Correspondence

INTERNATIONAL JOURNAL OF SURGERY

OPEN

The predictive role of hematological inflammatory markers on the prognosis of kidney injury

Yang Xiong, MD[a], Wei Wang, PhD[a], Feng Qin, PhD[a], Liling Xiong, PhD[b,*]

Dear Editor,

Inflammation has been documented to play a core role in the occurrence and recurrence of numerous diseases, such as nonsmall cell lung cancer[1]. Recently, Liu *et al*.[1] reported that a high neutrophil-to-lymphocyte ratio in peripheral blood was associated with a low incidence of pathological complete response and short disease-free survival time. Neutrophil-to-lymphocyte ratio can reflect the systemic inflammatory status of individuals. This study discloses the potential of hematological inflammatory markers in predicting the prognosis of cancers. However, the predictive role of hematological inflammatory markers in kidney injury remains unknown. Kidney dysfunction during chemotherapy may also have an impact on the overall prognosis. Due to kidney injury, patients may not tolerate the side effects of chemotherapy, consequently leading to poor prognosis. Inflammation is an important pathogenic mechanism of kidney injury[2]. Investigating hematological inflammatory markers indicative of kidney injury is crucial for the prognosis of both malignant and benign conditions. It can alarm early intervention of renal failure, consequently improving patients' overall health status and prognosis.

The platelet-to-white blood cell ratio (PWR) index is a novel hematologic marker of systemic inflammation, defined as the amount of platelet/white blood cells[3]. It has been closely linked with various diseases, including stroke. However, the association between PWR and rapid kidney function decline remains unestablished and warrants further investigation. To explore the association between PWR and rapid kidney function decline, data from the CHARLS was used. Rapid kidney function decline was defined as an estimated glomerular filtration rate decline >4 ml min/1.73/m^2/year. There were 4233 individuals included in the analysis. The detailed process of statistical analysis can be found in the Supplemental Files (Supplemental Digital Content 1, http://links.lww.com/JS9/B739). The association of PWR with rapid kidney function decline is illustrated in Figure 1. In the full model, a one-unit increase in PWR corresponded to a 0.986-fold risk of rapid kidney function decline (95% CI = 0.976–0.996, $P = 0.008$; Fig. 1A). The odds ratios (ORs) for the T2 and T3 groups were 0.61 (95% CI = 0.44–0.84, $P = 0.002$) and 0.51 (95% CI = 0.37–0.72, $P < 0.001$) in the full models, respectively (Fig. 1A). Subgroup analysis further confirmed that an increase in PWR is associated with a decrease in the risk of rapid kidney function decline (Table S1, Supplemental Digital Content 1, http://links.lww.com/JS9/B739). All ORs in the subgroups were less than 1, and most P values were less than 0.05. No significant interaction effects of covariates were detected (P for interaction >0.05). Trend tests were performed to explore the potential exposure–response association between PWR and rapid kidney function decline. A significant trend was detected in increasing PWR and declining risk of rapid kidney function decline, indicating a dose–response association of PWR with rapid kidney function decline. The restricted cubic spline regression analysis confirmed a significant non-linear association between PWR and rapid kidney function decline in the overall population (P for non-linear = 0.005; Fig. 1B), males (P for non-linear = 0.028; Fig. 1C), and females (P for non-linear = 0.042; Fig. 1D). As PWR increased, the risk of rapid kidney function decline initially decreased and then plateaued. The inflection point was identified at a PWR of 32.65.

Hematological inflammatory markers are hitting high notes for convenience, repeatability, and cost-effectiveness. The research by Liu *et al*.[1] mainly focused on the impact of neutrophil-to-lymphocyte ratio on efficacy and survival status, instead of kidney injury. The association between hematological inflammatory markers and kidney injury is not clarified. In this letter, our analyses disclosed that a low PWR was associated with an increased risk of rapid kidney function decline. As a novel hematologic marker of systemic inflammation, PWR shows promising potential in predicting the onset and progression of kidney injury. This finding has clinical significance for predicting renal injury in chemotherapy patients or healthy individuals. Regular monitoring of PWR changes is crucial for patients with early kidney damage. However, due to the observational nature of this study, further research is needed to establish a causal relationship. This study provides a valuable foundation for future investigations in this area.

[a]Department of Urology and Andrology Laboratory, West China Hospital, Sichuan University and [b]Department of Obstetrics, Chengdu Women's and Children's Center Hospital, School of Medicine, University of Electronic Science and Technology of China, Chengdu, Sichuan, People's Republic of China

Yang Xiong and Wei Wang contributed equally to this paper.

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

*Corresponding author. Address: Chengdu Women's and Children's Central Hospital, School of Medicine, University of Electronic Science and Technology of China, Chengdu, Sichuan 610073, People's Republic of China. Tel./fax: +86 28 85164351. E-mail: lilybear1222@163.com (L. Xiong).

