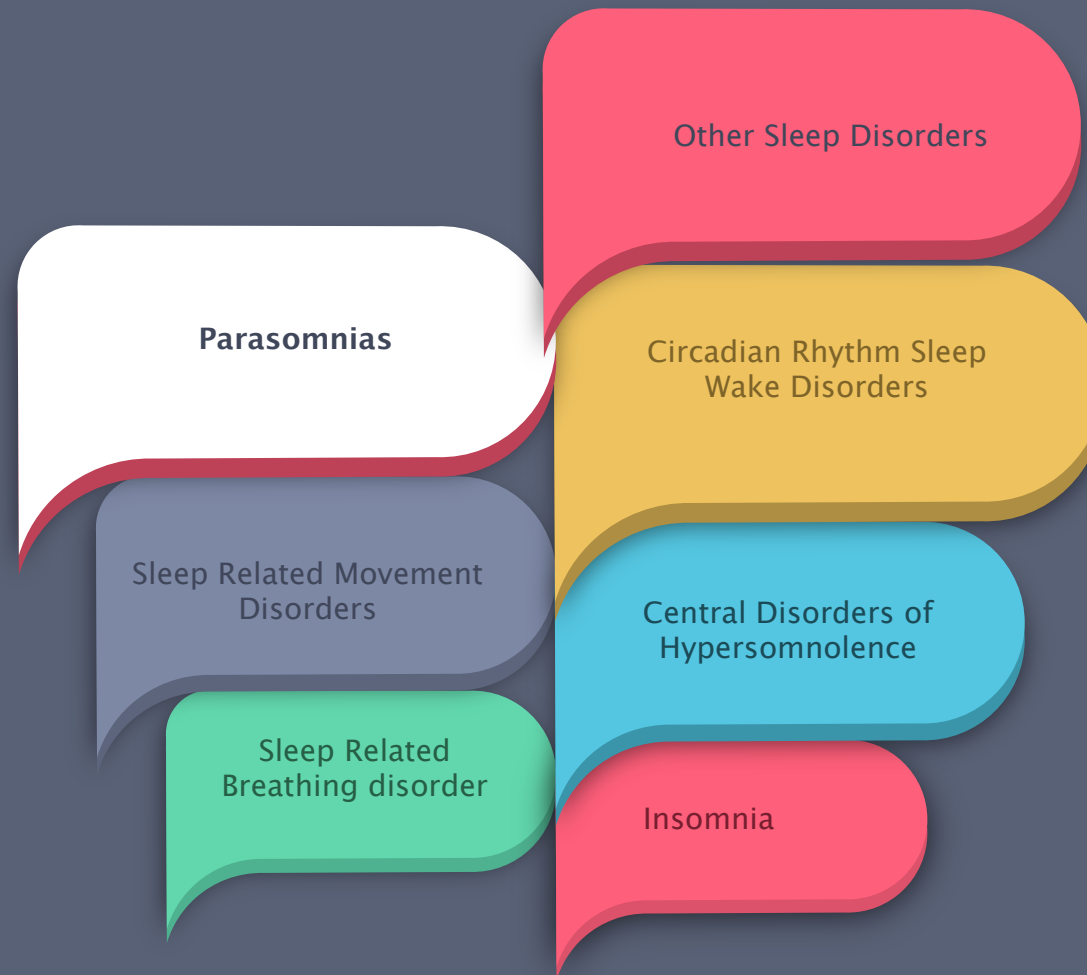


REM Sleep Behavior & Other Parasomnias

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International Classification of Sleep Disorders (ICSD)



Objectives

Overview of Parasomnias

NREM Parasomnias

Nocturnal Frontal Lobe Seizures
vs NREM Parasomnias

REM Sleep Behavior Disorder

Quick History



Long time ago.....

- Parasomnias : unresolved emotional conflict
- Sigmud Freud: Sleepwalking represented an attempt to fullfill an unconscious desire

1924 Hans Berger

Invented the first electroencephalogram!

