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Sleep and sleep-wake cycle in an 81-year-old patient with de novo ultra-rapid cycling bipolar disorder

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Abstract This is a case report of an 81-year-old man who developed de novo bipolar disorder with ultra-rapid cycling at the age of 80. Mood was self-rated daily over a period of ten weeks; in addition, polysomnographic and motor activity recordings were performed during a drug-free baseline period. Both depressive and hypomanic episodes had an average duration of about 30 hours; the affective cycle was thus independent from the sleep-wake cycle. When mood shifts occurred during nighttime, sleep was different in nights following depression than in nights following hypomania. Positron emission tomography revealed a moderate bilateral frontal hypermetabolism in the hypomanic phase and yielded normal findings for the depressive stage. In contrast to what is usually expected in ultra-rapid cycling bipolar disorder, this case demonstrates an unusual sleep-unrelated cycle duration in the oldest reported patient so far.

Key words Bipolar disorder · Ultra-rapid cycling · Sleep-wake pattern · Polysomnography · Positron emission tomography

Introduction

Rapid cycling bipolar disorder was first described in 1974 (Dunner and Fieve) and defined as the occurrence of at least four manic, hypomanic, or depressive episodes over the previous 12 months. The clinical symptoms do not differ from those in conventional cyclers, and there are no differences in life events and family history (Alarcon 1985; Coryell et al. 1992). Ultra-rapid cycling (URC) may represent one extreme in a spectrum of cycling frequencies in this disorder, characterized by very short affective oscillations (Kramlinger and Post 1996). Various case series of URC patients report a typical episode duration of 24 hours with mood change in the early morning (Alarcon 1985; Wehr et al. 1982). Rapid cycling can develop late in the progressive course of an affective disorder, is sometimes induced by antidepressant treatment and may also arise as the initial manifestation of bipolar disorder (Goodwin and Jamison 1990).

Accordingly, we report about the sleep and sleep-wake cycle in an 81-year-old man who had recently developed new onset URC bipolar disorder in the absence of both an underlying organic disease and a prior psychiatric history. All investigations were performed during a drug-free baseline period prior to treatment.

Case report

An 81-year-old retired porter was referred to our clinic because of frequent affective oscillations, meeting criteria for bipolar disorder not otherwise specified (DSM-IV 296.80; American Psychiatric Association 1994). Further psychiatric diagnoses were excluded by a semi-structured interview based on the International Diagnostic Checklists (Janca and Hiller 1996). The patient and his family reported frequent mood swings between depression and hypomania. These had begun nine months before admission without any precipitating events. The patient had never suffered from any psychiatric or severe somatic illness, and there was no family history of psychiatric disorders. He was not under medication and did not drink alcohol.

Physical and neurological examinations showed no abnormalities. Neuropsychological testing demonstrated average intellectual abilities with no evidence of a decline in cognitive functioning. Nuclear magnetic resonance imaging (NMR) revealed mild generalized atrophy within the average range for his age. Positron emission tomography (PET) with [^{18}F]-FDG of the

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brain, performed on a "depressive" and a "hypomanic" day, showed moderate bilateral frontal hypermetabolism during the hypomanic episode, but no abnormalities in the depressive state. Additional clinical investigations involving electroencephalography, extensive testing of blood (including thyrogland parameters and thyroid antibodies) and cerebrospinal fluid (CSF) were unremarkable.

Self-ratings of mood performed twice daily (08:00 am and 08:00 pm) over a drug-free period of ten weeks (using both parallel forms of the Adjective Mood Scale (AMS, von Zerssen 1986)) revealed a periodical alternation of depressive and hypomanic episodes without "normothymic" intervals. Each episode had a relatively consistent duration of about 30 hours. The sleep-wake pattern, as assessed by means of wrist actigraphy for a period of three weeks and, in addition, continuous sleep EEG recording for one week showed a normal 24 hour period unrelated to the periodicity of the mood cycle. Daytime naps occurred twice during the week with continuous sleep EEG recording, both between 01:00 and 02:00 pm when the patient was in a depressed state. One of them was followed by a switch to hypomania; after the other nap, depression continued. Besides the week with continuous sleep recording, four nocturnal polysomnographies were performed. During nights following a "depressed" day, shorter REM latencies and increased REM density were more frequent than during nights following a "hypomanic" day. In the nights followed by hypomania, shortened sleep with early morning awakening was often observed. Fig. 1 demonstrates two typical sleep recordings from nights with mood switches in either direction.

After these investigations, the patient was treated with valproic acid (600 mg daily). As demonstrated in Fig. 2, the amplitude of mood swings was dampened immediately and remainded small during the follow-up observation period.

Discussion

Rapid cycling occurs in about 13 % to 20 % of all patients suffering from bipolar disorder (Goodwin and Jamison 1990). In only 20 % of these patients, rapid cycling is present from the first onset of the disorder (Persad et al. 1996). This paper presents the case of an 81-year-old man who developed de novo ultra-rapid cycling (URC) bipolar disorder at the age of 80; this is an unusual age of onset of rapid cycling (Camus et al. 1997), and to our knowledge, this is the oldest patient with de novo URC reported in the literature.

