Parasomnias and When to Refer to a Respiratory Physician / Sleep Specialist

Neel Thakkar*, Amita Nene**

Introduction

Parasomnias are a group of disorders exclusive to sleep and wake-to-sleep transition that involve arousals with abnormal motor, sensory or behavioural experiences.[1] Sensory experiences often involve perceptions, dreamlike hallucinations, and autonomic symptoms. When associated with excessive motor activity and other complex motor behaviours, these Parasomnias can be troublesome to the patient and bed partners. Motor behaviours may or may not be restricted to bed and can become dangerous when the subject ambulates or is agitated.

In some parasomnias, it may be injury or possibility of physical injury to the patient or bed partner that brings them to the physicians. The other presentations include disturbed nocturnal sleep of patients, bed partners, or family members who are living in the same house. The behaviours may seem purposeful but are inappropriate for the time of occurrence. In general, most parasomnias are more common in children and decrease in occurrence as they get older.[2] Parasomnias have been reported in approximately 4% of the adult population.[3]

The parasomnias that have complex motor behaviours occurring during sleep can have medico-legal implications, as violence could be an important component. The incidence of violent behaviour during sleep is generally presumed to be low, but is reported to have a prevalence of up to 2% in adults.[4]

Pathophysiology

Sleep is broadly divided into non-REM and REM sleep, NREM further into stage N1, N2 and N3. Sleep stage shift is not a complete on-off switch phenomenon, but involves reorganisation and transition of various neuronal centre for an equivocal stage to be reached. During this period of reorganisation - which is a unique state of sleep dissociation, an admixture of 2 or 3 different states of being is observed. It is usually an arousal at this stage that leads to complex motor behaviour during sleep causing parasomnias.[5] REM parasomnias occur because of the abnormal intrusion of wakefulness into REM sleep and likewise NREM parasomnias occur because of abnormal intrusions of wakefulness into NREM sleep.

Classification of Parasomnias

The International classification of sleep disorders-3 (ICSD-3) categorises parasomnias into three major groups

*Clinical Associate Critical Care, P.D. Hinduja Hospital and Medical Research Centre, Mahim, Mumbai, **Consultant Chest Physician and Sleep Medicine Specialist Coordinator, Dept. of Respiratory Diseases, Bombay Hospital and Institute of Medical Sciences, 12 New Marine Lines, Mumbai - 400 020.

(Table 1). These are :

A. Events associated with NREM sleep,
B. Events associated with REM sleep, and
C. Other parasomnias

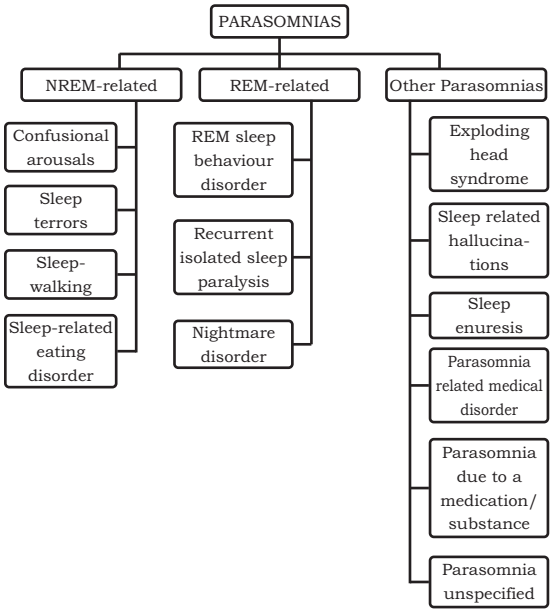

Table 1 Classification of parasomnias

Diagnosis of parasomnias is complex and needs an amalgamation of clinical features and EEG findings based on the stage of sleep and pattern. Whenever there is a suspicion of such disease, an adequate sleep history from patient and partner is relevant to attain a diagnosis. The typical features of the common parasomnias are listed below.

