# 1 Opioid & Sedation Management

Ignore the Snore No More: Obstructive Sleep Apnea & STOP BANG

February 20, 2018
Indiana’s Bold Aim

To make Indiana the safest place to receive health care in the United States...

*if not the world*
WAKE UP promotes opioid and sedation management to reduce unnecessary sleepiness and sedation.

- Informational State Survey
- Educational Webinars
- Online Resources
  - Webinar recordings, resource sheet, webinar information sheet and pre-written WAKE UP social media are available here on the IHAconnect.org website: https://www.ihaconnect.org/patientsafety/initiatives/Pages/UP-Campaign.aspx
# Wake Up Webinars

<table>
<thead>
<tr>
<th>Topic</th>
<th>Date</th>
<th>Time</th>
<th>Speakers</th>
<th>Audience</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of the State: State &amp; National Opioid Stats and Emergency Department Point Program</td>
<td>January 23</td>
<td>3-4pm ET</td>
<td>Kaitlyn Boller, MHA &amp; Krista Brucker, MD</td>
<td>Emergency Dept personnel, LCSW, pharmacy, discharge planners, care coordinators, quality, educators</td>
</tr>
<tr>
<td>Obstructive Sleep Apnea &amp; STOP BANG Assessment</td>
<td>February 20</td>
<td>3-4pm ET</td>
<td>Abhinav Singh, MD</td>
<td>Medical Surgical Staff, Respiratory, Educators</td>
</tr>
<tr>
<td>Sedation Management and Opioid Practices to Minimize Harm</td>
<td>March 6</td>
<td>3-4pm ET</td>
<td>Maryanne Whitney, Cynosure Health &amp; Jennifer Hittle, IU Health Arnette</td>
<td>ICU/Medical/Surgical/Procedural Staff &amp; Managers, Pharmacy, Respiratory, Educators</td>
</tr>
<tr>
<td>Delirium Assessment, Prevention, &amp; Treatment</td>
<td>March 20</td>
<td>3-4pm ET</td>
<td>Malaz Boustani, MD</td>
<td>Quality, ICU/Medical/Surgical Staff &amp; Managers, Pharmacy, Educators</td>
</tr>
</tbody>
</table>

Use the following to join each installment in the series:

**Dial in number:** (888) 390-3967  
**Participant link:** [https://join.onstreammedia.com](https://join.onstreammedia.com)
Wake-Up Resources

- **Social Media**
- **Resource Sheet**
- **Webinar Information**
  - (click hyperlink above to access—also accessible on IHA website-Patient Safety Up Campaign)
- **Patient Safety Awareness Week Toolkit and**
  - IPSCresources.com
2018 Patient Safety Awareness Week

March 11-17, 2018
Patient Safety Awareness Week

Daily Topics

- Opioid Awareness
- Wake Up: Know Your Meds
- Get Up: Prevention of Falls
- Soap Up: Hand Hygiene
- Safe Antibiotic Usage
- Could it be Sepsis?
- Safe Infant Sleep Practices
Objectives

Following this webinar,

1. Identify signs, symptoms & pathophysiology of Obstructive Sleep Apnea (OSA)
2. Identify potential complications of OSA
3. Describe STOP BANG assessment for OSA
4. Describe Pre-acute, Acute Care & Post-Acute process improvements to reduce respiratory depression from OSA
5. Describe relationship of STOP BANG OSA Assessments in HIIN Wake-Up Campaign
Wake UP Overview

1. Is my patient awake enough to get up or is there a change in sedation level?

At risk medicines:
- Opioids & Sedatives
- Antihistamines/anticholinergics
- Antipsychotics
- Some antidepressants
- Anti-emetics
- Muscle relaxants

HIIN Script Up 1/30/18:

American Geriatric Society
Beers Criteria
Meds to watch in ≥ 65 yo
Medications to avoid in those over 65yrs

- Anticholinergics
  - Benadryl®, Phenergan®, Vistaril®

- Antispasmodic agents
  - Donnatal®, Bentyl®, Librax®, Probanthine®

- Sleep aids
  - Ambien®, Luminal®, Dalmane®, Nembutal®

- Benzodiazepines
  - Ativan®, Valium®, Xanax®, Librium®, Klonopin®

- NSAIDS
  - Advil®, Motrin®, Aleve®

- Cardiac drugs
  - Digoxin > 0.125mg/day, Procardia®, Catapres®

Beers Criteria Medications
Hospital Resources

ADDRESSING SUBSTANCE ABUSE

Designed to help staff provide support to all patients with special attention to substance abuse, this toolkit provides access to articles, policies, management techniques, assessment tools and more. Our Addressing Substance Abuse Checklist should be printed and shared.

