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CKD & associated complications

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High ankle-brachial index reflects increased traditional cardiovascular risk factors, but low ABI is associated with vascular calcification in patients with chronic kidney disease

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Background: Ankle-brachial index (ABI) is a non-invasive method for predicting vascular dysfunction, which is related with a peripheral arterial disease. Previous reports demonstrated that the proportion of high (≥1.3) as well as low (≤0.9) ABI increases as decreasing estimated glomerular filtration rate (eGFR) and abnormal (High or Low) ABI is closely associated with cardiovascular (CV) risks in CKD population. The aim of this study was to investigate the association between abnormal ABI and CV risks in patients with CKD.

Methods: We investigated the pre-dialysis CKD (stage 1~5) patients in a prospective cohort study, KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD)). The patients were divided into three groups according to ABI; low (≤0.9), high (≥1.3), or normal ABI group. Multiple logistic regression was used to identify the independent association between abnormal ABI and various CV risks in present analysis.

Results: A total of 1,818 patients were enrolled. The mean age was 53.5±12.3 years, and 1,119 (61.6%) patients were male. Abnormal ABI group showed significantly older age (low vs normal vs high: 58.5±11.9 vs 52.7±12.3 vs 59.5±9.6 years, P<0.001), higher proportion of male (71.4 vs 59.7 vs 77.4%, P<0.001), more prevalent diabetes (53.6 vs 29.0 vs 48.8%, P<0.001), higher left ventricular mass index (LVMI) (104±30 vs 93±25 vs 106±25 g/m^3, P<0.001), and higher log coronary calcium score (logCCS) (4.8±2.0 vs 3.4±1.6 vs 4.3±1.8, P<0.001), while eGFR was significantly lower in abnormal ABI group compare to normal ABI group (41.8±24.1 vs 51.2±30.3 vs 41.1±26.3 ml/min/1.73m^2, P<0.001). Moreover, the proportion of high and low ABI was significantly higher in patients with advanced CKD stage. In multiple logistic regression, old age (odds ratio [OR], 1.060; 95% confidence interval [CI], 1.029-1.091, P<0.001), male (OR, 4.731; 95% CI, 2.169-10.317, P<0.001), smoking (OR, 0.502; 95% CI, 0.267-0.945, P=0.033), hemoglobin (OR, 0.813; 95% CI, 0.672-0.984, P=0.034), and LVMI (OR, 1.016; 95% CI, 1.005-1.028, P=0.005) were independently associated with higher ABI group, while logCCS (OR, 1.313; 95% CI, 1.082-1.592, P=0.006) was independently associated with low ABI group compared with normal ABI group even after adjustment for multiple traditional CV risk factors.

Conclusion: Abnormal ABI is significantly associated with CV risks in patients with CKD. However, present study suggests that high and low ABI might have substantial difference from pathophysiological mechanisms in CKD patients.

Keywords: Ankle brachial index, CKD (Chronic Kidney Disease)