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Brief report

Affective lability in patients with bipolar disorders is associated with high levels of childhood trauma

Monica Aas^{a,b,*}, Sofie R. Aminoff^{b,c}, Trine Vik Lagerberg^b, Bruno Etain^{d,e,f,g}, Ingrid Agartz^{a,h}, Ole A. Andreassen^{a,b,g}, Ingrid Melle^{a,b}

^a NORMENT, Institute of Clinical Medicine, University of Oslo, Norway

^b Psychosis Research Unit, Division of Mental Health and Addiction, Oslo University Hospital, Oslo, Norway

^c Department of Specialized Inpatient Treatment, Akershus University Hospital, Norway

^d AP-HP, Hôpital H. Mondor – A. Chenevier, Pôle de Psychiatrie, Créteil 94000, France

^e Inserm, U955, Créteil 94000, France

^f Fondation Fondamental, Créteil, France

^g ENBREC, European Network of Bipolar Research Expert Centres (ENBREC), Paris, France

^h Department of Psychiatric Research, Diakonhjemmet Hospital, Oslo, Norway

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ABSTRACT

This study aimed to investigate associations between a history of childhood trauma and levels of affective lability in bipolar patients compared to controls. Forty-two patients and 14 controls were assessed using the Affective Liability Scale (ALS) and the Childhood Trauma Questionnaire (CTQ). Affective Liability Score was significantly associated with scores on the Childhood Trauma Questionnaire. A multivariate regression model indicated a relationship between childhood trauma scores and differences in affective lability between patients and controls.

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1. Introduction

Affective lability is a core feature of several mental disorders, including bipolar disorders (Goodman et al., 2003; Aminoff et al., 2012). Affective lability is defined as frequent and intense fluctuations in affect in response to both pleasant and unpleasant events, and can be measured with the Affective Liability Scale (ALS). Studies of bipolar disorders suggest heightened affective lability and intensity both in manic and mixed episodes (Henry et al., 2003), as well as trait affective lability in euthymic states (Henry et al., 2008).

Previous research has linked childhood trauma, and specifically emotional abuse, to later affective lability in personality disorders (Goodman et al., 2003). Regarding bipolar disorders, one large study ($n=202$) showed that childhood trauma is associated with higher scores on the ALS, with the strongest association for emotional abuse (Etain et al., 2008). Childhood trauma has been linked to increased amygdala activation (van Harmelen et al.,

2013), a brain region important for fear and emotions (Gallagher and Chiba, 1996; Aas et al., 2012b), supporting a relationship of childhood trauma with possible changes in emotional regulation. Childhood trauma has also been linked to changes in the prefrontal cortex that possibly affects the control of the emotion-driven impulses (Marquez et al., 2013). Thus childhood trauma may be related to changes in emotional regulation by increased emotional stimuli from the amygdala (particularly negative stimuli), combined with reduced control of these emotions by the prefrontal cortex.

Several studies have found that severe mental disorders, such as bipolar disorders, are characterized by an increased level of reports of childhood trauma experiences compared to the general population (Etain et al., 2013; Aas et al., 2013). In bipolar disorders an increased level of childhood trauma is also associated with a more rapid cycling course, suicide attempts, more mood episodes and earlier age at onset (Daruy-Filho et al., 2011; Etain et al., 2008, 2012, 2013).

This study is the first to investigate if childhood trauma, as measured by the Childhood Trauma Questionnaire (CTQ), mediates higher levels of Affective Liability Scores (ALS) in patients with bipolar disorders compared to controls. This is important for the further understanding of the mechanisms behind bipolar

* Corresponding author at: NORMENT, KG Jebsen Psychosis Research Centre, TOP study group, Division of Mental Health and Addiction, Institute of Clinical Medicine, Bygg 49, Ullevål sykehus, PO Box 4956, Nydalen, 0424 Oslo, Norway.

