Why discuss sleep in dementia?

- Frequently comorbid in neurologic disease
- Have a bidirectional relationship with neuralgic disease
- Has prognostic implications for neurologic disease
- Sometimes overlooked or dismissed by neurologists
### Risks for Nursing Home Placement in Men

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Relative Risk</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep</td>
<td>5.3</td>
<td>1.7-16.1*</td>
</tr>
<tr>
<td>Age &gt; 74</td>
<td>1.3</td>
<td>0.0-4.3</td>
</tr>
<tr>
<td>ADL Impairment</td>
<td>2.6</td>
<td>0.9-8.6</td>
</tr>
<tr>
<td>Fair-Poor Health</td>
<td>0.8</td>
<td>0.2-2.8</td>
</tr>
<tr>
<td>Low Income</td>
<td>1.4</td>
<td>0.4-4.6</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>4.6</td>
<td>1.4-15.2*</td>
</tr>
<tr>
<td>Depression</td>
<td>1.0</td>
<td>0.2-4.7</td>
</tr>
<tr>
<td>Living Alone</td>
<td>2.0</td>
<td>0.6-6.2</td>
</tr>
</tbody>
</table>


---

### Sleep Disturbances with Aging

- **Respondents (%):**
  - 16-19: 50
  - 20-29: 40
  - 30-39: 30
  - 40-49: 20
  - 50-59: 10
  - 60-69: 5
  - >70: 1

![Graph showing sleep disturbances with aging](image)

### Number of people age 65 and over, by age group, selected years 1900-2000 and projected 2010-2050

- **Note:** Data for 2010-2050 are projections of the population. Reference population: Those data refer to the white population. Source: U.S. Census Bureau, Determined Census and Projections.
Increased likelihood for institutionalization
Irritability
Impaired motor or cognitive skills
Daytime somnolence
Depression, anxiety
Disruption of home environment
Increase use of medications & health visits

Sleep Disorders as Risks for NH Placement

Sleep Disruption

External factors
Internal factors

Sleep Disruption

Extrinsic factors

★ periodic environmental stimuli
★ Inactivity
★ Environmental factors: Excessive noise & light
★ Nursing care activities


Intrinsic Factors

**Illness:**
- Dementia
- Depression / medical illness
- Medications

**Age related increased:**
- Changes in sleep architecture
- Changes in the internal circadian clock
- Increased prevalence of 1st sleep disorders

**Pathogenic Mechanism of Sleep Disturbances in Dementia**

<table>
<thead>
<tr>
<th>Direct</th>
<th>Indirect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Alterations: Brain areas involved in the Regulation of sleep</td>
<td></td>
</tr>
<tr>
<td>Preoptic Nucleus: Insomnia</td>
<td></td>
</tr>
<tr>
<td>Post. Hypothalamus/ Reticular Activating System: Hypersomnia</td>
<td></td>
</tr>
<tr>
<td>SCN: Circadian Rhythm Disturbances</td>
<td></td>
</tr>
<tr>
<td>Pedunculopontine Nucleus: RBD</td>
<td></td>
</tr>
<tr>
<td>Underlying Medical/ψ Conditions/Tx</td>
<td></td>
</tr>
<tr>
<td>Medications (i.e DA, anticholinergics)</td>
<td></td>
</tr>
<tr>
<td>Physical Immobility, Tremor, Rigidity,</td>
<td></td>
</tr>
<tr>
<td>Frequent Nocturia</td>
<td></td>
</tr>
<tr>
<td>Excessive Nocturnal Motor Activity (PLMS, RBD)</td>
<td></td>
</tr>
</tbody>
</table>
Sleep Disorders in Dementia: Neuronatomical Pathways-1

Decreased Light exposure

Cataracts

Macular Degeneration

Lens

Retina-Macula

Retino-hypothalamic Tract

Suprachiasmatic nucleus

Pineal Gland

Excessive Noise Inappropriate light Exposure

Melatonin Level

Underlying Sleep Disorders: OSA, RLS, PLMD and Psychiatric Disorders

Sleep Disorders in Dementia: Neuronatomical Pathways-2

Circadian Rhythm Disruption

Atrophy of the SCN

pedunculopontine tegmental & laterodorsal tegmental nuclei

Degeneration of the Peri-locus Coeruleus

Degeneration of respiratory neurons:

Degeneration of the brainstem respiratory neurons and the supramedullary respiratory pathways

