Investigators

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Study Rationale

- Strong epi data linking SDB to increased risk of CVD, cancers, and cognitive decline – but not assessed in prospective studies nor in elderly women
- Largest studies to date examined SDB link to health outcomes in younger adults (mean=65yrs), or in men
- No study has prospectively examined sleep apnea on incidence of cancer; hypoxemia promotes tumor growth via multiple mechanisms
- Few studies have prospectively examined predictive value of SDB & other sleep disturbances on cognitive trajectory and incident cognitive impairment (MCI, AD) in elderly adults; new data linking sleep disturbance to Aβ accumulation in brain – implications for AD pathology
- WHI offers a time-limited opportunity to study sleep quality in a well-characterized cohort of elderly women
I. Cardiovascular Disease

A. **Primary**: Test whether increased SDB-related intermittent hypoxemia (IH) – measured by elevated oxygen desaturation index (ODI) – is associated with increased risk of major cardiovascular events (composite outcome of myocardial infarction, stroke, heart failure (HF), cardiovascular mortality).

B. **Secondary**: (i) Test whether short sleep duration, reduced sleep efficiency, and poor sleep quality are associated with increased risk of major CVD events (composite outcome); (ii) Test whether elevated ODI, short sleep duration, and reduced sleep efficiency and poor sleep quality (sleep exposures) are associated with incident stroke and HF.

II. Cancer

A. **Primary**: Test whether increased SDB-related IH is associated with increased risk of cancer (excluding non-melanoma skin cancer).

B. **Secondary**: (i) Test whether short sleep duration and poor sleep quality are associated with increased cancer risk; (ii) Test whether sleep exposures are associated with cancer of the breast, and with cancer aggressiveness, as measured by cancer stage and hormone receptor status.

III. Cognitive Decline

A. **Primary**: Test whether increased SDB-related IH is associated with a faster rate of cognitive decline (composite outcome of global cognition, episodic memory, executive function test scores).

B. **Secondary**: (i) Test whether short sleep duration, reduced sleep efficiency and adverse sleep exposures (including SDB-related IH) are associated with a faster rate of cognitive decline; (ii) Test whether sleep exposures are associated with increased risk of mild cognitive impairment or dementia; (iii) Examine strength of associations between sleep exposures and episodic memory vs. other cognitive domains.
Study Design

Overview

• Prospective study of 5000 older women enrolled in the WHI Extension Study

• All correspondence with participants by phone and by mail; no clinic visits

• Utilize extensive resources available through the WHI to maximize cost efficiency
Study Design
Baseline (N = 5000)

1. **Sleep Assessment** using simple sensitive wrist-worn devices
   - **WatchPAT**: FDA-approved portable diagnostic device for sleep apnea measuring peripheral arterial tone (autonomic change due to respiratory disturbances), blood oxygen levels, actigraphy, heart rate, body position, snoring
   - **Actigraphy**: continuous measurements of activity via tri-axial accelerometer obtained for 4 consecutive 24-hour periods (overlapping oximetry); measures total sleep/wake time, number of awakenings, sleep efficiency and fragmentation, and frequency of daytime naps

2. **Cognitive Assessment** via telephone using validated protocols, and trained/experienced examiners; previously developed for WHIMS follow-up studies and now used in COSMOS-Mind
No Sleep Apnea

Severe Sleep Apnea
Study Design
Follow-up

• **Adjudicated CVD** (annually, 4 years of f/u)
  - MI, stroke, HF, coronary revascularization
  - Cardiovascular mortality

• **Adjudicated Cancers** (annually, 4 years of f/u)
  - Incidence of all cancers, breast cancer
  - Cancer aggressiveness (stage, hormone receptor status)

• **Cognitive Assessment** (annually, 3 years of f/u)
  - Global measures of cognition, episodic memory, executive function, subjective memory complaints, dementia questionnaire
  - Adjudication to identify mild cognitive impairment (MCI), Alzheimer’s disease, and other dementias
Participants

- Targeting N=5000 with a valid sleep study (WatchPAT & Actigraph) - conducted soon after enrollment

- Inclusion
  - No history of clinically significant CVD (MI, stroke, HF) within the last 2 years
  - No diagnosis of cancer within the last 2 years (non-melanoma skin cancer ok)
  - CPAP supplemental oxygen users ok
  - No diagnosis of dementia
Clinical Relevance

- Vast majority of sleep disturbances are undiagnosed and untreated – implications for prevalence of health complications and morbidity

- WHISPER will assess clinical utility of 3 targets for intervention: overnight oxygenation, sleep duration, and sleep quality

- Study will test whether a simple, home-based sleep assessment identifies those at greatest risk of poor health outcomes 4 years later, and thus at high priority for early intervention

- Findings may support addition of a simple sleep assessment to routine clinical care in older adults
Women’s Health Initiative Sleep Hypoxia Effects on Resilience

WHISPER presents a “Show~n~Tell” WEBINAR describing 2 home-based sleep study devices and associated data collected as part of the study that provide continuous measurements of oxygen desaturation, heart rate, and overall activity.

Date: Thursday, May 31, 2018
Time: 3-4 pm (ET)

Please register for the WHISPER Show~n~Tell Webinar using the following link:

https://attendee.gotowebinar.com/register/4377062721672932098
Ancillary Studies to WHISPER

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