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Serum Levels of Plasminogen Activator Inhibitor-1 (PAI-1) Are Increased in Alzheimer's Disease and MCI Patients and Correlate With Cognitive Deficits

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Abstract : Alzheimer's disease (AD) is a central nervous system (CNS) disease characterized by loss of memory, cognitive functions and neurodegeneration. Plasmin is an enzyme degrading many plasma proteins. In the CNS, plasmin may reduce the accumulation of A□, and have other actions relevant to AD pathophysiology. Brain plasmin synthesis is regulated by two enzymes: one activating, the tissue plasminogen activator (tPA), and the other inhibiting, the plasminogen activator inhibitor-1 (PAI-1). We investigated whether tPA and PAI-1 serum levels in AD and amnestic mild cognitive impairment (aMCI) patients are altered compared to cognitively healthy controls. Moreover, we examined the PAI-1/tPA ratio in these patient groups. 40 AD, 40 aMCI and 10 healthy controls were recruited. Venous blood was collected and PAI-1 and tPA serum concentrations were quantified by sandwich ELISAs. The results showed that PAI-1 levels increased in AD and aMCI patients. This increase negatively correlated with cognitive deficit measured by MMSE. Similarly, the ratio between tPA and PAI-1 gradually increases in aMCI and AD patients. This study demonstrates that AD and aMCI patients have altered PAI-1 serum levels and PAI-1/tPA ratio. Since these enzymes are CNS regulators of plasmin, PAI-1 serum levels could be a marker reflecting a cognitive decline in AD.

Keywords : Alzheimer disease, amnestic mild cognitive impairment, plasmin, tissue-type plasminogen activator
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