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Associations of sarcopenia and albuminuria

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Background: Sarcopenia is characterized by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes including physical disability, poor quality of life, and death. Albuminuria is a well-known risk factor for chronic kidney disease and cardiovascular disease. Little is known about the relationship between sarcopenia and albuminruia. This study was to investigate the associations between sarcopenia and albuminuria using data from the Korea National Health and Nutrition Examination Survey (KNHANES), which is a cross-sectional and nationally representative survey that was composed of a health interview survey, a nutrition survey, and a health examination survey.

Methods: Using data from KNHANES 2011, 1087 subjects aged 50 years or older, and who underwent estimation of appendicular skeletal muscle mass (ASM) were enrolled. Sarcopenia was defined as an ASM divided by body weight (ASM/weight) that was less than 2 standard deviation (SD) below the sex-specific mean for young adults, and presarcopenia was defined as that less than 1 SD. Albuminuria was estimated as urine albumin-to-creatinine ratio (ACR) from fasting spot urine samples. Microalbuminuria was defined as 30 mg/g $\leq$ ACR < 300 mg/g and macroalbuminuria as ACR $\geq$ 300 mg/g. The association between sarcopenia and micro- or macroalbuminuria was cross-sectionally analyzed.

Results: The prevalence of micro- or macroalbuminuria significantly increased in males with presarcopenia (15.2%) and sarcopenia (45.45%) compared to men with normal ASM (9.86%, $P < 0.0001$), while the prevalence in females did not differ according to the ASM ($P = 0.817$).The risk of micro- or macroalbuminuria was elevated 7.661-fold in males with sarcopenia (95% CI 2.72 – 2.158, $P = 0.0001$), but the risk was not elevated in femlaes. A subgroup analyses was performed according to the presence of diabetes, hypertension and metabolic syndrome. In the non-diabetes group, the risk of micro- or macroalbuminuria was elevated 6.185-fold in males with sarcopenia (95% CI 1.889 – 20.251, $P = 0.003$), but the risk was insignificant in females. In the hypertension group, the risk of micro- or macroalbuminuria was elevated 11.449-fold in males with sarcopenia (95% CI 3.037 – 43.156, $P = 0.0003$), but the risk was insignificant in females. In the non-metabolic syndrome group, the risk of micro- or macroalbuminuria was elevated 8.183-fold in males with sarcopenia (95% CI 1.539 – 43.495, $P = 0.013$), but the risk was insignificant in females. There was no significant association between albuminuria and sarcopenia in subjects with diabetes or metabolic syndrome and in subjects without hypertension, in both sexes.

Conclusion: Sarcopenia is associated with micro- or macroalbuminuria in males, especially in subjects with hypertension and those without diabetes and metabolic syndrome. In contrast, no significant relationship was observed in females.

Keywords: Albuminuria, Muscle mass, sarcopenia