A. Parasomnias associated with NREM sleep

These are also known as Disoders of Arousal and include

1. Confusional arousals
2. Sleepwalking
3. Sleep terrors also called Night terrors, and
4. Sleep-related eating disorders.

These disorders of arousal share several common features, such as

i. Occur in the first half of the night, typically within the first 2 hours of sleep
ii. There are recurrent episodes of incomplete awakening,
iii. There is absent or inappropriate responsiveness during the episode,
iv. There is partial or complete amnesia for the episode

But, these also have certain unique features which help; differentiate them. Each of these are discussed in detail below

1. Confusional arousals (also called sleep drunkenness or excessive sleep inertia)

Confusional arousals consist of arousals originating from NREM sleep (usually slow wave sleep) and are associated with an arousal with confusion and disorientation. These behaviours are associated with slow mentation and poor or inappropriate response to questions. They occur in the first half of the night and are associated with amnesia of the event, and recall of the event in the morning is - absent. Associated motor behaviour usually is simple and purposeless. Aggression or violent behaviour is uncommon, but may follow forced awakening from sleep.[6] When sexual behaviour is encountered along the continuum of confusional arousals the parasomnia is further defined as a sexsomnia.

Confusional arousals occur equally in boys and girls. High prevalence is observed

at a prevalence of 17.3% in children 3 to 13 years of age, after which the prevalence decreases.[6] Prevalence among adults 15 years and older is estimated at 2.9% to 4.2%.[3] Genetic factors play an important predisposing role, and there may be a familial history of similar childhood nocturnal behaviours.

In adults, a variety of triggers have the potential to precipitate confusional arousals. These are sleep deprivation, fever, infections, centrally active medications (antidepressants, hypnotics, and tranquillisers), sleep-disordered breathing, and periodic limb movements of sleep.

Confusional arousal variants

Variants of confusional arousals in adults and adolescents include sleep-related sexual behaviours and severe morning sleep inertia.

Sleep related sexual behaviour includes violent masturbations, fondling the bed partner, sexual assaults and loud sexual vocalisations, sexual intercourse with or without orgasm, and agitated sexual behaviours, which can have considerable medicolegal implications. In addition to confusional arousals, sexsomnias have also been reported with other NREM parasomnias such as somnambulism.

Treatment with medications such as clonazepam with simultaneous psychotherapy is an effective treatment combination, in these patients.

Severe morning sleep inertia is clinically similar to typical confusional arousal and arises from light NREM sleep, but does not occur out of slow wave sleep.

2. Sleepwalking (also known as somnambulism)

Sleepwalking arises out of slow wave sleep and is noticed usually in the first third of the Sleep.[8] The episodes are characterised by walking phenomenon during sleep.

Patients with sleepwalking parasomnias are typically calm; however, more complex behaviours such as eating, cooking, unlocking doors, cleaning the house, sexual activities, and even driving have been reported.[9] If awakened, patients are found to be confused and can become agitated or violent. The ambulation usually terminates spontaneously and most often, patients return to their bed and have no recall of the episodes the following morning. Sometimes termination of sleepwalking may occur in unusual places such as the bathroom or kitchen.

Sleepwalking is common in children, with prevalence as high as 17%, decreasing to About 3% in adults.[10] Patients are at risk of injury from falls while going downstairs, running into closed doors or windows, or jumping out of windows. Genetic factors play a significant risk for sleepwalking, especially in first-degree relatives. Triggers for sleepwalking are similar to those seen in patients with confusional arousals.

3. Sleep Terrors (also called night terrors or pavor nocturnes)

Sleep terrors, are parasomnias arising

out of slow wave sleep. Sleep terrors are characterised by a sudden arousal associated with an intensely loud scream or crying in the first few hours of sleep onset. During a sleep terror, the patient may act in a frightened, anxious, agitated, and panicky manner. Inconsolability is a striking feature. Typically, the child doesnot want to be comforted or touched during the event, speech during the episode is incoherent and environment perception seems altered. The child may run in circles or run into walls and may even run outside, possibly as a result of altered perception and panic.

