

# **Obstructive Sleep Apnea-Hypopnea Syndrome (OSAHS)**

See Excessive Daytime Sleepiness

See Insomnia

See Obstructive Sleep Apnea (Peds)

## **Background**

### 1. Definition

- Repetitive episodes of partial (hypopnea) or complete (apnea) airflow obstruction during sleep resulting
  - Gas exchange abnormalities
  - Sleep fragmentation
  - Daytime somnolence
  - Cardiovascular consequences

### 2. General info

- **Apnea**
  - Cessation of airflow for at least 10 s<sup>2</sup>
  - Associated with
    - Arousal
    - 4% drop in SaO<sub>2</sub>
- **Hypopnea**
  - 30-50% reduction in airflow for at least 10 s<sup>2</sup>
    - Associated with
      - Arousal
      - O<sub>2</sub> desaturation
- **Upper airway resistance syndrome (UARS)**
  - Recurrent arousals due to periods of increased airway resistance without overt apneas or hypopneas, leading to daytime hypersomnolence
- Strong associations between OSAHS and
  - Cardiovascular disease
  - Motor vehicle accidents
  - Cognitive impairment
  - Endocrine abnormalities (glucose intolerance and insulin resistance)
- Some goals of therapy of OSAHS include
  - Improving quality of life
  - Reducing risk of medical comorbidities

## **Pathophysiology**

### 1. Pathology of disease

- OSAHS is characterized by narrowing/ collapse at various sites in the upper airway
- Site of upper airway obstruction is the pharynx
- Obesity exacerbates the narrowing due to increased adipose tissue in the neck
- OSA seems to increase levels of leptin, in turn, makes it difficult for pts to lose weight<sup>4</sup>

### 2. Incidence, prevalence

- 2% F and 4% M between age of 30-60
- Prevalence increases with age but plateaus after age 65

- Increasing incidence due to diagnostic awareness and escalating obesity
  - Prevalence of OSA without daytime sleepiness
    - 25% middle age males
    - 9% middle age females
3. Risk factors
- Body habitus
    - Body mass index (BMI) >28 kg/sq m
    - Neck circumference > 40 cm
    - Central body fat distribution
  - Craniofacial and upper airway abnormalities
    - Enlarged tonsils and adenoids
    - Abnormalities of mandibular or maxillary size and position
    - Narrowed nasal cavities
    - Macroglossia
    - Low-lying soft palate
    - Enlarged uvula<sup>3</sup>
    - Anatomical imbalance between tongue size and craniofacial dimensions<sup>4</sup>
  - Genetic / family Hx
    - Heritability found in 30-35% of cases<sup>6</sup>
  - OSAHS may be aggravated by
    - Nighttime alcohol ingestion
    - Sedatives
    - Supine posture
    - Nasal congestion
    - Allergies
    - Smoking<sup>6</sup>
4. Morbidity/mortality
- Increased incidence of co-morbid conditions
    - Hypertension, CAD, MI, CHF, stroke
    - Risk of stroke nearly doubled for men w/sleep apnea
    - DM 2 and insulin resistance are present in 30% and 20% of OSA pts, respectively<sup>5</sup>
    - Oxidative stress by producing radicals can cause vascular inflammation and atherosclerosis which in turn play important role in OSA<sup>5</sup>
    - BMI highly associated with oxidative stress<sup>5</sup>

## **Diagnostics**

1. Questionnaires, physical exam, and clinical prediction rules estimate pretest probability of OSAHS, but are not specific enough to make dx
2. History
  - Habitual snoring
  - Nocturnal snorting
  - Gasping
  - Witnessed apneas
  - Fatigue, daytime sleepiness, MVAs, personality changes, irritability, depression
  - Morning or nocturnal headaches

### 3. Physical exam

- Pay special attention to body habitus and upper airway
  - Retrognathia
  - Macroglossia
  - Low-lying soft palate
  - Tonsillar hypertrophy
  - Nasal septal deviation
  - Size and asymmetry of nares
- Chronic leg edema

