

White blood cell count and stable coronary artery disease: The role of neutrophil to lymphocyte ratio

In their recently published article, Ates et al. [1] have evaluated the relationship between total white blood cell (WBC) count and the presence, severity and extent of coronary atherosclerosis detected in 817 subjects undergoing multislice computed tomographic coronary angiography for suspected coronary artery disease (CAD). Although plaque morphology was not associated with total WBC counts, the extent of coronary atherosclerosis was increased with higher total WBC quartiles. Patients with critical luminal stenosis had higher levels of total WBC counts compared to patients with non-critical luminal narrowing.

Although the current study is a well-designed and presented one, there is an important point needing to be further discussed. It was reported that the neutrophil to lymphocyte ratio was a more important parameter than total WBC count with regards to the presence, severity and extent of coronary atherosclerosis. Papa et al. [2] analyzed the predictive ability for cardiac events of differential WBC against established risk factors in angiographically proven CAD patients in a relatively large-scale prospective study. They prospectively evaluated complete blood count, biomarkers of inflammation (C-reactive protein [CRP] and serum iron [SI]), glucose/lipid metabolism (fasting glucose [FG], total, high-density lipoprotein [HDL] and low-density lipoprotein cholesterol) and established risk factors in 422 consecutive ischemic patients with angiographically documented stable CAD. On a three-year follow-up, cardiac death and non-fatal myocardial infarction (MI) were considered as end-points. In multivariate analysis, neutrophil to lymphocyte ratio emerged as an independent predictor of cardiac death (HR 8.13) together with CRP, left ventricular ejection fraction (LVEF), FG, HDL and SI. CRP, LVEF, and HDL showed an independent prognostic value for cardiac death and non-fatal MI.

Event-free survival according to neutrophil to lymphocyte ratio tertiles was 99% for the first tertile (1.23 ± 0.26), 96.5% for the second (2.05 ± 0.29), and 88.8% for the third one (5.19 ± 3.81). In another very large-scale prospective study, Horne et al. [3] analyzed the predictive ability of total WBC count and its subtypes for risk of death or MI in 3,227 patients. The predictive ability for death/MI of quartile (Q) 4 vs Q1 total WBC, neutrophil (N), lymphocyte (L), and monocyte (M) counts and neutrophil to lymphocyte ratio were assessed using Cox regressions. Total WBC count is confirmed to be an independent predictor of death/MI in patients with or at high risk for CAD, but greater predictive ability is provided by high N ($Q4 > 6.6 \times 10^3/\mu\text{L}$) or low L counts. The greatest risk prediction is given by the N/L ratio, with $Q4$ vs $Q1$ (> 4.71 vs > 1.96) increasing the hazard by 2.2-fold.

In conclusion, high N to L ratio was associated with increased cardiac mortality in clinically stable patients with CAD compared to total WBC count. Further large-scale prospective studies are needed to clearly understand the exact role of total WBC and subtypes in the pathophysiology of CAD.

References

1. Ates AH, Canpolat U, Yorgun H et al. Total white blood cell count is associated with the presence, severity and extent of coronary atherosclerosis detected by dual-source multislice computed tomographic coronary angiography. *Cardiol J*, 2011; 18: 371-377.
2. Papa A, Emdin M, Passino C, Michelassi C, Battaglia D, Cocci F. Predictive value of elevated neutrophil-lymphocyte ratio on cardiac mortality in patients with stable coronary artery disease. *Clin Chim Acta*, 2008; 395: 27-31.
3. Horne BD, Anderson JL, John JM et al. Intermountain Heart Collaborative Study Group. Which white blood cell subtypes predict increased cardiovascular risk? *J Am Coll Cardiol*, 2005; 45: 1638-1643.

Turgay Celik¹, Baris Bugan²

¹Department of Cardiology, Gulhane Military Medical Academy, School of Medicine, 06018 Etlik-Ankara, Turkey
 tel: +90-312-3044268, fax: +90-312-3044250, e-mail: benturgay@yahoo.com

²Department of Cardiology, Malatya Army District Hospital, Malatya, Turkey