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The Association of Urinary Phosphate Excretion and Osteoporosis in Patients with Chronic Kidney Disease : Result from KNOW-CKD

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Objectives : The mechanism of osteoporosis is more complex in patients with chronic kidney disease (CKD) than general population because of accompanying chronic kidney disease-mineral bone disorder. We aimed to investigate the association of ability to handling urinary phosphate excretion and osteoporosis.
Methods : We analyzed 1,647 patients who were enrolled in the KNOW-CKD and have baseline 24-hour urinary phosphate value and dual-energy x-ray absorptiometry results. The subjects were divided into three groups according to tertile of urinary phosphate excretion. Osteoporosis was defined as T-score of -2.5 or less for one of L1 spine, total hip, or femur neck. The association of osteoporosis and urinary phosphate excretion was evaluated.
Results : The patients with higher urinary phosphate excretion tended to be younger, have higher body mass index and higher estimated glomerular filtration rate (eGFR), lower serum phosphate level. The osteoporosis was observed in 88 patients (16.0%), 31 patients (5.7%), and 14 patients (2.5%) for 1st (< 494mg), 2nd (494-660 mg), and 3rd (>660mg) tertile, respectively. In multivariate logistic regression analysis adjusted for age, sex, body mass index, hemoglobin, serum albumin, phosphate, calcium, and eGFR, patients belonged to 2nd tertile (odds ratio 0.543, 95% confidence interval 0.338-0.857, p = 0.010), and 3rd tertile (odds ratio 0.438, 95% confidence interval 0.223-0.812, p = 0.012) showed lower risk of osteoporosis compared to the patients in 1st tertile. In the subgroup analysis, the risk of osteoporosis was not significantly different among patients with CKD 1-2, however the decreasing risk of osteoporosis according to the tertile of urinary phosphate excretion was more prominent among patients with CKD 3-4.
Conclusions : Higher urinary phosphate excretion was associated with lower risk of osteoporosis in patients with CKD.