



This document was developed by Boston Children's Hospital for educational purposes only. Decisions about evaluation and treatment are the responsibility of the treating clinician and should always be tailored to individual clinical circumstances.

## Nerve or Wound Catheters with Continuous Infusions of Local Anesthetics

### Background

Patients with a nerve or wound catheter are managed collaboratively by the primary service and the Pain Treatment Service.

Nerve Catheters are NOT epidurals. See Epidural Analgesia Policy for management and care of epidural catheters.

### Policy

Orders require a thoughtful review by an authorized prescriber at every transfer of venue and/or change of service. Notify the Pain Treatment Service when patients with nerve or wound catheters are transferred so that the orders can be reviewed and modified accordingly.

Use standard concentration of solutions (refer to *templated order forms*) except in certain clinical situations such as palliative care.

ONLY the patient or nurse presses the PCA/NCA button. In rare instances there may be restricted roles for family members pushing the button. This exception is discussed with the team of health care professionals caring for the patient. Exceptions require an order from the Pain Treatment Service attending physician.

Dressing changes, visualization (by removing a dressing) or removing a catheter inserted in a surgical wound or nerve catheters is completed by Pain Treatment Service or occasionally, the Surgical Service.

Patients with nerve or wound catheters have a patent IV while the catheters are infusing. Exception is if the patient is being discharged home with a nerve catheter within 4 hours.

Patients that meet certain criteria may go home with a nerve catheter if approved by the Pain/regional service. The catheter is removed at home during a telehealth visit with a NP or MD. Intensive Care Unit Management is REQUIRED for infants with PARAVERTEBRAL CATHETERS who are:

- Less than 44 weeks PMA (Post Menstrual Age) regardless of prematurity status.
- Less than 1 year of age with a recent history (within the past 4 weeks) of apnea and bradycardia.
- Exceptions require a Pain Treatment Service Attending order.

Continuous cardiorespiratory monitoring is required for:

- Infants less than 1 year age.
- All patients with continuous paravertebral catheters.
- Patients with high risk for complications from nerve catheters (Pain Service will identify patients who are at risk).

## Purpose

To provide specific guidelines for the management of patients receiving local anesthetics via nerve or wound catheters.

To provide relief of pain using a continuous infusion of a local anesthetic directly into the surgical site or around a nerve in a safe and therapeutic manner.

## Critical Alerts

### Emergency Response

Stop infusion and immediately contact the appropriate physician on site if the following occur:

- Pain NOT Consistent with Illness or Surgery
  - ❖ Unexpected intense pain, particularly if sudden or associated with altered vital signs such as respiratory distress, hypotension, tachycardia or fever are immediately evaluated by the primary service and new diagnoses such as wound dehiscence, bladder distension, ileus, compartment syndrome, tight cast or dressing, bleeding or infection should be considered. The first priority in caring for a patient with significant pain not consistent with illness or surgery is to stabilize and treat the primary cause of the pain especially if associated with altered vital signs (Acute Pain Management Communication Guide).
- Signs and symptoms of local anesthetic toxicity

Signs and symptoms of LA toxicity			
	CNS	Cardiac	Response to signs of LA Toxicity
<b>Mild</b>	<ul style="list-style-type: none"> <li>• Perioral numbness, metallic taste</li> <li>• Ringing ears, blurred/double vision</li> <li>• Dizziness, nausea</li> <li>• Restlessness</li> </ul>	<ul style="list-style-type: none"> <li>• Mild tachycardia (40% or less above baseline)</li> <li>• Mild hypertension (40% or less above baseline)</li> </ul>	<ul style="list-style-type: none"> <li>• Hold infusion and administer Oxygen.</li> <li>• Notify Pain Treatment Service Attending.</li> <li>• If symptoms persist or progress, initiate protocol for Administration of intralipids for Local Anesthetic Toxicity.</li> </ul>
<b>Severe</b>	<ul style="list-style-type: none"> <li>• Mild sedation</li> <li>• Slurred speech</li> <li>• Agitation</li> </ul>	<ul style="list-style-type: none"> <li>• Tachycardia (more than 40% above baseline)</li> <li>• Bradycardia (more than 40%)</li> </ul>	<ul style="list-style-type: none"> <li>• Hold infusion and administer oxygen.</li> <li>• Initiate STAT call or Code Blue response Initiate protocol for</li> </ul>

	<ul style="list-style-type: none"> <li>• CNS depression</li> <li>• Muscle twitching, abnormal motor movements, seizures</li> <li>• Respiratory arrest</li> </ul>	<p>below baseline or absolute heart rate &lt; 35 bpm)</p> <ul style="list-style-type: none"> <li>• Hypertension (more than 40% above baseline) followed by hypotension (more than 40% below baseline)</li> <li>• Ventricular dysrhythmias</li> <li>• Asystole</li> </ul>	<p>the Administration of Intralipids for Local Anesthetic Toxicity.</p> <ul style="list-style-type: none"> <li>• Initiate Guideline for the Initial Management of Seizures as appropriate.</li> </ul>
--	--	--	---

- Respiratory depression requiring intervention (oxygen administration, stimulation, ventilatory support). Initiate STAT call and /or Code Blue response for respiratory or cardiac compromise as needed.
- Decrease of >20% in baseline blood pressure.
- Signs of infection including pain, inflammation, erythema and purulent drainage at insertion site.
- Catheter tubing becomes disconnected.