1936

Harvey and Lewis described the characteristics of the different stages of Sleep

1953 Eugene Aserinsky

Application of newly developed EOG (electro-oculography)
Eugene Aserinsky and Nathaniel Kleitman at the University of Chicago first described REM sleep

Sleep Lab 1970

First Clinical Sleep Laboratory was Developed in Stanford

1980 Carlos Schenck, MD

First reported on dream-enacting behavior primarily affecting middle aged men.....RBD

Antonio Culebras, MD 1989

First to describe RBD secondary to stroke in the ponto- mesencephalic tegmentum

TODAY

> 80 identified Sleep Disorders
- Parasomnias are viewed as a disruption in the sleep cycle leading to incomplete awakenings

Present



What are Parasomnias?

- “PARA” – Alongside of
“SOMNUS” – Sleep
- Occur during entry into sleep,
within sleep or during
arousals from sleep
- Involve complex, seemingly
purposeful, goal directed
behaviors WITHOUT
consciousness

The Nightmare: Henry Fuseli, 1781

Sleep Stages



NREM

REM

NREM Parasomnias

CONFUSIONAL AROUSALS

- Children age < 5
- Slow speech & mild agitation
- Moaning, crying
- Lasts 5 - 10 minutes
- Attempts at awakening the patient may prolong event

SLEEP WALKING

- onset age 4 - 8 years
- 2 % of the adult population
- Motor Behaviors : Simple to Complex
- Purposeful movements
- Amnesia +/- partial recall

SLEEP TERRORS

- 15% of children between age 3 - 10 years
- Usually resolve by mid teen years
- Most dramatic
- Abrupt cry followed by autonomic and Behavioral fear
- Can last 5 to 15 minutes
- May appear awake with eyes open
- Clumsy purposefull movements

SEXOMNIA

- Sleep related abnormal sexual behavior
- Variant of confusion arousal
- Sexual behaviors WITHOUT awareness of intention
- occurs 1 - 2 hours after sleep onset
- Occur in isolation or in association with sleep walking
- Medial legal issues

NREM Parasomnias

- Represent a spectrum of behaviors produced by a faulty arousal system
- Most common in childhood but may persist into adulthood
- Amnesia for the event is characteristic
- Attempts to awaken the patient may prolong the episode
- Genetic predisposition
 - Sleep walking 6 x more common in monozygotic twins than in dizygotic twins *
 - Sleep terrors 2 x more common in children whose parents experienced sleep walking compared to children whose parents did not **

* Kolwin H. Sleep-walking in twins. *Lancet* 1970; 2:446.

* Petit D, Pennesri MH, Paquet J, et al. Childhood Sleepwalking and Sleep Terrors: A Longitudinal Study of Prevalence and Familial Aggregation. *JAMA Pediatr* 2013; 167:643.


** Hublin C, Kanto J. Genetic aetiology and genetic epidemiology of parasomnias. *Sleep Med Rev* 2003; 7:413.

Pathophysiology of NREM

 Incomplete awakening from sleep


 Active: Motor Strip
Inactive: Prefrontal & Midtemporal

SPECT During a Sleep Walking Episode

 **Increase** blood flow:
– Cerebellum
– Posterior Cingulate Cortex

Decrease blood flow:
– Frontoparieteal cortex

Evaluation of the Dangerous Dreamer

 Comprehensive Clinical history of the typical event provided by the patient and the bed partner including:

- Timing
- Frequency
- Semiology
- Evolution

The Frontal Lobe Epilepsy and Parasomnia Scale



Score

0 or less : NREM parasomnia

1 – 2: Indeterminate

≥ 3: NFLE



In initial validation studies NFLE
was reliably diagnosed:

100 % sensitivity

90 % specificity



When diagnosis remains
uncertain:

– VEEG

– Polysomnogram

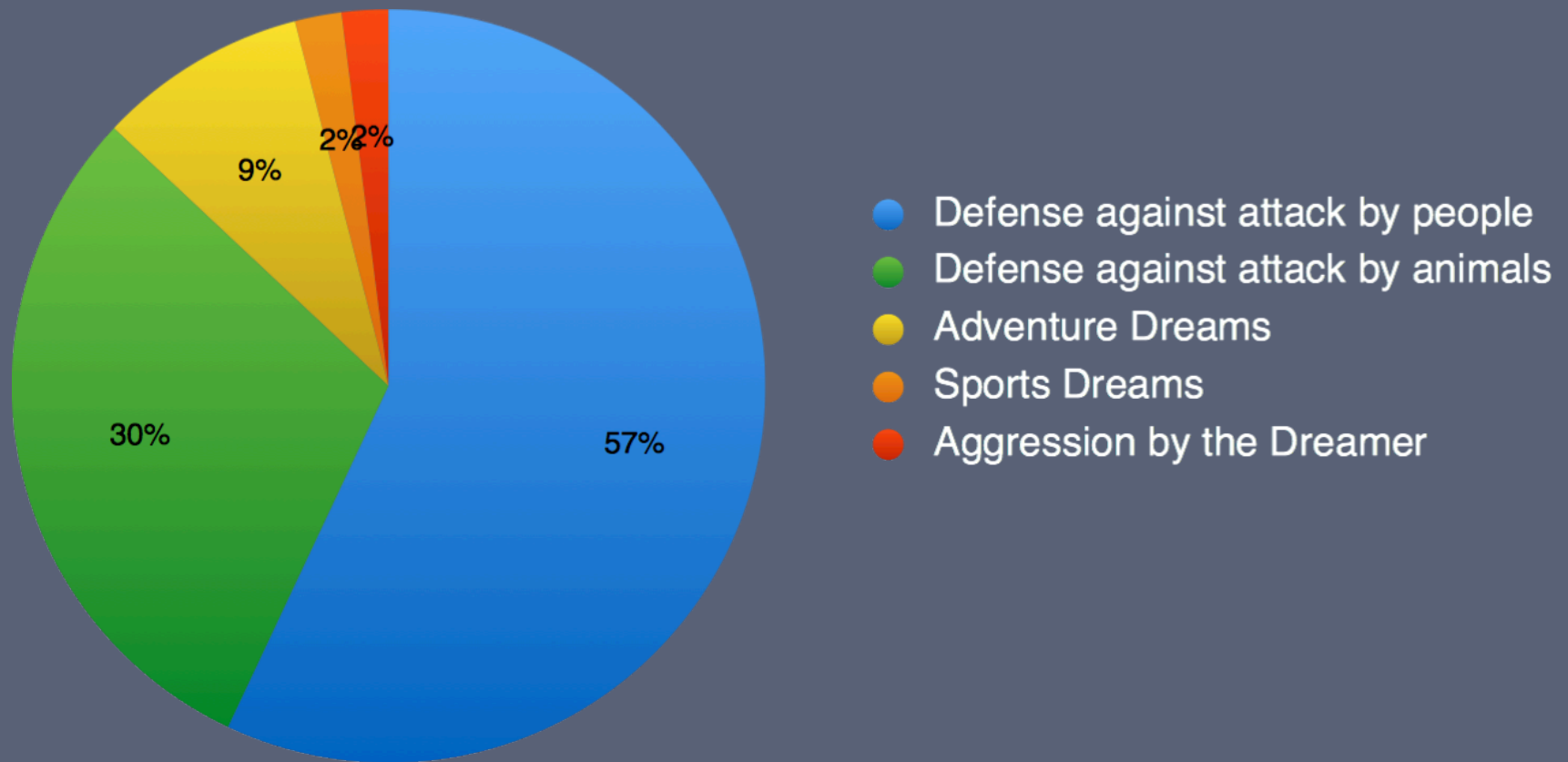
Management

- Treatment depends on frequency and severity of events
Most patients do not require pharmacological treatment
- Safety Precautions
Sleep Hygiene
Avoid precipitating factors: alcohol and sleep deprivation
- If episodes are frequent and self injurious:
 - Clonazepam 0.5 – 1 mg , 1/2 hour prior to bedtime*
 - Melatonin 3 – 10 mg

REM Sleep Behavior Disorder

- Unique parasomnia characterized by dream enactment behavior associated with loss of muscle atonia in REM sleep
- Occur > 90 min after sleep onset and predominantly in the 2nd half of the night

Frequency of Reported Behaviors During RBD Dream Enactment Events



Olson E, Boeve B, Silber M. Rapid eye movement sleep behavior disorder: demographic, clinical, and laboratory findings in 93 cases. *Brain* 2000;123:331-9.