Risk for SDB

Autonomic dysfunction

Avidan, A.Y. Rev Neurol Dis, 2007

“Hallmark” Sleep Disorders

<table>
<thead>
<tr>
<th>Amyloidopathy</th>
<th>Synucleinopathy</th>
<th>Tau-opathy</th>
<th>TDP-43-opathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alzheimer disease</td>
<td>Parkinson disease</td>
<td>Frontotemporal dementias</td>
<td>ALS</td>
</tr>
<tr>
<td></td>
<td>Lewy Body dementia</td>
<td>Progressive Supranuclear Palsy</td>
<td>Frontotemporal Dementia (FTLD-U)</td>
</tr>
<tr>
<td></td>
<td>Multiple System Atrophy</td>
<td>Corticobasal Degeneration</td>
<td></td>
</tr>
<tr>
<td>Insomnia</td>
<td>Insomnia</td>
<td>None characteristic (all possible, but tend to be less prominent)</td>
<td>ALS: SDB</td>
</tr>
<tr>
<td>Circadian Rhythm changes</td>
<td>Excessive Somnolence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somnolence later</td>
<td>REM sleep behavior disorder</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sleep Disorders in Neurodegeneration: The General Rule

- Amyloidopathies
  - Circadian rhythm disturbances (sundowning)
  - Sleep breathing disorders

- α-Synucleonopathies
  - Hypersomnolence
  - Sleep breathing disorders
  - Parasomnias: RBD

Alzheimer’s Disease

Sleep disturbances & cognitive dysfunction are positively correlated

Sundowning
OSA

Bost, P.J., et al. Science. 2005

The awake and the sleeping brain of mice

Nightly Flushing Of The Brain
Sleep and AD pathology—A Bidirectional Relationship

Sleep deprivation increases \([A\beta]\) ➤ chronic accumulation of \(A\beta\)
Sleep extension has the opposite effect.

Yo-El S. Ju, Lucey, PB, Holtzman, DM

Implications:
- AD & other Neurodegenerative Diseases
- Role of Hypnotics
- Untreated sleep Disorders — OSA
- Consequences of chronic sleep deprivation — Insomnia
- Shift workers, physicians on call

Polysomnographic Findings in AD

<table>
<thead>
<tr>
<th>LESS</th>
<th>MORE</th>
<th>UNCHANGED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep efficiency</td>
<td>Awakenings</td>
<td>Stage N2 %</td>
</tr>
<tr>
<td>Slow wave sleep</td>
<td>Stage N1 Sleep</td>
<td>Other REM features</td>
</tr>
<tr>
<td>Stage N2 hallmarks  - spindles  - K complexes</td>
<td>REM %</td>
<td>REM atonia</td>
</tr>
</tbody>
</table>

Brez, M.H. et al. Semin Neurol, 2005

Early Bedtime
Advanced Cognitive Impairment
Use of Sedatives
Underlying Medical Problems
Unfamiliar sleeping environments
Sundowning

Implications:
- AD & other Neurodegenerative Diseases
- Role of Hypnotics
- Untreated sleep Disorders — OSA
- Consequences of chronic sleep deprivation — Insomnia
- Shift workers, physicians on call
Almost every patient will present with a sleep disturbance:

- Insomnia is the most common complaint
- Immobility in bed
- Absence of or ↓ REM sleep
- RBD & SDB are rare

Progressive Supranuclear Palsy

Sleep in Parkinson’s Disease

Clinical Symptoms of Parkinson’s Disease

Cognitive Impairment

<table>
<thead>
<tr>
<th>Percent of Patients</th>
<th>Sleep Disorders</th>
<th>Pain</th>
<th>Depression</th>
<th>Psychosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>60</td>
<td>50</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>
RBD is most commonly associated with neurodegenerative disease, particularly α-Synucleinopathies:

- Parkinson’s disease
- Dementia with Lewy Bodies
- Multiple System Atrophy
Chronic Behavioral Disorders of Human REM Sleep: A New Category of Parasomnia

Carlos H. Schenck, Scott R. Bundlie, Milton G. Ettinger, and Mark W. Mahowald

Minnesota Regional Sleep Disorders Center, Hennepin County Medical Center, University of Minnesota, Minneapolis, Minnesota, U.S.A.

