Sleep & Wakefulness Disorders in Parkinson’s Disease:
The Challenge of Getting a Good Night’s Sleep

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March 25, 2017
PFNCA Symposium
Sleep is mandatory... eventually

SURVIVAL:
water, food, air
& SLEEP
What is sleep & what does it do?

- Restores us physically
- Resets us psychologically
- We learn during sleep
- Mood is dependent on sleep
- Caloric management is sleep dependent
Sleep? .... What happens when we don’t get enough?

- Impaired cognitive function
  - difficulty with FOCUS, ATTENTION & CONCENTRATION
  - irritability
  - impaired memory
  - Impaired inhibitory control
  - subjective sleepiness
  - prolonged auditory reaction time
  - prolonged visual reaction time
Impaired motor function

– Prolonged motor reaction time

– Tremor
– Incoordination
– Blurred vision
Sleep is a dynamic process:

- Each stage has a unique purpose
- Must cycle thru all stages
  - adequate time in each stage
  - orderly sequence
Sleep

Synaptic Homeostasis Hypothesis

During the day we acquire info & build connections

......At night we downscale and clean up

“Sleep is the price we pay for plasticity”

Glial Washing

- Glial supportive cells in the brain
- Form the *GLYMPHATIC* system
- Enhanced removal of toxic waste
  - Including amyloid proteins assoc with Alzheimer’s
- During slow wave sleep
• The more we use a brain region during the day ➔ more local slow wave sleep activity is needed to clean up at night.
STATES of BEING

Wakefulness

.... and many ambiguous states in between.....

... and sleep-related phenomena

Sleep

Non-REM Sleep

REM Sleep
REM Sleep

- Dreaming
- No memories of the dream process formed
- Cognitive cortex off line
- Muscle paralysis (atonia)
- Rapid eye movement (REM) bursts
- LEARNING & CREATIVITY

Positive effect of sleep on learning does not occur if sleep restricted!!!!
Sleep Requirements

Adults …. including seniors:
7-9 hrs
Medical & Social Implications of Disrupted & Insufficient Sleep in PD

- Aggravation of underlying PD symptoms
- Impaired responsiveness to medication
- Impaired social function
  - ↑ irritability, mood disorder
  - ↑ hypophonia
- Difficulty with weight control
Parkinson’s & Sleep Disorders

- Sleep-wake abnormalities are found in >60% of patients
- More severe PD: ↑ sleep disturbance
  - Nocturnal sleep abnormalities: 60-98%
  - Daytime sleepiness: 15-51%
Disorders of Sleep-Wake in PD

1. Insomnia & Fragmentation of sleep
2. Excessive daytime sleepiness
3. Obstructive Sleep Apnea
4. Periodic Limb Movements of Sleep
5. REM Sleep Behavioral Disorder
6. Disturbed Sleep-Wake Timing (?)
1. Insomnia & fragmentation of Sleep

- Sleep onset difficulty
  - Anxiety
  - Medication side effects

- Frequent arousals
  - Tremor during sleep
  - Rigidity (may disturb transition into sleep & repositioning during the night)

- Other sleep disorders:
  - Sleep apnea
  - REM sleep behavioral disorder
  - Periodic limb movements of sleep

- Concurrent depression

- Altered sleep timing (circadian rhythm)
Is INSOMNIA due to:

- A disorder of the brain’s ability to initiate or maintain sleep

  OR

- A disorder of the brain’s ability to turn alertness OFF
“Light is a DRUG that promotes WAKEFULNESS”

Charles A. Czeisler, PhD, MD • Director of Sleep Medicine • Harvard Medical School
Management of Insomnia in PD

- Monitor sleep pattern (keep logs)
- Prioritize sleep
- Regulate the schedule
- Add a pre-bed wind-down time
- Control evening light (orange lenses)
- Disengage: Turn off electronics
- Cognitive – behavioral therapy (CBT)
- Judicious use of sleep medication
- Use of nocturnal PD meds
Lost Environmental Sleep Cues

- BR no longer for “Ss”
  sleep & sex only
- Light from screens
- Intellectual engagement
- Noise
  - TV & subliminal messages
2. Excessive Daytime Sleepiness in Parkinson’s Disease

