Obstructive Sleep Apnea and Fitness to Work in Safety Sensitive Position

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  - Fluid Pharmaceutics
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- Advisory Boards:
  - Shire Pharmaceuticals
  - Sanofi-Aventis Pharmaceuticals
  - Valeant Pharmaceuticals

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Conflict of Interest

■ None

Learning Objectives

Upon completion of the workshop the participant will:

1) Be able to assess and determine the pretest probability of a worker’s likelihood of having Obstructive Sleep Apnea.
2) Be able to clinically determine the worker’s fitness to work in a safety critical position with respect to daytime sleepiness and inattention.
3) Have a comprehensive understanding of the sleep physician’s role in determining fitness to work.

Epidemiological Background

■ Excessive Daytime Sleepiness (EDS) and OSA
  - 17 - 28% of commercial drivers (2.4 – 3.9 million) in US are estimated to have OSA
  - Number 1 Risk Factor: Obesity
  - OSA is the most common Medical Cause of EDS
  - Drivers with OSA crash risk (RR = 2.43, 95% CI: 1.21-4.89) compared to those w/o OSA

Epidemiological Background

- Risk Factors
  - Obesity:
    - N. American data Increased Risk with BMI > 26 kg/m²
  - Age:
    - Increased prevalence of OSA with increasing age
  - Male Sex:
    - Due to male predominance in the occupation
  - Ethnicity:
    - Asians higher risk of OSA at lower BMI
    - African Americans may be at higher risk


Obesity and Crash RR²

<table>
<thead>
<tr>
<th>BMI Category</th>
<th>All crashes</th>
<th>Prevalence: cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight: BMI &lt; 18.5</td>
<td>1.000</td>
<td>Prevalence: cases</td>
</tr>
<tr>
<td>Normal: 18.5 ≤ BMI &lt; 25.0</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>overweight: BMI 25.0 ≤ 30</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Obese: BMI &gt; 30</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Obese-Class I: BMI 30 ≤ 35</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Obese-Class II: BMI 35 ≤ 40</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Obese-Class III: BMI &gt; 40</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

Strong association between:
- BMI
- EDS
- Crash Risk

Self Report Sleep Habits and Accident/Near Miss in Professional Drivers

<table>
<thead>
<tr>
<th></th>
<th>Mean (SE)</th>
<th>95% CI</th>
<th>Adjusted p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3.6 (0.7)</td>
<td>3.0-4.2</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sleep Deprivation</td>
<td>1.9 (0.7)</td>
<td>1.1-2.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sleep Duration</td>
<td>1.4 (0.5)</td>
<td>1.1-1.8</td>
<td>0.022</td>
</tr>
<tr>
<td>Snoring</td>
<td>0.5 (0.4)</td>
<td>0.0-1.0</td>
<td>0.42 (1.0-0.98)</td>
</tr>
<tr>
<td>Sleep Latency (h)</td>
<td>1.0 (0.6)</td>
<td>0.0-2.0</td>
<td>2.21 (1.1-7.3)</td>
</tr>
<tr>
<td>BMI</td>
<td>23.3 (2.0)</td>
<td>22.0-24.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>87.5 (2.9)</td>
<td>85.3-89.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Neck Circumference</td>
<td>20.5 (1.7)</td>
<td>20.0-21.0</td>
<td>0.04</td>
</tr>
<tr>
<td>Head circumference</td>
<td>36.7 (1.7)</td>
<td>36.0-37.4</td>
<td>1.6 (1.0-2.5)</td>
</tr>
<tr>
<td>Sleep Testing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Testing (Level III)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-Lab Testing (Level I)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep Medicine Consultation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clinical Screening for OSA

Pre-Test Probability and Diagnosis

- Clinical Screening:
  - Psychometrics
  - Anthropometrics
- Diagnostic Testing:
  - Home Testing (Level III)
  - In-Lab Testing (Level I)
- Sleep Medicine Consultation
Obstructive Sleep Apnea

Adjusted Neck Circumference (ANC)
- Measure neck circumference in cm:
  - Add on:
    - 3 cm if loud snorer
    - 3 cm if witnessed apneas or gasping awakenings
    - 4 cm if hypertension
- Categorize as:
  - low (< 43 cm), moderate (43-47.9 cm), high (≥ 48 cm)