Summary: Four men, aged 67–72 years, had 4-month to 6-year histories of injuring themselves or their spouses with aggressive behaviors during sleep, often during attempted dream enactment. A 60-year-old woman had disruptive

★ 1965--> Cats with lesions in the perilocus coeruleus nucleus demonstrated prominent motor activity during REM sleep = REM without atonia

★ 1986--> First reports publication of RBD in humans

The Semiology of RBD

REM Sleep

Sudden Arousal

Rapid return to baseline +/- Recall

Possible injury

Lasts 30 sec - 3 minutes

Complex Behavior
Pathophysiology of REM Sleep Behavior Disorder

**Pedunculopontine Nuclei**

**Peri-Locus Ceruleus**

**Spinal Cord**

**Ventrolateral Reticulospinal Tract**

**Muscle**

**Medullary Reticular Formation**

**Magnocellular neurons**

**Lateral Tegmentoreticular Tract**

**Spinal Motor Neuron**

**REM-associated Atonia**

**Lack of REM Atonia**

**RBD**

Lack of pontine-mediated medullar inhibition of spinal motor neurons

Lack of medullary-mediated spinal motor neuron inhibition

**Note:** Lack of muscle atonia in chin & limb EMG

---

**RBD Diagnostic Requirement**

Suspected clinically, confirmed by PSG

**Diagnostic Criteria:**

- **PGS abnormality:** Elevated EMG tone during REM sleep in either submental or limb leads.
- **Either a history of dream enactment behavior or observation** of abnormal REM sleep behavior during the PSG.
- **Absence of EEG epileptiform activity** during REM sleep.
- **The disturbance in not explained by another sleep/medical/neurological/mental disorder, and is not related to medication/substance use.**

**ICSD-II = ICSD III**

---

**Polysomnography of REM Sleep Behavior Disorder**

**Note:** Lack of muscle atonia in chin & limb EMG
**Polysomnography of REM Sleep Behavior Disorder**

- Dense & High voltage REM
- Desynchronized EEG typical of REM sleep
- Obliteration of muscle atonia in limbs and chin
- >27% RWA in a 30 second

**Proper RBD Etiquettes**

**REM Sleep Without Atonia (RSWA):**
Electrographic finding of EMG augmentation during REM Sleep

**Dream Enactment Behavior:**
Behavior exhibited during sleep that is interpreted by the observer as acting out dreams

**REM Sleep Behavior Disorder:**
RSWA +/- complex behaviors during REM sleep in patients with recurrent dream enactment.

Boeve BF, Brain, 2007

**Why Order Sleep Studies in RBD?**

1. RBD is the single parasomnia requiring PSG confirmation.

2. Readily available assay for confirmation of RBD and exclusion of RBD Mimes

1. RBD heralds the future diagnosis of a-synucleinopathies: Dx is crucial in the neurologic f/u of these patients.

1. Dream-enacting behaviors are not unique to RBD-may be seen OSA, Non-REM parasomnias & nocturnal seizures.
A 78 y/o man with no significant past medical history develops 2 episodes of dream enactment behaviors and is confirmed to have REM sleep without atonia on a sleep study. The next step is to:

(A) Do not tell the patient that he may develop dementia as the likelihood is too low given the infrequent episodes.

(B) Tell him that he will develop Parkinson's disease within a 10 year interval.

(C) Inform the patient that he may have a 50% chance of developing an alpha synucleopathy within a decade.

(D) Place the patient on Melatonin and clonazepam nightly & watch for the development of dementia.

**RBD Predicts Neurodegeneration**

Mean interval between RBD onset and emergence of a Parkinsonian disorder (presumably PD): 12.7 + 7.3 years

-Kaplan-Meier Curve-

Postuma, et al Neurology 2009

61 y/o with dream enactment
Dr. Jekyll & Mr. Hyde syndrome

Treatment for RBD

- Safety is the first step before any pharmacologic intervention
  - Formal Neurological Exam
- Safety
- Pharmacologic intervention may not be needed if symptoms are intermittent/mild
- Clonazepam has most data - 90% effective.
- Melatonin
- Avoid aggravating Rx: SSRIs, SNRIs

RBD –Safety: Level A Evidence

- Modifying sleep environment: safety:
  - Bedroom Safe
  - Remove hard/sharp objects
  - Sleep in padded mattress
  - Place mattress on floor
  - Cover windows with heavy curtain
  - Use pillow barricades
- Until managed, sleep alone
- Sleep in sleeping bag until treated
### RBD – Clonazepam Tx: Level B

- Doses: 0.25-2mg QHS
- No evidence of tolerance
- Mechanism of action: suppression of phasic motor activity
- ~80-90% success rate
- Downside: (1) Long t ½ (2) Respiratory depression

