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Correlation between regional cerebral blood flow and EEG upper alpha/low alpha frequency power ratio in mild cognitive impairment

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Background: Several biomarkers have been proposed for detecting AD in its earliest stages, that is, in the prodromal stage. In an attempt to find noninvasive biomarkers, researchers have investigated the feasibility of neuroimaging tools, such as MR, SPECT as well as neurophysiological measurements using EEG. Moreover, the increase of EEG alpha3/alpha2 ratio has been associated with AD-converters subjects with mild cognitive impairment (MCI).

Objective: To study the association of EEG marker with specific cerebral blood flow changes in subjects with MCI.

Methods: 27 adult subjects with mild cognitive impairment underwent EEG recording and perfusion single-photon emission computed tomography (SPECT) evaluation. The alpha3/alpha2 frequency power ratio was computed for each subject. Two groups were obtained according to the median values of alpha3/alpha2, at a cut-off of 1.17. Correlation between brain perfusion and EEG markers were detected.

Results: Subjects with higher alpha3/alpha2 showed a trendly lower perfusion than low alpha3/alpha2 frequency power ratio group. The two groups were significantly different as about the hippocampal volume and correlation with the theta frequency activity.

Conclusion: There is a complex interplay between cerebral blood flow, theta frequency activity and hippocampal volume in MCI patients with prodromal Alzheimer's disease, characterized by higher EEG alpha3 /alpha2 frequency power ratio.

Biography

Moretti Davide Vito is consultant neurologist, chief of the clinical neurophysiology service and researcher at the National Institute of Research and Cure for Mental disorders and Dementia S. John of God, Brescia, Italy. He received his medical degree from Catholic University in Rome and completed his residency in neurology and fellowship in movement disorders at University of Trieste, Italy. Moreover, he received the PhD in neurophysiology at La Sapienza University (thesis title "Quantitative EEG in Alzheimer's disease"). He is currently involved in research and care of subjects with Alzheimer's disease and dementia in the Memory Clinic/ Alzheimer Operative Unit of the S. John of God Institute. Moreover, he is the chief of the clinical neurophysiology unit. His research is primarily concerned about quantitative EEG evaluation of Alzheimer's patients both in prodromic and clinically evident phase of the disease.

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