Brief report

Trait impulsivity in patients with mood disorders

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Abstract

Background: Impulsivity is a key component of the manic behavior of bipolar disorder and is reported to occur in bipolar patients as a stable characteristic, i.e. a trait. Nevertheless, impulsivity has not been widely studied in depressed bipolar patients. We assessed impulsivity in depressed and euthymic bipolar and unipolar patients and healthy controls. We hypothesized that bipolar subjects would have higher levels of trait impulsivity than the comparison groups.

Methods: Twenty-four depressed bipolar, 24 depressed unipolar, 12 euthymic bipolar, and 10 euthymic unipolar patients, as well as 51 healthy subjects were evaluated with the Barratt Impulsiveness Scale (BIS). Analysis of covariance with age and sex as covariates was used to compare mean group differences.

Results: Depressed bipolar, euthymic bipolar, and depressed unipolar patients did not differ, and showed greater impulsivity than healthy controls on all of the BIS scales. Euthymic unipolar patients scored higher than healthy controls only on motor impulsivity.

Limitations: Higher number of past substance abusers in the bipolar groups, and no control for anxiety and personality disorders, as well as small sample sizes, limit the reach of this study.

Conclusions: This study replicates prior findings of stable trait impulsivity in bipolar disorder patients, and extends them, confirming that this trait can be demonstrated in depressed patients, as well as manic and euthymic ones. Trait impulsivity may be the result of repeated mood episodes or be present prior to their onset, either way it would influence the clinical presentation of bipolar disorder.

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1. Introduction

Impulsivity is the neurophysiologically based inability to conform behavior to its context or consequences (Barratt and Patton, 1983). Various findings suggest that
impulsivity plays an important role in bipolar disorder. Impulsive behavior is important for the diagnosis of mania (American Psychiatric Association. Task Force on DSM-IV, 2000). Impulsivity also contributes to bipolar disorder complications, such as suicide (Fawcett et al., 1997; Maser et al., 2002; Swann et al., 2005) and substance abuse (Allen et al., 1998; Moeller et al., 2001a; Swann et al., 2004). Bipolar disorder also may be physiologically and clinically related to other conditions characterized by impulsivity, including anti-social and borderline personality disorders, impulse-control disorders, and attention deficit and hyperactivity disorder (Henry et al., 2001; McElroy et al., 1996; Moeller et al., 2001b).

Both the impulsivity that appears in the manic phase of bipolar disorder (state impulsivity) and the stable impulsivity that may extend across mood states (trait impulsivity) are important features of bipolar disorder. Euthymic bipolar patients express trait impulsivity at higher levels than healthy individuals (Swann et al., 2001), but they do not differ from manic bipolar patients (Swann et al., 2003). These findings indicate that the impulsivity found among bipolar patients may be independent of mood state.

An association between impulsivity and bipolar disorder that extends across mood states is important because it would indicate that impulsivity is more than the direct expression of mood symptoms in the affected individuals. This association could have different origins: it could be a consequence of repeated mood episodes, a risk factor for the disorder, or a manifestation of an independent factor linked with the biological causes of the disorder. Each of these possibilities could have important implications for a better understanding of bipolar disorder.

Confirmation that depressed bipolar patients have the same level of impulsivity as euthymic ones is essential for the hypothesis that state independent impulsivity is present in bipolar disorder. Nevertheless, to our knowledge, there are no studies assessing impulsivity in depressed bipolar patients. The goal of this analysis was to assess trait impulsivity in depressed and euthymic bipolar patients and to compare them to patients with major depressive disorder and healthy subjects. We hypothesized that bipolar subjects would have higher levels of trait impulsivity compared to the comparison groups.