### RBD-Melatonin Tx: Level B

- **Advantages**: Few Side effects, partial restoration of REM sleep atonia.
- 3mg partially restored atonia in 85% of those with I-REM (6/7). ¹
- 3-9mg improved symptoms in 13/15 I-RBD patients. ²
- 3-12mg improved symptoms in 12/14 of patients with RBD-associated with neurodegenerative disease. ³


### RBD-Melatonin Tx: How does it work?

- SCN- mediated rostral pontine restoration of REM sleep atonia
- Up regulation of glycine-mediated alpha motor neuron inhibitions
- REM sleep suppression

1. Kunz, 1997
2. Kunz, 1999
3. Takeuchi, 2001
Pharmacologic treatment of RBD

<table>
<thead>
<tr>
<th>Drug (*)</th>
<th>Dose</th>
<th>Level of Recommendation</th>
<th>Special considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonazepam</td>
<td>0.25-4.0 mg before bedtime (usual recommended dose is 0.5-2.0 mg).</td>
<td>Suggested (*)</td>
<td>Use with caution in patients with dementia, gait disorders, or concurrent sleep disorders. Side effects include sedation, impotence, urinary incontinence, confusion and memory dysfunction.</td>
</tr>
<tr>
<td>Melatonin</td>
<td>3 mg to 12 mg before bedtime.</td>
<td>Suggested (†)</td>
<td>Effective in patients with Parkinson's disease, memory problems, and sleep-disordered breathing. Side effects include headaches, sleepiness and delusions/hallucinations.</td>
</tr>
<tr>
<td>Zopiclone</td>
<td>7.5-15 mg before bedtime.</td>
<td>May be considered (††)</td>
<td>Side effects include rash and nausea.</td>
</tr>
<tr>
<td>Yi-Gan San</td>
<td>2.5 g tid.</td>
<td>May be considered (††)</td>
<td>May be considered (††)</td>
</tr>
<tr>
<td>Sodium oxybate</td>
<td>Unknown.</td>
<td>May be considered (††)</td>
<td>Studied mainly on patients with idiopathic hypersomnia. Side effects were reported when used for the treatment of RBD.</td>
</tr>
<tr>
<td>Donepezil</td>
<td>5-15 mg.</td>
<td>May be considered (††)</td>
<td></td>
</tr>
<tr>
<td>Rivastigmine</td>
<td>6-12 mg bid.</td>
<td>May be considered (††)</td>
<td>Studied mainly on patients with dementia of Lewy body.</td>
</tr>
<tr>
<td>Temazepam</td>
<td>10 mg.</td>
<td>May be considered (††)</td>
<td></td>
</tr>
<tr>
<td>Alprazolam</td>
<td>1-3 mg.</td>
<td>May be considered (††)</td>
<td></td>
</tr>
<tr>
<td>Desipramine</td>
<td>50 mg (max. 100 mg).</td>
<td>May be considered (††)</td>
<td></td>
</tr>
<tr>
<td>Carbamazepine</td>
<td>500 to 1500 mg od.</td>
<td>May be considered (††)</td>
<td></td>
</tr>
</tbody>
</table>

(*) Not FDA approved for the treatment of RBD.
(†) Supported by sparse high grade evidence data, or a substantial amount of low grade data and/or clinical consensus.
(††) Supported by low grade data.

Louden, 1995
Vorona, 2002
Nash, 2003
Onofrj, 2003
Winkelman, 2004
Disclosure of RBD & Supportive Counseling

✓ Disclosing a diagnosis versus disclosing the risk of a diagnosis.

✓ The diagnosis of RBD is not absolutely predictive of the development of a neurodegenerative disease, but rather suggests an increased susceptibility probability.

✓ The ethical principles of autonomy, informed consent, and respect for persons support disclosure of information to patients.

✓ In RBD patient’s individual risk of developing a neurodegenerative disorder is uncertain, and physicians are unable to provide definitive information.

