**KINGSTON HEALTH SCIENCES CENTRE**

 **CLINICAL POLICY AND PROCEDURE**

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| **SUBJECT** Peripheral Regional Nerve Blocks: Continuous/Intermittent and/or Single Shot PROCEDURE A: Initiation of peripheral nerve catheters PROCEDURE B: Assessment and monitoring PROCEDURE C: Recording and reporting PROCEDURE D: CADD pump operating responsibilities PROCEDURE E: Quality control and patient safety | **NUMBER** P-101**PAGE** 1 of 7**ORIGINAL ISSUE** 2019 April**REVIEW** **REVISION**  |

**Introduction:**

Peripheral nerve blocks (PNB) are widely used for surgical anesthesia as well as for both postoperative and nonsurgical analgesia. The most common rationale for their use is to avoid side effects and complications of general anesthesia, and to provide analgesia while minimizing opioid use. PNBs may be performed as a one-time administration of local anesthetic (LA), or as an infusion through a perineural catheter.

For a peripheral upper and lower extremity nerve block, ultrasound technology is used to directly visualize the nerve or nerve plexus that will be blocked with local anesthetic. Once visualized, LA is injected as close to the target nerve or nerve plexus as possible. The local anesthetic bathes the nerve, blocking sodium channels and thereby interrupting the transmission of painful impulses. The result will be blockade of sensory and motor nerve fibers.

In contrast to peripheral extremity nerve blocks, truncal blocks do not require direct visualization of the nerve or nerve plexus. Instead of injecting around the nerve, LA is injected into and spreads through target muscle planes in order to target as many specific nerve endings as possible (see Regional Analgesia/Anesthesia Learning Guide for examples of common upper and lower extremity and truncal blocks). Truncal blocks will result in blockade of sensory nerve fibers only, therefore there is no need to test for motor block.

Continuous infusions or intermittent boluses of local anesthetic agents are used to maintain established peripheral nerve blocks, thus:

1. providing more effective pain control
2. decreasing the risk of pulmonary complications
3. promoting early ambulation.

**Definitions:**

**Regional Analgesia:**

Refers to a local anesthetic agent injected near a specific nerve or group of nerves to induce a loss of sensation to pain in that region of the body. Regional analgesia includes neuraxial (epidural/spinal) and peripheral nerve blocks.

**Intermittent Regional Analgesia:**

Refers to the delivery of a prescribed dose of local anesthetic (bolus) given either manually through the epidural filter or programmed through the epidural Continuous Ambulatory Drug Device (CADD) pump.

**Local Anesthetic:**

Local anesthetics, for example bupivacaine and ropivicaine, bind to and inactive sodium channels to block nerve conduction and transmission of pain signals from nerve fibres.

**Local Anesthetic Systemic Toxicity (LAST):**

A life threatening adverse reaction resulting from local anesthetic reaching significant systemic circulating levels. **Early signs:** numbness/tingling around lips, metallic taste, dizziness, blurred vision, tinnitus, decreased hearing, restlessness, tremor. **Late signs:** cardiac arrhythmias, bradycardia or tachycardia, seizures, severe hypotension, cardiac collapse.

**Policy:**

1. The Registered Nurse/Registered Practical Nurse (RN/RPN) who successfully completes the defined organizational knowledge and skill evaluation may care for patient receiving regional analgesia. The nurse will complete:
	1. The KHSC Regional Analgesia/Anesthesia learning guide
	2. The KHSC Regional Analgesia/Anesthesia learning guide test (achieving a score equal to or greater than 80%)
	3. Successful performance and documentation, as determined by the Clinical Learning Specialist (CLS), Nursing Manager or delegate, of the assessment of a patient receiving the above modalities.
2. The peripheral regional catheter and local anesthetic is established in a clinical area where continuous blood pressure, oxygen saturation and heart rate monitoring can be applied to the patient.

