PROGRESSION OF GREY AND WHITE MATTER ABNORMALITIES IN EARLY PARKINSON'S DISEASE

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Introduction: Parkinson’s disease (PD) involves progressive brain atrophy in advanced patients and patients with dementia. However, there are no structural neuroimaging longitudinal studies in early stages of the disease.

Aim: To investigate the progression of structural grey and white matter abnormalities and cognitive deficits in early PD patients.

Methods: MRI and neuropsychological evaluations were obtained at base-line and follow-up (mean ± SD = 35.50 ± 1.85 months) on a sample composed of 17 early PD patients (Hoehn and Yahr ≤ II stage and disease evolution ≤ 5 years) and 15 healthy controls. Whole-brain voxel-wise analyses of both grey matter (GM) regional volume and white matter (WM) fractional anisotropy (FA) were carried out by means of voxel-based morphometry (VBM) approach for GM analysis and the method of tract-based spatial statistics (TBSS) for WM analysis.

Results: Both PD patients and healthy controls showed progressive cortical and subcortical GM volume loss and WM FA reductions. In comparison with control group, PD patients showed greater progressive GM loss in paralimbic and some neocortical areas. PD patients also showed greater FA reductions in the external capsule and WM adjacent to limbic and paralimbic structures. However, this greater progression of GM volume loss and WM FA reductions in PD patients was not accompanied by a progressive neuropsychological decline, except in psychomotor speed.

Conclusion: PD patients present progressive GM atrophy and WM FA reductions even in early stages of the disease that is not accompanied by a significant decline in cognitive functions suggesting functional compensatory mechanisms.