These events can be possibly dangerous, when ambulation is present, and may result in physical injury to self or their bed partners. These events last from 30 seconds up to 5 minutes and majority of patients are amnesic to the event in the morning but some remember them as imagery dream or fragments of dream. A strong component of sympathetic activation with sweating, tachycardia, tachypnoea, flushed skin, or mydriasis is present in almost all patients, which is a differentiating factor.

Affected children are usually 4 to 12 years and the estimated prevalence is between 1% and 6.5% of children.[6] Although sleep terrors tend to resolve spontaneously during adolescence, they may persist and can be seen in 4% of adults as well.

Sleep-related eating disorder (SRED), also called Sleep eating

It occurs due to a mixture of wake and NREM sleep. SRED is a variant of sleepwalking and is characterised by recurrent episodes of involuntary eating and is associated with diminished levels of consciousness during an arousal from sleep. It is not linked to daytime eating disturbances such as anorexia nervosa, bulimia nervosa or binge eating disorder.

The repeated episodes of eating and drinking during the main sleep period are accompanied by consumption of inedible or toxic substances (e.g., frozen foods, high caloric processed foods, cat food, cigarettes, or cleaning solutions). SRED is also associated with insomnia, sleep-related injury, occurrence of dangerous behaviours in the search for or while cooking food. This can result in morning anorexia, or adverse health consequences from recurrent binge eating of high caloric food, like weight gain, metabolic disorders (e.g. diabetes mellitus, hyperlipidaemia), hypertension, and obstructive sleep apnoea (OSA). There is partial or no memory of the event.

The episodes typically occur in the first one-third of the sleep period. It generally presents in young adulthood and more commonly affects females. Common comorbid symptoms include insomnia, anxiety, daytime sleepiness, past or current sleepwalking (two-thirds), and former or current eating behaviour problems.

The absent or diminished level of awareness during, the nocturnal food intake is the primary feature distinguishing SRED from eating

disorders and noctumal eating syndrome, characterised by excessive eating between dinner and bedtime or following complete awakening from sleep. In many cases, SRED may be related to treatment with a hypnotic agent or a comorbid sleep disorder such as restless leg syndrome (RLS), OSA or periodic limb movement disorder (PLMD).

Management of NREM parasomnias

Management of disorders of arousal from NREM sleep includes behavioural management and environmental safety (Table 2), recommended in all patients, and pharmacotherapy, typically reserved for more severe and injury-prone cases

Table 2. Environmental safety and behavioural management in patients of NREM parasomnias

Environmental safety	Behavioural management
• Pad nearby furniture • Lower mattress to the floor and/or use a ground-floor bedroom • Secure doors and windows (locks, alarms, barriers) • Locking medication cabinets, • Remove sharp and dangerous objects from bedroom, including firearms • Hiding car keys	• Avoid sleep deprivation • Maintain consistent and regular sleep-wake cycle • Identify and eliminate potential triggers, including alcohol, stress and medications like lithium zolpidem • Treat co morbid sleep disorders like OSA, PLM RLS • Educate patients, bed partners and bystanders.

Counselling and support are the key elements for the treatment of NREM parasomnias. Parents, bed partners, and family members should be educated on how to safely interact with the patient during episodes so as not to increase agitation, worsen confusion, or provoke violent, self-protecive behaviour. This generally involves allowing the patient to move freely without being physically restrained while ensuring safety. Family members should not shout or scream in an effort to arouse the patient, but rather, gently coax the patient back to bed. Forced awakenings, which risk precipitating some parasomnias during slow wave sleep, should be discouraged.

In the case of SRED, highly sought after foods should be secured outside of the kitchen. Locks may be needed on the refrigerator or kitchen cabinetry.

