NEUTROPHIL-TO-LYMPHOCYTE AND LYMPHOCYTE-TO-MONOCYTE RATIOS AS INFLAMMATION MARKERS: LARGE COHORT STUDY

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Objectives. Recent studies (Buonacera 2022, Oh 2022) indicate that blood cell ratios may provide valuable clinical information.

The aim of this research was to study neutrophil to lymphocyte (NTL), neutrophil-to-monocyte (NTM) and lymphocyte-to-monocyte (LTM) ratios and their relation to CRP.

Materials and Methods. 299562 anonymized clinical blood tests (Sysmex XN-9000), performed in 2021 simultaneously with CRP (ARCHITECT i4000SR) at SIA "Centrālā laboratorija" were analyzed by IBM SPSS. Overt leukemias were excluded.

Results. All three ratios correlated with CRP (Spearman, $p < 0.001$) and were different in normal ($\leqslant 5$ mg/L) and elevated CRP (Kruskal-Wallis, $p < 0.001$). NTL and LTM in ROC test effectively discriminated elevated CRP (AUC 0.732 and 0.280, respectively, with cutoffs 1.72 and 3.69), being comparable to absolute (0.730) and relative (0.717) neutrophil counts and superior to WBC (0.690). NTM was less informative (0.605) and was not further analyzed.

NTL increased with age, LTM increased till age 3 and decreased afterwards (Kruskal-Wallis $p < 0.001$). Highly significant discrimination of elevated CRP was observed in all age groups.

NTL increased and LTM decreased through the whole range of CRP.

Both NTL and LTM discriminated elevated CRP in decreased, normal and increased WBC and neutrophil settings, this difference was highly significant (Mann-Whitney) in all age groups.

NTL in was slightly higher in men (mean 2.65 vs 2.44) and LTM in women (4.01 vs 3.62), Mann-Whitney $p < 0.001$.

Conclusions. The cohort corresponds to real life practice and is sufficient for representable results.

Both NTL and LTM are easily obtainable and informative. Discrimination of elevated CRP when WBC and neutrophils are normal is of particular interest and may be is valuable for screening purposes. Another feature is lineal relationship with CRP with a possibility to evaluate inflammation severity.

Additional research is necessary to evaluate NTL and LTM role in different clinical settings and to specify reference values and cutoffs.