

Avoid the dangers of opioid therapy

When opioids keep patients free from pain, you must keep them free from harm.

By Yvonne D'Arcy, MS, CRNP, CNS

OPIOIDS provide superb pain relief and are among the least expensive drugs prescribed. Plus, in low doses, they're usually safe.

But these potent analgesics do pose dangers. The risks of abuse and serious adverse effects have always come with the benefits of opioids. Now, based on new information from the Institute for Safe Medication Practices (ISMP), the Food and Drug Administration (FDA), and the Joint Commission, there's a growing awareness of safety concerns.

New safety recommendations

Because of a controversy regarding the use of opioids for chronic, persistent noncancer pain, the American Pain Society and the American Academy of Pain Medicine issued a new guideline in 2009. The guideline panel, a multidisciplinary group of national experts, performed a systematic review of the pertinent literature and made the recommendations summarized below.

- Before starting long-term opioid therapy, obtain a health history and perform a physical examination to assess the patient's potential for opioid abuse. Obtain informed consent.
- Consider initial treatment with opioids to be a therapeutic trial. Analyze the risks and benefits and individualize the dosage, especially if the patient has moderate to severe pain that adversely affects the quality of life.
- Clinicians familiar with the use and risks of methadone should initiate a patient's methadone therapy.

- Carefully monitor all patients using long-term opioid therapy. Monitor patients who have a history of aberrant drug-related behaviors closely—for example, by using more frequent urine screening.
- Anticipate adverse effects and assess patients for changes in opioid requirements, dosage escalations, and compliance with opioid therapy. If a patient experiences adverse effects or decreased pain relief, consider rotating several opioids to achieve better pain relief.
- Use a multidisciplinary approach to opioid therapy that includes psychotherapeutic options (such as cognitive behavioral therapy, progressive relaxation, and biofeedback), functional restoration, and interdisciplinary therapy. When patients repeat aberrant drug-related behaviors, engage in drug diversion, or aren't progress-

ing toward therapeutic goals, opioid therapy may be discontinued; when patients have intolerable adverse effects, the dosage or the opioid may be changed.

- Counsel patients not to drive when impaired and not to take opioids during pregnancy.
- Every patient using long-term opioid therapy should have a primary clinician who oversees medical care.

The recommendations include using these tools and screening instruments to determine the risk to the patient:

- Screener and Opioid Assessment for Patients with Pain (SOAPP)
- Diagnosis, Intractability, Risk, Efficacy (DIRE)
- Opioid Risk Tool (ORT)
- Current Opioid Misuse Measure (COMM)
- Pain Assessment and Documentation Tool (PADT).

Variable responses

Common opioids include morphine, oxycodone, codeine, hydrocodone, hydromorphone, fentanyl, meperidine, and methadone. These drugs bind to mu receptor sites throughout the central and peripheral nervous systems to produce analgesia. However, recent research reveals that numerous alleles of the mu receptor gene and numerous receptor subtypes can create differences in opioid binding ability, affecting analgesia.

These genetic differences help explain some of the variation in response to opioids and opioid doses. The two biggest influences on opioid efficacy for pain relief are ge-

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LEARNING OBJECTIVES

1. State the physiologic action of opioids.
2. Describe the clinical guidelines for the use of long-term opioid therapy in chronic noncancer pain.
3. Discuss the benefits and risks of opioids, patient-controlled analgesia, and the fentanyl patch.
4. Identify strategies that nurses and institutions can take to improve opioid safety.



Opioid responses: The role of genetics

In a recent study, patients having total knee arthroscopy were genetically profiled and differentiated by a mu binding site type that influences sensitivity to morphine metabolism. One group had a genetically determined efficient morphine metabolism pattern (AA). A second group had a heterozygous genetic variation (AG). And a third group had a homozygous nonsensitive genetic variation that reduced or impaired morphine sensitivity (GG).

For postoperative pain relief, all three groups received morphine using a patient-controlled analgesia (PCA) device. In the first 48 hours, patients in the AA and AG groups used about 25 mg of morphine, while patients in the GG group used 40 mg. The GG group also made many more attempts to obtain analgesia from the PCA device. These patients might have had better results with another opioid.

netic polymorphism at the mu binding sites and variations in opioids. (See *Opioid responses: The role of genetics*.)

Other factors that can influence opioid metabolism and affect analgesia include:

- the CYP450 system in the liver, which transforms some opioids into usable metabolites
- the metabolism rate of opioids, which may be poor, intermediate, extensive, or ultrarapid
- racial differences (5% to 10% of White people are unable to or have a poor ability to metabolize codeine to morphine, the active metabolite).