**NOTE**: In order to facilitate initial intensive monitoring, the therapy is established for approximately one (1) hour prior to patient transfer to another unit.

1. Ensure continuous peripheral nerve block infusions are run through a dedicated Continuous
	1. Ambulatory Drug Device (CADD) infusion pump.
2. When the patient is receiving a continuous local anesthetic agent, a vial of ephedrine 50 mg IV, a vial of atropine 0.6 mg IV, two 10 mL vials of 0.9% sodium chloride, and two 10 mL syringes are available\*\* during and up to 6 hours after the infusion.

**NOTE**: \*\*Available denotes either on the nursing unit or via the RACE team.

1. The patient will have an established intravenous (IV) access for the duration of therapy. This IV access may be saline locked.
2. Only the prescriber may:
	1. administer the first dose of medication
	2. change the peripheral regional catheter dressing
	3. change the peripheral regional catheter tubing
	4. mix local anesthetic solutions.
3. Only RN’s in Post Anesthetic Care Unit (PACU) may deliver a ‘clinician bolus’ via the CADD pump as prescribed by the anesthesiologist or Acute Pain Management Service (APMS) team member.
4. Only those analgesics, anti-emetics, antihistamines, neuropathic pain agents and sedatives authorized by the APMS can be administered. Medications requiring authorization by the APMS include:
	1. Opioids (including methadone)
	2. Acetaminophen
	3. Non-Steroidal Anti-Inflammatory Drugs
	4. Anti-emetics
	5. Anti-pruritics/antihistamines
	6. Sedatives (i.e. trazodone, zopiclone)
	7. Opioid antagonists (i.e. naloxone)
	8. Neuropathic pain agents (i.e. gabapentin, pregabalin, amitriptyline)
	9. Benzodiazepines
	10. Phenothiazines

**NOTE:** Medical cannabis must be authorized by APMS

1. Orders from APMS do not require a co signature by the attending service.
2. The control key required for operation of the CADD infusion pump is:
	1. Locked in the OMNICELL automated drug cabinet

**NOTE:** At no time will the control key be left unsupervised in an active CADD pump device.

1. A patient with continuous peripheral regional nerve block infusion may not leave the nursing unit unaccompanied by a hospital employee unless authorized by APMS.
2. The patient may not shower while catheter insitu.

**Procedure A: Initiation of Peripheral Nerve Catheters**

1. The following procedure will be carried out by RNs and/or nurse practitioners (NPs) for assisting with insertion of continuous epidural infusions
	1. Complete procedure safety checklist (Appendix A).
	2. Verify correct patient using two identifiers.
	3. Establish and ensure patency of IV.
	4. Obtain baseline vitals, blood pressure, heart rate, temperature, oxygen saturation, and respiratory rate (RR).
	5. Place patient on cardiac monitor and interpret rhythm strip. Ensure strip and interpretation is included on the flowsheet.
	6. Assist with positioning.
	7. Monitor patient as per Procedure B.

**NOTE**: The anesthesiology resident will assemble supplies

**Procedure B: Assessment and Monitoring**

1. When the patient is receiving a continuous infusion and/or single shot peripheral nerve block of local anesthetic agents, assess the patient according to the guidelines outlined below.
	1. At the start of the infusion or at the time of single bolus dose
		1. Pain
		2. Blood pressure (BP) & Heart Rate (HR)
		3. Catheter site if applicable
		4. Sensory and motor function
	2. At 15 and 30 minutes
		1. Pain
		2. BP & HR
		3. Signs and symptoms of local anesthetic toxicity
	3. At 1 hour
		1. Pain
		2. BP & HR
		3. Signs and symptoms of local anesthetic toxicity
	4. Then q4h and PRN for duration of infusion and/or sensory and motor deficit and until the resumption of previous sensory and motor function
		1. Pain & Level of sedation (LOS)
		2. BP & HR
		3. Signs and symptoms of local anesthetic toxicity
		4. Sensory and motor function
	5. Q12H and PRN for duration of infusion and/or sensory and motor deficit and until the resumption of previous sensory and/or motor function
		1. Catheter site, catheter connections
		2. Paresthesia
		3. Sensory and motor function
2. Indications for PRN sensory and motor block assessments include:
	1. Increasing pain
	2. Patient reports of numbness, tingling, or pins and needles sensation
	3. Lower limb weakness
	4. Sudden bowel or bladder incontinence
	5. Urinary retention
	6. Sudden pain at catheter site
3. Indications for PRN catheter site assessments:
	1. Change in pain
	2. Presence of fluid at catheter site
	3. Patient report of pain at catheter site
	4. Elevated temperature
	5. Change in primary nursing responsibility
4. Ensure the patient has established IV access and that it is patent for 6 hours post administration of local anesthetic.

