



Clinical Manual Children's Health Program Policy/Protocol/Procedure

TITLE:	Pediatric Patient Controlled Analgesia (PCA)	NUMBER:	1518
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Approved by:	IWK Policy and Practice Committee	Approval Date:	Sept. 25, 2020
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Applies To:	IWK Children's Health Program Registered Nurses, Acute Pain Services and the Pediatric Advanced Care Team		

THIS CARE IS A BEYOND ENTRY LEVEL COMPETENCY (BELC) FOR REGISTERED NURSES PRACTICING AT THE IWK HEALTH CENTRE AND REQUIRES INITIAL CERTIFICATION AND YEARLY RECERTIFICATION

This policy supports Patient Controlled Analgesia (PCA) care for patients followed by the IWK Acute Pain Service (APS) and Pediatric Advanced Care Team (PACT). Some practices differ for patients receiving palliative care, refer to Appendix B.

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POLICY STATEMENTS

1. This policy applies to PCA use via peripheral intravenous (IV) and Central Venous Access Devices (CVAD) routes. If, PCA was started by APS, APS must be contacted for all PCA management questions or concerns. If the PCA was started by PACT, PACT must be contacted for PCA management.
2. All Registered Nurses (RNs) within the Children's Health Program at IWK Health who provide care for patients receiving PCA must assess, plan and provide care consistent with the protocols and procedures outlined within this policy and within their scope of practice.
3. The component of this care related to the programming of PCA pumps by RNs is a Beyond Entry Level competency (BELC). Initial certification, online tracking, annual recertification, and demonstration of competency are requirements for the performance of this skill. Certification and recertification includes successful completion of the theory and competency components within the online training module in advance of providing this care. If the skill is beyond the level of knowledge, skill and expertise, the RN must take action and address any education needs to ensure the delivery of safe care.
4. Patients using PCA must demonstrate an understanding of cause and effect (e.g. understand the relationship between pain, pushing the PCA button and pain relief). This usually develops around the age of 7. Patient and family education must be done by the nurse prior to starting PCA.
5. PCAs will be used by PACT to manage pain and other symptoms for PACT Inpatients. If the PCA is used for a young palliative care patient, parent (s) /substitute decision maker (SDM) may act as a proxy for their child. The PCA pumps may be used in the home setting for palliative patients. PACT must act as the liaison with the family and community nursing agencies for PCA management.

GUIDING PRINCIPLES AND VALUES

The Comfort Promise is a commitment to do everything possible to prevent and treat pain. The IWK's implementation of The Comfort Promise promotes the use of four strategies to reduce pain:

1. Use of topical anesthetics
2. Breastfeeding, Skin to Skin contact and/ or sucrose for infants 0-12 months
3. Comfort positioning
4. Developmentally appropriate distraction

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GUIDELINES

Patients at risk for complications during PCA use include:

- Morbid obesity (greater incidence of desaturation)
- Sleep apnea
- Concurrent medications that potentiate opioid side effects (i.e. sedatives)
- Impaired organ function

Patients who may not be appropriate for PCA include the following:

- Anyone with cognitive abilities that prohibit understanding and following directions for IV PCA (i.e. infants, young children, patients with decreased level of consciousness or with developmental disabilities).
- Anyone without the physical ability to push the PCA button that controls the dose administration

PROTOCOL

1. For the duration of the PCA therapy, all other analgesics and central nervous system (CNS) depressants are not to be administered unless approved by the APS. The PCA clinical order set (COS) preempt all pain, sedative, hypersensitivity and transfusion reaction orders written by the attending team.
2. An independent double check by two RNs or a RN and physician is required in the following situations:
 - Initial PCA pump programming
 - Pump parameter changes
 - Shift change or assignment changes
 - Transfer of care from one unit to another
 - Bag change
3. PCA medication bag and tubing must be changed by the nurse. The bag is changed every 24 hours and the tubing is changed every 72-96 hours. Changing the bag requires an independent double check. Refer to [IWK Health Policy #1155 – Insertion and Maintenance of Peripheral Intravenous Devices and Initiation and Maintenance of Peripheral Intravenous Therapy](#). If the PCA is infusing through a CVAD refer to [IWK Health Policy # 735 – Central Venous Access Devices \(CVAD\) - Care and Maintenance](#).
4. All PCA tubing and pump will be labelled according to the [IWK Health Policy # 10.15 – Labeling of Medication Outside of Pharmacy](#).
5. Naloxone (Narcan® or equivalent) 0.4 mg/mL must be readily available when a patient is receiving PCA therapy.

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6. The PCA pump key is to be treated as a controlled narcotic key and must be secured for limited access by approved care providers e.g. locked medication room.