To keep therapy safe despite these variables, ask the patient or family members about past experiences with opioids. Did a small dose control pain? Or did the patient need a large dose? Did the patient become oversedated? The answers will provide a baseline for selecting the analgesic and the dosage.

If the patient has never had an opioid, carefully monitor his or her response. The dosage may need to be titrated to achieve safe, effective pain relief.

Getting it right

Since including pain management in the Joint Commission standards in 2001, the Commission has focused on these areas: adequate pain management, pain assessment, drug use, and sentinel events related to drug use. The Joint Commission has also developed Patient Safety Goals that include goals for safe drug use summarized below:

- Be alert for drug names that look alike or sound alike, such as MS Contin, which is extended-release morphine, and OxyContin, which is extended-release oxycodone.
- Maintain a list of high-alert drugs and provide methods for decreasing confusion, such as “TALL man” lettering for drug names—for example, MORphine and HYDRORmorphone.

- Avoid confusing abbreviations, such as “QD” for “every day.”
- Make sure all patient drugs are checked on admission and current drugs are reviewed by the physician daily.

Data from the Medications Errors Reporting Program and U.S. Pharmacopeia (USP) MEDMARX data indicate that opioids, particularly morphine and hydromorphone, are among the most frequently confused *high-alert drugs*—that is, drugs with a high risk of patient harm when an error occurs. In 2003, I.V. opioids were among the top 10 high-alert drugs.

Risky opioids

All opioids can cause oversedation and respiratory depression, but some are more problematic than others. Meperidine (Demerol) has a metabolite called normeperidine that can build up in the central nervous system (CNS) and cause seizures. For this reason, meperidine is no longer considered a first-line drug for pain.

Propoxyphene N-100 contains 650 mg of acetaminophen and a small amount of propoxyphene (Darvocet), which has a cardiotoxic metabolite that can cause cardiac arrhythmias or seizures. The FDA is considering removing this drug from the market.

The neuroexcitatory adverse effects of meperidine and propoxyphene are related to CNS sensitivity and renal insufficiency and thus more common in older patients and

patients with renal impairment. Neither drug should be used in elderly patients.

Methadone can be used for chronic pain. However, because a dose provides analgesia for only 6 to 8 hours and estimates of the drug's half-life range from 12 to 120 hours, methadone poses a high risk of delayed respiratory depression. The drug also can cause torsades de pointes, a cardiac arrhythmia, when used at high doses over time.

All patients taking methadone on a regular basis should have regular electrocardiograms to detect cardiac abnormalities. Pain therapy should start with short-acting drugs before a patient uses the longer-acting methadone. After the switch to methadone, carefully monitor the patient for sedation and respiratory failure. Monitor dosage increases, which should occur no sooner than every 3 days because of the drug's long half-life.

Problems with patient-controlled analgesia

Patient-controlled analgesia (PCA) was developed as a means of increasing pain relief and patient satisfaction with pain control after surgery. Using a pushbutton, a patient can activate a portable pump containing a reservoir of a prescribed analgesic. The pump is programmed to give no more than the prescribed amount. Both the American Society of Anesthesiologists and the American Society of Peri-Anesthesia Nurses endorse the use of PCA for postoperative pain relief.



Patient-controlled analgesia vs. intermittent injections

Patient-controlled analgesia (PCA) has these advantages over intermittent injections:

- PCA provides improved pain relief.
- The patient has more control over pain relief.
- Coughing, deep breathing, and ambulation are easier.
- The patient can maintain a steady opioid serum level, avoiding the peaks and valleys of intermittent opioid administration.
- PCA can shorten hospital stays after major surgery.

(See *Patient-controlled analgesia vs. intermittent injections*.)

However, overdoses in patients using PCA have raised safety concerns. One of the main reasons for the adverse reactions has been incorrect programming of the PCA pump.

Common programming errors include:

- delivering a bolus dose and then forgetting to return the pump settings to the correct rate
- confusing “milligram” and “milliliter”
- selecting the wrong lockout
- selecting the wrong drug concentration
- confusing “PCA bolus dose” with “PCA basal dose.”

PCA continuous infusions are no longer recommended for opioid-naïve patients because they add little analgesia but create a high risk of oversedation. PCA by proxy, use of the PCA device to deliver a drug dose by an unauthorized person, can produce serious, sometimes fatal, outcomes. The medication error database for the USP lists 6,069 PCA errors; 460 of them resulted in harm or death. PCA by proxy was responsible for 12 of these errors. One death resulted from a nurse activating the PCA button for patients.