Scheduled waking may help to reduce the incidence of episodes of non-REM parasomnias such as somnambulism (sleep walking) and sleep terror. The patient is gently and briefly woken 15-30 minutes prior to the normal episode time. The procedure is repeated nightly for up to one month, and then a trial without waking is done to assess whether there is a continued response.

Pharmacotherapy

Pharmacotherapy is typically needed for patients when there is a concern for physical injury or if the episodes involve potentially dangerous complex activities. Low-dose clonazepam (0.5-1 mg) and other benzodiazepines such as temazepam or diazepam have been used to limit nocturnal arousals. Trazodone and certain selective serotonin reuptake inhibitors (SSRIs) such as paroxetine are effective as well. Management of comorbid sleep disturbances in results in a significant decline in frequency of the NREM parasomnias

A summary of differentiating features of NREM parasomnias as well as their management strategies is summarised in Table 3.

Table 3 - Differentiating features of NREM parasomnias

Clinical features	Confusional arousal	Sleep terror	Sleep walking	SRE
Age of onset	**2-10 years**	**2-10 years**	**5-10 years**	**Young adulthood**
Frequency	**3-4/week to 1-2 month**	**3-4/week to 1-2 month**	**3-4/week to 1-2 month**	**1-2 month 1-2 month**
Behaviour	Whimpering, some articulation, sitting up in bed, confused	Screaming, agitation, flushed face, sweating, inconsolable	Walking about the room or house, may be quiet or agitated, unresponsive to verbal commands	Eating high caloric or unusual foods with eyes open (amnestic) Morning anorexia Unexplained weight gain
Duration	**10-30 minutes**	**10-20 minutes**	**10-20 minutes**	**10-20 minutes**
EEG	Slow wave sleep, with rhythmic theta or delta activity	Slow wave sleep, with rhythmic theta or delta activity	Slow wave sleep, with rhythmic theta or delta activity	Arousals in NREM sleep
Pharmacotherapy	Clonazepam	Clonazepam	Clonazepam	Clonazepam SSRI Topiramate

B. Disorders of REM sleep

REM-related parasomnias include

1. Nightmares
2. REM sleep behaviour disorder (RBD) and
3. Recurrent isolated sleep paralysis.

These disorders occur as a result of state of disassociation between REM sleep and wakefulness (in case of recurrent sleep paralysis and RBD) or disturbed cognitive-emotional regulation arising from REM (in case of nightmares).

In contrast to the arousal disorders, which, for the most part, occur in otherwise healthy individuals, in many cases, RBD and nightmares arise from serious neuropathology (RBD) or psychopathology (nightmare disorder).

1. Nightmares

Nightmares are common, affecting between 10% and 50% of children and up to two-thirds of the general population can remember at least 1 or a few nightmares in the course of their childhood. Half of all adults recall occasional nightmare, whereas 1% reports more than an occasional nightmare a week.[11] Nightmares present as a prolonged and vivid dream sequence that tends to become progressively more intense, complex, and anxiety provoking. This eventually terminates in an arousal and has a vivid recall. Episodes may increase with triggers of stress, particularly following traumatic events, medications such as β-adrenergic blockers, levodopa, and abrupt withdrawal of REM suppressant drugs.

The polysomnography (PSG) shows an abrupt awakening from REM sleep associated with an increased REM sleep density and variability in heart and respiratory rates.

Reassurance is often the main management necessary, but when episodes are severe and refractory, the use of REM-suppressing agents such as tricyclic antidepressants (TCAs) or SSRIs may be needed.

