Obstructive Sleep Apnea

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Sleep…an overview

- Active process
- Average adult needs 8 hours per night
- Adolescents and young adults may need up to 8.5-9.25 hours per night

What happens when you sleep?

- 3 states:
  - Wake
  - NREM
    - Divided into 4 stages
    - Different depths of sleep
    - Predominates in first half of night (particularly deep sleep)
  - REM (rapid eye movement)
    - Cycles approximately every 90 minutes
    - Longer periods during last half of night
    - Dreams
    - Paralysis

Definition of Obstructive Sleep Apnea Syndrome

- Repetitive episodes of upper airway obstruction
- Occurs during sleep
- Usually associated with reduction in blood oxygen level

Definitions

- Obstructive apnea = cessation of airflow
- Obstructive hypopnea = reduction (>50%) of airflow
- Duration = 10 seconds
- Apneas and hypopneas have same pathological sequelae
- Apnea-hypopnea index (AHI) = apneas + hypopneas per hour (>5 abnormal)
How many people are affected by obstructive sleep apnea?

- 4% men, 2% women with symptoms of OSA and AHI > 5
- 24% men, 9% women with AHI > 5

Signs/Symptoms Suggestive of OSA

- Snoring
- Witnessed apneas, gasping or both
- Obesity
- Large neck circumference
- Excessive daytime sleepiness or fatigue
- Family history

Why Do You Get OSA?

- Increased size and fat content of soft palate and uvula
- Large or posterior-lying tongue
- Swelling of the airway lining due to irritation (e.g., from cigarette smoke)
- Other structural abnormalities

Factors That Contribute to OSA

- Increased size and fat content of soft palate and uvula
- Large or posterior-lying tongue
- Swelling of the airway lining due to irritation (e.g., from cigarette smoke)
- Other structural abnormalities

OSA – Risk Factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Magnitude</th>
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</thead>
<tbody>
<tr>
<td>Male sex</td>
<td>++</td>
</tr>
<tr>
<td>Ageing</td>
<td>++</td>
</tr>
<tr>
<td>Obesity</td>
<td>+++</td>
</tr>
<tr>
<td>Menopausal status</td>
<td>+</td>
</tr>
<tr>
<td>African American</td>
<td>+</td>
</tr>
<tr>
<td>Alcohol</td>
<td>++</td>
</tr>
<tr>
<td>Smoking</td>
<td>+</td>
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</tbody>
</table>

OSA Risk Factors

- Certain pain medications
  - Decrease airway stability
  - Decrease drive to breath

- Certain sedating medications
  - Decrease airway stability
Repetitive sleep-related occlusions or near-occlusions of upper airway
  ➔ Reduction or absence of ventilation
  ➔ Oxygen level decreases, carbon dioxide increases
  ➔ Progressive increase in breathing effort
  ➔ Arousal or awakening

PREVENTS RESTORATIVE, DEEP SLEEP

Polysomnogram - Obstructive Apnea

Sleep Deprivation - Consequences
  • Decreased alertness
  • Decreased reaction time
  • Decreased performance on complex tasks
  • Decreased short-term memory
  • Decreased vigilance
  • Impaired new learning
  • Immune system effects
  • Increased risk of negative moods

Consequences of OSA

<table>
<thead>
<tr>
<th>Effect</th>
<th>Magnitude</th>
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</thead>
<tbody>
<tr>
<td>Neurocognitive</td>
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<tr>
<td>Motor vehicle accidents</td>
<td>7</td>
</tr>
<tr>
<td>Occupational accidents</td>
<td>2.2</td>
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<tr>
<td>Cardiovascular</td>
<td></td>
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<tr>
<td>Hypertension</td>
<td>1.3 - 2.9</td>
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<td>Coronary disease</td>
<td>1.3 – 23</td>
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<tr>
<td>Stroke</td>
<td>1.6</td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>2.4</td>
</tr>
</tbody>
</table>
Consequences of OSA

- Increased operative risk
  - Increased risk at induction/intubation
  - Increased risk at extubation
  - Increased risk of post-operative sedative/pain control complications

OSA - Treatment

- Conservative Measures
  - Weight loss
  - Avoidance of supine position
  - Avoidance of alcohol or drugs which exacerbate OSA
- Dental Appliance
  - Most effective for mild OSA

OSA - Treatment

- Surgery
  - Uvulopalatopharyngoplasty (UPPP)
    - 41% of patients obtain AHI < 20
  - LAUP even less effective for OSA
  - Nasal surgery
  - Somnoplasty
  - Mandibular osteotomy-hyoid myotomy
  - Mandibular advancement
  - tracheotomy

OSA - Treatment

- Continuous positive airway pressure (CPAP)

- CPAP
  - Treatment of choice in most cases
  - 95+% effective in controlling OSA
  - Evidence that CPAP improves sleepiness, mood, cognitive function, quality of life and sleep quality
  - BiPAP, C-flex now available