

Contents

Using This Book to Review Sleep Medicine ix

SECTION 1	Normal Sleep and Its Variants	1
	1.1 Sleep-Wake Mechanisms and Neurophysiology	1
	1.2 Other Physiology	14
	1.3 Normal Sleep	19
	1.4 Sleep Deprivation	23
	1.5 Scoring and Staging	27
SECTION 2	Sleep-Wake Timing	61
SECTION 3	Insomnia	77
SECTION 4	Central Disorders of Hypersomnolence	103
	4.1 Narcolepsy	103
	4.2 Idiopathic Hypersomnia	112
	4.3 Sleepiness With Hypersexuality	114
	4.4 Insufficient Sleep Syndrome	115
	4.5 Hypersomnia Due to Medical Disorders	122
	4.6 Hypersomnia Due to Medications	124
	4.7 Hypersomnia Associated With Psychiatric Disorders	126
SECTION 5	Parasomnias	131
	5.1 Non-Rapid Eye Movement Parasomnias	131
	5.2 Rapid Eye Movement Parasomnias	137
	5.3 Other Parasomnias	143
	5.4 Name That Stage	145
SECTION 6	Sleep-Related Movement Disorders	149
	6.1 Limb Movement Disorders	149
	6.2 Other Movement Disorders	160
SECTION 7	Sleep-Related Breathing Disorders	169
	7.1 Obstructive Sleep Apnea	169
	7.2 Central Sleep Apnea	195
	7.3 Sleep-Related Hypoventilation and Hypoxemic Syndromes	211
	7.4 Isolated Symptoms and Normal Variants	216

SECTION 8	Sleep in Other Disorders	223
	8.1 Neurologic Disorders	223
	8.2 Psychiatric Disorders	232
	8.3 Other Disorders	238
SECTION 9	Instrumentation and Testing in Sleep Medicine	243
SECTION 10	Pediatrics: Not Gone and Not Forgotten	257
APPENDIX 1	Highly Recommended Lists	271
APPENDIX 2	Topics Index	273
APPENDIX 3	Knowledge Base for Sleep Medicine Practitioners in Europe	275
APPENDIX 4	Knowledge Base for Sleep Medicine Practitioners in Japan	283
APPENDIX 5	International Sleep Medicine Board Certification Examinations	287
APPENDIX 6	Knowledge Base for Dental Sleep Medicine Practitioners	289

Normal Sleep and Its Variants

1.1 Sleep-Wake Mechanisms and Neurophysiology

QUESTIONS

A 20-Year-Old Student Pulling an All-Nighter

A 20-year-old student with asthma is cramming for a final exam he will take the next morning. He has studied the entire day and now has decided to study through the night. He becomes extremely sleepy at 4 AM and has two cups of strong coffee.

- Which neurologic structure is primarily involved in maintaining his alertness?
 - Ascending reticular activating system
 - Hypothalamus
 - Pineal gland
 - Ventrolateral preoptic (VLPO) nuclei
- The brain localization for structures that keeps him awake is located in the
 - Medullary bulb
 - Midbrain
 - Pons
 - Entire brainstem
- Which of the neurotransmitters below is focused on sleep promotion (as opposed to wakefulness)?
 - 5-Hydroxytryptamine (5-HT) from serotonergic neurons in the dorsal raphe nucleus
 - Acetylcholine from cholinergic neurons in pedunculopontine tegmental and laterodorsal tegmental nuclei
 - Gamma-aminobutyric acid (GABA) and galanin (GAL) from the VLPO
 - Norepinephrine from noradrenergic neurons of the ventrolateral medulla and locus coeruleus
- Pathways of the arousal system reach the cerebral cortex through which neurologic structures?
 - Cerebellum and pons
 - Medulla and spinal cord
 - Pons and medulla
 - Thalamus, hypothalamus, and basal forebrain
- Which chemical involved in hunger regulation also has input into the arousal system?
 - Ghrelin
 - Insulin
 - Leptin
 - Orexin (hypocretin)
- Which chemical is accumulating in his central nervous system (CNS) to cause sleepiness before he drinks coffee?
 - Adenosine
 - Gamma-hydroxybutyric acid (GHB)
 - Melatonin
 - Serotonin

7. He drank coffee for its stimulant effect; it works to increase wakefulness by binding to the receptors of which one of the following:
- A. Adenosine
 - B. GHB
 - C. Melatonin
 - D. Serotonin
8. The student becomes jittery about 20 minutes after drinking the coffee and feels his heart beating rapidly. Assuming he is taking all of the following medications, which one is likely producing the tachycardia?
- A. Fluticasone
 - B. Montelukast
 - C. Prednisone
 - D. Theophylline