Nightmares should be differentiated from sleep terrors as summarised in Table 4:

Table 4 - Differences between sleep terror and nightmares

Charateristic	Sleep terror	Nightmares
Timing during the night	First third (deep slow wave sleep)	Last third (REM sleep)
Movements	Common	Rare
Severity	Severe	Mild
Vocalisations	Common	Rare
Autonomic discharge	Severe	Mild
Injuries	Common	Rare
Recall	Absent	Present
State on waking	Confused/ disoriented	Function well
Displacement from bed	Common	Rare

2. Recurrent Isolated Sleep Paralysis

Sleep paralysis is defined as an inability to perform voluntary motor function at sleep onset or on awakening. The disorder occurs at least once in a lifetime in 40%-50% of normal individuals. Patients report scary episodes in which movements of the skeletal muscles are not possible, although respiratory and ocular movements and cognition usually remain intact. Episodes last a few minutes and may be aborted spontaneously or on external stimulation.

Predisposing factors include acute sleep deprivation and sleep-wake cycle disturbances (shift work, jet lag). The underlying cause for sleep paralysis may be attributed to abnormalities in the mechanism controlling REM sleep muscle atonia and it is probably a result of abnormal activation of limbic system structures.[12]

Pharmacotherapy for sleep paralysis is often not required when episodes are infrequent and in most cases reassurance is all that is needed. Management is most successful when patients avoid irregular sleep schedules but when sleep paralysis is severe, the use of anxiolytic medications and fluoxetine may be indicated

3. REM Sleep Behaviour Disorder

In a person with REM sleep behaviour disorder (RBD), the paralysis that normally occurs during REM sleep is incomplete or absent, allowing the person to "act out" his or her dreams. RBD is characterised by the acting out of dreams that are vivid, intense, and violent. Dream-enacting behaviours include talking, singing, shouting to more complex motor phenomena such as walking, running, punching, kicking, jumping and violent agitated behaviours that correlate with the reported aggressive dreaming experience.[13] The injury associated with the spells is often what brings the patient to the care and attention of the physician.

Patients with RBD may experience their episodes as early as 90 minutes after falling asleep and more frequently during the second half of night, as REM sleep is denser in the later part of the night. The frequency of episodes varies from once a month to every night episodes, which result in more significant sleep-disruption and are more likely to be brought to medical attention.

RBD may be further classified into an acute and a chronic form.

a) Acute form : This is seen in the setting of substance or medication-related cases, injury of the central nervous system (stroke, demyelination), or metabolic derangements. The most common drug-

related forms include rapid withdrawal from alcohol, abrupt discontinuation of sedative hypnotics agents (which result in REM rebound), and cases related to TCAs, cholinergic agents, MAO inhibitors, biperiden, and SSRIs (resulting in loss of REM atonia).

b) Chronic form (idiopathic)

It is generally more frequent, occurs later in life, becomes progressively more severe with time, and eventually stabilises. Approximately 60% of patients who present with RBD are classified as idiopathic.

The prevalence of RBD is estimated to be 0.5%.[4] The disorder has an increased gender predilection in that it affects males more than females (9:1 ratio), and has a higher prevalence in older age, usually in men more than 60 years old. Subjective reports indicate that about 25% of patients with Parkinsonism have dream enactment behaviours suggestive of RBD, and sleep evaluation in patients of Parkinson disease who had sleep disturbances found RBD to be present in up to 47%.[14]

The criteria for RBD have been simplified in the ICSD 2014, and include:

(1) Repeated episodes of behaviour or vocalisation that are either documented by PSG to arise from REM or are presumed to arise from REM based on reports of dream enactment,

(2) Evidence of REM sleep without atonia characterised by abnormal elevation of limb or chin electromyography tone during REM sleep on PSG or when other clinical findings are strongly suggestive.

Management

Patients with RBD should be carefully assessed or risks for injury, because of the aggressive nature of the events and the potential for movement out of bed and violent behaviours. Active and passive safety measures along with environmental safety measures (Table 2), are a necessity in every patient with possible RBD who experiences aggressive spells and affliction of harm to the bed partner.

