# Dopamine transporter single-photon emission computed tomography brain scan: A reliable way to distinguish between degenerative and drug-induced parkinsonism

Sir,

A 54-year-old man on valproate because of bipolar affective disorders developed extra-pyramidal symptoms suggestive of drug-induced parkinsonism. His symptoms persisted despite stopping valproate. He had a dopamine transporter (DaT) scan and single-photon emission computed tomography (SPECT) scan. The DaT scan showed abnormality (Grade 1) [Table 1] in the right putaminal tracer uptake suggestive of degenerative parkinsonism instead of drug-induced parkinsonism [Figure 1a and b].[1,2]

DaT is the presynaptic transmembrane protein of the dopaminergic synapses. It transports dopamine back to the presynaptic neurons from the synaptic cleft. $^{123}$I-ioflupane is a molecular imaging agent used in DaT imaging to demonstrate the location and concentration of DaTs in the synapses. Tc99m-TRODAT and F-18 FDOPA positron emission tomography scan can also assess the DaT activity and the integrity of the presynaptic nigrostriatal function.[3]

DaT SPECT brain scan is helpful to distinguish between pre- (degenerative) and post-synaptic (such as drug-induced or vascular parkinsonism) parkinsonism.[4] DaT imaging is usually normal in postsynaptic parkinsonism, but abnormal in the presynaptic variety.[1] The degenerative presynaptic parkinsonism includes sub-types such as idiopathic Parkinson's disease, progressive supranuclear palsy, multiple system atrophy, Lewy body dementia, and corticobasal degeneration. Though this SPECT scan can distinguish between pre- and post-synaptic parkinsonism, it cannot distinguish among the sub-types of degenerative parkinsonism mentioned above.[1,4]

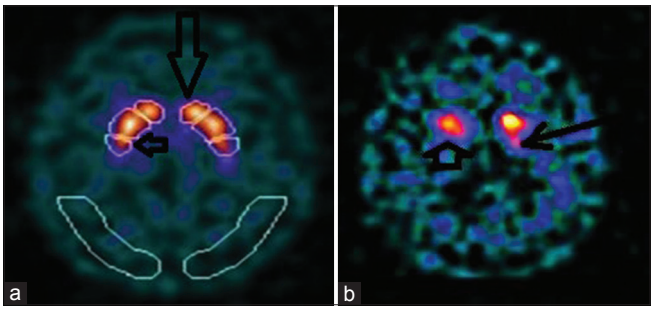


**Figure 1:** (a) Normal dopamine transporter single-photon emission computed tomography scan appearance, normal dopamine transporter scan appearance with head of the caudate nucleus appearing like a full stop (large arrow), and the putamen appearing like tail (small arrow). (b) Abnormal dopamine transporter scan in our patient: The left side is normal with normal putaminal tail (large arrow). The right side has abnormal tracer uptake - absence of putaminal tail, but the normal appearance of the caudate nucleus was like a full stop (small open arrow) (Type 1 abnormal uptake as per Benamer *et al.*)[2]

**Table 1: Type of dopamine scan tracer ($^{123}$I-Ioflupane) uptake in the human basal ganglia**

| Grade | Appearance in each grade |
|---|---|
| Normal uptake | Caudate nucleus appears like "full stop" and putamen-like "tail" (whole appearance is like a comma on both sides) |
| Type 1 | Normal "full stop" with unilateral disappearing "coma" (asymmetrical loss of putaminal tail) |
| Type 2 | "Two full stops" (bilateral loss of putaminal tails) |
| Type 3 | "Disappearing full stops" (partial to complete loss of caudate and putaminal signals) |

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## Conflicts of interest

There are no conflicts of interest.

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