- Sleep attacks may occur
- Prevalence: 43-56% of PD patients
- Multifactorial:
  - PD disturbs alerting brainstem pathways
  - Side effect of dopaminergic PD therapy
  - Consequence of other sleep disorders
Measures of Sleepiness

- **Subjective:** Epworth Sleepiness Scale
  - 8 point rating scale of sleepiness during key activities over the past week

- **Objective:**
  - Daytime Multiple Sleep Latency Test (MSLT)
  - Daytime Maintenance of Wakefulness Test
    - Used to assess alertness & driving safety
Treatment of EDS

- Optimize nocturnal sleep:
  - Quality, quantity & timing
- Identify & Treat co-existent sleep disorders
- Timed naps
- Stimulants & Wake promoting agents
  - Modafinil, r-modafinil
  - In Study: Jazz JZP-110 specifically being studied for sleepiness in Parkinson’s disease
Cardinal Symptoms of OSA

- Loud snoring…. but not always
- Excessive daytime sleepiness
- Obesity … but not always
- Less frequent associated symptoms
  - sleep onset insomnia
  - multiple nighttime awakenings
  - fatigue
  - cognitive impairment
Nose: cartilage
Mouth: boney palate
Pharynx: jeopardy zone: muscular
Trachea: cartilaginous rings
Open Airway  Closed Airway
4. Nocturnal movements in PD

- 28% of PD patients have Restless Leg Syndrome
- >15% have Periodic Limb Movements of Sleep
- 15-50% have REM Sleep Behavioral Disorder
RLS & PLMS Dx & RX

- Clinical history +/- sleep study
- Check serum iron / ferritin levels
- Treatments overlap with PD meds
  - Gabapentin
  - Opioids
- Failure of normal paralysis of REM sleep
- Dream enactment behaviors
- Rx
  - Treat underlying sleep apnea
  - Remove offending medications: SSRIs
  - Rx: Clonazepam, melatonin, gabapentin
Resources
Epworth Sleepiness Scale (ESS)

How likely are you to doze off in the following circumstances over the past week?

Score 0-3: 0 = no chance of dozing, 1=slight chance, 2=moderate chance, & 3=high probability

1. Sitting & reading
2. Watching TV
3. Sitting inactive in a public place
4. As a passenger in a car for 1 hour
5. Lying down to rest in the afternoon
6. Sitting & talking to someone
7. Sitting quietly after a lunch without alcohol
8. In a car while stopped in traffic

Scoring of ESS:

<8/24 = normal alertness
8-9/24 = borderline alertness
≥ 10/24 = excessive daytime sleepiness

Johns, MW. Sleep 1991; 14: 540
Multiple Sleep Latency Test

- Measures patient’s tendency to fall asleep
- Obtained in setting of regular sleep schedule with preceding in-lab sleep study
- Patient is given 5, 20-minute opportunities to nap at 2 hour intervals during the day lying down in a darkened room
- Sleep onset is scored objectively by EEG, eye movements and muscle tone

Average sleep latency < 10 minutes is considered abnormal
Resources for Insomnia

• Sleep logs to track sleep schedule:

• On-line cognitive behavioral therapy
  – http://www.myshuti.com/
  – $135 for 6 session course
  – On line access for 16 weeks
Light Control

• **Uvex orange lens glasses:**
  – to block the alerting blue light portion of the light spectrum in the evening
  – Wear in PM beginning 1.5 - 2 hours prior to desired bedtime to help initiate sleep
  – [www.amazon.com](http://www.amazon.com): search UVEX orange lens glasses
  – The standard UVEX S1933x are fine unless you wear glasses in which case you may want the larger S0360x model. $9-12.
Habits to Help You Sleep Better

• Keep a regular schedule
• Wind down “me time” before bedtime
• Daily exercise
• Dim screens/reduce ambient light
• Clear the decks – safe sleep environment
• Avoid late, heavy meals
• Avoid evening naps
• Avoid late alcohol
• No heavy discussions at bedtime
• Sleep work-up & treat the problems