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Clinical factors to discriminate the AKI patients requiring CRRT over 6 days

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Background: To avoid unnecessary “early CRRT” increasing cost without measurable clinical benefit, the factors to predict the duration of CRRT should be settled. We investigated factors influencing the duration of CRRT including clinical parameters and the biomarker of AKI such as NGAL and serum creatinine.

Methods: We extracted 228 patients who required CRRT for AKI in ICUs and were followed for 28 days from January 1st to December 31st, 2014. We excluded patients with chronic kidney disease, prior liver or kidney transplantation, and death within 72 hours after CRRT start. We divided survivors (n=124, median duration of CRRT: 6 days) into the shorter group (≤ 6 days, n=65) and longer group (>6 days, n=59) and retrospectively analyzed. We also tested the performance of the predictors.

Results: The presence of acute respiratory distress syndrome (p=0.002), mean arterial pressure (p=0.086), urine output (ml/kg/hour, p=0.006), the duration of mechanical ventilation (p<0.005), the duration of ECMO (p=0.001), platelet count (p=0.013), serum creatinine (p=0.086) and serum total CO₂ (p=0.064) were considered significantly correlated with the duration of CRRT in univariate linear regression analysis. Among them, urine output (p=0.012) and duration of ventilation (p<0.005) were independently significant in multivariate analysis. As the predicting factors of the duration of CRRT over 6 days, urine output (OR 0.381, 95% CI 0.207-0.704, P=0.002), application of mechanical ventilation (2.321, 1.083-4.974, p=0.03), and the presence of ECMO support (5.187, 1.757-15.315, p=0.003) were independent factors in multivariate logistic regression analysis. Serum creatinine and NGAL were not significant. A clinical model using above three parameters demonstrated the discriminatory ability with AUC of 0.764 (95% CI, 0.704-0.818) to predict the duration of CRRT over 6 days.

Conclusion: Simultaneously considering of urine output, mechanical ventilation and ECMO could select the AKI patients requiring CRRT over 6 days and avoid unnecessary “early CRRT”. These criteria should be confirmed by other randomized studies.

Keywords: Acute kidney injury, continuous renal replacement therapy