# Inconsistent findings of neutrophil/lymphocyte and platelet/lymphocyte in trauma patients

Yifu Si, M.D.,[1] Fang Chen, M.D.[2]

[1]Depatment of Intensive Care, Pinghu First People's Hospital, Zhejiang-*China*
[2]Depatment of Intensive Care, Zhejiang Hospital, Zhejiang-*China*

To the Editor,

Recently, Dr. Lee et al.[1] examine the association between neutrophil to lymphocyte (NLR)/platelet to lymphocyte (PLR) and in-hospital mortality in patients with trauma. They found that low NLR and PLR were associated with increased in-hospital mortality rates. This study is well designed. However, several issues should be noted. As the reviewer indicated, the current finding is different from most previous studies which reported that high NLR[2–4] or PLR[5,6] is a significant risk factor for poor prognosis in various cohorts, such as critically ill trauma,[2,3] traumatic brain injury,[4] cardiac diseases,[5] and tumor.[6] The reason for these contradictory findings remains unclear. The authors speculated that some factors may contribute to the inconsistent findings, such as different inclusion criteria (patients who died within the first 24 h were included in the study), different time intervals from injury to arrival, and severity of trauma.

We are concerned that there are may be other reasons. As common blood parameters, both platelet and neutrophil count have normal ranges, and according to clinical experience,[7] both extremely low and high neutrophil and platelet count, which to a certain degree reflected the value of NLR and PLR, are associated with poor outcomes. In addition, several studies have indicated that PLR and NLR showed a non-linear predictive ability that both high and low PLR[8] or NLR[9,10] were associated with increased mortality in different cohorts. Therefore, the association between NLR/PLR and in-hospital mortality in trauma patients may also be non-linear. When we directly included these indexes in a generalized linear model (including logistic model), we assumed that there was a linear relationship between NLR/PLR and the dependent outcomes. Therefore, the results would be severely biased by the proportion of patients with high or low NLR/PLR. This could also account for these inconsistent findings. Multivariate models with restricted cubic splines or polynomial regression may be optimal options to solve this limitation. Finally, we thank Dr. Lee for their valuable research.

## REFERENCES

1. Lee DH, Lee BK, Lee SM, Cho YS, Yun SW. Association of neutrophil-to-lymphocyte and platelet-to-lymphocyte ratios with in-hospital mortality in the early phase of severe trauma. Ulus Travma Acil Cerrahi Derg 2021;27:290–5. [CrossRef]

2. Dilektasli E, Inaba K, Haltmeier T, Wong MD, Clark D, Benjamin ER, et al. The prognostic value of neutrophil-to-lymphocyte ratio on mortality in critically ill trauma patients. J Trauma Acute Care Surg 2016;81:882–8. [CrossRef]

3. Duchesne JC, Tatum D, Jones G, Davis B, Robledo R, DeMoya M, et al. Multi-institutional analysis of neutrophil-to-lymphocyte ratio (NLR) in patients with severe hemorrhage: A new mortality predictor value. J Trauma Acute Care Surg 2017;83:888–93. [CrossRef]

4. Siwicka-Gieroba D, Malodobry K, Biernawska J, Robba C, Bohatyrewicz R, Rola R, et al. The neutrophil/lymphocyte count ratio predicts mortality in severe traumatic brain injury patients. J Clin Med 2019;8:1453. [CrossRef]

5. Demir M, Duyuler PT, Guray U, Celik MC. Platelet to lymphocyte ratio on admission and prognosis in patients with acute cardiogenic pulmonary edema. J Emerg Med 2018;55:465–71. [CrossRef]

6. You J, Zhu GQ, Xie L, Liu WY, Shi L, Wang OC, et al. Preoperative platelet to lymphocyte ratio is a valuable prognostic biomarker in patients with colorectal cancer. Oncotarget 2016;7:25516–27. [CrossRef]

7. Du X, Zhu B, Hu G, Mao W, Wang S, Zhang H, et al. U-shape association between white blood cell count and the risk of diabetes in young Chinese adults. Diabet Med 2009;26:955–60. [CrossRef]

8. Raffetti E, Donato F, Casari S, Castelnuovo F, Sighinolfi L, Bandera A, et al. Systemic inflammation-based scores and mortality for all causes in HIV-infected patients: a MASTER cohort study. BMC Infect. Dis. 2017;17:193. [CrossRef]

9. Urabe M, Yamashita H, Uemura Y, Tanabe A, Yagi K, Aikou S, et al. Non-linear association between long-term outcome and preoperative neutrophil-to-lymphocyte ratio in patients undergoing curative resection for gastric cancer: A retrospective analysis of 1335 cases in a tetrachotomous manner. Jpn J Clin Oncol 2018;48:343–9. [CrossRef]

10. Zhang W, Jiang X. Predictive value of neutrophil-leucocyte in cardiac surgery. Ann Transl Med 2021;9:82. [CrossRef]