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CHANGES OF RESTING-STATE EEG AND FUNCTIONAL CONNECTIVITY IN THE SENSOR AND SOURCE SPACE OF PATIENTS WITH MAJOR DEPRESSION

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Introduction:
Dyfunctions of prefrontal neuronal circuits contribute to the pathophysiology of depression. Previous studies showed increased functional MRI and EEG connectivity in patients with depression. In this study we investigated a large sample of patients with major depression (n=228) and healthy subjects (n=215).
Methods:
Spectrotemporal dynamics during resting state with closed eyes were analyzed in sensor and source space to examine functional EEG connectivity (fcEEG) alterations between groups. Quantitative measures of delta, theta, alpha , beta and gamma power, hemispheric asymmetry, coherence, phase and current source density (CSD, eLORETA) analyses were calculated from artifact-free EEG recordings.
Results:
EEG theta power was increased in all brain regions in the group of patients with a focus in frontal regions and increased frontal theta and alpha power. Excessive coherence differences were detected in the delta, theta and alpha-bands in frontal, frontal-temporal and frontal-parietal regions. There were changes in phase differences in the delta, theta, alpha-bands between patients and healthy subjects. Differences in CSD were found for the delta, theta, alpha-band in the (rostral and subgenual) anterior cingulate cortex (ACC) with increased CSD in the patients.
Conclusion:
The main finding of the present study was an increase in cortical slow-wave activity in sensor and source space in patients with depression revealing marked differences in prefrontal cortical networks. Functional delta, theta and alpha connectivity (coherence and phase) were altered with a predominance in the left hemisphere. Dysfunctions of the ACC, together with alterations in fcEEG may contribute to the pathophysiology of major depression.

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