RBD-Summary

How to evaluate?
Multiple nights/expanded EEG & multiple limb EMG channels, Video-monitoring. Home video

How to Treat?
Safety (A must)
Clonazepam 0.25-0.5mg, Melatonin 9-12mg (if OSA, older, refractory)

Future Implications:
Place RBD patients on neuropotective agents to delay or stop the progression to future Parkinsonism.
Low levels of CSF Hypocretin in PD

Treatment of EDS in PD

- Modafinil – psychostimulant
  - 3 trials
    - 2 positive (Hogl et al)
    - 1 negative (Epworth and MSLT)
- Light therapy = placebo
- Ritalin?
  - one open label study (Epworth ↓ by 1)
Insomnia in PD

>2/3 of patients = Sleep maintenance insomnia
30% - 40% spend the night awake
↑ Sleep fragmentation

Excessive nocturia seen in late PD
Related to the dysautonomia → severe sleep disruption

Motor Disturbances in PD: RLS/PLMS

20% of patients with PD have RLS¹
(compared with 5%–10% of the general population)

PLMS occur in 15% of PD patients²

Compared with RLS patients, PD patients with RLS were:
- Older at onset &
- Less likely to have a family history of RLS than idiopathic RLS patients¹


RLS: The Communications Disconnect

What the Patients Say......
- Creepy crawly
- Tugging
- Like bugs creeping
- Pain..... but not pain
- Hebebe gebebe's

What the Physician is listening for...
- Tingy
- Numbness
- Twitching/jerking
- Funny sensations

### Restless Legs Syndrome vs. Periodic Leg Movements

<table>
<thead>
<tr>
<th>Restless Legs Syndrome</th>
<th>Periodic Leg Movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Diagnosis</td>
<td>Electromyographic finding seen during a sleep study</td>
</tr>
<tr>
<td>Confirmed by History and Physical Examination</td>
<td>Confirmed during a sleep study</td>
</tr>
<tr>
<td>About 80% have periodic leg movements</td>
<td>About 30% have restless legs syndrome</td>
</tr>
</tbody>
</table>

### Sleep Apnea in PD

SDB in PD > age-matched controls.

SDB in PD may be caused by:
- Respiratory muscles rigidity
- Abnormal autonomic control
- Dyskinetic movements of pharyngeal musculature
- Laryngeal spasm
- Drug-induced pulmonary effects, including LD-induced respiratory dyskinesia.

### Shy-Drager syndrome (SDS)

Commonly encounter:
- Sleep-related respiratory dysrhythmias

**Nocturnal Stridor**

Due to bilateral vocal cord abductor atrophy & paralysis.
Shy-Drager syndrome (SDS)

- Stridor -> sudden unexpected nocturnal death.
- Tx: Obligatory nCPAP or Tracheostomy

- Stridor is a poor prognostic
- Associated with sudden death during sleep,
- Initiation of Rx is critical.

Tx of Sleep Disorders in Dementia

- Review medications
- Treat underlying neurological condition
- Treat comorbid conditions (depression, OSA)
- Improve sleep hygiene:
  - Maintain regular sleep & wake times
  - Regulate amount of time in bed
  - Maximum light exposure during the daytime
  - Minimize excessive light exposure during the nighttime
  - Maximize daytime activities
  - Minimize late-day caffeine, nicotine,
    - alcohol intake
  - Reduce length of daytime naps

Medications to Avoid and Why:

- Levodopa<DA: Sleep attacks
- Antidepressants: RBD, RLS
- Dopamine antagonists: RLS
- CNS depressants: EDS, sleep apnea
Treatment of Insomnia in Dementia

CBTi (Cognitive Behavioral Therapy, for insomnia)

Circadian Cues
- Light: 30-60 minutes
- Physical activity: 3-6 hrs before bedtime

Hypnotics
- Benzodiazepine receptor modulators:
  - Zaleplon, zolpidem, Eszopiclone

Melatonin Agonists
- Ramelteon

What Do People Take to Try to Improve Their Sleep?

28% use alcohol

Pharmacologic Treatments: BzRAs approved for insomnia

- Sonata® (zaleplon)
- Ambien® (zolpidem)
- Halcion® (triazolam)
- Lunesta® (eszopiclone)
- Restoril® (temazepam)
- Prosom® (estazolam)
- Doral® (quazepam)
- Dalmene® (flurazepam)

Half-life (hours)

- Sonata: 11
- Ambien: 10-24
- Halcion: 39
- Lunesta: 74

All brand names are the property of their respective owners.

Currently Available Hypnotics Agents: Benzodiazepine Modulators, H1 receptor antagonists, Hcrt receptor antagonists, and Melatonin Agonists.

