Common Sleep Disorders

Diana Corzine, MD-ABMS Sleep
Chief MT VA Sleep Medicine
2018
Objectives:

<table>
<thead>
<tr>
<th>Understand</th>
<th>Understand how Sleep Disorders affects health.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe</td>
<td>Describe some Common Sleep Disorders.</td>
</tr>
<tr>
<td>Outline</td>
<td>Outline evaluation and management strategies for treating patients with Sleep disorders.</td>
</tr>
</tbody>
</table>
Why is Sleep Important?

1. Memory consolidation and improving Brain plasticity for learning - REM sleep particularly important for memory

2. Immune regulation – sleep helps boost the immune system
   a. With sleep deprivation, increased risk of infection.
   b. Can live without food for 10 days but with no sleep for 10 days, high risk of death from sepsis
3. Restorative theory: Sleep is required for muscle growth, tissue repair, protein synthesis, and growth hormone release occur mostly or entirely during sleep

4. Adaptive theory – evolutionarily helpful to have periods of decreased metabolic demands and rest such as sleep
Sleep Disorders cause increased risk of:

- Obesity/diabetes
- Hypertension
- Cardiovascular events
- Stroke
- Depression, Anxiety and PTSD
- Substance abuse
- Cancer
- All cause mortality
Mechanism Unclear

Potential reasons include:

- Dysregulation of the hypothalamic-pituitary axis (HPA) axis
  - adrenocorticotropic hormone and cortisol secretion are increased in patients with poor sleep quality/insomnia
  - Chronic activation or dysregulation of the HPA axis not only may lead to increased risk of CVD but also to insulin resistance, diabetes, and mental health disorders such as anxiety and depression

- Increased Sympathetic Nervous System Activity

- Short sleep duration (< 5 h) and insomnia associated with increased carotid intima media thickness and inverse association between short sleep duration and incident coronary calcification (a marker of subclinical CVD)

- Sleep loss has also been linked with elevated systemic circulating levels of inflammatory biomarkers such as C-reactive protein and Interleukin-6, which are associated with cardiovascular disease

- Insomnia may influence heart health through its impact on lifestyle behaviors such as diet and exercise, which are known to affect cardiovascular outcomes
Sleep Disturbance = increased risk of some Cancers

• Decreased Sleep may lead to increase in Breast, Prostate and Colorectal cancers

• Increased Breast Cancer risk in Women with poor sleep quality:
  
  • 2016 article in *Genes and Cancer*: Melatonin blocked growth of some Breast Cancer Cells.

  • 2012 article in *Breast Cancer Research*: Women who chronically lacked good quality Sleep (on average < 6 hours per night) were at increased risk of developing more aggressive Breast Cancers
Common Sleep Disorders

01 Sleep Apnea
• Obstructive most common
• Central Apnea
• Mixed

02 Insomnia

03 Restless Leg Syndrome

04 Less common but many questions about: Narcolepsy
Sleep Medicine Services

01 Clinic consultations
02 Nocturnal Oximetry
03 Home Sleep Test
04 In-Lab studies – POLYSOMNOMGRAM – Gold Standard
05 Actigraphy
06 Screening
  • Epworth Sleepiness Scale
  • STOP-BANG questions
Nocturnal Oximetry

01
Not a good tool for OSA screening

02
Used to assess if PAP alone is adequate for 02

- Altitude important
- Assess other medical conditions – CAD, COPD, CHF, etc.
# Report Title

**Patient Data**
- Name: [Redacted]
- DOB: 1946/11/15
- Physician: Corzine, Diana MD, ABMS-Sleep
- Note 1: No cell service

**Recording Date: 20 September 2017**
- Time: 01:05:39
- Duration: 06:43:40
- Analyzed: 06:43:40

**Comments:** No CPAP and sleeping in a recliner

Data storage rate of 4 seconds every sample.

## Event Data

<table>
<thead>
<tr>
<th>Event Data</th>
<th>SpO2 (%)</th>
<th>Pulse (bpm)</th>
<th>%SpO2 Level</th>
<th>Events</th>
<th>Below (%)</th>
<th>Time (sec)</th>
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<tbody>
<tr>
<td>Total Events</td>
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<td>80.4</td>
<td>95</td>
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<td>Time In Events</td>
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<td>26.9</td>
<td>94 - 95</td>
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<td>Avg Event Dur.</td>
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<td>26.6</td>
<td>89 - 85</td>
<td>15</td>
<td>90</td>
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<tr>
<td>Index (1/hr)</td>
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<td>84 - 80</td>
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<td>85</td>
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<tr>
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</table>

**Analysis Parameters**

Desaturation Event: drop in SpO2 by at least 4% for a minimum duration of 10 seconds.
Pulse Event: Change in rate by at least 6 bpm for a minimum duration of 8 seconds.

