PLASMA TOCOPHEROLS, TOCOTRIENOLS AND COGNITIVE DECLINE: A MULTICENTRE STUDY IN EUROPE

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Introduction: Vitamin E is a family of eight antioxidant compounds (four tocopherols and four tocotrienols) with neuroprotective properties, but only alpha-tocopherol has been previously investigated in Alzheimer’s disease (AD) and mild cognitive impairment (MCI).

Aims: To examine the correlation between plasma levels of eight vitamin E forms, together with markers of vitamin E oxidative/nitrosative damage (alpha-tocopherilquinone and 5-nitro-gamma-tocopherol), and cognitive decline in a clinical setting.

Methods: Within the AddNeuroMed Project, a multicentre-European study of biomarkers for AD, tocopherols, tocotrienols, alpha-tocopherilquinone and 5-nitro-gamma-tocopherol were measured in plasma with HPLC for 521 participants, including 168 AD cases, 166 with MCI, and 187 cognitively normal (CN) subjects. Data were analyzed using multivariable-polytomous-logistic-regression with adjustment for potential confounders.

Results: Compared to CN, AD and MCI cases had lower levels of total tocopherols with ORs (odds ratios) [95%CI] of highest tertile of 0.15 [0.05-0.44] for MCI and 0.16 [0.05-0.46] for AD, total tocotrienols with ORs of 0.08 [0.02-0.26] for MCI and OR 0.06 [0.02-0.21] for AD, and total vitamin E with ORs of 0.15 [0.05-0.42] for MCI and 0.15 [0.05-0.45] for AD, respectively. The ORs of highest tertile of the tocopherilquinone/alpha-tocopherol ratio were 25.3 (95%CI 6.8-93.7) for AD and 4.43 (95%CI 1.27-15.5) for MCI compared to CN. The 5-nitro-gamma-tocopherol/gamma-tocopherol ratio appeared to be high among AD and MCI cases (OR 11.0 [95%CI 3.1-39.0] for AD; OR 48.1 [95%CI 12.7-182] for MCI).

Conclusions: Reduced plasma levels of vitamin E forms and increased levels of their oxidative/nitrosative markers may be indicators for the development of cognitive decline.