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만성신질환 환자에서의 대사성 산증과 비타민D결핍이 골밀도에 미치는 영향

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Effect of Metabolic Acidosis and Vitamin D Deficiency on Bone Mineral Density in Patients with Chronic Kidney Disease

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Background: Metabolic acidosis and vitamin D deficiency is an established risk factor for osteopenia or osteoporosis in general population. Although metabolic acidosis and vitamin D deficiency are prevalent in chronic kidney disease (CKD) patients, the association of metabolic acidosis and vitamin D deficiency with bone mineral density (BMD) has not been fully evaluated in these patients. Therefore, this study was aimed to assess the risk of abnormal BMD on metabolic acidosis and vitamin D deficiency in patients with CKD.

Methods: We included 1,425 participants with CKD stage 1 to 5 who enrolled in the KoreaN cohort study for Outcome in patients With Chronic Kidney Disease (KNOW-CKD) from April 2011 to December 2013. Metabolic acidosis was defined as serum bicarbonate <22 mEq/L, and vitamin D deficiency was defined as serum calcidiol (25-hydroxy-vitamin D) <20 ng/mL. Subjects were categorized into two groups, normal or osteopenia group with the cutoff T-score of -1.0 at total hip and femur neck. Logistic regression analysis was used to assess the independent association of metabolic acidosis and vitamin D deficiency with BMD.

Results: The mean age was 53.1 years, 940 (65.9%) patients were male. Metabolic acidosis was found in 1326 patients (93.1%), and vitamin D deficiency in 859 patients (60.3%). Osteopenia was diagnosed in 264 patients (18.5 %) by total hip and 444 (30.2%) patients by femur neck. Multivariate logistic regression analysis demonstrated that patients with both metabolic acidosis and vitamin D deficiency had increased risk of osteopenia of femur neck (odds ratio=1.017, 95% confidence interval=1.003 to 1.939, p=0.048). However, there was no significant association in total hip.

Conclusion: Metabolic acidosis and vitamin D deficiency had significant association with decreased BMD in patients with CKD, suggesting that intervention of metabolic acidosis and vitamin D deficiency could be helpful in these patients.

Key Words: 골밀도, 대사성산증, 비타민D결핍
BMD, Acidosis, Vitamin D deficiency