Safe Use of Opioids in Individuals with Obstructive Sleep Apnea

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Objectives

- Define obstructive sleep apnea.
- Identify prevalence of obstructive sleep apnea and pain.
- Review the literature related to the use of opioids in individuals with obstructive sleep apnea.
- List best practices for the use of opioids in individuals with obstructive sleep apnea.
Obstructive Sleep Apnea (OSA)

- Chronic disorder characterized by collapse of the upper airway during sleep and pauses in breathing.

- Muscle relaxation during REM sleep causes narrowing of the airway with partial or complete obstruction (Khan & Ali, 2008).
Obstructive Sleep Apnea

- Airway obstruction causes the individual to arouse. The cycle of obstruction and arousal may be repeated multiple of times during the night (Khan & Ali, 2008).

- Although the sleep interruption is brief and not remembered by the individual, it causes strain on the cardiovascular system due to sudden increases in blood pressure and heart rate (Jigajinni, Sultan, & Radhakrishnan, 2009).
Signs & Symptoms of OSA

- loud snoring
- periods of breathing cessation
- gasping or choking
- daytime sleepiness
- morning headaches
- decreased concentration and memory (Epstein et al., 2009).
Signs & Symptoms of OSA

- feeling un-refreshed after sleeping
- feeling sleepy during the daytime
- need for daytime naps
- nocturia
- decreased libido  (McCabe & Hardinge, 2011).
Other Conditions OSA Contributes to

- hypertension
- cerebrovascular accidents
- myocardial infarction
- cor pulmonale
- motor vehicle accidents (Epstein et al., 2009)
- gastroesophageal reflux
- intra-cranial hypertension
Other Conditions OSA Contributes to

- polycythemia
- right heart failure
- nocturnal angina
- fatigue
- impaired cognition
- anxiety
- depression (Khan & Ali, 2008), (Moos & Cuddeford, 2006).
Diagnosis of OSA

- Polysomnography conducted in a sleep lab
- Based on the apnea/hypopnea index and degree of oxygen desaturation.
- A diagnosis of OSA is made if there are more than 15 obstructive events during the night or more than five an hour (Epstein et al., 2009).
Treatment of OSA

Conservative treatments include weight loss, avoidance of alcohol and smoking cessation (Moos & Cuddeford, 2006).

- Continuous positive airway pressure (CPAP)
- Oral appliances
- Surgery
Prevalence of OSA

- **2 – 4 % percent of adults** (Epstein et al., 2009)
- **Up to 5% of the general population** (Khan & Ali, 2008)
- **May be as high as 14% in men and 7% in women** (Jarzyna et al., 2011)
- **May be as high as 78% in morbidly obese individuals** (Park, Ramar, & Olson, 2011)
- **Up to 80% may be undiagnosed** (Adesanya, Lee, Grilich, & Joshi, 2010).
Prevalence of Pain

- Most common reason for physician visits
- 1 out of 6 MD visits because of acute pain
- 11 million office visits annually for joint pain, 7 million for back pain and 11 million for headache (Paulose & Hertz, 2008)
- Chronic pain affects over 100 million adults in the United States each year (Institute of Medicine, 2011)
Challenges related to opioid use in patients with OSA

- Opioids are known to cause sedation and may lead to respiratory depression (American Pain Society, 2008).
- Opioids cause relaxation of the tongue and upper airway muscles (Macintyre, Loadsman, & Scott, 2011).
- OSA patients receiving opioids for chronic pain management may also be at risk for adverse effects related to respiratory depression (Walker et al., 2007).
Regional anesthesia is recommended for use when possible (Bamgbade, 2009; Bolden, 2009; Jigajinni, 2009; Khan, 2008; Moos, 2006; Rudra, 2008; Schwengel, 2009).

When using general anesthesia, short-acting agents provide quicker return to baseline respiratory status (Adesanya, 2010; Chung, 2008).

The use of sedatives should be minimized or avoided (Ankichetty, 2011; Macintyre, 2011).
Literature Review

Opioids that are mu receptors agonists have the greatest risk of causing respiratory depression (Jungquist, 2011). These include morphine, codeine, fentanyl, hydrocodone, hydromorphone, oxycodone and methadone (Pasero, 2011).

