

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”¹ 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.^{2,3} 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,⁴ or urine albumin to creatinine ratio (UACR)⁵ 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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