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Letter to the Editor

A Case of Late-Onset De Novo Huntington's Disease Diagnosed via ^{18}F-FDG PET

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Dear Editor,

Huntington's disease (HD) is a rare inherited neurodegenerative disease that is primarily characterized by chorea, cognitive decline, and psychiatric symptoms. Patients undergoing late-onset HD exhibit mild clinical symptoms.[1] Herein, we report a case of late-onset HD diagnosed using brain ^{18}F-fluorodeoxyglucose positron emission tomography (FDG PET) imaging instead of other evaluations in a patient who complained of cognitive decline.

A 70-year-old female with progressive cognitive decline visited our memory clinic. She complained of difficulty in performing activities of daily living. The caregiver reported that the patient had impaired memory and difficulty in managing simple household chores. Additionally, the patient complained of experiencing involuntary movement of both hands during the last 4 to 5 years. There was no family history of dementia or movement disorders. The patient denied having any psychiatric symptoms. This denial was supported by the caregiver. The patient had a history of rheumatoid arthritis, asthma, and hypertension. The patient was administered propranolol for involuntary movement. We performed several tests as well as brain imaging to evaluate cognitive decline. In the Korean version of the Mini-Mental State Examination, the initial score was 24 and the Global Deterioration Scale score was 3. Although the Seoul Neuropsychological Screening Battery (SNSB) conducted to assess cognitive function in detail indicated a decline in frontal/executive function, verbal and visual memory functions were relatively preserved. She failed to perform alternating hand movements and the fist-edge-palm test. After one year, we performed a follow-up with the SNSB. Visuospatial function and frontal/executive functions were slightly aggravated compared to those of the previous year (**Supplementary Fig. 1**). Magnetic resonance imaging (MRI), which was performed to assess cognitive decline, revealed an acute-to-subacute infarction in the left inferior frontal sulcus (**Fig. 1A**). ^{18}F-florbetaben amyloid PET performed for further cognitive evaluation confirmed negative amyloid deposition with a global standardized uptake value ratio of 0.949 by Neurophet SCALE PET (cut-off value for amyloid positivity, 1.27) (**Fig. 1B**). FDG PET revealed diffuse hypometabolism in the bilateral striata and mild hypometabolism in the bilateral medial prefrontal cortex (**Fig. 1C**).

The movement disorder clinic of our hospital confirmed that the patient's involuntary movements were more likely to be chorea than tremors. Based on cognitive decline, chorea, and FDG PET results, HD was suspected and genetic testing was performed. HD was

