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Skeletal muscle mass is independently associated with survival and renal recovery from dialysis in critically ill patients with sepsis-induced acute kidney injury receiving continuous renal replacement therapy

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Objectives: Lower skeletal muscle mass at intensive care unit (ICU) admission has been associated with poor outcomes including higher mortality. In this study, we investigate whether skeletal muscle mass measured by computed tomography (CT) is independently associated with survival and renal recovery from dialysis in critically ill patients with sepsis-induced acute kidney injury (SIAKI) receiving continuous renal replacement therapy (CRRT).

Methods: This retrospective study included 618 patients with SIAKI who received CRRT in our ICU. All patients underwent abdominal CT scans within three days prior to ICU admission. The skeletal muscle cross-sectional area at the 3rd lumbar vertebra was quantified and skeletal muscle index (SMI), a normalized measure of skeletal muscle mass, was calculated. Using Korean-specific cutoffs of SMI, patients were categorized into sarcopenia and non-sarcopenia.

Results: Of the 618 patients, 301 expired within 28 days after ICU admission. Non-survivors showed a higher prevalence of sarcopenia and lower SMI than survivors. Multivariable Cox regression analysis demonstrated that sarcopenia assessed by CT-derived skeletal muscle index was an independent predictor of the 28-day mortality (hazard ratio [HR]: 2.66; 95% confidential interval [CI]: 1.42–2.38; $P < 0.001$). Among the survivors, sarcopenia was independently associated with renal recovery from dialysis within 28 days after ICU admission (HR: 0.42, 95% CI: 0.26–0.68; $P < 0.001$). In the Kaplan-Meier analysis, sarcopenic patients showed a lower rate of survival and recovery from dialysis within 28 days after ICU admission than non-sarcopenic patients.

Conclusions: This study demonstrated that sarcopenia assessed by CT-derived skeletal muscle index was independently associated with mortality and renal recovery from dialysis in critically ill patients with SIAKI receiving CRRT. Sarcopenia could be a valuable tool for predicting prognosis in these patients.