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BRIEF COMMUNICATION

The Biological Rhythms Interview of Assessment in Neuropsychiatry in patients with bipolar disorder: correlation with affective temperaments and schizotypy

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Objective: To assess the relationship of biological rhythms, evaluated by the Biological Rhythms Interview of Assessment in Neuropsychiatry (BRIAN), with affective temperaments and schizotypy.
Methods: The BRIAN assessment, along with the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-Autoquestionnaire (TEMPS-A) and the Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE), was administered to 54 patients with remitted bipolar disorder (BD) and 54 healthy control (HC) subjects.
Results: The TEMPS-A cyclothymic temperament correlated positively and the hyperthymic temperament correlated negatively with BRIAN scores in both the BD and HC groups, although the correlation was stronger in BD subjects. Depressive temperament was associated with BRIAN scores in BD but not in HC; conversely, the irritable temperament was associated with BRIAN scores in HC, but not in BD. Several positive correlations between BRIAN scores and the schizotypal dimensions of the O-LIFE were observed in both BD and HC subjects, especially with cognitive disorganization and less so with unusual experiences and impulsive nonconformity. A correlation with introversion/anhedonia was found only in BD subjects.
Conclusion: Cyclothymic and depressive temperaments predispose to disturbances of biological rhythms in BD, while a hyperthymic temperament can be protective. Similar predispositions were also found for all schizotypal dimensions, mostly for cognitive disorganization.

Keywords: Mood disorder – bipolar; biological rhythms; emotion; personality disorder cluster A (paranoid-schizoid-schizotypal); lithium

Introduction

Biological rhythm disturbances play an etiological role in bipolar disorder (BD), and their regulation may contribute to a therapeutic effect.[1] Impairments in sleep-wake patterns have been reported in patients with BD, who are also more likely to have the evening chronotype than control subjects.[2,3] Brazilian investigators introduced the Biological Rhythms Interview of Assessment in Neuropsychiatry (BRIAN) as a novel tool that allows complex assessment of biological rhythms[4] and showed that disruption in biological rhythms was greater in patients with BD than in those with major depression, and greater in both mood disorders than in community controls.[5]

It is conceivable that a tendency to biological rhythm disturbances could be associated with personality dimensions, such as affective temperament and schizotypy. The Temperament Scale of Memphis, Pisa, Paris, and San Diego-Autoquestionnaire (TEMPS-A) developed by Akiskal et al.[6] has become the most important tool for measuring affective temperaments (depressive, cyclothymic, hyperthymic, irritable, and anxious).[7] A recent meta-analysis of the TEMPS-A by Solmi et al.[8] showed that the various types of affective temperament are on the continuum, with increasing scores from healthy subjects to BD patients. Our group studied a relationship between circadian clock gene polymorphisms and temperaments as assessed by the TEMPS-A. The polymorphisms of the main gene associated with circadian rhythm, *ARNTL* (aryl hydrocarbon receptor nuclear translocator-like), were associated with hyperthymic and anxious temperament, whereas *TIM* (timeless circadian clock) gene polymorphisms were associated with cyclothymic temperament.[9] Korean investigators administering the Korean versions of the TEMPS-A and the Composite Scale of Morningness in healthy young adults found that evening-type subjects were more likely to endorse depressive, cyclothymic, irritable, and anxious temperaments, while morning types were more likely to have a hyperthymic temperament.[10]

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The Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) was proposed as a tool for measuring dimensions of schizotypy, such as unusual experiences, cognitive disorganization, introvertive anhedonia, and impulsive nonconformity.[11] We have studied the relationship between circadian clock gene polymorphisms and schizotypy dimensions measured by the O-LIFE, and found an association between *ARNTL* polymorphisms and such schizotypy dimensions as unusual experiences and cognitive disorganization.[12]

The aim of the present study is to assess a possible relationship between biological rhythms evaluated by the BRIAN scale, affective temperaments measured by the TEMPS-A, and schizotypy measured by the O-LIFE in a Polish population of patients with BD compared with healthy control (HC) subjects.

