Obstructive Sleep Apnea and its Effects on Daily Living

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Objectives

- Identify risk factors and clinical associations with obstructive sleep apnea
- Discuss treatment options
- Evaluate proper management and treatment outcomes
Obstructive Sleep Apnea (OSA)

- About 80-90% of US adults with OSA are undiagnosed
- Leading cause of daytime sleepiness
- Associated with many cardiovascular complications

Pathophysiology

1. Physical obstruction with respiration
2. Brief breathing cessation reduces blood oxygen
3. Brain responds to restore breathing
**OSA Clinical Presentation**

- Unexplained excessive sleepiness
- Morning headaches
- Decreased concentration and libido
- Witnessed apneas
- Snoring, gasping/choking

**Sleep Apneas**

- **Central Sleep Apnea (CSA)**
  - Lack of signals sent from the brain to tell the body to breathe
  - Presents similar to OSA
  - Type of CSA common in heart failure and stroke patients
  - Presents as increased and decreased breath cycles

**Risk Factor: Weight**

- **Weight**:
  - BMI 25-29.9 (overweight)
  - BMI >30 (obese)

- **Neck circumference**:
  - Men more than 17 in.
  - Women more than 16 in.
Risk Factors: Anatomical

- Craniofacial and upper airway abnormalities
  - Abnormal anatomy of the bony soft tissue of the head and neck
- Endocrine Disorders
  - Acromegaly and Hypothyroidism
- Nocturnal Nasal Congestion
- Family History

Other Risk Factors

- Age
  - Men older than 40 years old
  - Women older than 50 years old
- Gender
  - Occurs in males more frequently than females
- Smoking
- Alcohol
- Narcotics
- Benzodiazepines

Evaluate for OSA

- BMI > 35 (severely obese)
- Heart Failure
- Stroke
- Arrhythmia
- Diabetes
- Hypertension
- High-risk driving population
OSA and Cardiovascular Disease

- Significant increase in sympathetic activity during sleep due to arousals
- Influences heart rate and blood pressure
- OSA identified as secondary risk factor for hypertension

Hypertension

- Association found independent of obesity
- Treatment provides a modest but significant reduction

Pulmonary Hypertension

- Prevalent in up to 20% of modest-severe OSA patients
- Treatment provides a modest but significant reduction
Stroke

- OSA is an independent risk factor for stroke risk
- Treatment studies are limited but suggestive to prevent stroke recurrence

Heart Failure

- Sleep disorders are commonly associated in heart failure
- Treatment improves progression but unknown effects on mortality

Atrial Fibrillation

- Frequently associated with OSA
- Treatment has benefits but data is limited
Guidelines

- American Academy of Sleep Medicine
- American College of Physicians

Diagnosis

- Polysomnography (PSG)
- Portable Monitors
- Questionnaires

Polysomnography (PSG)

- Provides the most accurate OSA diagnosis
- Type of sleep study performed in a lab
Portable Monitors

- Should not replace sleep study in lab
- Patient is monitored from home
- Recommended for high risk patients with no comorbidities

OSA Diagnosis

- Apnea-hypopnea index (AHI): Number of sleep apnea or hypopnea events combined per hour during sleep
  - Mild: AHI 5-15
  - Moderate: AHI >15-<30
  - Severe: AHI >30

Apnea-hypopnea index (AHI)

- Centers for Medicare & Medicaid Services reimburses for treatment if the following is met:
  - AHI score of at least 15 events per hour or at least 5 events/hour with symptoms
**OSA Questionnaire Diagnosis**

- Epworth Sleepiness Scale
- Berlin Questionnaire
- Multivariate Apnea Prediction Index
- Pittsburgh Sleep Quality Index
- STOP-BANG Questionnaire

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**Epworth Sleepiness Scale**

*The Epworth Sleepiness Scale (To assess risk of Obstructive Sleep Apnea)*

Use the following scale to determine the most appropriate number for each situation:

- 0 = would never doze
- 1 = slight chance of dozing
- 2 = definite chance of dozing
- 3 = very strong chance of dozing

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chances of dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td>1</td>
</tr>
<tr>
<td>Sitting, inactive in a public place (e.g. a theatre or a meeting)</td>
<td>1</td>
</tr>
<tr>
<td>As a passenger in a car for an hour without a break</td>
<td>2</td>
</tr>
<tr>
<td>Lying down to rest in the afternoons when circumstances permit</td>
<td>3</td>
</tr>
<tr>
<td>Sitting and talking to someone</td>
<td>1</td>
</tr>
<tr>
<td>Sitting quietly after a lunch without alcohol</td>
<td>1</td>
</tr>
<tr>
<td>In a car, while stopped for a few minutes in the traffic</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 9

