Obstructive Sleep Apnea

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Learning Objectives

- To identify the risk factors for Obstructive Sleep Apnea (OSA)
- To summarize screening and evaluation for OSA
- To discuss treatment options and review the guidelines regarding management for OSA

Question?

- A 52-year-old woman reports feeling tried and sleepy despite sleeping 7 to 8 hours every night. She wakes unrefreshed. She has been told by her husband that she snores. Recently, she has noted sleepiness while driving home from work. Her medical history includes obesity, hypertension, and type 2 diabetes mellitus. Her physical examination is notable for a BMI of 35 and a large tongue partially obscuring the soft palate. How would you evaluate and treat this patient?

Definition

Obstructive sleep apnea is characterized by

- Episodic sleep state
- Dependent collapse of the upper airway resulting in periodic reductions or cessations in ventilation, with consequent hypoxia, hypercapnia, or arousals from sleep

Prevalence

- 3% among women and 10% among men 30 to 49 years of age.
- 9% among women and 17% among men 50 to 70 years of age.
- Estimated 24 million persons in the United States – many have not received a diagnosis yet.

Risk factors

Any condition that reduce the size of the resting pharynx or increase airway collapsibility.

1. Obesity
2. Male sex
3. Hypothyroidism or Acromegaly.
4. Increased tonsillar and adenoid tissue
5. Craniofacial abnormalities (retrognathia and maxillary insufficiency)

Signs or Symptoms That Should Trigger Suspicion of Obstructive Sleep Apnea.

- Loud or irregular snoring
- Daytime sleepiness
- Unrefreshing sleep regardless of sleep duration
- Increased fatigue when patient is sedentary
- Nocturia
- Choking and gasping in sleep
- Dry mouth on awakening
- Morning headaches
- Body mass index >30
- Crowded oropharynx
- Increased neck circumference (men, >17 in. [43.2 cm]; women, >15 in. [38.1 cm])

- Not every patient with obstructive sleep apnea perceives sleepiness or has been told of snoring.
- Although higher BMIs markedly increase the risk of obstructive sleep apnea, some patients are of normal weight.

Increased likelihood with certain medical conditions

- Congestive heart failure
- Atrial fibrillation
- Treatment-refractory hypertension
- Type 2 diabetes
- Metabolic syndrome
- Nocturnal dysrhythmias
- Stroke
- Hypothyroidism
- Acromegaly
- Pulmonary hypertension
- High-risk drivers and preoperative bariatric- surgery patients also merit consideration

Evaluation by PCP

- Is the patient obese?
- Is the patient retrognathic?
- Does the patient snore?
- Does the patient have hypertension?
- Does the patient have atrial fibrillation?
- Does the patient complain of excessive daytime sleepiness?

Epworth Sleepiness Score

- One of the most frequently used methods for determining a person's average level of daytime sleepiness.
- Self-reported questionnaire involving eight questions to assess the propensity for daytime sleepiness or dozing.

0 Would ***never*** doze

1 ***Slight*** chance of dozing

2 ***Moderate*** chance of dozing

3 ***High*** chance of dozing

	Chance of Dozing			
Sitting and reading	0	1	2	3
Watching television	0	1	2	3
Sitting inactive in a public place (eg, a theater or a meeting)	0	1	2	3
As a passenger in a car for an hour without a break	0	1	2	3
Lying down to rest in the afternoon when circumstances permit	0	1	2	3
Sitting and talking to someone	0	1	2	3
Sitting quietly after a lunch without alcohol	0	1	2	3
In a car, while stopped for a few minutes in traffic	0	1	2	3
			Total Score:	

Interpreting Epworth Sleepiness Scale Scores[1,2]		
Normal	EDS*	High Levels of EDS*
0-10	>10	>16

Evaluation

- Polysomnography is the standard diagnostic test for the diagnosis of OSA in adult patients in whom there is a concern for OSA based on a comprehensive sleep evaluation

Polysomnography (PSG)

- Full-night PSG is recommended for the diagnosis of a sleep related breathing disorder
- Split-night study - Initial diagnostic PSG (2 hours) followed by continuous positive airway pressure titration on the same night.
- Home sleep apnea testing (HSAT).

Polysomnography (PSG)

- Electroencephalogram – measures brain activity
- Electro myelogram – measures muscle activity
- Nasal/ oral airflow
- Electrocardiogram
- Thoracic and abdominal movements
- Body position
- Oxygen saturation

Polysomnography (PSG) – Respiratory Events

- AHI (Apnea Hypopnea Index)
- RERA (Respiratory Effort Related Arousal)
- Respiratory Disturbance Index (RDI = AHI+RERA per hour)
- Oxygen Saturation

Apneas and Hypopneas

- Obstructive apneas are defined as near-complete (>90%) cessations in airflow for more than 10 seconds in sleep, despite ventilatory effort.
- Hypopneas are generally defined as reductions in air- flow by more than 30% with concurrent reductions in oxyhemoglobin saturation by at least 4% or arousals from sleep.

