LIFE-THREATENING respiratory depression is the most serious of the opioid adverse effects. To most nurses, it is one of the most frightening aspects of opioid administration. However, nurses can be the key to preventing clinically significant respiratory depression by performing systematic assessments of their patients’ sedation levels. Less opioid is required to produce sedation than to produce respiratory depression, a characteristic that makes sedation a particularly sensitive indicator of impending respiratory depression. Gradual increases in sedation are an early warning sign and must be attended to with a prompt reduction in opioid dose and more frequent monitoring until the patient demonstrates an acceptable level of sedation.1-4

Sedation Assessment

Nursing assessment of opioid-induced sedation is convenient, inexpensive, and takes minimal time to perform. To ensure clear communication between members of the health care team and to evaluate trends in patients’ levels of sedation, a simple, easy-to-understand sedation scale designed for use during opioid administration for pain management is recommended.2 The use of sedation scales is common in hospitals in the United States. The author performed a survey of members of the American Pain Society and the American Society for Pain Management Nursing e-mail list service in 2006 that revealed all but one member institution used some type of sedation scale during opioid therapies, such as intravenous patient-controlled analgesia (IV PCA) and epidural analgesia (N = 64). The most commonly used sedation scale among those surveyed was the Pasero Opioid-induced Sedation Scale (POSS) (Table 1). Two studies have established validity and reliability (0.9035 and 0.9096 by Cronbach’s alpha) of the POSS for sedation assessment during opioid administration for pain management.

Note that the POSS links nursing interventions to the various levels of sedation. Research has shown that nurses find this approach helpful in making appropriate decisions about how to proceed with opioid treatment.5,6 Actions may include increasing the opioid dose in a patient who is easy to arouse and reports unacceptable pain relief, or decreasing or holding the opioid dose in a patient who is excessively sedated.1-4 Opioid analgesic orders or a hospital protocol should include the expectation that a nurse will decrease the opioid dose if a patient is excessively sedated.

Even sedated patients may rouse when the nurse enters the room, stands by the bed, or simply touches the patient. However, further evaluation is necessary. A proper sedation assessment requires the nurse to observe how quickly the patient rouses when stimulated by the presence of the nurse, a touch, or conversation. The patient’s ability to stay awake once aroused is a critical indicator of level of sedation. To determine this, the patient should be asked to wake up and answer a simple question. A patient who is easy to arouse will be able to awaken readily and respond with a complete answer to the question without falling asleep (sedation level 1 or 2 on the POSS). Falling asleep mid-sentence indicates a sedation level of 3 on the POSS. Note that the POSS requires the nurse to decrease the opioid dose and increase monitoring frequency until the patient has a sedation level of less than 3 (see Table 1).

Sedation scales such as the Ramsay Scale7 or Richmond Agitation Sedation Scale8 are used to assess purposeful, goal-directed sedation during procedures or in ventilated, critically ill patients, and are not recommended for use during opioid administration for pain management because they incorporate assessment of other conditions in addition to sedation.2 Most goal-directed sedation scales link anxiety or agitation to the sedation scale, which complicates assessment because agitation and anxiety are not indicators of increasing opioid-induced sedation. Patients may be either calm or anxious and sedated. Further, the scales used for assessment of purposeful, goal-directed sedation were not developed for assessment of sedation during opioid administration for pain management. Similarly, simple sedation scales such as the POSS were not developed for assessment of purposeful, goal-directed
Sedation. Many hospitals have appropriately decided to use two different sedation scales depending on the goals of treatment—one scale for purposeful sedation and a simpler sedation scale for assessment of sedation during opioid administration for pain management. 5, 6

Respiratory Assessment

A comprehensive assessment of respiratory status goes hand-in-hand with sedation assessment and requires more than counting a patient’s respiratory rate over a 30- or 60-second period. Although respiratory rate is an important parameter to obtain, clinically significant respiratory depression is not defined by a specific number of respirations per minute. 1 Rather, it is defined by several characteristics of a patient’s respiratory status and is compared with the patient’s baseline respiratory status.

