Summary

Dopamine Transporter SPECT in Patients with Parkinson's Disease

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The major neuropathological feature in Parkinson's disease (PD) is severe degeneration of the dopamine (DA) neurons in the substantia nigra. Dopamine transporter (DAT) is an important protein in the regulation of DA neurotransmission. It has been reported that PD patients show a loss of DAT in striatum. We report here the findings of single photon emission computed tomography (SPECT) of the DAT with 2β-carboxymethoxy-3β-(4[^{123}I]iodophenyl)tropane ([^{123}I]β-CIT) to investigate striatal DAT in 10 patients with PD, one patient with vascular parkinsonism (VP), and one patient with dystonia syndrome. Patients were evaluated using the Webster rating scale. Specific/nondisplaceable striatal binding ratio (V3") was obtained in each case. In PD patients, the uptake of [^{123}I]β-CIT was reduced, especially in the tail of putamen compared with caudate nucleus. Even in the early stage of PD, the uptake of β-CIT was reduced not only in the severely affected side, but also in the mildly disturbed side of the brain. Putamen caudate ratio was generally low in PD patients. In VP patient, the uptake was reduced, but putamen caudate ratio was not decreased. V3" values showed significant correlation with the severity of clinical symptoms such as self-care, facies, posture, gait, speech, and Hoehn-Yahr's stage. On the other hand, V3" values were not significantly correlated with the degree of tremor, seborrhea, and duration of the illness. In conclusion, we found that SPECT of the [^{123}I]β-CIT is a useful method for the diagnosis in the patients presenting parkinsonism, and for the clinico-physiological estimation of parkinsonian symptoms such as self-care, facies, posture, gait, and speech.

Key words: [^{123}I]β-CIT, Dopamine transporter, SPECT, Parkinson's disease, Webster rating scale.