## Graphic Summary

- **SpO2 (10 % per division)**
  - Time 1:05
  - SpO2 at 100
  - %Time

- **Pulse (10 BPM per division)**
  - Time 1:05
  - SpO2 Events at 200

- **SpO2 Events at 200**
  - Events 0-100
Report Title

Patient Data
Name:
DOB: 10/46/11/15
Age: 70
Physician: Corzine, Diana MD, ABMS-Sleep
Note 1: No poli service

Height: 71 in
Weight: 258 lb
BMI: 36.1
Note 2: pl will upload modem data this week

Recording Date: 27 September 2017
Time: 00:39:53
Duration: 08:51:24
Analyzed: 08:51:24

Data storage rate of 4 seconds every sample.

<table>
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<th>%SpO2</th>
<th>Level</th>
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<th>Time</th>
<th>Below(%)</th>
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<td>Adjusted Index (1/hr)</td>
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<tr>
<td>Events &lt; 88%</td>
<td>9.9</td>
<td>9</td>
<td>44</td>
<td>40</td>
<td>0</td>
<td>45</td>
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<tr>
<td>Maximum SpO2 (%)</td>
<td>81</td>
<td>88%</td>
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<tr>
<td>Avg. Low SpO2 (%)</td>
<td>90.1</td>
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<td>14</td>
<td>70</td>
<td>0</td>
<td>75</td>
<td>0.0</td>
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<tr>
<td>Pulses between 88%</td>
<td>84.7</td>
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<td></td>
<td></td>
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<tr>
<td>Pulses Data</td>
<td>Avg. Pulse Rate(bpm)</td>
<td>52.2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analysis Parameters
Desaturation Event: drop in SpO2 by at least 4% for a minimum duration of 10 seconds.
Pulse Event: Change in rate by at least 6 bpm for a minimum duration of 8 seconds.

Graphic Summary
SpO2 (10% per division)

Pulse (10 BPM per division)

Time 0:36 1:00
SpO2 at 100%
% Time

Events at 0
Obstructive Sleep Apnea: Repetitive partial or complete collapse (APNEA) of the upper airway during sleep, often associated with oxygen desaturation (HYPOPNEA)

Associated conditions

- Obesity
- Cardiovascular disease
- Stroke
- Diabetes
- Mood disturbance
- Neurocognitive dysfunction
- Motor vehicle accidents, 5 x more in patients with untreated OSA
OSA risk factors

- Obesity
- Advancing age
- Male gender— but need more studies in women to really ascertain this gender bias
- Menopause
- Craniofacial/upper airway abnormalities
- Nasal congestion
- Smoking
- Family history
- Pregnancy
- Other medical conditions: End stage renal disease, congestive heart failure, chronic lung disease, stroke
Testing for OSA:

Home Sleep Testing

- Benefits: convenient, comfortable, Home sleep environment, provides more data than nocturnal oximetry alone
- Excellent for picking up on Moderate to Severe Apnea

- Drawbacks: Test for evaluating Sleep Apnea ONLY - cannot assess sleep architecture or sleep movements (parasomnias, etc.)
  - Not helpful with treatment/PAP titration or advanced therapies
  - Cannot assess Respiratory related arousals which are not associated with a 4% oxygen desaturation so can underestimate disease
HOME SLEEP APNEA TEST (HSAT)
Testing for OSA: In-Lab Polysomnography

The Gold Standard
- 12 channels of data
- Can assess Sleep stages as well as Sleep movements
- PAP titration

AHI or Apnea, Hypopnea Index: the total number of complete obstructions (APNEA) and partial obstructions (HYPOPNEA) of breathing occurring per hour of sleep. By definition, these pauses in breathing must last for at least 10 seconds
- 0-4 Normal
- 5-14 Mild
- 15-29 Moderate
- > 30 Severe
Polysomnography (PSG)

• Diagnostic
• Split night
• Titration: Different kinds of titration with or without 02
  • CPAP
  • Bipap
  • ASV
  • AVAPS
POLYSOMNOGRAM
osa treatment

- Positive airway pressure therapy (PAP) most effective IF used – 80% of patients who used PAP had some improvement in symptoms

- Compliance always a challenge: BUT same can be said for treating HTN with Medications = adherence data suggests only 40-60% adherent to medication regimen

- 65-83% in one study, same between sexes but one prospective study showed female patients used CPAP more
OSA Treatment Has a Major Impact on Treating and Preventing Illness

After one year, patients surveyed state OSA treatment delivers...

