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The Impact of Disease Severity on Paradoxical Association between Body Mass Index and Mortality in Patients with Acute Kidney Injury Undergoing Continuous Renal Replacement Therapy

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Objectives : Association between high body mass index (BMI) and survival benefit is confounded by comorbid conditions such as nutritional status and inflammation. Patients with acute kidney injury (AKI), particularly those receiving continuous renal replacement therapy (CRRT), are highly catabolic and more susceptible to loss of energy. Herein, we evaluated whether disease severity can modify the relationship between BMI and mortality.

Methods : A total of 1144 patients who had undergone CRRT were categorized into four groups; underweight, normal, overweight, and obesity according to BMI classification by the Committee of Clinical Practice Guidelines and Korean Society for the Study of Obesity. More severe disease was defined as sepsis-related organ failure assessment (SOFA) score ≥ a median value of 12. The study endpoint was death that occurred within 30 days after the initiation of CRRT.

Results : The mean age was 63.2 years and 439 (38.4 %) were females. The median BMI was 23.6 (20.9-26.2) kg/m2. The obese group was younger and had lower estimated glomerular filtration rate (eGFR) and higher SOFA score than normal BMI group. Overall, obese patients were significantly associated with a lower risk of death as compared to normal BMI group in a multivariable analysis adjusted for cofounding factors [hazard ratio (HR), 0.81; 95% confidence interval (CI), 0.68-0.97; P = 0.03]. This association was only evident among patients with high severity (HR, 0.61; 95% CI, 0.48-0.77, P < 0.001). In contrast, in those with low severity, survival benefit of high BMI was lost, whereas underweight was associated with an increased risk of death (HR, 1.72; 95% CI, 1.15-2.57; P = 0.008).

Conclusions : In this study, we found a protective effect of high BMI in AKI

patients undergoing CRRT, particularly in those with more disease severity; the effect was not observed in those with less disease severity.

Keywords : body mass index, acute kidney injury, continuous renal replacement therapy, disease severity, mortality