عنوان مقاله:

Effective Connectivity within the Papez Circuit in the Multiple Sclerosis Patients: A Comparative Study Using Resting-State fMRI

محل انتشار:

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خلاصه مقاله:

Background: Multiple sclerosis (MS) disease causes structural and functional damage to brain. Structural imaging of the MS-induced damage cannot adequately describe the functional impairment of the brain in MS patients. Therefore, it seems that advanced functional imaging analysis such as functional magnetic resonance imaging (fMRI) data is needed for better management of this disease. Objective: The aim of present study was to evaluate the effective connectivity within the Papez circuit in MS patients using resting-state fMRI.Material and Methods: In this cross-sectional analytical study, ۲۲ healthy individuals and ۲۴ patients with MS underwent resting-state fMRI. After pre-processing of the obtained data, the time series of Cingulate gyrus (CG), Para hippocampus gyrus (PHG), anterior thalamic nuclei (ATN), Mammillary body (MB), and Hippocampus (HPC) were extracted as the main Papez circuit components. The obtained time series were statistically analyzed as an input of the dynamic causal model in order to evaluate the effective connectivity in the Papez circuit. Results: The power of effective connectivity between each pair of tested nodes in Papez circuit was significantly lower in MS patients than healthy subjects. Also, the effective connectivity level of MS patients in direction of HPC→ATN was higher in men than women. In addition, effective self-connection in CG→CG and MB→MB regions in healthy subjects were higher in women than them in men. Conclusion: The present study reveals significant difference in effective connectivity of the Papez nodes in MS patients than control group, which can be exploited to diagnosis and predict or evaluate the treatment response of these patients.

کلمات کلیدی:

Functional Neuroimaging, Magnetic Resonance Imaging, Multiple Sclerosis, Brain, Effective Connectivity