Obstructive Sleep Apnea: Diagnosis and Management

Kunal Agarwal, MD, FAAFP

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Dr. Agarwal received his Bachelor of Arts degree in Neuroscience from Johns Hopkins University in Baltimore, Maryland and his medical degree from Ross University School of Medicine in Portsmouth, Dominica. He completed his residency in family medicine at Western Michigan University School of Medicine in Kalamazoo and a fellowship in sleep medicine at Henry Ford Hospital in Detroit, Michigan. Board certified in both family medicine and sleep medicine, Dr. Agarwal is a member of the AAFP, the American Academy of Sleep Medicine (AASM), the American College of Chest Physicians, and the American Association of Physicians of Indian Origin (AAPI).

Dr. Agarwal practices family medicine and sleep medicine in Seaford, Delaware. At the Nanticoke Sleep Disorders Centers, he sees adult and pediatric sleep patients, and he developed an inpatient sleep apnea screening program. He serves as a member of the Nanticoke Leadership Council, Pharmacy and Therapeutics Committee, and is vice chairman of the Provider Wellness Committee. He also serves as the physician advisor to the Polysomnogram Advisory Council at the Delaware Department of State Division of Professional Regulation. Dr. Agarwal has been named as Top Doctor by Delaware Today in 2017, 2018 (featured on cover), and 2019.
Learning Objectives

1. Identify patients, based on risk factors, who need to be evaluated for obstructive sleep apnea.

2. Consider OSA in the differential diagnosis of a variety of clinical presentations including new onset hypertension and daytime fatigue.

3. Counsel patients to make lifestyle modifications that may relieve mild obstructive sleep apnea.

4. Counsel patients on strategies to encourage compliance with CPAP therapy for obstructive sleep apnea, and mandibular advancement devices as an alternative.

Audience Engagement System

Step 1

Step 2

Step 3
Outline

• Definition
• Epidemiology
• Risk factors
• Screening
• Diagnosis
• Polysomnogram and Home Sleep Study
• Sleep Apnea and other medical conditions
• Treatment
• Questions

Definition

• Episodes of complete or partial collapse of airway are translated to # of apnea and hypopnea events (AHI).
  • **Apnea** = cessation of airflow > 10 seconds
  • **Hypopnea** = Decreased airflow > 10 seconds associated with:
    • Arousal
    • Oxyhemoglobin desaturation
Epidemiology

• Men: women = 2:1
• 80-90% undiagnosed
• Prevalence of 20-30% males and 10-15% females in North America
• Higher prevalence in African Americans, compared to Caucasians <35 years of age
• Similar prevalence in Asia to USA, despite lower obesity
• 18 million suffer (prevalence similar to Diabetes)
• Can affect children
OSA Treatment Economic Analysis

• Annual per patient diagnosis and treatment costs are 67% less than leaving patients undiagnosed

• Diagnosing and treating all 29.4M Americans with OSA could save $100.1 billion

• Biggest opportunity cost involves lost workplace productivity ($ 86.9 Billion)

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USPSTF Recommendation

• Current evidence is insufficient to assess the balance of benefits and harms of screening for OSA in asymptomatic adults. (I statement)

• No evidence that detecting OSA through screening among individuals who do not present with symptoms yields any benefit.

• Should have low threshold for screening
Nearly 50 percent of adult patients visiting primary care physicians are at risk for OSA

30% to 40% of patients who see their PCP regularly are at high risk for OSA

Only 20% of them spontaneously report their sleep symptoms

Complete review of systems, should include specific questions about sleep (snoring, sleepiness, apneas)

Few pediatricians (18%) had ever received formal training on sleep disorders.

Data from the 2015 National Ambulatory Medical Care Survey indicates that family physicians make a diagnosis of OSA in over 775,762 office visits annually

Studies suggest that OSA can be effectively managed in the primary care office setting

92,608 total boarded family medicine physicians

173 are also boarded in sleep medicine
African Americans and OSA

- Less likely to receive OSA evaluation and treatment, even though they are at greater risk than their Caucasian counterparts
- Misconception that OSA was synonymous with insomnia
- Misconception was that OSA was a natural process of aging
- Belief OSA was caused by:
  - eating certain foods,
  - eating too late or immediately before bedtime,
  - not doing enough activities during the day and therefore not being tired enough at the end of the day

