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Impact of neutrophil-to-lymphocyte ratio on aortic artery calcification and bone mineral density in patients with end-stage renal disease

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Objectives: The neutrophil-to-lymphocyte ratio (NLR) is known as a prognostic biomarker in patients with various diseases as well as general population. However, it is unclear whether NLR can reflect the severity of vascular calcification and bone metabolism in end-stage renal disease. This study investigated the relationship between NLR and aortic artery calcification and bone mineral density (BMD) in dialysis patients.

Methods: We conducted a cross-sectional analysis using baseline data from a multicenter prospective cohort for dialysis patients in Korea. A total of 791 patients were divided into tertile groups according to NLR levels, and the association between NLR levels and the Kauppila aortic artery calcification score (AACS) and BMD were assessed.

Results: The highest tertile NLR group had more male sex, alcohol intake, and prevalence of diabetes and higher comorbidity index than the lowest tertile group. Fasting glucose and C-reactive protein levels were higher, and corrected calcium, serum iron, and lipid profiles were lower in the highest tertile NLR group than those in other groups. AACS showed significantly higher score in the highest tertile group than in other groups ($P = 0.016$), but mean BMD and T-score were not different from the lumbar spine and femur between groups. NLR levels significantly increased with increasing AACS in mainly L2 and L4 (L2 Anterior, $P = 0.013$; L2 Posterior, $P = 0.005$; L4 Anterior, $P = 0.005$, L4 Posterior, $P = 0.006$). In multivariable logistic regression, the highest tertile NLR group was independently associated with severe aortic artery calcification (AACS ≥ 4, Odds ratio 2.702, 95% confidential interval 1.187–6.153, $P = 0.019$), but was not associated with osteoporosis in the lumbar spine and femur after adjusting confounding factors.

Conclusions: Increased NLR can be used as a valuable predictor of aortic artery calcification in end-stage renal disease.