2. Methods

2.1. Subjects

Subjects were: 24 depressed bipolar (BP), 24 depressed unipolar (UP), 12 euthymic BP, and 10 euthymic UP patients, as well as 51 healthy controls (HC) (demographic data in Table 1). The subjects were recruited from advertisements as part of an ongoing program of mood disorders imaging studies. The inclusion criteria were 18 years of age or older, diagnosis of bipolar disorder or major depressive disorder for the patients, and no history of Axis I disorders for the controls. Exclusion criteria for all subjects were presence of chronic illnesses, including hypertension, diabetes, and liver or kidney diseases, as well as current thyroid dysfunctions; history of neurological disorders (in the subject or first degree relatives) or neurological trauma resulting in loss of consciousness; current comorbid Axis I disorder, except for anxiety disorders; and substance abuse within 6 months of study participation (urine analysis was used to exclude drug users).

2.2. Instruments and procedures

Subjects completed the Barratt Impulsiveness Scale (BIS) (Barratt, 1965), and the Hamilton Rating Scale for

<table>
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<td>Healthy controls (n=51)</td>
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Note: There were no significant differences in age or sex among groups. There were no significant differences in history of substance abuse among bipolar and unipolar groups.

a Abbreviation: HAM-D — Hamilton Rating Scale for Depression.
b Significantly different from healthy controls (p<.05).
c Significantly different from euthymic unipolar and euthymic bipolar (p<.05).
d Distribution of subjects on medication (excluding HC) significantly different among groups (p<.05).
Depression (HAM-D) (Hamilton, 1960). Diagnosis and mood state were assessed with the Structured Clinical Interview for DSM-IV (SCID-IV) (First et al., 1996).

The BIS is a self-report scale developed to measure impulsivity as a stable characteristic (Barratt and Patton, 1983). It has three different subscales: attentional (rapid shifts of attention and impatience with complexity), motor (impetuous action), and non-planning (lack of future orientation) (Patton et al., 1995). A total score is also obtained. The version 11A was used (Barratt, 1994).

The HAM-D is an interview scale widely used to measure intensity of depressive symptoms (Hamilton, 1960). The version with 21 items was used.

Prior to any assessment, the study was explained to the subjects and written informed consent was obtained on forms approved by the local Institutional Review Board.

2.3. Statistical analysis

Analysis of covariance (ANCOVA), adjusting for age and gender, was used in all group comparisons. Partial eta squared was obtained for these comparisons to measure the effect sizes. Post-hoc tests with Sidak adjustment to control Type I errors were used to perform pairwise comparisons among the groups. The Pearson correlation coefficients between HAM-D scores and BIS total scores were performed for all bipolar (euthymic and depressed merged into one group) and all unipolar (euthymic and depressed merged into one group) patients to assess whether impulsivity is related to severity of mood symptoms. As BIS is supposed to measure impulsivity as a stable characteristic (Barratt and Patton, 1983), it was hypothesized that there would be no significant correlation. The adopted two-sided level of significance was .05.

3. Results

3.1. Demographic and clinical data

There were no significant differences among the groups for age or gender distribution. HC scored significantly lower than the other four groups on the HAM-D, and the euthymic groups scored significantly lower than the depressed ones (Table 1).

3.2. Group comparisons

HC had significantly lower scores on all the BIS scales compared to depressed BP, euthymic BP and depressed UP (Tables 2 and 3). The effect of diagnosis explained a substantial proportion of variance in the BIS scores as reflected by the effect size measure (partial eta squared ranging from 0.26 to 0.46). HC scored significantly lower than euthymic UP only on motor impulsivity. Depressed and euthymic BP subjects did not show significant differences on any of the BIS scales.

Depressed UP scored significantly higher than euthymic UP only on non-planning impulsivity. There were no significant differences between these two groups on the other scales (Table 3). Depressed UP showed no significant differences compared to the two BP groups on all the scales. Euthymic UP scored significantly lower than both BP groups on non-planning impulsivity, and showed no significant differences on motor, and attentional impulsivity. On the total impulsivity measure, euthymic UP scored significantly lower than depressed BP, but showed no difference when compared to euthymic BP (Table 3).

3.3. Association between impulsivity and mood symptoms

Among all BP patients (euthymic and depressed combined) the correlation between depression severity (HAM-D) and impulsivity (BIS total) was not significant \((r=.33, p=.060)\). Among all UP patients (euthymic and depressed) the result was similar \((r=.35, p=.056)\).