Screening for OSA

- American Academy of Sleep Medicine (AASM) suggests three opportunities to screen for OSA:
  - At routine health maintenance visits
  - If the patient reports clinical symptoms of OSA
  - If the patient has risk factors.
STOP BANG score

- Snoring
- Tired, fatigued, or sleepy
- Observed apneas
- Pressure (hx of high blood pressure)
- BMI > 35
- Age >50
- Neck size > 16 inches
- Gender: Male

- Each 1 point
  - Low Risk : 0 – 2
  - Intermediate Risk :3 – 4
  - High Risk : 5 – 8

- User friendly – 5th grade reading level
- Sensitivity of 93% at AHI of 15
- Specificity of 43% at AHI of 15

- Validated in preoperative setting

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**Berlin Questionnaire**

1. Complete the following: height_________ weight_________

2. Do you snore?
   - Yes
   - No
   - Don’t know

3. How do you sleep?
   - Sleeps louder than breathing
   - As loud as talking
   - Louder than usual
   - Very loud, can be heard in adjacent room

4. How often do you snore?
   - Every night
   - Every other night
   - 3 times a week
   - 2 times a month
   - Never or nearly never

5. Has your snoring ever bothered other people?
   - Yes
   - No

6. Have you noticed that you quit breathing during your sleep?
   - Every night
   - Every other night
   - 3 times a week
   - 2 times a month
   - Never or nearly never

**Scoring:**

- **Score:** Any answer within box outline is a positive response
- **Category:** Category 1 is positive with 2 or more positive responses to questions 2-4
- **Category 2:** Category 2 is positive with 3 or more positive responses to questions 7-9
- **Category 3:** Category 3 is positive with 1 or more positive response and/or an BMI >30

**BERLIN Questionnaire**

Validated in primary care settings.

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The BQ for OSA (5). The questionnaire incorporates questions about snoring (category 1), daytime somnolence (category 2), and hypertension and BMI (category 3). BQ, Berlin questionnaire; OSA, obstructive sleep apnea; BMI, body mass index.
Epworth Sleepiness Scale:
Measures average sleep propensity (chance of dozing) over 8 common situations that almost everyone encounters.

*Score greater than 10 is significant*

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of Dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sitting and reading</td>
<td>0-3</td>
</tr>
<tr>
<td>• Watching T.V.</td>
<td>0-3</td>
</tr>
<tr>
<td>• Sitting inactive in a public place (i.e., theater, meeting)</td>
<td>0-3</td>
</tr>
<tr>
<td>• As a passenger in a car for 1 hour without a break</td>
<td>0-3</td>
</tr>
<tr>
<td>• Lying down to rest in the afternoon when circumstances permit</td>
<td>0-3</td>
</tr>
<tr>
<td>• Sitting talking to someone</td>
<td>0-3</td>
</tr>
<tr>
<td>• Sitting quietly after lunch without alcohol</td>
<td>0-3</td>
</tr>
<tr>
<td>• In a car while stopped for a few minutes in traffic</td>
<td>0-24 (0-10 normal)</td>
</tr>
</tbody>
</table>

Total

3= High chance of dozing; 2=moderate; 1=slight; 0=never

Poll Question 1

Which of the following is NOT a high risk factor for OSA?

A. Congestive heart failure
B. Thyroid disorder
C. Stroke
D. Atrial fibrillation
E. They are ALL high risk factors
Risk Factors

- Male
- Postmenopausal women
- Overweight BMI>30
- Over 40 years of age
- Neck size 17 inches or greater in men; 16 inches in females
- Family history of OSA
- Smoking
- Excessive alcohol use
- Ethnic origin: African American, Hispanic, Asian
- Small oral pharynx – crowded airway

High risk for OSA

- Obesity (BMI > 35)
- Congestive heart failure
- Atrial fibrillation
- Resistant hypertension
- Type 2 diabetes
- Nocturnal dysrhythmias
- Stroke
- Pulmonary hypertension
- High-risk driving populations
- Preoperative for bariatric surgery
Common Signs of Sleep Apnea

**Sleep Disturbance**
- Loud or disruptive snoring
- Gasping or choking during sleep
- Witnessed apneas
- Restless sleep

**Daytime function**
- Loss of energy/unexplained fatigue
- Excessive daytime sleepiness
- Morning headaches

**Medical Issues**
- Dry or sore throat
- Depression, irritability or difficulty concentrating
- High blood pressure
- Nocturia
- Weight gain
- Decreased libido
- Memory loss
- ADHD in children/behavioral problems/poor grades
- Failure to thrive/growth impairment (peds)
Diagnosis

• Combined assessment of clinical features and objective sleep study data.
• The gold standard: **overnight polysomnogram**
• The Polysomnogram (PSG):
  • Provides detailed information on sleep state and respiratory and gas exchange abnormalities.

