Impaired Muscle Health and Amino Acid Kinetics in Older Adults With Mild Cognitive Impairment and the Role of Comorbidities

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Objectives: Recent studies suggest that mild cognitive impairment (MCI) is more prevalent in older individuals with comorbidities that negatively affect muscle mass and function. Our objective is to identify whether impaired muscle health and alterations in plasma amino acid kinetics exist in a large group of participants with MCI and to study the effects of the presence of comorbidities.

Methods: 113 individuals without MCI ($n = 72$ with at least 1 comorbidity based on Charlson comorbidity index (CCI > 0) and $n = 41$ without comorbidities (CCI $= 0$)), and 85 individuals with MCI, based on Montreal cognitive assessment (MoCA) ($n = 51$: CCI > 0; $n = 34$: CCI $= 0$), were selected from the MEDIT database consisting of healthy older adults and adults with at least 1 stable chronic condition or disease. Handgrip strength was measured by dynamometry and inspiratory muscle strength by mouth pressure device. DEXA was used to analyze body composition and visceral adipose tissue (VAT). Postabsorptive kinetics of glycine were measured by pulse stable isotope administration. Plasma GLY enrichment and amino acid profile were analyzed by LC-MS/MS. Stats were done by ANCOVA (covariates BMI, sex, and age) and Pearson correlation. Significance was set at $p < 0.05$.

Results: MoCA scores were lower in MCI participants without comorbidities compared to those with comorbidities ($p = 0.0021$). Independent of the presence of comorbidities, the MCI individuals tended to have lower levels of lean mass on the whole-body level ($p = 0.051$) and in the extremity compartment ($p = 0.0129$). Both the presence of MCI and comorbidities had a negative effect on respiratory ($p = 0.003$) and skeletal muscle strength ($p = 0.0002$). MCI individuals had lower GLY plasma concentration ($p = 0.016$) and whole-body production ($p = 0.001$), independent of the presence of comorbidities or amount of VAT. MCI∗comorbidity interactions were found for respiratory and skeletal muscle strength, and the plasma concentrations of hydroxyproline and the branched-chain amino acids leucine, valine, and isoleucine (all $p < 0.05$).

Conclusions: Impaired muscle health and disturbed amino acid kinetics exist in MCI, only partly related to the presence of comorbidities.

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