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Parasomnias

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INTRODUCTION

Parasomnias represent a wide variety of disorders that interrupt sleep and cause unusual nocturnal behavior. These disorders are reported in 1% to 10% of the population,[1] with the highest preponderance in children. These disorders may be classified on the basis of the sleep stage in which they occur, or the age of first occurrence in a given patient, or the clinical behavior during the event. Clinical history from the patient and family members is usually enough to establish a diagnosis. Treatment is dependent upon the type of behavior exhibited, frequency, and disruption to patient and other family members. The importance of these disorders arises from the potential that they hold for anxiety, sleep disruption, and possible harm.

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Human consciousness has three separate states of being, each with its own unique characteristics: wake, nonrapid eye movement (NREM) sleep, and rapid eye movement (REM) sleep.[2] During wakefulness, one reacts to external stimuli. During sleep, the brain reacts to internal stimuli. Sleep is subdivided into different stages based on EEG activity and other behavior including eye movements and muscle tone. During NREM sleep, which accounts for 75% of any given night's sleep in normal adults, brain wave activity slows but muscle tone is preserved. REM sleep is unique in that the EEG frequency is in the "wake" range, with bursts of eye movements and muscle atonia. REM episodes appear cyclically during the night. The first REM episode appears 90 minutes after the first sleep onset and then reoccurs every 60 to 90 minutes through the remainder of sleep cycle. These sleep stages are interspersed with periods of wakefulness that also appear periodically during the night. A systematic arrangement of these different stages during the course of a typical night constitutes what is referred to as sleep architecture.

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The control mechanisms for the switch from one state to the other have not been defined.[3] There is no specific "sleep" and "wake" center that regulates this activity. The control of the state is dependent upon interaction from a diverse spectrum of structures, which in turn affect the characteristics and reactivity of the rest of the brain. Brain structures will have different functions based upon the current state of consciousness. Stimulation of a certain nucleus may have different effects if the person is awake as compared to being in REM sleep.

Parasomnias arise due to a disruption in the switch from one state to another. Most commonly parasomnias occur as an incomplete awakening from NREM sleep. In these episodes the brain is reacting to both internal and external stimuli. Characteristic behaviors of sleep may also invade wakefulness. Cataplexy (abrupt loss of muscle tone), which is found in 70% of persons with narcolepsy, is due to muscle atonia. Here, REM sleep transgresses abruptly into wakefulness; muscle atonia is the accompaniment of REM sleep. Normally smooth transitions between states can be influenced by genetic and environmental factors. Sleep terrors and sleepwalking often have a familial incidence. Environmental factors such as sleep deprivation, alcohol and stimulants might increase these episodes, as would emotional stress. These environmental and emotional factors likely decrease arousal threshold allowing for more frequent arousals, or disrupting the normal mechanism of transition from one stage to another.

CLASSIFICATION

Parasomnias may be classified according to sleep stage (Table 1), type of behavior and age of onset.

NREM Parasomnias

Collectively, this group of disorders is the most common parasomnia.[4] It includes confusional awakenings, sleep terrors, and sleepwalking. These disorders differ in their clinical presentation but often there is a great deal of overlap between them. Most common in child-

hood, they may persist into adulthood. The episodes occur as an incomplete arousal from stage 3-4 NREM sleep; therefore they usually occur within the first one third of the night when stage 3-4 sleep is most prominent. Amnesia for the event is a characteristic of NREM parasomnias and usually the person cannot be awakened from the episode.

NREM parasomnias share common features. All are more common in childhood, but as the brain matures, the incidence decreases. A positive family history is associated with all of the disorders. More recent studies, particularly in children, have refuted a previous notion of association of parasomnias with psychopathology. The episodes are usually precipitated by environmental stimuli such as loud noises during sleep, metabolic disturbances, infection, and fever. Sleep deprivation or a change in the sleep schedule will increase the likelihood of an event, especially when other factors are involved. Psychoactive drugs such as alcohol and sedatives may exacerbate the condition. Emotional stress and anxiety will also precipitate an event.

Confusional Awakenings are a common feature in young children under age 5. The episodes consist of arousal with confusion, slow speech, and mild agitation. Moaning or crying may signal the episode, which generally lasts for 5 to 10 minutes, and the child usually cannot be aroused from the episode. Attempts at awakening the child may actually prolong the parasomnia.