PROCEDURE

1. Gather Equipment:
 - PCA pump and lock box
 - PCA tubing
 - PCA key
 - Opioid solution prepared by pharmacy
 - 2 way connector
 - PCA labels
 - Continuous oxygen saturation monitor
 - Oxygen supply in patient room, oxygen mask and suction at the bedside
 - Crash cart available on unit
 - Naloxone Injection 0.4 mg/mL available on unit
 - Developmentally appropriate pain scale – Refer to *IWK Health Centre Policy # 1519- Pain Management*
 - Patient Controlled Analgesia (PCA) Record Patient's Health (IWKPACO)
 - Sedation Scale – Refer to Vital Signs Record Patient's Health (IWKVSIS)
2. Ensure patient has IV access.
3. Assess patient's cognitive and physical status to determine their understanding and physical ability to independently use the infusion pump as prescribed/indicated. Consider alternative method of pain management if unable to safely and effectively utilize pump as prescribed.
4. Check for medication allergies and/or sensitivities and any medications that may potentiate the adverse effects of the opioid.
5. Verify the PCA orders are present and written by an APS Physician or PACT and are scanned to pharmacy.
6. Scan the preprinted IV Patient Controlled Analgesia (PCA) Pediatric Orders (IWKIVPA) to pharmacy where they will be entered in the scheduled (SCH) section of the cMAR.
 - 6.1. No administration times will be associated with this entry; however the bag or cassette changes must be documented on the cMAR
 - 6.2. PCA program parameters are not entered by pharmacy and will not print on the cMAR.

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- 6.3. The nurse reconciling the cMAR will verify the program parameters against the most recent order and document the parameters on the cMAR. This documentation requires a double signature.
 - 6.4. All parameter changes require a double signature on the cMAR. Up to two parameter changes may be transcribed on the original cMAR entry. Additional changes (beyond two) will be transcribed in a blank space on the patient's cMAR.
7. The following will be included in the independent double check (two RNs or 1 physician and 1 RN):
 - Review the PCA orders
 - Identify the patient using two unique identifiers
 - Check for allergies or other cautions
 - Verify that the medication and the pump program parameters correspond with the PCA orders.
 - Document independent double checks on the Patient Controlled Analgesia Record (IWKPACO)
 8. Perform hourly site to source checks according to IWK Health Policy #1155 – *Insertion and Maintenance of Peripheral Intravenous Devices and Initiation and Maintenance of Peripheral Intravenous Therapy*.
 9. Ensure that the PCA line is interlocked into an extension set with y-connector closest to the intravenous (IV) cannula. This will prevent opioid boluses when flushing lines or administering other IV medications.
 10. The PCA requires a running IV maintenance infusion if the continuous infusion is running less than 5 mL/hour or if the PCA is in “bolus only” mode.

Note: The minimum rate for the PACT PCA pump is 2 mL/hour; this provides enough volume and pressure to maintain a central line.

11. Ensure that the bolus button is within easy reach of the patient and secured for ready access. **ONLY THE PATIENT MAY PRESS THE BOLUS BUTTON.** Parents and staff may encourage the patient to use the bolus button as required. For PACT Inpatients refer to Appendix B.
12. Assess the patient and family's understanding of PCA. Provide ongoing education as required, after the PCA has been established.

Assessment and Monitoring

Note: For PACT Inpatients refer to Appendix B.

The following monitoring schedule is the minimum requirement while a patient is receiving PCA analgesia. The information is to be documented on the Patient Controlled Analgesia

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Record (PCA) Patient's Health Form (IWKPACO) and Vital Signs Record (IWKVISI). **Document any abnormal assessment in the progress notes and contact the APS physician.**

1. Monitor respiratory rate, quality of respirations and sedation level:
 - Prior to PCA initiation
 - Q30mins x 1 hour
 - Then q1h x 24 hours
 - Then q2h until PCA pump is discontinued.
2. Temperature, pulse, respirations (TPR) and blood pressure (BP) q4h or as attending physician's order.
3. Continuous oxygen saturation monitoring is required for the first 24 hours. After 24 hours, continuous oxygen saturation monitoring is required when the patient is asleep, left unattended, or prn. If the patient's saturations are below 93%, administer oxygen and notify the APS physician and the respiratory therapist that oxygen has been applied.
4. PCA pump settings, site to source check and patient PCA use must be checked as follows:
 - Initiation of PCA
 - Transfer of Care
 - Dose changes
 - Q1h until the PCA pump is discontinued.
5. Pain Assessment:
 - Assess pain prior to initiation of PCA
 - Then Q1h X 4 hours
 - Then Q4h for the duration of the PCA

Refer to [IWK Health Policy # 1519 - Pain Management](#).