The use of non-opioid analgesics may decrease the amount of opioids needed (Adesanya, 2010; Chung, 2008; Jigajinni, 2009; Khan, 2008; Rudra, 2008).
Literature Review

Opioids contribute to central nervous system depression by
- depressing the respiratory drive
- decreasing level of consciousness
- depressing airway muscle tone.

This causes decreased ventilation and leads to hypoxia and hypercapnia (Macintyre, 2011).
Literature Review

- Measures should be undertaken to prevent hypoxemia and hypercapnia (Adesanya, 2010).
- Hypoxemia was associated with a change in oxygen delivery, emergent CPAP application, administration of intravenous naloxone, increased intensity of care and increased length of stay in a study of orthopedic surgery patients with OSA (Liu, 2011).
Literature Review

Continuous oxygen saturation monitoring is recommended for OSA patients receiving opioids (Adesanya, 2010; Bamgbade, 2009; Bolden 2007 & 2009; Gay, 2010; Haeck, 2009; Horlocker, 2009; Jigajinni, 2009; Moos, 2006; Shafazand, 2009).

Oxygen saturation monitoring may not be a reliable method of detecting postoperative ventilatory impairment, particularly in patients receiving oxygen (Jarzyna, 2011; Pasero, 2009).
Literature Review

- Sedation manifests earlier than other respiratory effects of opioids and is not masked by supplemental oxygen use (Jarzyna, 2011).

- The Pasero Opioid-induced Sedation Scale (POSS) is a scale that includes nursing interventions based on the level of sedation assessed (Pasero, 2009).

- Patients should be awakened to measure sedation (Macintyre, 2011).
Literature Review

Patients who use a CPAP device should use it post-operatively (Adesanya, 2010; Bolden 2009; Haeck, 2009; Horlocker, 2009; Jigajinni, 2009; Moos, 2006; Pace, 2008; Rudra, 2008).

Capnography, the measurement of expired carbon dioxide, is recommended to help prevent hypercapnia (Haeck, 2009; Pace, 2008).

Capnography is a more sensitive early indicator of respiratory depression than oximetry (Jarzyna, 2011; Maddox, 2008; McCarter, 2008; Pace, 2008).
Best practices for Opioid Use in Patients with OSA

- Individualize opioid doses given post-operatively and titrate to effect (Macintyre et al., 2011).

- Do not use a basal (continuous) dose when using PCA (N. Bolden et al., 2009; Jarzyna et al., 2011; Khan & Ali, 2008; Macintyre et al., 2011; Moos & Cuddeford, 2006).

- The use of non-opioid analgesics may decrease the amount of opioids needed (Adesanya et al., 2010; Chung et al., 2008; Jigajinni et al., 2009; Khan & Ali, 2008; Pasero & McCaffery, 2011; Rudra et al., 2008).
Best practices for Opioid Use in Patients with OSA

- **Sedation should be monitored using a valid and reliable sedation scale** (Craft, 2010; Hutchison & Rodiguez, 2008; Jarzyna et al., 2011; Macintyre et al., 2011; Pasero, 2009).

- **Patients should be positioned either with their head up 30 degrees or on their side** (Adesanya et al., 2010; Chung et al., 2008; Khan & Ali, 2008; Rudra et al., 2008).
Best practices for Opioid Use in Patients with OSA

Patients who use a CPAP at home should use a CPAP following surgery at any time they are drowsy to help maintain the airway while receiving opioids. CPAP may also be of use to treat respiratory depression (Adesanya et al., 2010; N. Bolden et al., 2009; Haeck et al., 2009; Horlocker et al., 2009; Jigajinni et al., 2009; Khan & Ali, 2008; Moos & Cuddeford, 2006; Pace, 2008; Rudra et al., 2008; Shafazand, 2009).
Best practices for Opioid Use in Patients with OSA

- A continuous pulse oximeter should be used to monitor oxygenation (Bamgbadea et al., 2009; N. Bolden et al., 2007; N. Bolden et al., 2009; Chung et al., 2008; Gay, 2010; Haeck et al., 2009; Jigajinni et al., 2009; Macintyre et al., 2011; Maddox et al., 2008; Moos & Cuddeford, 2006; Shafazand, 2009).

- Capnography is a more sensitive indicator of ventilation and can help prevent respiratory complications (Haeck et al., 2009; Jarzyna et al., 2011; Maddox et al., 2008; McCarter et al., 2010; Pace, 2008; Pasero, 2009). (Maddox et al., 2008; McCarter et al., 2010).
References


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