REORGANIZATION OF MOTOR SYSTEM IN PARKINSON’S DISEASE

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Aims and background: Functional organization of the human brain can be changed after circumscribed injury. Presence of adaptive reorganization in disorders involving a more complex network like Parkinson's disease (PD) is less known. We investigated adaptive reorganization in PD by functional MRI (fMRI) using passive motor tasks and compared the brain activation patterns in patients with left- vs. right-sided dominant symptoms.

Methods: Ten right-handed PD patients were studied. We grouped them according to the predominant side of symptoms, thus, a right-sided dominant (RPD) and a left-sided dominant (LPD) group was formed. Functional MRI (fMRI) was used to map brain activation with a paradigm consisted of four-finger passive movement task, which altered with resting states in a block design. In each patient this examination was performed two times: on the left and on the right hand separately. Data were acquired using a 3-T MR scanner. Analysis of fMRI data was performed using the FSL software package.

Results: We found that motor-related areas of the less affected hemisphere including primary sensorimotor cortex, secondary sensory cortex (SII), SMA, and basal ganglia seemed to be involved in motor reorganization in PD. However, we could demonstrate this reorganization only in PD patients with right-sided dominant symptoms.

Conclusion: Human brain in PD tries to compensate for the failure of the basal ganglia motor loop by employing alternative (ipsilateral) motor pathways, suggesting that a complex reorganization can also take place in disorders like PD which affect the whole motor-related network.