Epidemiology of RBD

- Onset ~ age 50
- 9 x more common in men
- Affects approximately 0.5 % of general population*



35 Million
Affected

Pathophysiology

RBD Diagnostic Criteria

ICSD III - 2015

- Repeat episodes of sleep related vocalization and/or complex motor behaviors
- These behaviors are documented by polysomnography to occur during REM sleep or, based on clinical history of dream enactment, are presumed to occur during REM Sleep
- Polysomnographic recording demonstrates REM sleep without atonia
- The disturbance is not better explained by another sleep disorder, mental disorder, medication or substance use.

Causes of RBD



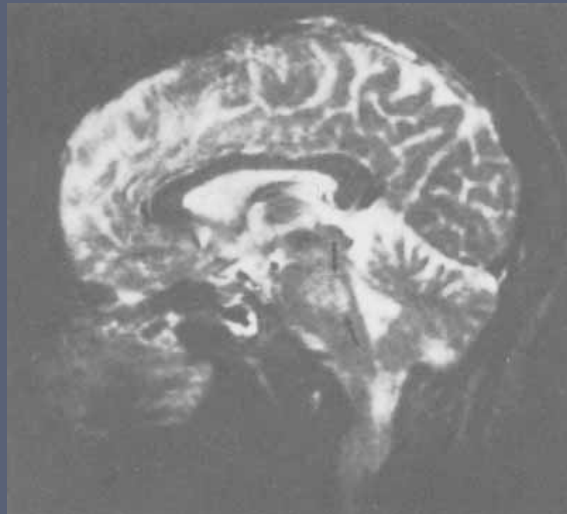
Lesions affecting REM generator centers in the Brainstem

- Multiple Sclerosis
- Tumors
- Stroke



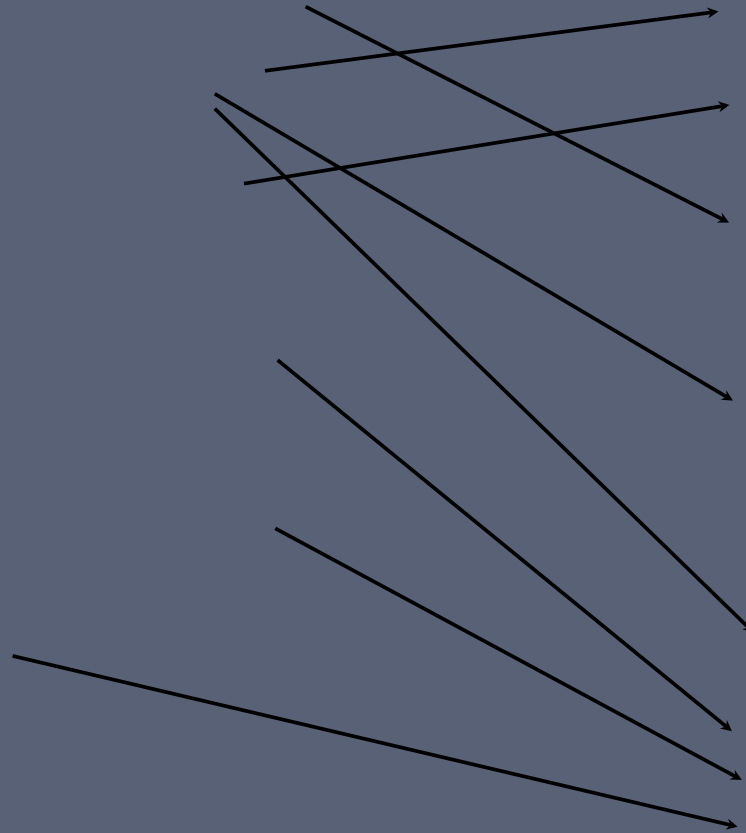
Drugs: Psychotropics and Antidepressants

- SSRIs
- SNRI's: **Venlafaxine and TCA's**



Culebras, Antonio MD; Moore, James T. RPSGT [Magnetic resonance findings in REM sleep behavior disorder.](#) *Neurology.* **39(11)**:1519-1523, November 1989.

