Parasomnias: an overview

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Parasomnias are abnormal experiences or behaviours that occur during sleep and can be subdivided into disorders of arousal, disorders of rapid eye movement (REM) sleep or other parasomnias. Diagnosis rests on a thorough clinical evaluation with supporting data from a full polysomnography with time synchronized video. While the prognosis for arousal disorders is generally excellent, the diagnosis of REM behaviour disorder (RBD) is more ominous and associated with neurodegenerative disorders, and as such, requires routine neurological surveillance. The cornerstone of treatment for all parasomnias is adequate patient and bed partner education. Data supporting pharmacologic therapy are limited but clonazepam for RBD has been reported to be effective in up to 89 per cent of patients.

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Parasomnias constitute one of the main categories of sleep disorders. Broadly defined these are undesirable behaviour or experiential phenomena occurring during sleep or in the transition to, and from, sleep. Parasomnias can be divided into three subgroups: disorders of arousal, disorders of REM sleep, and other parasomnias. These occur due to abnormal transitions between the three primary states of being wake, rapid eye movement (REM) sleep, and non rapid eye movement (NREM) sleep. These different states may overlap or intrude into one another, and it is the overlap of wakefulness and NREM sleep that gives rise to confusional arousals, and the intrusion of REM sleep into waking that produces REM sleep behaviour disorder (RBD).

Parasomnias most likely to be encountered in clinical practice are namely, sleepwalking, sleep terrors, confusional arousals, REM sleep behaviour disorder (RBD) and nightmares. In addition, less common, but equally important disorders, such as exploding head syndrome, sleep-related groaning (catathrenia) and sleep-related eating disorder will be discussed briefly.

Disorders of arousal

Non rapid eye movement sleep arousal parasomnias include confusional arousals, sleep terrors (pavor nocturnus) and sleepwalking (somnambulism). These emerge when normal wake and NREM state boundaries become destabilized and elements of the waking state intrude into NREM sleep.

Confusional arousals can occur throughout the night but are seen most commonly during the first half of the major sleep period when NREM density is highest. Confusional arousals are estimated to affect 4 per cent of adults. It is characterized by abrupt awakenings with apparent confusion, diminished vigilance, disorientation, and occasional violent or inappropriate behaviour. Children may present with inconsolable crying³. The
duration of arousals is variable but can last from several minutes to hours. Affected individuals often have no recollection of the event upon awakening, and typically do not leave the bed\(^2\)\(^3\).

Sleep terrors are characterized by abrupt awakenings from sleep accompanied by loud screaming, crying, apparent panic and agitation\(^2\). Individuals may also demonstrate violent behaviour, and attempts to reason with, or console, are often unsuccessful. Indeed, the latter may even give rise to worse behaviour or a violent reaction\(^2\)\(^4\). Sleep terrors are believed to be a reaction to a frightening image that results in agitated arousal and sympathetic nervous activation\(^2\).

During an episode of sleepwalking, a person may appear agitated or calm, and behaviour may range from simple ambulation with a “glassy stare” to more complex activities such as driving\(^3\). Sleepwalking may be preceded by confusional arousals or sleep terrors\(^2\)\(^3\). Sleepwalking occurs more frequently in children with an estimated prevalence of up to 40 per cent in this age group. Prevalence among adults is about 4 per cent\(^1\)\(^6\).

Evaluation of individuals with arousal disorders begins with a thorough history and physical examination, emphasizing personal and family history of sleep disorders and social history. Inquiry should include a search for factors that may trigger or exacerbate the parasomnias including febrile illness, alcohol use, sleep deprivation, stressors and medication. A neurologic and mental status examination is essential. Certain individuals may require additional testing, particularly those who present with occupationally- or socially-limiting excessive daytime sleepiness; violent or disruptive behaviour; injuries to self or others; or significant medical, psychiatric or neurologic findings. In such cases, an attended polysomnographic evaluation with time-synchronized video monitoring may help identify nocturnal behaviours associated with an arousal disorder. Additional studies include full montage electroencephalography to exclude nocturnal seizures as well as neuroimaging studies to exclude a structural lesion.

Differential diagnoses is extensive and include sleep-related breathing disorders, RBD, psychiatric disorders, nocturnal seizures, medication or substance use (e.g., alcohol, benzodiazepines and non benzodiazepine benzodiazepine receptor agonists)\(^7\) and malingering.

The primary therapy for disorders of arousal is reassurance and prevention. For most, the disease course is usually benign and tends to resolve spontaneously with time. It is essential that both the patient and bed partner be educated about safety precautions for the home and bedroom environment, such as reducing or eliminating potential sources of injury (e.g., relocating the bedroom to a room on the ground floor, securing doors, using heavy draperies over the windows, removing mirrors, and keeping the floor free of objects that the sleepwalker might potentially trip over). Bed partners should be counselled not to attempt to stimulate the patient during an episode as this may trigger violent behaviour\(^5\). Additional preventive measures include avoidance of factors and behaviours that can precipitate arousal parasomnias, including sleep deprivation as well as the use of alcohol and caffeine. A trial of sleep extension or scheduled awakening may be considered. With scheduled awakening, the patient is awakened just before the typical time of the parasomnia episode and thereafter allowed to return to sleep. Pharmacologic agents that have been used with some success include paroxetine and trazodone and low-dose benzodiazepines\(^8\)\(^10\). Relaxation techniques and hypnosis have been described as therapy for NREM arousal disorders\(^11\)\(^12\).

**REM sleep behaviour disorder (RBD)**

REM sleep is defined by a low amplitude mixed frequency electroencephalographic tracing. There is variability in resting heart and respiratory rate, as well as increased metabolism and body temperature relative to the NREM state. Finally, REM sleep is further characterized by a paucity of muscle activity with near complete somatic muscular atonia and little to no chin or leg electromyographic activity.