International Journal of Surgery (2024) 110:2453–2454

Received 21 December 2023; Accepted 23 December 2023

Supplemental Digital Content is available for this article. Direct URL citations are provided in the HTML and PDF versions of this article on the journal's website, www.lww.com/international-journal-of-surgery.

Published online 18 January 2024

http://dx.doi.org/10.1097/JS9.0000000000001072

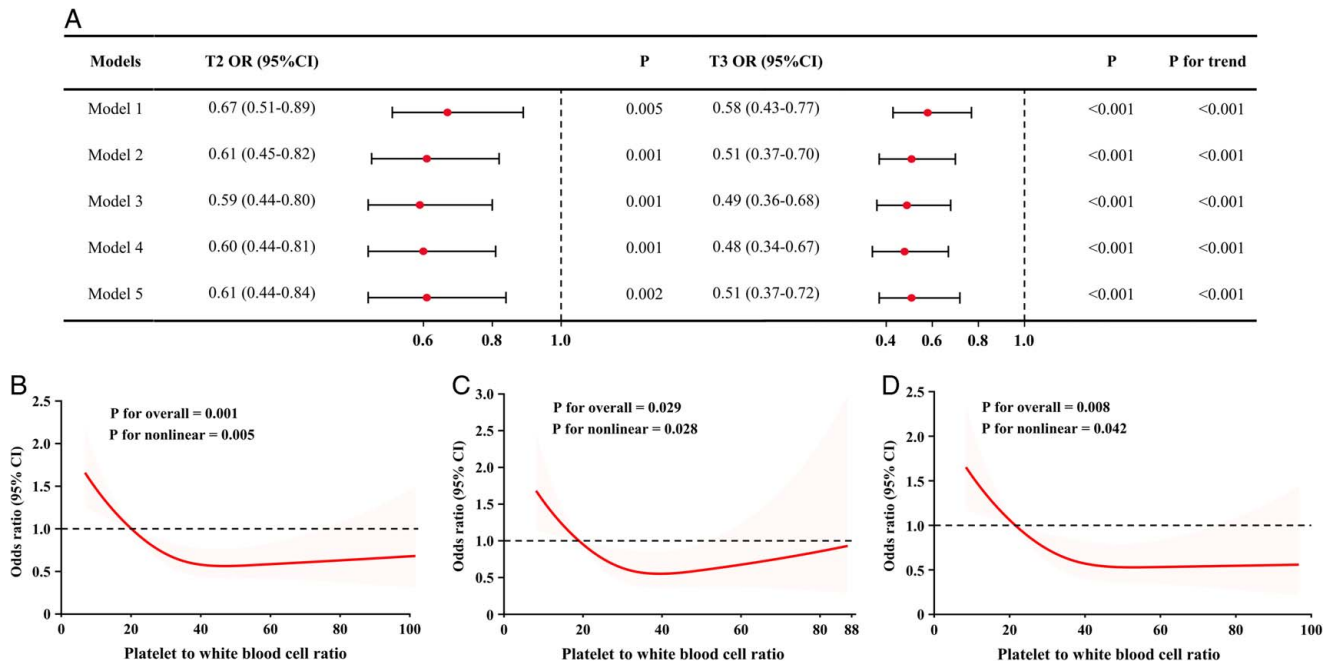

Figure 1. The association of platelet-to-white blood cell ratio (PWR) with rapid kidney function decline. Panel A shows the results of logistic analysis of PWR with rapid kidney function decline. Panels B–D show the results of restricted cubic splines in the overall population (B), males (C), and females (D). The adjusted covariates in models were detailed in the Supplemental files (Supplemental Digital Content 1, http://links.lww.com/JS9/B739).

Ethics approval

As all data are publicly accessible, institutional review board approval was not required.

Consent

Written informed consent was obtained from all the participants before attending this survey.

Source of funding

This work was supported by the Natural Science Foundation of China (No. 82201864).

Author contribution

Y.X.: conceptualization, data acquisition, and writing; W.W, and F.Q.: statistical analysis and writing; L.X.: review, editing, and supervision.

Conflicts of interest disclosure

The authors declare no conflicts of interest.

Research registration unique identifying number (UIN)

1. Name of the registry: not applicable.
2. Unique identifying number or registration ID: not applicable.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): not applicable.

Guarantor

All authors.

Data availability statement

Data are available from the corresponding author if the justification for the requirement is justified.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Acknowledgements

The authors thank Dr Tao Jin for his technical assistance.

References

[1] Liu W, Ren S, Yang L, *et al*. The predictive role of hematologic markers in resectable NSCLC patients treated with neoadjuvant chemoimmunotherapy: a retrospective cohort study. Int J Surg 2023;109:3519–26.

[2] Furman D, Campisi J, Verdin E, *et al*. Chronic inflammation in the etiology of disease across the life span. Nat Med 2019;25:1822–32.

[3] Zhao S, Pan H, Guo Q, *et al*. Platelet to white blood cell ratio was an independent prognostic predictor in acute myeloid leukemia. Hematology 2022;27:426–30.