Cerebrospinal fluid monoamine metabolite profiles in bipolar disorder, ADHD, and controls.


Abstract

Alterations in monoaminergic signaling are suggested as key aspects of the pathophysiology of bipolar disorder and ADHD, but it is not known if the monoamine metabolic profile differs between these disorders. One method to study monoaminergic systems in humans is to measure monoamine end-point metabolite concentrations in cerebrospinal fluid (CSF). Here, we analyzed CSF monoamine metabolite concentrations in 103 adults with bipolar disorder, 72 adults with ADHD, and 113 controls. Individuals with bipolar disorder had significantly higher homovanillic acid (HVA, 264 ± 112 nmol/L, p < 0.001) and 5-hydroxyindoleacetic acid (5-HIAA, 116 ± 42 nmol/L, p = 0.001) concentration, but lower 3-methoxy-4-hydroxyphenylethanol (MHPG, 38 ± 8 nmol/L, p < 0.001) concentrations than controls (HVA, 206 ± 70 nmol/L; 5-HIAA, 98 ± 31 nmol/L; and MHPG, 42 ± 7 nmol/L). Higher HVA concentrations were associated with a history of psychosis in the bipolar disorder sample. Subjects with ADHD had higher HVA (240 ± 94 nmol/L, p < 0.001) concentrations compared with controls. In addition, SSRI treatment was associated with lower 5-HIAA concentrations in both patient groups. A power analysis indicated that for within-group comparisons, only large effects would be reliably detectable. Thus, there may be moderate-to-small effects caused by medication that was not detected due to the limited size of the subgroups in these analyses. In conclusion, the present study suggests disorder-specific alterations of CSF monoamine metabolite concentrations in patients with bipolar disorder and ADHD compared with controls; these differences were independent of acute symptoms and medication effects.