REM sleep behaviour disorder is characterized by the intermittent loss of REM atonia due to disinhibition of normally inhibitory mid-brain projections to spinal motor neurons. This, in conjunction with an active dream state, results in behavioural release and the apparent “acting out of dreams”. The Table provides the key characteristics of NREM arousal disorders and RBD.

Prevalence of RBD is estimated to be about 0.5 per cent\(^13\). RBD tends to affect older adults, with a mean age of onset of 50 to 60 yr, predominantly affecting males\(^13\). It may be a harbinger of significant neurodegenerative disorders, including Parkinson’s disease (PD) as well as other synucleinopathies. Up to 25 per cent of patients with PD demonstrate clinical features of RBD. Conversely, PD may develop in up
to 43 per cent of patients diagnosed with RBD14,15. Other disease processes associated with RBD include narcolepsy (reported in 25% of patients with RBD), multiple sclerosis, Tourette’s syndrome, and normal pressure hydrocephalus15.

REM behaviour disorder may present with complaints by patients or bed partners of violent nocturnal behaviour especially when the latter are out of character with the patient’s waking personality. The patient may complain of vivid dreaming and self or bed partner injury. Abnormal behaviours include sleep talking, yelling, limb movement, and complex motor activities. Patients with RBD arouse from sleep to full alertness often with complete recall of fearful dream content, which may involve being chased or attacked. The motor behaviour exhibited tends to correlate with dream content. The frequency of these episodes varies from once every few weeks to several times a night. Episodes tend to occur 90 min or more after sleep onset, when the first REM period typically begins. As the REM density is greatest during the latter part of the evening, RBD episodes tend to occur more frequently during this time.

Differential diagnostic considerations include the NREM arousal disorders, atypical arousals arising from patients with obstructive sleep apnoea and periodic limb movement disorder; nocturnal seizures; panic disorder; and dissociative disorder.

Evaluation of patients with suspected RBD includes a thorough medical, neurologic and psychiatric history, and physical examination as well as polysomnography with video monitoring. Polysomnographic findings often reveal normal sleep architecture and characteristic REM-associated abnormalities (increase in chin EMG activity, and excess REM-associated limb activity)16.

Treatment of RBD involves ensuring the safety of the patient and bed partner. Pharmacologic treatment with benzodiazapines is reported to be quite effective with one study demonstrating an 89.5 per cent effectiveness with clonazapam17. Other studies have described some success with melatonin, pramipexole, levodopa, gabapentin and clonidine18-24, but further investigations are required before these agents become standard therapies for this disorder.

**Nightmares**

Nightmares are unpleasant, often frightening, dreams that commonly awaken the sleeper out of REM sleep1. Episodes typically occur in the latter half of the night. Following the awakening, the individual becomes fully alert and profoundly anxious. There is vivid recall of the preceding dream as well as difficulty returning to sleep. Compared to sleep terrors, there is less autonomic activation, and tachycardia and tachypnoea, if present, are not as severe. Nightmares related to acute stress disorder or post-traumatic stress disorder can also occur during NREM sleep.

Episodes can be precipitated by illness, traumatic experiences, and alcohol and medication use, such as antidepressants and beta-agonist antihypertensive agents. Onset of nightmares is usually during childhood when prevalence is highest. Among adults, nightmares appear to be more common in women than in men.

Nightmares should be distinguished from sleep terrors, RBD and nocturnal panic attacks. Aside from reassurance that the condition is benign, no specific therapy is usually necessary. Behavioural treatment, such as imagery, psychotherapy or REM sleep suppressant agents may be considered for individuals who present with very frequent events or who describe extremely disturbing dream contents.

**Other parasomnias**

The exploding head syndrome consists of a sensation of sudden loud noise or “explosion” felt in the
head that occurs as an individual falls asleep. It is not accompanied by significant pain but may be associated with a sensation of a flash of light or a myoclonic jerk. This disorder is considered by many to be a variant of sleep starts and generally has a benign course that requires no specific therapy.\(^3\)

Sleep-related groaning, or catathrenia, is characterized by expiratory groaning during sleep, commonly during REM sleep in the second half of the night. It is a rare condition that is more prevalent among males. Affected individuals are asymptomatic and physical examination and sleep architecture are generally normal.\(^7\)

Finally, sleep-related eating syndrome consists of arousals from sleep with involuntary eating or drinking. The awakenings appear to be triggered by learned behaviour and not by real hunger or thirst. There is generally partial or total amnesia for the episode, and no associated abnormal eating behaviour while awake. Onset is commonly during adulthood, with women affected more frequently than men. Episodes can be precipitated by sleepwalking, obstructive sleep apnoea and medication use (e.g., zolpidem).

**Summary**

In summary, diagnosis of parasomnias relies on a comprehensive clinical evaluation. Additional testing with polysomnography and time-synchronized video recording may be indicated for cases that are associated with very frequent episodes, complaints of excessive sleepiness, unusual presentation, or injury to the individual or bed partner. Polysomnography is also indicated if an underlying seizure activity is suspected, in which case additional electroencephalographic leads are needed. Multiple polysomnographic studies performed over several nights may be required. Extensive neurological and psychiatric assessment may be considered for cases with medico-legal implications. Therapy of all parasomnias should include education regarding patient and bed partner safety as well as the avoidance of known precipitating factors. Unlike the relatively benign course of the arousal disorders, RBD may be a harbinger of significant neurologic disease and these patients should undergo regular clinical surveillance for the subsequent emergence of neurodegenerative diseases.

**References**


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