Questions to ask on routine exam

• Is the patient obese?
• Is the patient retrognathic?
• Does the patient complain of daytime sleepiness?
• Does the patient snore?
• Does the patient have hypertension?
Physical Exam

• Focus on cardiac, respiratory, and neuro exams
• increased neck circumference (> 17 inches in men, > 16 inches in women),
• body mass index (BMI) > 30 kg/m²,
• a Modified Mallampati score of 3 or 4
• retrognathia, lateral peritonsillar narrowing, macroglossia, tonsillar hypertrophy, elongated/enlarged uvula, high arched/narrow hard palate, nasal abnormalities (polyps, deviation, valve abnormalities, turbinate hypertrophy) and/or overjet

Craniofacial Anatomy

• Mandibular body length
• Retrognathia
• Tonsillar hypertrophy
• Enlarged tongue or soft palate
• Inferiorly positioned hyoid bone
• Maxillary and mandibular retro position
• Decreased posterior airway space
Craniofacial Anatomy

Non-Obstructed Airway  Obstructed Airway

The modified Mallampati classification for difficult laryngoscopy and intubation

- Hard palate
- Soft palate
- Uvula
- Pillar

Class I: Uvula is visible
Class II: Uvula and pillars are visible
Class III: Uvula, pillars, and hard palate are visible
Class IV: Only the hard palate is visible

Reference:
Polysomnography (PSG)

Multiple physiologic parameters are measured and compared with the established norms.

- Electrocardiography (EKG)
- Electroencephalography (EEG)
- Electro-oculography (EOG)
- Electromyography (EMG)
- Pulse Oximetry
- Respiration:
  - Effort (chest and abdominal movements)
  - Airflow
  - Snore sensor/microphone
Human Sleep Architecture

• Wake
• NREM sleep
  • Stages 1 and 2 (light sleep)
  • Stages 3 (deep sleep)
• REM sleep
• Recognition of certain characteristic EEG patterns is essential for staging sleep

PSG

• Sleep apnea severity index:
  • \[ AHI = \text{apnea-hypopnea index} \]
  \[ = \# \text{ of apneas and hypopneas} / \text{hours of sleep} \]

• Mild: 5 – 15 events/hour of sleep
• Moderate: 15 – 30 event/hour of sleep
• Severe: > 30 events/hour of sleep
Poll Question 2

Which patient scenario is matched with the appropriate sleep study type to diagnose sleep apnea?

A. 45-year-old, very obese (BMI, 65 kg/m²) man with diabetes, congestive heart failure, respiratory failure, and severe desaturations with oximetry – **home sleep study**

B. A 60-year-old, obese (BMI, 34 kg/m²), sleepy man receiving treatment for hypertension who snores and was previously diagnosed with sleep apnea in the past – **split study**

C. A 75-year-old, man (BMI, 23 kg/m²) with back pain – **split study**

D. A 69-year-old, obese (BMI, 32 kg/m²) man who smokes, has COPD and daytime sleepiness, snores loudly, and is using supplemental oxygen – **home sleep study**.
PSG

• Duration of the diagnostic study should be at least six hours.
• Need at least 120 minutes sleep time to qualify for PAP therapy

• Split-night studies
  • First half = diagnosis
  • Second half = initiation of CPAP therapy
    (when obvious OSA is present (AHI >20))

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PSG vs Home sleep study

The home sleep test measures the same 5 essential channels for diagnosing OSA as the lab PSG. Other PSG measurements apply to non-OSA clinical evaluations.
HST

• American Academy of Sleep Medicine recommends it as an alternative to polysomnography, in conjunction with a comprehensive sleep evaluation, only in the following situations:

  • If the patient has a high pretest probability of moderate to severe OSA
  
  • If immobility or critical illness makes polysomnography unfeasible
  
  • If direct monitoring of the response to non-CPAP treatments for sleep apnea is needed

HST

• **Home testing for OSA should NOT be used in the following situations:**
  
  • If the patient has significant morbidity such as moderate to severe pulmonary disease, neuromuscular disease, or congestive heart failure
  
