Clinical Update

Naloxone: How Well Do You Know This Drug?

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The use of opioids in the treatment of cancer-related pain is a common occurrence. Nurses in a variety of oncology settings see patients with pain daily. Although most oncology nurses have a basic understanding of the different types of opioids and their general side effects, few have a full understanding of the pharmacokinetics of these agents and often are fearful that adverse reactions will occur. This fear, in turn, may lead to the undertreatment of patients’ pain. Probably the most feared adverse reaction to opioids is respiratory depression. The American Pain Society (1999) stated that “no patient has succumbed to opioid-induced respiratory depression while awake” (p. 30).

In fact, respiratory depression is rare in patients receiving long-term opioid treatment. Concern should be focused on opioid-naïve patients who experience severe pain and are in need of increased or high-dose opioids. Assessment of pain and close monitoring of the patients’ sedation level and respiratory status are critical in the prevention and early intervention of this potentially serious side effect.

This article provides an overview of naloxone (Narcan®, Endo Pharmaceuticals, Chadds Ford, PA) and its possible side effects. Proper naloxone administration techniques also are described should respiratory depression occur.

Naloxone’s primary indication is as an antagonist for opioid-induced respiratory depression. The drug also has been shown to be effective in treating opioid-induced pruritis (Kjellberg & Tramer, 2001). Research currently is being conducted to evaluate its effectiveness in substance abuse treatment and as an adjunctive agent in sedation or sedation has been determined, naloxone then should be administered via IV, intramuscular (IM), or subcutaneous (SQ) routes. Onset of action occurs within one to two minutes when administered through an IV and two to five minutes when administered IM or SQ. The peak effect is unknown, and the duration of action is dose and route dependent. The proper technique for the administration of naloxone is outlined in Figure 1.

Once respiratory depression or sedation has been determined, naloxone then should be administered via IV, intramuscular (IM), or subcutaneous (SQ) routes. Onset of action occurs within one to two minutes when administered through an IV and two to five minutes when administered IM or SQ. The peak effect is unknown, and the duration of action is dose and route dependent. The proper technique for the administration of naloxone is outlined in Figure 1.

The inappropriate administration of naloxone (e.g., rapid infusion) can lead to acute withdrawal syndrome and the return of severe pain. Symptoms associated with abrupt reversal may include tachycardia, hyper- or hypotension, agitation, ventricular fibrillation, pulmonary edema, nausea and vomiting, tremors, abdominal cramps, and hyperactive reflexes. These symptoms, in turn, may lead to seizures, cardiac arrest, and even death (American Society of Health Pharmacists, 2000; O’Malley-Dafner & Davies, 2000).

Pulmonary edema as an adverse reaction to naloxone administration may happen when an abrupt reversal of analgesia occurs, which causes an immediate increase in sympathetic...

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IV bolus administration (IV push)
- Dilute by mixing 0.4 mg of naloxone with 9 ml of normal saline in a 10 ml syringe.
- Administer by slow IV push, 0.5–1.0 ml over two minutes.
- Observe the patient’s response. Response should be seen within one to two minutes. If no response occurs, continue administration of naloxone as noted above up to a total dose of 0.8 mg.
- Assess the patient for other causes of sedation.
- Discontinue naloxone as soon as the patient opens his or her eyes, responds to physical stimulation, or has a respiratory rate greater than 12 breaths per minute.
- The purpose of titration is to improve respiratory function and/or mentation, not to reverse analgesia.
- Keep a syringe nearby, as another dose of naloxone may be needed. The duration of naloxone is shorter than the duration of action of most opioids.

IV infusion administration (IV drip)
- Dilute 2 mg of naloxone in 500 ml of either normal saline or 5% dextrose solution to provide a concentration of 0.004 mg/ml.
- The rate of infusion should be titrated to the level of the patient’s response.
- All IV infusions require close monitoring of response and pain status.
- Subcutaneous (SQ) and intramuscular (IM) administration
  - SQ and IM routes of administration may be used if the patient does not have IV access.
  - These routes have been shown to have a longer duration of action secondary to absorption.

Naloxone use in children
- Dose is 0.01 mg/body weight either IV, IM, or SQ at three- to five-minute intervals or until the desired response is achieved.
- Children should be monitored closely (e.g., responsiveness, vital signs, pain status).

**Figure 1. Naloxone Dosage and Administration**


nervous system activity. In other words, the reversal of opioid analgesia enables severe pain to return, and the pain induces tachycardia and vasoconstriction. The vasoconstriction can lead to decreased cardiac output, increased left atrial pressure and pulmonary venous pressure, and fluid movement across the alveolar capillary membrane, which decreases oxygen diffusion into the pulmonary capillaries, producing hypoxemia and hypoxia (O’Malley-Dafner & Davies, 2000). This adverse reaction in response to naloxone is manifested as an acute and profound onset of respiratory and cardiac distress.

Nursing considerations for patients who have received naloxone are outlined in Figure 2. Naloxone should be used cautiously in patients with chronic renal failure, histories of cardiac irritability, and opioid addiction. These patients require careful monitoring when receiving naloxone (Hanes, Franklin, Kuhl, & Headley, 1999). Patient and family education should begin when opioids are first prescribed and should be ongoing, even before naloxone is considered.

1. Monitor vital signs, especially respiratory rate and blood pressure.
2. Attach pulse oximeter to monitor oxygen saturation.
3. Assess pain status.
4. Assess for other possible causes of sedation, in addition to opioid therapy.
5. Assess breath sounds for increased or new onset of wheezes, crackles, or rhonchi.
6. Evaluate need for chest x-ray or electrocardiogram.
9. Decrease opioid dose to half of the original dose when the patient is easily aroused and his or her respiratory rate is greater than 12 breaths per minute.
10. Teach the patient and family about the actions and effects of naloxone.

**Figure 2. Nursing Considerations in the Use of Naloxone**

Note. Based on information from O’Malley-Dafner & Davies, 2000; Pasero & McCaffery, 2000.

**Conclusion**

With the advent of the Joint Commission on the Accreditation of Healthcare Organization’s pain standards, healthcare professionals are educating themselves and others about proper pain assessment and management. Knowledge about medications used to treat pain, as well as medications that reverse their adverse effects, is a key component of effective pain management and promotion of patient safety.

**References**


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