

Parkinsonism and Sleep



Outline

- (Some) normal sleep physiology
- Disease associated sleep fragmentation
- Restless legs syndrome/ periodic limb movement disorder
- REM behavior disorder

Inclusions

- α -synuclein inclusion in the neuron
 - Parkinson disease (PD)
 - Lewy body dementia
 - Multiple system atrophy
 - Progressive supranuclear palsy
- β -amyloid and tau protein accumulation
 - Alzheimer disease

Sleep Effects

- α -synuclein inclusions target dopamine containing neurons causing:
 - Excessive daytime sleepiness (60-90 % in PD)
 - Sleep fragmentation
 - Circadian alterations

Two process model of sleep

- Process S (sleep)
 - Sleepiness accrued by virtue of time awake
 - Indicates the **homeostatic** sleep drive
- Process C (circadian)
 - Helps us stay awake as sleepiness builds
 - Sends an alerting signal in early evening
 - No signal in the second half of the sleep period-allows up to stay asleep
 - Regulates body temperature, hormone secretion, digestion, cell division

Homeostatic
Sleep Drive



Wake

Sleep

Alertness
Level



Circadian
Wake Drive



6:00 a.m.

3:00 p.m.

10:00 p.m.

3:00 a.m.

6:00 a.m.

3:00 p.m.

10:00 p.m.

3:00 a.m.

ADAPTED FROM



Sleep Changes in Parkinson Disease

- Reduced activity levels
 - Actigraphy
- Altered hormone release
- Hallucinations predict impaired sleep-wake rhythm
- Circadian alterations
 - Decreased daily melatonin secretion
 - Longer time to sleep after dim-light melatonin onset (DLMO) with dopamine treatment
 - Increased daytime sleepiness seen with lowest melatonin levels

Circadian Mechanisms in PD

- Less exposure to light
 - Being homebound
 - Cataracts
 - Less melanopsin-enhanced by dopamine
 - Less light input from nerve degeneration
 - Morning light exposure (7500 lux) may improve sleepiness and motor symptoms
- Melatonin
 - 3-5 mg may improve sleep quality and daytime sleepiness

Sleep and PD

- Sleep attacks with dopamine treatment
 - In contrast, amphetamines increase synaptic dopamine and are alerting
 - Can occur while driving
 - Naps in the afternoon can help
 - Modafinil or armodafinil can be helpful
- Sleepiness rare at the onset of PD, increases over time
 - Degeneration of “wake up” nerve groups occurs
- Stridor
 - More so in MSA
 - Can be life threatening
 - CPAP can help avoid tracheostomy

Sleep and PD (cont.)

- Insomnia
 - Correlates with depression and anxiety
 - Worse over time
 - Cramps, dystonia, nocturia, restless legs syndrome
 - Medications – selegiline can be stimulating
- Hallucinations
 - Can occur in proximity to REM sleep
- Obstructive Sleep Apnea
- Medication psychosis

Periodic Limb Movements and Restless Legs Syndrome (RLS)

- RLS characterized by
 - An unavoidable urge to move the legs
 - Worse with immobilization
 - Better (temporarily) with movement
 - Mostly at night
 - Family history
- Periodic limb movements (PLM)
 - Seen on a sleep study
 - May or may not have clinical relevance

Parasomnias

- Any sleep-related movement
- REM behavior disorder most common
- Somnambulism (sleepwalking) has been reported
- Myoclonus (muscle jerks)
- Rest tremor
- Dystonia (posturing, cramps, twisting)
- Bruxism (tooth grinding, clenching)

REM Behavior Disorder (RBD)

- Only recognized REM parasomnia (excluding nightmares)
- Primary
 - Idiopathic – tends to precede PD by up to 20 years
 - May be a subtype of PD
 - Seen in 30-60% of PD
- Secondary
 - SSRIs
 - Obstructive sleep apnea
 - PD – less severe

RBD Symptoms

- Dream congruent complex behaviors
 - Laughing, crying, talking, swearing
- Fighting in sleep
- More violent dream content
- Little to no interaction with environment
- Normal consciousness when awakened (wake them up)
- Disappearance of PD symptoms during the episode

Videos

<https://www.youtube.com/watch?v=rFXYRQ9xPUA>

<https://youtu.be/D7N2dBRy5Jo>

RBD Treatment

- Clonazepam 0.25-2 mg
 - Only certain indication for this drug
- Melatonin 2-9 mg
- Avoid agents that promote REM sleep
 - Varinicline (Chantix)
 - Donepezil (Aricept) may not increase RBD

Its all a big mess.

– BADMAN



It's the imperfections
that make something beautiful
that's what makes it **different**
and **unique** from everything else.

– *Bob Ross*

AZ QUOTES



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