4. Discussion

Our findings confirm prior reports of higher trait impulsivity among bipolar subjects compared to healthy controls (Swann et al., 2001, 2003). Furthermore, while these previous studies reported that manic and euthymic bipolar patients have similar levels of trait impulsivity, our data indicate that depressed and euthymic bipolar patients also exhibit similar levels of this trait. Furthermore, we found no significant relationship between impulsivity and severity of mood symptoms. These findings reinforce the hypothesis that the relatively high level of impulsivity found in bipolar patients may be a stable component, which is not merely a manifestation of mood state.
Euthymic unipolar patients scored similarly to depressed unipolar patients on all but the non-planning impulsivity scale. Whereas depressed unipolar patients were consistently more impulsive than healthy controls, euthymic unipolar patients scored significantly higher than healthy controls only on motor impulsiveness. Taken dimension by dimension, these results indicate that lack of future orientation (non-planning impulsivity) is probably a state dependant symptom for unipolar individuals, while impetuous action (motor impulsivity) may be a trait that differentiates unipolar individuals from healthy ones. Taken as a whole, the results for the non-planning and attentional dimensions of impulsivity, as well as the BIS total ones, suggest that depressed unipolar individuals are more impulsive than euthymic unipolar ones, except for its motor dimension. Therefore, a somewhat different picture emerges for unipolar patients than was shown for bipolar individuals. In contrast to the relative independence between impulsivity and mood state in bipolar patients, most of the dimensions of impulsivity (the ones that account for attentional disturbances and lack of future orientation) may be linked to the mood state of unipolar individuals and, therefore, probably be a consequence of depressive symptoms.

The analysis relating HAM-D and BIS scores primarily indicated that the impulsivity found among these subjects was, as expected, not related to the severity of the depressive symptoms. Nevertheless, the nearly significant results for both bipolar and unipolar subjects could indicate that a weak positive correlation between depression and impulsivity is possible. Additional research will be needed to better describe the relationship between depression symptom severity and impulsivity.

The small sample sizes in the euthymic groups limit the reach of this study, by making it more difficult to find differences between the groups, and part of our conclusions are based on non-differences. One remark can be made to contradict this limitation: among the bipolar patients, the BIS scores of the euthymic and depressed samples were very similar (Table 3), therefore both small effect size and small sample size characterize the comparisons between these two groups. Unfortunately the same argument cannot be used for the unipolar groups, because the differences between euthymic and depressed subjects were not so small (Table 3).

None of the subjects in the depressed unipolar group were taking psychotropic medications at the time of the assessment while 40% of the subjects in the euthymic unipolar group were (Table 1). This different proportion of medicated subjects could be a reason for the difference in non-planning impulsivity found between the groups, considering that antidepressant medication usually ameliorates the lack of future orientation found among depressed patients. Future studies focusing impulsivity among unipolar subjects should control antidepressant use.

Trait impulsivity increases additively in bipolar disorder patients with comorbid substance abuse (Swann et al., 2004) and our bipolar groups contained a non-significantly higher number of past substance abusers than the unipolar groups. This could have affected comparisons between the bipolar and unipolar groups. Furthermore, it raises questions about how much trait impulsivity could be attributed specifically for bipolarity independent of substance abuse.

Two diagnosis issues also limit the study. There were not enough subjects to rule out possible effects of comorbid anxiety disorders, and only Axis I diagnoses were assessed. Hence these results were obtained with no control for personality disorders.

These results are preliminary, and should be replicated with larger samples, controlling for anxiety and personality disorders. Comparative analysis of bipolar patients with and without history of substance abuse should be performed. Future studies should also address whether the stable component of impulsivity in bipolar disorder is a consequence of repeated mood episodes or is present prior to mood disorder onset. If heightened impulsivity precedes mood disorder onset,
then impulsivity could be a risk factor or an independent manifestation of the biological causes of mood disorder. Either way, it would influence the clinical presentation of bipolar disorder, as well as its treatment, for higher interepisode impulsivity may contribute to poorer compliance and, consequently, poorer outcome.

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