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Sleep evaluation in the symptomatic episode of recurrent hypersomnia

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Abstract: Recurrent hypersomnia (RH) is a rare disorder characterized by episodes of hypersomnia, variously accompanied by behavioural and cognitive disturbances, compulsive eating behaviour and hypersexuality. Electrophysiologic evaluation of the sleep during symptomatic and asymptomatic periods of RH distinguishes RH from other primary sleep or mental disorders. Unique polysomnographic findings during the hypersomniac attack lasting 96 hours in a 16-year-old boy affected with primary RH are presented in this paper.

Keywords: Recurrent hypersomnia, kleine-levin syndrome, multiple sleep latency test, polysomnography

1 Introduction

Recurrent hypersomnia (RH) is an infrequent disorder characterized by recurrent episodes of hypersomnia often associated with other symptoms that typically occur weeks or months apart. According to the American Academy of Sleep Medicine [1], the diagnosis of Kleine-Levin syndrome should be reserved for cases in which recurrent episodes of hypersomnia are clearly associated with behavioural abnormalities. These may include binge eating, hypersexuality, abnormal behaviour (e.g., irritability, aggression, and odd behaviour), and cognitive abnormalities (e.g., feelings of unreality, confusion, and hallucinations). A flu-like illness, less frequently alcohol consumption, head trauma, exposure

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to anaesthesia, physical exertion or psychological distress are reported immediately prior to the onset of the first episode [2].

The etiopathogenesis of primary RH is still unknown. A hypothalamic dysfunction, an intermittent imbalance in the hypothalamic dopaminergic tone [3], an autoimmune nature [4] and recently an involvement of the thalamus [5] have been discussed. Secondary cases of RH were observed in association with genetic or developmental diseases, infection, autoimmune encephalitis, stroke, post-traumatic brain haematoma, hydrocephalus, multiple sclerosis, or paraneoplasia [2].

2 Case Report

For the first time in July 2004, a previously healthy 15 year old young man was not able to wake up in the morning, remained in bed the entire day, got up only to eat and use the toilet. He was not interested in his surroundings and had feelings of unreality. During the episode he ate less than usual and lost 2kg. After seven days of hypersomnia, he woke up refreshed, communicative, and was without any cognitive or behavioural disturbances. The following night he could not fall asleep for two hours and got up early in the morning.

The second attack of sleepiness in November´04 had the same uniformity of symptoms, as did subsequent episodes of hypersomnia in February´05, April´05, May´05, June´05, November´05, January´06 and October´06. Each period lasted from 7 to 9 days and was preceded by fatigue and tiredness lasting three days, all without any signs of infection. The first and two other episodes of RH occurred two days after alcohol consumption.

While treated by escitalopram (10mg) continually and modafinil (100mg) during the episodes since June 2005, there was no change in the number, duration and severity of the episodes.

Clinical examination, blood tests, plasma bacterial and viral serologies, cerebrospinal fluid white cells and proteins were normal. MRI was also normal. Psychological and psychiatric examinations were unremarkable during asymptomatic intervals and symptomatic episodes.

Sleep was recorded during symptomatic and asymptomatic episode of RH, using standard criteria [6]. Multiple sleep latency tests (MSLT) were preformed four times a day, using recommended criteria [7].

Complete polysomnography (PSG) obtained during an asymptomatic interval showed a total sleep time (TST) of 354 min, with a sleep efficiency of 98%, normal REM latency. The duration of Stage 1 non-rapid eye movement (1 NREM) was 3,1% of TST, that of 2 NREM 46,8% of TST, slow wave sleep (SWS) 29% of TST, REM 26% of TST. There was not any present sleep related breathing disorders, periodic limb movements or other sleep pathology. An MSLT performed the next morning showed a mean sleep latency of 11 min, without episodes of sleep-onset rapid eye movement (SOREM).

Sleep during the third hypersomnic attack was monitored for 96 hours, starting on the 3rd day of the attack. TST and sleep stages durations were calculated for each 24 hours. TST was increased up to 17 hours a day (18. 4. 2005) and decreased in the course

of the attack (11,4 h of sleep 21.4.2006). Similarly day-by-day, the duration of 1 NREM and 2 NREM was decreasing in comparison with increasing wake time. The amount of deep sleep stages (SWS, REM) showed very low fluctuation in the course of the episode (Fig. 1).