**Procedure C: Recording and Reporting**

1. Discontinue the infusion and notify APMS STAT if you observe or suspect:
	1. systolic blood pressure less than 90mm Hg

 **NOTE:** report variations from normal in infant and pediatric patients.

* 1. convulsions
	2. local anesthetic toxicity (see definitions for signs and symptoms)
	3. catheter migration
	4. disconnection of the infusion line from the peripheral nerve catheter
	5. dressing rolls up or falls off and catheter is exposed.
1. Notify APMS if you observe:
	1. Inadequate pain relief
	2. Temperature greater than 38.5o C
	3. Challenges with the CADD infusion pump (e.g. pump malfunction, downstream occlusion, low battery)
	4. Paresthesia/sensory/motor block that is distressing to patient
	5. A written order for anticoagulant therapy (see last page of Neuraxial Order Set)
	6. Redness, excessive bruising, swelling, and infection (e.g. pain, warmth, discharge)
	7. Leaking from the catheter site.
2. Document on the Analgesia Flow Sheet:
	1. Date and time
	2. Identify pain scale
	3. Patient’s self-report of pain (0-10 at rest and with activity)
	4. Level of sensory block
	5. Level of motor block
	6. Rate changes
	7. Lockout, bolus dose, continuous infusion rate (if applicable)
	8. Patient controlled function demands and deliveries (if applicable)
	9. Solution and reservoir changes
	10. RN initials.
3. Document on the continuous parenteral therapy section of Medication Administration Record (MAR):
	1. Peripheral nerve block solution and concentration
	2. Date and time of initiation and each solution bag change
	3. Discontinuation date and time.
4. Document in the Interprofessional Progress Notes or on the unit-specific flow sheet:
	1. Condition of catheter and insertion site
	2. Condition of dressing
	3. Condition of filter and whether connection is secure
	4. Evidence of side effects/complications and actions taken to manage those
	5. Evaluation of patient response to interventions
	6. Communication with APMS staff.
5. Post removal of peripheral nerve block catheter (done by APMS), call APMS if any of the following:
	1. There is alteration to sensation or movement during and following removal
	2. If persistent fluid leakage, localized bleeding, or expansion of bruising is noted
	3. If sensory block is not resolved within 24 hours after catheter removal.
6. Verify patient’s identity and infusion parameters programmed on pump with patient care orders.
	1. Complete **independent double checks** at the following times
		1. prior to initiation of continuous peripheral nerve block infusion
		2. with each bag change
		3. with prescribed changes in dose/rate by anaesthesiology or APMS.
	2. Complete **independent verification** with changes in nursing responsibility (e.g. shift changes, unit to unit transfers).
	3. To verify parameters programmed on pump, press **select** on CADD pump console to confirm:
		1. Local anesthetic drug and concentration
		2. Continuous infusion rate
		3. Patient Controlled Regional Analgesia (PCRA) dose if applicable and lockout time.
	4. If there is a discrepancy between the patient care orders and the parameters programmed on the CADD pump, notify APMS to make necessary changes.
		1. Nurses do not clear totals of local anesthetic delivered.
7. Assessment and documentation will be performed for the duration of sensory and motor deficits in both single bolus or infusion interventions except patients with planned discharge home before sensory/motor blockade has resolved. These patients will be followed-up by APMS.
8. If the patient is receiving both a continuous regional infusion and Intravenous Patient Controlled Analgesia (PCA-IV), a separate Analgesia Flowsheet must be used and documentation must be appropriate to each individual modality.