E-mail address: monica.aas@medisin.uio.no (M. Aas).

disorders that will hopefully also contribute to patients' treatment in the long-term. Based on our relatively small sample size with the limitations that follows, we aim to investigate the above in this brief report, which should be investigated further in a larger independent sample. Our hypotheses are as follows: (1) Patients will have significantly higher scores on the ALS and the CTQ compared to controls; (2) the total score on the ALS will be positively correlated with the total score on the CTQ, with the strongest correlation for emotional abuse; (3) childhood trauma will be associated with higher ALS scores in patients compared to controls.

2. Methods

2.1. Participants

Participants were recruited consecutively from psychiatric units (outpatient and inpatient) in four major hospitals in Oslo as part of the larger Thematically Organized Psychosis (TOP) Research study. For the present study, 42 DSM-IV-diagnosed patients were recruited between 2007 and spring 2013, all of whom had a diagnosis of bipolar disorders (37 bipolar I disorder, two bipolar NOS, and three bipolar II); patients' age mean \pm S.D. was 30.8 ± 10.6 ; 55% of the same were females. Twenty nine (64%) of the patients had experienced at least one psychotic episode.

14 persons without severe mental disorders or ongoing illicit drug abuse were recruited from the same geographical areas as healthy control subjects (Controls' age mean \pm S.D.: 29.4 ± 7.6 ; 37% females). This is an ongoing study, and the collection of CTQ from control subjects started later than the collection of CTQ from patients, explaining the larger N in patients compared to controls. Exclusion criteria for all groups were an unstable or uncontrolled medical condition that interferes with brain function, and age outside the range of 18–65 years. It is an ongoing debate whether borderline personality disorder (BPD) belongs to the bipolar spectrum (Coulston et al., 2012). In our study, however, we only included patients who met DSM-IV SCID 1 diagnostic criteria for bipolar disorder, independent of any possible personality disorders they may also have had. Moreover, controls did not have any current axis one disorders. The Regional Committee for Medical Research Ethics, and the Norwegian Data Inspectorate approved the study. All participants gave written informed consent.

2.2. Clinical assessment

Clinical assessment was carried out by trained psychiatrists and clinical psychologists. Diagnosis was based on the Structured Clinical Interview for DSM-IV Axis I disorders (SCID-I). Diagnostic reliability was found to be satisfactory (Ringen et al., 2008) with overall agreement for DSM-IV diagnostic categories of 82% and the overall κ 0.77 (95% CI: 0.60–0.94). Current positive and negative symptoms were rated using the Positive and Negative Syndrome Scale (PANSS) (Kay et al. 1987). Inter-rater reliability was acceptable with intra-class correlation coefficients (Shrout and Fleiss, 1979) for PANSS subscales ranging from 0.71 to 0.73. Participants were defined as currently psychotic if they scored 4 or higher on any one of the following PANSS items: P1, P3, P5, P6, and G9. Use of medication at the time of testing was determined through clinical interview and medical charts. In the patient group, 29 patients (69%) used one or more antipsychotics; 13 patients (31%) used anti-depressants, and 20 patients (48%) used at least one type of mood stabilizers.

2.3. Affective Liability Scale (ALS)

Affective liability was measured using the Norwegian version of the Affective Liability Scale (ALS) (Harvey et al., 1989). The ALS includes 54 questions, rated from 0 to 3, and is divided into six sections that examine affective variations between euthymia on the one hand, and depression, elation, anger and anxiety on the other, and that also examine the affective variations between anxiety and depression, and between depression and elation. The total score is the sum of the question's scores divided by 54, thus ranging from 0 to 3, a score closer to 3 indicating greater affective liability.

2.4. Childhood Trauma Questionnaire (CTQ)

Traumatic events in childhood were rated using a Norwegian version of the Childhood Trauma Questionnaire (CTQ) (Bernstein et al., 2003; Aas et al., 2012a). This is a self-report questionnaire with 28-items (Bernstein et al., 2003), yielding scores on the following five subscales: trauma, emotional abuse, physical abuse, sexual abuse, physical neglect, and emotional neglect. Each subscale is measured

with five items rated on a five-point Likert scale from 1 (never true) to 5 (very often true).

