

SLEEP DISORDERS

Background

Sleep disorders affect approximately 20% of the general public. At least 45% of patients with cancer experience sleep disorders of any type.¹ Pain, medications, treatments, and hospitalization, as well as the physical and psychological impact of the disease process, can affect sleep. Patients frequently do not mention sleep problems to their health care provider. As a result, insomnia is often unrecognized and untreated in patients with cancer.¹⁻⁴

The term *sleep disorder* is defined by American Academy of Sleep Medicine as perceived or actual alterations in night sleep that result in daytime impairment.⁵ Among the most common sleep disorders are insomnia, hypersomnia (excessive sleepiness), sleep-related breathing disorders, and sleep-related movement disorders (eg, restless legs syndrome, periodic limb movement disorder). Insomnia, the most common sleep disorder among cancer patients, includes difficulty initiating sleep, difficulty maintaining sleep, waking too early, or sleep that is chronically unrestorative or poor in quality that occurs despite adequate opportunity and circumstances for sleep.^{2,6}

Sleep disturbance can affect the results of cancer therapy and supportive care due to decreased ability to concentrate and comply with treatment, make reasoned decisions, or interact appropriately with others. A short- or long-term outcome of sleep disturbance may be depression or anxiety.³ Quality of life may sharply decline, and alterations to immune and neuroendocrine function may occur.^{2,7,8}

Normal Sleep Patterns

Normal sleep consists of 2 phases: rapid eye movement (REM) and non-REM (NREM) sleep. In REM sleep (dreaming), the brain is active, but in NREM sleep, brain activity is far lower. NREM (slow-wave) sleep usually demonstrates 4 progressively deepening stages (NREM1-NREM4), as shown on electroencephalogram findings.^{9,10} For most people, a period of NREM is followed by REM in cycles of about 90 minutes that are repeated 4 to 6 times during a 7- to 8-hour sleep session. The sleep-wake cycle is controlled by the circadian rhythm, a phenomenon associated

with fluctuations in light, hormones, eating, and/or socializing that repeats every 24 hours. Disruptions in sleep patterns can disrupt the circadian rhythm and impair the sleep cycle.^{2,3,11}

Risk Factors

All patients with cancer are at risk for sleep disorders (Table 1).^{11,12} Paraneoplastic syndromes associated with steroid production and symptoms associated with tumor invasion, such as draining lesions, gastrointestinal and genitourinary symptoms, pain, fever, cough, dyspnea, and pruritus, also contribute to sleep problems. Central nervous system stimulants, narcotics, sedatives, hypnotics, steroids, caffeine, nicotine, some antidepressants, and dietary supplements that include vitamins may affect sleep patterns. These factors, as well as the disease process, must be considered when caring for the cancer patient with a sleep disorder.

Table 1. Risk Factors for Sleep Disorders

- Nonmodifiable risk factors
 - Female gender
 - Older age
 - Hyperarousability prior to cancer diagnosis
 - Personal or family history of sleep disorders
 - Personal or family history of mood or anxiety disorders
 - Chronic illness
- Potentially modifiable risk factors
 - Low socioeconomic status
 - Low education level
 - Life stressors other than cancer
 - Alcohol use
 - Pain
 - Use of stimulants
 - Cancer treatment

Data from Graci,² Vena et al,⁸ Berger et al,¹² Aldrich,¹³ and Clark et al.¹⁴

Assessment

It is important that the nurse assess the patient's sleep patterns and habits, because sleep disorders can cause additional pain, anxiety, and depression, as well as respiratory and other health problems. The assessment should include documentation of predisposing factors, sleep patterns, emotional status, exercise and activity level, diet, symptoms, medications, and caregiver routines.

A more extensive assessment by a sleep specialist can include polysomnography, a test that monitors multiple physical data during a sleep cycle. While usually used to assess and diagnose chronic sleep disorders, polysomnography can provide valuable information for the management of sleep problems in the cancer patient. Polysomnography is normally performed in a hospital sleep laboratory but can be done at home through ambulatory polysomnography. Ambulatory polysomnography allows collection of data over a continuous 24- to 48-hour period, including daytime sleeping. Participants are able to perform usual activities, with the exception of bathing or showering.¹⁵

Subjective Self-Reporting

Vena et al⁸ provide a detailed list of instruments for subjective assessment of sleep and daytime sleepiness. Berger and colleagues¹⁶ identified 4 sleep-specific instruments that have been used in studies of sleep and quality of life in patients with cancer:

1. Pittsburgh Sleep Quality Index¹⁷
2. Sleep diaries¹⁸⁻¹⁹
3. Sleep scale²⁰
4. Insomnia Severity Index²¹

Suggested Sleep Quality Interview Questions²

1. How did you sleep prior to your cancer diagnosis?
2. How are you sleeping now?
3. On a scale of 1 to 10, with 1 being the most refreshing and restful sleep and 10 being the worst, how would you rate your sleep over the past week?
4. Do you have difficulty falling asleep?
5. Do you have difficulty staying asleep?
6. Do you wake up too early in the morning?
7. How tired are you during the day?
8. How long does it usually take you to fall asleep?
9. How long are you awake on a typical night?