6. For unresolved pain, page the APS Physician or APS Clinical Nurse Specialist for additional consultation and assessment.
7. For pain at a new site or increased pain after pain control has been established, page the attending physician and the APS Physician.
8. If the patient is stable on their PCA infusion after the first 24 hours and their overall condition is stable, they may go off the inpatient unit but must remain within the Health Centre with a parent/guardian or IWK staff.

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9. If the maximum bolus dose limit is reached, the nurse must contact the APS physician on-call for further instructions.

Potential Complications and Management

1. For constipation – monitor daily and if not contraindicated prevent constipation by placing patient on a bowel regime in collaboration with attending service.
2. For pruritus - see the PCA order sheets for anti-pruritic medication. If ineffective, page the APS physician or PACT.
3. For nausea/vomiting - see the PCA order sheets for antiemetic. If ineffective, page the APS physician or PACT.
4. For urinary retention - contact the APS physician, PACT or the attending physician.

Emergency Situations

Note: For PACT Inpatients refer to Appendix B.

If any of the following signs or symptoms occur, **STOP the PCA infusion** and call the APS Physician. Refer to IV Patient Controlled Analgesia (PCA) Pediatric Orders (IWKIVPA)

1. Depressed level of consciousness/sedation score less than 4 and/or respiratory rate:
 - Less than 14 for less than 8 years of age
 - Less than 12 for 8 years of age and above
 - 1.1 Stimulate the patient and apply oxygen to maintain oxygen saturations above 94%.
 - 1.2 Page the APS Physician, attending physician, and respiratory therapist.
2. For respiratory rate less than 8/min, apneic or unresponsive or systolic BP less than 65:
 - 2.1 Institute resuscitation measures – Call Code Blue.
 - 2.2 STAT page the APS Physician, and Attending Physician.

Medication Wastage

When there is medication remaining in the PCA, when medication is being replaced or when PCA therapy is discontinued confirm waste with a second RN by a visual check and both must sign and document the amount remaining on the Narcotic Waste Disposal Record obtained from Pharmacy. Refer to [IWK Health Medication Management Policy # 50.35- Narcotic and Controlled Drugs – Pyxis MedStation](#).

Documentation

All PCA pump assessments and care will be documented in the patients IWK permanent health record.

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Document assessment findings on the Patient Controlled Analgesia Record (IWKPACO) and Vital Signs Record Children's Health (IWK_VISI)

REFERENCES

- Anghelescu, D., Zhang, K., Faughnan, L., Pei, D. (2015). The safety and effectiveness of patient-controlled analgesia in outpatient children and young adults with cancer: A retrospective study. *Journal of Pediatric Hematology/Oncology*, 37(5), 378-382.
- Anghelescu, D., Snaman, J., Trujillo, L., Sykes, A., Yuan, Y., & Baker, J. (2015). Patient-controlled analgesia at the end of life at a pediatric oncology institution. *Pediatric Blood & Cancer*, 62(7), 1237-1244.
- Chidambaran, V., & Sadhasivam, S. (2012). Pediatric acute and surgical pain management: Recent advances and future perspectives. *International Anesthesiology Clinics*, 50(4), 66-82.
- Clifford, T. (2013). Patient controlled analgesia – safe practices. *Journal of Perianesthesia Nursing*, 28(2), 113-114.
- DiGiusto, M., Bhalla, T., Martin, D., Foerschler, D., Jones, M., & Tobias, J. (2014). Patient-controlled analgesia in the pediatric population: Morphine vs. Hydromorphone. *Journal of Pain Research*, 7, 471-475.
- Epstein, H. (2017). Postoperative patient-controlled analgesia in the pediatric cardiac intensive care unit. *Critical Care Nurse*, 37(1), 55-61.
- Faerber, J., Zhong, W., Dai, D., Baehr, A., Maxwell, L., Kraemer, F., & Feudtner, C. (2017). Comparative safety of morphine delivered via intravenous route vs. patient-controlled analgesia device for pediatric inpatients. *Journal of Pain and Symptom Management*, 53(5), 842-850.
- Franson, H.E. (2010). Postoperative Patient-Controlled Analgesia in the Pediatric Population: a Literature Review. *American Association of Nurse Anesthetists*, 78(5):374-8.
- Ocay, D., Otis, A., Teles, A., & Ferland, C. (2018). Safety of patient controlled analgesia after surgery in children and adolescents: Concerns and potential solutions. *Frontiers in Pediatrics*, 6 (336), 1-5.
- Pasecro, C., McCaffery, M. (2011). Pain Assessment and Pharmacological Management. Chapter 17 – Intravenous Patient Controlled Analgesia. P. 462-472 Mosby, Elsevier.
- Plate, J., & Goldstein, L. (2012). Post-operative Patient-controlled Analgesia in Pediatric Patients. *Practical Pain Management*, 11(2), 1-3.

