

## **PCA: Critical Facts**

1. **PCA = Patient-Controlled Analgesia**
2. **Definition:** “an interactive method of pain management that permits patients to manage their pain by self-administering doses of analgesics, usually opioids.” (1)
3. **Route:**
  - PCA may be administered intravenously (most common for acute pain exacerbations or postoperative pain management) or
  - Subcutaneously (most common for advanced disease or end-of-life care).
4. **Indications:**
  - Moderate to severe pain (i.e. postoperative pain or pain crisis)
  - Pain of advanced or progressive disease (usually with a basal/continuous infusion)
  - When oral route is unavailable or oral analgesics are not working
  - To determine the need and/or amount of opioid analgesics
5. **Candidates for PCA:**
  - Patients able to understand the relationship between pain, pressing the button to administer medication, and pain relief
  - Patients able to operate the PCA pump
6. **Elements of PCA treatment that promote safety:**
  - Pump programmed to
    - Administer fixed dose when patient pushes button (“demand dose”)
    - Establish “delay” or “lockout” interval during which pushing button does not result in administration of a dose
    - Hourly limit on total amount of medication that may be administered
    - If patient becomes sedated, s/he will not push button, thus preventing respiratory depression (i.e., patient must be awake to self-administer medication)
  - ONLY THE PATIENT SHOULD PUSH THE BUTTON
  - Patient/family teaching about pain and PCA as a treatment
  - Restriction on use of basal (continuous/background) infusion to specific circumstances
  - Nursing care that includes regular monitoring/reassessment
7. **Additional elements of PCA treatment that promote efficient pain management:**
  - Clinician-administered rescue/breakthrough/bolus loading dose
  - Range orders that permit adjustment of demand dose according to patient response
  - Standards for assessment and reassessment
    - Pain severity (score)
    - Vital signs
    - O<sub>2</sub> saturation (optional; see below)
    - Sedation level (score)
  - DOCUMENT TOTAL AMOUNT OF OPIOID USED AT THE END OF EACH SHIFT

- For those patients who have uncontrolled pain, knowing the amount of opioids used each shift will help facilitate an easier transition to other routes of administration

#### **8. Safe use of basal/continuous rate**

- Basal rate should generally not be used except for a patient who is already opioid tolerant
- If the patient reports inadequate analgesia despite increasing the demand dose from baseline by an adequate amount (25 – 100%), adding a basal rate may be considered
- Begin basal rate conservatively
  - One half of the projected hourly rate for an opioid naïve patient
  - Morphine 0.5 – 1 mg/hr

#### **9. Should O<sub>2</sub> saturation be a routine monitoring parameter?**

- O<sub>2</sub> saturation is a prudent supplemental assessment measure in select patients
  - History of sleep apnea
  - Obesity
  - Conditions that decrease ventilatory capacity
- There is no evidence that routine monitoring of O<sub>2</sub> saturation for patients on PCA provides an additional measure of safety. In fact, it may provide a false sense of security, since decreased O<sub>2</sub> saturation is a late sign of respiratory depression.
- Risk factors for opioid-induced respiratory depression
  - Concurrent use of benzodiazepines
  - History of sleep apnea
  - Opioid naïve patient
  - Basal/continuous rate present (especially in opioid naïve)
  - Night-time
  - Age >65
  - Obesity
  - Someone other than the patient is pushing the demand button
  - Inadequate monitoring of sedation
- Sedation always precedes respiratory depression. Therefore the most effective monitoring of the patient receiving opioids is the systematic ongoing assessment for sedation. Sedation should be assessed every 1-2 hours for at least the first 8 hours of PCA treatment, and after the addition of basal/continuous infusion.
- If the patient is stable, record respiratory rate, analgesia and sedation levels every 4 hours
- If a patient becomes sedated, the appropriate action is to
  - reduce the infusion rate by 50%
  - if no basal/continuous rate is present, reduce the demand dose by 50%
  - if pain cannot be controlled at the new rate (and assuming the patient is no longer sedated), the new rate may be increased by 25%
- The following sedation assessment scale should be routinely used at each assessment interval

Sedation level	Suggested Nursing action
S = sleep, easy to arouse	No action necessary
1 = awake & alert	No action necessary
2 = slightly drowsy, easily aroused	No action necessary, but monitor closely for progression of sedation
3 = frequently drowsy, arousable, drifts off to sleep during conversation	Decrease opioid dose by 25 – 50%; consider requesting order for non-opioid analgesic if patient continues to complain of pain; monitor closely for sedation level and respiratory status
4 = somnolent, minimal or no response to physical stimulation	Stop opioid; notify prescriber; consider conservative naloxone protocol (to reduce sedation, but not reverse analgesia)

#### 10. PCA at MGH:

- See screen shot of PCA order
- PCA orders are commonly discussed and documented using the following notation: a/b/c (example: 1/6/0), where
  - a = the PCA demand dose
  - b = the PCA lockout interval
  - c = the basal/continuous infusion rate
- Other elements of the order include
  - Medication concentration
    - Default standard concentration for morphine (adults): 1 mg/ml
    - Default standard concentration of hydromorphone (adults): 0.5 mg/ml
    - Default standard concentration for morphine (pediatrics <40 kg): 0.2 mg/ml
    - Default standard concentration of hydromorphone (pediatrics <40 kg): 0.1 mg/ml
  - Range for PCA dose
  - PCA 1 hour dose limit: usually set to the maximum amount that can be delivered given the default settings

#### 11. MGH resources:

- PCA nursing procedure (draft revision)
- PCA flow sheet (currently undergoing trial)
- Principles of patient/family education (draft)
- Patient/family education handout (draft)

#### References:

1. Pasero C, McCaffery M. Safe Use of a Continuous Infusion with IV PCA. *Journal of PeriAnesthesia Nursing*. Feb 2004;19(1):42-45.
2. Ballantyne J, Fishman SM, Abdi S eds. *The Massachusetts General Hospital Handbook of Pain Management*, 2<sup>nd</sup> ed. Philadelphia: Lippincott Williams & Wilkins, 2002.