Sleep Terrors are the most dramatic of the NREM disorders. Onset is abrupt with a cry followed by autonomic and behavioral features of intense fear. Pathogenesis is a very abrupt arousal from stage 3-4 NREM sleep. The child may sit in bed or begin to run about the room as if trying to escape from an unseen danger. During the episode the child appears to be awake with eyes open and clumsy purposeful movement. Injury is possible in that the child may run into furniture or leave the house. The child, who cannot be awakened, will return to sleep in 5 to 15 minutes. As with other NREM parasomnias, attempts at awakening the child will prolong the episode. Recent studies cite an incidence of 15% in children between 3 and 10 years. Although the disorder generally resolves during the mid-teens, in a minority of patients it might persist into adulthood. There is often a family history of parasomnias.

Sleepwalking consists of motor behavior, which may be as simple as standing at the bedside or as complex as opening doors and walking out of the house. The sleepwalking may be calm or agitated, but it is without the intense fear that is noted in sleep terrors. Onset is between the ages of 4 and 8 years. Incidence rates vary from 6% to 40%. As with the other NREM parasomnias the incidence declines with age. Sleepwalking occurs in 2% of the adult population.[1] People may be awakened from sleepwalking and may or may not have amnesia for the episodes. Generally purposeful activity can occur such as walking around the house, having a conversation, doing household chores, and even operating an automobile.

Table 1. Sleep-stage based classification of parasomnias

NREM Parasomnias	REM Parasomnias	Sleep Stage-independent Parasomnias
Confusional arousals (awakenings)	REM behavior disorder (RBD)	Sleep-talking
Sleep terrors		Teeth grinding
Sleepwalking		Bed rocking
		Periodic Limb Movements of Sleep
		Nocturnal panic disorders

Treatment depends upon the frequency and severity of the events. Most children do not require treatment. The episodes are generally infrequent, and education and reassurance of the parents are all that is required. Episodes that are frequent and self-injurious may require medication. Benzodiazepines such as clonazepam (0.5–1 mg) and zolpidem (Ambien™, 5–10 mg) given at bedtime are the drugs of choice.[5] Nightly use of medication may be needed for frequent events. Alter-natively, intermittent use may be helpful if a stressful situation is anticipated, e.g., sleepovers or summer camp. Scheduled arousals have also been effective.[6] The child is awakened 1 to 2 hours after bedtime, but before the expected arousal. Four weeks of scheduled awakenings will often reduce the incidence of the arousals. Locks on outside doors will prevent excursions outside of the house.

These episodes may persist into adulthood. Medication remains the cornerstone of management. Environmental factors such as alcohol and sleep deprivation become important precipitating factors in adults as well as emotional distress. Attention to sleep hygiene is effective. Sleep hygiene consists of regular sleep/wake hours, avoidance of caffeine and alcohol after 3 PM, and soothing activities prior to bedtime. Those in whom emotional stress plays a precipitating role will find stress management and self-hypnosis helpful.

REM Behavior Disorder

REM behavior disorder (RBD) was first described in 1985.[7] This parasomnia occurs during REM sleep;

therefore it manifests usually during the second part of the night. The episodes, which are generally brief and intense, do not occur during the first several REM episodes and are not seen when REM is achieved during daytime sleep. RBD consists of complex activity for which the patient has amnesia, although he may awaken during or after the event. Activity often consists of lunging out of bed or striking a bed partner. The mechanism of the outburst is due to the lack of muscle atonia, which usually accompanies REM sleep and prevents motor movement during REM or dream sleep. In essence, the patient "acts out (the) dream," although the episode generally consists of nonspecific movements.[8] Actions may be aggressive against the bed partner such as striking out with leg or arm. The patient may become violent if attempts are made to restrain him.

RBD usually begins in men with onset in the 60s and 70s. Its etiology is uncertain but perhaps related to cerebrovascular disease. It has also been noted that a number of patients with RBD ultimately develop Parkinson's Disease.[9] Sleep disorders are a common early feature of this neurodegenerative disorder.

RBD and NREM parasomnias share the same precipitating factors. There is some evidence that SSRIs may aggravate RBD. Benzodiazepines, especially the longer-acting agents such as clonazepam and temazepam, are effective in treatment of RBD.

