Opioids & Sleep Apnea: Can They Exist in Harmony?

Kathy Lattavo, RN, MSN, RN-C

Objectives

- 1) Define sleep apnea.
- 2) Recognize signs & symptoms of sleep apnea.
- 3) Interpret current recommendations regarding the use of opioids with sleep apnea.
- 4) Develop a pain management plan of care for a patient with sleep apnea.

Disclosure

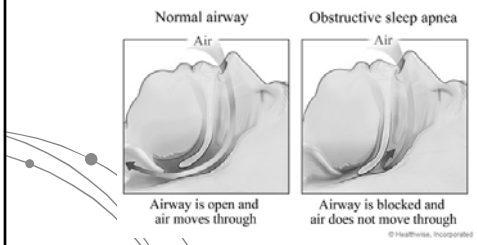
- No disclosures or conflict of interest identified.

What is sleep apnea?

- Obstructive sleep apnea (OSA): a syndrome characterized by periodic, partial or complete obstruction of the upper airway during sleep
- Cessation of airflow > 10 sec or shallow breathing
  - Leads to apnea-hypopnea, arousal & O_2 desaturation

- Apnea: cessation of airflow at nose & mouth for > 10 seconds; complete obstruction of the upper airway
- Hypopnea: 50% reduction in airflow for 10 seconds for 15 or more times per hour & a 4% decrease in O_2 saturation

- Apnea-Hypopnea Index measures severity:
  - *Normal* - 5 episodes/hour
  - *Mild* - between 5-14 episodes/hour
  - *Moderate* -15-30 episodes/hour
  - *Severe* - >30 episodes/hour



Definition (cont)

- Central sleep apnea (CSA): brain fails to signal the respiratory muscles to facilitate breathing
  - Both airflow & ventilatory effort are absent
- Mixed sleep apnea: combination of OSA & CSA
  - Interval of no respiratory effort & interval of obstructed respiratory effort

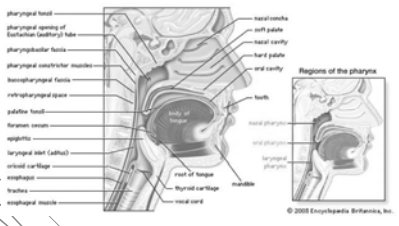
Statistics

- OSA affects 1 in 5 adults (mild OSA)
- Estimated 18 million Americans have OSA
- 1 in 15 adults has moderate to severe OSA
- 75%-85% are undiagnosed
- Overt OSA estimated to be 2% in women & 4% in men

Pathophysiology

- Characterized by complete or partial collapse of the pharyngeal airway during sleep
- Relaxation of soft tissues causes complete collapse of airway with total obstruction of airflow
  - Respiratory effort is observed but airflow is restricted

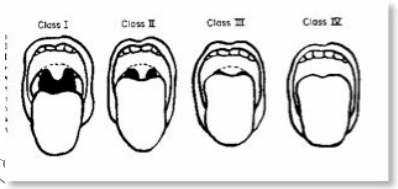
- Apnea is caused by a negative increase in intrathoracic pressure
- Increased pressure causes atrial stretching which triggers atrial natriuretic peptide



- Repeated cycle of airway collapse leads to increased SNS activity, hypoxemia, hypercapnea, reoxygenation, changes in pressure, vascular endothelial dysfunction, increased oxidative stress, inflammation, increased platelet aggregation & metabolic dysfunction

Risk Factors

- Obesity
- HTN
- Snoring
- Diabetes
- Genetic predisposition
- Large neck circumference
- Tobacco smoking
- Male gender
- Post-menopausal female
- Abnormal anatomy
- Age over 40
- Race



Signs & Symptoms of OSA

- Snoring
- Apnea
- Daytime sleepiness
- Awakening with choking
- Difficulty with concentration & attention
- Restless sleep
- Morning HA
- Moodiness
- Irritability
- Nocturia

Screening: STOP Bang

- **S** (snore)
- **T** (tired)
- **O** (observed)
- **P** (blood pressure)
- **B** (BMI >35)
- **A** (age > 50)
- **N** (neck circumference > 40 cm)
- **G** (gender male)

Epworth Sleepiness Scale

- Sitting & reading
- Watching TV
- Sitting inactive in a public place
- As a passenger in a car for an hour without a break
- Lying down to rest in the afternoon
- Sitting & talking to someone
- Sitting quietly after a lunch without alcohol
- In a car, while stopped for a few minutes in traffic

Polysommography

- Gold standard for diagnosis

Treatment

- Behavioral modifications
- Continuous positive airway pressure (CPAP), bilevel positive airway pressure (BPAP) & automatic adjusting positive airway pressure
- Oral appliances
- Uvulopalatopharyngoplasty (UPPP)
- Uvulopalatal flap (UFP)
- Laser-assisted uvulopalatoplasty (LAUP)
- Somnoplasty

OSA & Pain Management

- What's the problem???
  - Anesthetics, sedatives & analgesics selectively decrease the activity of the upper airway & increase the tendency of the upper airway to collapse
  - These agents impair the arousal response
  - Opioids can depress the respiratory drive & subsequent oxygen desaturation
  - CNS depressants diminish the action of the pharyngeal dilator muscles

- Most common cause of reduced ventilation after surgery is depression of the ventilatory response to CO_2
  - Occurs in 4-8% treated with regional anesthesia
  - Occurs in 29-40% treated with IV opioids

