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Effect of fluid overload on survival in patients with sepsis-induced acute kidney injury receiving continuous renal replacement therapy

Il Young Kim[1], Byung Min Ye[1], Min Jeong Kim[1], Seo Rin Kim[1], Dong Won Lee[1], Hyo Jin Kim[2], Harin Rhee[2], Sang Heon Song[2], Eun Young Seong[2], Soo Bong Lee[1]
[1]Department of Internal Medicine-Nephrology, Pusan National University Yangsan Hospital, Korea, Republic of
[2]Department of Internal Medicine-Nephrology, Pusan National University Hospital, Korea, Republic of

Objectives: The association between fluid overload and survival has not been well elucidated in critically ill patients with sepsis-induced acute kidney injury (SIAKI) receiving CRRT. We aim to investigate what the best cutoff value for fluid overload for predicting the mortality is and whether minimizing fluid overload through CRRT is associated with survival benefit in these patients.

Methods: We analyzed 543 patients with SIAKI who received CRRT in our intensive care units. The degree of cumulative fluid overload in relation to body weight was expressed as percent fluid overload (%FO). %FO was further subdivided into percent fluid overload from AKI diagnosis to CRRT initiation (%FOpreCRRT) and total fluid overload (%FOtotal).

Results: The best cutoff value of fluid overload for predicting the 28-day mortality were %FOpreCRRT > 4.6% [area under the curve (AUC), 0.826; P < 0.001] and % FOtotal > 9.6% (AUC, 0.834; P < 0.001). Multivariable analysis demonstrated that patients with % FOpreCRRT > 4.6% and % FOtotal > 9.6% were 1.9 times and 3.37 times more likely to expire compared to those ≤ 4.6% and ≤ 9.6%, respectively (P < 0.001). This association between survival and fluid overload was consistent across the various subgroups according to disease severity, CRRT initiation time, age, diabetes, sex, and oliguria. %). The 28-day mortality was the highest in patients with %FOpreCRRT > 4.6% and %FOtotal > 9.6% (84.7%), followed by those with %FOpreCRRT ≤ 4.6% and %FOtotal > 9.6% (65.0%), %FOpreCRRT > 4.6% and %FOtotal ≤ 9.6% (43.6%), and %FOpreCRRT ≤ 4.6% and %FOtotal ≤ 9.6% (22%) (P < 0.001).

Conclusions: This study demonstrated that fluid overload was independently associated with 28-day mortality in critically ill patients with SIAKI. Maintaining the %FOpreCRRT ≤ 4.6% and % FOtotal ≤ 9.6% through CRRT was significantly associated with survival benefit in these patients.