**Procedure D: CADD pump operating responsibilities**

1. For initiation of continuous nerve block infusion and/or with each change of pump solution bag reset the reservoir volume:
	1. Press Stop/Start button
	2. Unlock box for local anesthetic solution bag access;
	3. Remove old bag and aseptically attach the new bag;
	4. Relock box ensuring tubing is not kinked in the process.
	5. Scroll down arrow until Reservoir Volume is highlighted – press select
	6. Unlock the key pad using the CADD pump key (key hole opening right side lockbox)
	7. Scroll up or down arrows to adjust the value then press save
	8. Press Stop/Start button
	9. Press ‘Review pump settings’
	10. Choose ‘Accept’ value to confirm the value is correct for the highlighted patient specific parameter.
	11. Continue until all specific parameters have been reviewed, accepted and display checkmarks. Press next
	12. Start pump? Press yes
	13. Use the key to relock pump – Start pump? Press yes.
2. To monitor and document volume infused and PCRA doses given/attempted press:
	1. From the home screen press Reports (no need to stop pump).
	2. Press ‘Given and PCRA Dose Counters’.
3. Changing the battery:
	1. Press stop/start;
	2. “Stop pump?” displays. Press Yes
	3. Remove the used batteries from the top of the pump;
	4. Insert new batteries;
	5. Press the power switch to turn the pump on;
	6. The screen displays “Do you want to start a new patient?” Press No
	7. Press stop/start to start the pump;
	8. “Start pump?” displays. Press Yes

**Procedure E: Quality Control and Patient Safety**

1. Each shift, assess and ensure the following:
	1. Infusions are run through dedicated CADD yellow-striped non-ported tubing
	2. The system is maintained using dedicated yellow CADD pump lockbox
	3. The local anesthetic solution is labeled for regional nerve block use ONLY
	4. The connection filter is wrapped in gauze and taped securely to skin to prevent inadvertent disconnect of catheter tubing
2. If catheter becomes disconnected or tubing severed, call APMS immediately. Cover end with sterile gauze to keep end as sterile as possible. NEVER use alcohol to clean disconnected line.

**NOTE:** If critical incident occurs, secure CADD pump with solution and tubing in place for APMS and Clinical Engineering to inspect. Refer to Administration Policy 06-170.

1. Patients will receive education about the possible signs/symptoms of lidocaine toxicity and when to access help.
2. Care of the anesthetized limb
	1. Move anesthetized limb with caution.
	2. Move often q2h to avoid skin breakdown.
	3. Provide skin care and maintain proper alignment.
	4. Avoid contact with hot or cold objects.
	5. For upper extremity nerve blocks, place a pillow under the arm to protect the elbow and prevent ulnar nerve injury.
	6. Lower extremity nerve blocks, place a pillow under the limb to prevent injury to the peroneal nerve. Prior to mobilizing, assess quad function. Always use 2 people to assist with first time transfers, and the patient should not to mobilize on blocked leg until sensation returns.

**Related Policies and Procedures**:

Administrative Policy 11-100 Administration of Anaesthetics

Administration Policy 14-101 Medication Administration

Administration Policy 14-222 High Alert Medications

Administration Policy 06-170. Incident reporting, Follow up and Review.

Clinical Policy P-100 Epidural/Paravertebral/Intrathecal/Peripheral Regional Analgesia - Intermittent or Continuous Administration

Clinical Policy D-5710 Documentation: Medication Administration Record.

