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Long-term clinical impacts of cumulative fluid balance in continuous renal replacement therapy

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Objectives : Renal functional assessment at 3 months after continuous renal replacement therapy (CRRT) initiation can be useful in predicting long-term mortality and progression to ESRD. We investigated the association between fluid balance before and after CRRT initiation and long-term outcomes after acute kidney injury (AKI) episode requiring CRRT.

Methods : Among 1764 adult AKI patients started on CRRT from 2009 to 2013 in intensive care units in four tertiary academic hospitals in Korea, 331 survivors at 3 months after CRRT initiation were enrolled. Chronic kidney disease (CKD) progression was defined as a worsening renal status assessed at 3 months after CRRT initiation, comprising RRT continuation, an increase in serum creatinine of more than 50%, and a decrease in the estimated glomerular filtration rate of 35% or more than the baseline values.

Results : Cumulative fluid balance during 5 days after CRRT initiation was not associated with CKD progression. However, a positive fluid balance during 24 hours before CRRT initiation had the protective effect for CKD progression [Odds ratio 0.46 (0.23-0.91); P = 0.026]. This result was significant after adjustment for gender, age, and baseline serum creatinine. During the median 20.4 (7.5-39.7) months of follow-up, fluid balance was not associated with the long-term mortality.

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Conclusions : Cumulative fluid balance after CRRT initiation was not associated with the long-term clinical outcomes. However, positive fluid balance during 24 hours before CRRT initiation was a favorable factor for CKD progression. The monitoring and management of fluid balance before CRRT initiation could be important.

Keywords : Continuous renal replacement therapy; Acute kidney injury; Fluid balance; Chronic kidney disease progression