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Predictive value of cystatin C-based GFR for successful weaning from continuous renal replacement therapy: A prospective observational study

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Objectives : Continuous renal replacement therapy (CRRT) is the mainstay of treatment for critically ill patients with acute kidney injury. The aim of our study is to identify whether biomarkers or factors of renal function can predict successful weaning from CRRT.

Methods : We conducted a prospective observational study of 110 patients who had received CRRT and were weaned from it after renal recovery. Successful weaning from CRRT was defined as elimination of the requirement for RRT for at least 14 days after cessation of CRRT, whereas redialysis within 14 days was defined as restart-RRT. Serum levels of cystatin C (CysC), neutrophil gelatinase-associated lipocalin (NGAL), and conventional biomarkers of renal function were checked at the time of cessation of CRRT.

Results : Of the 110 patients we evaluated, 89 patients (80.9%) were successfully weaned from CRRT while 21 (19.1%) patients were not. Serum CysC levels were lower and urine output was higher in the success group compared with the restart-RRT group at the time of cessation of CRRT (CysC: 1.70 ± 0.68 mg/L vs. 2.47 ± 0.93 mg/L, $P < 0.001$; urine output: 2.03 ± 2.10 mL/h/kg vs. 1.02 ± 0.93 mL/h/kg, $P = 0.016$). Multivariable logistic regression showed that CysC-based estimated glomerular filtration rate (eGFR) was an independent predictor for successful weaning from CRRT (odds ratio [OR], 1.25; 95% confidence interval [CI], 1.04–1.51; $P = 0.016$) while NGAL and urine output were not associated with successful weaning from CRRT. The area under the receiver operating characteristic curve of CysC-based eGFR, which predicts successful weaning from CRRT, was 0.75 (95% CI, 0.63–0.86); sensitivity and specificity were 65.2% and 76.2%, respectively, at a cutoff of 32.9 mL/min/1.73 m2.

Conclusions : Cystatin C-based eGFR at the time of cessation of CRRT is a good predictor of successful weaning from CRRT in critically ill patients with acute kidney injury.

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Keywords : acute kidney injury, continuous renal replacement therapy (CRRT), cystatin C (CsyC), weaning