  • In evaluating a patient suspected of having comorbid sleep disorders such as central sleep apnea, periodic limb movement disorder, insomnia, parasomnias, circadian rhythm disorder, or narcolepsy
  
  • In screening of asymptomatic patients
Limitations of PSG

• Requires an overnight stay in sleep lab
• Time consuming
• Labor intensive
• Costly
• Limited access in some regions

Limitations of home sleep study

• HST underestimates sleep apnea severity
• Higher false negative diagnostic rates (~17%)
• Restricted definition of Hypopnea (no arousal)
• Estimated total sleep times
• Cannot objectively tell if patient is sleeping or in deep sleep (REM)
• Acceptable for ruling in sleep apnea
• NOT for ruling out sleep apnea
Sleep Apnea and other medical conditions

Hypertension and OSA

• >70-80% of patients with resistant HTN have OSA.

• CPAP treatment and pharmacological therapies have additive effects on lowering BP
Arrhythmias and Sleep Apnea

• Atrial fibrillation, non-sustained ventricular tachycardia, and complex ventricular ectopy more common in OSA patients

• Bradyarrhythmias and heart block may be treated effectively with CPAP

Heart Failure and OSA

• Obstructive sleep apnea is the most common, least recognized co-morbidity -- 70% of systolic HF patients have OSA/CSA

• Similar symptoms in heart failure and OSA

• CPAP treatment can improve ejection fraction in patients with systolic dysfunction.
Coronary Heart Disease and Sleep Apnea

- CAD estimated to be present in 20–25% of OSA patients
- Major cardiac events are more likely in patients with severe OSA
- CPAP may significantly reduce the rate of nonfatal and fatal cardiovascular events
- Screening for both disorders in patients with risk factors

Sleep Apnea and Diabetes

- Patients with OSA have an increased prevalence of insulin resistance and type 2 diabetes.
- Patients with severe OSA had 30% higher risk of incident diabetes compared with patients without OSA
Stroke and Sleep Apnea

• OSA occurs in 60-70% of stroke patients

• Over 50% of stroke patients may demonstrate signs of OSA within the first 24 hours after stroke

• Long-term CPAP treatment in moderate to severe OSA and ischemic stroke is associated with a reduction in the mortality rate

Alzheimer’s disease and sleep apnea

• Patients diagnosed with OSA after age 65 may be at increased risk of later developing Alzheimer’s disease.

• CPAP therapy can improve sleepiness, cognitive function, slow deterioration, and improve mood
Sleep Apnea and Obesity

• Obesity is essentially the only reversible risk factor

• About 70% of those with OSA are obese

• Higher BMI associated with higher prevalence

• Lose or gain 10% of body weight, change in AHI is 30%.

• Usually applies to middle age and middle sized people. Not obese or elderly.
Sleep Apnea and Obesity

Apple shape is riskier than Pear shape

Traffic Accidents and OSA

• Sleepiness affects reaction time, lane position and steering
• OSA patients are 2-15 times as likely to have an accident as the general population
• The risk of motor vehicle crashes was higher in men.
• The FAA says the performance degradation of mild to moderate OSA can equal BAL 0.08%
• After 2 years of CPAP treatment, the rate of near miss accidents was comparable with drivers without OSA.
Avoid this guy on the road!

Sleep Apnea and Surgery

• OSA is higher in patients presenting for surgery than in the general population.
  • 70% prevalence in bariatric surgery patients
  • 22% in the adult surgical population presenting for non-upper airway surgery.
• Issues with airway management and pain control
• Higher post-op respiratory complications
• Significantly longer hospital and ICU stays
• Patients with OSA treated with CPAP preoperatively showed reduced opioid use and reduced pain scores
Poll Question 3

Because of fatigue, sleep disturbance, and BP that is difficult to control, a 56 year old woman undergoes polysomnography (PSG). Her Epworth Sleepiness Scale score is 14. The PSG results revealed sleep efficiency of 61%, apnea hypopnea index (AHI) of 56/h, oxygen desaturations index of 52/h, lowest SaO2 of 78%, and time <90% SaO2 of 43 min.

When discussing the results and the recommended course of action, the patient’s primary sleep complaint is insomnia, and she states that she does not believe she will be able to sleep with a CPAP mask on.

Which of the following is the best immediate option for this patient?

