Health Consequences of Untreated Obstructive Sleep Apnea

Eric Newgent, DO, MS
Sleep Medicine
ThedaCare Berlin, WI
I have no actual or potential conflicts of interest in relation to this program/presentation.
Objectives

- Describe the basic pathophysiology of OSA.
- Discuss the incidence and prevalence among different groups.
- Understand health consequences of untreated OSA.
- Outline how the pathophysiology manifests in different Diseases.
- Describe the basic PCP Office Sleep Evaluation.
Pathophysiology of OSA

- Airway collapse causing decreased air flow results in Hypoxemia and Hypercarbia
- Activation of Sympathetic Nervous System
- Increased Heart Rate and Blood Pressure
- Increased Preload and Afterload
Pathophysiology of OSA

- Oxidative Stress causes inflammation and endothelial dysfunction
- Release of Stress Hormones (cortisol) causing increased blood sugar and decreasing immunity
Effects on Sleep

- Arousals due to sympathetic activation cause Sleep Disturbance
- Sleep Fragmentation- restlessness and lack of sustained sleep, nocturia
- REM sleep disturbance- Daytime Sleepiness, Nonrestorative Sleep
Adult OSA

- 25 Million American – 80% are undiagnosed (More women than men)
- 1 in 15 adults have Moderate to Severe OSA
- Overall prevalence is 9-24%
- Affects Men 2:1 over Women
- Women 10-15%
- Men 20-30%

Leazzo A. AM Update on Obstructive Sleep Apnea. Osteo Family Physician 2016;8(6);16-21.
2-4% of Children, boys=girls

Children peak 2-8 years (Tonsilar growth)

25-45% of obese children have OSA

Health Consequences to OSA

- Hypertension
- Heart Attacks
- Heart Failure
- Atrial Fibrillation
- Stroke
- Diabetes

Consequences of OSA

- Motor Vehicle Crashes
- Work-related injuries
- Depression
- Decreased neurocognitive performance

Health Conditions Associated with OSA

- Atrial Fib: 4.0 Odds Ratio
- Depression: 2.6
- CHF: 2.4
- Stroke: 1.6-4.3
- Hypertension: 1.4-2.9
- CAD: 1.3
- DM: 1.2-2.6
Beer vs. Sleep

Getting 6 hr sleep ≈ 2 to 3 beers
Getting 4 hr sleep ≈ 5 to 6 beers
Getting 2 hr sleep ≈ 7 to 8 beers
GETTING 0 HR SLEEP ≈ 10 TO 11 BEERS

50% of those with OSA have hypertension

Hypertension may be the only clue that someone has OSA

Treatment of OSA may result in better control or even resolution of hypertension

OSA may exacerbate the CV complications of Chronic Kidney Disease and End Stage Renal Disease

OSA and Diabetes

- Often Comorbid conditions- chicken or egg
- Share common risk factors- obesity, age
- Share common complications- Hptn, CV Disease
- 23% of men with diabetes have OSA
- OSA can worsen glycemic control- cortisol and steroids

Mary S et al. (2002). OSA is independently associated with insulin resistance. AM j Resp and Crt Care Med; 165(5)
OSA and Heart Disease

- There is a consistent association between OSA and Hypertension, CAD, Cardiac Arrhythmias, and Heart Failure

- CAD occurs in 67% of adult population in US

- OSA is associated with nocturnal cardiac arrhythmias - OSA has been associated with prolonged QT interval

- Treatment of OSA with CPAP can improve CV outcomes
There is a clear and significant association between OSA and AF. Up to 82% of patients with AF have OSA.

OSA is associated with both new-onset AF and recurrence after ablation (42% relative risk reduction).

CPAP is associated with significant decrease in recurrent AF with or without ablation.

AF has been treated with medical therapy and ablation, CPAP is a third major treatment option.

OSA and Heart Failure

- Studies show a causal link between OSA and Heart Failure
- The prevalence of OSA in Heart failure is 50-75% in those with reduced ejection fraction
- The pathophysiology has a bidirectional relationship
- Pulmonary Hypertension is seen in 20% of patients with OSA

OSA and Stroke

- OSA increases the risk of ischemic stroke (3-6 fold increase)
- OSA also increases the risk of cardioembolic stroke
- Moderate to Severe OSA is associated with adverse rehabilitation outcomes in post-stroke patients
- Overnight Oximetry first 5 days post stroke as screen for OSA
OSA and Headache

- 1:5 Patients with OSA have morning headaches
- Main reason for migraines is hypoxemia/hypercapnia
- Change in cerebral blood flow
- Increased intracranial pressure

OSA and Pregnancy

- Prevalence of OSA in third trimester 27%
- Pregnancy may worsen pre-existing OSA
- Increased risk of gestational diabetes, preeclampsia
- Moderate to Severe OSA is associated with increased odds of severe morbidity- eclampsia, cardiomyopathy, pulmonary embolism, and in-hospital mortality

