노인재활

발표일시 및 장소: 10 월 19 일(토) 14:40-14:50 Room B(5F)

OP2-4-5

Relationship between low handgrip strength and chronic kidney diseases: KNHANES 2014-2017

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Introduction

Accelerated loss of muscle mass is common in patients with the chronic kidney disease (CKD). Various factors associated with CKD such as nutritional deficiencies, metabolic acidosis, and chronic inflammation contribute to muscle wasting. This study investigated the relationship between CKD and handgrip strength (HGS) in Korean population.

Methods

This was a population-based, cross-sectional study using a nationally representative sample of 24,785 subjects aged ≥19 years from the Korea National Health and Nutrition Examination Surveys of 2014–2017. HGS was measured using a digital hand dynamometer and the cut-offs for grade I and II low HGS were presented by deriving -1 and -2 standard deviations values of sex-matched healthy young adults (19-39 years old), respectively. The estimation of glomerular filtration rate (eGFR) was determined using the Chronic Kidney Disease Epidemiology Collaboration formula and CKD was defined as <60 mL/min per 1.73m2 in this study.

Results

The cut-off values for grade I and II low HGS were 37.0 and 29.5 Kg for men and 21.5 and 16.8 Kg for women, respectively. The prevalence of grade II low HGS was 15.4% in a total population. Subjects with low HGS showed higher prevalence of diabetes, hypertension, and CKD than those with normal HGS (Table 1). There was a significant correlation between HGS and eGFR in both men and women (Figure 1.) In multivariate logistic regression adjusted by age group, diabetes, hypertension, and obesity, grade II low HGS showed an independent relationship with CKD in both men (OR 2.540, 95% CI 1.862-3.467) and women (OR 1.722, 95% CI 1.281-2.315) (Table 2).

Conclusions

The prevalence of CKD was higher in subjects with low HGS. Early detection of low HGS may be useful in assessing potential renal function impairment.

Table 1. Demographic and Clinical Characteristics of a Total Population According to Handgrip Strength

Variable	Handgrip Strength			
	Normal (N = 16,702)	Grade I Low Handgrip Strength (N = 5,382)	Grade II Low Handgrip Strength (N = 2,701)	P-Value
Age (years), mean (SD)	47.1 (14.7)	58.3 (17.4)	68.3 (15.4)	<0.001[a]
Sex (male), N (%)	7107 (42.6)	2596 (48.2)	1526 (56.5)	<0.001[b]
Body mass index (kg/m^2), mean (SD)	23.9 (3.6)	23.0 (3.6)	22.0 (4.1)	<0.001[a]
Fasting plasma glucose (mg/dL), mean (SD)	98.9 (22.2)	102.4 (26.2)	103.1 (28.3)	<0.001[a]
HbA1c (%), mean (SD)	5.6 (0.7)	5.8 (0.9)	5.8 (0.9)	<0.001[a]
Impaired glucose tolerance (%)	24.0	23.2	23.2	<0.001[b]
Diabetes (%)	9.0	18.3	24.6	<0.001[b]
Prehypertension (%)	0.3	21.9	20.9	<0.001[b]
Hypertension (%)	0.3	40.9	53.0	<0.001[b]
Serum BUN (mg/dL), mean (SD)	14.0 (4.1)	14.7 (4.9)	15.0 (6.3)	<0.001[a]
Serum creatinine (mg/dL), mean (SD)	0.8 (0.2)	0.8 (0.4)	0.8 (0.4)	<0.001[a]
eGFR (mL/min/1.73m^2), mean (SD)	100.2 (19.6)	97.6 (25.8)	105.2 (37.7)	<0.001[a]
CKD (%)	2.0	6.2	10.0	<0.001[b]

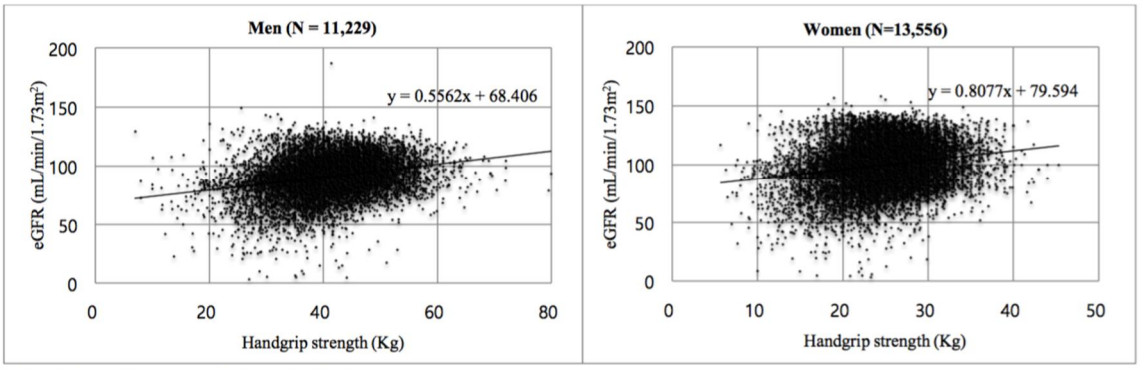
[a]Calculated using analysis of variance.
[b]Calculated using Pearson's chi-squared test.
Abbreviations: HbA1c, hemoglobin A1C; BUN, blood urea nitrogen; eGFR, estimated glomerular filtration rate; CKD, chronic kidney disease

Table 2. Chronic Kidney Disease Prevalence According to Handgrip Strength

Model	Handgrip Strength					
	Normal	Grade I Low Handgrip Strength			Grade II Low Handgrip Strength	
		OR	95% CI	P-Value	OR	95% CI	P-Value
Men							
Model 1	1.000	3.521	(2.805-4.420)	<0.001	4.878	(3.797-6.267)	<0.001
Model 2	1.000	1.577	(1.230-2.020)	<0.001	2.343	(1.767-3.107)	<0.001
Model 3	1.000	1.590	(1.215-2.080)	0.001	2.540	(1.862-3.467)	<0.001
Women							
Model 1	1.000	3.014	(2.397-3.788)	<0.001	6.244	(4.838-8.058)	<0.001
Model 2	1.000	1.316	(1.030-1.681)	0.028	1.854	(1.407-2.442)	<0.001
Model 3	1.000	1.177	(0.907-1.526)	0.220	1.722	(1.281-2.315)	<0.001

Data are expressed as unadjusted and adjusted odds ratios with 95% confidence intervals for chronic kidney disease prevalence in different models.
Model 1 was unadjusted.
Model 2 was adjusted for age.
Model 3 was adjusted for age, DM, HTN and obesity.
Abbreviations: OR, odds ratios; CI, confidence intervals

Figure 1. Scatter Plot Between Estimated Glomerular Filtration Rate and Handgrip Strength.



Abbreviations: eGFR, estimated glomerular filtration rate

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