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Soluble-Klotho와 심혈관계 인자들과의 연관성 탐색: KNOW-CKD 연구

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The Association between Soluble Klotho and Cardiac Parameters in Chronic Kidney Disease: KNOW-CKD Study

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Objective: Klotho is one of mineral metabolism regulator in chronic kidney disease (CKD). Bone mineral metabolism is important in CKD and it is associated with cardiovascular (CV) complications. We explored factors determining serum klotho concentration and investigated the association between klotho and cardiac parameters from Korean CKD patients.

Methods: We analyzed 1,443 CKD patients with soluble klotho at baseline from the prospective KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD) study. Serum concentrations of soluble klotho were divided into tertiles. We used multivariable linear regression to analyze the association with klotho. We analyzed the association between klotho and left ventricular hypertrophy (LVH) and arterial stiffness. Left ventricular mass index (LVMi) was used as a maker of LVH (male >115 g/m^3, female >95 g/m^3). Brachial-to-ankle pulse wave velocity (baPWV) was used as a marker of arterial stiffness.

Results: Patients were 53.5±12.4 years old and 61.5% were male. Patients in the first tertile (n=480, 99-426 pg/mL) were older and had lower eGFR, lower 1,25(OH)2VitD, higher iPTH, and higher C-terminal FGF23. In a multivariable linear regression analysis adjusted with age, gender, HTN, DM, systolic blood pressure, body mass index, eGFR, hemoglobin, uric acid, albumin, CRP, corrected Ca, P, 25(OH)VitD, 1,25(OH)2VitD, iPTH, C-terminal FGF23, random urine protein creatinine ratio, only uric acid (B coefficient, -0.11; 95% confidence interval (CI), -0.02 to -0.01; p< 0.001), log CRP (B coefficient, -0.37; 95% CI, -0.05 to -0.02; p<0.001), and hemoglobin (B coefficient, 0.10; 95% CI, -0.00 to 0.02; p=0.001) remained independently associated with klotho. Among CV parameters, LVH (OR 0.46; 95% CI, 0.25 to 0.85; p=0.014) and baPWV (Pearson correlation, -0.99; p=0.001) were associated with klotho in univariate analysis. However, in multivariable analysis, klotho was not independently associated with LVH and baPWV.

Conclusion: Serum klotho was independently associated with uric acid, hemoglobin and CRP in KNOW-CKD population. Unlike western CKD population, klotho was not an independent determining factor for LVH and arterial stiffness. Further studies are warranted to elucidate the clinico-pathogenic significance of klotho in Korean CKD patients.

Key Words: Klotho, 만성신부전, 심혈관계 인자
Klotho, Chronic kidney disease, Cardiac parameter