Energy intake and expenditure in patients with Alzheimer’s disease and mild cognitive impairment: The NUDAD project

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Abstract

Background: Malnutrition is common in patients with Alzheimer’s disease (AD) dementia and mild cognitive impairment (MCI) and is associated with institutionalization and increased mortality. Malnutrition is the result of a negative energy balance, which could be due to reduced dietary intake and/or higher energy expenditure. To study underlying mechanisms for malnutrition, we investigated dietary intake and resting energy expenditure (REE) of patients with AD dementia, MCI and controls. In addition, we studied associations of global cognition (Mini-Mental State Examination (MMSE)) and AD biomarkers with dietary intake and REE.

Method: We included 219 participants from the NUDAD project, 71 patients with AD dementia (age: 68 ± 8 years, 58% female, MMSE 24 ± 3), 52 with MCI (67 ± 8 years, 42% female, MMSE 26 ± 2) and 96 controls (62 ± 7 years, 52% female, MMSE 28 ± 2). We used a 238-item food frequency questionnaire to assess dietary intake (energy, protein, carbohydrate and fat). In a subgroup of 92 participants (30 patients with AD dementia, 22 with MCI and 40 controls) we measured REE with indirect calorimetry. Between-group differences in dietary intake and REE were tested with ANOVAs. All analyses were adjusted for age, sex, education, and body mass index or fat-free mass.

Result: Patients with AD dementia and MCI did not differ from controls in total energy intake (1991 ± 71 and 2172 ± 80 vs 2022 ± 61 kcal/d, p > 0.05) nor in protein, carbohydrate or fat intake. Patients with AD dementia and MCI had a higher REE than controls (1704 ± 41 and 1754 ± 47 vs 1569 ± 34 kcal/d, p < 0.05). We did not find an association of MMSE score or AD biomarkers with dietary intake and REE.

Conclusion: We found a higher resting energy expenditure, despite similar energy intake in patients with AD and MCI compared to controls. These findings suggest that elevated metabolism rather than reduced energy intake explains malnutrition in AD. These results could be useful to optimize dietary advice for patients with AD dementia and MCI.