Epworth Sleepiness Scale

<table>
<thead>
<tr>
<th>Functional Impairment</th>
<th>NEVER</th>
<th>SLIGHT</th>
<th>MODERATE</th>
<th>HIGH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Watching TV</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sitting, inactive in a public place (e.g. theatre or meeting places)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Any passenger in a car for an hour without a break</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Using down in motor vehicle environment</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sitting and talking to someone</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sitting quietly after a meal without alcohol</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>In a car, while required for a few minutes by another</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Score: 17/24

Limitations of Clinical Screening
- Self Report Provides Very Low Yield
- Symptoms of OSA
- Symptoms of Daytime Sleepiness
- Alternate Screening Methods are Necessary in an Occ Med Setting
- Somni-Sage Questionnaire©
Somni-Sage Questionnaire

- OSA Symptoms
- Additional symptoms not associated with OSA by drivers
- Ht, Wt, NC, Medical Conditions
- EDS:
  - ESS
  - "Do you become drowsy while driving?"

![Diagram of Somni-Sage Questionnaire]

SS PP value remains constant in spite of learning effect over time by drivers.
Joint Task Force Screening Recommendations

Subjective Criteria:
- Snoring, EDS, witnessed apnea
- MVC related to fatigue/sleep
- Previous Dx of OSA
- ESS > 10

Objective Criteria:
- Sleeping in waiting room
- 2 or more of the following
  - BMI ≥ 35kg/m²
  - NC > 17 in male > 16 in female
  - HTN (uncontrolled or ≥ 2 Medications)

NIH PROMIS Sleep Screening Tool

- Do you have problems with your sleep or sleep disturbance on average (e.g., in the past month) for three or more nights per week?

- If yes, does the problem with your sleep negatively affect your daytime function or quality of life?

Patients who answer ‘yes’ to both require further assessment

Diagnostic Testing

- In Home Level III Testing
  - Advantages
  - Limitations

- In Lab Level I Testing
  - Advantages
  - Limitations
Current Standard of Care

- Respiratory Companies solicit referrals
- RTs perform Level III Sleep Studies
- Sleep Studies are interpreted by trained and non-trained MDs.
- Variable treatment standards
- Variable Follow-up
- Variable Compliance with Treatment

Level III Testing

- AASM Criteria
  - Comprehensive Sleep Evaluation
  - No medical comorbidities
  - No psychiatric comorbidities
  - No co-existing primary sleep disorders

Level I Polysomnogram

- AASM Criteria
  - Comprehensive Sleep Evaluation
  - Presence of Comorbid Medical Disease
  - Presence of Comorbid Psychiatric Illness
  - Presence of Co-existing Primary Sleep Disorders
Referral for Moderate to High Risk OSA Workers

- Obesity +
- Medical and Non-medical risk factors
- Non-Obese with medical/psychiatric comorbidities
- All Operators with sleep disturbance
- Significant Concern or Question Regarding Performance and Fitness to Work

Clinical Caveat

“the clinical experience of the senior author (SNK) and his colleagues is that such an approach can have a fairly high supplemental yield to other measures. Drivers who deny symptoms and diagnoses on questionnaires and self-report forms will divulge much more information when skilled physicians take the time to ask repetitive and additional questions in creative ways.”


Fitness to Work in a Safety Sensitive Position
Evaluating Risk  
Canadian Perspective  

- Ontario  
  - rate of collisions for all licensed drivers is 0.05 ± 0.05 MVCs per driver (one accident every 20 years per licensed driver)  
  - Section 203(1) of the Ontario Highway traffic act states  
    - "... Every legally qualified medical practitioner shall report to the Registrar (of Motor Vehicles) ... every person 16 years of age ... who, in the opinion of the medical practitioner, is suffering from a condition that may make it dangerous for the person to operate a motor vehicle."  
  - Section 203(2) protects me from litigation, this still  
  - Regulations do not help me in assessing driving risk  
  - MD is not the "license police" but a patient advocate  


Evaluating Risk  
Australian Perspective  

- The rate of accidents in the general driving population is low:  
  - approximately one percent of drivers will have an accident each year  
  - One - 2% will involve a fatality  
  - If the relative risk among untreated sleep apneics were increased five-fold  
    - the accident rate per driver per year would be ~ 5%, still a relatively low figure and not sufficient in my opinion to demand that Mr. Z stops driving.  
  - A comparable increased relative risk of accidents due to sleepiness occurs for night versus day driving (45), yet there is no move to ban night driving.  
  - These purely statistical considerations, however, should be complimented by specific information about Mr. Z's driving behavior.


