

SHAPE ANALYSIS OF SUBCORTICAL STRUCTURES IN IDIOPATHIC RAPID EYE MOVEMENT SLEEP BEHAVIOR DISORDER

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Idiopathic rapid eye movement sleep behavior disorder (iRBD) is considered as a risk factor for the development of Parkinson's disease. Structural brain abnormalities preceding onset of motor signs in Parkinson's disease remain poorly understood and iRBD offers one way to better understand Parkinson's disease in its preclinical stages. In iRBD, gray matter abnormalities involve both volume and cortical thickness. Another technique, vertex-based shape analysis, allows for quantification of surface differences in subcortical structures and overcomes some limitations of voxel-based measures. No study has yet studied shape of subcortical structures involved in cortico-subcortical loops in iRBD patients. Forty-one patients with iRBD and 41 controls underwent MRI examination. Voxel-based morphometry (VBM) was used to investigate local gray matter volume. Subcortical structures (i.e., putamen, caudate nucleus, globus pallidus, and thalamus) were studied for global volume and shape. VBM shows gray matter volume reductions in the frontal and insular lobes and the basal ganglia. Surface-based volumetric analysis shows reduced volume of the right putamen and the left globus pallidus. Shape analysis shows 2 clusters of abnormal surface displacement in the left putamen on the medial and lateral surfaces representing surface contraction and surface expansion. In summary, patients with iRBD present with shape and global volume abnormalities in the putamen and globus pallidus, along with local reductions of gray matter volume in the frontal lobes. This study was supported by grants from the Canadian Institutes of Health Research, the Fonds de Recherche du Québec - Santé, and the W. Garfield Weston Foundation.