The Relationship Between Dynapenia and Insulin Resistance in Non-Diabetic Women Over 65 Years of Age

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Abstract

Background: Dynapenia and insulin resistance are common conditions in women without a diagnosis of diabetes mellitus. Dynapenia, a result of malnutrition, is defined as a decline in muscle mass and function associated with aging. In dynapenic patients, immunosuppression, delayed wound healing, and an increased risk of morbidity and mortality are observed. Recent studies have suggested a potential link between hyperglycemia and dynapenia. However, it is unclear whether this effect occurs before overt diabetes develops. Therefore, this study aimed to investigate the relationship between dynapenia and insulin resistance in non-diabetic women aged 65 and older.

Methods: The study included 168 women over the age of 65 without a diagnosis of diabetes mellitus who visited our outpatient clinic. They were divided into two groups: non-dynapenic and dynapenic. A detailed medical history was taken, and physical examinations and blood tests were conducted. Height, weight, upper arm, and calf circumference measurements were performed. Muscle strength was assessed using a hydraulic hand dynamometer. Body composition, including muscle mass, body fat percentage, metabolic rate/body fat, and lean body mass, was measured using bioelectrical impedance analysis (BIA). Skeletal muscle mass index (SMI) values were calculated. Physical performance was evaluated using the sit-to-stand test. Statistical analyses were performed using SPSS 21.0, with a significance level of $p < 0.05$.

Results: The study included 179 non-diabetic women aged 65 and older. Among them, 94 were dynapenic, and 85 were non-dynapenic. Muscle mass, handgrip strength, calf circumference measurements, and albumin levels were significantly lower in the dynapenic group compared to the non-dynapenic group. AST levels were significantly higher in dynapenic patients. There were no statistically significant differences in age, body mass index (BMI), SMI, muscle mass, and handgrip strength measurements based on the presence of HOMA-IR. Patients with insulin resistance had significantly higher glucose, insulin, calcium, hemoglobin, upper arm, and calf circumference measurements compared to those without insulin resistance. Handgrip strength measurements differed significantly according to the sit-to-stand test. Pairwise comparisons revealed that handgrip strength values in group 1 were significantly higher than in groups 2 and 3. Glucose, insulin, and upper arm circumference were significantly associated with dynapenia.

Conclusions: In our study, we observed a clear correlation between HOMA-IR and dynapenia in non-diabetic women aged 65 and older. We found that the presence of dynapenia increased the risk of insulin resistance by 2.385 times. We identified a decrease in muscle strength among non-diabetic elderly women and found that dynapenia in diabetic patients begins during the prediabetic phase in association with insulin resistance. Therefore, close monitoring and treatment of patients with insulin resistance are crucial to preventing the development of dynapenia.

Keywords

Dynapenia, HOMA-IR, Insulin Resistance.