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만성콩팥병 환자에서 소변 크레아티닌 배설량과 동맥경화도의 관계: KNOW-CKD 연구

성균관의대 강북삼성병원 내과[1], 서울대병원 내과[2], 서울의대 예방의학교실[3], 서울대병원 의학연구협력센터[4], 서울의대 분당병원 내과[5], 연세의대 세브란스병원 내과[6], 가톨릭의대 서울성모병원 내과[7], 가천의대 길병원 내과[8] 을지병원 내과[9], 전남의대 내과[10], 인제의대 부산백병원 내과[11], KNOW-CKD 연구자 모임

현영율[1], 이규백[1], 오국환[2], 안규리[2], 박수경[3], 이중엽[4], 채동완[5], 최규헌[6] 김용수[7], 정우경[8], 황영환[9], 김수완[10], 김영훈[11]

The association between Urine Creatinine Excretion and Arterial Stiffness in Chronic Kidney Disease: KNOW-CKD Study

Young Youl Hyun[1], Kyu Beck Lee[1], Kook-Hwan Oh[2], Curie Ahn[2], Sue Kyung Park[3], Joongyub Lee[4], Dong Wan Chae[5] Kyu Hun Choi[6], Yong-Soo Kim[7], Wookyung Chung[8], Young-Hwan Hwang[9], Soo Wan Kim[10], Yeong Hoon Kim[11]

Department of Internal Medicine[1], Sungkyunkwan University School of Medicine, Kangbuk Samsung Hospital,
Department of Internal Medicine[2], Seoul National University Hospital,
Department of Preventive Medicine[3], Seoul National University College of Medicine,
Medical Research Collaborating Center[4], Seoul National University Hospital and
Seoul National University College of Medicine,
Department of Internal Medicine[5], Seoul National University Bundang Hospital
Department of Internal Medicine[6], Yonsei University Severance Hospital
Department of Internal Medicine[7], The Catholic University Seoul St. Mary Hospital
Department of Internal Medicine[8], Gachon University, Gil Hospital
Department of Internal Medicine[9], Eulji General Hospital
Department of Internal Medicine[10], Chonnam National University Medical School
Department of Internal Medicine[11], Inje University, Pusan Paik Hospital
KNOW-CKD Study Group

Objective: Arterial stiffness measured by PWV (Pulse Wave Velocity) is a predictor of cardiovascular events, cardiovascular and all-cause mortality in patients with hypertension, diabetes and ESRD and even in the general population. Previous studies also have shown that low muscle mass is associated with arterial stiffness in non-CKD (Chronic Kidney Disease) population, and this might be a link between lower muscle mass and worse cardiovascular outcome. However, the association between muscle mass and arterial stiffness in CKD patients is not known.

Methods: 1,529 CKD patients were enrolled in the prospective KoreaN Cohort Study for Outcome in Patients With Chronic Kidney Disease (KNOW-CKD) study between 2011~2013. We analyzed 1,017 participants from this cohort who underwent a 24-hr urine collection and brachial-ankle PWV (baPWV) as baseline examination. Mean of right and left baPWV (mPWV) was used as a marker of arterial stiffness. 24-hr urine creatinine excretion (UCr) was used as an estimate of muscle mass. We used multivariate linear regression to analyze the association between UCr and mPWV. Logistic regression analysis was used to estimate the odds ratio for highest quintile of mPWV.

Results: Participants were divided into five groups according to their quintile of UCr. mPWV values were different between UCr quintiles (1,639±415, 1,553±369, 1,553±355, 1,484±276 and 1,411±254 for the 1st to 5th quintiles of UCr, $p<0.001$). Per each 100 mg/d increase in UCr, mPWV decreased by 6 m/sec in multivariable linear regression model fully-adjusted with age, sex, BMI, SBP, diabetes, calcium, phosphorus, eGFR, total cholesterol, log-transformed CRP, statin usage and current smoking status ($p=0.022$). The odds ratio of 1st quintile for CAC compared with 4th quintile was 2.18 (1.16-4.11, P=0.016) in a logistic model fully-adjusted with age, sex, BMI, hypertension, diabetes, eGFR, calcium, phosphorus, total cholesterol, hsCRP, statin usage and current smoking status.

Conclusion: Low muscle mass estimated by low UCR was associated high baPWV in predialysis CKD patients in Korea. Further studies are warranted to verify the causal relationship and the role of muscle mass in the development of cardiovascular disease in CKD patients.

Key Words: 소변 크레아티닌 배설량, 근육량, 동맥경직도
Urine creatinine excretion, Muscle mass, Arterial stiffness