To use PCA safely, the ISMP and the Joint Commission recommend the following:

- Determine which patients are good candidates for PCA. Don't select patients who can't activate the PCA pump independently, such as confused patients and patients who don't understand how to activate the dose mechanism.
- Use two independent nurse checks to confirm the PCA rate, drug, concentration, and dose settings.
- Clearly identify where each I.V. line is infusing.
- Use prefilled syringes or bags.
- Use standardized order sets.

When monitoring PCA therapy, assess the patient for oversedation and hypoventilation. Using a simple

scale such as the Ramsey sedation scale can help you identify the onset of sedation. Simply rousing a patient isn't reliable. A patient who is starting to experience oversedation can be awakened and respond to questions and then quickly return to an oversedated state. Capnography, which measures the build-up of carbon dioxide in the blood, can detect hypoventilation, a good indicator of impending respiratory depression. Relying only on oxygen saturation readings can be deceiving because supplemental oxygen can skew the readings. If you regularly monitor the patient's respiratory rate and depth and sedation levels, PCA can be a safe, effective way to control pain.

Misuse of the fentanyl patch

The fentanyl patch (Duragesic) is a transdermal drug system that provides constant delivery of the opioid fentanyl. The system creates a drug depot in the dermal layers from which the drug can be delivered into the bloodstream at a consistent rate. The patch can take up to 18 hours to consistently deliver the prescribed dose. Achieving steady state in the patient's blood can take up to 48 hours. This delayed action can cause delayed respiratory depression.

In the United States, more than 100 patients have died from overdoses related to fentanyl patches. These deaths resulted from poor understandings of how the patch works and which patients should use it. Because of its delayed effect, the patch isn't indicated for acute pain. Also,

before using the patch, patients should be receiving opioids regularly.

Patients who haven't been receiving I.V. or oral opioids should be given other, shorter-acting types of analgesics, not the fentanyl patch. As the prescribing information for fentanyl notes, even opioid-tolerant patients can become oversedated with large doses.

Teach patients using fentanyl patches these safety points:

- Don't cut the patch. Doing so can result in an overdose.
- Don't apply heat over the patch.
- Dispose of the patch by folding the adhesive side, so it sticks to itself. Then, place it safely in a closed container or flush it down the toilet.
- Don't place the patch in a regular wastebasket.

Safety considerations

As a nurse, you're in a good position to make a judgment about a patient's ability to comply with the drug order as written. Some patients don't understand how to take drugs or will stop taking them when adverse effects occur. To avoid misunderstandings, at each visit or admission, observe how patients are taking their drugs, count how many tablets they've used, and look for outdated drugs and remove them. These actions will go a long way toward making sure patients take their drugs correctly.

To make opioid therapy safe, make sure you take these steps:

- Become familiar with opioid drugs and common dosages.
- Locate good resources, such as

Instituting safe opioid practices

Institutions can provide a good environment for safe opioid therapy by taking these actions:

- Create guidelines for determining dosages and prescribing opioids.
- Limit prescribing privileges for high-risk opioids such as methadone. Only prescribers who specialize in pain management or have special education should be allowed to prescribe these drugs.
- Use standardized order sets indicating normal dosing, such as PCA order sets.
- Set safe dose limits, so high-dose drug orders will be flagged by the pharmacy as being inappropriate or needing review.
- Create an opioid resource group made up of pain specialists, nurses, anesthesiologists who work in pain management, and pharmacists to help prescribers write safe orders for opioids.
- Participate in the error-reporting system and create an environment in which errors can be discussed and action plans can be developed.

pain specialists or pharmacists, who can provide information about using opioids correctly.

- Know the signs and symptoms of opioid toxicity.
- Be aware that using drugs with sedative effects, such as antiemetics, muscle relaxants, and sedatives, increases the risk of oversedation.
- Teach patients the reason they are taking opioids, the prescribed dose, and the possible adverse effects. Give patients a phone contact in case adverse reactions develop.
- Maintain competency in entering PCA prescriptions and machine programming.
- If PCA therapy is being considered, make sure your patient is a suitable candidate.

- Use a sedation scale to monitor patient response to opioids.
- Monitor patients starting opioid therapy every 2 hours. (See *Instituting safe opioid practices*.)

Improving safety

Measures are being developed to help nurses and practitioners who prescribe and administer opioids. Bar-coding can help determine if the right drugs are being given to the right patients. Using drug reconciliation to check home drugs against prescribed drugs can identify errors in drugs and doses. The FDA is now calling for drug companies to formulate risk evaluation and mitigation strategies for opioids, so prescribers can make more informed drug choices based on the risks and benefits.