Careful exclusion of contributing organic factors is mandatory when rapid cycling bipolar disorder occurs in an advanced age (Persad et al. 1996). In our patient, extensive investigations including structural brain imaging and laboratory testing of blood and CSF revealed no significant abnormalities; thus it appears un-

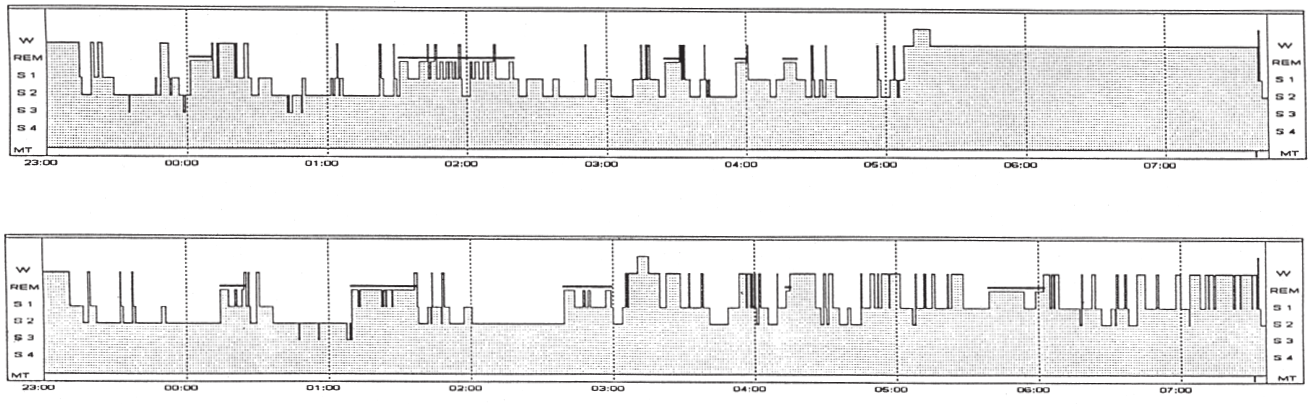

Fig. 1 Sleep during a night with mood switch from depression to hypomania (top) and a night with mood switch from hypomania to depression (bottom).

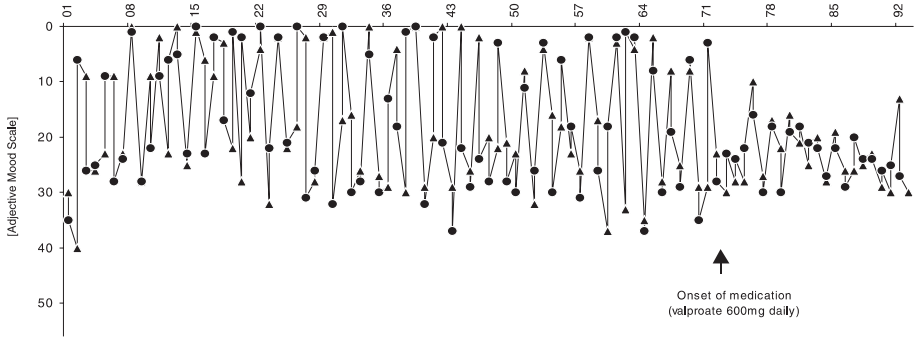

Fig. 2 Time sequence of mood changes, as recorded twice daily by self-rating of psychopathology (Adjective Mood Scale by von Zerssen 1986) during hospitalized baseline and treatment period. Scale ranges from 0 (absolute well-being) to 56 (maximal uneasiness). Morning ratings are marked by ▲, evening ratings by ●.

likely that the psychiatric disorder was caused by an underlying organic condition. Positron emission tomography showed a moderate bilateral frontal hypermetabolism during hypomania which is in line with current functional studies in mood disorders (Kennedy et al. 1997).

In the literature, 48 hours is considered the most prevalent mood cycle duration in ultra-rapid cycling bipolar disorder, and mood switches are reported to occur most frequently during the last third of the night (Alarcon 1985; Wehr et al. 1982). In the patient presented here, a mood cycle duration of about 60 hours was present; affective switches could occur at any time of day, and there was no relationship with the rather stable 24 hour sleep-wake cycle. These results are in line with recent observations, supporting a continuum of cycling frequencies in ultra-rapid cyclers which ranges from affective oscillations occuring within several days to distinct mood shifts of less than 24 hours' duration (Kramlinger and Post 1996).

The majority of mood shifts during daytime was not related to the occurrence of sleep. During one week of continuous sleep EEG recording, only two spontaneous daytime naps occurred, both between 01:00 pm and 02:00 pm. Neither of them induced a depressed state or an intensification of preexisting depression; one of them was followed by a hypomanic state which might have occurred even without a sleep episode since it had been preceded by about 30 hours of depression. These very limited observations are in line with previous studies demonstrating a variable impact of daytime naps on mood (Wiegand et al. 1993). Nocturnal sleep architecture, however, was not independent from mood state: as expected, during nights following depression, shortened REM latencies and increased REM densities were observed. Nocturnal sleep preceding hypomania was shorter and characterized by early morning awakening; this is in line with data by Leibenluft et al. (1996) showing that decrease in sleep duration and wake-onset time are the best predictors for mania or hypomania the next day.

In conclusion, new onset ultra-rapid cycling bipolar disorder can develop late in life, without preceding psychiatric history or underlying physical disorders. A mood cycle duration of 60 hours in the presence of a stable 24 hour sleep-wake cycle demonstrates the independence of both cycles.

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