Segmental bioimpedance variables in association with mild cognitive impairment due to Alzheimer disease

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Abstract

Background: Recognizing and monitoring changes in body composition can reveal early signs of body vital status, thereby applying appropriate therapies or lifestyle changes which may help to reverse the risk of MCI. This study aims to examine the association between body composition and bioimpedance variables with mild cognitive impairment (MCI) due to Alzheimer’s disease (AD).

Method: We obtained four water-related and six impedance-related variables for upper and lower extremities as well as several whole body composition variables such as fat (%), body cell mass (%), water volume (TBW FFM), and metabolic rate (BMR) from segmental multi-frequency bioelectrical impedance analysis (MF-BIA) for 938 elderly participants, including 672 cognitively normal individuals (CN) and 266 MCI subjects. Participants’ characteristics, anthropometric information, and the selected BIA variables were described and statistically compared between CN and MCI subjects. The correlations between the selected BIA and neuropsychological tests such as the Korean version of Mini-Mental State Examination (K-MMSE) and Seoul Neuropsychological Screening Battery – second edition (SNSB-II) before and after controlling for age and sex were also examined. Univariate and multivariate logistic regression analyses with the estimated odds ratios were conducted to investigate the associations between these BIA variables and MCI prevalence and for different gender groups.

Result: Our MCI samples were shown to be slightly older, more depressive, and have significantly poorer cognitive abilities compared to CN subjects. The partial correlations upon controlling for age and sex between the selected BIA variables and neuropsychological tests were not magnificent. However, after accounting for age, sex, GDS score, and the significant comorbidities, resistance and reactance in lower extremities survived to be associated with MCI with ORs (95%CI) of 0.81 (0.68-0.96) and 0.79 (0.67-0.94), respectively. After stratify by gender, these variables remained significant in only female group.

Conclusion: The reductions in segmental body resistance and reactance increase the incidence of MCI, these patterns are more pronounced in the lower extremities and especially in female subjects. These two variables can be considered as early bioimpedance changes in MCI due to AD.