Pharmacotheray with clonazepam (0.25-1 mg at night), achieves improvement in most (90%) patients. RBD can also be treated with melatonin in doses between 3 and 12 mg at bedtime and is greatly effective. Other agents that may be helpful for RBD include imipramine (25 mg by mouth every bedtime), carbamazepine (100 mg by mouth 3 times a day) as well as dopamine agonists and precursors (i.e., pramipexole and levodopa, respectively).

The features of different types of REM parasomnias has been summarised in Table 5.

C. Other Parasomnias

1. Exploding head syndrome

This is a more dramatic, multisensory phenomenon that also occurs at sleep onset and it consists of a painless sensation of head explosion.[15] It is sometimes confused with a headache syndrome or even subarachnoid haemorrhage There is usually no actual movement associated with this parasomnia, but in one case series, two-

thirds of individuals noted muscle jerks or twitches, and over 80 percent noted tachycardia or sense of fear.[15]

Table 5 : Differentiating features of REM parasomnias

Clinical feature	Recurrent isolated sleep paralysis	REM Nightmares	REM sleep behaviour disorder
Age of onset (years)	**Variable**	**Child/ Adulthood**	**Older adults**
Time of occurrence	Upon awakening	Second half of the night	Second half of the night
Behaviour	Inability to move with preservation of eye and diaphragmatic movement	Vivid, disturbing dreams may end with a sudden jolt or jerk.	Sometimes combative, violent dream enactment with eyes closed.
Duration	Seconds to a minute	Seconds	Seconds to a minute
PSG	Arousal from REM sleep	Awakening our of REM sleep appearing distressed	Excessive EMG tone during REM sleep
Risk factors	None	associated with stress, psychological trauma, or medication effect	Associated with parkinsonism, narcolepsy, or medications

2. Sleep related hallucinations

These are sensory phenomena, most commonly visual, but can also be tactile, auditory, or kinetic with sensation of falling associated with sleep.

They can be isolated or associated with hypnic jerks which consist of a sudden, brief jerk of the whole body or one or more segments at sleep onset. It is often associated with the sense of falling.

Sleep related hallucinations are of two types:

- **Hypnogogic hallucinations:** They occur when the patient is falling asleep.
- **Hypnopompic hallucinations:** They occur when the patient is waking up from sleep.

3. Sleep enuresis also called Nocturnal enuresis

Sleep enuresis or nocturnal enuresis is defined as discrete episodes of urinary incontinence during sleep atleast twice per week. Enuresis can occur in all stages of sleep including the sleep wake transition. It is of two types:

- **Primary enuresis:** It refers to a child who has never achieved a period of dryness at night. This form is most common and has a strong familial pattern.
- **Secondary enuresis:** describes a child who develops enuresis after a period of six or more months of nighttime dryness. Secondary enuresis is more likely to be associated with acquired factors such as urinary tract infection, diabetes mellitus, OSA, diabetes insipidus, and psychological disturbances such as a stressful event.

The possibility of OSA should be considered in children presenting with nocturnal enuresis, particularly if they have one or more of the following characteristics:

- Habitual snoring or observed apnoeas
- Obesity
- Adenotonsillar hypertrophy and/or mouth-breathing
- Secondary enuresis

Among children with enuresis and OSA, the enuresis usually resolves, if the OSA is treated.

4. Parasomnia due to a medication or a substance

A variety of nocturnal events can be caused or exacerbated by medications or substance abuse. Some hypnotics with short half-lives, such as zolpidem, have been implicated in initiating complex sleep-related behaviours such as sleep-related eating, sleepwalking, and even driving.[16]

5. Parasomnia due to a medical condition

It is the manifestation of parasomnia associated with underlying medical or neurologic disorder e. g. parkinsonism, demyelination and stroke.