<table>
<thead>
<tr>
<th>Prescribing and Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ED Prescribing Guidelines</strong></td>
</tr>
<tr>
<td>1. Indiana Guidelines for Opioid Prescribing in the Emergency Department</td>
</tr>
<tr>
<td><strong>Chronic Pain Rules</strong></td>
</tr>
<tr>
<td>1. Indiana Pain Management Prescribing Requirements Final Rule</td>
</tr>
<tr>
<td>2. Summary</td>
</tr>
<tr>
<td>3. Comparison of CDC Guidelines to Indiana Prescribing Rule</td>
</tr>
<tr>
<td><strong>Acute Pain Prescribing Guidelines</strong></td>
</tr>
<tr>
<td>1. Indiana Guidelines for Managing Acute Pain</td>
</tr>
</tbody>
</table>

https://www.ihaconnect.org/member/resources/Pages/Checklist.aspx
Wake Up Checklist

WAKE UP

To reduce: ADE, airway safety events, delirium, falls, VAE and VTE

☐ Are the dangers of over sedation known?
☐ Is there a strong desire to keep sedation to a minimum?
☐ Have you selected evidence-based assessment tools such as:
  ☐ STOP BANG (identifies patients at risk for obstructive sleep apnea)
  ☐ PASERO OPIOID-INDUCED SEDATION SCALE (POSS)
  ☐ RICHMOND AGITATION SEDATION SCALE (RASS)
☐ Have staff been educated on the use of the selected assessment tool(s) and performance expectations?
☐ Is there a place to document the results of the assessment(s)?
☐ Are assessment targets established for each patient?
☐ Are the results from assessment(s) used to modify sedation levels?
☐ Is there a protocol in place to adjust sedation levels?

http://www.hret-hiin.org/engage/up-campaign.shtml
Wake UP Processes

- **Patient & family awareness** of dangers of opioids
- **Use of non-opioid and non-pharmacologic pain management**
- **Safe order sets preventing high opioid doses to opioid naïve patients and prevent layering of benzos on opioids**
- **Routine nursing assessments that pair pain & sedation tools** (e.g. Pasero Opioid Sedation Scale or Michigan Opioid Sedation Scale)
Polling Question #1

What is your primary role within your organization?
- Infection Prevention
- Nursing Professional
- Laboratory Professional
- Medical Staff
- Environment Services / Housekeeping
- Social Worker
- Mental Health Professional
STOP BANG Use: 28%

<table>
<thead>
<tr>
<th>ANSWER CHOICES</th>
<th>RESPONSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasero Opioid-Induced Sedation Scale (POSS) prior to an after opioid administration</td>
<td>66.67%</td>
</tr>
<tr>
<td>Offer multi-modal pain management - both pharmacologic and non-pharmacologic modalities</td>
<td>50.00%</td>
</tr>
<tr>
<td>Setting realistic pain management expectations prior to admission</td>
<td>44.44%</td>
</tr>
<tr>
<td>Asking about comfort level in addition to pain score</td>
<td>55.56%</td>
</tr>
<tr>
<td>Using teach-back methods with patients and families to enhance their knowledge and assist in setting pain management expectations</td>
<td>66.67%</td>
</tr>
<tr>
<td>STOP BANG for identifying Obstructive Sleep Apnea</td>
<td>27.78%</td>
</tr>
<tr>
<td>Richmond Agitation Sedation Scale (RASS)</td>
<td>72.22%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>22.22%</td>
</tr>
</tbody>
</table>

Total Respondents: 18

If yes, do you use or complete the following? (Check all that apply)

Answered: 10  Skipped: 2

- Pasero Opioid-induced Sedation Scale (POSS) prior to an after opioid administration: 66.67%, 12 responses
- Offer multi-modal pain management - both pharmacologic and non-pharmacologic modalities: 50.00%, 9 responses
- Setting realistic pain management expectations prior to admission: 44.44%, 8 responses
- Asking about comfort level in addition to pain score: 55.56%, 10 responses
- Using teach-back methods with patients and families to enhance their knowledge and assist in setting pain management expectations: 66.67%, 12 responses
- STOP BANG for identifying Obstructive Sleep Apnea: 27.78%, 5 responses
- Richmond Agitation Sedation Scale (RASS): 72.22%, 13 responses
- Other (please specify): 22.22%, 4 responses

IHAconnect.org/Quality-Patient-Safety
Ignore the Snore... No More!!