Methods

Patients

Patients were recruited from the Department of Adult Psychiatry, Poznań University of Medical Sciences, and the Department of Affective Disorders, Jagiellonian University Medical College, Kraków, Poland. Fifty-four patients with BD (17 male, 37 female) were included, with a mean age of 52±13 years. Of these patients, 24 (nine male, 15 female) had bipolar I and 30 (eight male, 22 female) had bipolar II disorder. The mean duration of illness was 17±10 years. All patients were assessed during a remission period. All were on mood stabilizers, and some were also receiving antidepressants. The most frequently used mood stabilizers were lithium (27 patients), quetiapine (24 patients), and valproate (13 patients). The most frequently used antidepressants were venlafaxine (17 patients), trazodone (seven patients), and sertraline (six patients).

The control group consisted of 54 subjects, 25 men and 29 women, with a mean age of 42±14 years. These subjects had no psychiatric history or first-degree relatives with psychiatric disorders.

Instruments

Biological Rhythms Interview of Assessment in Neuropsychiatry (BRIAN)

The BRIAN contains 21 items designed to assess five areas related to biological rhythms: sleep, activity, social aspect, diet, and predominant rhythm (chronotype). All items are evaluated on a four-point scale, where 1 = not at all, 2 = rarely, 3 = sometimes, and 4 = often; higher scores denote greater disturbance in the corresponding biological rhythm. The scale has been translated into several languages. The Polish version, developed in the Department of Adult Psychiatry, Poznań University of Medical Sciences, and the Department of Affective Disorders, Jagiellonian University Medical College, Kraków, following the back-translation method, has been approved by the first author of the original scale (FK).

Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-autoquestionnaire (TEMPS-A)

The 110-item version of the TEMPS-A questionnaire was used in this study. Five temperament domains were evaluated: depressive (items 1-21), cyclothymic (items 22-42), hyperthymic (items 43-63), irritable (items 64-84), and anxious (items 85-110). Scores for each scale were calculated as the sum of scores for each variable belonging to the corresponding category divided by the number of variables: $(v_1 + v_2 + v_3 \ldots v_x)/nv$.

Oxford-Liverpool Inventory for Feelings and Experiences (O-LIFE)

The short version of the O-LIFE, which consists of 43 questions referring to four dimensions of schizotypy, was used. A tendency to unusual experiences is evaluated on the basis of answers to 12 questions, cognitive disorganization is assessed by 11 questions, and introvertive anhedonia and impulsive nonconformity by 10 questions each. Scores for each domain were computed as for the TEMPS-A.

Ethical aspects

This study was approved by the Poznań University of Medical Sciences Bioethics Committee. Written informed consent was obtained from each subject after the study procedure had been explained in detail.

Statistical analysis

Calculations were performed using Statistica version 10. Statistical relationships between BRIAN scores, affective temperaments measured by the TEMPS-A, and schizotypy dimensions measured by the O-LIFE were calculated using Spearman's rank correlation coefficients. Statistical significance was accepted at $p < 0.05$.

Results

Correlations between BRIAN, TEMPS-A, and O-LIFE scores in the BP and HC groups are presented in Table 1.

In the BD group, the BRIAN total score and sub-scores for all five areas of the instrument correlated positively with the intensity of the TEMPS-A cyclothymic temperament. In HCs, such associations were obtained for the BRIAN total score and two BRIAN domains. In BD subjects, the BRIAN total score and scores for four areas correlated negatively with hyperthymic temperament. This was also observed in HCs for the BRIAN total score and the activity area. In BD subjects but not in HCs, disturbances of sleep, activity, and social issues correlated with depressive temperament. On the other hand, irritable temperament correlated with total score and subscores for three areas of the BRIAN in HCs, but not in BD subjects.

The BRIAN total score and sub-scores for four BRIAN areas correlated positively with cognitive disorganization as measured with the O-LIFE, in the BD and HC groups

Table 1 Correlations of BRIAN scores with TEMPS-A and O-LIFE scores in patients with remitted bipolar disorder and healthy controls

