

Letter to the Editor

Neutrophil lymphocyte ratio should be assessed together with other inflammatory markers and confounding factors

To the Editor,

We read the article by Gökhan et al¹ entitled "Neutrophil lymphocyte ratios in stroke subtypes and transient ischemic attack" with great interest, which was published in the previous issue of European Review for Medical and Pharmacological Sciences.

The authors¹ aimed to test the value of Neutrophil Lymphocyte Ratio (NLR), as a prognostically important and an easy-to-measure inflammatory marker, in patients presenting to Emergency Service with stroke and transient ischemic attack. They concluded that NLR can be used as a simple and easy-to-measure marker for prediction of short-term prognosis and in-hospital mortality in stroke patients. It is a well-designed and valuable study, but we have some concerns about the article.

Elevated levels of systemic inflammatory markers have been found associated with higher prevalence of cardiovascular diseases^{2,3}. It is shown that hypertension, diabetes mellitus, hyperlipidemia, obesity and smoking are associated with chronic low grade inflammation⁴.

Systemic inflammatory state can be measured by using a wide spectrum of biochemical and haematological markers^{2,4}. Higher leukocyte and neutrophil counts are associated with the prognosis of cardiovascular diseases⁵. In addition to other risk factors, smoking, the commonest cause of leukocytosis, and obesity, the second most common cause of leukocytosis, are significant independent predictors of a higher blood leukocyte count^{6,7}.

Although measured easily, NLR is more complicated due to being a combined factor of inflammation and immune reaction². NLR and other inflammatory markers are prognostic indicators of stroke as well as other cardiovascular diseases, and the significance is quite stronger especially when used in combination². If the association between NLR and inflammatory markers (C reactive protein, interleukin-6, tumour necrosis factor-alpha) and cardiovascular risk factors such as obesity and smoking in addition to hypertension, diabetes mellitus, hyperlipidemia were determined, the study and the results could have been more evident and valuable in predicting prognosis and mortality in stroke.

Conflict of interest

The Authors declare that they have no conflict of interests.

References

- 1) GÖKHAN S, OZHASENEKLER A, MANSUR DURGUN H, AKIL E, USTÜNDAG M, ORAK M. Neutrophil lymphocyte ratios in stroke subtypes and transient ischemic attack. *Eur Rev Med Pharmacol Sci* 2013; 17: 653-657.
- 2) FOLSOM AR, ROSAMOND WD, SHAHAR E, COOPER LS, ALEKSIC N, NIETO FJ, RASMUSSEN ML, WU KK. Prospective study of markers of hemostatic function with risk of ischemic stroke. The Atherosclerosis Risk in Communities (ARIC) Study Investigators. *Circulation* 1999; 100: 736-742.
- 3) TONDI P, SANTOLIQUIDO A, DI GIORGIO A, SESTITO A, SGUEGLIA GA, FLORE R, CARERI G, PINNACCHIO G, LANZA GA, CREA F. Endothelial dysfunction as assessed by flow-mediated dilation in patients with cardiac syndrome X: role of inflammation. *Eur Rev Med Pharmacol Sci* 2011; 15: 1074-1077.
- 4) FOLSOM AR, ALEKSIC N, CATELLIER D, JUNEJA HS, WU KK. C-reactive protein and incident coronary heart disease in the Atherosclerosis Risk In Communities (ARIC) study. *Am Heart J* 2002; 144: 233-238.
- 5) ZAZULA AD, PRÉCOMA-NETO D, GOMES AM, KRUKLIS H, BARBIERI GF, FORTE RY, LANGOWISKI AR, FACIN G, GUARITA-SOUZA LC, FARIA NETO JR. An assessment of neutrophils/lymphocytes ratio in patients suspected of acute coronary syndrome. *Arq Bras Cardiol* 2008; 90: 31-36.
- 6) HERISHANU Y, ROGOWSKI O, POLLIACK A, MARILUS R. Leukocytosis in obese individuals: possible link in patients with unexplained persistent neutrophilia. *Eur J Haematol* 2006; 76: 516-520.
- 7) SCHWARTZ J, WEISS ST. Host and environmental factors influencing the peripheral blood leukocyte count. *Am J Epidemiol* 1991; 134: 1402-1409.

E. Yalcinkaya, B. Bugan¹, M. Celik, S. Yasar, E. Gursoy

Gulhane Military Medical Faculty, Department of Cardiology, Ankara, Turkey

¹Malatya Army Hospital, Department of Cardiology, Malatya, Turkey