Background: The study aimed at establishing the relationship between white matter hyperintensities (WMH) burden, hippocampal atrophy and specific cognitive deficits in Parkinson's disease (PD).

Methods: One hundred and seven patients with PD, aged 63±9 years (with disease duration 6±5 years, UPDRS score parts II-IV: 31.68±16.58, daily levodopa dose 694±440 mg, MMSE score 28±3) participated in the study. All patients underwent magnetic resonance imaging (MRI) and neuropsychological assessment. Brain scans were assessed in terms of general, periventricular (PWMH) and deep WMH (DWMH) with the use of Wahlund and Erkinjuntti scales. Hippocampal atrophy was measured with the use of Scheltens scale. Neuropsychological assessment addressed language (semantic fluency), visuospatial function (Rey Complex Figure Test), verbal learning (Auditory Verbal Learning Test), working memory and executive functions (Trail Making Test, TMT; Wisconsin Card Sorting Test, WCST; phonemic fluency).

Results: In the whole sample the overall WMH correlated with TMT B raw score (rho=0.24), errors on WCST (rho=0.23), while Scheltens score was associated with AVLT 1-5 summed score (rho=0.21). On the basis of neuropsychological test scores the patients were subsequently divided into three groups: with normal cognition (PD-NC; n=19), with mild cognitive impairment (PD-MCI; n=59) and with dementia (PD-D; n=29). In PD-D percentage of information recalled over delay was correlated with Scheltens scale score (rho=0.465). In PD-MCI number of errors on TMT B was associated with PWMH (rho=0.31), while errors on WCST correlated with overall WMH (rho=0.27).

Conclusion: WMH in PD are related specifically to executive function. Memory impairment is associated with the degree of hippocampal atrophy.