### 4. Diagnostic testing

- **Polysomnography (PSG)** (SOR:A)<sup>2</sup>
  - Recording of
    - Sleep architecture
    - Airflow and ventilatory effort
    - Oxygen saturation
    - EKG
    - Limb movement
    - Body position
    - EEG
    - Electrooculogram
  - PSG documents adequacy of sleep and indicates whether other etiologies are present, such as narcolepsy or PLMD
- **Apnea-hypopnea index (AHI)** (SOR:C)<sup>2</sup>
  - Number of apneas and hypopneas per hour of sleep
  - OSAHS
    - AHI of 5 or greater combined with daytime somnolence
  - Severity
    - Mild with AHI 5-14
    - Moderate with AHI 15-30
    - Severe with AHI >30
- **CPAP titration study** (SOR:A)<sup>2</sup>
  - To determine the optimal pressure that eliminates snoring and apneas-hypopneas
  - Done when diagnosis of OSAHS is established
  - Can be done as a split-night or second full night study

### Differential Diagnosis

1. Upper airway resistance syndrome (UARS)
2. Central sleep apnea
3. Periodic limb movement disorder of sleep
4. Narcolepsy
5. Idiopathic hypersomnia

### Therapeutics

1. Conservative measures
  - Weight loss (SOR:B)<sup>9,10,11</sup>
  - Alcohol and sedative avoidance
  - Avoiding the supine position in the case of positional OSAHS
  - Good sleep hygiene

## 2. CPAP

- Treatment of choice for most patients (SOR:B)<sup>12,13,14</sup>
- Primary treatment target is hypersomnolence
- Tolerability of CPAP is challenging
  - Compliance as low as 40%
  - Can be improved with heated humidification, machines that ramp up slowly, and bilevel pressure machines
- Complications
  - Epistaxis
  - Rhinorrhea
  - Nasal dryness
  - Congestion
  - Facial abrasions
  - Conjunctivitis
- Uncertain benefit for those with mild disease

## 3. Oral appliances

- Move the tongue or mandible forward
- Inconsistent results
- More for patients with mild to moderate OSA<sup>7</sup>

## 4. Surgery

- **Uvulopalatopharyngoplasty (UPPP) (SOR:2C)<sup>2</sup>**
  - Mixed results
  - Success rate is approximately 50%
  - Long-term success rate falls to 35% after 4 years<sup>7</sup>
  - Less effective in patients with BMI > 30 and in patients with severe disease
  - Associated with significant pain post-op
- Nasal surgery (SOR:C)<sup>7</sup>
- Maxillomandibular advancement (SOR:C)
  - May be effective in patients with anatomical abnormalities leading to OSAHS
- Temperature controlled radiofrequency ablation (SOR:C)<sup>2</sup>
  - Volume reduction of tongue and soft palate
  - 20% success rate<sup>7</sup>
- Tracheostomy (SOR:C)
  - Last-resort measure
  - In life-threatening situations
- Bariatric surgery (SOR:C)<sup>7</sup>
  - Effective in the treatment of OSAHS caused by obesity
  - Must meet BMI requirements of 40 without existing medical conditions and 35 with co-existing medical conditions<sup>7</sup>

## 5. Medications

- Modafinil (SOR:B)<sup>7</sup>
  - Wake promoting that can be used at the same time as other treatments in a complementary manner<sup>7</sup>

## Follow-Up

1. Every 6-12 mo
2. CPAP machine needs maintenance q 6-12 mo

## Prognosis

1. Varies with degree of obstruction and patient compliance with treatment
2. Higher mortality<sup>15</sup>
3. Use more medical resources<sup>15</sup>
4. 3 to 6 fold increased risk of all cause mortality<sup>15</sup>
5. Vehicle accidents more common among patient with OSA<sup>16</sup>
6. Increases inattention and fatigue, consequently limiting daily function, also exacerbates already existing cognitive deficits<sup>16</sup>

## Prevention

1. The most preventable factor is weight gain
2. Avoid muscle relaxants
3. Avoid alcohol beverages before sleeping

## Patient Education

1. [www.sleepapnea.org](http://www.sleepapnea.org)
2. <http://familydoctor.org/online/famdocen/home/articles/212.html>

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### **Evidence-Based Inquiry**

1. Is surgery effective for reducing symptoms in adult patients with obstructive sleep apnea?
2. Is sleep apnea associated with increased risk of stroke?
3. What is the differential diagnosis of chronic leg edema in primary care?
4. Sleep apnea in adults: How accurate is clinical prediction?

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