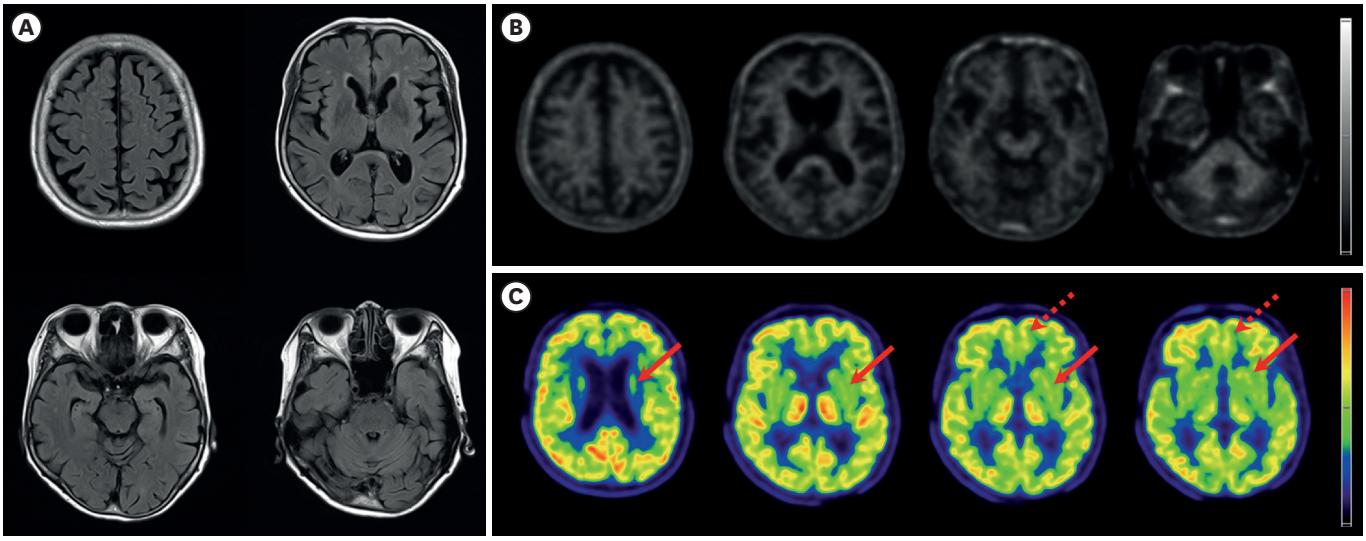

Fig. 1. Brain magnetic resonance imaging, amyloid, and FDG PET images. (A) Transaxial brain MR images revealing no significant caudate or putaminal atrophy. (B) Transaxial amyloid PET images showing negative amyloid deposition. (C) Transaxial FDG PET images revealing diffuse hypometabolism in the bilateral striatum (arrows) and mild hypometabolism in bilateral medial prefrontal cortices (dotted arrows).
FDG PET: ^{18}F-fluorodeoxyglucose positron emission tomography.

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Conflict of Interest

The authors have no financial conflicts of interest.

Authors Contributions

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confirmed by 40 cytosine-adenine-guanine (CAG) repeats in one allele and 17 repeats in the other allele.

Clinical manifestations of HD occur mainly in patients in their 30s and 40s. However, approximately 2%–30% of patients with such manifestations are over 60 years old.[2] A previous study aimed at assessing the prevalence of HD in Korea found that approximately 40% of patients diagnosed with HD were in their 60s or older.[3] Late-onset HD (≥60 years) is characterized by mild motor symptoms, a lack of family history, and relatively low CAG repeats.[1] It may be difficult to suspect HD in patients with mild motor symptoms or cognitive decline. The first clinical symptoms in approximately 7% of patients with late-onset HD appear to be cognitive symptoms. Thus, accurate evaluation of cognitive decline is important.[1] Currently, there are no appropriate clinical scales to classify cognitive decline in HD characterized by executive dysfunction, which can occur in young adults. HD dementia, which differs from other types of dementia, is characterized by a decline in executive function. Previous studies have reported that cognitive decline in HD is associated with a decline in executive function.[2,4] In this case, the patient showed a significant decrease in executive function, consistent with results of previous studies.[2,4]

HD can be diagnosed via genetic testing. Neuroimaging might also be useful for diagnosing HD. Atrophy of the caudate head is typically the most important finding.[2] PET imaging is also helpful for diagnosing HD. In patients with HD, caudate and cortical metabolism are decreased.[5,6] In our case, while the brain MRI did not show significant atrophy of the caudate or putamen, FDG-PET revealed significantly decreased metabolism in the bilateral striatum and mild hypometabolism in bilateral medial prefrontal cortices. Notably, hypometabolism in the bilateral medial prefrontal cortex was correlated with executive function. Moreover, cognitive decline was not associated with amyloid depositions.

In this study, we used the Neurophet SCALE PET for quantitative analysis of amyloid PET. Neurophet SCALE PET is a quantitative PET analysis tool that uses deep learning-based

MRI segmentation. Compared to previously used methods such as PETsurfer, this program demonstrates a relatively higher accuracy and provides an easier means to obtain quantitative values of PET.[7] This study was approved by the Institutional Review Board of Uijeongbu Eulji Medical Center (#UEMC 2023-02-010).

In conclusion, since patients with late onset HD might not have severe clinical symptoms, it is necessary to accurately determine cognitive decline. FDG-PET maybe helpful in the diagnosis of HD.

SUPPLEMENTARY MATERIAL

Supplementary Fig. 1

In the SNSB, the initial test (A) indicated a decline in frontal/executive function, with verbal and visual memory functions relatively preserved. After one year (B), visuospatial functions and frontal/executive functions were slightly aggravated compared to those of the previous year.

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