SLEEP APNEA IN THE SURGICAL PATIENT

ABHINAV SINGH MD, MPH, DABIM-SM [SLEEP MEDICINE]
DEBBY HENTZ, RN, MSN, CS, CPHQ [QUALITY COORDINATOR]
JULI WHITE, MSN, APRN, FNP, NE-BC [SLEEP MEDICINE]
FEBRUARY 20, 2018  3.00 PM
What's the connexion?

Spuyten - Duyvil Metro North 
Bronx, 2013

Challenger 
1986

AIR FRANCE 447 
2009

Three Mile Island 
1979

FACES of SLEEP DISORDERS
Road Map!

- Introduction and Timeline.
- Epidemiology. [Overall vs Surgical pts]
- Definition, Diagnosis and Treatment.
- Screening Tools.
- Risks of Untreated OSA in the perioperative Population.
- Perioperative Protocols & Challenges.
- Future Direction.
Why Sleep?

(NREM) 75%

Stage 1
Stage 2
Stage 3
Stage 4

Body's rest, recovery & Metabolic restoration, regulation, Immunity

(REM) 25%

Phasic eye movements
Loss of muscle tone
EEG neutral

Active state of brain → learning, memory

Time Ticks Away

1837
- 1837 – Pickwick Papers, Charles Dickens
- 1918 – Osler Coins Pickwickian
- 1929 – EEG discovery

1950
- 1952 Discovery of REM sleep - University of Chicago

1970
- 1970s - Obstructive Sleep Apnea
- Only Cure - Tracheostomy

1980
- 1981 – Invention of CPAP, Australia
- 1990-2000 – Development of Bi Level PAP, ENT Surgery ; UPPP

2000
- 1990-2000 – CPAP, Bi Level PAP, Oral Appliances,
- 2000-2010 – Auto PAP, Humidity, Adaptive Servo Ventilation, Masks

NOW
- CPAP, Bi-level PAP with adaptive breathing, Portable Ventilators, Povent, Hypoglossal Nerve stimulator, More interfaces
Road Map!

- Introduction and timeline
- **Epidemiology. (Overall vs Surgical pts)**
- Pathophysiology, Definition, Diagnosis & Rx
- Risks of Untreated OSA (Overall vs Surgical Pts)
- Screening tools
- Perioperative Protocols and Challenges.
- Future Direction
Epidemiology Of OSA

- Snoring $\rightarrow$ 40% of men & 20% of women. ? Habitual Snoring

- ~ 9% of the adult population has OSA. [*NEJM 1993; 328: 1230-35, WI Cohort*]

- Recent studies ~ OSA rates as high as 26% of adults between 30-70 yrs of the U.S. population. 2013.

- **Untreated OSA Cost**: Medical, Mental Health, Work Productivity loss, Motor Vehicle Accidents $> \$150$ billion / yr.

  *Frost and Sullivan 2014*
Epidemiology

U.S Adult Population
245.2M

12%

Prevalence OSA (AHI>5)
29.4M

80%
20%

Undiagnosed
23.5M

Diagnosed
5.9M

85%
10%
5%
100%

CPAP
5M

Oral Appliances
0.6M

Surgery
0.3M

Lifestyle
5.9M


© American Academy of Sleep Medicine 2016
<table>
<thead>
<tr>
<th>Procedure</th>
<th>Prevalence</th>
<th>Reference</th>
</tr>
</thead>
</table>

**Bottom Line – Surgical population prevalence HIGHER!**

80% pts unaware prior to undergoing surgery
Road Map!

- Introduction and timeline.
- Epidemiology. (Overall vs Surgical pts)
- **Pathophysiology, Definition, Diagnosis & Rx.**
- Risks of Untreated OSA (Overall vs Surgical Pts)
- Screening tools
- Perioperative Protocols and Challenges
- Future Direction
Patho-Fizz!

Normal Breathing
- Airway is open
- Air flows freely to lungs

Obstructive Sleep Apnea
- Airway collapses
- Blocked air flow to lungs

http://www.toptenz.net/top-10-bizarre-sleep-disorders.php
OSA – playing the odds!
Visual Cues

Mallampati Score

Why do men have more OSA?

