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Cumulative fluid balance and mortality in elderly patients with acute kidney injury requiring continuous renal replacement therapy: a multicenter prospective cohort study

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Objectives : Cumulative fluid balance (CFB) is associated with mortality in septic patients. However, the association is not well-known in elderly patients with acute kidney injury (AKI) requiring continuous renal replacement therapy (CRRT). Therefore, we investigated the outcomes of CRRT in elderly patients with AKI according to CFB.

Methods : A total of 616 patients aged equal or over 65 years who started CRRT due to AKI from August 2009 to December 2013 were enrolled prospectively at three centers. They were divided into 2 groups based on the CFB for 72 hours before CRRT was started.

Results : The mean age of both group was 74.3 years. The median 72 hours CFB was 2803.5 mL. 190 patients (62.7%) were male in high CFB group and 175 patients (57.6%) in low CFB group. The most common cause of AKI was sepsis (54.2% versus 37.7%). Charlson comorbidity index was lower (6.0 versus 9.0), but sequential organ failure assessment score and acute physiology and chronic health evaluation (APACHE) II score were higher in high CFB group (12.9 versus 11.1 and 30.2 versus 27.9). Systolic, diastolic and mean arterial pressures were lower in high CFB group. There was no difference in target clearance. While hemoglobin, serum albumin and creatinine levels were lower, serum aspartate aminotransferase and alanine aminotransferase levels were higher in high CFB group ($P<0.05$). Overall cumulative survival and 28-days survival rates were higher in lower CFB group (Log-rank $P<0.01$ for both) and those were also significant after propensity score-matching. Furthermore, higher CFB was associated with higher mortality rate after adjustment for age,

sex, systolic arterial pressure, Charlson comorbidity index, APACHE II score, serum albumin and creatinine levels and use of diuretics (hazard ratio, 1.59; 95% confidence interval 1.30–1.97, P<0.01).

Conclusions : A more positive CFB is associated with an increased risk of mortality in elderly patients with AKI requiring CRRT.

Keywords : Cumulative fluid balance; elderly; continuous renal replacement therapy; acute kidney injury