Apnea–hypopnea index (AHI)

The number of apneas and hypopneas per hour of sleep is termed the apnea– hypopnea index (AHI).

The presence of obstructive sleep apnea is defined as an AHI of 5 or more events per hour.

Apnea–hypopnea index (AHI)

The AHI is used to categorize disease severity

- Mild OSA - 5 to15 events per hour
- Moderate OSA - 16 to 30 events per hour
- Severe OSA - 30 events per hour

Home Sleep Apnea Study (HSAT)

- Involves a single HSAT recording over at least one night.
- Must be administered by an accredited sleep center under the supervision of board certified and board eligible provider.
- Less sensitive than PSG
- PSG may be required if HSAT is inconclusive or negative and clinical suspicion of OSA is high.

Management

1. Continuous positive airway pressure (CPAP) - Mainstay of therapy in most adults
2. Medical Therapies
3. Non supine position
4. Weight loss
5. Oral appliances
6. Surgery
7. Inspire therapy – Upper airway Stimulation

Management

- Avoid Sedatives/hypnotics, cautious use of opioids
- Smoking cessation
- Sleep hygiene
  - Consistent sleep/wake times
  - Avoid alcohol, heavy meals before bedtime
  - Position on side
  - Avoid caffeine 8-12 hours before bedtime
  - Avoid TV, cellphone in bed

CPAP Therapy

- Most effective in treatment of OSA.
- CPAP treatment is standard of care.
- Maintains upper airway patency during sleep, preventing soft tissues from collapsing.
- Different types of mask are available.
  - Nasal pillows
  - Nasal mask
  - Full face mask

Guidelines for using CPAP

- AHI >15
- AHI 5-14.9 with symptoms – Excessive day time sleepiness Epworth sleepiness scale > 10/24, Hypertension or Cardiovascular disease or history of stroke.

Complications of PAP therapy

- Sensation of suffocation/ claustrophobia
- Inability to sleep
- Difficulty exhaling
- Aerophagia
- Sinus discomfort
- Mask related issues – rash/ skin abrasions
- Oral/ nasal dryness

Medical Therapies

- **Nasal Corticosteroids** – Improves CPAP adherence in patients with nasal symptoms.
- **Modafinil** - Residual excessive daytime sleepiness in OSA patients. Patients needs to demonstrate adequate CPAP compliance with 7-8 hour use every night before modafinil is indicated.
- **Non supine position** –lateral recumbent- supplement to primary therapy

Medical Therapy – Not recommended

- Nasal decongestant
- Aminophylline and theophylline
- SSRI
- Protriptyline
- Supplemental Oxygen

Weight loss

- Improves AHI.
- Recommended treatment option in mild OSA.
- Should be combined with primary treatment of OSA – like CPAP/ dental devices/ surgery
- Bariatric surgery

Surgery

- Tonsillectomy and adenoidectomy - in pediatric patients
- Bariatric surgery
- Uvulopalatopharyngoplasty (UPPP)
- Tongue reduction procedures
- Tracheostomy - for life-threatening obstructive apnea.

Surgeries are not routinely recommended as success rate is low. Usually sleep apnea comes back in 50% of the patients as upper airway obstruction develops at different location in upper airway after surgery.

Oral Appliances

- Patient intolerant to CPAP
- Patients who desire alternate therapy

- Mandibular advancement device and Tongue retaining device - Aid with bringing lower jaw and tongue forward during sleep

Oral Appliances

- Improve frequency and intensity of snoring
- Improve sleep quality for both patients who snore and their bed partners
- Improve quality of life (QOL) measures
- A qualified dentist should be involved for custom, titratable appliance.
- Out of pocket cost ~$2000-3000 as insurances not cover.

Upper Airway Stimulation / Inspire Therapy

- Upper airway stimulation device is surgically implanted in patients.
- Uni lateral stimulation of the hypoglossal nerve
- Synchronous with ventilation
- Evokes a functional response of the tongue muscles and an anterior displacement of the tongue.

- Questions?

Sources

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Snore Arousal

- Any type of arousal occurring immediately following a period of crescendo snoring in the absence of apneic event.

Respiratory Effort Related Arousal (RERA)

Increasing respiratory effort for 10 seconds or longer leading to arousal from sleep but one that does not fulfill the criteria for Apnea/ hypopnea.

No associated desaturation.