Obstructive Sleep Apnea and Cardiovascular Disease (OVERVIEW)

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Steven Khov, DO, FAAP
Pulmonary Associates of Lancaster, Ltd
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skhov2@lghealth.org

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- NONE
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GOALS

- What is Obstructive Sleep Apnea?
- What are the Risk Factors?
- What are the cardiac health effects of OSA?
- Testing for OSA?
- Treatments for OSA
- Put people to sleep during this talk
Obstructive Sleep Apnea

- Obstructive sleep apnea (OSA) is a disorder in which a person frequently stops breathing during his or her sleep.¹
- It results from an obstruction of the upper airway during sleep that occurs because of inadequate motor tone of the tongue and/or airway dilator muscles.¹


Image Credit: drkarenation.com

Prevalence of OSA

- afflicts at least 25 million adults in the U.S²
- estimated 26% of adults between ages 30-70 have sleep apnea²
- BMI greater than 28, OSA is present in 41%³
- Up to 93% of women and 82% of men with moderate to severe OSA are not diagnosed⁴

Cardiovascular Effects of OSA

- Hypertension
- 3- to 4-fold increase risks of complex tachyarrhythmia (afib and NSVT)
- higher recurrence rate of atrial fibrillation
- increased the odds of fatal and nonfatal cardiovascular events
- higher incidence of stroke, independent of confounders
- Increase risk of having heart failure (odds ratio 2.38)


Symptoms of OSA

RISK FACTORS

- Male Gender
- Obesity (BMI >30)
- Hypertension
- Alcohol or sedative usage
- Upper Airway/Facial Abnormalities
- Smoking
- Large Neck Circumference (>17” male, >16” female)
- Family History of OSA
- Endocrine and/or metabolic disorders
Shared Risk Factors

- Hypertension
- Higher incidents in men
- Increase incidence with age
- Increase risks with increase BMI
- Sedentary lifestyle
- Dietary indiscretions

Hypertension and OSA

- Wisconsin Sleep Cohort Study
- Prospective Population Based Study
- Adjusted for baseline hypertension, BMI, neck and waist circumference, age, sex, and use of alcohol and cigarettes

\[ \text{Odds Ratio} \begin{array}{ccc} \text{O-5} & \text{O-15} & \text{>15} \\ 1.42 & 2.03 & 2.89 \\ 95\% \text{ CI} & 1.33-1.78 & 1.29-3.17 & 1.46-5.64 \end{array} \]

- "dose–response association between sleep-disordered breathing at baseline and the presence of hypertension four years later that was independent of known confounding factors"\(^5\)
- Treatment of OSA with CPAP improved blood pressure control, even in those with resistant hypertension\(^6\)

**OSA and AFib**

- Mayo Clinic 2004 - 17% higher incident of OSA found in patients with persistent Afib
- German study 2009 – OSA prevalence 42.7%
- Brazil study 2009 – OSA prevalence 81.6%


**OSA and recurrence rate Afib**

- Untreated OSA – recurrence rate of Afib at 12 months was 82%
- Treated OSA – recurrence rate of Afib at 12 months was 42%
- Control group – recurrence rate of Afib at 12 months was 53%
- P = 0.013


**OSA and Stroke**

- The Sleep Heart Health Study11 – 8 years follow-up
- Men with AHI > 19, adjusted hazard ratio of 2.86 (95% confidence interval, 1.1–7.4) for ischemic stroke. P=0.016
- Mild OSA - stroke risk by 6% (95% confidence interval, 2–10%) for each quarter percentile increase

- Increase risks of death from stroke if you have OSA (adjusted hazard ratio, 1.76; 95% confidence interval, 1.05–2.95; P = .03)\textsuperscript{12}

- Independent of age, sex, BMI, smoking, hypertension, diabetes, afib, MMSE, and Barthel index of activities of daily living

- Using CPAP reduces mortality in setting of OSA and ischemic strokes\textsuperscript{13}


### POLYSOMNOGRAPHY

- 4-Channel EEG
- EOG
- ECG
- Chin and Tibia EMG
- Airflow Monitor
- Pulse Oximeter
- Respiratory Effort
- Body Positioning

Image Credit: Athens Center for Dental Sleep Medicine
Treatment Options for OSA

- WEIGHT LOSS
- EXERCISE
- AVOIDANCE OF ALCOHOL
- AVOIDANCE OF SEDATING MEDICATIONS
- AVOID SLEEPING SUPINE

- Mandibular Advancement Device
- CPAP
- Hypoglossal Nerve Stimulator
- Surgery
  - Radiofrequency Ablation of Tongue Base
  - Maxillomandibular Advancement Surgery
  - Genioglossal Advancement
  - Hyoid Suspension
  - UPPP and tonsillectomy
Benefits of CPAP

- CPAP use significantly reduced the occurrences of PAF (P < 0.001), PVC (P = 0.016), sinus bradycardia (P = 0.001), and sinus pause (P = 0.004). 14
- Untreated severe OSA significantly increased the risk of fatal (odds ratio 2.87, 95% CI 1.17-7.51) and non-fatal (3.17, 1.12-7.51) cardiovascular events compared with healthy participants. 15


IT’S NOT JUST THE HYPOXIA

"In patients with cardiovascular disease or multiple cardiovascular risk factors, the treatment of obstructive sleep apnea with CPAP, but not nocturnal supplemental oxygen, resulted in a significant reduction in blood pressure." 16

THANK YOU