Prognostic Value of Dysnatremia in Patients in Need of RRT in the ICU

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Introduction
Background and objectives
Dysnatremias are the most common electrolyte disorders and an independent risk factor of poor prognosis in critically ill patients. (1) The present study aimed to evaluate the impact of dysnatremia on the prognosis of acute kidney injury (AKI) requiring renal replacement therapy (RRT) in the ICU.

Objectives
To evaluate the prevalence of dysnatremia an its impact on the prognosis of acute kidney injury (AKI) requiring renal replacement therapy (RRT) in the ICU.

Methods
Design and setting
This multicenter observational prospective study was approved by the local Ethical Committee and performed in 14 ICU of 3 tertiary care hospitals in Rio de Janeiro, Brazil.
Selection of participants, data collection and definitions
All patients in need of RRT, admitted to ICU were included. Were excluded form the study: patients with non-renal indication(s) for renal support, End Stage Renal Disease (ESRD) on dialysis, those with less than 24 hours of ICU admission or ICU readmissions, those who did not had sodium measurement before initiation RRT.

Dysnatremia definition and sodium categorization
Dysnatremia was considered as any serum sodium concentration < 135mEq/L or > 145mEq/L and was treated as a categorical variable: hyponatremia was categorized as mild (130mEq/L ≤ serum sodium ≤ 134mEq/L) or severe (serum sodium ≤ 129mEq/L), hypernatremia was also categorized as mild (146 mEq/L ≤ serum sodium ≤ 155 mEq/L) or severe (serum sodium > 156mEq/L). Normal serum sodium (135 mEq/L ≤ serum sodium ≤ 145 mEq/L) was used as the reference category.

Statistical analysis
Univariate and multivariate logistic regression analyses were used to identify factors associated with hospital and ICU mortality.

Results
A total of 772 patients were prospectively included. The study population median age was 75 [interquartile interval (IQR) – 61-82]. Dysnatremia was highly prevalent, observed in 47.3% of patients. Contrasting to published results in the ICU (2) and in chronic hemodialysis patients (3), hypernatremia was the main observed sodium disturbance (33.7% vs. 13.6% in hyponatremia, p=0.001) Figure 1. ICU and hospital mortality were respectively 64.6% and 69.7%. In multivariate analysis, older patients, clinical admission, the number of comorbidities, length of ICU stay before the beginning of RRT and the number of organ dysfunction were associated with higher hospital mortality Table 1. Moderate (146-155 mEq/L) and severe (> 155 mEq/L) hypernatremia were independently associated with ICU mortality (OR, 1.55; 95% CI, 1.01-2.38 and 3.96; 95% CI, 1.67-9.37, respectively). Severe hypernatremia was also associated with higher hospital mortality (OR, 2.97; 95% CI, 1.22-7.22) Figure 2.

Conclusions
Hypernatremia was the main sodium disturbance and independently associated to poor outcomes in AKI population in need of RRT in the ICU.

References

Figure 1: Sodium distribution as a continuous variable (A) and between categories (B)

Figure 2: Adjusted odds ratio ICU and Hospital Mortality in sodium categories (1<130 mEq/L; 2-130-134 mEq/L; 3-135-145 mEq/L; 4-146-155 mEq/L; 5->155 mEq/L)