6. Parasomnia unspecified

Parasomnia unspecified occurs as a manifestation of underlying psychiatric disorder. There is significant increased rates of parasomnias, like nightmares, sleep paralysis, sleep walking in people with psychiatric illness such as schizophrenia, bipolar disorder as well as mood and anxiety disorders.[17]

Nocturnal frontal lobe epilepsy - Parasomnia mimic - A diagnosis not to be missed

In some people, the signs and symptoms of nocturnal frontal lobe epilepsy may closely mimic that of a parasomnia and may pose a diagnostic challenge. The episodes are sudden, brief, spanning less than a minute in duration with little or no ictal confusion and occur exclusively or mainly during sleep.[18] The main distinguishing features between parasomnias and nocturnal seizures are shown in Table 6.

Table 6 : Differentiating patterns between NFLE and parasomnias on history

	Normal Frontal Lobe Epilepsy	**Parasomnia**
Duration	< 2 minutes	> 10 minutes
Number of events	Multiple events per night	Only one or 2 events per night
Complexity	Complex behaviour uncommon	Complex behaviour common. Often movement out of bed
Recall	Often full recall of event and speech	Event and speech during event not recalled

Approach to a patient with parasomnia

1. A detailed history from the patient and especially from the partner / witness of these events can provide valuable insight and lead to correct diagnosis, gratifying management, and preventive and safety interventions.
2. Home-made video recordings, if available can be used to give support to the presumptive diagnosis.
3. Ask about childhood and family history of parasomnias.
4. Ask about time of night when symptoms occur and whether the patient recalls associated dreams.
5. Factors that may precipitate NREM parasomnias as mentioned earlier should be explored, including comorbid obstructive sleep apnoea, periodic limb movements of sleep, and temporal association with certain medications.
6. Neuroimaging is typically not required in most patients with parasomnias, but may be necessary in patients with focal findings on, neurologic examination or

atypical features (e.g., younger women with dream enactment behaviour. The sleep specialist will determine whether the patient needs an MRI of the brain or a neurologic work up.

Role of overnight polysomnography

PSG can provide important information in determining the aetiology of the noctumal events; it captures the physiology of each sleep state and evaluates the possibility of other contributing sleep disorders.

The nocturnal PSG is not required for diagnosing NREM parasomnias and parasomnias like exploding head syndrome and nocturnal enuresis.

Indications for PSG in patients of parasomnias include

1. Atypical presentation for a parasomnia (age of onset, time of night, behavioural description)
2. There is concern about injury to the patient or spouse
3. Patient also has excessive daytime sleepiness or complaints of insomnia
4. When there is suspicion for coexistent sleep disorders like sleep apnoea, periodic limb movements, narcolepsy or other sleep disorders
5. There is a high level of suspicion for an underlying seizure disorder.

When to refer to a Respiratory Physician / Sleep Specialist?

1) If the general physician is not well-versed with parasomnias and its treatment, then any patient who experiences abnormal motor, behavioural, or sensory K experiences during sleep or arousal should be referred to a sleep specialist for further evaluation
2) If the general physician is well versed with parasomnias and its treatment, and if the patient is a child who presents with parasomnias like confusional arousals, sleep terror, sleep walking, nocturnal enuresis and nightmares, then these can be initially managed by that general physician
3) Parasomnias like REM behaviour disorder and REM paralysis must be referred to a sleep specialist
4) All patients with adult onset parasonmias (NREM and REM) need to be referred to a sleep specialist for an evaluation.
5) Referral to a sleep specialist is a MUST, if treatment of any parasonmia is ineffective, the risk of harm to the patient or partner is significant, the symptoms are atypical or the diagnosis is unclear.

Conclusion

Parasomnias are common in the general population. These parasomnias arise as brain transitions between NREM sleep, REM sleep, and wakefulness. Parasomnias can be accurately diagnosed and effectively treated. Certain parasomnias may indicate the onset of serious medical disorders. In most cases, ensuring good sleep hygiene measures, avoiding sleep deprivation, reducing stress, treating primary sleep disorders, and ensuring patient safety are very effective measures and provide adequate relief of symptoms. When episodes cause

distress, are frequent, and/or impose danger to the patient or their bed partner, effective pharmacotherapeutic measures are available.