	BRIAN					
TEMPS-A	Sleep	Activity	Social	Eating	Chronotype	Total
Depressive temperament						
BD	0.31*	0.35*	0.26*	0.21	-0.01	0.35†
HC	0.08	0.15	0.13	0.07	-0.17	0.09
Cyclothymic temperament						
BD	0.29*	0.46†	0.42†	0.40†	0.30*	0.51‡
HC	0.31*	0.17	0.22	0.43*	-0.08	0.36†
Hyperthymic temperament						
BD	-0.38†	-0.47†	-0.32*	-0.26*	0.15	-0.44‡
HC	-0.22	-0.32*	-0.18	-0.20	0.23	-0.27*
Irritable temperament						
BD	0.11	0.24	0.20	0.24	0.29	0.25
HC	0.41†	0.26	0.27*	0.32*	-0.02	0.40†
Anxious temperament						
BD	0.24	0.27	0.18	0.23	0.01	0.28
HC	0.24	0.18	0.14	0.13	-0.17	0.17
O-LIFE						
Unusual experiences						
BD	0.22	0.12	0.06	0.32*	0.35†	0.23
HC	0.11	0.27*	0.06	0.39†	-0.02	0.29*
Cognitive disorganization						
BD	0.52‡	0.52‡	0.47‡	0.55‡	0.16	0.63‡
HC	0.38†	0.37†	0.33*	0.28*	-0.09	0.42†
Introversion/anhedonia						
BD	0.38†	0.48‡	0.42†	0.24	0.10	0.49‡
HC	0.02	-0.05	0.18	0.11	-0.08	0.04
Impulsive nonconformity						
BD	0.26	0.31*	0.27	0.36†	0.43†	0.38†
HC	0.22	0.14	-0.01	0.31*	0.08	0.23

BD = subjects with bipolar disorder; BRIAN = Biological Rhythms Interview of Assessment in Neuropsychiatry; HC = healthy controls; O-LIFE = Oxford-Liverpool Inventory for Feelings and Experiences; TEMPS-A = Temperament Evaluation of Memphis, Pisa and San Diego-Autoquestionnaire.
*$p < 0.05$; †$p < 0.01$; ‡$p < 0.001$.

alike. Significant positive correlations were also obtained in both groups for impulsive nonconformity and unusual experiences, although less so than for cognitive disorganization. Associations between BRIAN score and introversion/anhedonia were found only in BD subjects, not in HCs.

Discussion

This study shows a significant association between disturbances of biological rhythms as measured with the BRIAN and cyclothymic temperament as measured with the TEMPS-A, both in BD subjects and in HCs. In addition, in the BD group, positive correlations were observed between disturbances of sleep, activity, and social patterns as measured by the BRIAN and depressive temperament scores on the TEMPS-A. This may indicate that, among the temperaments assessed by the TEMPS-A, the cyclothymic temperament predisposes to disturbances in biological rhythms to the greatest extent. The correlation obtained with depressive temperament in BD subjects may corroborate the findings of a previous study by Pinho et al.[13] that reported a dose-dependent association between severity of depressive symptoms and degree of biological rhythm disturbances, assessed by the BRIAN, in patients with BD.

Another finding of our study connected with the TEMPS-A is that, in both BD subjects and HCs, biological rhythm disturbances correlated negatively with hyperthymic temperament. This suggests that a hyperthymic temperament may be protective against occurrence of such disturbances. Such protection could be partly explained by a propensity of subjects with hyperthymic temperament to a morningness chronotype.[10] Furthermore, patients with BD who score higher on this temperament could respond better to treatment modalities that influence biological rhythms. In a previous study by our group of patients on long-term lithium treatment, the response to lithium correlated positively with hyperthymic temperament and negatively with cyclothymic and depressive temperament scores.[14]

To date, the relationship between biological rhythm disturbances and schizotypal dimensions has not been studied, except as it pertains to biological clock genes.[12] Our results strongly suggest that, both in BD subjects and in HCs, a significant association exists between BRIAN scores reflecting biological rhythm disorders and higher scores on cognitive disorganization, unusual experiences, and impulsive nonconformity, as well as with introversion/anhedonia, the latter specifically in patients with BD. The most prominent correlation in this respect is

with cognitive disorganization, a dimension mostly connected with psychoticism. In a previous study of lithium prophylaxis, we found a significant negative correlation between cognitive disorganization and lithium efficacy, while correlations with other schizotypy dimensions were not significant.[15]

Our study has several limitations. The studied groups were small and patients were receiving various mood stabilizers and antidepressants, which may exert regulatory action on biological rhythms and improve sleep quality. Finally, the average age was younger in the control group.

Despite these limitations, our research employing the BRIAN suggests that, in patients with BD, cyclothymic and depressive temperaments (as measured by the TEMPS-A) predispose to disturbances in biological rhythms, while a hyperthymic temperament can be protective. Such a predisposition was also demonstrated for all schizotypal dimensions measured by the O-LIFE, most strikingly cognitive disorganization. Some of these associations were also present in HC subjects.

Disclosure

The authors report no conflicts of interest.

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