A. Modafinil
B. Education and oral appliance
C. Reassurance and a prescription for hypnotics
D. Education and a trial of CPAP
Treatment

- Behavioral Methods
- Positive Airway Pressure Therapy
  * CPAP & Auto CPAP.
  * Bi-PAP – usually better for obesity hypoventilation, those that fail or intolerant to CPAP
  * ASV – central sleep apnea
- Dental Oral Appliance
- Surgical

Behavioral treatment

- Weight loss:
  - 10 – 15 % reduction in weight can lead to ~ 50% reduction in sleep apnea severity in moderately obese male patients.
- Avoid alcohol and sedatives
- Avoid sleep deprivation
- Avoid supine sleep position
- Stop smoking
Positional Therapy

• If AHI lower when lateral: avoid supine position
  • Up to 1/3 mild or moderate cases are position-dependent

• Methods for adherence
  • Tennis ball strapped to back while sleeping
  • Wearable positional avoidance devices
  • Monitors or alarms

Positive Airway Pressure

2006 American Academy of Sleep Medicine
• Treatment of OSA with PAP therapy should be based on a diagnosis of OSA established using objective sleep apnea testing.

• Adequate follow-up, including troubleshooting and monitoring of objective efficacy and usage data to ensure adequate treatment and adherence, should occur following PAP therapy initiation and during treatment of OSA.
AASM Recommendations

• We recommend that clinicians use PAP, compared to no therapy, to treat OSA in adults with excessive sleepiness. (STRONG)
• We recommend that PAP therapy be initiated using either APAP at home or in-laboratory PAP titration in adults with OSA and no significant comorbidities. (STRONG)
• We recommend that clinicians use either CPAP or APAP for ongoing treatment of OSA in adults. (STRONG)
• We recommend that educational interventions be given with initiation of PAP therapy in adults with OSA. (STRONG)
CPAP therapy

• GOALS:
  • Eliminate apneas & hypopneas
  • Increased oxyhemoglobin saturation
  • Improve sleep duration and quality
  • Reduce daytime sleepiness
  • Enhance daytime function and quality of life

• BENEFITS:
  • Improve quality of life
  • Better BP and glycemic control
  • Reduce CV morbidity/mortality
  • Reduce MVA
  • Reduce healthcare costs

Patients should use CPAP whenever they sleep.
CMS: adequate CPAP use ≥4 hours/day on 70% of nights

Full face
Full face

Nasal mask
Nasal pillows

Nasal pillows
CPAP therapy

• Problems:
  • Mask discomfort
  • Patient acceptance
  • Claustrophobia
  • Aerophagia

• Focusing on goals for use of CPAP and reviewing goals relative to pre-treatment status improves adherence

How the CPAP treatment works

• The user is provided with a constant stream of compressed air

• The pressure from the air keeps the airway open lessening/preventing the number of sleep apnea episodes

• The air pressure is measured in cm per water.

• Range is 4-20 cm H2O.
Poll Question 4

Which of the following patients with OSA would be the best candidate to consider for use of an autotitrating PAP (APAP) therapy?

A. 45-year-old, very obese (BMI, 55 kg/m²) man with diabetes and severe desaturations with oximetry
B. A 60-year-old, obese (BMI, 34 kg/m²), sleepy woman receiving treatment for hypertension
C. A 75-year-old, sleepy man (BMI, 27 kg/m²) with snoring, using methadone and baclofen for back pain
D. A 69-year-old, overweight (BMI, 30 kg/m²) man who smokes, has asthma and daytime sleepiness, and snores loudly

Auto CPAP (APAP)

• Aka: Automatic, automated, autotitrating, autoadjusting, self-titrating
• Detects and responds to changes in upper airway flow or resistance patterns
• Range: 4-20 cm H2O.
• Clear candidates: Uncomplicated moderate to severe OSAS

• Not APAP candidates:
• Congestive heart failure
• COPD and chronic lung disease
• Obesity Hypoventilation Syndrome
• Other hypoventilation Syndromes
• Lack of snoring
PAP adherence

• Adherence enhanced by:
  • Education and cognitive behavioral therapy
  • Heated humidification
  • Short term eszopiclone (Lunesta)
  • Desensitization for claustrophobic patients
  • Patient and partner involved – mask selection
  • Loss of intimacy – have fun, then put mask on
  • Other PAP modes if patient has intolerance to pressure
  • Mask choice: Nasal, nasal pillow, full face mask

• Best mask is the one the patient will wear!

