A Novel Evaluation of Current Psychiatric Treatment Paradigms Involving Polypharmacy via Resting-State Functional Magnetic Resonance Imaging (fMRI) in a Sample of Patients With Bipolar I Disorder

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As bipolar I disorder (BD-I) is characterized by manic, mixed, and depressive episodes, polypharmacy—combining 2 or more medications simultaneously—is common for BD-I psychiatric treatment to address these wide-ranging symptoms. However, high treatment inadequacy rates for BD-I demonstrate a flaw in the current symptom and diagnosis-based treatment paradigm. This study's purpose was to use resting-state functional magnetic resonance imaging to comprehensively examine the neuroscientific validity of 2 polypharmacies typically used in BD-I. Anatomical & functional images, and patient medication history & diagnoses, were obtained from the OpenfMRI database's UCLA CNP Study. 32 BD-I patients were separated into 2 groups based on their prescribed polypharmacy: either a second-generation antipsychotic (SGA) with a mood stabilizer (MS), or an SGA with an anxiolytic benzodiazepine (AB). Since AB's affect GABA pathways in the hippocampus and MS's affect glutamate pathways in the ventral striatum, these were selected as the 2 regions of interest (ROIs). Preprocessing and analyses were performed using FSL. Following first-level analysis, group-level analysis was performed to compare resting-state BOLD signals in the ventral striatum and hippocampus between experimental groups. Analyses showed no significant differences in BOLD activation between groups in either ROI, revealing that these 2 regimens don't act as direct combinations of the individual medications they're composed of. These findings highlight the current limitations of polypharmacy in accounting for unique neurological differences and stress the need for further integration between neuroscience and psychiatry's clinical applications to develop a more precise and individually-optimized psychiatric treatment paradigm.

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