Meniscus Educational Institute

18 Elizabeth Street • Suite 300 • West Conshohocken, PA 19428-2935

VOICE: (610) 834-1810 • FACSIMILE: (610) 834-8856 • INTERNET: <http://www.meniscus.com>

3

Diagnosis and Classification of Insomnia

Graci has classified insomnia into 3 types²:

- Delayed sleep onset
 - Difficulty falling asleep after going to bed for the night
- Impaired sleep continuity
 - Awakening during the time allotted for sleep
 - Does not include causes such as loud noises, restless sleeping partner, disruptions by children or pets
- Early awakening
 - Waking up earlier, often by several hours, than planned
 - Usually results in impaired daytime functioning, increased daytime drowsiness

Clinical Practice Guidelines

Sleep disturbance guidelines are included in the National Comprehensive Cancer Network (NCCN) guidelines on cancer-related fatigue.²² No specific sleep guidelines for management of insomnia in people with cancer currently exist, but there are pharmacologic as well as nonpharmacologic interventions that can help patients with sleep disorders²³:

- Clinical Practice Guideline—Adult Insomnia: Assessment to Diagnosis. *Toward Optimized Practice*. Canadian Medical Association; 2007. (Includes an evaluation tool.)
- Clinical Practice Guideline—Adult Primary Insomnia: Diagnosis to Management. *Toward Optimized Practice*. Canadian Medical Association; 2007.
- National Guideline Clearinghouse. Sleep disorders.
http://www.guideline.gov/summary/summary.aspx?ss=15&doc_id=9381&nbr=5027.
Accessed April 14, 2011.

Resources

The Oncology Nursing Society (ONS) has published an evidence-based guideline for sleep disorders in people with cancer. The ONS Putting Evidence into Practice (PEP[®]) card is available at <http://www.ons.org/Research/PEP/Topics/Sleep>. Accessed April 14, 2011. A full article on the development of the ONS PEP[®] card was published by Page et al. Putting Evidence into Practice: Evidence-based Interventions for Sleep-wake Disturbances. *Clin J Oncol Nurs*. 2006;10:753-767. Accessed April 14, 2011.

Management of Insomnia Related to Cancer

Management of insomnia related to cancer should include behavioral (cognitive and environmental) and pharmacologic interventions as applicable.

Cognitive-Behavioral Therapy

Cognitive-behavioral therapy (CBT) has demonstrated efficacy in treating both short- and long-term insomnia, although not directly in patients with cancer, but it requires patience on the part of the patient and health care provider. Resolution may take several weeks.² Some psychiatric specialists highly recommend CBT for long-term insomnia associated with psychological and/or behavioral components.^{2,12} The most frequently used treatments are stimulus control therapy, sleep restriction therapy, relaxation therapies, and sleep hygiene education.^{11,12,24,25,26}

Elements of Sleep Hygiene Education^{11,12,24,25}

- Go to bed and get up at the same time every day, including weekends
- Avoid caffeine, nicotine, and alcohol within 4 to 6 hours of bedtime
- Avoid heavy meals within 2 hours of bedtime
- Avoid drinking fluids after supper to prevent frequent nighttime urination
- Use a condom catheter for male nocturnal incontinence and an incontinence garment or pad for females, if needed
- Avoid stimulating environments after 5:00 PM (ie, avoid noisy environments)
- Provide a calm, soothing sleep environment that includes a comfortable room temperature, low or no lights, and a quiet room

- Use your bedroom for sleep and intimate activity only
- Avoid watching TV in bed
- Stop working, watching TV, computer use, or other stimulating activities close to bedtime
- Establish a relaxing routine for getting ready for bed
- Use earplugs if the environment is too noisy
- Change the mattress on your bed if it is uncomfortable
- Reposition yourself and provide support with pillows, as needed
- When in bed, relax and think pleasant thoughts to help you fall asleep
- Avoid napping. If you have to nap, do so before 3:00 PM and do not sleep for more than 1 hour
- Engage in regular physical activity during the day, but avoid vigorous exercise too close to bedtime
- Avoid clock watching by placing the clock where you can't see it

Pharmacologic Interventions

When making decisions about which sleep medications to use, consider pharmacokinetics.

