

PATIENT CONTROLLED ANALGESIA (PCA)

Appropriate candidates for PCA include patients who are:

- Anticipated to have pain requiring opioids for a minimum of 24-36 hours.
- Alert
- Unable to take oral medications, unable to eat or drink and have unpredictable pain of sudden onset.
- Understand concepts of PCA (cause and effect, able to rate pain, able to plan use with painful activities) – usually developmentally over 7 years of age.
- Physically able to hold and push the button.

Before PCA is started

- Provide education to patient and family.
- Make patient comfortable BEFORE the PCA therapy is initiated. This may require several intermittent analgesic doses of opioids before the PCA pump is started.

Ordering and Setting the PCA Pump

- Note: Due to limitations of the PCA pump, round doses to nearest 0.1ml.

MEDICATION	Opioid Naïve Children	Sickle Cell Crisis or Chronic Opioid Use Children	Adult or > 50kg Patients
<u>Morphine</u>			
Concentration	1 mg/ml	1 mg/ml or 5mg/ml	1mg/ml
Loading or nurse bolus dose	0.05 - 0.1 mg/kg up to 5mg	0.05 - 0.1 mg/kg up to 5mg	5 mg
Continuous Dose	Not Recommended Initially	Convert home dose to hourly rate, usually 0.02-0.03mg/kg/hour. Up to 2.5mg/hour	Not Recommended Initially
PCA dose	0.02 mg/kg up to 1mg	0.02-0.03mg/kg up to 1.5mg	1 mg
Lockout Interval	6-10 minutes	6-10 minutes	6-10 minutes
1 Hour Max	0.06-0.1 mg/kg; up to 5mg	0.1 - 0.2 mg/kg; up to 10 mg	5 mg
<u>Hydromorphone</u>			
Concentration	0.2 mg/ml	0.2mg/ml or 0.6 mg/ml	0.2 mg/ml
Loading or nurse bolus dose	0.01-0.02 mg/kg; up to 1mg	0.01-0.02 mg/kg; up to 1mg	1 mg
Continuous Dose	Not Recommended Initially	Convert home dose to hourly rate, usually 0.004-0.006 mg/kg/hour; Up to 0.4mg/hour	Not Recommended Initially
PCA dose	0.004 mg/kg; up to 0.2 mg	0.004-0.006 mg/kg; up to 0.3 mg	0.2 mg
Lockout Interval	6-10 minutes	6-10 minutes	6-10 minutes
1 Hour Max	0.01-0.02 mg/kg; up to 1mg	0.02-0.04mg/kg; up to 2 mg	1 mg
<u>Fentanyl</u>			
Concentration	10 mcg/ml	10 mcg/ml or 20 mcg/ml	10 mcg/ml
Loading or nurse bolus dose	0.5-1 mcg/kg; up to 50mcg	0.5-1 mcg/kg; up to 50 mcg	50 mcg
Continuous Dose	Not Recommended Initially	Convert home dose to hourly rate; usually 0.2-0.3 mcg/kg/hour; Up to 25mcg/hour	Not Recommended Initially
PCA dose	0.2 mcg/kg; up to 10 mcg	0.2-0.3 mcg/kg; up to 15 mcg	10 mcg
Lockout Interval	6-10 minutes	6-10 minutes	6-10 minutes
1 Hour Max	0.6-1 mcg/kg; up to 50mcg	1-2 mcg/kg; up to 100 mcg	50 mcg

Assessment and Monitoring:

Assess pain scores and pump history frequently (every 4 hours and when pump alarms) after initiation and following any changes in PCA pump settings.

The PCA pump has the ability to summarize demands and delivered doses.

- “Demands” are the number of times the patient requests a dose but does NOT receive one.
- “Delivered doses” are the number of times the patient requests a dose AND receives one.

Document demands and delivered doses, changes in pain intensity/pain score and actions taken on patient’s flowsheet and MAR and or progress notes.

If any of the following “triggers” are present, reassess the situation and consider the need for action:

- Verbal complaint of pain
- Patient reaches 1 hour maximum and is locked out of additional doses
- Patient having more than twice as many demands than delivered doses in a 4 hour period
- Runs of demands and injections every hour – suggesting that patient is not sleeping or someone else is activating PCA.
- Functional limitations related to uncontrolled pain
- Adverse effects present

Dose Titration

- A patient in acute pain should receive an additional bolus (above the settings of the PCA). If no relief in 30 minutes, an additional bolus should be administered.
- Reassess reason for increase in pain (e.g. ambulation, physical therapy, behind in pain control due to long period of sleep) and adjust dose to prevent future pain crises.

Consult Pain Team if any of the following adjustments have been made and patient’s pain is not well controlled:

- Increase 1 hour maximum amount equivalent to 1 PCA dose.
- Increase PCA dose by 10-20 %
- Make adjustments to continuous infusion with caution since it may result in drug accumulation and over sedation. Consider an increase of continuous rate equivalent to 25-50% of the hourly average of the last 6 hours of PCA use. Do not change continuous rate more frequently than every 12 hours.