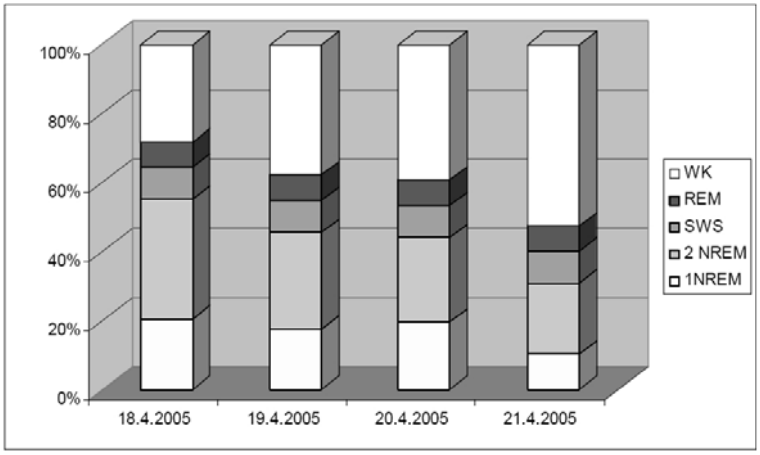

Fig. 1 Results of PSG monitoring during hypersomniac episode counted for each 24 hour period. An increase of wake time and a decrease of 1 and 2 NREM, accompanied by stable amount of SWS and REM in the course of the attack of RH. (*WK, wake time; REM, rapid eye movement; SWS, slow wave sleep; 2 NREM, stage2 of non rapid eye movement sleep; 1 NREM, stage1 of non rapid eye movement sleep, SWS slow wave sleep.*)

Sleep efficiency, sleep stages and REM latency were separately accounted for in night-time sleep. The nocturnal sleep was considered as extending from the beginning to the end of consolidated nocturnal sleep (mean 714 min). During the symptomatic interval, the nocturnal sleep had a cyclic structure in the first half of the night. During the second half, the cycles were less clear and the sleep was accompanied by a number of awakenings of short durations from 2 NREM. Sleep efficiency was diminished and decreased further in the course of the episode (from 93,1% to 84,9%). Elevated portion of 1, 2 NREM was decreasing (73,7%-71,7%-62,6%-41%) together with an increase of wake time (28,3%-37,6%-39,3%-52,7%) during night-time in the course of the attack.

MSLT was performed on the second monitored day (the 4th day of the attack of RH) and showed mean sleep latency of 4,5 min without SOREM.

3 Discussion

Hypersomnia, a major clinical symptom of RH, has been evaluated only in 5.4% of the 186 published cases [2]. The presented continuous polysomnographic monitoring lasting 96 hours is the longest sleep study on RH.

In accordance with the published data, total sleep time (calculated for a 24 hour period) during a symptomatic period was prolonged with an excess of 1 NREM and 2 NREM stages.

A relative decrease of deep sleep stages of night time sleep was found by Rosenow [8] (decrease of SWS), and Wilkus [9] (decrease of REM sleep) as observed in our patient. In comparison with Lavie [10], we did not prove reduced REM latency. Differences between PSG findings in the literature and the presented case rise up the question whether they would be caused by the inter-individual differences of the cases of RH or differences in electrophysiologic methodology across the studies, especially the definition of the night-time sleep in a patient who sleeps 16-18 hours per a 24 hour period.

Our observations are in agreement with the report of Rosenow [8] that the MSLT shows sleep latencies less than 5 minutes, during symptomatic episodes but not during asymptomatic intervals. The results in the presented case did not confirm commonly reported REM sleep during daytime sleep or narcolepsy-like pattern (2 or more SOREMs) [2]. However, during hypersomnic episode on the first day, the MSLT cannot be validated under standard conditions as a result of the patient's inability to cooperate with the examination (to stay awake between the tests).

The periodic nature of hypersomnolence and its objective evidence based on 24 hours lasting PSG during symptomatic period and complete night-time PSG followed by MSLT during asymptomatic intervals are essential in establishing the diagnosis of recurrent hypersomnia.

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