

Sodium Alterations during Continuous Venovenous Renal Replacement Therapy

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Introduction: About 10% of patients admitted to the intensive care unit (ICU) receive continuous renal replacement therapy (CRRT), exposing them to large exchanges of volume and electrolytes. The aim of the present study was to describe variation in sodium concentration ($[Na^+]$) during continuous venovenous hemofiltration (CVVH) and assess the incidence of hyponatremia after 48 hours of CVVH treatment.

Methods: Oligo-anuric ICU patients with clinical indications for CRRT (PrismaMax, Baxter) were enrolled. The CRRT was performed in CVVH modality, with 150 ml/min of blood flow. Regional anticoagulation was achieved with diluted citrate (Prismocitrate 18/0; Gambro) at 1500 ml/h. Phoxilium (Baxter Healthcare Spa) or Multibic 2K (Fresenius Medical Care, Germany) was employed as replacement solutions, administered post-dilution at 1500 ml/h. Of note, all three solutions have a declared $[Na^+]$ of 140 mmol/L. $[Na^+]$ was measured by direct ion-selective methods (RAPIDPoint 500 Blood Gas System, Siemens Healthcare Diagnostics) at the beginning of CVVH treatment (T_0) and after 3, 6, 12, 24, 48, and 72 hours.

Sodium variations were analyzed via one-way repeated measures ANOVA. A binomial test was performed to compare the incidence of hyponatremia ($[Na^+] < 135$ mmol/L) with the expected 15% (*i.e.* the incidence reported in the literature). Data are reported as mean \pm standard deviation.

Results: Twenty-six patients aged 62 ± 14 years were enrolled. Three patients were hyponatremic (130 ± 2 mmol/L), seven patients were hypernatremic (151 ± 4 mmol/L) and sixteen normonatremic (141 ± 3 mmol/L). Overall, $[Na^+]$ decreased from 142 ± 7 to 135 ± 3 mmol/L ($p < 0.001$) in 48 hours. Eighteen (69%) patients were hyponatremic (133 ± 1 mmol/L) after 48 hours of CVVH ($p = 0.02$).

Conclusion: During CVVH we observed a significant decrease in $[Na^+]$ and a high incidence of hyponatremia.

Figure 1 Change in sodium concentration during CVVH treatment.

