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Leukocyte indices: A possible marker of subclinical inflammation in very elderly patients and centenarians

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Aim: To study the possibility of using leukocyte indices as markers of subclinical inflammation in very elderly patients and centenarians with Coronary Artery Disease (CAD).

Materials and methods: The cross-sectional study enrolled 127 patients; 93 patients with CAD—in the study group, 34 patients without CAD—in the control group. The mean age of patients reached 88.2 ± 5.3 years (76–98 years); 48.8% were over 90 years of age. The majority of patients (68.5%) were women. The ratio of the number of neutrophils to lymphocytes (NLR), neutrophils to monocytes (NMR), platelets to lymphocytes (PLR) and the Systemic Immune-Inflammation Index (SII) were determined. Along with this, Interleukin-6 (IL-6) was determined in all patients, Tumor Necrosis Factor- α (TNF- α)—in 49 patients, by enzyme-linked immunoassay.

Results: The mean content of leukocytes was $5.9 \pm 1.5 \times 10^9/l$, neutrophils— $3.7 \pm 1.3 \times 10^9/l$, lymphocytes— $1.6 \pm 0.5 \times 10^9/l$, monocytes— $0.4 \pm 0.2 \times 10^9/l$, platelets— $224 \pm 78 \times 10^9/l$. The neutrophil-lymphocyte ratio reached 2.7 ± 1.2 , NMR— 14.5 ± 16.3 , TLR— 158.3 ± 82.2 , SII— 591 ± 374 . In patients with coronary artery disease, the mean content of leukocytes was significantly higher than in the control group (6.1 ± 1.5 and $5.4 \pm 1.5 \times 10^9/l$, respectively, $p=0.02$), and platelets were less (212 ± 60 and $243 \pm 78 \times 10^9/l$, respectively, $p=0.02$). The platelet-lymphocyte ratio (139 ± 54 and 185 ± 87 , $p=0.001$) and neutrophils-monocytes ratio (12.4 ± 13.4 and 20.8 ± 22.0 ; $p=0.04$) were lower in patients with coronary artery disease. In the group of patients with CAD the systemic immune-inflammatory index was also lower (554 ± 345 and 762 ± 616 ; $p=0.02$). In patients with heart failure, a significantly higher content of leukocytes was revealed (6.5 ± 1.7 and $5.7 \pm 1.4 \times 10^9/l$, respectively, $p=0.009$). Along with this, a tendency to a higher content of neutrophils (4.1 ± 1.4 and 3.6 ± 1.2 , $p=0.06$), lymphocytes (1.7 ± 0.6 and 1.5 ± 0.5 , $p=0.08$) and monocytes (0.5 ± 0.2 and 0.4 ± 0.2 , $p=0.09$) was found in patients with heart failure. A direct correlation was established between NLR and the concentration of IL-6 ($r=0.26$; $p=0.003$), as well as an inverse correlation with the content of TNF- α ($r=-0.3$; $p=0.03$). A highly significant correlation was registered between the NLR and functional abilities of patients, assessed using the Barthel index ($r=-0.35$; $p<0.0001$) and the IADL scale ($r=-0.34$; $p<0.0001$). In addition, there was a direct correlation between NLR and the risk of falls by the Morse scale ($r=0.38$; $p=0.001$) and a trend towards inverse correlation with vitamin D content ($r=-0.22$; $p=0.05$). There was a direct relationship between TLR and the level of IL-6 ($r=0.18$; $p=0.04$), ESR ($r=0.20$; $p=0.02$) and the values of the Morse Fall Scale ($r=0.43$; $p<0.0001$). An inverse correlation was registered between TLR and TNF- α ($r=-0.43$; $p=0.002$), Barthel index ($r=-0.20$; $p=0.02$), IADL scale ($r=-0.21$; $p=0.01$), hemoglobin ($r=-0.29$; $p=0.001$), indicators of bone mineral density in the proximal femur ($r=-0.2$; $p=0.03$). No significant relationships were found for the neutrophils-monocytes ratio, except for an inverse correlation with ESR ($r=-0.21$; $p=0.02$). In relation to systemic immune-inflammation index, a direct correlation of this indicator with IL-6 ($r=0.39$; $p<0.0001$) and the values of the Morse Fall Scale ($r=0.45$; $p<0.0001$), as well as an inverse relationship with TNF- α

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($r=-0.35$; $p=0.01$), Barthel index ($r=-0.2$; $p=0.02$) and IADL scale ($r=-0.27$; $p=0.002$) were registered.

Conclusion: The study results suggest that various leukocyte indices can be used as markers of subclinical inflammation in patients with coronary artery disease in old age and in centenarians.

Biography

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