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**Creatinine-cystatin C Ratio is associated with mortality in ICU patients undergoing continuous renal replacement therapy**

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**Objectives:** Development of acute kidney injury (AKI) in intensive care patients considerably increases the risk of mortality. Although several factors that are related to outcome have been recognized in this patient group, stratifying mortality risk still remains a challenge. While serum creatinine levels are confounded by muscle wasting in critical illness, cystatin C is expected to be less modulated by muscle mass. Speculating that the ratio between serum creatinine and cystatin C may reflect muscle mass in critically ill AKI patients, we evaluated the association between creatinine-cystatin C ratio and mortality in patients requiring continuous renal replacement therapy (CRRT) in the intensive care unit (ICU).

**Methods:** Retrospective analyses were conducted on 445 ICU patients who underwent CRRT between August 2009 and October 2016 at Severance Hospital of Yonsei University Health System. The patients were divided into four groups based on creatinine-cystatin C ratio at the time of CRRT commencement. The primary outcome was 90-day mortality after CRRT initiation.

**Results:** The mean age was  $64.0 \pm 14.5$  years, and 57.5% of patients were male. The most common cause of AKI was sepsis. The median and range of the creatinine-cystatin C ratio was 0.83 (0.13-6.20). The 90-day mortality rate for each creatinine-cystatin C ratio quartiles 1, 2, 3, and 4 were 76.5%, 74.1%, 61.3%, and 52.2%, respectively. Multiple Cox proportional hazard models revealed that the creatinine-cystatin C ratio was an independent predictor of 90-day mortality even after adjusting for confounding factors (Hazard ratio, 0.970; 95% confidence interval, 0.951-0.989,  $P=0.002$ ). The prediction of mortality was significantly improved when creatinine-cystatin C ratio was considered compared to APACHE-II or SOFA scores alone.

**Conclusions:** Creatinine-cystatin C ratio is associated with mortality in ICU patients undergoing CRRT, and may be a practical marker in predicting survival among ICU patients with AKI.