Obstructive Sleep Apnea:
Treatment Options for Commercial Drivers

Ralph V. Harder MD, FCCP
St. Mary’s Center for Sleep Disorders
Auburn, Maine
January 2010
Overview

- Obstructive Sleep Apnea (OSA) in Commercial Drivers
- Prevalence of OSA
- Pathophysiology of OSA
- Evaluation for OSA
- Medical Treatment of OSA
- Surgical Treatment of OSA
- Portable Monitoring and Proposed FMCSA Guidelines
Sleep Apnea in CMV Drivers

- Trucking industry has 3rd highest fatality rate (12%) of all US occupations.

- In 2006: 368,000 large truck crashes; 4,321 fatalities; 77,000 injuries

Sleep Apnea in CMV Drivers

- More prevalent than in general population: 28.2% mild apnea, 4.7% severe.
- Stooohs et. al. found 2x higher crash rate per mile in those with OSA vs those without. (1)

1. Sleep 1994;17:619-23
## Prevalence of OSA: General Population

<table>
<thead>
<tr>
<th>Study Location</th>
<th>n</th>
<th>Age Range</th>
<th>Prevalence of AHI&gt;5 (95%CI)</th>
<th>Prevalence of AHI15 (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>626</td>
<td>30-60</td>
<td>24 (19-28)</td>
<td>9 (6-12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penn</td>
<td>1741</td>
<td>20-99</td>
<td>17 (15-20)</td>
<td>Not given</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain</td>
<td>400</td>
<td>30-70</td>
<td>26 (20-32)</td>
<td>28 (20-35)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pathophysiology of OSA

- Sites of Obstruction:
Screening for Sleep Apnea

- History of snoring, witnessed apnea, daytime sleepiness
- Physical Exam: neck size > 17” male, >15.5” female; BMI > 28
- Epworth Sleepiness Scale or Berlin Questionnaire
- Co morbidities: hypertension, diabetes, atrial fibrillation, stroke
Who should have Sleep Study?

- “High risk” according to Berlin Questionnaire (or)
- BMI \(\geq 33 \text{ kg/m}^2\) (or)
- Those with high risk symptoms or physical findings
- FMCSA Guideline 4
Evaluation of Sleep

- Polysomnography
  - EMG
  - Airflow
  - EEG, EOG
  - Oxygen Saturation
  - Cardiac Rhythm
  - Leg Movements
  - Respiratory Effort
Evaluation of Sleep

- Portable Monitoring
- Air flow
- Respiratory effort
- Oxygen saturation
Staging of Sleep

Woodson, Tucker “Obstructive Sleep Apnea Syndrome, Diagnosis and Treatment” SIPAC 1996

- REM
- Sleep Latency, REM Latency
- Arousal
Evaluation of Sleep
- Polysomnography

Woodson, Tucker “Obstructive Sleep Apnea Syndrome, Diagnosis and Treatment” SIPAC 1996
Definition of OSA

- AHI 5-15 events/hour = mild disease
- AHI 20-40=moderate, >40=severe
- AHI > 20 increases risk of complications
Medical Management

- Weight Loss
- Treatment of Nasal Congestion
- Sedative Avoidance
- Avoidance of supine positioning during sleep
- End-expiratory pressure therapy
- Oral device
Medical Management

- CPAP/BIPAP
  - Pressure can be individually titrated or auto-titrated
  - Compliance 85%

  - Air leakage, eustachian tube dysfunction, noise, mask discomfort, claustrophobia
Nonsurgical Management

- Oral appliance
  - Mandibular advancement
  - Tongue retaining
  - Not for CMV drivers
Surgical Management

- Measures of success are variable–
  - No further need for medical or surgical therapy
  - Response = 50% reduction in RDI
  - Reduction of RDI to < 20
  - Reduction in arousals and daytime sleepiness
  - Overall success rate is 30-40%
Surgical Management

- Nasal Surgery
  - Limited efficacy when used alone
  - Verse et al 2002 showed 15.8% success rate when used alone in patients with OSA and day-time nasal congestion with snoring (RDI<20 and 50% reduction)

- Adenoidectomy
Surgical Management

- Uvulopalatopharyngoplasty
Surgical Management

- Uvulopalatopharyngoplasty
  - The most commonly performed surgery for OSA
  - Severity of disease is poor outcome predictor
  - Levin and Becker (1994) up to 80% initial success decreased to 46% “success” rate at 12 months
Surgical Management

- Laser Assisted Uvulopalatoplasty
  - High initial success rate for snoring
  - Rates decrease, as for UP3 at twelve months
  - Performed awake
Surgical Management

- Radiofrequency Ablation – Fischer et al 2003

Radiofrequency device is inserted into various parts of palate, tonsils and tongue base at various thermal energies.
Surgical Management

- Bariatric Surgery
- Facial Bone Surgery
- Tracheostomy
- All less frequently used but can be effective
Post-operative evaluation

- Appropriate time elapsed and
- Cleared by treating clinician and
- No daytime sleepiness and
- AHI < or equal to 10 events/hour
- Annual objective testing (except for bariatric surgery)
Treatment Considerations:
In-lab Polysomnography (PSG) vs Portable Monitoring (PM)

- Accuracy – PSG is gold standard
- Ease of use – PM done in home
- Access – may be shorter wait for PM
- PM not suitable for PAP titration studies
- Cost - $2500 (PSG) vs $600 (PM)