Aging and Effects on Sleep

Baptist Healthcare System Sleep Symposium
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Objectives

- Discuss the effect of aging on
  - Sleep architecture
  - Sleep apnea
  - Insomnia
  - RLS/PLMS
  - Circadian sleep disorders

- Discuss treatment paradigms in the elderly patient

 Disclosure of Financial Relationships

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Has no relationships with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients.

Changes in sleep architecture with age

- Meta-analysis of 65 studies in healthy persons
- 3,557 total subjects aged 5-102 years

**Age related trend for total sleep time**


**Reported Hours Slept Older vs. Younger American Adults**

2003 NSF Sleep in America Poll

**Changes in sleep architecture with age**


**Sleep histogram and aging**
Summary of the effects of aging on sleep

- SWS decreases markedly with age (primarily in old men)
- REM sleep (as % of total sleep) is well preserved with age, except with dementia.
- Sleep disturbances, arousals, WASO, increase markedly with age.
- The need for sleep remains unchanged with age.
- Marked inter-individual variability in sleep quality in the elderly.

INSOMNIA
Prevalence by Age Group

Large-scale community survey of non-institutionalized American adults, aged 18 to 79 years

Many Medical Conditions Disturb Sleep

- Headaches
- GI changes (GERD, Dyspepsia)
- Arthritic Pain
- Neurodegenerative Processes
- Orofacial Pain/TMJ
- CAD/CHF
- Benign prostatic hypertrophy & Nocturia
- Peripheral Neuropathy with Pain

Insomnia and Mortality in Older Adults

Survival as a function of sleep latency
Survival as a function of sleep efficiency

- Sleep latencies > 30 minutes: 2.14x greater mortality risk (p=0.005)
- Sleep efficiency < 82%: 1.93x greater mortality risk (p=0.014)

Electroencephalographic sleep assessments controlled for age, gender, & baseline medical burden

Deu KA et al. Psychosom Med. 2012 64:53-75
Summary: insomnia and aging

- Prevalence of insomnia and sleep complaints increase dramatically with aging.
- Insomnia in the older adult is most often comorbid with medical or psychiatric illness, behavioral problems, and sleep disorders.
- Using rigorous exclusion criteria for co-morbidities, prevalence of insomnia is very low in healthy older adults.
- Conclusion: aging does not cause insomnia.

Vitaia et al, 2002

Obstructive sleep apnea and aging

SDB in Elderly: Potential Age-Dependent Risk Factors

- Increased BMI (central obesity)
- Decreased muscle strength
- Increased airway collapsibility
- Decreased lung volumes
- Decreased central respiratory drive (?)
Excessively sleepy

Most studies suggest that SDB does not increase the risk of mortality in the older adult. Most studies suggest that older adults with SDB are:

- Excessively sleepy
- SDB may contribute to:
  - Decreased quality of life
  - Cognitive impairment
  - Greater risk of nocturia
  - Greater risk of hypertension
  - Greater risk of cardiovascular disease

Summary: OSA and aging

- Prevalence of OSA increases with age; > 60% in the elderly
- OSA in the elderly not associated with increased mortality, but may affect cognitive function more than the young.
- Treatment of OSA in the elderly improves cognitive function and other physiological factors as in the younger OSA patient.
- CPAP adherence in the elderly may be similar or better than in younger patients

Restless Legs Syndrome (Ekbom disease)

A neurological sensory-movement disorder

Does treating sleep apnea in the older adult lead to improvements?

- In a review of the literature, CPAP in the elderly:
  - Reduces or eliminates apneas and hypopneas
  - Improves sleep architecture
  - Is superior to placebo
  - Improves daytime sleepiness
  - Improves motor speed and nonverbal learning and memory
  - Reduces vascular resistance, coagulability and other factors affecting cardiac function
  - Decreases nocturia


Weaver TE, Cheewar ER. Continuous positive airway pressure treatment for sleep apnea in older adults. Sleep Med Rev 2001; 11(2).
Summary: RLS and PLMS in aging

- Prevalence of RLS and PLMS increases with age
- Cause is unknown
  - May be related to comorbid conditions
    - Anemia
    - Chronic back pain (DJD, injuries, etc)
    - Peripheral neuropathy (diabetes, medications)
    - Dopaminergic dysfunction
    - Use of antidepressants
    - Malnutrition – iron deficiency, blood loss

Circadian Rhythm Sleep Disorders in the elderly: Advanced sleep phase
Potential mechanism for circadian rhythm disorders in the elderly

- Deterioration of the suprachiasmatic nucleus
  - Reduced endogenous melatonin secretion
  - Reduced amplitude of the circadian rhythm may also decrease with age.
  - Overall, a weaker circadian rhythm with age
- Weak or non-existent external cues (Zeitgebers) necessary to entrain the circadian rhythm to a 24 hour day.

Summary: Aging and circadian disorders

- Advanced sleep phase disorder is common in the elderly
- Causes include
  - Lack of bright light exposure.
  - CNS atrophy with involvement of the suprachiasmatic nucleus.