Determining Medical Fitness to Operate Motor Vehicles  

CMA Driver's Guide
Sleep Disorders Section

- Obstructive Sleep Apnea
  - Population Risk of MVC 4 - 10X
  - Individual Risk?

Excessive Daytime Sleepiness:
What is it?

- Fatigue:
  - Tired, Inattentive but not Sleepy
- Non-Restorative Sleep
  - The patient sleeps but wakes up Tired
- Daytime Sleepiness
  - Unable to resist sleep or maintain wakefulness
  - Persistent
  - Intermittent

Assessing Sleepiness and Inattention

- Take the complaint of sleepiness seriously.
- Document the history carefully:
  - What does the patient describe in their words.
  - What kind of driving or safety sensitive work do they do.
  - Have their been incidents or “near misses”.
  - Is anyone else concerned (employer/family).
  - Are you concerned and what makes you concerned.
  - In your opinion what is the potential risk to the patient and the public.
- Provide clear recommendations and method of monitoring outcome.
The Primary Care Physician’s: Role and Responsibilities

- Medical-Legal Responsibilities (CMA guidelines)
  - Procedural Differences
  - Mandatory Reporting
  - Discretionary Reporting
    - Alberta
    - Nova Scotia
    - Quebec
  - MD Protection All Provinces
- Medical-Legal Responsibilities
  - CMPA
  - Patient Responsibility
  - Physician Responsibility
  - Legal Precedent

The Primary Care Physician’s: Role and Responsibilities

- Medical Responsibilities
  - College of Physicians and Surgeons
  - Public Safety Responsibilities

Assessing Risk

- Distinguish between and Determine Cause of:
  - Fatigue
  - Uncontrollable Sleepiness
  - Excessive Need for Sleep
  - Intermittent Sleepiness
- Voluntary Driving Cessation
  - Negotiate a Solution with the patient
- Involuntary Driving Cessation
  - Gender: Male > Female
  - Insight: (Psychological vs Psychiatric)
  - Lack of Insight
  - Lack of Awareness of Risk
  - Lack of Acceptance of Responsibility
Reporting: General Advice

- “In general physicians should err on the side of reporting…especially important in jurisdictions where there is mandatory reporting”
- Assess Fitness and document your process.
- Inform the patient!
- Negotiate a solution.
- Contact MVB for advice.
- Chart, Chart, Chart!

Admissibility of Medical Reports

- For the most part Medical Records are protected in all provinces and territories by access to information regulations and MD/Patient privilege.
- Admissibility of records largely to prove compliance with reporting regulations.
- Admissibility not addressed in:
  - BC
  - New Brunswick
  - Nova Scotia

Occupational MDs Role

- There are no Valid/Reliable Subjective or Objective metrics to predict EDS and Consequent Risk
- The Occupational Physician’s role is to detect a patient at risk and implement a plan.
- The Occupational Physician’s Responsibility is to protect the patient and the public.
- The Occupational Physician is expected to use best practices and best judgment in making a professional decision.
Sleep MDs Role

- The Sleep Physicians role is to use their clinical expertise to advise the Occupational Physician on the management of the patient and potential risk to public safety based on his/her clinical experience and expertise in the area of Occupational Sleep Medicine.
- The Sleep Physicians responsibility is to facilitate treatment, monitor compliance and response.
- The Sleep Physicians responsibility is to advise the Occupational Physician regarding fitness to work and accommodation and safe return to work strategy.

Clinical Pearls

- Document your assessment and discussion of Risk and Safety:
  - Your responsibility
  - Patient’s responsibility
  - How you are managing the issue
- Document your assessment and discussion of Risk and Safety:
  - MD Responsibility
  - Patient’s Responsibility
  - Intervention
  - Follow-up
  - Monitoring Outcome

References