- Medications that are poorly absorbed may have a longer onset of action, resulting in delayed sleep onset
- Medications that have a long duration of action may result in excessive daytime sleepiness the following day (Table 2).²

Benzodiazepines include diazepam (Valium), temazepam (Restoril), triazolam (Halcion), and clonazepam (Klonopin) have been commonly used in the management of sleep disorders. When used in conjunction with other treatment for short periods of time, these agents are safe and effective in producing natural sleep, because they are less disruptive of REM sleep than are other hypnotic agents

Nonbenzodiazepine sleep aids include antidepressants, antihistamines, and antipsychotics. Zolpidem (Ambien) and zaleplon (Sonata) reportedly have not been associated with tolerance, dependence, sleep cycle alterations, or rebound insomnia.

Eszopiclone (Lunesta) has a low risk of dependence and no evidence of tolerance. The prescribing information should be consulted before this medication is used for patients with severe hepatic impairment or concomitantly with CYP34A inhibitors.

Ramelteon (Rozerem) works by altering the body's use of melatonin, encouraging the body to sleep at night rather than napping during the day. It is not a controlled substance and is reportedly not associated with tolerance or dependence. The prescribing information should be consulted before this medication is used for patients with severe hepatic impairment or concomitantly with CYP34A inhibitors

Over-the-counter (OTC) sleep aids usually contain antihistamines, most often diphenhydramine or doxylamine. OTC sleep medications should not be taken for more than 7 to 10 days. Many prescription sleep medications may be safer than OTC preparations, especially in older adults.

Table 2. Medications Commonly Used to Promote Sleep

Drug Category	Medication	Hypnotic Dose (route)	Onset (duration of action)
Benzodiazepines	diazepam (Valium)	5–10 mg (capsule, tablet)	30–60 min (6–8 h)
	temazepam (Restoril)	15–30 mg (capsule)	60 min, minimum (6–8 h)
	triazolam (Halcion)	0.125–0.5 mg (tablet)	30 min (peaks 1–1.5 h)
	clonazepam (Klonopin)	0.5–2.0 mg (tablet)	30–60 min (8–12 h)
Tricyclic antidepressants	doxepin (Sinequan)	10–150 mg	30 min
	amitriptyline (Elavil)	10–15 mg	30 min
	nortriptyline (Pamelor)	10–50 mg	30 min
Chloral derivatives	chloral hydrate	0.5–1.0 g (capsule, syrup, suppository)	30–60 min (4–8 h)
Second-generation antidepressants	trazodone (Desyrel)	25–150 mg	30 min
	nefazodone (Serzone)	50–100 mg	30 min
	mirtazapine (Remeron)	15–60 mg	30 min
Antihistamines	diphenhydramine (Benadryl)	25–100 mg (tablet, capsule, syrup)	10–30 min (4–6 h)
	hydroxyzine (Vistaril, Atarax)	10–100 mg (tablet, capsule, syrup)	15–30 min (4–6 h)
Neuroleptics	chlorpromazine (Thorazine)	10–50 mg	30–60 min
Other	zolpidem tartrate (Ambien)	5–20 mg	30 min (4–6 h)
	zaleplon (Sonata)	10–20 mg	30 min (4–6 h)

From National Cancer Institute (NCI).²⁷

References

1. National Cancer Institute (NCI). Sleep disorders (PDQ[®]), health professional version. Updated August 31, 2010. <http://www.cancer.gov/cancertopics/pdq/supportivecare/sleepdisorders/HealthProfessional> Accessed April 14, 2011.
2. Graci G. Pathogenesis and management of cancer-related insomnia. *J Support Oncol*. 2005;3:349-359.
3. Fiorentino L, Ancoli-Israel S. Sleep dysfunction in patients with cancer. *Curr Treat Options Neurol*. 2007;9:337-346.
4. Savard J, Morin CM. Insomnia in the context of cancer: a review of a neglected problem. *J Clin Oncol*. 2001;19:895-908.
5. American Academy of Sleep Medicine. *The International Classification of Sleep Disorders, Revised: Diagnostic and Coding Manual (ICSD-R)*, 2nd ed. Westchester, IL; 2005.
6. Passik SD, Whitcomb LA, Kirsh KL, Theobald DE. An unsuccessful attempt to develop a single-item screen for insomnia in cancer patients. *J Pain Symptom Manage*. 2003;25:284-287.
7. Lamberg L. Sleep disorders, often unrecognized, complicate many physical illnesses. *JAMA*. 2000;284:2173-2175.
8. Vena C, Parker K, Cunningham M, et al. Sleep-wake disturbances in people with cancer part I: an overview of sleep, sleep regulation, and effects of disease and treatment. *Oncol Nurs Forum*. 2004;31:735-746.
9. Anderson P, Grant M. Comfort: sleep. In Johnson BL, Gross J, eds. *Handbook of Oncology Nursing*, 3rd ed. Boston: Jones & Bartlett; 1998: 337-359.
10. Guyton AC. *Textbook of Medical Physiology*, 7th ed. Philadelphia: WB Saunders; 1986.
11. Oncology Nursing Society. Putting Evidence into Practice[®] (PEP): Sleep/Wake Disturbances 2006. <http://www.ons.org/Research/PEP/Topics/Sleep>. Accessed April 14, 2011.
12. Berger A, Parker K, Young-McCaughan S, et al. Sleep/wake disturbances in patients with cancer and their caregivers: state of the science [online exclusive]. *Oncol Nurs Forum*. 2005;32:E98-E126.
13. Aldrich M. Cardinal manifestations of sleep disorders. In: Kryger MH, Roth T, Dement WC, eds. *Principles and Practice of Sleep Medicine*. Philadelphia: WB Saunders; 2000: 526-528.
14. Clark J, Cunningham M, McMillan S, et al. Sleep-wake disturbances in people with cancer part II: evaluating the evidence for clinical decision making. *Oncol Nurs Forum*. 2004;3:747-771.
15. Parker KP, Bliwise DL, Ribeiro M, et al. Sleep/wake patterns of individuals with advanced cancer measured by ambulatory polysomnography. *J Clin Oncol*. 2008;26:2464-2472.
16. Berger A, Sankaranarayanan J, Watanabe-Gallosay S. Current methodological approaches to the study of sleep disturbances and quality of life in adults with cancer: a systematic review. *Psycho-Oncol*. 2007;16: 410-420.

