Rancho Los Amigos National Rehabilitation Center

ADMINISTRATIVE POLICY AND PROCEDURE

SUBJECT: **PATIENT CONTROLLED ANALGESIA (PCA) PROGRAM**

Policy No.: B816.1
Supersedes: February 2017
Revision Date: August 2022

PURPOSE:

To delineate procedures required for ordering, supplying, administering, and monitoring Patient Controlled Analgesia (PCA) for the management of pain.

RESPONSIBILITIES:

1. An individualized Pain Care Plan must be developed and implemented by the client's primary care team. This includes ongoing assessment of the patient's level of pain, as well as the safety and efficacy of PCA.

2. Orders for PCA may be entered by a physician who has narcotic prescription privileges at Rancho. Advanced practice providers who have patient-specific authority and the supervising physician has narcotic prescription privileges at Rancho may also write PCA orders.

3. Administration and monitoring of PCA must be performed by a Registered Nurse who has completed the Nursing PCA Competency Program.

4. Supply of PCA medication must be provided and monitored by the Controlled Substance Pharmacist(s).

DEFINITIONS:

1. Infusion Narcotic Dosing: The use of a PCA-infusion pump to deliver narcotics by intermittent bolus, continuous infusion, or mixed modes.

   Note: "PCA" is the generic term for any of these modes of infusing pain medication.

2. PCA Mode: The infusion pump is set to deliver medication as intermittent boluses.

3. Continuous Infusion Mode: The infusion pump is set to deliver medication as a continuous infusion.

4. Mixed PCA/Continuous Mode: The infusion pump is set to deliver a continuous low dose infusion, together with additional boluses at a prescribed dose and frequency.

5. Acceptable Pain Threshold: A level of pain, acceptable to the patient, which allows the patient to perform certain functions or activities of daily living.

APPROVED BY:

PATIENT SELECTION CRITERIA:

Requirements:

1. The patient understands the objectives for using PCA for pain control.
2. The patient requires narcotics for pain control as frequently as every 2-3 hours.
3. **Note:** Continuous infusion may be considered for some patients who have relative contraindications (see below) for bolus infusion.

Contraindications:

1. Allergy to the narcotics approved by the hospital for PCA administration.
2. Presence of delirium or psychosis.

Relative contraindications (High risk, use PCA with caution):

1. History of substance abuse or dependency (e.g., for narcotics, alcohol, sedatives, or tranquilizers).
2. Inability to communicate needs.
3. Compromised pulmonary and cardiovascular function (continuous oxygen saturation monitoring recommended).
4. Compromised hepatorenal function.
5. Inability to safely self-administer bolus medication due to cognitive, psychiatric, or motor impairment. In this situation, bolus modes should not be used.
6. Obese patients.
   Key Point: Patients with a BMI $\geq$ 40 require telemetry monitoring while on PCA.
7. History of sleep apnea (continuous oxygen saturation monitoring recommended).
8. Patients 65 years and older.
   Key Point: The frequency of nursing assessment may increase as ordered by the physician in these patients.

POLICIES AND GUIDELINES FOR USE:

Prior to Initiating Therapy:

The ordering provider will:

1. Review all medications currently prescribed for pain management. Note: PCA may be used alone or in combination with other pain management modalities (e.g., non-steroidal anti-inflammatory drugs, local anesthetics, or nonpharmacologic interventions).

2. Discontinue all other forms of opioid administration before initiating PCA.

3. Discuss the PCA Treatment Plan with the patient and/or family prior to initiation of treatment.

   Key Point: For surgical patients, the discussion should take place before surgery.
   Key Point: For patients under 13 years of age (or any patient weighing under 50 pounds), a Pediatric consult is required before ordering PCA.

4. Document the content of the patient/family discussion in the Medical Record. The indications for treatment and the patient/ family concurrence with the PCA Treatment Plan should be specifically documented.

5. The physician or RN will provide education and instruction to the patient/family and obtain their signature on the Patient Education Acknowledgment Form.

Key Point: For post-operative PCA, patient/family instructions should be given prior to surgery. For emergency surgery, instructions will be given as soon as possible before the surgery or before initiation of PCA.

Physician's Orders

1. Physician Orders will be entered using the PCA power plan, the following will be included:

A. Name of medication approved by Rancho for PCA administration
   1. Morphine 1 mg/ml or
   2. Hydromorphone 0.5mg/ml

B. Delivery Route (I.V.)
C. Loading dose (in milligrams)
D. Mode of delivery (PCA bolus, Continuous, or Mixed bolus/continuous modes)
E. Dose of medication:
   1. For continuous infusion: dose of medication (milligrams per hour)
   2. For bolus infusion: dose (in milligrams) and frequency.
F. Delay or Lockout Interval between each bolus (in minutes).
   Notification Parameters. Conditions for which the physician wishes to be notified
G. Treatment parameters and modalities for side effects and adverse reactions.

