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Association of Pre-CKRT Urine Output with ESKD Risk and AKD Mediation: Insights from the LINKA Study

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Objectives : While urine output(UO) is a key indicator of kidney function and reflects acute kidney injury(AKI) severity, its prognostic value for long-term kidney recovery remains uncertain. We examined the relationship between pre-continuous kidney replacement therapy(CKRT) UO and subsequent acute kidney disease(AKD) as an intermediate outcome, as well as long-term outcomes.
Methods : We analyzed data from the LINKA cohort, a multicenter study of 1,472 patients with AKI who initiated CKRT. Patients who had undergone dialysis before CKRT, died or were censored within 3 months of CKRT initiation were excluded. Patients were categorized based on the median UO 1 hour before CKRT initiation(UO_preCKRT). To balance baseline differences, propensity score matching(PSM) or inverse probability of treatment weighted(IPTW) was applied. AKD was defined based on kidney function or dialysis status at 3 months. Logistic regression assessed AKD risk, while multivariate Cox regression evaluated UO-preCKRT's impact on end-stage kidney disease(ESKD) and all-cause mortality. Mediation analysis using IPTW data with 1,000 bootstrap replications was conducted.
Results : Among 1,083 patients, 183 developed ESKD, and 229 died (Median follow-up: 20.4 and 22.4 months, respectively), and 417 had UO_preCKRT <20cc. In PSM data, AKD risk was higher in the lower UO_preCKRT group (OR 1.46, 95% CI: 1.11-1.92). The lower UO_preCKRT group had a greater risk of ESKD and mortality, though not statistically significant, while AKD remained a strong predictor across both PSM and IPTW analyses. Mediation analysis showed lower UO_preCKRT was associated with an increased ESKD risk (total effect: HR 1.41, 95% CI: 1.03-1.93), with 41% mediated through AKD (P = 0.042). This indirect pathway was significant (Rpnie = 1.09, P = 0.002), while the direct effect was not. For mortality, only the indirect pathway through AKD was significant.
Conclusions : Lower UO_preCKRT was associated with ESKD progression, mediated primarily by AKD, highlighting the need for careful monitoring and post-CKRT care.

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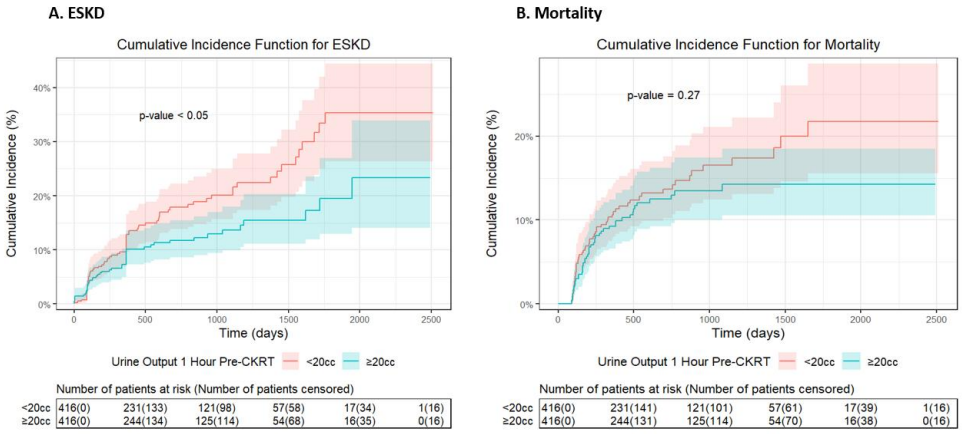

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