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Association between 25-hydroxyvitamin D deficiency and rapid chronic kidney disease progression

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Background: 25-hydroxyvitamin D [25(OH)D] deficiency is highly prevalent in the chronic kidney disease (CKD) population, which is linked with cardiovascular events and mortality. Here we evaluated the relationship between 25(OH)D deficiency and the rapid declining in estimated glomerular filtration rate (eGFR) using KNOW-CKD cohort data.

Methods: In total, 1063 CKD patients were measured for the concentrations of 25(OH)D and creatinine with a follow-up of 4 years in a prospective multi-center cohort study of CKD patients in Korea. We divided the patients into two groups according to their serum 25(OH)D levels (deficiency group: 25(OH)D < 15 ng/ml, vs. non-deficiency group: 25(OH)D ≥ 15 ng/ml). Rapid progression was defined by the decline of eGFR over 5 ml/min/1.73m² per year (N=326) and as controls if decline of eGFR was under 1 ml/min/1.73m² per year (N=609).

Results: The average of decline in eGFR was 1.82 ml/min/1.73m² per year, maximum value of which was 53.8 ml/min/1.73m² per year. The mean of 25(OH)D was 16.8 ng/ml in the rapid progression groups, while that of the control group was 18.5 ng/ml. Univariate linear regression analysis showed that the rapid CKD decline was correlated with age, diabetes, serum albumin, 25(OH)D deficiency, cystatin C, and the albumin-to-creatinine ratio. Multiple analysis revealed that age, hypoalbuminemia, 25(OH)D deficiency, diabetes, and macroalbuminuria associated with rapid progression.

Conclusion: Vitamin D deficiency was associated with rapid eGFR decline in CKD patients. The results of this prospective cohort study suggest that vitamin D supplementation may significantly help the preservation of renal function in CKD patients.

Keywords: 25-hydroxyvitamin D deficiency, chronic kidney disease, rapid eGFR decline