Pear vs Apple
Diagnosis

Polysomnography – In lab

Home Sleep Apnea Test
Snoring – Posterior airway vibration (60-70 db)

Whisper 20 db, Conversation 30 db, Vacuum Cleaner 70db

Mild OSA → AHI = 5-15 /hr. of Sleep.
Moderate OSA → AHI = 15-30 /hr. of Sleep.
Severe OSA → AHI = 30/hr of Sleep.

RDI > 20 /hr > 40/hr (Apnea + Hypopnea + RERA)
REI Respiratory Event Index
Treatments
Bypass Surgery, Stents, Pacemakers

Mild – Moderate OSA
- CPAP
- Auto – PAP
- Bi level – PAP
- Oral Appliance
- Postural therapy
- Weight loss

Moderate – Severe OSA
- CPAP (Gold standard)
- Auto - PAP
- Bi Level PAP
- Surgical ( ENT, UPPP, DNS )
- Surgical ( Mandibular advancement)
- Hypoglossal nerve stimulator
- Tracheostomy ( rarely done)

PAP therapy - Mainstay
Treatment of OSA

- 100 interfaces
- Downloadable
- Auto PAP /Humidity
- 35 yrs since invention
Road Map!

- Introduction and timeline.
- Epidemiology. [Overall vs Surgical pts]
- Pathophysiology, Definition, Diagnosis & Rx.
- Risks of Untreated OSA (Overall vs Surgical Pts)
- Screening tools.
- Perioperative Protocols and Challenges.
- Future Direction.
Untreated OSA - more than meets the eye

Shamsuzzaman et al JAMA 2003
Diseases Associated with OSA

- Hypertension: 35%
- Atrial Fibrillation: 49%  % with OSA
- Pacemakers: 59%
- Diabetes: 72%
- Congestive Heart Failure: 76%
- Obesity: 77%
- Drug Resistant Hypertension: 83%
- Night Time Heart Attacks: 91%

- 85% or 30-40 million patients are undiagnosed.
- Comorbidities make treatment a must.
Surgical Pt. + Untreated OSA = *Perfect Storm*

- **Perioperative medications** (e.g., sedatives, general anesthetic agents, opioids, neuromuscular blocking agents) may
  - **Reduce** upper airway dilator tone
  - **Inhibit** protective airway reflexes
  - **Inhibit** Central ventilatory drive, & **blunt protective arousal mechanisms**
  - **Inhibit** peripheral chemo-responsiveness to hypoxic & hypercapneic stimuli
  - **Exacerbate** repetitive upper airway collapse in pts with OSA.
Surgical patients are at risk for fluid and salt retention. (Rostral fluid shifts legs to neck) (Peri Op IVF s)

- Supine posture

- Perioperative discontinuation of continuous positive airway pressure (CPAP) - More Fuel to the fire!
REM Sleep Rebound

- **NORMAL REM physiology** - 25% of the night, increased instability of heart rate, respiration, and blood pressure
  - In OSA pts → REM related hypoxic episodes 2-3 times increased
  - Pharyngeal tone is further diminished; with hypoxic sympathetic tone increased

- Surgical trauma **releases inflammatory cytokines**
  - (TNF-α), interleukin 1 (IL-1), & IL-6. = REM SUPRESSION

- REM sleep frequently absent on 1-3 post-op days, then **REM rebound occurs**.

- REM sleep is also associated with **increased sympathetic discharge** leading to tachycardia, hemodynamic instability, and myocardial ischemia.

*Chest 2006;129:198-205*
Post – Op Morbidity

- Majority of unexpected & unexplained postoperative deaths occur at night and within 7 days of surgery.
- In MI survivors, OSA found in 36% vs 3.8% of matched controls.
- After correcting for known risk factors, OSA with AHI>5.3 was independently predictive of MI with an odds ratio of 23.3 (p<0.001)

