Pediatric Nephrology in the ICU. Heidelberg: Springer-Verlag Berlin; 2009; pp 1-17.
6. Topf J, Faubel S. The fluid, electrolyte, and acid-base companion. 1st edn. Alert and Oriented, San Diego, 1999; pp. 591.

7. Berendes E, Walter M, Cullen P, Prien T, Van Aken H, Horsthemke J, et al. Secretion of brain natriuretic peptide in patients with aneurismal subarachnoid hemorrhage. Lancet. 1997; 349 (9047): 245-249.

8. Trachtman H. Sodium and water homeostasis. Pediatr Clin North Am 1995; 42(6): 1343-1363.

9. Shah M. Homeostasis and disorders of sodium, potassium and acid-base balance. In: Vijayakumar M, Nammalwar BR, eds. Principles and Practice of Pediatric Nephrology. 2nd edn. Chennai: Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, 2013; pp 13-82.

10. Baum M. Sodium and volume homeostasis. In: Kher KK, Schnaper HW, Greenbaum LA, eds. Clinical Pediatric Nephrology. 3rd edn. N.W: CRC Press, Boca Raton 2017; pp165-182.

11. Madden N, Trachtman H. Physiology of the developing kidney: Sodium and water homeostasis and its disorder. In: Avner ED, Harmon WE, Niaudet P, Yoshikawa N, Emma F, Goldstein SL, eds. Pediatr Nephrol 7th edn. Heidelberg: Springer-Verlag Berlin, 2016; pp 181-217.

12. Baylis PH, Cheetham T. Diabetes Insipidus. Arch Dis Child 1998; 79(1): 84-89.