

Managing Pain with Opioid Analgesics: Critical Facts

1. **Opioid heterogeneity:** Not all opioids are created equal
 - **Similarities:** General statements can be made about the similar effects and side effects of the most common opioids (morphine, oxycodone, hydromorphone, fentanyl)
 - Indicated for moderate to severe pain
 - No analgesic “ceiling effect”—does not lose analgesic efficacy as dose is increased
 - Common side effects are N/V, constipation, sedation, pruritis
 - Tolerance develops to all side effects within a few days, with the exception of constipation, which persists as long as the opioid is taken; constipation prophylaxis is universally required
 - Multiple routes available, with the exception of oxycodone, which is PO only
 - **Differences:** There are significant exceptions and variations with other opioids
 - Codeine
 - Useful for mild to moderate pain only
 - Has a ceiling effect (continuing to raise the dose does not lead to greater analgesic effect) at about 200 mg PO
 - About 10% of the population has a genetic defect that prevents metabolism of codeine
 - Hydrocodone
 - Oral route only
 - Available only in combination with non-opioid analgesics
 - Dosing is limited by the toxicities of the combination analgesic, i.e., acetaminophen or ibuprofen
 - Meperidine (Demerol)
 - Short duration of action (2-3 hours)
 - Rapid accumulation of a neurotoxic metabolite, normeperidine, especially in the elderly and those with decreased renal function
 - Serious drug-drug interaction with MAO inhibitors
 - Painful burning sensation and local tissue damage when given IM or SC
 - Propoxyphene (Darvon, Darvocet)
 - Weak analgesic for mild pain; probably no more effective than acetaminophen or aspirin
 - Rapid accumulation of a neurotoxic metabolite, norpropoxyphene, especially in the elderly and those with decreased renal function
 - Methadone
 - Very long half-life with wide distribution and accumulation
 - Wide interpatient variability in pharmacokinetics
 - Many drug-food and drug-drug interactions due to CYP-450 metabolism
 - Should consult Pain Service or Palliative Care Service if contemplating putting a patient on methadone
2. **Addiction:**
 - Addiction is an unusual opioid effect, and is extremely rare when opioids are used for acute pain.
 - Aberrant drug-related behaviors, possibly indicating addiction, is more common among people with chronic pain, but remains unusual

- There is no evidence that exposure to opioids “causes” addiction.
- Both tolerance and dependence are expected physiologic processes that occur when opioids are used regularly for 3-7 days. Neither tolerance nor dependence is an indicator of addiction.
- Special precautions should be put in place when treating pain in a patient with a history of substance abuse, but that history is not justification for the withholding of otherwise appropriate opioid analgesic therapy.

3. **Opioid Titration:**

- Titration is a systematic process of incremental dose adjustment based on patient needs and responses.
- “The goal of titration is to use the smallest dose that provides satisfactory pain relief with the fewest side effects.” (McCaffery & Pasero 1999).
- The need for dose adjustment is based on reported severity of pain and frequency of need for breakthrough/rescue doses: “titrating to effect.”
- Titration may be upward (a.k.a. “dose escalation”) or downward (tapering), depending on the patient’s needs and responses. Once the optimal basal dose is reached, it is held steady but a proportional breakthrough or rescue dose available.
- Doses adjustments are calculated based on a percentage of the current dose (most commonly an increase or decrease of 25 – 50%).
- Sometimes a secondary aim of IV titration is to find a steady dose and then convert to an oral equivalent, the usually preferred route of administration.
- Intravenous opioid titration is indicated for:
 - New onset of severe pain, such as
 - Trauma pain
 - Early post-operative pain
 - Recurring pain syndromes, such as sickle cell crisis
 - Pain crisis, such as an acute exacerbation of a chronic condition (e.g., cancer or AIDS), that causes pain

4. **Managing pain with continuous opioid infusion:**

- Pain is most effectively managed using a combination of the basal/continuous rate plus nurse-administered PRN bolus/rescue/breakthrough doses
- If the patient is in significant pain at the initiation of the infusion, a loading dose of 2 – 5 times the hourly rate is indicated
- As it takes at least 8 hours for a new rate to reach steady state, the basal/continuous rate should be increased no sooner than 8 hours after the last basal increase; the preferable interval is 24 hours between basal increases.
- In the interim, use of nurse-administered PRN doses provides
 - rapid response to the patient’s need for pain relief, and
 - the basis for future increases of the basal rate
- Rescue/breakthrough doses are equal to 10% of the 24-hour rate.
- Twenty-four hours after the last basal rate adjustment calculate the total opioid dose in those 24 hours [basal rate + PRN doses]. Divide the total by 24 to reach the new hourly rate.
- When the basal rate is increased, the rescue/breakthrough dose is changed proportionately to maintain that dose at 10% of the 24-hour dose.

5. Range orders:

- Opioid range orders are intended to permit flexibility, rapid response, and individualized judgments on the opioid dose to be administered to the patient.
 - Orders should take into consideration both drug characteristics and patient condition
 - “Range” generally refers to a choice of dose within upper and lower limits (e.g., “2 – 6 mg”)
 - Time interval ranges (e.g., “may administer every 4 – 6 hours”) are rarely appropriate and cannot be combined with a dose range in the same order
 - The maximum dose within the range should generally not be more than 4 times the minimum dose
 - Open ended orders such as “titrate to comfort” are not acceptable and violate regulatory standards
- The nurse is permitted and expected to use professional judgment in determining the appropriate dose to choose. Judgments are based on the nurse’s assessment of the patient and knowledge of the analgesic to be administered
 - If the patient is opioid naïve, the lowest dose in the range should generally be chosen.
 - Once the patient has a history of responses to an opioid, the nurse has more information upon which to make a judgment. Factors to include in the decision-making process include:
 - Pain intensity (pain score)
 - Size of last dose
 - Interval since last dose
 - Change in pain since last dose
 - Response to last dose
 - Potential triggers (inducers) of increased pain
- Documentation of patient response, including degree of pain relief and side effects, is crucial to making judgments about future doses.

6. Monitoring/reassessment of a patient receiving opioid analgesics:

- Pain score (0 – 10)
- Sedation score—inappropriate sedation should be considered an early sign of respiratory depression until proven otherwise (see scale, below)
- Vital signs (particularly blood pressure and pulse)
- Other side effects (N/V; pruritis; constipation; mental status change).

Sedation level

S = sleep, easy to arouse

1 = awake & alert

2 = slightly drowsy, easily aroused

3 = frequently drowsy, arousable, drifts off to sleep during conversation

4 = somnolent, minimal or no response to physical stimulation