

Neutrophil-to-lymphocyte ratio predicting suicide risk in euthymic patients with bipolar disorder: Moderatory effect of family history

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Abstract

Background: Neutrophil-to-lymphocyte ratio (NLR) has been independently related to bipolar disorder (BD) and factors associated with suicidal risk. The aim of our study was to explore the relationship between NLR and suicide risk in euthymic BD patients. We also sought to propose a model of interaction between NLR and stress–diathesis factors, leading to suicidal risk in BD.

Methods: The study group consisted of 83 patients diagnosed with BD (36 suicide attempters; 47 suicide non-attempters), compared to the healthy control group ($n = 73$) and matched according to age, gender, and body mass index (BMI). NLR was measured according to the complete blood count. Mood symptoms have been assessed by Young Mania Rating Scale and Montgomery–Asberg Depression Rating Scale. Early trauma and acute stress were evaluated by Early Trauma Inventory Self Report–Short Form and List of Threatening Experiences Questionnaire, respectively. Suicide risk has been assessed by Suicide Behaviors Questionnaire-Revised (SBQ-R).

Results: Significant correlation was found between NLR and SBQ-R score. The main effects of suicide attempts on NLR, after covarying for confounders, were observed, indicating increased NLR in BD suicide attempters compared to healthy controls. We found significant moderatory effects of family history on NLR relationship to suicidal risk, with NLR being significant positive predictor of suicidal risk only in the patients with positive family history of suicide attempts.

Conclusions: The results suggest an enhancing effect of positive family history of suicide attempts on predictive effect of NLR on suicide risk. Our data support the idea that immune markers can predict suicide attempt risk in BD, but only in the subpopulation of BD patients with family history of suicide attempts. This could lead to prevention in suicide behavior in the patient population at particular risk of suicide.

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1. Introduction

Compared to other psychiatric disorders, bipolar disorder (BD) has the highest frequency of suicide attempt and completion [1,2]. There is growing evidence that neuroinflammation plays a critical role in the pathophysiology of both BD and suicidal behavior [3–6]. Furthermore, various immune alterations, such as abnormal levels of inflammatory cytokines secreted from peripheral blood cells, have been identified as potential discriminating factors between suicide

attempters and non-attempters in mood disorders [2,6]. However, the number of studies on future suicide risk, including both patient groups, and the role of diathesis and stress factors [7] in the cross-talk between immune dysfunction and suicidal behavior is limited [6].

Neutrophil to lymphocyte ratio (NLR) has been suggested as a new indicator of chronic low-grade inflammation and a predictor of clinical outcomes in neuroimmune disorders [3,8,9]. NLR can be derived from white blood cell count and is an inexpensive, reproducible test. More importantly, it is a ratio calculated from the counts of products of two different but complementary immune pathways [10]. Neutrophils represent an active nonspecific inflammatory mediator, initiating the first line of defense and exhibiting phagocytic and apoptotic effects through the secretion of various

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