A proper respiratory assessment during opioid treatment requires the nurse to watch the rise and fall of the patient’s chest to determine the rate, depth, and regularity of respirations. 9 Current respiratory rate should be compared with previous rates, and trends should be noted. Shallow respirations or periods of apnea, even brief periods, require further evaluation.

Listening to the sound of the patient’s respiration is critical. Snoring indicates airway obstruction 10 and must be attended to promptly with repositioning, 11 a request for respiratory therapy consultation, and further evaluation for the presence of obstructive sleep apnea (OSA). 10 Even subtle snoring can evolve into complete obstruction in a sedated patient, and so must be addressed.

Many times patients or their family members report that snoring is “normal” because the patient often snores at home. This thinking can lead to fatal consequences. In the home setting, patients are typically awakened by their own snoring and ineffectual respiration; however, in the context of opioid administration and perhaps other sedating medications, patients may be too sedated to self-arouse. Under these circumstances, snoring is an ominous sign and requires the nurse to arouse and further evaluate the patient to avert disaster.

All patients and their family members should be asked on admission about whether the patient snores. If the answer is yes, further evaluation such as a sleep study to diagnose OSA may be warranted before surgery or administration of sedating agents. At the very least, opioid doses should be decreased by 25% to 50% and continuous CO2 monitoring (ie, capnography) implemented in patients with known or suspected OSA. Continuous pulse oximetry may be used, but it is important to remember that pulse oximetry may yield high oxygen levels.
Mrs Gray is a 68-year-old female who has been on the clinical unit for six hours after a total abdominal hysterectomy. She is receiving acetaminophen orally and IV PCA with a PCA bolus dose of 0.2 mg of hydromorphone and a delay (lockout) interval of eight minutes. Upon entering the room, the nurse notes that Mrs Gray is asleep and has regular, sufficiently deep, and quiet respirations at a rate of 16 breaths per minute. She is able to stay awake easily while talking with her daughter. Mrs Gray remained stable and her pain was well controlled with regularly scheduled doses of acetaminophen orally and IV PCA with a PCA bolus dose of 0.2 mg of hydromorphone and a delay (lockout) interval of eight minutes. Upon entering the room, the nurse notes that Mrs Gray is asleep and has regular, sufficiently deep, and quiet respirations at a rate of 16 breaths per minute. If supplemental oxygen is required and pulse oximetry is the only mechanical monitoring available, high-risk patients should be moved to a more closely monitored setting. The American Society of Anesthesiologists lists clinical signs suggestive of OSA such as frequent, loud snoring; neck circumference of 17 inches in men or 16 inches in women; and body mass index of 35 kg/m² or more, and provides recommendations for appropriate management in the perianesthesia/perioperative setting.

Frequency of Sedation and Respiratory Status Assessment

The most dangerous time for a patient in terms of opioid-induced respiratory depression is during the first 24 hours of opioid therapy. This includes patients who are opioid tolerant (have been taking regular daily doses of an opioid for several days) and have been given opioid analgesia in addition to their usual amount, such as the patient who takes opioid analgesia for chronic pain and receives IV PCA for acute pain after surgery. Sedation level and respiratory status should be assessed at least every one to two hours during the first 24 hours of opioid therapy, then every 4 hours in stable patients. The need for more frequent assessment is common and should be based on the method of analgesic administration and patient response. For example, patients who have received single-dose epidural or intrathecal morphine injection should be assessed hourly for the first 12 hours then every two hours for the next 12 hours. Opioid-naive patients who are receiving a basal rate with IV PCA should be assessed hourly and the basal rate discontinued promptly if increased sedation is noted. Patients should be assessed at the peak time of the last opioid dose when opioids are given by single doses such as an intramuscular or IV bolus or oral opioid. For example, the peak time after administration of an IV bolus of morphine is 15 to 30 minutes and 60 to 90 minutes after an immediate-release oral opioid. Patients who are sedated at the peak time should be watched very closely until they demonstrate an acceptable sedation level and respiratory status. Charts containing pharmacokinetic information such as onset, peak, and duration of the various opioids by the various routes of administration can be posted on clinical units for reference.
Assessment of the Sleeping Patient

Nurses often ask if they should awaken sleeping patients to determine level of sedation. It is acceptable to allow a patient to sleep who has been receiving stable opioid doses and demonstrates optimal respiratory status determined by a comprehensive respiratory assessment as described above. However, patients must be aroused if there is any question about whether the patient is sleeping normally or is sedated. It is important to realize that arousal will stimulate respiration, so respiratory depth, regularity, rate, and noisiness should be noted before arousing the sleeping patient to obtain a more accurate picture of the patient’s respiratory status.

