Physical activity is associated with the incident CKD in subjects with normal renal function: Community based prospective cohort study

Young Su Joo, Ki Heon Nam, Hae-Ryong Yun, Joohwan Kim, Changhyun Lee, Jung Tak Park, Seung Hyeok Han, Shin-Wook Kang, Tae-Hyun Yoo
Department of Internal Medicine-Nephrology, Severance Hospital, Korea, Republic of

Objectives: Physical exercise has a beneficial effect on the prevention of cardiovascular disease and diabetes via improvement in the cardio-metabolic disturbances and is associated with better survival in patients with various chronic diseases as well as general population. However, the effects of physical activity on renal outcomes remains unclear. We aimed to investigate the association between daily physical activity and the development of chronic kidney disease (CKD) in relatively healthy population with normal renal function.

Methods: Data were retrieved from the Korean Genome and Epidemiology Study, a prospective community-based cohort study. Daily physical activity was estimated by semi quantitative daily activity questionnaire. The eGFR calculated by the CKD-EPI equation from a total of 8,261 subjects were followed up biennially from 2001 to 2014. The primary endpoint was incident CKD, defined as a composite of eGFR <60 mL×min⁻¹×1.73 m² and/or the development of proteinuria during the follow up period.

Results: The mean age of study subjects was 52.0 years and 3,953 (47.9%) participants were male. At baseline, the mean eGFR was 94.16 ± 14.16 mL×min⁻¹×1.73 m². And the average daily physical activity was 1443.3 ± 896.5 MET·h. During a mean follow-up duration of 119.2 (79.1 – 159.3) months, CKD newly developed in 1,518 (18.4%) subjects. The incidence of proteinuria and eGFR decline lower than 60 mL×min⁻¹×1.73 m² were 288 (3.5%) and 1,319 (15.9) subjects, respectively. When divided into quartiles according to daily physical activity, Kaplan-Meier analysis revealed that the risk of CKD development in the highest quartile was significantly lower than that of the lowest quartile (P <0.001). This association was remained significant even after adjustments were made for confounding factors by multivariable Cox regression model. (HR [95% CI] = 0.75 [0.65–0.87], P < 0.01).

Conclusions: High physical activity is independently associated with decreased risk of incident CKD in healthy population with normal renal function.