Molecular biomarkers of Parkinson disease and neurodegenerative disorders in cerebrospinal fluid

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Introduction

Molecular biomarkers of Parkinson disease (PD) and neurodegenerative disorders in cerebrospinal fluid (CSF) have aroused much interest of researchers for understanding the pathology, and aiming early diagnosis and intervention, but these markers have not been fully established yet. α-synuclein (αSYN) is a candidate of biomarkers for PD because αSYN is a main component of Lewy body and mutation of the gene cause familial PD, However, the results of the previous studies are inconclusive, or even conflicting. Furthermore, reported normal values of αSYN are widely varied among the studies, and the factors influencing αSYN in CSF are not fully elucidated. One possible influential factor would be blood contamination because αSYN is contained in serum, plasma or whole blood more abundantly (Mollenhauer, 2010). This study aimed to evaluate αSYN, amyloid β40 (Aβ40), amyloid β42 (Aβ42), tau, phosphorylated tau (p-tau), neuron specific enolase (NSE) and ATP13A2 (PARK9 gene product) in PD and neurodegenerative disorders as candidate biomarkers, and to assess the usefulness of these markers, and find influential factors of αSYN.

Methods

This study enrolled 41 patients: -13 PD; -17 non-PD neurodegenerative disorders (non-PD; Alzheimer disease=2, dementia with Lewy bodies=1, progressive supranuclear palsy=2, multiple system atrophy=7, amyotrophic lateral sclerosis=2, spinocerebellar degeneration=3); -11 non-neurodegenerative disorders (NND; normal pressure hydrocephalus=7, cervical spondylosis=1, Alzheimer disease=2, dementia with Lewy bodies=1, progressive supranuclear palsy=2, multiple system atrophy=7, amyotrophic lateral sclerosis=2, spinocerebellar degeneration=3).

This study was approved by local ethical committee, and written informed consents were obtained from all subjects.

Sample collection and measurement:

Lumbar puncture was performed at the L4-S1 interspace. We obtained CSF from the subjects and did not show significant differences among PD, non-PD and NND (data not shown).

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Conclusions

Tau, p-tau and NSE in CSF reflect neurodegenerative processes, and can discriminate PD from other neurological disorders. αSYN in CSF is strongly influenced by blood contamination.

References

5) Tokuda, Neurology. 2010;75(20):1766-72