**Epworth Sleepiness Scale (ESS)**

<table>
<thead>
<tr>
<th>Situations</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Sitting and Reading</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2) Watching TV</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3) Sitting inactive in a public place (meeting/lecture)</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4) Passenger in a car for one hour without a break</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5) Lying down to rest in the afternoon</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6) Sitting and talking to someone</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7) Sitting quietly after lunch when without alcohol</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8) In a car while stopped for a few minutes in traffic</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total: 18 4 10 7
STOP-BANG

STOP-BANG Questionnaire:
- S – Snoring: Do you snore loudly?
- T – Tired: Do you feel tired, sleepy during daytime?
- O – Observed: Has anyone observed you stop breathing during sleep?
- P – Blood Pressure: Are you being treated or have you been treated for hypertension?
- B – BMI: Body mass index > 35
- A – Age: Age over 50 years
- N – Neck: Neck circumference greater than 40 cm
- G – Gender: Male gender

OSA Treatment

- Behavioral Modifications
- CPAP Machine
- Oral/Nasal Devices
- Stimulation Therapy
- Surgery

Treatment: Behavioral

- Weight loss
  - BMI less than 25
  - Will improve other medical conditions
- Positional Therapy
  - Positional pillows
  - Sleeping on side, NOT back
- Avoidance of sedating substances
  - Alcohol
  - Narcotics
  - Benzodiazepines
Continuous Positive Airway Pressure: CPAP

- First line treatment for OSA
- Provides continuous pressured air to keep airways open while sleeping
- Indicated for all types of OSA (mild/moderate/severe)

Non-compliance with CPAP

- Increased adherence found in patients with higher AHI and ESS scores
- Non-compliance due to:
  - Discomfort
  - Irritation
  - Claustrophobia

Non-Adherence

- Automatic settings or "Ramp" feature
- Bilevel Positive Airway Pressure (BiPAP)
- Attach heated humidifier
- OTC products can be used for dry mouth, nose and eyes
- Dry mouth, nose and eyes
CPAP: Nasal Pillow Mask

- Relieves Claustrophobia
- Provides full vision field

CPAP: Nasal Mask

- Benefits when there is frequent moving while sleeping
- Higher air pressure settings

CPAP: Full-Face Mask

- Nasal obstruction or congestion
- Mouth breathers
Treatment: Oral Devices

- Mild to moderate OSA
- Custom fitting devices ideal: OTC devices not recommended

Mandibular Advancement Devices (MAD)

- Preferred over tongue retaining devices
- Repositions the lower jaw forward and down slightly

Tongue Retaining Device (TRD)

- Repositions tongue forward
- Preferred oral device for larger tongues
Oral Device Adverse Effects

- Tooth loosening
- Dental crown damage
- Excessive salivation/dry mouth
- Tooth and jaw discomfort/pain
- Temporary or permanent bite changes

Provent Nasal Device

- Adhesive strip with valves
- May need a chin strap for mouth breathers
- Limited studies comparing to other treatments

Inspire Upper Airway Stimulation Therapy

- Implanted device in the upper chest
- Monitors breathing and stimulates nerves to keep airways open
- Indicated for moderate-severe OSA
Treatment: Surgery

- Considered when:
  - Treatment outcomes are inadequate
  - Anatomy or functional deficiencies can be correctable

Treatment: Pharmacological

### Medical Conditions

- Hypothyroidism
- Acromegaly
- Concurrent rhinitis

### Residual Daytime Sleepiness

- Provigil (Modafinil)
- Nuvigil (Armodafinil)

Provigil (Modafinil)

- Must be used with CPAP therapy
- MOA: Inhibits dopamine reuptake
- Dose: 200 mg every morning (up to 400 mg)
- Adverse effects: headache, nervousness, nausea, decreased appetite
Nuvigil (Armodafinil)

- Must be used with CPAP therapy
- MOA: Inhibits dopamine reuptake (R-enantiomer of modafinil)
- Dose: 150 mg every morning (up to 250 mg)
- Adverse effects: headache, insomnia, anxiety, nausea, dry mouth, and dizziness

Sleep Hygiene

- Environment: Quite, dark, calming
- Bed only for sleep
- Remove electronics
- Avoid large meals before bed

Assessment of Treatment Outcomes

- Resolution of sleepiness
- Adherence to therapy
- Quality of life/patient satisfaction
- Obtaining adequate amount of sleep
- Proper sleep hygiene
- Weight loss
True/False Questions

- Benzodiazepines have been proven to improve sleep apnea

True/False Questions

- Patient concerns of unexplained daytime sleepiness could indicate the need for an evaluation of obstructive sleep apnea
True/False Questions

- Obstructive sleep apnea and cardiovascular disease are often associated

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