Insomnia
• 7x increase in good quality sleep
• Decline from 54% to 1% reporting “very bad” quality sleep

Depression, Anxiety and Mental Health
• 12x increase in “good quality” sleep
• 4x reduction in reported life threatening mental health condition
• 49% report improved mental health

Heart Disease
• 56% report reduced heart disease risk
• 5x decrease in self-reported life-threatening heart disease
• Decline from 50% to 3% reporting “very bad” quality sleep
• Increase from 0% to 26% reporting “very good” quality sleep

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PAP works! OSA Treatment Has a Major Impact on Comorbidities

After one year, patients surveyed state OSA treatment delivers...

**Hypertension**
- 41% report blood pressure improvement
- 17% report decrease in medication usage

**Diabetes**
- 31% report improved HbA1c
- 14x increase in “good quality” sleep

**Asthma & Breathing Conditions**
- 54% report improved respiratory function
- 70% increase in patients reporting symptoms as mild
- 8x increase in “good quality” sleep
Central Sleep Apnea or Mixed Apnea

• Less than 10% of patients with Primary Central Sleep Apnea

• Secondary Central Sleep Apnea
  • CVA
  • Neurologic degenerative disease
  • CHF
  • Chronic Narcotics

• Complex sleep apnea sometimes a response to PAP
  • Thought to be secondary to overcorrection of hypercarbic drive
  • Treat with ASV – machine generated breaths – need EF > 45%
This Happened on PAP (Bi-Level)

Central Apnea Developed
Other Therapies for OSA

1. Positional therapy
2. Weight reduction
3. Alcohol and sedative avoidance
4. Smoking cessation
Other Therapies for OSA, continued: none are as effective as PAP

• Oral appliances: Mandibular Advancement Device

• Surgical therapy:
  • Bariatric Surgery – 75% of patients after weight loss will still have OSA
  • UPPP – Uvulopalatopharyngoplasty – maybe 15% of patients have positive response
  • BMMA – Bi-Maxillary and Mandibular Advancement
  • HGNS – Hypoglossal Nerve Stimulator (Inspire)
    • Patient selection important and close follow up
Obstructive Sleep Apnea: upper airway obstructions (complete or partial) that occur repeatedly during sleep

https://www.whitewolfdental.com/sleep-apnea/
"I have a theory about your insomnia..."
Insomnia: Definition

1. Repeated difficulty with sleep initiation, duration, maintenance, consolidation, or quality of sleep > 1 month.

2. Occurs despite adequate time and opportunity for sleep.

3. Results in some form of daytime impairment.
Healthy Sleep Habits = FIVE THINGS ALL PEOPLE WITH INSOMNIA SHOULD DO

<table>
<thead>
<tr>
<th>KEEP</th>
<th>KEEP A VERY REGULAR SLEEP SCHEDULE – this is KEY!</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUIT</td>
<td>QUIT TOBACCO - Stimulant</td>
</tr>
<tr>
<td>QUIT</td>
<td>QUIT CAFFEINE – Stimulant and delays Melatonin secretion</td>
</tr>
<tr>
<td>QUIT</td>
<td>QUIT ALCOHOL – Sedative but when wears off rebound awakening and Changes REM sleep</td>
</tr>
<tr>
<td>QUIT</td>
<td>QUIT Screen time within 1 hour of bedtime and affect of blue light = delays Melatonin secretion</td>
</tr>
</tbody>
</table>
Sleep Stages

NREM Stage 1
- Transition to sleep;
- Light form of sleep;

REM
- Provides mental and physical energy;
- Supports daytime performance;
- Brain is active and dreams occur;

NREM Stage 2
- Beginning of sleep;
- Disintegration from surrounding;

NREM Stage 3
- Deep, restorative sleep;
- Blood pressure drops, muscles relax, breathing becomes slower;
- Energy is restored and hormones are released;

Screen Time and Insomnia

• Minimize Screen time 60-90 minutes prior to bedtime and NOT in the middle of the night.

• Blue light from screens suppresses endogenous melatonin.

• Causing Delayed Sleep Phase instead of insomnia?

• Significant sleep disturbances from screen time especially in adolescents and young adults.
Insomnia, continued

Best to try to treat without medication if possible – most effective therapy long term as compared to a sedative hypnotic

Cognitive Behavior Therapy for Insomnia

Sleep Stimulus Control

Sleep Restriction: prolonged shallow sleep as compared to deep, shorter sleep

Being aware of a delayed Sleep schedule as the real problem rather than insomnia
**Actigraphy:** A tool to help evaluate sleep schedule and amount of sleep based on activity
PTSD and Sleep

Sleep disturbance represent two of the diagnostic criteria for PTSD

1. Recurrent Nightmares – intrusion cluster of symptoms
2. Insomnia – arousal cluster of symptoms

Non-gender specific studies have shown 92% of active duty personnel with PTSD have insomnia as compared to 28% without PTSD.