Chest 2006;129:198-205

Tough ? Unethical to do a study; Sham CPAP group to prove increased morbidity. Difficult to replicate perioperative scenario in Animal models. Unique OSA.
<table>
<thead>
<tr>
<th>Author</th>
<th>Type of Study</th>
<th># of Patients</th>
<th>Dx of OSA</th>
<th>Type of Surgeries</th>
<th>Complications</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gupta et al.98</td>
<td>Case control study</td>
<td>101 Pts. with OSA &amp; 101 matched controls</td>
<td>PSG</td>
<td>Orthopedic (hip or knee replacement)</td>
<td>Reintubation, hypoxemia, acute hypercapnia, MI, arrhythmia, delirium, &amp; ICU transfer</td>
<td>Pts with OSA had higher rate of postoperative complications (39% vs 18%). These pts also had increased hospital length of stay.</td>
</tr>
<tr>
<td>Auckley et al.105</td>
<td>Historical cohort study</td>
<td>81 pts with completed Berlin Q</td>
<td>Berlin Q</td>
<td>Elective surgery (type of surgeries is not included in the abstract)</td>
<td>Hypoxemia, hypercapnia, reintubation, atelectasis, pneumonia, arrhythmia, thromboembolism</td>
<td>Pts. with high-risk of sleep apnea based on the Berlin Q had a higher rate of postoperative complications (20% vs 4.5%).</td>
</tr>
<tr>
<td>Kaw et al.100</td>
<td>Case control study</td>
<td>37 pts with OSA &amp; 185 matched controls</td>
<td>PSG</td>
<td>Cardiac</td>
<td>Encephalopathy, postoperative infections, and ICU length of stay</td>
<td>Pts. with OSA had higher rate of encephalopathy, postoperative infections (mediastinitis), &amp; increased ICU length of stay.</td>
</tr>
<tr>
<td>Hwang et al.102</td>
<td>Historical cohort study</td>
<td>172 Pts underwent NOSS</td>
<td>Home NOSS</td>
<td>Abdominal, ENT, Thoracic, Vascular, Gyn, Neurosurgical, Urologic, Cardiothoracic, and Orthopedic</td>
<td>Arrhythmia, hypoxemia, atelectasis, GI bleed, pneumonia, PE, PE,</td>
<td>Pts with ODI 4% ≥ 5/h had a higher rate of postop complications than those with ODI4% &lt; 5/h (15.3% vs 2.7%).</td>
</tr>
<tr>
<td>Study</td>
<td>Type</td>
<td>Patients Description</td>
<td>Diagnosis/Complications</td>
<td>Result</td>
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<tr>
<td>Liao et al. 99 2009</td>
<td>Retrospective matched cohort study</td>
<td>240 Pts with OSA &amp; 240 matched controls (ICD-9) codes</td>
<td>Hypoxemia, pulmonary edema, bronchospasm, arrhythmia, confusion</td>
<td>Pts with OSA had a higher incidence of postop complications (48% vs 36%)</td>
<td></td>
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</tr>
<tr>
<td>Vasu et al. 16 2010</td>
<td>Historical cohort study</td>
<td>135 pts. completed STOP BANG Q</td>
<td>Hypoxemia, pneumonia, PE, atelectasis, hypotension, A-Fib</td>
<td>Pts with high-risk of OSA based on STOP BANG Q had a higher rate of postop complications (19.6% vs 1.3%) and hospital length of stay.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memtsoudis et al. 101</td>
<td>Case control study</td>
<td>58358 orthopedic pts with OSA &amp; 45547 G Surg pts with OSA were matched for controls in 1:3 manner</td>
<td>Aspiration pneumonia, pulmonary embolism, need for intubation and mechanical ventilation, ARDS</td>
<td>Patients with OSA undergoing orthopedic &amp; general surgeries were at a higher risk of aspiration pneumonia, ARDS, and the need for intubation &amp; mechanical ventilation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaw et al. 103 2011</td>
<td>Cohort study</td>
<td>471 pts who underwent non-cardiac surgery within 3 yrs of PSG</td>
<td>A Fib, respiratory failure, hypoxemia, delirium, transfer to ICU, CHF, MI, hospital length of stay</td>
<td>Pts with OSA had a higher rate of postop hypoxemia (12.4% vs 2.1%), transfer to ICU (6.7% vs 1.6%), any complication (14.2% vs 2.6%), &amp; hospital length of stay.</td>
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</tbody>
</table>
Respiratory Complications

- Profound oxyhemoglobin desaturation
- Aspiration pneumonia & ARDS
- Post-obstructive pulmonary edema (from breathing against an obstructed upper airway)
- Emergent non Invasive Ventilation. Bi Level PAP. ICU tx
- Acute respiratory Failure, Arrest & Re intubation
Cardiovascular Complications

- Large BP fluctuations.
- Myocardial ischemia.
- Cardiac arrhythmias. (Watch me fib watch me ne ne)
- Increased Length of Stay.
- Sudden Cardiac death.
- Post op delirium. (X 6 fold in Cardiac Surgeries)
- Elective Hips & Knee Sx – X 2 fold hospital death.
Road Map!