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Seki, H., Ideno, S., Ishihara, T., Watanabe, K., Matsumoto, M., & Morisake, H. (2018). Postoperative pain management in patients undergoing posterior spinal fusion for adolescent idiopathic scoliosis: A narrative review. *Scoliosis and Spinal Disorders*, 13(1), 17-31.

Stroud, A., Tulanont, D., Coates, T., Goodney, P., & Croitoru, D. (2014). *Journal of Pediatric Surgery*, 49(5), 798-806.

Suresh, S., Birmingham, P., & Kozlowski, R. (2012). Pediatric pain management. *Anesthesiology Clinics of North America*, 30(1), 101-117.

Resources:

Patient Controlled Analgesia Smiths Medical Online Training Portal module found at <https://www.smiths-medical-education.com> IWK Access code # **2014-22**

RELATED DOCUMENTS

Policies

IWK Health Policy # 1140 - Administration of IV Medication

IWK Health Policy # 805 - Death of a Patient (DOP)

IWK Health Policy # 1155 - Insertion and Maintenance of Peripheral Intravenous Devices and Initiation and Maintenance of Peripheral Intravenous Therapy

IWK Health Medication Management Policy # 25.05 - High Alert Medications - Independent Double Check

IWK Health Policy # 1519 - Pain Management

Forms

IV Patient Controlled Analgesia (PCA) Pediatric Orders (IWKIVPA)

Patient Controlled Analgesia (PCA) Record Children's Health (IWKPACO)

Vital Signs Record Children's Health (IWKVISI)

Appendices

Appendix A - Definitions

Appendix B - Pediatric Palliative Care Applications

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Appendix A - Definitions

Acute Pain Services - 24 hour/day consultative service consisting of anesthesiologists and Clinical Nurse Specialists who specialize in pediatric pain management.

Patient Controlled Analgesia (PCA) - is a method of administering pain medication intravenously (IV) for pain management where the patient has the ability to administer preset doses of an analgesic, on demand, by way of a designated infusion pump (O'cay et al., 2018).

Pediatric Advance Care Team (PACT) - is a consultative service consisting of physicians and a Clinical Nurse Specialist who work collaboratively with other health care professionals in the Health Centre and throughout the Maritimes. The service provides and/or facilitates support for the child with a life-threatening/life-limiting illness and the family.

Site to Source – is the assessment of the vascular access site, the infusion system from connection to the IV through to the bag/ syringe /bottle, as well as, checking the pump settings.

Appendix B: Pediatric Palliative Care Applications

Monitoring:

1. Vital signs as per attending physicians orders, based on the goals of care for the patient and family.
2. Continuous oxygen saturation monitoring is not required, although monitoring and supplemental oxygen may be provided if it aligns with family wishes and is perceived as comforting for the patient.
3. Pain Assessment – refer to IWK Health Policy #1519 - Pain Assessment
4. For unresolved pain, page the PACT physician or Clinical Nurse Specialist for additional consultation and assessment.
5. For pain at a new site, or increased pain, page the attending physician and the PACT physician.
6. If pain is managed with PCA, arrangements may be made for discharge, or passes.
7. Parents/family must receive PCA education prior to discharge.
8. In some situations it may be deemed appropriate for the parent or staff to administer PCA boluses. This would be indicated in the physician's orders.
9. There is no maximum setting for the PCA pump in the context of pediatric palliative care. The amount is titrated according to the needs of the patient.
10. Assessment to be documented on PCA Record (Form IWKPACO) and Vital Signs Record Children's Health (Form IWKVISI)

Emergency Situations

Increasing sedation levels or decreasing respiratory effort, may be attributed to the patient's disease rather than the impact of opioids.

For opioid tolerant patients:

1. Notify attending physician and PACT physician/Clinical Nurse Specialist
2. Do not administer oxygen unless it is helpful for the patient's comfort.
3. Do not administer naloxone.
4. Provide information/reassurance and emotional support to family

For end of life care: Refer to IWK Health Policy # 805 - *Death of a Patient (DOP)* and the DOP Information Centre to assist in the provision of post-mortem care.

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District Health Authority/IWK Policies Being Replaced

(Please List)

Version History

(To Be Completed by the Policy Office)

Major Revisions (e.g. Standard 4 year review)	Minor Revisions (e.g. spelling correction, wording changes, etc.)
September 25, 2020	

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