

Brain atrophy in Parkinson's disease with polysomnography-confirmed REM sleep behavior disorder

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Abstract

We aimed to investigate cortical and subcortical brain alterations in people with Parkinson's disease with polysomnography-confirmed rapid eye movement (REM) sleep behavior disorder (RBD). Thirty people with Parkinson's disease, including 15 people with RBD, were recruited and compared with 41 healthy controls. Surface-based cortical and subcortical analyses were performed on T1-weighted images to investigate thickness and shape abnormalities between groups, and voxel-based and deformation-based morphometry were performed to investigate local volume. Correlations were performed in patients to investigate the structural correlates of motor activity during REM sleep. People with RBD showed cortical thinning in the right perisylvian and inferior temporal cortices and shape contraction in the putamen compared with people without RBD. Compared with controls, people with RBD had extensive cortical thinning and volume loss, brainstem volume was reduced, and shape contraction was found in the basal ganglia and hippocampus. In comparison to controls, people without RBD showed more restricted thinning in the sensorimotor, parietal, and occipital cortices, reduced volume in the brainstem, temporal and more posterior areas, and shape contraction in the pallidum and hippocampus. In Parkinson's disease, higher tonic and phasic REM sleep motor activity was associated with contraction of the thalamic surface, extensive cortical thinning, and subtle volume reduction in the middle temporal gyrus. In Parkinson's disease, the presence of RBD is associated with extensive cortical and subcortical abnormalities, suggesting more severe neurodegeneration in people with RBD. This provides potential neuroanatomical correlates for the more severe clinical phenotype reported in people with Parkinson's disease with RBD.

[REM sleep behavior disorder](#), [Parkinson's disease](#), [Structural MRI](#), [cortical thickness](#)

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