Bibliography

1. International Classification of Sleep Disorders, 3rd ed, American Academy of Sleep Medicine, Darien, IL 2014.
2. Furet O, Goodwin JL, Quan SF. Incidence and Remission of Parasomnias among Adolescent Children in the Tucson Children's Assessment of Sleep Apnea (TuCASA) Study. *Southwest J Pulm Crit Care* 2011; 2:93.
3. Ohayon MM, Guilleminault C, Priest RG. Night terrors, sleepwalking, and confusional arousals in the general population: their frequency and relationship to other sleep and mental disorders. *J Clin Psychiatry* 1999; 60(4):268-76 [quiz 277].
4. Ohayon MM, Caulet M, Priest RG. Violent behavior during sleep. *J Clin Psychiatry* 1997; 58(8):369-76 [quiz: 377].
5. Mahowald MW, Ettinger MG. Things that go bump in the night: the parasomnias revisited. *J Clin Neurophysiol* 1990; 7(1):1 19-43.
6. American Academy of Sleep Medicine. The international classification of sleep disorders: diagnostic and coding manual. 2nd edition. Westchester (IL): American Academy of SleepMedicine; 2005 .p. 139-47.
7. Ohayon MM, Priest RG, Zulley J, et al. The place of confusional arousals in sleep and mental disorders: findings in a general population sample of 13,057 subjects. *J Nerv Ment Dis* 2000; 188(6):340-8.
8. Mehlenbeck R, Spirito A, Owens J, et al. The clinical presentation of childhood partial arousal parasomnias. *Sleep Med* 2000; 1 (4): 307-12.
9. Pillmann F. Complex dream-enacting behaviour in sleepwalking. *Psychosom Med* 2009; 71(2):231-4.
10. Mahowald MW, Cramer-Bornemarm M. NREM sleep-arousal parasomnias. In: Principles and practice of sleep medicine, 4th edition. 2005. p. 889-96.
11. Levin R, Fireman G. Nightmare prevalence, nightmare distress, and self-reported psychological disturbance. *Sleep* 2002; 25(2):205-12 A.
12. Buzzi G, Cirignotta F. Isolated sleep paralysis: a web survey. *Sleep Res Online* 2000; 3(2):61-6.
13. Schenck CH, Mahowald MW. Polysomnographic, neurologic, psychiatric, and clinical outcome report on 70 consecutive cases with REM sleep behaviour disorder (RBD): sustained clonazepam efficacy in 89.5% of 57 treated patients. *Cleve Clin J Med* 1990; 57 (Suppl):s9-23.
14. Comella CL, Nardine TM, Diederich NJ, et al. Sleep-related violence, injury, and REM sleep behavior disorder in Parkinson's disease. *Neurology* 1998; 51:526-9.
15. Sharpless BA. Characteristic symptoms and associated features of exploding head syndrome in undergraduates. *Cephalalgia* 2018; 38:595.
16. Chen LF, Lin CE, Chou PYC, et al. A comparison of complex sleep behaviors with two short-acting Z-hypnosedative drugs in nonpsychotic patients. *Neuropsychiatr Dis Treat* 2013; 9:1159.
17. Waters F, Moretto U, Dang-Vu TT. Psychiatric Illness and Parasomnias: a Systematic Review. *Curr Psychiatry Rep.* 2017; l9(7):37.

Visible and non-visible haematuria may herald serious disease

Haematuria is important as both visible and non-visible haematuria may herald serious pathology (e.g. malignancy or vasculitis), and also because it is common. It is estimated that for every thousand patients registered in primary care five will consult with visible haematuria per annum, with the prevalence of asymptomatic non-visible haematuria in the UK being approximately 2.5%.

The pathophysiology of haematuria depends on whether the blood loss originates from the nephron (glomerular haematuria) or from any distal part of the urinary tract (extra-glomerular).

The Practitioner, 2018, Vol 262;1812-11-15