Sleep Disorders Not Dependent On Sleep Stage

These consist of a number of less dramatic episodes during sleep. Sleep talking is a common disturbance with many of the same precipitating characteristics of NREM parasomnias. Often familial, it is aggravated by poor sleep hygiene and emotional distress. Teeth grinding and bed rocking are similar problems. While teeth grinding may require a mouth guard to prevent injury to the teeth, the other disorders usually do not disturb sleep to a significant degree, and therefore, often require no treatment.

OTHER NOCTURAL ACTIVITIES

Periodic Limb Movements Of Sleep

Periodic limb movements of sleep (PLMS) consist of episodic brief movements of the extremities—usually the legs—throughout the early stages of sleep. Movements last from 0.5 to 3 seconds and reoccur in a periodic pattern every 20 to 40 seconds. The patient is unaware of the movements and the bed partner might report disturbed sleep because of the periodic movements. PLMS may be associated with Restless Leg Syndrome, iron deficiency anemia, renal disease, neuropathy, degenerative arthritis or chronic back pain. It is more common in the elderly and may have no underlying precipitating factor.

Nocturnal Panic Disorder

Panic disorders may occur in conjunction with daytime disorder or be an independent disorder.[10] People awaken with intense anxiety or fear. In contrast to sleep terrors, the patient awakens easily. Lack of dream recall separates this disorder from nightmares.

Nocturnal Seizures

Seizures occur frequently during sleep in those with epilepsy. Of patients with epilepsy, 10% to 20% will have seizures only during sleep. Seizures are most likely to occur during transitions in NREM sleep. A parasomnia, previously known as paroxysmal nocturnal dystonia, has been found to actually represent a nocturnal seizure disorder.[11] Nocturnal frontal lobe seizures may mimic parasomnias. Like a parasomnia, the seizure causes a sudden apparent awakening from sleep. The motor activity of the seizure is highly stereotyped as compared to the more reactive activity noted during parasomnias. A polysomnogram with extended EEG and concurrent video recording is often required for diagnosis. As with other forms of epilepsy, anticonvulsants are the treatment of choice.

DIAGNOSIS OF PARASOMNIAS

Ideally diagnosis would be based upon capturing an event during a polysomnogram. However, the yield and cost aspects make this approach impractical. Also, the parasomnias occur sporadically, making it unlikely that an event will be captured during the one night in the sleep lab. Therefore diagnosis usually depends on the clinical history obtained from the patient as well as witnesses to the episode. A clinical history is adequate for diagnosis if the behavior and timing are consistent with a parasomnia, a strong family history is present, the episodes are infrequent and the potential for self-injury is absent. Investigation with a polysomnogram is indicated if there are unusual clinical characteristics; injurious behavior, frequent (weekly) episodes or the motor behavior is stereotyped.[12] Patient's complaints of daytime sleepiness or symptoms of sleep apnea or periodic limb movements should trigger additional investigation with a polysomnogram. The sleep study should be done with extended EEG with the goal of identifying usual EEG activity as well as sleep apnea and PLMS, which may trigger a parasomnia. If there is a high suspicion for seizures, video-EEG monitoring would be the preferred diagnostic procedure.

TREATMENT

In all forms of parasomnia, attention to sleep hygiene is the basis for treatment. Sleep deprivation, irregular sleep hours, caffeine, nicotine, and alcohol lead to disturbed sleep and a greater likelihood of nocturnal arousals. Clonazepam is the drug of choice when the episodes are frequent and dangerous for the patient or those in the vicinity. Other benzodiazepines such as temazepam, diazepam and alprazolam have also been utilized. Tricyclic antidepressants, trazodone, and anticonvulsants are used in the unlikely event that the parasomnia does not respond to a benzodiazepine. Lack of response to a benzodiazepine requires a re-examination of the diagnosis.

SUMMARY

Parasomnias are common in the benign forms such as sleepwalking and sleep talking. The more dramatic forms such as sleep terrors and confusional awakenings occur frequently in childhood, but attenuate in the teen years. REM behavior disorder, seen in the elderly, is an uncommon entity. Generally diagnosis is based upon clinical history with sleep studies reserved for unusual presentation. The focus of treatment is attention to sleep hygiene with medication(s) reserved for more severe and repetitive cases.

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