OSA and Mental Health

- Marital Discord, Anger
- Mood Disorders-Bipolar Disorder, MDD
- Schizophrenia/Schizoaffective Disorder
- Anxiety/Panic Disorder
- Post Traumatic Stress Disorder

OSA contributes to the development and severity of NAFLD especially in Severe OSA

OSA and Overall Mortality

- There is a significant, high mortality risk with untreated OSA, independent of age, sex, and BMI

- There is a 4 to 5 fold increase in all-cause and cardiovascular mortality with untreated severe OSA

- Increased risk of cancer


OSA and Work-Related Injuries

- Workplace-specific data shows untreated OSA at least doubles the risk of accidents.

- Drivers with OSA who were fully compliant with the company-mandated PAP treatment had a crash rate no different than that of the control group.

45-50% of Commercial Drivers (CD) are obese

15-30% have OSA

CD with OSA have 2-11 fold increase in being involved in a crash

29% have fallen asleep at the wheel, and 18% have had near miss


OSA in Preoperative Evaluation

- Incidence of perioperative complications is increased 2 to 4 fold in patients with OSA
- Respiratory Compromise most common
- High risk are procedures major invasive surgery that will impact airway or CV function, and use of opioids
- In known OSA patients document severity, effectiveness, and compliance with therapy
Perioperative Complications

- Unanticipated ICU admission
- Pneumonia
- Hypoxemia
- Difficult intubation
- Myocardial infarction
- Pulmonary embolism
- Atelectasis
- Cardiac arrhythmias
- Prolonged LOS
1. Adult patients at risk for OSA should be identified before surgery
2. STOP-Bang tool has been most validated (>3)
3. Insufficient evidence to support or cancel surgery
4. Surgical team needs to be aware of patient has OSA
5. Facilities should have PAP equipment available perioperative
6. Patient should wear their CPAP during hospital stay

Society of Anesthesia and Sleep Medicine Guidelines on Preoperative Screening and Assessment of Adult Patients with Obstructive Sleep Apnea *Anesthesia Analgesia* 2016:123;452-73.
PCP Screen for OSA in the Office

**STOP-Bang Questionnaire**

- Snoring
- Tiredness
- Observed Apnea
- Pressure- Hypertension

- **BMI> 35**
- **Age> 50**
- **Neck> 16”**
- **Gender- Male**
- **Score of 3 or more intermediate risk of OSA**


STOP-Bang

TOTAL SCORE

- High risk of OSA: Yes 5 - 8
- Intermediate risk of OSA: Yes 3 - 4
- Low risk of OSA: Yes 0 – 2
- Sensitivity 84%
- Specificity 56% (increases with higher scores)
- PPV 81

www.stopbang.ca
Serum bicarbonate is significantly correlated to AHI ≥ 28 mmol/L (on Basic Metabolic Profile)

For STOP-Bang ≥ 3 improves specificity to predict Moderate-Severe OSA

OSA Home Sleep Test

- Attended Sleep Study is gold standard
- Not for general population screening
- Useful for high pre-test probability (sleep evaluation first)
- STOP-Bang provides indication
- STOP-Bang + HST- high Sensitivity and Specificity
- Patients who have positive HST without significant co-morbidities may be treated with CPAP
Accuracy of Home Sleep Test for OSA

- Type III; 4 Channels; AHI-15
- Sensitivity 64-100%
- Specificity 41-100%
Inpatient Sleep Medicine

- 80% of hospitalized cardiac patients have SDB but not diagnosed
- Screen with Nocturnal Oximetry
- Diagnosing and treating with CPAP reduced 30-day readmission rates

Kauta et al, J Clin Sleep Med 2014;10(10):1051-1059 Diagnosis and Treatment of Sleep Disordered Breathing in Hospitalized Cardiac Patients: A Reduction in 30-day Hospital Readmission Rates
Reduced Readmission Rates

- Congestive Heart Failure
- COPD
- AMI

Sharma, S., et al. Effect of Early Intervention with Positive Airway Pressure for Sleep Disordered Breathing on Six-Month Readmission Rates in Hospitalized Patients with Heart Failure. 2015 Am J Cardiology

Medicare Core Quality Measures

- Heart Failure- readmission, mortality, meds
- Controlling Hypertension
- Ischemic Heart Disease- readmission, mortality, meds, tobacco
- Diabetes- HbA1C, exams
- Depression- readmission
Conclusion

- OSA is very common and becoming more common
- Consider the diagnosis in a wide range of patients
- OSA is associated with many common serious medical conditions
- Treating OSA can help manage many of these conditions and should be considered in the treatment plan
- OSA can be easily screened for with STOP-Bang Questionnaire
- Treatment of OSA may be a strategy to reduce Readmissions Rates