- Introduction and timeline.
- Epidemiology. [Overall vs Surgical pts]
- Pathophysiology, Definition, Diagnosis & Rx.
- Risks of Untreated OSA (Overall vs Surgical Pts)
- Screening tools.
- Perioperative Protocols and Challenges.
- Take Home points & Future Direction.
Screening Tools

- STOP BANG (8 point simple questionnaire)
- PSG. (polysomnography i.e. Sleep study)
- Home Sleep Apnea Testing. (Portable, at home)
- BERLIN Questionnaire
- ASA Check list

- Established OSA – Compliant
- Established OSA - Non Compliant
STOP - BANG

<table>
<thead>
<tr>
<th>STOP</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you <strong>SNORE</strong> loudly (louder than talking or loud enough to be heard through closed doors)?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Do you often feel <strong>TIRED</strong>, fatigued, or sleepy during daytime?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Has anyone <strong>OBSERVED</strong> you stop breathing during your sleep?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Do you have or are you being treated for high blood <strong>PRESSURE</strong>?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BANG</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BMI</strong> more than 35kg/m2?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>AGE</strong> over 50 years old?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>NECK</strong> circumference &gt; 16 inches (40cm)?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>GENDER</strong>: Male?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**High risk of OSA**: Yes 5 - 8  
**Intermediate risk of OSA**: Yes 3 - 4  
**Low risk of OSA**: Yes 0 - 2

Chung F et al. Anesthesiology 2008; 108: 812-821,
STOP BANG - Performance

- + STOP-BANG score ≥ 3 (any 3 positive items),
  - Sensitivity for identifying moderate-severe OSA was 87%
  - Specificity for identifying moderate-severe OSA was 31%

- Ideal screening tool with high sensitivity.

- Specificity: (for identifying moderate-severe OSA)
  - 2 positive items from the 4 STOP questions + BMI > 35 kg/m², = 85%,
  - 2 positive items from the 4 STOP questions + male gender, = 77%,
  - 2 positive items from the 4 STOP questions + neck circumference > 40 cm = 79%,

- What about NOSS? Oxygen desaturation index by nocturnal oximetry had a sensitivity of 75-95% and a specificity of 67-97% as compared to AHI. (Apnea Hypopnea Index) NOSS → No CPAP!
Screening

- Who to screen? (Every one presenting for a surgery or being discharged from the hospital)

- When to screen?
  - At the initial appointment using **STOP BANG**.
  - If 3-5 – heightened Vigilance, monitoring, Empiric PAP therapy.
  - If 6-8 - Consider deferring Sx - OSA diagnostics & Rx
# American Society of Anesthesiologists Checklist

**High risk of OSA if 2 or more categories scored as positive.**  
**Low risk of OSA if 1 or no categories scored as positive**

<table>
<thead>
<tr>
<th>Category 1: Predisposing physical characteristics</th>
<th>Category result</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. BMI ≥ 35</td>
<td>If 2 or more items in this category are present, then this category is positive</td>
</tr>
<tr>
<td>b. Neck circumference &gt; 45 cm/17 cm (men) or 40 cm/16 cm (women)</td>
<td></td>
</tr>
<tr>
<td>c. Craniofacial abnormalities affecting the airway</td>
<td></td>
</tr>
<tr>
<td>d. Anatomical nasal obstruction</td>
<td></td>
</tr>
<tr>
<td>e. Tonsils nearly touching or touching the midline</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 2: History of apparent airway obstruction during sleep</th>
<th>Category result</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Snoring loud enough to be heard through closed doors</td>
<td>If 2 or more items are present (or 1 item if patient lives alone), then this category is positive</td>
</tr>
<tr>
<td>b. Frequent snoring</td>
<td></td>
</tr>
<tr>
<td>c. Observed pauses in breathing during sleep</td>
<td></td>
</tr>
<tr>
<td>d. Awakens from sleep with a choking sensation</td>
<td></td>
</tr>
<tr>
<td>e. Frequent arousals from sleep</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category 3: Somnolence</th>
<th>Category result</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Frequent somnolence or fatigue despite adequate “sleep”</td>
<td>If 1 or more items in this category are present, then this category is positive</td>
</tr>
<tr>
<td>b. Falls asleep easily in a nonstimulating environment (eg, watching TV, reading, riding in or driving a car) despite adequate sleep</td>
<td></td>
</tr>
<tr>
<td>c. Parent or teacher comments that child appears sleepy during the day, is easily distracted, is overly aggressive or has difficulty concentrating</td>
<td></td>
</tr>
<tr>
<td>d. Child often difficult to arouse at usual awakening time</td>
<td></td>
</tr>
</tbody>
</table>
Road Map!