**Note:** Keep catheter and tubing sterile (wrap in sterile gauze). Do not reconnect.

- Catheter site is exposed or contaminated.
- Inadequate pain control.
- Inadvertent displacement of catheters.

**Note:** Patients often experience loss of feeling at or around the surgical area. If numbness occurs, take proper measures to prevent injury (e.g., pressure ulcers and skin breakdown) especially in extremities by positioning and regular assessment of pressure points.

## Procedure

### Assessment

- Typically, pain is assessed every 4 hours with vital signs while the patient is awake and/or at risk for experiencing pain. More frequent assessment is necessary in patients in whom pain has not been well controlled and/or patients who are receiving continuous infusions of local anesthetics via, wound or intrapleural/intercostal catheters. Pain assessment after surgery or an invasive procedure may occur more frequently.

Assessment Element	Frequency
Pain assessment*	4 hours
Responsiveness Assessment*	4 hours
Respiratory Rate and Depth**	4 hour
Heart Rate, Blood Pressure, Temperature	4 hours
Catheter site and dressing*	4 hours
Skin Integrity	4 hours

Side Effects	4 hours
Circulation, Sensation and Movement (CSM)	4 hours

\* Unless otherwise noted.

\*\* Use a stethoscope to evaluate depth of respirations at bases of lungs.

## Responsiveness Assessment

- Awake and Alert.
- Easily aroused but drowsy.
- Drowsy but opens eyes when name is called several times.
- Hard to arouse, needing tactile stimuli.
- Only responds to pain.
- No response.

## Implementation

1. Program pump with a second RN per The Patient Care Manual: Independent Double Checks for High Alert Medications, verifying drug concentration and parameters as ordered to ensure proper dose and concentration are programmed.
2. Label tubing and change solution and tubing every **96 hours** as per the Patient Care Manual: Medication Administration by Intravenous Route. Perform line reconciliation to ensure connection to the proper solution.
3. Clearly label infusions with a sticker with the words "**wound/nerve catheter**" on the following:
  - Medication source (syringe or bag) labeled by pharmacy.
  - On tubing near the medication source AND near the wound/nerve catheter.
4. The primary service determines if patients with wound catheters may ambulate with assistance and writes appropriate orders.
 

**Note:** Use caution prior to ambulation because patients with nerve or wound catheters may have motor weakness and decreased sensation.
5. Patients with running infusions are accompanied by a RN when leaving the nursing unit unless otherwise noted.
6. At a consistent time, each morning, prior to the change of shift:
  - Total the amount of medication infused in milliliters over the 24-hour period.
  - Document the 24-hour total.
  - After totaling and documenting 24-hour totals, clear the pump.
7. For patients with a lower extremity catheter, ensure patients are able to safely ambulate with crutches or walk independently before being discharged home.

## Evaluation

Evaluate effectiveness of the procedure and patient outcomes.

## Documentation

Complete patient care documentation as described in the Patient Care Manual. In addition, document specific Nerve or Wound Catheters with Continuous Infusions of Local Anesthetics information as follows:

**Pain History and Initial Assessment form**

Obtain a pain history for every patient from the patient and/or family/caregivers within **24 hours** of admission and an Initial Pain Assessment when clinically indicated.

**Patient Care Flow Sheet/ Electronic Document**

Document pain assessment using age-appropriate Pain Assessment Tools

Document the nerve catheter settings every shift change or at transfer of care.

Document total 24 hour medication volume and dose **every morning** in totals section of nerve catheter documentation.

Document assessment of the following at regular intervals (typically every 4 hours):

- heart rate, blood pressure, temperature
- side effects
- pain assessment
- respiratory rate and depth
- catheter site and dressing
- CSM checks
- Skin integrity (especially over all bony prominences)
- Responsiveness Assessment

Describe success, partial success, or failure of the interventions provided for pain.

24 hour medication total

**Progress Notes**

Record all changes in pain management plan, and communication of unexpected outcomes (unsatisfactory pain relief, significant side effects, dose changes, etc.) along with response to changes.

## References

Liu, S.S., Richman, J. M., Thirlby, R.C., & Wu, C.L. (2006). Efficacy of continuous Wound Catheters Delivering Local Anesthetic for postoperative analgesia: A Quantitative and Qualitative Systematic Review of Randomized Controlled Trials. Journal American College of Surgeons, 203(6).

## Document Attributes

<b>Title</b>	Nerve or Wound Catheters with Continuous Infusions of Local Anesthetics		
<b>Authors</b>	Jean Solodiuk, RN, MSN Navil Sethna, MD	<b>Date of Origin</b>	02/17/07
<b>Reviewed/ Revised by</b>	Jean Solodiuk, PhD, MSN, RN	<b>Dates Reviewed/Revised</b>	12/07, 08/09, 01/11, 10/14, 06/18, 03/21
<b>Copyright</b>	©Boston Children's Hospital 2022	<b>Last Modified</b>	03/15/21
<b>Approved</b>	<p><b>Signature on file</b></p> <hr/> <p>Laura J. Wood DNP, MS, RN, NEA-BC Senior Vice President for Patient Care Operations, Chief Nursing Officer</p> <p><b>Signature on file</b></p> <hr/> <p>Alana Arnold, PharmD Director of Pharmacy Services</p>		