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Psychiatry Research 118 (2003) 259–271
PSYCHIATRY RESEARCH
www.elsevier.com/locate/psychres

Pattern-reversed visual evoked potentials in subtypes of major depression

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Received 22 June 1999; received in revised form 4 December 2000; accepted 18 December 2000

Abstract

There are no articles in the international psychiatric literature reporting subclinical visual system disorders in depressed patients, although a disturbance of circadian rhythms is one of the prominent theories of the etiopathogenesis of depression. Fifty patients aged 21–60 years suffering from major depression according to DSM-IV criteria, and 20 controls took part in the study. Diagnosis was obtained with the aid of the Schedules for Clinical Assessment in Neuropsychiatry version 2.0. Psychometric assessment included the Hamilton Depression Rating Scale, the Hamilton Anxiety Scale, the 1965 and 1971 Newcastle Scales, and the Diagnostic Melancholia Scale. All subjects had normal electroretinographic and flash-visual evoked potential (VEP) recordings. Pattern-reversed VEPs (PR-VEPs) were recorded from each eye separately. Three-way analysis of covariance, Student's *t*-test and Pearson product–moment correlation coefficients were used for the analysis. All recordings were within the normal range. N80 and P100 latency were significantly shorter in atypical and significantly longer in melancholic patients. There was a positive correlation between N80 and P100 latency and age of onset and melancholic indices, and a negative correlation with the presence and the number of life events precipitating onset. The results of the current study suggest that PR-VEPs are consistent with other biological data supporting the atypical-melancholic distinction. The most important finding was the strong negative relationship between PR-VEP latency and stressful life events. The current study also provided data inconsistent with the hyperarousal theory and in support of an arousal dysregulation hypothesis for major depression.

Keywords: Depression; PR-VEPs; Neurophysiology; Psychophysiology; Arousal

1. Introduction

Modern classification systems recognize melancholic ('somatic') and atypical features (Fountoulakis et al., 1999b). In spite of early reports (Dally and Rohde, 1961; Liebowitz et al., 1988; Sargant, 1960; West and Dally, 1959) concerning the 'atypical syndrome' (with reverse neurovegetative symptoms), today the only finding that continues to be robust is not the favorable response of atypical patients to monoamine oxidase inhibi-

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0165-1781/03/$ - see front matter © 2003 Elsevier Science Ireland Ltd. All rights reserved.
doi:10.1016/S0165-1781(03)00097-0

tors, but their resistance to tricyclic antidepressants. Atypical depression is considered to constitute a risk factor for further mental suffering (Tsolaki et al., 1997; Fountoulakis et al., 2000). It is suggested that the subtype of depression is also of prime importance in event-related potential (ERP) studies (Shagass, 1981).

Electrophysiological methods, although spatially removed from the events they record, are possibly closer in time to these events in comparison to cerebrospinal fluid, urine and peripheral blood testing. Relationships between electrophysiological testing and peripheral biological markers have been reported in depression (Buchsbaum et al., 1971a, 1973a; Buchsbaum and Wender, 1973b). Studies on primates also support the usefulness of these methods and the relationship of catecholaminergic activity with visual information processing (Redmond et al., 1975), possibly reflecting a secondary elaboration or process enabling the organism to choose the appropriate motoric or affective response (Bruder et al., 1992). However, although some features of the ERP (e.g. the amplitude and latency response to varying levels of stimulus intensity; Buchsbaum, 1974) might be heritable, ERPs are generally considered to reflect state-related rather than trait-related processes (Shagass, 1979).

Articles on the visual system of depressives (Buchsbaum et al., 1971a, 1977; Fotiou et al., 1999; Fountoulakis et al., 1999a) and Alzheimer's disease patients (Fotiou et al., 2000) have shown that the assessment of the visual system may provide valuable information about different diseases affecting the central nervous system (CNS).

The hypothesis under investigation in the current study was that melancholic patients may manifest reduced conduction velocity in the brain, and this could be related to differences in their response to life events as suggested by several authors (Buchsbaum et al., 1973a; Buchsbaum, 1975; Fotiou et al., 1999). Another hypothesis under investigation in the current study was whether there is a difference in the conduction velocity between hemispheres, since this could lead to a disruption in the flow and processing of information in the brain and thus could lead to affective disorders.

The rationale behind the use of pattern-reversed visual evoked potentials (PR-VEPs) was that they constitute a marker for the conduction velocity in the CNS, are highly reliable (compared with flash-VEPs), are short-latency potentials (below 200 ms), and thus demand minimum effort and collaboration from the subject (in contrast to long-latency potentials).

Since severity is frequently confounded with specific clinical features (e.g. suicidality and psychomotor changes), and different scales and criteria sets reflect different approaches to this problem, the simultaneous use of multiple rating scales was judged to be necessary.

2. Methods

2.1. Subjects

Fifty (15 males and 35 females) patients suffering from major depression according to DSM-IV (American Psychiatric Association, 1994) and depression according to ICD-10 criteria (World Health Organization, 1993) took part in the study. The patients ranged in age from 21 to 60 years (mean = 41.0, S.D. = 11.4). The patients were compared with a control group ($n = 20$ controls, 7 males and 13 females, aged 20–55 years, mean = 36.7, S.D. = 8.9). All subjects provided written informed consent. Fourteen of the depressed patients fulfilled criteria for atypical features, 16 for melancholic features (according to DSM-IV) and 32 for somatic syndrome (according to ICD-10). Nine patients did not fulfill criteria for any-specific syndrome (undifferentiated patients).

The depressed group comprised inpatients or outpatients from the Third Department of Psychiatry, Aristotle University of Thessaloniki, University Hospital AHEPA, Thessaloniki Greece. All were free of any medication for at least 2 weeks before the first assessment and diagnosis, and drug-free at the time of testing. In no case was medication interrupted in order to include the patient in the study. In addition, all were physically healthy with normal clinical and laboratory findings, including electroencephalography and thyroid function tests. No pathological findings were revealed in the opthalmological examination. All