

# Neutrophil Percentage as a Potential Biomarker of Acute Kidney Injury Risk and Short-term Prognosis in Patients with Acute Myocardial Infarction in the Elderly [Response to Letter]

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## Dear editor

We thank the authors for their thoughtful comments on our article “Neutrophil percentage as a potential biomarker of acute kidney injury risk and short-term prognosis in patients with acute myocardial infarction in the elderly”<sup>1</sup> and appreciate the opportunity to address their considerations.

First, we agree with the authors that composite parameters like neutrophil percentages or other blood cell ratios (eg neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio and lymphocyte-to-monocyte ratio) may also be influenced by factors beyond inflammation alone. Therefore, variables affecting bone marrow function or nutritional indicators were included. We enrolled 2,829 patients with acute myocardial infarction of whom 307 patients (10.9%) (average age: 64.3 years) developed AKI in hospital. Patients were divided into two groups according to whether they developed AKI. We found that there were significant differences of hemoglobin, platelet-lymphocyte ratio and neutrophil-lymphocyte ratio between the two groups ( $P < 0.05$ ) (Table 1). Multivariate regression indicated that neutrophil percentage was still an independent risk factor for AKI after adjusted (OR=1.028, 95%CI: 1.005–1.051) (Table 2).

Second, we agree that proteinuria was identified as an important risk factor of AKI in different populations.<sup>2,3</sup> The aim of this current study was to explore biomarkers of early evaluation the acute kidney injury (AKI) risk in elderly patients after myocardial infarction. This may help clinicians take preventive measures at an early stage. Although

**Table 1** Baseline Characteristic of Blood Routine Examinations between AKI and Non-AKI Group

	AKI (n=307)	Non-AKI (n=2522)	P-value
White blood cell	10.00 (±3.73)	9.72 (±3.52)	0.362
Neutrophil percentage	76.89 (±11.31)	73.28 (±11.81)	0.091
Lymphocyte percentage	16.84 (±13.59)	19.11 (±10.18)	0.552
Neutrophil count	7.90 (±3.67)	7.29 (±3.36)	0.160
Lymphocyte count	1.50 (±0.96)	1.73 (±1.05)	0.193
Hemoglobin	131.15 (±22.44)	139.63 (19.23)	<0.001
Platelet count	209.85 (±78.47)	212.79 (±66.28)	0.094
Platelet-lymphocyte ratio	178.96 (±102.47)	155.84 (±108.98)	0.011
Neutrophil-lymphocyte ratio	7.28 (±5.81)	5.70 (±5.10)	<0.001

**Table 2** Multivariate Regression Analysis of Blood Routine Indices for Predicting AKI

Characteristics	Multivariable Analysis	
	OR (95%CI)	P-value
Neutrophil percentage	1.028 (1.005–1.051)	0.016
Lymphocyte percentage	1.027 (0.997–1.058)	0.078
Neutrophil count	1.027 (0.958–1.101)	0.454
Lymphocyte count	0.837 (0.622–1.128)	0.243
Hemoglobin	0.981 (0.975–0.987)	<0.001
Platelet-lymphocyte ratio	0.999 (0.998–1.001)	0.478
Neutrophil-lymphocyte ratio	1.023 (0.981–1.068)	0.292

baseline proteinuria levels could reflect the patients' renal function, the urine samples could not be obtained at the first time after admission. So, we did not include proteinuria in the regression analyses. Instead of proteinuria, we determined circulating creatinine levels at admission to evaluate the baseline renal function of the enrolled patients. This was also a limitation of the current study. In addition, for the elderly patients, the indicators such as trace albuminuria in the urine,<sup>4</sup> or urine albumin to creatinine ratio (UACR)<sup>5</sup> may also be potential biomarkers for renal function evaluation in the early stage.

Finally, we thank the authors for helping us enhance the understandability and enrich the interpretative depth of our findings, which may enhance the clinical application value of our study in guiding prognosis in the elderly patients with acute myocardial infarction.

## Disclosure

The authors report no conflicts of interest in this communication.

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