17. Buysse DJ, Rehnolds III CF, Monk TH, et al. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Res.* 1989;28:193-213.
18. Lacks P. *Behavioral Treatment for Persistent Insomnia.* New York: Program Press; 1987.
19. Morin C. *Insomnia: Psychological assessment and management,* 1993. New York: Guilford.
20. Snyder-Halpern R, Verran JA. Instrumentation to describe subjective sleep characteristics in healthy subjects. *Res Nurs Health.*1987;10:155-163.
21. Blais F, Gendron L, Mimeault V, Morin,C. Evaluation of insomnia: validity of 3 questionnaires. *Encephale.* 1997;23:447-453.
22. National Comprehensive Cancer Network (NCCN) Clinical Practice Guidelines in Oncology: *Cancer-related Fatigue.*
http://www.nccn.org/professionals/physician_gls/PDF/fatigue.pdf Accessed April 14, 2011. Free registration required.
23. National Institutes of Health, National Heart, Lung, and Blood Institute. Sleep disorders information. <http://www.nhlbi.nih.gov/health/public/sleep/index.htm>. Accessed April 14, 2011.
24. Mills M, Graci G. Sleep disturbances. In: Frogge M, ed. *Cancer Symptom Management.* Sudbury, MA: Jones & Bartlett; 2004: 111-134.
25. Davidson JR, Feldman-Stewart D, Brennenstuhl S, Ram S. (2007), How to provide insomnia interventions to people with cancer: Insights from patients. *Psycho-Oncology,* 2007;16:1028–1038..
26. Erickson J, Berger AM. Sleep-wake disturbances. In Brown CG. (Ed). *A Guide to Oncology Symptom Management* (pp. 473–495). 2010. Pittsburgh PA: Oncology Nursing Society
27. National Cancer Institute (NCI). Sleep disorders (PDQ®): medications commonly used to promote sleep. Updated August 31, 2010.
<http://www.cancer.gov/cancertopics/pdq/supportivecare/sleepdisorders/HealthProfessional/Table1> . Accessed April 14, 2011

Web Resources

Academy of Cognitive Therapy.

<http://www.academyofct.org/Library/InfoManage/Guide.asp?FolderID=1001&SessionID={2B1ACB12-57AD-47D4-846E-8C2F8DE87513}>. Accessed April 14, 2011.

The American Academy of Sleep Medicine (AASM) provides in-depth information about sleep, sleep hygiene, sleep disorders, and treatments, as well as the latest in research. This site also provides a variety of instruments that can be used by health care professionals to assess sleep and sleep habits: <http://www.sleepeducation.com>. Accessed April 14, 2011.

National Cancer Institute (NCI). Sleep disorders (PDQ®), health professional version. Updated August 31, 2010.

<http://www.cancer.gov/cancertopics/pdq/supportivecare/sleepdisorders/HealthProfessional>. Accessed April 14, 2011. **National Cancer Institute (NCI). Sleep disorders (PDQ®), patient version. Updated January 8, 2010.**

<http://www.cancer.gov/cancertopics/pdq/supportivecare/sleepdisorders/Patient> Accessed April 14, 2011.

National Sleep Foundation. Find a sleep care center. <http://www.sleepfoundation.org/> . Accessed April 14, 2011.