CPAP follow up

• Assess symptomatic improvement – more refreshed, sound sleep, nocturia resolved
• Compliance – modem, SD card, manually from machine
• Efficacy – is AHI <5.0?
• Mask leak
• Nasal/mouth dryness
• Problems exhaling with CPAP – may need Bipap
• Resupply – mask, cushion, filters, hose
• Follow up at: 2 weeks, 1 months, 3 months, 6 months, yearly
AASM Guidelines – Oral Appliance

• We recommend that sleep physicians prescribe oral appliances, rather than no therapy, for adult patients who request treatment of primary snoring (without obstructive sleep apnea). (STANDARD)

• We recommend that sleep physicians consider prescription of oral appliances, rather than no treatment, for adult patients with obstructive sleep apnea who are intolerant of CPAP therapy or prefer alternate therapy. (STANDARD)

Dental Oral Appliance

• Decrease airway collapsibility and enlarge upper airway
  • Requires adequate dentition, good jaw mobility, may exacerbate TMJ
  • Refer to experienced dentist (sleep dentistry accreditation)

• Less effective than CPAP for normalizing the AHI
  • Mild or moderate OSA: May be reasonable initial therapy
  • Severe OSA: Not recommended as initial therapy; less increase in oxygenation for AHI >30.
  • Patients tend to accept better than CPAP

• Follow-up sleep study needed to document adequacy
Dental Oral Appliance

• Mandibular Repositioning Splint
  • Protrude the mandible forward and hold tongue more anteriorly, away from the posterior pharyngeal wall

Surgeries

• Uvulopalatopharyngoplasty (UPPP)
  • Small reduction in symptoms
  • Fewer than half of patients have reduction in severity

• Tonsillectomy, nasal septoplasty
  • Increase CPAP tolerability + reduce snoring (not cure)

• Maxillomandibular advancement (MMA)
  • Invasive procedure with prolonged postop recovery
  • Cure rate >90%, particularly in non-obese with retrognathia

• Tracheostomy
  • Cures OSA
  • Can be used in life-threatening situations
Uvulopalatopharyngoplasty (UPPP)

Maxillomandibular Advancement (MMA)
Upper Airway (Hypoglossal Nerve) Stimulation

**Inclusion:**
- 22 years of age or older
- have moderate to severe OSA (AHI range from 15-65 with <25% central apneas)
- unable to use CPAP
- free of complete concentric collapse at the palate

**Exclusion:**
- BMI >32 and
- Drug induced sedation endoscopy (DISE) shows complete concentric collapse of soft palate (~10%)

- Median AHI decreased 68% at 12 months,
- But one-third were non-responders
Residual sleepiness

- Ensure adequate sleep duration (~7 hours for adults)
- Confirm OSA diagnosis
- Adequate CPAP titration
- Measure CPAP efficacy – mask leaks, compliance
- Ensure adequate compliance
- Exclude comorbid conditions – rule out depression, anemia, narcolepsy, thyroid disorder, vitamin deficiencies, poor sleep hygiene, medication side effects
- Unrealistic expectations
- Brain damage from intermittent hypoxemia

Practice Recommendations

- Include “snoring, witnessed apneas, and sleepiness” in Review of Systems.

- Order sleep studies on ALL high risk patients: heart failure, A Fib, stroke, resistant HTN, preoperative, morbid obesity

- Try dental oral appliance for CPAP intolerant and mild to moderate OSA

- Counsel ALL patients not to drive when sleepy
Summary - Diagnosis

• 80% undiagnosed for OSA
• Evaluate patients with symptoms suggestive of OSA
  • Snoring, sleepiness, gasping, choking, drowsy driving, witnessed apneas
• High risk: heart failure, A Fib, stroke, resistant HTN, preoperative
• Screening: STOP BANG, Berlin, Epworth questionnaires
• In lab testing – PSG: gold standard; more accurate, but costly
• In home sleep testing – HST: if high clinical suspicion of OSA and no significant cardiopulmonary comorbid conditions

Summary - Treatment

• Conservative measures: weight loss, positional therapy, no ETOH
• First line – CPAP therapy
• Benefits: symptom resolution, improves BP/glycemic control, reduces CV risk
• Enhance adherence: education, goal setting, right mask, humidification, short term hypnotic
• Oral Appliance for mild to moderate OSA, and or CPAP intolerant
• Surgery – UPPP, MMA, tracheostomy, upper airway stimulation
Otherwise snore and this will happen to you….

Or sleep alone….
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