2. Re- Orders for PCA

A. PCA orders and all orders which appear on the PCA Physician's Order set are effective for up to 72 hours.
B. A new order sheet must be completed for each 72-hour period. The rationale for continued PCA use is to be documented in the Physician Progress Note.

Table: Parameter recommendations for PCA Administration in Adults

	Morphine	**Hydromorphone**
Loading dose	0.03 mg/kg	None or 0.5-1 mg
PCA mode (bolus)	Lockout interval: 10 minutes (Range 5-15 min) Amount: 0.5-3.0 mg/10 minutes	Lockout interval: 10 minutes (Range 5-15min) Amount: 0.1-0.3 mg/10 minutes
Continuous mode	Dose: 1 mg/hr to 2 mg/hr (depends upon relationship between pain relief and side-effects)	0.1-0.2 mg/hour (depending upon relationship between pain relief and side effects

	Morphine	Hydromorphone
Mixed PCA / Continuous	Lockout interval: 10 minutes (Range 5-15 min) Bolus Amount: 0.5-3 mg/10 minutes Continuous Infusion: 0.5-2 mg/hr Maximum combined dose: 18 mg/hr	Lockout interval: 10 minutes (Range 5-15) Bolus amount: 0.1-0.3 mg/10 minutes Continuous infusion: 0.1-0.2 mg/hr
Recommended Treatment for side effects:	• Pruritus: treat with diphenhydramine (Benadryl) as appropriate • Nausea/Vomiting: antiemetic medication of choice (contained in Hospital Formulary) • Urinary retention: straight catheterize q6h if no urine output • Respiratory depression or decreased cognition: if patient not arousable or respiratory rate < 10/min, discontinue PCA, stimulate and give Naloxone 0.2 mg may repeat x1in 5 minutes.	• Pruritus: treat with diphenhydramine (Benadryl) as appropriate • Nausea and Vomiting: antiemetic of choice (contained in hospital formulary) • Urinary retention: straight catheter q 6 hours if no urine output • Respiratory depression or decreased cognition: if patient not arousable or RR less than 10/min, D/C PCA, provide supplemental O2 and administer Naloxone 0.2 mg IVP over 30 seconds and repeat once in 3 minutes as needed.

C. Surgical Patients:

1. **Outpatients:** The physician inform the nursing staff of the need for patient education regarding PCA and will enter an order to education patient on PCA use.

2. **Inpatients**: The physician will do the following to inform the nursing staff of the need for patient education regarding PCA.

   A. Enter the order in the medical record at the time the pre-op orders are entered.
   Key Point: The orders are placed in a planned state until after surgery.
      1. Enter an order to educate the patient regarding PCA.
      2. After Surgery, the PCA orders are reviewed as needed and then signed by the surgeon.

Key Point: Once the patient leaves the PAR, the RN from the admitting unit will notify the physician if there is a need to change the plan of care. If so, a new order will need to be entered.

Medication Order, Storing, and Use

1. Naloxone (Narcan) (approximately 2-unit dose vials per patient receiving PCA) will be readily available.

2. Opioids will be ordered, dispensed and secured per (a) Pharmacy Policy 3.13.0 and (b) Controlled Substance Handling and Nursing Administration Policy A-460.

3. Disposition of wasted (unused) solution will follow procedures for wastage of any narcotic (see above Pharmacy and Nursing Policy & Procedures). Documentation of the wastage will be done in the medical record.

4. The infuser key for the PCA pumps will be kept in a secure location at all times.

5. The narcotic cartridge will be removed/replaced by the RN:

   A. upon completion of therapy
   B. when the cartridge is empty
   C. To ensure that there is sufficient solution to maintain the infusion during a patient's absence from the unit as needed.

6. The infusion set-up will be changed every 72 hours, preferably timed to coincide with the completed infusion of the cartridge.

Equipment: Ordering, Changing, Storing, and Cleaning

1. PCA pumps are ordered through Nursing Equipment Room

   Key Point: In the PAR, enough pumps will be available each day to meet the needs of surgical patients.

Initiating Therapy: The RN:

1. Validates the physician's order and confirms that the indications and consent for PCA are documented in the medical record.
   Key Point: The RN will notify the physician of the need to clarify/correct the orders/ documentation before PCA can be initiated.

2. Educates the patient (legal guardian or next of kin) about the purpose, rationale, and use PCA infusion according to the PCA Patient Education Guidelines. Asks the patient/family to sign the PCA Patient Education Acknowledgment form. Places the signed form in the patient's medical record.

3. Gather all supplies:

   A. PCA pump
   B. IV tubing
   C. PCA Cartridge
   D. IV pump
   E. D5W IV solution
   F. O2/ETCO2 monitoring device

4. Set up the narcotic-filled cartridge and infuser pump based on physician's orders and manufacturer's guidelines.

5. Prior to initiating The RN will verify that the alarm settings of the ETCO2 module are as follows:
   A. ETCO2 value: 20-50 mmHg
   B. Respiratory Rate: 8-30 breaths per minute
   C. Presence of ETCO2 waveform
   E. Pause rate (PCA will stop): Respiratory rate of less than 6
   F. Alarm limits may be changed per physician's order only.