- Introduction and timeline
- Epidemiology (Overall vs Surgical pts)
- Pathophysiology, Definition, Diagnosis & Rx
- Risks of Untreated OSA (Overall vs Surgical Pts)
- Screening tools
- Perioperative Protocols and Challenges
- Take Home points & Future Direction
Peri-Operative Day -1 to Day 0

- Anticipate the difficult airway.
- Most pts may be obese & appropriate care should be taken to prevent desaturation.
- Short-acting anesthetics, less soluble inhalational agents, titrate opioids, & minimize sedation.
- Awake extubation may be needed ;( 30° to 45°)head-up position or lateral
- Modifications of anesthetic technique, e.g. avoidance of general anesthesia in favor of a central neuraxial or a peripheral nerve block.
Post Operative Day 2 ..3...4

- **Immediate Post OP – PACU**
  - HOB, Extubate to PAP, Minimize sedatives, multimodal analgesia

- **PACU → Home** (counsel, PAP compliance, testing, minimize narcotics & muscle relaxers)

- **PACU → Ward** (End-tidals, O2, HOB elevation, Witnessed apneas, Empiric PAP)

- **Ward → Home** (counsel, PAP compliance, Encourage testing, minimize narcotics & muscle relaxers)
Franciscan Health-Central Indiana

Indianapolis

Mooresville

Carmel
PERI-OPERATIVE TOOL KIT

Preoperative Considerations

Perioperative Evaluation

Patient with Known OSA

Patient with Presumptive Diagnosis of OSA

Optimized Co-morbid Conditions AND able to use CPAP after discharge

Non-optimized Co-morbid Conditions

Optimized Co-morbid Conditions AND Postoperative pain can be managed predominantly by using non-opioid analgesic techniques

Intraoperative Considerations

Proceed with Surgery

Not Suitable for Surgery, may benefit from diagnosis and treatment

Proceed with Surgery

Postoperative Considerations

Exercise caution with OSA patients who develop prolonged and frequent severe respiratory events in the postoperative period.

Pre-operatively

- All patients entering through the preadmission testing will be assessed for OSA
- All patients with a STOP BANG score ≥ 3 will have an OSA sticker placed on chart
- STOP BANG score of 3 or 4/"Suspected OSA" will proceed with surgery and have an appointment for a sleep consultation post-operatively
- STOP BANG score ≥ 5 will be scheduled for an internal medicine consult for risk identification, stratification and potential sleep study
- STOP BANG score ≥ 5 with one of the following: BMI ≥ 30, Difficulty airway/mampati 3 or 4, History of difficult or slow to wake up after surgery, or one comorbidity such as:
  - arrhythmias
  - cerebrovascular disease
  - CHF
  - metabolic syndrome
- Will cause delay in surgery for additional workup and optimization/sleep study for all elective surgeries
- STOP BANG score 7 or 8 elective surgery will be canceled until additional workup/sleep study is completed
- Patient and family education provided

Intra-Operative Phase

- Consider non-opioid multimodal analgesia approach (local/regional anesthesia, non-steroidal anti-inflammatory drugs and IV acetaminophen)
- Local or regional anesthesia is preferred and should be used whenever possible
- If moderate sedation is required, continuous capnography should be used during the procedure
- If general anesthesia is planned, providers should preferably use a technique that allows early emergence
- If opioids are required, use short-acting ones when possible
- CPAP is advised during procedural sedation

PACU Phase

- In addition to the routine PACU discharge criteria of the Adreene score, patients with a suspected diagnosis of OSA are monitored for:
  - Apnea ≥ 10 seconds
  - Desaturation on 4 liters of O2
  - Inability to wean from nasal cannula O2
  - Bradynpnea ≤ 8 respiratory rate/minute
  - Pain sedation score mismatch
- Place patients in a semi-upright position
- Observe patients for oxygen desaturation and/or apneic episodes patients to have EtCO2 monitoring

PACU Phase (continued)