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| Director, Professional Practice –Signature |  | Date |

**Appendix A**

**PACU Procedural Data Flowsheet**

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| **Safety Checklist** | **Procedure** | **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (yyyy/mm/dd)**Time:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (hhmm) |
| [ ]  All team members introduce themselves by name and role[ ]  Patient identification band on[ ]  Consent: Verbal or written[ ]  Procedure: Site and side confirmed[ ]  Adverse reactions documented[ ]  Equipment and monitors available and checked [ ]  Coagulation status identified (paravetebral/epidural) | [ ]  Epidural [ ]  Paravertebral[ ]  Peripheral Regional Block: Type: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_[ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Adverse Reactions:** [ ]  Yes [ ]  No |
| **Pain Intensity** | **Level of Sedation (Pasero)**  | **Level of Sensory Block** | **Motor Block Score** |
| [ ]  Numeric Rating Scale: 0 to 10 [ ]  Present Pain Intensity: none to severe[ ]  Wong Baker Faces ScaleWongPainScale | **S** - Sleep **1** - Awake/alert **2** - Slightly drowsy/easily roused**3** - Frequently drowsy but rousable, drifts off to sleep during conversation**4** - Somnolent, minimal or no response to verbal or physical stimulation | [ ]  Epidural/Paravertebral  (upper and lower level)[ ]  Peripheral Regional  (document areas effected) | 0 - Full flexion of knees and feet 1 - Just able to move knees 2 - (Almost complete) Able to move feet only 3 - (Complete) Unable to move feet or knees |
| **IV Fluids** | **Medications** |
| **Time (hhmm)** | **Solution** | **Rate mL/h** | **Volume Hung** | **Initials** | **Time** | **Medication** | **Dose** | **Route** | **Initials** |
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| **Time****(hhmm)** |  **Progress Notes** |
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| **Printed Name** | **Signature** | **Designation** | **Initials** |
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**PACU Procedural Data Flowsheet**

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| **Time** |  |  |  |  |  |  |  |  |
| Temp x 0 C Ax = Axillary O = OralPulse  **.**Ly = LyingS = SittingBP Sys **∨** Mean **–**  Diast **∧** | 4039383736 3534 33 32 | 20019018017016015014013012011010090807060504030 | **. . .** | **. . .** | **. . .** | **. . .** | **. . .** | **. . .** | **. . .** | **. . .** |
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| **Respiratory rate** |  |  |  |  |  |  |  |  |
| **Oxygen Source** |  |  |  |  |  |  |  |  |
| **Oxygen Saturation %** |  |  |  |  |  |  |  |  |
| **Level of Sedation (Pasero)** |  |  |  |  |  |  |  |  |
| **Patient Position** |  |  |  |  |  |  |  |  |
| **Level of Sensory Block** |  | **R** | **L** | **R** | **L** | **R** | **L** | **R** | **L** | **R** | **L** | **R** | **L** | **R** | **L** | **R** | **L** |
| **Upper** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Lower** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Motor Block (0-3)** |  |  |  |  |  |  |  |  |
| **Regional Blocks: Sensation** **(Document area(s) effected** |  |  |  |  |  |  |  |  |
| **Initials** |  |  |  |  |  |  |  |  |
| **Rhythm Strip Analysis**: PR Interval: \_\_\_\_\_\_\_\_\_\_ QRS Complex: \_\_\_\_\_\_\_\_\_\_ QT Interval: \_\_\_\_\_\_\_\_\_\_\_ Interpretation: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Patient Position** | **Level of Sedation (Pasero)** | **Oxygen Delivery System** |
| S = SupineR = Right side downL = Left side downT = TrendelenburgSF = Semi Fowlers | S = Sleep 1 = Awake/alert 2 = Slightly drowsy/easily roused3 = Frequently drowsy but rousable, drifts off to sleep during conversation4 = Somnolent, minimal or no response to verbal or physical stimulation | NC = Nasal Cannula C = CPAPFM = Face Mask B = BiPAPVM = Venti MaskTH = Trach Hood |