It is reassuring to know that patients who are sleeping normally and have well-controlled pain will fall back to sleep after they are aroused for the sedation assessment. Those who do not fall back to sleep require further evaluation because they may be experiencing pain and need analgesia. Note that patients who achieve pain control and fall asleep after a period of poor pain control should be carefully assessed to be sure that what seems to be normal sleep is not actually excessive sedation.

**Multimodal Therapy**

A principle of safe pain management is to administer the lowest effective analgesic dose necessary for the patient to achieve satisfactory pain control. This can be accomplished with the use of multimodal analgesic approaches that combine drugs with different underlying mechanisms, such as nonopioids (acetaminophen and nonsteroidal anti-inflammatory drugs [NSAIDs]), opioids, local anesthetics, and anticonvulsants. Lower analgesic doses have the potential to produce fewer adverse effects. Further, multimodal analgesia can result in comparable or greater pain relief than can be achieved with any single analgesic. Note that the POSS recommends administering a nonsedating nonopioid to excessively sedated patients (see Table 1). A preventive approach is preferred whereby nonopioids are routinely initiated preoperatively or at least at the same time as opioids in the PACU.

**Summary**

Patients are at highest risk for opioid-induced respiratory depression during the first 24 hours of opioid therapy. Sedation is a very sensitive indicator of impending opioid-induced respiratory depression and precedes clinically significant episodes. Systematic sedation assessment using a simple sedation scale during opioid administration for pain management is recommended. If increasing sedation is noted, opioid doses should be promptly decreased and the patient monitored more frequently until the sedation level is acceptable. Using multimodal analgesic approaches, such as adding acetaminophen and an NSAID to the opioid treatment plan, allows lower opioid doses and fewer adverse effects. See Table 2 for case presentations that demonstrate appropriate decision making based on sedation and respiratory assessments.

**References**


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**Calendar of Events**

**July 18, 2009.** Perianesthesia Review. Lois Schick MBA, MN, RN, CPAN, CAPA, Speaker. Mayo Clinic, Jacksonville, FL. For further information, contact Nancy Fishman at 904.956.3101 or fishman.nancy@mayo.edu.

**October 9-10, 2009.** Perianesthesia Nurses Association of California (PANAC) 30th Anniversary Meeting/Conference at Hilton Garden Inn, San Francisco/Oakland Bay Bridge, Emeryville, CA. For information, contact Sheryl Michelson, 408-252-8723; michelson.clayborn@sbcglobal.net or visit www.panac.org.

**October 23-25, 2009.** FLASPAN’s 40th Annual Conference. The Magic is Still Strong after 40 Years. Regal Sun Resort, Lake Buena Vista, FL. For further information contact Kim Godfrey at 904.622.6322 or pacurn32068@hotmail.com.

**November 18-20, 2009.** The Joanna Briggs Institute invites you to attend its biennial 2009 International Convention, Ripples to Revolution: from Bench to Bedside, to be held at the Hyatt Regency in Adelaide, South Australia. We’ve specially designed the event to bring together evidence-based researchers and reviewers, guideline developers, clinicians, educators, policy makers, administrators and consumers from all over the world to work toward an integrated approach to improving global health care using evidence-based guidelines,** Abstracts accepted until 22 June 2009 ** For further information contact Chris Cafcakis, (08) 8303 3637, chris.cafcakis@adelaide.edu.au, (08) 8303 4881 (fax) or visit the website at: http://www.joannabriggs.edu.au/events/2009JBIConv/index.html.