Sleep Onset—REM and NREM Sleep

The Frequency of Multiple Sleep Onset REM Periods Among Subjects With No Excessive Daytime Sleepiness

Christopher Bishop, Leon Rosenthal, Todd Helmus, Timothy Roehrs and Thomas Roth

Sleep Disorders and Research Center, Henry Ford Hospital, Detroit, Michigan, U.S.A.

Summary: The multiple sleep latency test (MSLT) is a valuable tool in the assessment of excessive daytime sleepiness (EDS). Additionally, multiple sleep onset rapid eye movement periods (SOREMPs) are a frequent occurrence in patients with narcolepsy. To date, however, few studies have evaluated the frequency of SOREMPs in a population of healthy control subjects. Subjects participating in a variety of sleep studies were screened with a nocturnal clinical polysomnogram, followed by the MSLT. Subjects were required to be drug free and have no sleep-related symptoms or medical or psychiatric conditions. Of the 139 subjects who were screened, 24 (17%) had two or more SOREMPs. These individuals were more likely to be male, younger, and sleepier than those with one or zero SOREMPs. The etiology of two or more SOREMPs in healthy controls was not apparent from the clinical or polysomnographic evaluation. Although it is possible that these findings are early signs of narcolepsy, subjects reported being free of any sleep-related complaints. Further investigations into the determinants of multiple SOREMPs and their reliability among asymptomatic populations are warranted. Key Words: Multiple sleep latency test (MSLT)—Narcolepsy—Excessive daytime sleepiness (EDS)—Sleep onset REM periods (SOREMPs).

The consensus among sleep researchers and clinicians is that sleepiness is a basic physiological state (1). It is believed that sleepiness is determined by quantity and quality of sleep, circadian rhythms, central nervous system (CNS) depressant drugs, and CNS diseases. In this context, the multiple sleep latency test (MSLT) has been shown to be useful in the quantification of sleepiness for both research and clinical purposes. Thus, it has become the most widely used tool in the determination of level of sleepiness. The MSLT is also useful in the diagnosis of excessive daytime sleepiness (EDS) (2). For example, patients with narcolepsy and obstructive sleep apnea (OSA) are known to have a heightened propensity to fall asleep. Although sleepiness among OSA patients is the result of sleep fragmentation (due to sleep-disordered breathing), sleepiness among narcoleptic patients is a result of CNS pathology. In addition, multiple sleep onset rapid eye movement (REM) periods (SOREMPs) are more frequent among narcoleptic patients when compared to other patient populations (3,4). Furthermore, these findings have been shown to be a reliable feature among narcoleptic patients (5), even when tested at several-year intervals. Despite the consistent polysomnographic findings documented among narcoleptics, the base rate of multiple SOREMPs among healthy controls remains largely unknown. The purpose of this study was to determine the base rate of multiple SOREMPs among healthy subjects with no reported complaints of EDS or any other sleeping disorder.

METHODS

Subjects

The participants were 139 (67 females and 72 males) consecutive subjects who were screened for one of four ongoing sleep research protocols. Subjects were screened for these studies between June 15, 1994 and August 1, 1995.

Procedure

Individuals responding to advertisements in area newspapers were screened over the telephone to determine if they qualified for further consideration.
They were questioned about their sleep habits, napping behavior, medical and psychiatric problems, and drug history. Subjects reporting regular nocturnal sleep habits, no regular napping, and no evidence of EDS or other sleep disorder-related symptoms were given an appointment for further evaluation at the sleep center. All subjects gave informed consent and were told they were being screened for one of four available sleep research protocols. Three of the protocols involved the administration of a psychopharmacological agent, and the fourth involved manipulations of time in bed. 

RESULTS

Subjects

Of the 139 subjects, 24 (17%) were found to have two or more SOREMPs. Eight (6%) subjects demonstrated one SOREM, and 107 (77%) participants did not have any SOREMPs. Subjects with zero and one sleep onset REM period (NSOREMP) were compared to those with two or more sleep onset REM periods (SOREM). Age and gender are presented in Table 1.

On weekdays, the SOREM group averaged a reported time in bed (TIB) of 8.0 ± 1.6 hours, versus 8.0 ± 0.98 hours for the NSOREMP group [t = 0.130; not significant (NS)]. Their reported total sleep times (TST) on weekdays were also comparable (SOREM group, 7.6 ± 1.6 hours; NSOREMP group, 7.4 ± 0.97 hours; t = 0.619, NS). On weekends the SOREM group reported a TIB of 8.5 ± 1.4 hours and TST of 7.9 ± 1.7 hours, similar to those of NSOREMP subjects, who reported a mean TIB of 8.4 ± 0.94 hours and TST of 7.9 ± 1.3 hours (t = 0.368, NS; t = 0.177, NS, respectively). Subjects were required not to take naps on a regular basis in order to be eligible for participation. Napping one to three times per week was not different between the two groups (SOREM group, 21%; NSOREMP group, 25%; χ² = 0.16, NS). The daytime subjective measures of sleepiness (the SWAI and the Epworth scales) failed to differentiate the two groups, as seen in Table 1.

Nocturnal screening evaluation

Data on sleep architecture are presented in Table 1. The sleep efficiencies and sleep architecture were comparable for both groups. Differences between the two groups emerged on their latency to stage 1 non-rapid eye movement (NREM) sleep. The latency to stage 1 NREM sleep for the SOREM group was 7.5 ± 6.2 minutes; for the NSOREMP group, it was 13.4 ± 12.7 minutes (t = 2.22; p < 0.05). There were no significant differences among the two groups on measures of sleep continuity (number of awakenings, entries to stage 1 NREM sleep, and entries to wake) (see Table 1).
Subjects were screened to report regular sleep schedules with no regular napping behavior, although there were no actigraphic recordings to validate regular sleep schedules prior to PSG evaluation. NCPSG failed to document any evidence of sleep-disordered breathing. No subject was identified as having intermittent snoring that resulted in a pattern of frequent arousals. Subjects were screened to determine drug-free status, and the absence of REM rebound in the SOREMPS group is consistent with the lack of evidence of drug effects. The possible role of chronic insufficient sleep may also be considered a potential explanation for the findings. However, subjects with SOREMPS did not differ in their subjective reports of sleep time or on their overnight PSG characteristics. Another potential explanation for these findings may be that these subjects in fact have evolving narcolepsy (10). However, the number of subjects with multiple SOREMPS far exceeded the expected base rate of narcolepsy in the general population (11).

The present findings should caution clinicians on the unrestricted use of PSG features for the diagnosis of narcolepsy, in particular among patients with no evidence of auxiliary symptoms. Although the latter group of patients has been shown to have symptoms of EDS, sleepiness, reliable PSG features (even when tested across time), and a higher than expected association with the human leukocyte antigen (HLA) DR2 (12), the present results require further research to determine the clinical significance of SOREMPS.

REFERENCES

2. Zorick F, Roehrs T, Koshorek G, et al. Patterns of sleepiness in...


