F-18 FP-CIT PET/CT Imaging in the Differential Diagnosis of Atypical Parkinsonian Disorders

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Atypical parkinsonian disorders (APD), such as progressive supranuclear palsy (PSP) and multiple system atrophy (MSA), which account for a significant proportion of parkinsonian cases, exhibit drug resistance and fatal neurodegenerative course. There are several clinical clues that suggest APD. However, the differential diagnosis of parkinsonism continues to be challenging with a high misdiagnosis rate, particularly in the early stage, because parkinsonian patients show similar symptoms and specific symptoms do not appear in early stage. Therefore, it is important to make an accurate diagnosis not only for deciding treatment regimens and assessing prognosis, but also for developing new therapeutic strategies.

Various imaging methods have been employed to improve the accuracy of differential diagnosis in patients with parkinsonism. For example, F-18 FDG PET, dopamine receptor and transporter SPECT or PET, MIBG cardiac SPECT, and brain MRI. Particularly, F-18 FDG PET is helpful for clinical practice and research because it is widely available and show typical regional glucose metabolic change according to the etiology of parkinsonism. Presynaptic dopamine transporter (DAT) imaging, by contrast, has not been confirmed to be as useful as F-18 FDG PET imaging in differentiating APD from Parkinson's disease (PD) because it reveals significant striatal DAT loss in APD as well as in PD, although it is useful in excluding essential tremor (ET), drug-induced parkinsonism (DIP), vascular parkinsonism, and Alzheimer's disease.

After registration in 2008, the use of F-18 FP-CIT PET/CT has increased dramatically in Korea for both clinical practice and research purpose. F-18 FP-CIT PET/CT has better spatial resolution and more sophisticated attenuation correction than DAT SPECT. Thus, it is possible to use F-18 FP-CIT PET/CT to detect the loss of presynaptic striatal DAT in neurodegenerative parkinsonian patients, but also to differentiate APD such as PSP and MSA from Parkinson's disease by subregional analysis of striatal uptake and dual phases imaging.

Key Words: Atypical parkinsonian disorders; F-18 FP-CIT; PET; Diagnosis

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