



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Fluid Overload Measured by Bioimpedance Analysis Predicts Mortality in Severe AKI Patients Undergoing CRRT

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Objectives : Fluid balance is an important prognostic factor in patients with severe acute kidney injury (AKI) undergoing continuous renal replacement therapy (CRRT). Bioimpedance analysis (BIA) is a noninvasive method for assessing body fluid status. However, evidence supporting the clinical utility of BIA-derived quantitative fluid overload (FO) indices remains limited. This study aimed to evaluate the predictive value of BIA-based FO for short-term mortality in severe AKI patients receiving CRRT.

Methods : This multicenter retrospective study included 139 patients with severe AKI who underwent CRRT at eight tertiary hospitals in Korea between 2017 and 2019. The primary outcome was 28-day mortality. Fluid status was measured using InBody S10 at days 0, 1, 2, and 7. FO was calculated based on the ideal ECW/TBW ratio of 0.385. Propensity score matching by sex yielded 61 survivors and 61 non-survivors for analysis. Cox proportional hazards models, Kaplan–Meier survival analysis with log-rank tests, and ROC analysis were performed to assess the association between FO and mortality and to determine optimal thresholds.

Results : BIA parameters reflecting ECW distribution on Days 1 and 2 were strongly associated with short-term prognosis. Day 2 FO was significantly higher in the mortality group than in survivors (2.14 vs. 1.37 L, $p < 0.001$). In Cox analysis, Day 2 FO showed the strongest association with mortality (HR 1.698, $p < 0.001$). Log-rank analysis identified an optimal threshold of 2.0 L ($p < 0.001$). ROC analysis showed an AUC of 0.670 with an optimal cutoff of 1.91 L based on the Youden index.

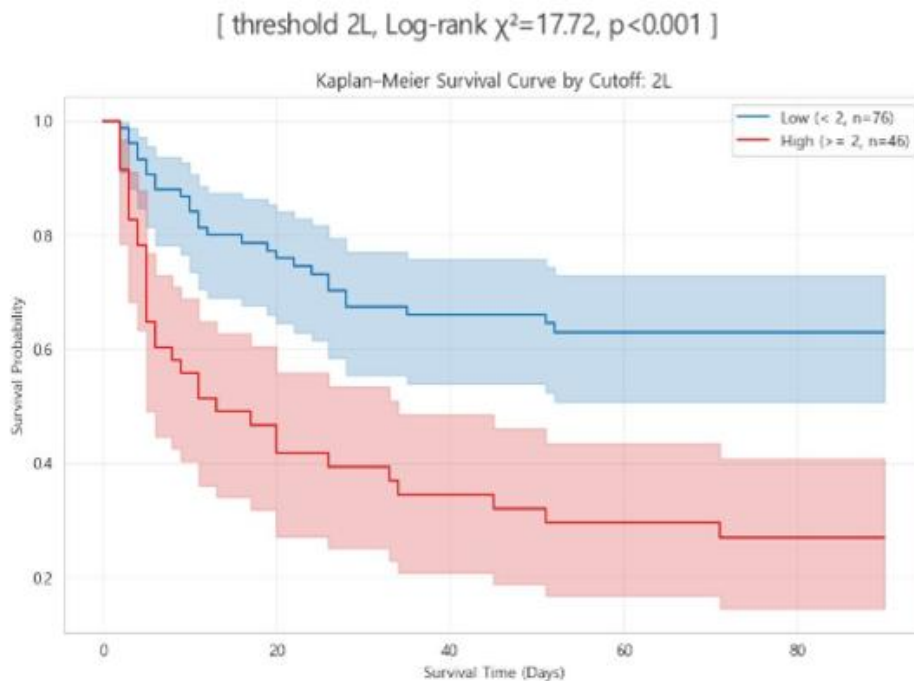
Conclusions : BIA-derived FO is a useful prognostic indicator in CRRT patients. Strong association of Day 2 FO after CRRT initiation with mortality suggests the importance of early fluid removal. BIA may provide a practical noninvasive tool for guiding early ultrafiltration targets in CRRT management.

Table 1.JPG



Hazard ratios for Day 1 parameters		
Variables	Hazard ratio	p value
TBW/Height ²	1.139	0.256
ΔTBW/Height ²	1.172	0.148
Fluid overload	1.614	0.009
ΔFluid overload	1.196	0.253
ECW ratio	1.308	0.036
ΔECW ratio	1.013	0.901
Hazard ratios for Day 2 parameters		
Variables	Hazard ratio	p value
TBW/Height ²	1.337	0.040
ΔTBW/Height ²	1.396	0.019
Fluid overload	1.698	<0.001
ΔFluid overload	1.352	0.005
ECW ratio	1.621	<0.001
ΔECW ratio	1.309	0.016

Table 1.JPG





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