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Platelet-to-lymphocyte ratio is associated with in-hospital mortality in critically ill patients with acute kidney injury requiring continuous renal replacement therapy

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Objectives: Platelet-to-lymphocyte ratio (PLR) is a marker of inflammation and predictor for mortality in a variety of diseases. However, the effectiveness of PLR as a predictor for mortality is uncertain in patients with severe acute kidney injury (AKI). We evaluated the association between PLR and mortality in critically ill patients with severe AKI requiring continuous renal replacement therapy (CRRT).

Methods: This is a retrospective observational cohort study, and a total of 1044 patients with AKI who underwent CRRT in Kyungpook National University Hospital from 2016 to 2021 were analyzed. Study subjects are divided into quintiles according to the PLR at the time of CRRT initiation. A Cox proportional hazard model was performed to investigate the association between PLR and mortality.

Results: The mean age was 65.3 years and 63.1% were male. In-hospital mortality, 30-day mortality, and 90-day mortality were 651 (62.4%), 608 (58.2%), and 627 (60.1%), respectively. The multivariable Cox proportional hazard model showed the lowest and highest quintiles of PLR had significantly higher in-hospital mortality compared to the third quintile, which was a reference group (first quintile: adjusted hazard ratio [aHR], 1.94; 95% confidence interval [CI], 1.44–2.62; P <0.001; fifth quintile: aHR, 1.60; 95% CI, 1.18–2.18; P = 0.002). The first and fifth quintiles of PLR showed consistently increased risk of both 30-day and 90-day mortality compared to the third quintile. In the subgroup analysis, both the lower and higher PLR were predictors for in-hospital mortality in patients with older age, female, hypertension, diabetes, or higher sequential organ failure assessment score.

Conclusions: Both the lower and higher PLR were independent predictors for in-hospital mortality in critically ill AKI patients requiring CRRT. PLR may be a useful prognostic indicator for patients with severe AKI that is easily accessible.

Table 1. Cox regression analysis for in-hospital mortality in platelet-to-lymphocyte ratio quintile groups

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	Model 1		Model 2		Model 3		Model 4	
	HR (95% CI)	p-value	aHR (95% CI)	p-value	aHR (95% CI)	p-value	aHR (95% CI)	p-value
Quintile 1	2.19 (1.69-2.83)	<.001	2.34 (1.78-3.09)	<0.001	2.26 (1.70-3.00)	<0.001	1.94 (1.44-2.62)	<0.001
Quintile 2	1.55 (1.19-2.03)	0.001	1.50 (1.13-1.99)	0.006	1.46 (1.09-1.95)	0.011	1.42 (1.05-1.94)	0.024
Quintile 3	Reference		Reference		Reference		Reference	
Quintile 4	1.29 (0.98-1.70)	0.068	1.28 (0.95-1.72)	0.102	1.26 (0.93-1.70)	0.135	1.28 (0.93-1.75)	0.128
Quintile 5	1.57 (1.20-2.04)	<0.001	1.62 (1.22-2.14)	<0.001	1.57 (1.17-2.10)	0.003	1.60 (1.18-2.18)	0.002

Model 1: unadjusted

Model 2: adjusted for age, sex, and body weight

Model 3: adjusted for age, sex, body weight, CCI, hypertension, and malignancy

Model 4: adjusted for age, sex, body weight, CCI, hypertension, malignancy, SOFA score, APACHEII score, mechanical ventilator use, and vasopressor use

Figure 1. Adjusted hazard ratios and 95% confidence intervals for mortality among platelet-to-lymphocyte ratio quintile groups

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