52% of combat veterans with PTSD reported significant nightmares.
Treatment for Insomnia related to PTSD

- Cognitive Behavior Therapy for both PTSD as well as specifically Insomnia
  - Has been shown to be more effective long term than medications
  - Focusses on Sleep stimulus control, sleep schedule, healthy sleep habits, de-arousal techniques, cognitive re-structuring about attitudes concerning sleep
  - Randomized trial in veterans with PTSD showed CBT-I had greater improvements and sleep than placebo—but this study was not gender specific

- Hypnotic may be helpful short term only such as Zolpidem 5mg
PTSD or Nightmares

From June 2017, VA/DoD Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder

- Prazosin for nightmares does not help with sleep latency but can improve REM sleep continuity
- Hydroxyzine possibly can help decrease nightmares and improve sleep as compared to placebo
- The studies that supported the above findings were also not gender specific
- Clonazepam has not been effective even though widespread use
- Depakote and Anti psychotics have not been shown to be effective for sleep or nightmares in PTSD
Medications for Insomnia

• Hypnotics: FDA approved only up to 2 months
• Trazadone is not actually a very good sleep aid as often the sedating effects wear off but if there is underlying depression, it can be helpful

• Melatonin – in some can be helpful but the KEY is HOW to take it
  • Take at a REGULAR time for a REGULAR sleep schedule - the goal is to promote a healthy circadian rhythm.
  • Take at least 2 hours prior to bedtime
  • May take 2-3 weeks to see an effect
"You think you have problems? I have restless leg syndrome in all 1000 legs."
Restless Leg Syndrome (Willis-Ekbom Disease)

1. Urge to move the legs, usually (but not necessarily) accompanied by uncomfortable sensations
2. Predominance of symptoms during evening or night hours
3. Presence of symptoms during rest or inactivity such as sitting or lying
4. Improvement of symptoms with movement, such as stretching or walking
Risk Factors for RLS

- Iron deficiency
  - Pregnancy
  - Medications: Antidepressants
  - Neuropathy
  - Kidney disease
  - Caffeine
  - Alcohol
  - Smoking
  - Family history
RLS and PLM evaluation and treatment

1

Check Ferritin, Tsh, Vitamin D, Magnesium and replace if low

2

Check medication list!
RLS increased with some Medications

• Deserves its own slide because many anti-depressants increase RLS and PLMD symptoms especially SSRIs (Prozac, Sertraline), SNRIs like (Duloxetine, Effexor), TCAs or Trazadone.

• This is to be kept in mind for those patients being treated with depression

• Wellbutrin only Anti-depressant that does not increase RLS symptoms
Treatment of RLS

• Replace iron if ferritin is low (<50mcg/L) – THIS WILL HELP A LOT

• Dopamine agonists (pramipexole, ropinirole)

• Anticonvulsants (gabapentin, pregabalin, carbamazepine)

• Dopamine precursors (carbidopa/levodopa) but be careful or Attenuation

• Benzodiazepine or BZD receptor agonists (Clonazepam, Zolpidem)

• Clonidine

• Opioids – last resort, given current opioid epidemic and tolerance
Narcolepsy: Etiology

- Loss of the neuropeptide orexin (hypocretin)

- Orexin helps with Sleep State Stability – staying asleep when asleep and staying awake when awake

- Narcolepsy is a disorder where REM sleep intrudes on wake and vice versa
Narcolepsy: Symptoms

• Daytime sleepiness with:
  • Cataplexy: emotionally-triggered transient muscle weakness. “Nap attacks”
  • Hypnagogic hallucinations: vivid hallucinations that occur as the patient is falling asleep. They probably result from a mixture of wakefulness and the dreaming of rapid eye movement (REM) sleep
  • Sleep paralysis: Sleep paralysis is the complete inability to move for one or two minutes immediately after awakening. It may also occur just before falling asleep
Narcolepsy: Epidemiology

• Narcolepsy type 1 (narcolepsy with cataplexy) prevalence of 25 to 50 per 100,000 people.

• Narcolepsy type 2 (narcolepsy without cataplexy estimated to be 20 to 34 per 100,000 people [8,9].

• Equally prevalent in Men and Women

• Symptoms usually start teens to twenties

• This is compared to the prevalence of OSA in patients age >50:
  • 20 to 30 per 100 in males and 10 to 15 per 100 in females
Narcolepsy

• MUST rule out other more common sleep disorders prior to diagnosing Narcolepsy as the reason for daytime sleepiness.

• Need to rule out Sleep Apnea, Insufficient Sleep, Insomnia, etc.