Daydreamer

A 16-year-old straight-A high school student is referred for evaluation because she no longer focuses well in school. She is seen to "nod off" in class, and her grades have recently plummeted. You learn that she sleeps 8 hours per night but complains of "broken sleep." She sometimes awakens in the middle of the night and then has trouble falling back to sleep. She has also noted a panicky feeling during nocturnal awakenings and states, "I feel someone is in the room, and I can't move." Further history reveals that she has recently started taking afternoon naps and dreams vividly while napping.

9. Her pediatrician believes that she is exhibiting symptoms of a neurologic disease, perhaps multiple sclerosis, and recommends a spinal tap. If a spinal tap were to be performed and the cerebrospinal fluid (CSF) were to be analyzed, what abnormality would likely be found?
- A. Elevated interleukin-6 (IL-6)
 - B. Elevated nerve growth factor
 - C. Reduced adenosine
 - D. Reduced hypocretin
10. The patient's unintended daytime sleep episodes are *most* likely caused by what abnormality?
- A. An underactive ascending reticular activating system
 - B. Excessive CNS serotonin levels
 - C. Loss of hypocretin neurons
 - D. Overactive CNS GABA_A receptors
11. The patient's episodes of awakening during the night, unable to move and sensing that someone is in the room, is characteristic of
- A. Posttraumatic stress disorder (PTSD)
 - B. Psychomotor epilepsy
 - C. Schizophrenic hallucination
 - D. Sleep paralysis
12. What neurologic phenomenon is causing her inability to move when she awakens during the night?
- A. Abnormal discharge from the frontal cortex inhibiting the motor cortex
 - B. Excessive adrenergic stimulation causing vasoconstriction of spinal arteries, resulting in ischemia of the spinal motor neurons
 - C. Excessive stimulation of the ascending reticular activating system that thus inhibits the motor cortex
 - D. Inhibition of motor neurons in the spine by both glycinergic and GABAergic mechanisms

Pandemic of Sleepiness

A 40-year-old patient with acute influenza is noted to have a severe cough and feels extremely sleepy whenever he is awake.

13. Which of the following phenomena is NOT causing sleepiness?
 - A. Activation by cytokines of the acute phase response
 - B. Viral encephalitis with influenza virus invading hypothalamic cells
 - C. Viral ribonucleic acid (RNA) and protein that induces cytokine production within the hypothalamus
 - D. Virus replicating in lung cells and inducing production of somnogenic cytokines
14. What is the effect of the infection on sleep architecture?
 - A. Enhancement of NREM sleep and inhibition of REM sleep
 - B. Increase in wakefulness with inability to consolidate sleep
 - C. Marked increase in rapid eye movement (REM) sleep, leading to hallucinations
 - D. No systematic effect on the relationship of REM to non-REM (NREM) sleep
15. Which infection-related cytokine/protein is NOT associated with sleepiness?
 - A. Brain-derived neurotrophic factor and growth hormone-releasing factor
 - B. IL-1 β and IL-6
 - C. Orexin (hypocretin) and leptin
 - D. Tumor necrosis factor and nerve growth factor
16. What is the expected natural history of the sleepiness in this case?
 - A. Sleepiness starts within hours of infection and lasts for days to weeks
 - B. The sleepiness can become chronic because of damage to the hypothalamus, a condition known as *encephalitis lethargica*
 - C. The sleepiness starts after the lung infection begins to resolve and can last months
 - D. The sleepiness usually is present only during the prodromal phase

Potpourri

17. A friend likes to drink red wine up to 30 minutes before bedtime about 5 nights a week. He tells you that the wine has an effect on his sleep. Which of the following *best* describes alcohol's effect when taken near bedtime?
 - A. Bizarre dreams
 - B. Decreased limb movements
 - C. Increased REM sleep
 - D. Reduced wake after sleep onset (WASO)
18. A waitress drinks three pots of coffee to stay alert and energized on her shift. The reason coffee helps her remain alert is because caffeine is a(n)
 - A. Adenosine antagonist
 - B. Serotonin antagonist
 - C. Norepinephrine agonist
 - D. Dopamine reuptake blocker
19. Caffeine has an approximate half-life of
 - A. 15 to 30 minutes
 - B. 1 to 2 hours
 - C. 3 to 5 hours
 - D. 6 to 8 hours