- If oxygen desaturation occurs while on supplemental oxygen therapy, use non-invasive ventilation, i.e., CPAP or Bi Level PAP (if patients use CPAP at home, they should use it in the PACU while drowsy)
- Minimize systemic opioids, if possible. If necessary, titrate to the lowest dose that works for the long acting opioids (e.g. morphine and hydromorphone)
- Contact anesthesiologist if problems are identified and continue

Outpatient Surgery (ASD) Recovery

- Place patients in a semi-upright position
- Observe patients for oxygen desaturation and/or apneic episodes. Patients to have EtCO2 monitoring
- If oxygen desaturation occurs, will use CPAP or Bi Level PAP
- Minimize/systemic opioids, if possible
- Patients who are noted to easily obstruct their airway when drowsy should receive extra vigilance with longer Phase II recovery time, as needed
- Use CPAP while sleeping even during the daytime
- Reinforce patient and family education
- Contact anesthesiologist if problems are new or reoccur

Outpatient Surgery (ASD) to Home

- Follow-up phone call
  - To include CPAP compliance while sleeping day or night at the time of discharge follow-up phone call
  - Patients encouraged to follow-up with their primary care physician
  - Reinforce follow-up phone call
  - Reinforce phone call
  - Reinforce phone call

Inpatient Nursing Unit to Home

- Contact Internal medicine physician if problems are new or reoccur
- PCA and monitoring End Tidal CO2
- Place patients in a semi-upright position, lateral and/or prone. Avoid flat bed and supine position
- Observe patient for oxygen desaturation and/or apneic episodes
- If oxygen desaturation occurs while on supplemental oxygen therapy, use non-invasive ventilation, i.e., CPAP or Bi Level PAP (if patient uses CPAP at home patient should use CPAP in the unit. If new order and unstable may require additional monitoring in ICU or ICU)
- Minimize/systemic opioids, if possible
- Patients who are noted to easily obstruct their airway when drowsy should receive extra vigilance with longer Phase II recovery time, as needed
- Reinforce follow-up phone call and patient/family education during hospitalization and at discharge

Challenges & Opportunities

- Sleep testing & follow up delays
- PAP device delivery delays
- Pt education and awareness
- PAP acclimation / Compliance
- Insurance Authorizations

Sleep Medicine Providers

Easier Screening.

Hospital based DME

Experienced Personnel
T- Rex ! (Take Home Reccs)

- **OSA prevalent** (25%) in Surgical Population as obesity grows.
- Frequently **not identified before surgery**.
- Identify, treat & reduce perioperative risk. Simple screening tools
- If pt. remains untreated, document additional risk & notify family.
- Minimize opioids / muscle relaxers, alternative analgesic modalities.
- Non Supine positions. Increased vigilance and Monitoring.
- **360 degrees of awareness.** (All involved)

*A stitch in time saves nine as well as ninety nine! (both short & long term gains)*
Team Effort! – 360 Degrees

- Surgical Colleagues.
- Anesthesia Team.
- Educating Patients and Families
- PACU / Nursing Team.
- Sleep Medicine Team.
- Pulmonary Critical Care Team.
- Respiratory Therapy Team
- Home Medical Equipment Companies
- Hospital Administration.
Risk Stratify. Screen Early

Sleepy vs Not sleepy Phenotypes?

Could we do salivary genetic metabolic tests to choose & dose medications better?

Programs can be implemented cost effectively to improve patient safety & **surgical outcomes** as well as improve **Long term pt outcomes**

Death & Near Miss Registry.

Sleep Medicine Telemedicine Service.

IN SLEEP WE TRUST!
Thank you for your Wakefulness

Q & A

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Debby Hentz: Debby.Hentz@franciscanalliance.org

Fix the Snore, improve yo $core!

Elective Surgery delayed surgery survived!

Ignore the snore no more!

Avoid the Perfect SnORM!

I DON'T SNORE
I DREAM I'M A MOTORCYCLE
Objectives

Following this webinar,

1. Identify signs, symptoms & pathophysiology of Obstructive Sleep Apnea (OSA)
2. Identify potential complications of OSA
3. Describe STOP BANG assessment for OSA
4. Describe Pre-acute, Acute Care & Post-Acute process improvements to reduce respiratory depression from OSA
ABCDEF Bundle

Have you implemented the ABCDEF Bundle in your ICU?*

*excludes response of not applicable
Grant me the serenity to prioritize the things I cannot delegate, the courage to say no when I need to, and the wisdom to know when to go home....

• Anonymous