

Association between serum adiponectin concentration and muscle function in Japanese adults

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学 位 論 文 要 約

博士論文題目 Association between serum adiponectin concentration and muscle function in Japanese adults
..... (日本成人における血清アディポネクチン濃度と骨格筋機能の関連).....

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Background: Previous population-based studies showed that high circulating adiponectin concentration is associated with greater insulin sensitivity and contribute to decreased risk of type 2 diabetes. However, there is a growing interest in the possibility that high levels of circulating adiponectin may play a paradoxical role in physical fitness. Recently, a significant and independent relationship between high adiponectin concentration and physical disability in the elderly has been observed. Further, a cross-sectional study showed an inverse association between serum adiponectin concentration and muscle strength in adolescents. These findings suggest potential involvement of circulating adiponectin in skeletal muscle function; however, little is known about this association.

Purpose: This study was designed to investigate the association between sex-specific serum adiponectin concentrations and muscle strength, including grip strength and leg extension power, in Japanese adults.

Methods: A cross-sectional study was performed using data gathered in 2008-2010 from the Oroshisho Study, a longitudinal study of the lifestyle-related effects on illness and health status in Japanese adult employees working at the Sendai Oroshisho Center in Sendai, Japan, between 2008 and 2011. Blood samples from participants were drawn to measure serum adiponectin concentrations. For grip strength analysis, a total of 1,259 individuals (949 men and 310 women) had provided data for all the variables studied. For leg extension power analysis, 965 subjects (716 men and 249 women) were available. This study was limited to participants who provided written informed consent for the analysis of their data. Association between serum adiponectin concentration and muscle strength was determined by using linear regression models or analysis of covariance (ANCOVA). Confounding factors mainly included socio-demographic, lifestyle-related and health-related factors. All statistical tests were two tailed; p values less than 0.05 were considered statistically significant. Data were analyzed with IBM SPSS Statistics 19.0 software.

Results: Multivariate linear regression analysis showed that serum adiponectin was associated significantly and inversely with both grip strength (β and standard error [SE]: men, -0.09 [0.01], $p = 0.010$; women, -0.20 [0.03], kg, $p = 0.002$) and leg extension power (men, -0.09 [0.02], $p = 0.014$; women, -0.14 [0.07], W, $p = 0.032$) after adjusting for age, occupation, educational levels, smoking status, drinking frequency, physical activity, depressive symptoms, metabolic syndrome, energy intakes, protein intakes, serum high-sensitivity C-reactive protein, and body mass index. In ANCOVA analysis, all of these associations were similar to the results from the multivariate linear regression analysis.

Conclusion: This cross-sectional study in Japanese adults demonstrates that serum adiponectin concentration is significantly associated with poor muscle strength independently of several potential confounding factors.