



Letter to Editor

What Is the Clinical Benefit of Neutrophil-Lymphocyte Ratio in Cardiovascular Patients?

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Dear Editor,

Neutrophil-lymphocyte ratio (NLR) has gained a significant interest in the recent years, especially in cardiovascular research area. NLR is an easy to use parameter with not requiring an extreme effort to obtain. It can be obtained easily from the complete blood count (CBC) test, which is the most performed test in hospitals. NLR is used to predict cognitive dysfunction after carotid endarterectomy¹, peripheral arterial disease prognostication², presence, severity and extent of coronary artery disease^{3,4}, and calcific aortic stenosis⁵. NLR has also been used for prediction of coronary heart disease mortality⁶, left atrial thrombus⁷, impaired myocardial perfusion⁸, outcomes of cryoballoon-based atrial fibrillation ablation⁹, and prognostication of ST-elevation myocardial infarction (STEMI).¹⁰ In almost all of these studies, higher NLR was associated with worse clinical outcomes in patients with coronary artery disease, STEMI, peripheral arterial disease, calcific aortic stenosis and atrial fibrillation. However, there is no a universally accepted cut-off value of NLR that dictates a negative outcome as normal or abnormal. All of the above-mentioned studies have used different cut-off values as normal or acceptable. Arbel et al. state >3 as an abnormally high value, other authors vary between <1.4 and <6 being normal.¹⁻¹⁰

In a recent study, Ghaffari et al.¹¹ evaluated the predictive value of peripheral neutrophil count and NLR in determining the prognosis of MI and the risk of major post-MI adverse events. In view of previous studies, it was not surprising to find an association between NLR and the frequency of heart failure and development of ventricular arrhythmias within the first day. The NLR was not associated with mortality but higher neutrophil count was the best predictive value for both mortality and heart failure.

In STEMI, peripheral leukocyte count usually increases within 2 hours after the onset of chest pain, that peaks 2 to 4 days after infarction, returning to normal in one week.¹² Ghaffari et al.¹¹ measured CBC within 12-24 hours of onset of symptoms. The shorter lifespan with a rapid turn-

over of neutrophils may have also affected the results of the study. Thus, serial neutrophil count may potentially be advantageous over its single measurement at the time of admission. This could easily be examined from the blood samples that are routinely obtained for monitoring cardiac enzymes. Also the measurement of NLR can be potentially affected by conditions such as metabolic syndrome, valvular heart disease, abnormal thyroid function tests, renal or hepatic dysfunction, local or systemic infection and ingestion of anti-inflammatory drugs.¹³

Park et al.¹⁰ evaluated the prognostic value of leukocyte profiles (neutrophil, lymphocyte, and monocyte absolute counts) in patients with STEMI treated with primary percutaneous intervention (PCI) and found that patients with 24-hour NLRs ≥ 5.44 were at increased risk for mortality and not admission leukocyte profile but the leukocyte profile at 24 hours after admission was associated with clinical outcomes (all-cause death). Indeed, Chia et al. showed that total leukocyte and neutrophil counts at 24 hours after primary PCI was an independent predictor of adverse cardiac events in patients with STEMI, but not the baseline hematologic indexes.¹⁴

After bare metal stent implantation hypersensitivity-mediated inflammation by eosinophilic cationic protein may be responsible for major cardiac events.¹⁵ Furthermore, hypersensitivity reactions against the drug eluting stent polymer material or the eluted drug have been associated with thrombotic complications probably mediated by persistent inflammation and incomplete apposed stent struts.¹⁶ Ghaffari et al. did not give any information about their revascularisation strategies. Therefore, it is not clear what type of stents were generally used and how long was their door to needle time. Also there was no any information about the patients' medication.

In conclusion, should the presence of a higher NLR without a universally accepted cut-off value alert the physician to a higher hospital mortality? If so, how can we manipulate the NLR to improve the outcome? The NLR may be useful when combined with standardized clinical mortality risk prediction scores and other inflammatory markers. More importantly, further epidemiological studies will

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be required to consider NLR as a useful marker in these clinical settings.

Ethical issues

Not applicable.

Competing interests

None.

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