<table>
<thead>
<tr>
<th>Agent</th>
<th>Initiates Sleep</th>
<th>Maintains Sleep</th>
<th>Sleep with limited opportunity</th>
<th>Required Inactivity (hr)</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eszopiclone</td>
<td>✓</td>
<td>✓</td>
<td>8+</td>
<td>1, 2, 3</td>
<td></td>
</tr>
<tr>
<td>Zaleplon</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>5, 10</td>
<td></td>
</tr>
<tr>
<td>Zolpidem</td>
<td>✓</td>
<td>✓</td>
<td>7-8</td>
<td>5, 10</td>
<td></td>
</tr>
<tr>
<td>Extended release</td>
<td>✓</td>
<td>✓</td>
<td>7-8</td>
<td>6.25, 12.5</td>
<td></td>
</tr>
<tr>
<td>Intermezzo (Sublingual)</td>
<td>✓</td>
<td>✓</td>
<td>(4 hrs)</td>
<td>4</td>
<td>1.75, 3.5</td>
</tr>
<tr>
<td>Zolpidem (oral spray)</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>5, 10</td>
<td></td>
</tr>
<tr>
<td>Eldur (Sublingual)</td>
<td>✓</td>
<td>✓</td>
<td>4</td>
<td>5, 10</td>
<td></td>
</tr>
<tr>
<td>Silenor</td>
<td>✓</td>
<td>✓</td>
<td>7-8</td>
<td>3, 6</td>
<td></td>
</tr>
<tr>
<td>Ramelteon</td>
<td>✓</td>
<td>✓</td>
<td>-</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Suvorexant</td>
<td>✓</td>
<td>✓</td>
<td>7</td>
<td>5, 10, 15, 20</td>
<td></td>
</tr>
</tbody>
</table>

The reader is advised to check the most recent FDA warning about dose adjustments, specifically for women and patients > age 65 years.

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**Hypnotics use in the Elderly**

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**Insomnia and Hypnotic Use as Predictors of Falls and Hip Fractures in Older Nursing Home Residents**

Avidan, Alon Y.1; Fries, Brant E.2, 3, 4; James, Mary L.2; Szafara, Kristina L2; Wright, Glenn2; Chervin, Ronald D.1

1. Sleep Disorders Center, Department of Neurology, University of Michigan, Ann Arbor, MI
2. Institute of Gerontology, University of Michigan, Ann Arbor, MI
3. School of Public Health, University of Michigan, Ann Arbor, MI
4. Ann Arbor VA Medical Center, Ann Arbor, MI
Treatment for Primary RLS

RLS Management Options

Nonpharmacologic Therapy
- Abstinence from caffeine, nicotine, and alcohol
- Consider the effect of medications that may enhance RLS

FDA-Approved Pharmacologic Therapy
1. Ropinirole
2. Pramipexole
3. Rotigotine
4. Gabapentin Enacarbil

FDA-approved medication for the treatment of moderate-to-severe primary RLS.

Sleep & Dementia: The Bottom Line
★ Sleep problems: common & predictable in neurodegeneration
★ Alzheimer’s dementia: insomnia, circadian rhythm
  • multimodal therapy – light, melatonin, etc.
★ PD / synuclein – the most known association:
  • Insomnia – very common, difficult to manage
  • Somnolence – multifactorial – meds, primary feature
  • RBD – Common, very treatable and is key in disease prediction
CASE-A: A 74 year old male has evidence of nightly violent dream enactment episodes. He punched his wife during one of the spells thinking that she was an intruder. The following are accurate statements regarding this patient

(A) A diagnostic polysomnogram utilizing expanded electromyographic montage is necessary for diagnosing this condition.
(B) Sharp objects should be removed from the bedroom environment
(C) Melatonin at 3mg at bedtime may be an options for management
(D) All are appropriate statements.

CASE-B: A 61 year old woman was recently diagnosed with Alzheimer’s dementia and insomnia. She has a severe urge to move the legs in the evening since being placed on an antiemetic for nausea. The discomfort improves when she walks and gets worse when she rests. She has a family history of colon cancer. The next the in the workup of this patient is:

(A) Management of her RLS with venlafaxin
(B) A sleep study to confirm the diagnosis of RLS
(C) Increase the dose of her metoclopramide.
(D) Begin treatment with a carbidopa levodopa due to low risks of augmentation.
(E) Obtain a ferritin level
CASE-C: A 73 year old woman is admitted to a nursing home for placement. One of the most important factors that could help improve her sleep quality include:

(A) Late afternoon naps lasting 60 minutes between 3-6PM
(B) Prophylactic nightly benzodiazepine hypnotic use to prevent insomnia
(C) Evening exercise regiment 30 minutes before planned time of sleep onset
(D) Maximizing daylight exposure