The patient is an 18-y-old white woman who presents for evaluation of excessive daytime sleepiness, with long sleep time, and an Epworth Sleepiness Scale score of 19/24. Her past medical history is significant for depression, anxiety disorder with panic attacks, and suicidal ideation, and intent, without plan, requiring psychiatric and psychological counseling.

She goes to bed at 21:00, falls asleep within minutes, does not awaken during the night, and rises in the morning at 07:30 with multiple alarms, often not feeling refreshed, and sometimes sleeps through multiple alarms missing school. She denies snoring, apnea, lower extremity restlessness, cataplexy, hypnogogic/hypnopompic hallucinations, or typical sleep paralysis, but does report a single episode where she tried to awaken in the morning but was not able to move for over 30 min.

Medications include paroxetine, and over-the-counter iron and carnitine supplements, which have not resolved her daytime sleepiness. She denies use of tobacco, alcohol, or illicit drugs; and drinks caffeine beverages only occasionally. Body mass index is 20.4 kg/m², oral airway is not crowded; and remainder of physical and neurological examination is unremarkable.

Seven-day wrist actigraphy performed immediately before diagnostic polysomnography showed variability in sleep schedule, with total sleep time ranging from 6 h to over 12 h, and an average total sleep time across seven days of 10 h 14 min (Figure 1). Diagnostic polysomnogram revealed total sleep time of 402 min, sleep efficiency of 92%, total sleep time apnea-hypopnea index of 0.1 events/h of sleep, TST respiratory disturbance index of 10 events/h of sleep, rapid sleep latency of 4 min, and REM latency of 316 min. During next day multiple sleep latency testing (MSLT), the patient was found to be unresponsive following the first nap attempt, and sleep technologist alerted sleep lab medical director, who examined the patient. Patient was breathing normally, with normal heart rate. Patient maintained eyes closed unresponsive during: loud verbal commands, auscultation, eliciting of deep tendon reflexes (DTRs), passive eyelid opening, and passive right arm overhead (Figure 2). DTRs were intact in all four extremities: 1+ in the biceps tendons bilaterally, and 1+ in the patella tendons bilaterally. Right arm was released when passively raised by the physician directly over the patient’s head, and upon release the arm avoided striking the patient’s head, landing in front of the patients’ head (Figure 3 and Video 1 in the supplemental material). Patient remained unresponsive for nearly an hour.

**QUESTION:** What do the findings on MSLT indicate?
Seven-day wrist actigraphy performed immediately before diagnostic polysomnography showed variability in sleep schedule, with total sleep time ranging from 6 h to over 12 h, and an average total sleep time across seven days of 10 h 14 min.
Assessment of an eyes closed motionless unresponsive patient during multiple sleep latency testing. (A) Eyelids held open, with attenuation of posterior dominant rhythm (PDR) of 9–10 Hz alpha activity, and return of PDR with eyelid closure. (B) Deep tendon reflexes (DTR) are intact in the upper extremities, 1+ in the biceps tendons bilaterally, and the lower extremities, 1+ in the patella tendons bilaterally. Throughout assessment of DTRs, eyelids are closed, patient is motionless, and PDR is maintained. (C) Heart and lung field auscultation, findings were unremarkable. Throughout auscultation, eyelids are closed, patient is motionless, and PDR is maintained.
Figure 3—Multiple sleep latency testing.

(A) Patient’s right arm is lifted above patient’s head, while patient is unresponsive, with eyes closed. Posterior dominant rhythm (PDR) is noted.

(B) Arm is released, and comes forward, avoiding striking the patient’s head. Throughout this assessment, eyelids are closed, patient is motionless, and PDR is maintained.
DISCUSSION

Pseudo-sleep is psychogenic behavior mimicking the behavior characteristics of normal sleep, in that the patient has their eyes closed and is apparently unresponsive and motionless; but neurophysiologic assessment reveals evidence of wakefulness in the form of typical waking background electroencephalographic (EEG) activity, in particular a posterior dominant rhythm in the alpha frequency range consistent with eyes closed wakefulness. This form of malingering or conversion disorder has been well described in long-term video EEG assessment in epilepsy monitoring units in patients with pseudo-seizures/psychogenic non-epileptic attacks.1–3 Video-EEG monitoring is a powerful tool that allows for the electrophysiologic confirmation of wakefulness, despite apparent eyes closed motionless unresponsiveness.

Functional neurological symptoms mimicking true sleep disorder include not only pseudo-sleep, but also psychogenic non-epileptic attacks during apparent sleep, and pseudo-narcolepsy with cataplexy.4,5 Presence of intact DTRs in all four extremities helped exclude generalized cataplexy, given that in typical cataplexy DTRs are absent. In addition, this patient’s unresponsiveness lasted for nearly an hour, and typical cataplexy is not so prolonged. The arm drop test was another indication of pseudo-neurologic unresponsiveness, wherein an atonic arm is raised over the patient’s face, and does not strike the patient’s face when released, but instead falls away from the face.

Functional neurologic sleep disorders may be vastly underreported given that those who evaluate them may not have familiarity with the interpretation of the electrophysiologic sleep data that is key for making the diagnosis, thus making it all the more important that sleep medicine physicians have familiarity with these disorders. Pseudo-sleep on electrophysiologic testing does not necessarily exclude central hypersomnia, and patient will continue to be evaluated in the sleep medicine clinic.

SLEEP MEDICINE PEARLS

1. Pseudo-sleep mimics sleep with eyes closed, motionless unresponsiveness.

2. Video-electroencephalography, as provided by standard polysomnography montage, in combination with passive eye opening attenuation of wakefulness posterior dominant rhythm are key to making the electrophysiologic diagnosis of pseudo-sleep.

3. Sleep physician familiarity with functional neurological sleep disorders is important, given their familiarity with the electrophysiologic sleep data required to establish the diagnosis.

REFERENCES


CITATION


DISCLOSURE STATEMENT

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