Parkinson Disease: Sleep Disorders

Description/Etiology
Parkinson disease (PD) is a progressive neurodegenerative disorder related to a deficiency of the neurotransmitter dopamine, which causes a chemical imbalance that affects voluntary movement. This chronic, debilitating condition is insidious in onset, usually begins unilaterally with mild symptoms, and eventually manifests bilaterally with increasingly severe symptoms. PD is characterized by a variable combination of tremor, bradykinesia, rigidity, and postural instability. Advancing disease erodes all functional abilities, causing autonomic dysfunction, musculoskeletal deformities, sensory symptoms, sleep disturbances, dermatologic problems, and psychiatric symptoms (for more information on PD, see Quick Lesson About … Parkinson Disease).

Impaired sleep is a common nonmotor complication of PD that has a major impact on patient and caregiver quality of life (QOL). Sleep impairment can manifest at any stage of PD and typically becomes more severe as the disease progresses. Nocturnal sleep disorders include sleep fragmentation, early awakening, difficulty falling asleep (i.e., sleep initiation), altered dreaming (with vocalization, terrors, and nightmares), restless legs syndrome (RLS), nocturia, sleep-disordered breathing (SDB), and rapid eye movement sleep behavior disorder (RBD), which is characterized by symptoms that range from increased muscle tone to physical activity and shouting. RBD might be a sign of presymptomatic PD. Daytime sleep disorders include excessive daytime sleepiness (EDS) and sudden onset of sleep (i.e., sleep attack). The etiology of PD-related sleep disorders is thought to be multifactorial and include age-influenced sleep changes, deterioration of the part of the brain that controls the sleep-wake cycle, medication side effects, poor nocturnal mobility, urinary frequency, anxiety, depression, lack of exercise, and dementia. Risk factors for EDS include male sex, poor nighttime sleep quality, and use of antihypertensive medications. Iron-deficiency anemia is associated with RLS. SDB is associated with more rapid progression of neurodegeneration in patients with PD. The presentation of SDB in PD is atypical, as SDB is most often related to obesity, and obesity is not present in most patients with PD.

Treatment of sleep disorders in PD is aimed at targeting the major sleep complaint and its underlying mechanism. Although there is no way to prevent the progression of PD, pharmacotherapy can control symptoms, preserve patient independence, and slow progression. Treating sleep disorders in PD has been shown to improve sleep, depressive symptoms, and motor dysfunction and to lessen fatigue. Treatment strategies involve pharmacologic agents and education about lifestyle modification.

Facts and Figures
An estimated 30–50% of patients with PD have RBD. EDS affects ~ 50% of patients with PD and SDB is present in 20–60% of individuals with PD.

Risk Factors
Common dopaminergic medication side effects, such as sleepiness, hallucinations, confusion, and psychosis, can compound existing sleep problems. Risk factors for sleep disorders in patients with PD include constipation, obesity, adenotonsillar hypertrophy, nasal obstruction, severe foot dystonia (i.e., muscle contraction), tremors and rigidity, leg and arm contortions, leg cramps, sleep-onset blepharospasm (i.e., eye muscle twitching), pain,
sleep-related respiratory dysrhythmias, and comorbid conditions, including Alzheimer’s disease.

**Signs and Symptoms/Clinical Presentation**

Symptoms of sleep disorders in patients with PD are general fatigue, drowsiness, not feeling refreshed after sleep, and falling asleep during periods of inactivity. A sleep attack presents as a spontaneous episode of dozing.

**Assessment**

› **Patient History**
  - Assess risk factors, including medications taken, and ask about PD onset
  - Assess sleep patterns and presence of movements or behaviors at night

› **Physical Findings of Particular Interest**
  - Other conditions that contribute to the development of sleep disorders can be present; these include pain, paroxysmal nocturnal dyspnea, gastroesophageal reflux disease (GERD), constipation, and nocturia secondary to prostatism

› **Diagnostic Tests/Studies**
  - Diagnosis is made by sleep history, which can include a subjective sleep assessment and/or objective assessment using tools such as the Epworth Sleepiness Scale (ESS), the Parkinson’s Disease Sleep Scale (PDSS), the Pittsburgh Sleep Quality Index (PSQI), and the Scale for Outcomes in PD Sleep Scale (SCOPA-S). The Multiple Sleep Latency Test and polysomnography can be ordered to diagnose sleep disorders
  - The patient’s bed partner can be asked to complete a sleep questionnaire to further identify sleep problems

