



Serum Potassium as A Mortality Predictor Among Patients Requiring Continuous Renal Replacement Therapy

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BACKGROUND

- Hyperkalemia and hypokalemia are common events in critically ill patients requiring continuous renal replacement therapy (CRRT).
- Mortality among patients with AKI significantly increases with any form of kidney replacement therapy.
- The impact of either hypokalemia or hyperkalemia on outcomes depends on several factors, including acute illness and underlying comorbid conditions.
- A U-shape association with mortality in non-dialysis patients has been reported, yet the values at which any medical or extracorporeal (KRT) intervention is warranted are not well established.
- Therefore, the optimal serum potassium level at which the benefits of CRRT outweigh its risks is still unknown.
- **We aimed to assess the association between serum potassium before and during CRRT with mortality.**

METHODS

- This is a retrospective cohort involving 1,279 critically ill patients of a tertiary center in the US receiving CRRT (CVVH) for AKI from December 2006 through November 2015.
- Patients who had end-stage kidney disease were on dialysis before CRRT initiation or received CRRT for less than 24 hours were excluded.
- The standard dose prescribed was 30 ml/kg/hr, and the replacement fluid contained 4 mmol/L of potassium, although there was an option to adjust the potassium concentration from 2 to 6 mmol/L.
- We used logistic regression to assess serum potassium before CRRT and mean serum potassium during CRRT as predictors for 90-day mortality after CRRT initiation.

RESULTS

- Before CRRT, there was a U-shaped association between serum potassium and 90-day mortality, with the nadir of mortality noted in serum potassium of 4.0-4.4 mmol/L (Fig 1).
- **In adjusted analysis, there was a significant increase in mortality when serum potassium before CRRT was ≤ 3.4 and ≥ 4.5 mmol/L, compared to serum potassium of 4.0-4.4 mmol/L.**
- In contrast, during CRRT, mortality progressively increased when the mean serum potassium was ≥ 4.5 mmol/L (Fig 2).
- **In adjusted analysis, mean serum potassium ≥ 4.5 mmol/L had 1.61-times higher odds of 90-day mortality than mean serum potassium 4.0-4.4 mmol/L.**

Figure 1: Serum Potassium before CRRT

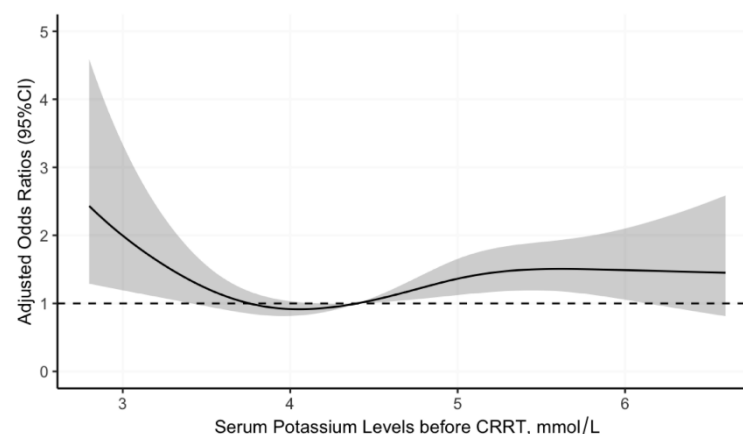
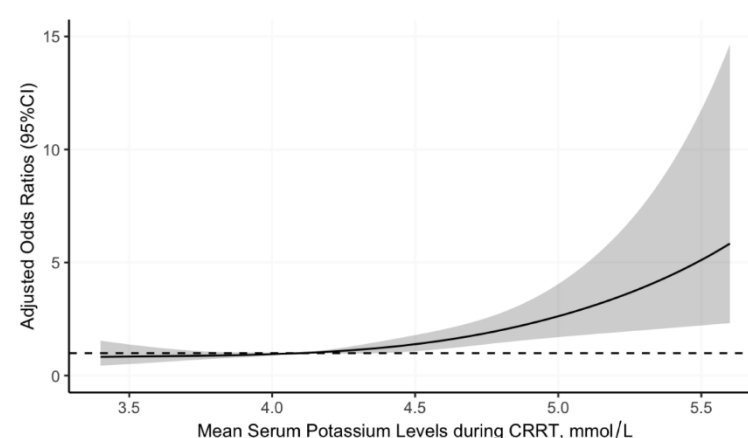


Figure 2: Serum Potassium during CRRT



DISCUSSION

- There was a U-shaped association between serum potassium before CRRT and 90-day mortality, with higher mortality observed when serum potassium before CRRT was ≤ 3.4 or ≥ 4.5 mEq/L. In contrast, higher mortality was observed only when mean serum potassium during CRRT was ≥ 4.5 mEq/L. **These findings clarify the predictive value of serum potassium before and during CRRT on mortality in CRRT patients.**
- Our findings are consistent with multiple studies that demonstrate dyskalemia in critically ill patients is associated with higher mortality. However, our study included only critically ill patients who required CRRT.
- Among the limitations of our study, we can list its observational nature and the residual confounders that we did not account for despite the adjusted analysis

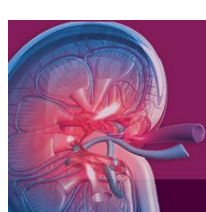
CONCLUSIONS

- **Hypokalemia and hyperkalemia before CRRT and hyperkalemia during CRRT predicts 90-day mortality.**
- **During CRRT, mean serum potassium ≥ 4.5 mmol/L was associated with increased mortality risk.**

REFERENCES



Mayo Clinic Nephrology
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