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Pre-Initiation Urine Output as a Meaningful Determinant of Outcomes in CKRT

Ara Ko

Seoul National University Hospital, Republic of Korea

While short-term outcomes following continuous kidney replacement therapy (CKRT) in severe acute kidney injury (AKI) are relatively well characterized, the long-term kidney trajectory of CKRT survivors remains poorly defined. Urine output (UO) is a simple and accessible indicator of kidney function that not only reflects renal performance but also captures renal reserve and recovery potential beyond static laboratory markers. In parallel, acute kidney disease (AKD) has emerged as a critical "vulnerable period" within the AKI–AKD–CKD continuum, yet upstream predictors such as pre-CKRT UO and their downstream impact on AKD and long-term outcomes have been underexplored. This lecture presents findings from the LINKA (Linking health medical records, biospecimens, and biosignals in Korean patients with AKI) study, a multicenter observational cohort involving eight major university-affiliated hospitals in Korea. We evaluated whether UO measured one hour before CKRT initiation (UO-preCKRT) predicts AKD at 3 months and subsequent long-term outcomes, including end-stage kidney disease (ESKD) and all-cause mortality. Among 1,083 patients who survived at least 3 months after CKRT, participants were stratified by median UO-preCKRT (<20 mL vs ≥20 mL). Both propensity score matching (PSM, 1:1) and inverse probability of treatment weighting (IPTW) were applied, and mediation analysis was performed to quantify the role of AKD as an intermediate outcome. Low UO-preCKRT was independently associated with a 1.5-fold higher risk of AKD (OR 1.50–1.55) and a significantly increased risk of progression to ESKD, with approximately 41% of the ESKD risk mediated through AKD. For all-cause mortality, only the indirect path through AKD reached statistical significance, while overall mediation was not robust. These findings suggest that low UO immediately before CKRT signals a high-risk trajectory toward AKD and ESKD, underscoring the need for early risk recognition and structured post-CKRT nephrology follow-up.

Keywords: Urine output, Acute kidney disease, mediation, End-stage kidney disease