**Treatment Goals**

› **Promote Optimum Sleep, Physiologic Function, and Emotional Well-Being**
  - Assess all physiologic systems, level of patient disability, and fall risk; follow facility protocols for fall prevention and educate the patient and family on PD pathophysiology and treatment option risks and benefits (for details of PD treatment unrelated to sleep disorders, see Quick Lesson referenced above)
  - Review laboratory/diagnostic study results on sleep evaluation, and ask patient/caregiver about problems with sleep
  - Assess patient/caregiver anxiety level and coping ability; evaluate for knowledge deficits and educate on general sleep hygiene measures that can be tried prior to or in addition to the use of pharmacologic options
    – Regular daytime activities, exposure to direct sunlight in the morning, and implementation of a schedule for bedtime and awakening can regulate circadian rhythm disruption
    – Hospitalized patients should follow their normal bedtime routine as much as possible and be provided a quiet and restful environment for sleep
    – Bed rails and physical therapy can improve nighttime mobility
  - Assess for nocturnal bladder symptoms as a cause of sleep disorders; if appropriate, reduce fluid intake in the evening, place a commode or urinal at the bedside, and/or request referral to a urologist for evaluation and treatment
  - Assess safety of the sleep environment
  - Discuss optimization of the dopaminergic medication regimen to improve nighttime mobility, decrease RLS, and prevent EDS; changes in the medication regimen can include giving small bedtime doses, using long-acting or timed-release agents, and giving selegiline, a nondrowsy dopaminergic agent that is taken in the morning
    – Clinician can titrate and reduce the dopaminergic regimen in order to treat sleep disorders involving hallucinations; downward titration can worsen PD symptoms, and patient input is essential to determine if QOL improves
  - Administer other pharmacologic agents prescribed for sleep disorders, including modafinil for EDS, a mild sedative for insomnia, clonazePAM for RBD, iron supplements for iron-deficiency anemia associated with RLS, clonazePAM or QUEtiapine for hallucinations, and/or antidepressants for depression
    – There is no completely effective treatment for EDS or sleep attacks

**Food for Thought**

› Dementia is one of the most debilitating nonmotor manifestations of PD, developing in 30–50% of patients within 15 years of PD diagnosis. In a 4-year follow-up study of 42 patients with PD, investigators found that RBD was associated with increased risk of new-onset dementia (Postuma et al., 2012a)

› In a study of 10 patients with PD, researchers concluded that deep brain stimulation might improve PD-related nocturnal sleep problems by restoring sleep architecture and normal rapid eye movement sleep (Nishida et al., 2011)
Although caffeine consumption has been consistently linked with reduced PD risk, researchers in a study of 61 patients with PD found that daily caffeine consumption had no significant benefit for EDS in these patients (Postuma et al., 2012b).

In a study of 421 patients with PD, 27% had insomnia at baseline and 33% of the remaining patients developed insomnia over the course of the 5-year study. Comorbid major depression, motor fluctuations, and those taking high doses of dopamine agonist medication were associated with more severe insomnia (Zhu et al., 2016b).

Red Flags

- Patients with PD taking dopaminergic medications should use caution when driving or operating machinery, especially if they have a history of EDS or sudden onset of sleep.
- Amphetamines should not be prescribed for EDS due to severe side effects and the potential for abuse.
- Sedatives and evening dosages of dopaminergic medications can have unpleasant side effects, including hallucinations, involuntary movements, vivid dreams, confusion, increased risk for falls, and increased EDS.
- Medications for PD must be continuously monitored for efficacy and have significant risk for toxicity and adverse effects—patient and caregiver knowledge of indications and side effects for each drug, close patient observation, and timely communication with the clinician are essential.

What Do I Need to Tell the Patient/Patient’s Family?

- Encourage patients to maintain physical and mental health and to maintain independence with ADLs as much as possible while utilizing a schedule for bedtime and awakening.
- Encourage joining a local support group, which can provide social interaction, family care services, and disease education.
- Educate to never take over-the-counter sleep aids without consulting the treating clinician.

References