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Association of serum uric acid level and long-term outcome in chronic kidney disease from the KoreaN Cohort Study for Outcomes in Patients with Chronic Kidney Disease (KNOW-CKD)

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Objectives: Hyperuricemia is an independent risk factor for microalbuminuria and decline of renal function. Though, it has not been proven whether it predicts renal outcome in chronic kidney disease patients.

Methods: Among the 2,238 patients enrolled in the KoreaN cohort study for Outcomes in patients With Chronic Kidney Disease (KNOW-CKD), 1,039 patients whose serum uric acid were measured more than 3 times were included. Patients were classified into three groups according to uric acid level by trajectory analysis using K-means. We investigated baseline characteristics and outcomes of each group. Renal events were defined as either doubling of creatinine, estimated glomerular filtration rate halving, or end-stage renal disease. Composite events were defined as either death, non-fatal cardiovascular disease, or renal event.

Results: Mean uric acid level was 6.29 ± 1.28 mg/dL for group A, 8.53 ± 1.26 mg/dL for group B, and 4.91 ± 1.36 mg/dL for group C. Men accounted for 64.1%, 70.4%, and 42.4% in group A, group B, and group C, respectively. Proportion of patients with hypertension (99.0%) and diabetes mellitus (DM) (24.2%) were the greatest in group B whose uric acid was the highest. The risk of renal event was 2.01-fold higher in group B (95% CI 1.43-2.84, $P < 0.001$) than group A when adjusted for age, sex, hypertension and DM, and 2.16-fold higher (95% CI 1.24-3.75, $P = 0.006$) when additionally adjusted for other relative factors. The risk of composite event of group B was also significantly higher compared with group A after adjustment for age, sex, hypertension, and DM (HR 2.37, 95% CI 1.62-3.47), and after adjustment for additional factors (HR 2.99, 95% CI 1.60-5.68, $P < 0.001$).

Conclusions: High uric acid level was associated with adverse renal outcome and composite outcome in chronic kidney disease patients by trajectory analysis.