

Subtle changes in central dopaminergic tone underlies bradykinesia in essential tremor

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Introduction: Previous neurophysiological observations indicated that movement slowness (here specifically referred to as bradykinesia) is a common movement abnormality in patients with essential tremor (ET).

Aims: In this study, we further investigate the pathophysiology of bradykinesia in ET patients by evaluating possible correlations between basal ganglia dopaminergic neurotransmission, as assessed by 123I-FP-CIT (DAT-SPECT), and kinematic parameters during finger tapping.

Methods: We enrolled 14 patients with a clinical diagnosis of ET (mean age \pm standard deviation-SD: 72 ± 10.7 years). The patients underwent clinical examination, kinematic assessment of finger tapping using an optoelectronic motion system analysis, and DAT-SPECT.

Results: Confirming previous findings, we observed that ET patients had a considerable variability of kinematic measures during finger tapping, with low movement velocity being observed in a subgroup of about the half of patients. In the whole group of ET patients, radiotracer uptake in both striata, as assessed with DAT-SPECT, was normal. However, the degree of uptake in the striatum was significantly lower in patients with lower movement velocity than in those with normal velocity ($P < 0.05$). Moreover, we found a correlation between the amount of radiotracer uptake in the striatum and movement velocity during finger tapping, i.e., the lower the radioligand uptake, the lower the movement velocity ($r = 0.59$, $P < 0.05$).

Conclusion: Despite the evidence of normal radiotracer uptake with DATSPECT examination, the study findings indicate a possible relationship between subtle changes in the central dopaminergic tone and bradykinesia in ET. These data provide further insight into ET pathophysiology. Longitudinal studies are needed to clarify whether subtle dopaminergic tone reduction in ET patients with kinematic evidence of bradykinesia represents a disease subtype or may predict the clinical progression in Parkinson's disease.