Hyponatremia in infants under 100 days old: frequently overlooked and multifactorial

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OBJECTIVES

Background: Hyponatremia is one of the most common electrolyte disorder in hospitalized children and early diagnosis and management are crucial to prevent morbidity and mortality. Because of the physiological resistance to aldosterone under 3 months of age, the mechanisms leading to hyponatremia are often misunderstood.

Objective: To assess the prevalence of hyponatremia in hospitalized infants younger than 100 days and evaluate the mechanisms leading to water and sodium imbalance.

RESULTS

86 patients were included.
The median age at identification of hyponatremia was 19.5 days (IQR 9.25-44.75).
77 patients (89.5%) had hospital-acquired hyponatremia.

92 patients had at least one serum sodium concentration measured:
- 6 patients were excluded
- 2 contaminated blood samples
- 2 hyperosmolar hyponatremia (hyperglycemia)
- 2 incomplete medical records

69 patients (6 patients younger than 65 days, 63 patients older than 65 days)
92 patients had at least one serum sodium concentration measured
- < 130 mmol/l for children younger than 31 days or
- < 133 mmol/l for children aged from 32 to 100 days

Flow Chart

Serum sodium values according to the mechanism of hyponatremia
Statistical analyses were not made on the groups containing less than 6 patients (i.e. digestive loss and acute renal failure) (*: p<0.05; **: p<0.01; ***: p<0.001)

Distribution of hyponatremia according to their mechanism

Mechanisms leading to a defective mineralocorticoid pathway

- Functional tubulopathy of prematurity
- Physiological resistance to aldosterone compounded by a severe sepsis
- Pseudohypoaldosteronism secondary to pyelonephritis or uropathy
- Abnormality in the mineralocorticoid pathway
- Digestive loss
- Acute renal failure
- SIADH
- Cardiac failure
- Iatrogeny
- Mixed cause

CONCLUSIONS

Hyponatremia is a frequent electrolyte disorder in the neonatal pediatric population. Iatrogenic causes played a major role in the occurrence of hyponatremia in our study. Genetic abnormalities of the mineralocorticoid pathway, considered as extremely rare were relatively prevalent and might be otherwise underdiagnosed. We conclude that hyponatremia in infants should be thoroughly analyzed and managed.

METHODS

The database of a large paediatric hospital was searched for hyponatremia occurring in infants younger than 100 days-old hospitalized in 2012. The charts were analyzed to evaluate the origin and the management of hyponatremia.

Distribution of the lowest values of serum sodium concentration, depending on the age of the patients at the time of hyponatremia

Distribution of hyponatremia occurring < 31 days (IQR 9.25-44.75)

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