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Cognitive Dysfunctioning and the Fronto-Limbic Network in Bipolar Disorder Patients: A Fmri Meta-Analysis

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Abstract : Introduction: Patients with bipolar disorder (BD), characterized by depressive and manic episodes, often suffer from cognitive dysfunction. An up-to-date meta-analysis of functional Magnetic Resonance Imaging (fMRI) studies examining cognitive function in BD is lacking. Objective: The aim of the current fMRI meta-analysis is to investigate brain functioning of bipolar patients compared with healthy subjects within three domains of emotion processing, reward processing, and working memory. Method: Differences in brain regions activation were tested within whole-brain analysis using the activation likelihood estimation (ALE) method. Separate analyses were performed for each cognitive domain. Results: A total of 50 fMRI studies were included: 20 studies used an emotion processing (316 BD and 369 HC) task, 9 studies a reward processing task (215 BD and 213 HC), and 21 studies used a working memory task (503 BD and 445 HC). During emotion processing, BD patients hyperactivated parts of the left amygdala and hippocampus as compared to HC's, but showed hypoactivation in the inferior frontal gyrus (IFG). Regarding reward processing, BD patients showed hyperactivation in part of the orbitofrontal cortex (OFC). During working memory, BD patients showed increased activity in the prefrontal cortex (PFC) and anterior cingulate cortex (ACC). Conclusions: This meta-analysis revealed evidence for activity disturbances in several brain areas involved in the cognitive functioning of BD patients. Furthermore, most of the found regions are part of the so-called fronto-limbic network which is hypothesized to be affected as a result of BD candidate genes' expression.

Keywords : cognitive functioning, fMRI analysis, bipolar disorder, fronto-limbic network
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