Polysomnogram



Polysomnogram

Management Safety Precautions

- Door alarms & Locks
- Barricade & Cover Windows
- Remove sharp objects
- Lock firearms
- Sleep in Sleeping bag
- Place mattress on the floor

Safety for the Patient & Bed Partner

Schenck, C. H., Lee, S. A., Bornemann, M. A. C. and Mahowald, M. W. (2009), Potentially Lethal Behaviors Associated With Rapid Eye Movement Sleep Behavior Disorder: Review of the Literature and Forensic Implications. *Journal of Forensic Sciences*, 54: 1475–1484. doi: 10.1111/j.1556-4029.2009.01163.x

Safety for the Patient & Bed Partner



Rapid eye movement sleep behaviour disorder:
demographic, clinical and laboratory findings in
93 cases

Eric J. Olson,^{1,2} Bradley F. Boeve^{1,3} and Michael H. Silber^{1,3}

53

spouses reported being assaulted
64 % of 83 patients with sleeping partners

13

reported injuries caused by punching, slapping, kicking,
pulling hair

2

reported strangulation

12

(15%) chose to sleep in a separate room

Pharmacological

Clonazepam*

- 0.25 mg to 2 mg QHS
- MOA: suppression of phasic motor activity
- 80 to 90 % success rate

Melatonin**

- 3 to 12 mg QHS
- restored atonia and improved symptoms in ~ 85 % of patients

Treatment of co-morbid sleep disorders

RBD and Neurodegenerative Disorders



Associated with the development of alpha synucleinopathies later in life :

- Parkinson's Disease
- Dementia with Lewy Bodies
- Multiple system atrophy



Thought to be related to the pathological involvement of common brainstem structures including nigraostriatal complex, locus coeruleus and raphe nucleus. *

Disclosure of Risks?

- Should the physician disclose the risk of neurodegenerative disease?
- Whether to break such news to patients should NOT be the question. Instead the determination of when and how to do it is important.
- Early disclosure appears to be the best approach

What is the risk of Neurodegenerative Disease?

1996: Schenck first reported the delayed emergence of Parkinsonian disorder or Dementia in 38 % of patients originally diagnosed with idiopathic RBD (mean interval of 13 years) *

Postuma et al, 2009



Schenck et al, 2013



Iranzo et al, 2014





- RBD may precede the diagnosis of a neurodegenerative disorder by up to **50 years** *
- with a mean latency of **12.7 years** from onset of RBD to the first manifestation of neurodegeneration **
- Future Implications:
 - Ongoing research to develop Neuroprotective agents to delay/stop the phenoconversion

*Claassen DO, Josephs KA, Ahlskog JE, et al REM sleep behavior disorder preceding other aspects of synucleinopathies by up to half a century. Neurology 2010;75(6): 494Y499

**Schenck CH, Mahowald MW. REM sleep behavior disorder: clinical, developmental, and neuroscience perspectives 16 years after its formal identification in SLEEP. Sleep 2002;25(2):120Y138

Summary

- Characterizing the nature of complex nocturnal behaviors is one of the most difficult to diagnostic challenges in sleep medicine
- Comprehensive clinical history is required to distinguish between NFLE and Parasomnias
- When in doubt refer for evaluation:
Upstate Sleep Clinic: Polysomnogram
Community EMU: Video EEG

The background of the image is a deep blue night sky filled with numerous stars of varying sizes and brightness. Some stars are very bright and have prominent diffraction spikes, while others are smaller and dimmer. In the lower half of the image, there are soft, wispy clouds in shades of light blue and white, partially obscuring the stars. The overall mood is serene and celestial.

Thank You