6. Obtains baseline assessment data (see "Monitoring" for specifics), identifies acceptable pain threshold, and then begins infusion.

7. The PCA should be infusing in its own intravenous site along with the D5W or NS at 10mLs/hr as ordered to keep vein open.

Key Point: The Acceptable Pain Threshold is assessed and documented using a Pain Intensity Scale, Visual Analogue Scale (VAS), or another age/diagnosis-appropriate tool.

Stopping Therapy:

1. The narcotic infusion will be stopped, and the physician notified under the following conditions:
   A. Changes in Level of Consciousness (LOC)
   B. B/P is lower than 90/50 (or as designated by the physician).
   C. Respiratory rate is lower than 10/min.
   D. Shallow respirations
   E. Oxygen saturation less than 94%
   F. ETCO2 above 45 or as ordered by the physician – Verify that ETCO2 equipment is applied properly, verify the presence of ETCO2 waveform
   G. Evidence of concurrent use of non-prescribed narcotics or other respiratory depressants as described in Administrative Policy #A346 - Management of Patient Substance Abuse

Key Point: Follow the treatment plan as outlined in the above Policy and Procedure.

2. The RN will discontinue PCA therapy when:
   A. Therapy is discontinued by physician's order.
   B. The primary IV therapy line is discontinued.

3. If the patient has not initiated a dose in over 12 hours, the physician will be notified to determine whether the PCA should be modified or discontinued.

Monitoring and Documentation:
Note: ETCO2 or capnography monitoring provides a method to continuously measure the respiratory rate and exhaled CO2 concentration of a patient. The measurement takes place at the peak of expiration. The normal ETCO2 level for most patients is 35-45 mmHg. Both elevated and low ETCO2 levels may be associated with sedation-related hypoventilation. The module will alarm for high and low ETCO2 levels, for high and low respiratory rates, and for apnea. In addition, at a respiratory rate of less

than 6 the PCA pump will automatically pause until restarted by the nurse. Patients with asthma, Chronic Obstructive Pulmonary Disease (COPD), and sleep apnea have a higher risk of hypoventilation and would benefit from ETCO2 monitoring.

The RN:

1. Initial Assessment
   A. Assess the following prior to initiating PCA therapy
      1. LOC
      2. IV site and patency
      3. Vital signs, including quality of respirations
      4. Pain
      5. History of allergic reaction to opioids
      6. Oxygen saturation via pulse oximetry
      7. ETCO2 reading

2. Ongoing Assessment
   A. Assess the following within 15 minutes into infusion, after dose changes, then a minimum of every 4 hours (2 hours in ICU)
      1. LOC
      2. Vital signs
      3. Allergic reactions
      4. Pain
      5. Oxygen Saturation
      6. All patients will remain on continuous ETCO2 monitoring while on PCA

   Key Point: The frequency of assessments may increase as ordered by the physician in patients considered to be at high risk.

3. Ensures that infusion parameters agree with ordered parameters and records the infusion settings at the beginning of each shift.
   A. Continuous dose rate
   B. PCA bolus dosing amount
   C. Lockout interval

4. Monitors and records the following at the end of each shift:
   A. Number of bolus injections given (Injected)
   B. Number of boluses attempted during lock-out interval (Demand)
   C. Total amount of medication the patient received during the past shift.

Assesses the relation between medication administered and the patient's pain threshold and level of pain. If the number of attempts during lockout periods, the total amount of medication, and pain level indicate inadequate pain control, the RN follows the physician's orders for increasing dosage or notifies the physician. **Additional Documentation:**

1. The Pain ICP will be initiated for each patient on PCA whose pain is not adequately controlled after 2 hours of PCA use

2. Each cartridge change will be documented

3. Side Effects and Adverse Reactions will be documented by the RN. This will include signs and symptoms, corrective steps or treatment provided, the person to whom adverse effects were reported, and patient response to treatment.

4. Patient teaching will be recorded in the medical record.

5. IV fluid intake will be recorded in the medical record.

RESOURCES:

American Society of Anesthesiologists (2012). *Practice guidelines for acute pain management in the perioperative setting.* American Society of Anesthesiologists.

American Pain Society. (2016). *Principles of analgesic use in the treatment of acute pain and cancer pain* (7th ed.). Glenview, IL: American Pain Society.

Centers for Medicare and Medicaid Services (2014). Requirements for Hospitals Medication Administration, Particularly Intravenous Medications and Post-Operative Care of Patients Receiving IV Opioids.

Medication and transitions at clinical handoffs (MATCH) tool kit for medication reconciliation. (2012, August). Retrieved from Agency for Healthcare Research and Quality: http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/match/

Approved by:
Critical Care Committee
Nursing Practice Council
Pain Management Committee
Pharmacy and Therapeutics Committee

Revised: February 2017
Reviewed: August 2022