- Opioids
  - Decrease respiratory rate at low doses
  - Decrease tidal volume at high doses
  - OSA patients are vulnerable to these effects

And the research shows…

- Webster et. al (2008)
  - 140 pts
  - 75% had abnormal apnea-hypopnea index
  - 39% had OSA
  - Median daily dosage of all opioids was 266 mg of morphine equivalents

- Direct relation between the index & daily dose of methadone but not to other around-the-clock opioids
- Results call for increased vigilance
- Pain & disordered sleep may potentiate each other
- Suggest that opioids (especially methadone) may be related to sleep apnea in chronic pain patients

Jungquist et. al (2010)

- Regardless of opioid dose or drug, management with opioids is not likely to exacerbate OSA at stable doses
- CSA was associated with opioid use
  - Positive linear relationship between morphine-equivalent dose & severity
  - Clinically relevant once the dose reaches 200 mg/day

McCormac et. al (2008)

- Continuous $PtcCO_2$ monitoring in 30 patients after major colorectal surgery
  - Monitoring continued for up to 24 hrs
  - Patients with PCAs had significantly higher elevation in $PctCO_2$ compared to those with epidural infusions
  - O_2 administered to all patients during the monitoring period
  - No difference in sedation scores between the groups

- A subtle state of subclinical respiratory impairment is likely to exist for several hours before obvious signs of respiratory distress
- Study confirms that pulse oximetry & respiratory rate are poor indicators of ventilatory function
  - Transcutaneous capnometer may be a valuable adjunct for patient monitoring

Guidelines for Perioperative Management (ASA)

- Use of local anesthetic or peripheral nerve blocks rather than general anesthesia improves outcomes for peripheral surgery
- Use of major conduction anesthesia rather than general anesthesia improves outcomes for peripheral surgery

Perioperative Guidelines (cont)

- Extubate when fully awake
- Reverse neuromuscular blockade fully before extubation
- Position in semi upright position for extubation & recovery

Perioperative Guidelines (cont)

- Regional analgesic techniques rather than systemic opioids reduce the likelihood of adverse outcomes
- Use PCA basal rates with extreme caution or avoid entirely
- Consider NSAIDs & other modalities to reduce opioid requirements, if appropriate

Perioperative Guidelines (cont)

- Caution with concurrent use of sedatives & opioids
- Supplemental O_2 should be administered continuously until pt is able to maintain baseline O_2 saturation while breathing room air
- Continuous monitoring is recommended

Practice Guidelines with Neuraxial Opioid Administration (ASA)

- Patients should bring positive airway pressure devices to hospital
- Single-injection neuraxial opioids may be used in place of parenteral opioids
- Extended-release epidural morphine may be used in place of IV or conventional epidural morphine
- Continuous epidural opioids are preferred to parenteral opioids

Neuraxial Practice Guidelines (cont)

- Administer lowest dose of neuraxial opioids
- Cautious use of parenteral opioids in the presence of neuraxial opioids
- Increased monitoring for use of concomitant medications

Neuraxial Practice Guidelines (cont)

- All patients receiving neuraxial medication should be monitored for:
  - Adequacy of ventilation
  - Oxygenation
  - Level of consciousness

Neuraxial Practice Guidelines (cont)

- Supplemental O_2 should be available
- O_2 should be administered to pts with altered LOC, respiratory depression or hypoxemia
- *Caution*: routine use may increase duration of apneic episodes & may hinder detection of atelectasis, transient apnea & hypoventilation

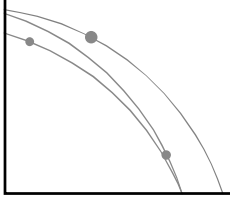
Neuraxial Practice Guidelines (cont)

- Maintain IV access if recurring respiratory depression occurs
- Use reversal agents as needed
- Noninvasive positive pressure ventilation may be considered for improving ventilatory status

Case Presentation

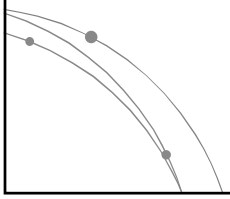
- 60 year old male admitted with colon cancer for a R hemicolectomy
- Medical history includes hypertension, diabetes & coronary artery disease

What other information would you like to know?

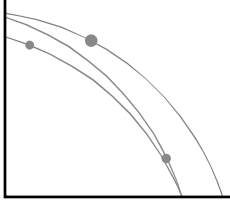


List analgesic protocols appropriate for a patient with Hx of OSA

- During surgery
- Postoperatively



Discuss nursing care for post-op patient with OSA



Take Home Messages…

- Can opioids & OSA exist in harmony?
  - Yes
- What guidelines should be followed?
  - Judicious use of opioids
  - Consider neuraxial opioids
  - Consider single-injection neuraxial opioid instead of parenteral opioid

- Consider extended-release epidural morphine
- Continuous epidural opioids preferred to parenteral opioids
- Use lowest dose of opioid possible
- Caution with parenteral & neuraxial opioids together

- Supplemental O_2 may be required
- Use noninvasive positive pressure ventilation
- Use local anesthetic or peripheral nerve blocks rather than general anesthesia
- Use major conduction anesthesia rather than general anesthesia

- Use regional analgesia instead of systemic opioids
- Caution with PCA basal rates
- Vigilant monitoring
- Use NSAIDs & other modalities
- Evaluate other medications

Questions???

Thank you!

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9/24/10
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