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Interval change plasma neutrophil gelatinase-associated lipocalin level and urine output as a predictor for survival in critically ill patients undergoing continuous renal replacement therapy

Ha yeon KIM, Eun hui BAE, Soo wan KIM, *Seong kwon MA

Internal medicine , Chonnam national university hospital , Korea,South

Objectives : Continuous renal replacement therapy (CRRT) is increasingly modality of treatment in hemodynamic unstable ICU patients with AKI. Several biomarker have been attempted an early detection or assisted predicting prognosis. The neutrophil gelatinase-associated lipocalin (NGAL) is a one of them used early kidney injury marker. The aim of this study was to determine the outcome and identify the predictors of mortality of critically ill patients treated with CRRT for AKI in the ICU.

Methods : Protocol 1: In the single tertiary medical center retrospective study of 1,527 patients admitted ICU and undergoing CRRT from January 2011 to December 2013 was performed. Univariate and multivariate regression analyses were conducted to examine the independent predictor of patients' survival. Protocol 2: This retrospective observational study included 404 AKI patients treated with CRRT. The levels of serum creatinine (Cr), plasma NGAL obtained at baseline and at 48 hour after starting CRRT were analyzed.

Results : In total, 1,527 patients with AKI treated with CRRT, the overall in-hospital mortality rate of the CRRT treated AKI patients was 50.6%. Multivariate cox proportional hazards analysis identified that a urine output less 30 ml for initial first hour at the initiation of CRRT was independent predictor (HR; 1.73, CI; 1.45-2.07, p value; <0.001) besides APACHE II score and older age per 10 years and congestive heart failure also showed the significant predictors. Plasma NGAL was not different between survivor and non-survivor, whereas the difference of plasma NGAL between at baseline and at 48 hour after starting CRRT was significant different. However, univariate analysis revealed that delta plasma NGAL was not significant factor for the survival.

Conclusions : Plasma NGAL have limitation of early biomarker of predictor of survival. At initiation of CRRT, a urine output less 30 ml for initial first hour is a predictor of survival. Urine output is still a robust prognostic biomarker in these patients with AKI treated with CRRT.

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Keywords : Urine output, plasma NGAL, continuous renal replacement therapy, survival predictor