The Heart and Obstructive Sleep Apnea
Mario Kinsella MD FAASM
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OSA

Repetitive episodes of apnea or reduced airflow
- Due to upper airway obstruction during sleep
- Patients often obese
- Often have hypertension or DM
OSA

- Obstructive apneas, hypopneas, or respiratory effort related arousals
- Daytime symptoms caused by disrupted sleep, such as sleepiness, fatigue, or poor concentration
- Signs of disrupted sleep, such as snoring, restlessness, or snorts

- ~ 15% males
- ~ 5% females
- Prevalence rising due to rising rates of obesity
OSA

Risk factors
- Age, increases from young adulthood thro’ seventh decade, then plateaus
- More common in men, rises in women after menopause
- Obesity, prevalence rises as the BMI rises, both in men and women
- Upper airway shape
- Nasal congestion
- Smoking
- Sedating drugs make it worse

OSA

Medical conditions increase risk
- Pregnancy
- CHF
- ESRD
- Chronic lung disease
- Stroke and TIA
- Acromegaly
- Hypothyroidism
- Polycystic ovary syndrome
Diagnosis

Gold standard is in-lab polysomnogram
Home sleep studies may be acceptable IF
- Patient has history consistent with moderate to severe OSA
- No other sleep disorder suspected, such as central sleep apnea
- No cardiac complications like a fib, CHF
Treatment

- PAP
- Surgery
- Oral appliances
- Hypoglossal nerve stimulation

Complications

- Daytime function, cognition, psychiatric
- Drowsy driving, auto crashes
  - 2–3 x more likely
- Metabolic syndrome and DM II
- Non-alcoholic fatty liver disease
- Perioperative complications
- Mortality
  - 2–3 x all cause mortality if OSA is severe
- Cardiovascular morbidity
OSA

2–4 x more common in men
- BUT women appear to be more likely to develop heart complications
- Strong association between OSA and hypertension, CAD, cardiac arrhythmia, and heart failure

OSA–Why?

- Repetitive episodes of apnea or reduced inspiratory airflow due to upper respiratory obstruction during sleep
- Associated with intermittent hypoxemia and hypercapnia, usually provoke an arousal
- Arousal associated with restoration of upper airway patency and ventilation
OSA

- Resulting hemodynamic, autonomic, inflammatory, and metabolic effects of abnormal breathing may contribute to the pathogenesis of a range of cardiovascular diseases
- OSA associated with a significant increase in sympathetic activity during sleep
  - Increases heart rate and blood pressure

OSA

- OSA is clearly a significant risk factor for cardiovascular disease
- Associated with increased cardiovascular morbidity and mortality
OSA

Treatment
- CPAP improves sleep related respiratory events, daytime sleepiness, blood pressure control, and intermediate cardiovascular endpoints
- No studies have equivocally shown benefits in reduction in cardiovascular endpoints
  - Cardiovascular mortality, AMI or stroke

Hypertension

Hypertension and OSA very common together
- Most studies suggest the likelihood of hypertension is higher, the more severe the OSA
- Severity of OSA during REM sleep is more strongly associated with hypertension
OSA

Treatment of OSA lowers blood pressure
- Effect is greater, the more severe the OSA
- Effect is not as great as BP medication

CAD

Severe OSA is independent risk factor for cardiovascular events related to coronary artery disease
OSA is risk factor for worse outcomes in patients with CAD
Having an MI appears to worsen the severity of OSA
CAD

Treating the OSA may reduce the incidence of cardiovascular events – MI, Acute coronary syndrome, stroke

Atrial Fibrillation

- OSA associated with higher incidence of a fib
- More severe the OSA, the higher incidence of a fib
- Association between central sleep apnea and a fib
- High number of pts with a fib have OSA (30–80%)
- OSA risk factor for recurrent a fib after ablation or cardioversion
Atrial Fibrillation

Treatment of OSA MAY reduce risk of recurrence after cardioversion or ablation
  » Several studies show reduction of recurrence of a fib in patients treated with OSA

Arrhythmias

Bradyarrhythmias, such as atroventricular block, sinus pause, and asystole common in severe OSA
  » Not known if asystole contributes to increased mortality of pts with OSA
  » PAP will help suppress noct arrhythmias in OSA
    ◦ Effect on mortality unknown
Sudden Cardiac Death

In people without OSA, sleep is cardioprotective. Those with OSA have increased nocturnal risk of SCD. OSA severity does increase risk of SCD, but risk increase much lower than CAD, cardiomyopathy, and heart failure.

Pulmonary Hypertension

- ~ 20% pts with OSA have pulm htn
- If no coexisting lung disease, degree of pul htn usually mild
- Risk factors for pulm htn are
  - Comorbid lung disease
  - Daytime hypoxemia
  - Increasing AHI
  - Comorbid obesity hypoventilation syndrome
Pulmonary Hypertension

- Treatment may help lower pulmonary artery systolic pressure
- Effect on mortality not known

Heart Failure

- OSA
- Central sleep apnea, associated with Cheyne-Stokes breathing, also called cyclic respirations
  - Cyclic crescendo-decrescendo respiratory effort and airflow during wakefulness or sleep, without upper airway obstruction
  - When accompanied by apneas, it is considered a type of central sleep apnea
- Both often coexist, therefore often use term Sleep Disordered Breathing (SDB)
Sleep disordered breathing

- OSA
- CSA–CSB
Central apnea

The absence of signal in either of the airflow leads indicates that this is an apnea; the absence of respiratory effort in either the thoracic or abdominal effort leads identifies this as a central apnea.

Cheyne-Stokes respiration

This compressed figure shows four cycles of crescendo-decrescendo respiratory flow and effort, which defines Cheyne-Stokes respiration. Note that each cycle is associated with significant oxyhemoglobin desaturation, though this is not strictly required to diagnose Cheyne-Stokes respiration.
Heart Failure

- OSA more common than CSA with CSB, the latter may be more common in CHF
- ~ 50% of patients with heart failure
- Heart failure with SDB worsens prognosis
- Increased nocturnal angina
- Recurrent arrhythmias, like a fib or v tach, can be triggered by SDB

Who to test for SDB?
Remember ~ 50% of patients with ht failure have SDB, therefore “screening tools” likely not more helpful
- Nocturnal angina
- Recurrent arrhythmia
- Refractory ht failure symptoms
- Witnessed abnormal respiratory pattern or apneas
- Repetitive oxygen desaturations during sleep
Heart Failure

ACC/AHA guidelines on diagnosis and treatment of chronic heart failure indicate clinical judgement should be used to screen for SDB in selected patients

Treatment

› Heart failure therapy
› PAP
  ◦ Improves LVEF on average ~ 5%
› Nocturnal oxygen
  ◦ If can’t tolerate PAP