2.5. Statistical analyses

Data were analyzed using the Predictive Analytic software (PASW), Version 18 (formerly SPSS Statistics). Continuous variables were presented as mean \pm standard deviation. As ALS and CTQ were not normally distributed we used non-parametric tests (Spearman's correlation and Mann–Whitney test), when comparing patients and controls on these clinical measures. For the mediation analysis, ALS and CTQ were log transformed before entered into the parametric logistic regression analysis. We also applied the principles for mediation analysis by Baron and Kenny (Baron and Kenny, 1986). As the dependent variable was dichotomous (patients versus controls), logistic regression was performed and Nagelkerke r^2 was used to indicate the power of explanation of the model (Nagelkerke, 1991). Lastly, to avoid type 1 error, we corrected for number of childhood sub-groups (physical, sexual and emotional abuse, as well as physical and emotional neglect), using a significance level of 0.01 compared to a standard level of ≤ 0.05 . As this was a hypothesis driven study, with a priori ideas on directions, we decided this was sufficient without the potential of losing important data.

3. Results

The patient group had a significantly higher CTQ total score compared to the control group (40.44 ± 12.50 versus 29.75 ± 4.29 ; Mann–Whitney test: $z = -2.85$, $p = 0.004$). Patients also had a significantly higher ALS total score compared to controls (1.01 ± 0.72 versus 0.28 ± 0.33 ; Mann–Whitney test: $z = -3.75$, $p < 0.001$). Independent sample t -test was conducted comparing ALS scores in patients taking medication (anti-psychotic medication, anti-depressants, or mood stabilizers), to patients not taking medication; no significant difference in ALS scores were observed between the groups ($f = 0.001$, $t = 0.72$, $d.f. = 39$, $p = 0.47$).

In the patient group, ALS was significantly and positively correlated (Spearman's correlation, [rho]) with CTQ total score ($r = 0.40$, $p = 0.009$). Moreover, the most significant correlations were observed for emotional abuse ($r = 0.41$, $p = 0.007$), and emotional neglect ($r = 0.39$, $p = 0.01$). No significant associations were shown in the control group only ($r < 0.26$; $p > 0.10$). Lastly, logistic regression showed that ALS (entered as an independent variable) was significantly associated with the participant group (patients/control; [Nagelkerke $r^2 = 0.36$, $d.f. = 1$, $p = 0.004$]). When both CTQ total score and ALS total score were added into the model as independent variables in the same multivariate regression

Table 1

Correlation between Affective Liability Scale (ALS) total score and childhood trauma.

	N	Affective Liability Scale (ALS) total score
Patients		
Physical abuse	42	$r = 0.33$; $p = \mathbf{0.035}$
Sexual abuse	42	$r = 0.33$; $p = \mathbf{0.030}$
Emotional abuse	42	$r = 0.41$; $p = \mathbf{0.007}^*$
Emotional neglect	42	$r = 0.39$; $p = \mathbf{0.01}^*$
Physical neglect	42	$r = 0.18$; $p = 0.27$
Controls		
Physical abuse	14	$r < 0.01$; $p > 0.9$
Sexual abuse	14	$r = -0.07$; $p = 0.81$
Emotional abuse	14	$r = -0.09$; $p = 0.75$
Emotional neglect	13	$r = 0.17$; $p = 0.59$
Physical neglect	13	$r = 0.26$; $p = 0.39$

Spearman's correlation (rho); childhood trauma was based on the Childhood Trauma Questionnaire (CTQ) with data divided into sub-groups of scores ranging from 5 to 25; Affective Liability Scale (ALS) total score was based on 54 sub-items from the Affective Liability Scale added together (score ranging from 0 to 143/54); p values: bold = $p \leq 0.05$.

* Significant after correction for multiple testing.

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