Published in final edited form as:

Electroencephalogr Clin Neurophysiol. 1979 April ; 46(4): 479–481.

REM SLEEP EPISODES DURING THE MULTIPLE SLEEP LATENCY TEST IN NARCOLEPTIC PATIENTS

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Abstract

We recently reported (Richardson et al. 1978) differences between control subjects and narcoleptic patients in the tendency to fall asleep during 20 min opportunities to sleep offered at 10.00, 12.00, 14.00, 16.00 and 18.00 o'clock using a modification of the procedure first used by Carskadon and Dement (1978). Any REM sleep that occurs during these tests may be relevant in evaluating for narcolepsy. This report describes the frequency distribution of REM sleep episodes in 40 narcoleptic patients given such a Multiple Sleep Latency Test.

Methods

Subjects

Forty narcoleptic patients (24 males, 16 females, mean age 44.7 years, range 20–73, S.D. = 11.7) were selected a priori from a medical history consistent with a diagnosis of narcolepsy. Moreover, in a post hoc inspection of our data, no patient showed fewer than two episodes of REM sleep on the Multiple Sleep Latency Test. Thus, our selection criteria follow the accepted definition of narcolepsy drafted by the First International Symposium on Narcolepsy, La Grande Motte, 1975 (Guilleminault et al. 1976).

Procedure

Patients were asked to refrain from taking sedatives or stimulant drugs and to limit their intake of stimulating or depressing beverages. All recordings were done in a single-bed hospital room. An all-night polysomnographic recording ruled out respiratory abnormalities or rhythmic leg movements characteristic of nocturnal myoclonus. The following morning, while EEG, EOG, and EMG electrodes were still in place, the patients were offered five 20 min opportunities to sleep, beginning at 10.00, 12.00, 14.00, 16.00 and 18.00 o'clock. Each test ended either after 20 min if no sleep occurred, or after 10 min of any combination of NREM (stages 1–4) and REM sleep. Thus maximum test length was 30 min (i.e. when sleep onset was in the 20th min). The technician attempted to enforce wakefulness between tests. Recordings were scored in the standard fashion (Rechtschaffen and Kales 1968). However, on each of the 5 opportunities, if REM sleep occurred, regardless of distribution of the stage REM scoring category, we counted only one REM sleep episode.

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Results

The frequency distribution of patients versus number of REM sleep episodes presented was as follows: 11 patients presented 2 REM sleep episodes, 5 presented 3, 11 presented 4, and 13 presented 5 ($\chi^2 = 3.6$, $df = 3$, P : N.S.). The mean number of REM sleep episodes per subject was 3.7, S.D. = 1.2. By comparison, none of the 14 control subjects reported by Richardson et al. (1978) presented REM sleep episodes on the Multiple Sleep Latency Test. Table I is a summary of our findings for number of REM sleep episodes throughout the day as well as sleep latency and latency to REM sleep after sleep onset. A χ^2 test failed to reject the hypothesis that test time does not influence the likelihood of a REM sleep episode ($\chi^2 = 0.5$, $df = 4$, P : N.S.). A repeated measures ANOVA did disclose a significant effect of test time on sleep latency ($F = 3.52$, $df = 4/156$, $P < 0.01$) that reflected the midafternoon drop in sleep latency. There were no differences in latencies to REM sleep after sleep onset (all t 's < 1.43 , all df 's ≥ 53 , all P 's: N.S.).

Discussion

This report and its companion article (Richardson et al. 1978) describe the results for narcoleptic patients on a clinical procedure that we have found to be of considerable diagnostic usefulness. The Multiple Sleep Latency Test can objectively evaluate abnormal sleepiness and provide sufficient opportunity to check for REM sleep episodes that occur shortly after sleep onset.

