Comparison of CSF Biomarkers between Alzheimer Disease and Other Causes of Dementia in Phramongkutklao Hospital

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Background: Alzheimer disease (AD) is a degenerative brain disease and most commonly a cause of dementia. Cerebrospinal fluid (CSF) levels of beta-amyloid (Aβ 1-42), phosphorylated tau (p-tau), and total tau (T-tau) are known to be biomarkers of Alzheimer disease (AD). These can differentiate AD from other causes of dementia with good sensitivity and specificity, but the cut-off levels differ between the test centers.

Objective: To compare cerebrospinal fluid CSF levels of beta-amyloid (Aβ 1-42), phosphorylated tau (p-tau), and total tau (T-tau) protein for distinguishing Alzheimer disease (AD) from other causes of dementia and normal memory.

Methods: Thirty-two patients with dementia and seven patients with normal memory at Phramongkutklao Hospital were enrolled for the CSF analysis. Diagnosis of dementia was performed by standard criteria for diagnosis of AD and other causes of dementia. All CSF tests were performed by using Enzyme-Linked Immunoassay (ELISA) technique.

Results: Thirty-nine patients were recruited in this study. Fifteen had AD, while 17 had other causes of dementia (including 13 vascular dementia, 3 frontotemporal lobar degeneration, and 1 dementia with Lewy body), and 7 normal memory patients. Sixteen were men and twenty-three were women. Mean age of the AD group was 75.93 (8.91). The other dementia groups were 75.53 (11.12) and normal memory group was 68.43 (6.63). Mean CSF Aβ 1-42, T-tau and p-tau in the AD group were 453.03(159.22) pg/mL, 291.58(255.55) pg/mL, and 33.02(22.90) pg/mL, respectively. Mean CSF Aβ 1-42, T-tau and p-Tau in the other dementia groups were 724.72(359.15) pg/mL, 234.97(418.33) pg/mL, and 16.31 (17.82) pg/mL, respectively. Mean CSF Aβ 1-42, T-tau and p-tau in the normal memory group were 733.55(453.55) pg/mL, 39.04 (13.54) pg/mL, and 7.19(9.04) pg/mL, respectively. The results showed that the AD group had significantly (P < 0.05) lower levels of CSF Aβ 1-42 and higher level of T-tau, p-tau than the other dementia group. Also, the AD group had significantly (P<0.05) lower levels of CSF Aβ 1-42 and higher level of p-tau than other dementia patients.

Conclusion: Patients with Alzheimer disease had lower levels of CSF Aβ 1-42 and T-tau, p-tau higher than those in other dementia patients and normal memory patients. CSF Aβ 1-42, T-tau and p-tau can be used to support the diagnosis of atypical presentation of AD.

Keywords: Alzheimer disease, Vascular dementia, Dementia with Lewy body