Introduction. Parkinson’s disease (PD) is characterized by dopamine depletion in the nigrostriatal system. According to the basal ganglia-thalamocortical circuit model, this leads to an abnormal modulation of cortico-subcortical networks. Functional MRI (fMRI) revealed less deactivation of Default Mode Network (DMN) during cognitive tasks in not-demented PD patients compared to healthy controls (HC). On the other hand, a recent study showed decreased connectivity within DMN in PD patients with dementia. Resting-state (RS) analysis of DMN in early PD patients might reveal neural correlates of cognitive functions prior to the clinical manifestations of their impairments.

Objective. Aim of this study was to investigate the integrity of RS DMN connectivity in patients with early PD.

Methods. We enrolled 57 early PD patients (Hoehn and Yahr stage I) without cognitive impairment (mild cognitive impairment or dementia) and 24 HC. We analyzed RS fMRI data using a model free (MELODIC) approach in FSL.

Results. PD patients showed increased connectivity within the DMN structures including the superior and middle temporal gyri, hippocampi, parahippocampal cortex, precuneus, posterior, middle and anterior cingulate cortices compared to HC bilaterally (p <0.05 FWE corrected) (Figure 1).

Conclusion. We demonstrated a dysfunction of DMN in the very early PD patients without cognitive impairment. There are two possible explanations for our findings. DMN abnormal connectivity in PD could be due to a compensatory mechanism that precedes clinically relevant cognitive impairment. Conversely, it could be secondary to a reduced thalamic outflow to the prefrontal cortex with the impairment of input/output information flows from and to this area and other DMN cortices.