As a criterion for abnormality with respect to such REM sleep, we suggest that two or more REM sleep episodes on the Multiple Sleep Latency Test be considered abnormal provided that the test occurred after a sleep period that approximates the individual's nominal nocturnal sleep. REM sleep in the Multiple Sleep Latency Test is preceded by less than 10 min of NREM sleep and so easily qualifies as 'sleep-onset-REM-sleep' (Wilson et al. 1973). The criterion of two or more REM sleep episodes in 5 opportunities seems prudent because there is increased likelihood for REM sleep to occur in the morning sleep of normal subjects (Webb et al. 1966). Although the control group of Richardson et al. (1978) showed no REM sleep in their tests, Webb and his colleagues' data suggest that REM sleep can occur in normal subjects during morning naps. In our narcoleptics, however, the χ^2 for time of day was not significant and none of the 11 patients with only two REM sleep episodes had their second episode before the 14.00 o'clock test. Furthermore, over 12% of the sample required the 16.00 o'clock test to present their second REM sleep episode.

In summary then, two or more REM sleep episodes on a Multiple Sleep Latency Test for a patient who by nocturnal polysomnography is free of sleep apnea, nocturnal myoclonus, etc., is consistent with a diagnosis of narcolepsy. We suggest that the Multiple Sleep Latency Test can provide primary care physicians with objective data not only as to the presence or absence of abnormal sleepiness (Richardson et al. 1978) but also the presence or absence of sleep-onset-REM-sleep indicative of narcolepsy. Obtaining objective evidence for narcolepsy is important for primary care physicians because the stimulants prescribed to control sleepiness may, at any time, require justification to drug abuse authorities. The Multiple Sleep Latency Test can provide such objective evidence in a convenient and standardized manner.

Summary

Forty narcoleptic patients were given the Multiple Sleep Latency Test, consisting of 20 min opportunities to sleep offered at 10.00, 12.00, 14.00, 16.00 and 18.00 o'clock. Eleven patients had 2 episodes of REM sleep, 5 had 3, 11 had 4, and 13 had 5 before they were awakened. Fourteen control subjects given similar opportunities to sleep (reported in a companion article

(Richardson et al. 1978)) had no REM sleep episodes. For the 10.00–18.00 o'clock opportunities respectively, there were 32, 29, 30, 28 and 27 REM sleep episodes. We conclude that this procedure can provide physicians with data useful in the diagnosis of narcolepsy.

Résumé

Sommeil paradoxal chez les narcoleptiques

40 malades narcoleptiques ont subi le test multiple de latence du sommeil; celui-ci consiste en la possibilité de dormir 20 min, offerte au sujet à 10,00, 12,00, 14,00, 16,00 et 18,00 h. 11 patients ont présenté deux épisodes de sommeil paradoxal, 5 en ont présenté 3, 11 en ont présenté 4, et 13 en ont présenté 5 avant d'être réveillés. 14 sujets de contrôle ont eu les mêmes possibilités de dormir (Richardson et al. 1978) et n'ont pas présenté d'épisode de sommeil paradoxal. Pour les séances de 10–18 h, il a été observé respectivement 32, 29, 30, 28, et 27 épisodes de sommeil paradoxal. Les auteurs concluent que cette manière de procéder peut fournir aux cliniciens des données utiles au diagnostic de narcolepsie.

Acknowledgements

Supported in part by a grant from the John Stauffer Charitable Trust and by Institute of Mental Health Grant MH 5084 to Dr. Dement. Dr. Mitler is supported by the Long Island Research Institute, New York State Department of Mental Hygiene.

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TABLE I
Number of REM sleep episodes as a function of test time in 40 narcoleptic subjects.

	Test time			
	10.00	12.00	14.00	16.00 18.00
Number of REM sleep episodes ($\chi^2 = 0.5, df = 4, P: N.S.$)	32	29	30	28 27
Mean sleep latency ($F = 3.52, df = 4/156, P < 0.01$)	3.2 $\pm$ 2.7	2.7 $\pm$ 3.6	2.5 $\pm$ 3.6	2.4 $\pm$ 3.1 4.1 $\pm$ 5.5
Mean REM sleep latency after sleep onset (all r 's < 1.43 (all df 's ≥ 53 , all P 's: N.S.)	3.4 $\pm$ 3.5	3.1 $\pm$ 2.8	3.1 $\pm$ 2.7	3.5 $\pm$ 2.9 3.7 $\pm$ 2.3