

# KSN 2016 Abstract Submission

*Volume, Acid-Base & Electrolyte*

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## Electrolyte and Mineral Disturbances in Septic Acute Kidney Injury Patients Undergoing Continuous Renal Replacement Therapy

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**Background:** Electrolyte and mineral disturbances frequently develop in critically ill patients and still remain a major concern even in patients on continuous renal replacement therapy (CRRT). However, it is not clear whether the imbalances in these parameters are associated with adverse outcomes in septic acute kidney injury (AKI) undergoing CRRT. Therefore, we aimed to investigate clinical implication of the electrolyte and mineral disturbances in these patients.

**Methods:** We conducted a post-hoc analysis using data from our recent prospective randomized controlled trial, 'Effects of High-volume Continuous Renal Replacement Therapy on Inflammatory Mediators and Outcomes in Patients with Septic Acute Kidney Injury'. In this study, blood samples were collected before and 24-hour after initiation of CRRT. We collected data for sodium (reference range, 135 to 145 mEq/L), potassium (reference range, 3.5 to 5.5 mEq/L), calcium (reference range, 8.5 to 10.5 mg/dL), and phosphate (reference range, 2.5 to 4.5 mg/dL) at two time-points. The study end point was defined as death that occurred within 90 days of CRRT initiation.

**Results:** A total number of 212 patients were included in the analysis. The mean age was 62.1 years and 138 (65.1%) patients were male. Before starting CRRT, deficiencies and excess in electrolyte or mineral were observed in 126 (59.4%) and 188 (88.7%) patients, respectively. Among 190 patients who survived 24 h after CRRT initiation, disturbances in electrolyte and mineral were still common: hyponatremia in 35 (19.2%), hypokalemia in 51 (28.0%), hypocalcemia 15 (8.5%), and hypophosphatemia in 35 (19.7%), while hypernatremia in 8 (4.4%), hyperkalemia in 2 (1.1%), hypercalcemia 11 (6.2%), and hyperphosphatemia in 53 (29.8%). A single and two or more deficiencies in these parameters at two time-points were not associated with mortality. However, 107 (84.3%) deaths occurred in patients with baseline phosphate levels  $\geq 4.5$  mg/dL as compared to 53 (70.7%) in patients with baseline phosphate levels of 2.5 to 4.5 mg/dL (hazard ratio [HR], 1.51; 95% confidence interval [CI], 1.08-2.10; P=0.02). The result remained unaltered in the analysis using 24 h time-point phosphate levels (HR, 1.61; 95% CI, 1.07-2.44; P=0.02). In a multivariable analysis with 24 h phosphate being treated as a continuous variable, an 1 mg/dL increase in phosphate level conferred a 17% increased risk of death (P<0.01).

**Conclusion:** This study showed that electrolyte and mineral disturbances are common and hyperphosphatemia may portend a poor prognosis in septic AKI undergoing CRRT.

**Keywords:** Continuous renal replacement therapy, Septic acute kidney injury