Avoiding the dangers of opioid

therapy requires that prescribers, nurses, and patients have appropriate information on safe administration and dosages and potential adverse effects as well as expert contacts to call with questions and concerns. When you and your colleagues have the best information and use the best practices, your patients will reap analgesic benefit of opioids without encountering the dangers. ★

Selected references

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Please circle the correct answer.

- Opioids bind to which type of receptor site?**
 - Morphine
 - Fentanyl
 - Mu
 - Tu
- Which statement about the analgesic effect of opioids is correct?**
 - The CPT400 system in the liver transforms some opioids into usable metabolites.
 - The metabolism rate of opioids doesn't vary from person to person.
 - About 50% of White people are unable to metabolize codeine to morphine.
 - Genetic polymorphism at receptor sites can cause variations in response to opioids.
- Which is not a recommendation from the American Pain Society and the American Academy of Pain Medicine?**
 - Anticipate adverse effects and assess patients for changes in opioid requirements.
 - Explain that taking certain opioids during pregnancy is acceptable.
 - Carefully monitor patients who have a history of aberrant drug-related behaviors.
 - Consider initial treatment with opioids to be a therapeutic trial.
- One goal for safe drug use is to:**
 - review a patient's current drugs weekly.
 - keep drugs with sound-alike names in the same location.
 - use QD as an abbreviation for "every day."
 - use "TALL man" lettering for drug names—for example, MORphine.
- What is the estimated half-life of methadone?**
 - 1 to 72 hours
 - 5 to 48 hours
 - 10 to 100 hours
 - 12 to 120 hours

- Which is a safety measure for patients taking methadone?**
 - Make dosage increases no sooner than every 24 hours.
 - Carefully monitor patients for sedation and respiratory failure.
 - Obtain annual echocardiograms to detect cardiac abnormalities.
 - Start therapy with long-acting drugs before using methadone.
- When comparing patient-controlled analgesia (PCA) and intermittent opioid injections, you should know that:**
 - PCA is less effective at maintaining a steady opioid serum level.
 - intermittent injections provide patients with more control over their pain.
 - coughing and deep breathing are easier with intermittent injections.
 - PCA can shorten hospital stays after major surgery.
- Which is a PCA safety measure?**
 - Fill the syringe immediately before starting the PCA infusion.
 - Select PCA as a method to relieve pain in confused patients.
 - Have two nurses independently confirm the PCA rate, drug, concentration, and dose settings.
 - Use various order sets to ensure patients' individual needs are met.
- How should you monitor the sedation level of a patient receiving opioids?**
 - Use a tool such as the Pain Assessment and Documentation Tool.
 - Use your ability to rouse the patient as the main indicator of sedation.
 - Rely solely on oxygen saturation readings.
 - Use capnography to detect hypoventilation.
- A tool you can use to evaluate sedation in patients receiving opioids is the:**

- Screener and Opioid Assessment for Patients with Pain.
 - Ramsey sedation scale.
 - Current Opioid Misuse Measure.
 - Opioid Risk Tool.
- Which statement about risky opioids is true?**
 - Propoxyphene N-100 contains 100 mg of acetaminophen.
 - Propoxyphene N-100 contains a substance that can cause osteoporosis.
 - Meperidine is not a first-line drug for pain.
 - Meperidine is a first-line drug for pain.
 - To consistently deliver the prescribed dose, a fentanyl patch may take up to:**
 - 4 hours.
 - 8 hours.
 - 12 hours.
 - 18 hours.
 - A fentanyl patch is an appropriate analgesic choice for a patient with:**
 - chronic arthritis pain.
 - appendicitis.
 - an acute asthma attack.
 - a compound fracture.
 - You should tell patients who use fentanyl patches:**
 - not to fold the adhesive side of the patch before disposal.
 - not to dispose of the patch in the wastebasket.
 - not to apply heat over the patch.
 - to cut the patch in two before application.
 - To make opioid therapy safe, you should:**
 - not allow PCA to be administered by proxy.
 - avoid standardized order sets.
 - know that antiemetics decrease the risk of oversedation.
 - know that muscle relaxants decrease the risk of oversedation.

Evaluation form (required)

1. In each blank, rate your achievement of each objective from 1 (low/poor) to 5 (high/excellent).

- State the physiologic action of opioids. _____
- Describe the clinical guidelines for the use of long-term opioid therapy in chronic noncancer pain. _____
- Discuss the benefits and risks of opioids, patient-controlled analgesia, and the fentanyl patch. _____
- Identify strategies that nurses and institutions can take to improve opioid safety. _____

Also rate the following from 1 to 5.

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