

Letter to the Editor

Vascular parkinsonism showing dopamine transporter scan findings mimicking those of Parkinson's disease

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ABSTRACT

Dopamine transporter (DAT) scan is important in the diagnosis of Parkinson's disease (PD). We herein report a patient with vascular parkinsonism (VP) who showed dopamine transporter (DAT) scan findings which mimicked those typically seen in patients with Parkinson's disease (PD). DAT scan findings in patients with VP are characterized by a lower striatal asymmetry index than in patients with PD and decreased uptake in the area consistent with old cerebral infarction or hemorrhage. However, we should be aware that, as in our patient, VP patients with asymmetric basal ganglia lesions, may show increased striatal asymmetry index and asymmetric DAT scan findings.

Dear Editor,

Dopamine transporter (DAT) scans play a significant role in the diagnosis and treatment of patients with suspected Parkinson's disease (PD). A recent systematic review and meta-analysis showed that the use of DAT imaging changed management in 54 % (95 % CI: 47–61 %) of patients and changed diagnosis in 31 % (95 % CI: 22–42 %) of patients with suspected Parkinsonian syndrome [1]. We herein report the case of a patient with vascular parkinsonism (VP) who presented with PD-like DAT findings.

An 83-year-old man was referred to our hospital because of gait difficulty for the past year. Neurological examination revealed no cerebellar ataxia or motor palsy. Cognitive function tests revealed a Mini-Mental State Examination score of 24. Bilateral symmetrical bradykinesia and rigidity were observed in the upper and lower limbs. The patient exhibited a shuffling gait with small steps. Freezing of gait was observed during turning and gait initiation. The patient had no complaints of constipation or hyposmia. ¹²³I-Meta-iodobenzylguanidine (MIBG) cardiac scintigraphy showed no decrease in the heart/mediastinum ratio (early phase, 2.50; delayed phase, 2.35). A DAT scan revealed decreased accumulation in the left lateral putamen, with a striatal binding ratio of 4.27 for the right putamen and 2.91 for the left putamen (Fig. 1). The striatal asymmetry index was 37.9 %. T2-weighted magnetic resonance imaging (MRI) revealed no midbrain lesions but did reveal old infarctions in the bilateral basal ganglia with a left predominance (Fig. 1). Mild periventricular hyperintensities were observed. The response to levodopa for parkinsonism was poor. Over 2 years of follow-up, there were no significant changes in brain MRI or DAT scan findings (Fig. 1), and there was no worsening of parkinsonism. Based on these findings, a diagnosis of VP was made.

Our patient had asymmetrical DAT scan findings that were typical of those of PD. However, the distribution of decreased DAT scan accumulation was thought to be consistent with old cerebral infarctions in the basal ganglia, and a diagnosis of VP was made based on the nonprogressive course and normal MIBG cardiac scintigraphy findings. Also, the patient did not complain of hyposmia, one of the supportive signs of

PD, but no olfactory examination was performed. Benitez-Rivero et al. [2] reported that DAT scan findings were 100 % abnormal in 280 PD patients, but among 106 VP patients, 32.5 % had normal DAT scan findings. Additionally, compared to those in the PD group, uptake ratios on DAT scans were significantly greater in VP patients on the most affected side of the putamen, caudate and striatum. Patients with VP have relatively preserved presynaptic dopamine function, resulting in a milder reduction in striatal accumulation in DAT scans than that observed in patients with PD [3]. In a study by Lee et al. [4] the severity of periventricular white matter hyperintensities in VP patients was significantly correlated with the availability of all substriatal DAT, and unlike PD patients, VP patients had a more diffuse loss of DAT availability across the entire striatum. However, our patient showed only mild periventricular hyperintensities.

DAT scan findings in patients with VP are characterized by a lower striatal asymmetry index than those observed in patients with PD and decreased uptake in the area consistent with old cerebral infarctions or hemorrhages [5]. A cutoff value of 14 or higher for the striatal asymmetry index on a DAT scan has been reported to differentiate PD patients from VP patients with a specificity of 100 % and a sensitivity of 50 % [6]. However, it should be noted that VP patients with asymmetrical basal ganglia lesions, as in our patient, may show an increased striatal asymmetry index and asymmetrical DAT scan findings mimicking those typically observed in patients with PD.

Author contributions

HS, HF, KO and KS contributed to the study design. HS and KS collected the data. HS drafted the manuscript. HF, KO and KH revised the manuscript. All of the authors approved the final version of the manuscript.

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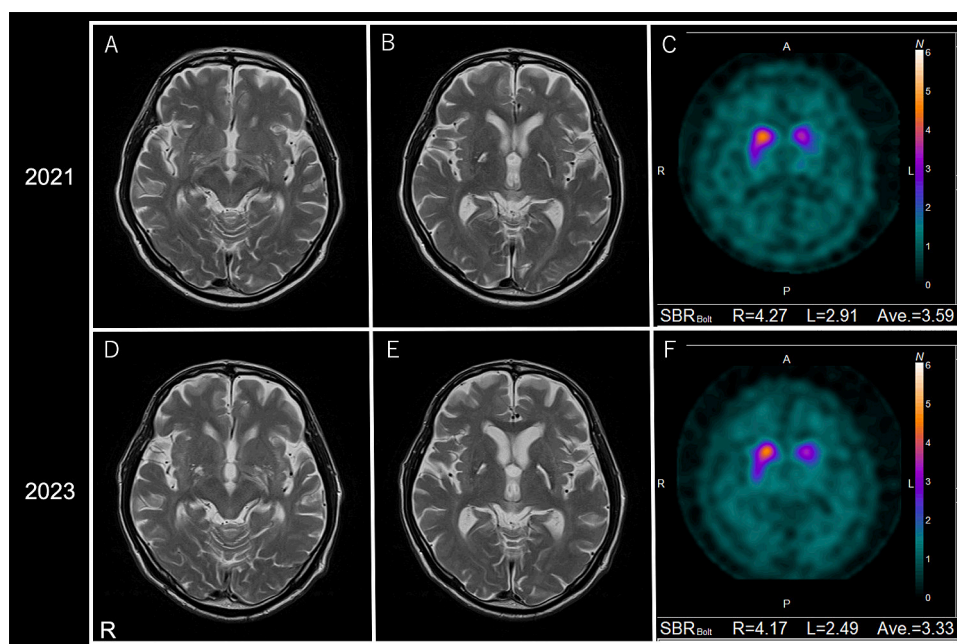


Fig. 1. Brain MRI and DAT scan images.

Images from T2-weighted MRI performed for our patient in 2021 (A, B) and 2023 (D, E) and DAT scans performed in 2021 (C) and 2023 (F) are shown.

CRediT authorship contribution statement

Hirotaka Sakuramoto: Writing – original draft, Investigation, Conceptualization. **Hiroaki Fujita:** Writing – review & editing, Methodology, Data curation, Conceptualization. **Keitaro Ogaki:** Writing – review & editing, Investigation, Conceptualization. **Keisuke Suzuki:** Writing – review & editing, Supervision, Investigation, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no conflicts of interest.

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