

Letter to the Editor

Ratios, Ratios and Ratios of white blood count for evaluation of inflammatory conditions

Dear Editor,

Leukocytes are major mediators of inflammation and play a key role in host defense to injury. The multipotent bone marrow hematopoietic stem cells that are involved in protecting the body against foreign invaders and infectious disease are the main source of leukocytes. Leukocytes are cells found throughout the body, including the blood and lymphatic system. There are three types of leukocytes which include the multinucleated leukocytes such as neutrophils, basophils, and eosinophils, the lymphocytes and the monocytes. Their role in patients with cardiovascular events has been emphasized in several studies. Several mechanisms have been proposed to explain the association of such worse outcomes with increased white blood cell count¹. These include actions on blood flow and on risk factors².

Obstructive sleep apnea is a chronic disorder which is associated with considerable cardiovascular risks resulting from the repetitive episodes of transient oxygen desaturation. This disorder is considered to be an independent risk factor for a number of cardiovascular diseases, including hypertension, ischemic heart disease, congestive heart failure and cerebral vascular events³.

In the very important paper published recently in *Eur Rev Med Pharmacol Sci*⁴ it was found that severe obstructive sleep apnea patients had a higher neutrophil to lymphocyte ratio than both mild, moderate obstructive sleep apnea patients as well as healthy controls. Following this report, two additional papers, on the same subject, have emphasized the role of neutrophil to lymphocyte ratio in the severity of sleep apnea. The first⁵ was dealing with the relationship between neutrophil to lymphocyte ratio, endothelial function, and severity in patients with obstructive sleep apnea and found that this ratio, together with endothelial dysfunction, significantly correlated with the severity of obstructive sleep apnea and the flow-mediated dilatation. Specifically, the continuous positive airway pressure therapy increased the levels of the number of endothelial progenitor cells and the levels of nitric oxide and decreased the level of asymmetric dimethylarginine. The second⁶ paper showed that the neutrophil to lymphocyte ratio in patients with severe obstructive sleep apnea was significantly higher than of control group, in patients with mild obstructive sleep apnea and in patients treated with continuous positive airway pressure. Additionally, there was a positive correlation between apnea-hypopnea index and neutrophil-to-lymphocyte ratio and a negative correlation between apnea-hypopnea index and minimum oxygen saturation. All these findings raise importance questions concerning the various leukocyte ratios and their usefulness in predicting the severity of various inflammatory diseases. Indeed, during the previous 2 years, 63 studies have been carried out using white blood count ratios in predicting acute coronary events. Between them 11 such studies were published, in 2013, whereas in 2014 more than 50 studies have examined the role of the neutrophil-lymphocyte ratio in association with acute myocardial infarction and other cardiac conditions. Fifty-nine other inflammatory conditions that have been evaluated with leukocyte ratios² are related to alimentary, blood, bone and joint, collagen, drugs, eye, infective, metabolic, neoplasm, neuro-psycho, and skin systems. The obstructive sleep apnea seems to be the 60th inflammatory condition evaluated with the leukocyte ratios. It is anticipated that, in the near future, there will be no disease affecting the human body that will remain without such evaluation. Apart from the neutrophil to lymphocyte ratio several other white blood count ratios have also been used and include the eosinophil to leukocyte ratio, eosinophil to lymphocyte ratio, eosinophil to neutrophil ratio, lymphocyte to monocyte ratio, neutrophil to lymphocyte ratio, platelet to eosinophil ratio and platelet to lymphocyte ratio. Since that platelet and neutrophil conjugate formation in diabetic women have a greater potential for activation compared to diabetic men and may contribute to thrombosis/inflammation and the greater severity of coronary heart disease observed in diabetic women as compared to diabetic men⁷ it is anticipated that the time for use the platelet to neutrophil ratio is in front of us. Furthermore, because increased platelet to monocyte aggregates formation, and associated proinflammatory monokine synthesis, predict mortality in older septic patients⁸

the platelet to monocyte ratio will not be late to come in use new paragraph. These simple inexpensive, readily measurable and readily available markers could provide risk evaluation in different inflammatory conditions, including sleep apnea, beyond that provided by conventional risk scores. A tailored cutoff value would provide more precise and accurate prognostic information. Such ratios may prove useful in prognosis for medical or interventional treatment strategy during hospital admission, especially in the early stages of the disease.

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Conflict of Interest

The Authors declare that they have no conflict of interests.

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