Lidocaine Infusion (Intravenous) Low Dose for: Neuropathic pain or Post-Operative Pain Management

(Previously: Lidocaine Infusion (Intravenous) Low Dose in PACU/HAU: Post-Operative Surgical Pain Management for Abdominal or Bowel Surgery)

Site Applicability:

SPH and MSJ medical - surgical program areas, critical care units and the Anesthesia Pain Clinic

Related Standards & Resources:

1. NCS6322 – Lidocaine infusion (Intravenous): Intermediate dose in PACU/HAU/Critical care
2. NCS6415 –Lidocaine (Intravenous) for Patient Receiving in Palliative Care Unit.
3. Lexicomp Drug Reference: Lidocaine
4. Parenteral Drug Therapy Manual: Lidocaine

Skill Level: Advanced skill

Registered Nurses knowledgeable about pharmacology, principles of pain management and with infusion pump education (Q2yearly review) working on Medical-Surgical areas, Outpatient Anesthesia Pain Clinic, in Critical Care Areas and HAU (not on 1South, Mental Health Units, Residential Care or Holy Family Rehab Unit)

Policy:

Patients must have a baseline 12 lead ECG completed and read by a physician prior to initiation of an IV lidocaine infusion. This may identify patients who have an asymptomatic cardiac conduction abnormality, who may be at risk of cardiac complications.

Need to Know:

1. Lidocaine IV infusions should NOT be used if there is an epidural infusion OR perineural infusion with bupivacaine or ropivacaine Cumulative effects of local anesthetics can be detrimental to the patient.
2. Lidocaine IV low dose infusions can only run for a maximum of 72 hours without continuous ECG monitoring. Infusions lasting greater than 72 hours require continuous ECG monitoring.
3. Lidocaine IV infusions can be given via peripheral IV or central IV lines.
4. Intravenous (IV) lidocaine is an analgesic, antihyperalgesic and anti-inflammatory drug. Lidocaine IV works in both the central and peripheral nervous systems by sodium channel blockade, inhibition of G protein-coupled receptors, and blocking the NMDA (N-methyl-D-asparate) receptors (responsible for post-op hyperalgesia).
5. Lidocaine is an amide type local anesthetic that is a non-selective sodium channel blocker. It works by reversibly blocking the sodium channels within the nerve fibres by inhibiting or reducing sodium influx into the nerve cytoplasm, potassium cannot flow out and depolarization of the cell is disrupted preventing the transmission of pain signals from the nerve to the brain. It is theorized that injured nerves develop abnormal, spontaneous active sodium channels at the site of the nerve injury and along the nerve pathway. In low doses, lidocaine can suppress the abnormal firing of sodium channels in the injured nerve(s) (i.e.

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has suppressive effects on ectopic discharges of the injured nerve) without blocking normal nerve conduction or cardiac conduction.

6. An optional lidocaine bolus of 1.5 to 2 mg/kg is given by an anesthesiologist over 3 to 5 minutes perioperatively. Usual loading dose IV lidocaine is 100 to 160 mg. Immediately, after the bolus a low dose IV lidocaine infusion of 0.5 to 2 mg/kg/hour is initiated by an anesthesiologist
7. The prescribing of IV lidocaine is restricted to Anesthesiologists, Acute and Chronic Pain physicians
8. Persons allergic to "amide" type medication (e.g. bupivacaine, procainamide, etc.) should not receive lidocaine.
9. Lidocaine infusions should not be administered to persons with:
    - Bradycardia (i.e. HR less than 48 beats/min)
    - cardiac conduction problems (e.g. 1st . 2nd or 3rd degree A-V block, BBB)
    - ischemic heart disease
    - heart failure (HF)
    - hypovolemia
    - liver disease
    - renal disease.
10. Lidocaine has a short plasma half-life of 1.5 to 2 hours. Thus, stopping the infusion at the initial signs of toxicity may quickly resolve symptoms.
11. Potential signs/symptoms of toxicity to IV lidocaine are dose-related and include:

    Early signs of toxicity:
    - Hypotension or hypertension
    - Lightheadedness/visual disturbances
    - Confusion
    - Dizziness
    - Fatigue and drowsiness
    - Nausea and vomiting
    - Tinnitus
    - Perioral numbness
    - Metallic taste
    - Slurred speech
    - Itching
    - Headache

    Late signs of toxicity:
    - Arrhythmias-irregular heartbeat or rapid heartbeat
    - Potential cardiac arrest
    - Tremors/restlessness
    - Seizures

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PRACTICE GUIDELINE

Equipment:

1. I.V. infusion pump (Alaris Signature Edition (SE) or Alaris PC with Guardrails) and I.V. tubing(s) Independent Double Checks are required when using the Alaris SE infusion pump.
2. dextrose 5% 500 mL IV solution
3. lidocaine solution (in IV med bag) as ordered

Assessment:

A) Initial:

1. Monitor Blood pressure (BP), Pulse (P)/Heart Rate (HR), Respiratory Rate (RR). Oxygen saturation (SpO_2) sedation score, Pain Scale level, location of pain and description of the quality of pain prior to the lidocaine infusion.
2. Ensure baseline 12 lead ECG done and read prior to initiation of lidocaine infusion.

B) Ongoing:

1. BP and Pulse/Heart Rate (P/HR) Q15 minutes x 1 hour, then Q4H until treatment completed during infusion.
2. Pain Scale level, Respiratory rate, and Sedation score Q15 minutes x 1 hour, then Q1H x 4 hours and then Q4H until treatment completed.
3. Assess for local anesthetic (i.e. lidocaine) toxicity signs & symptoms (see above) during IV low dose lidocaine infusion Q15 minutes x 1 hour, then Q4H until infusion completed.
4. Once the lidocaine infusion discontinued then monitor the patient's BP, P/HR, Sedation score, Respiratory Rate & Pain Scale level 1 hour post-lidocaine infusion.

Interventions:

Note: An independent double check (IDC) is required when an RN initiates the lidocaine infusion or changes a medication bag when using the Alaris SE infusion pump. Refer to interdisciplinary guideline Independent Double Checks for completing an IDC.

1. Lidocaine to be infused intravenously using an IV infusion Pump at dose and rate ordered by an Anesthesiologist/ or Acute Pain Service (SPH)/or Chronic pain physician

2. Stop the infusion and call the Anesthesiologist-on-call (MSJH)/ or Acute Pain Service (SPH)/ or Chronic pain physician who prescribed infusion IF:

- Sedation score equal to POSS= 3 or 4 (if concurrently on opioids) **OR** RASS =-4 or-5 (if not on opioids) see Appendixes A & B respectively.
- Blood pressure drop of 15 mmHg systolic or increase of 30 mmHg diastolic

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- Change in HR/pulse rate of 20/min
- Signs & symptoms of local anesthetic (i.e. lidocaine) toxicity

3. Call the Anesthesiologist-on-call (MSJH)/ or Acute Pain Service (SPH)/ or Chronic pain physician who prescribed infusion 1 hour post IV lidocaine infusion IF:

- Sedation score equal to POSS = 3 or 4 (if concurrently on opioids) OR RASS = -4 or-5 (if not on opioids) see appendices A & B respectively.
- Blood pressure drop of 15 mmHg systolic or increase of 30 mmHg diastolic
- Change in HR/pulse rate of 20/min
- Signs & symptoms of local anesthetic (i.e. lidocaine) toxicity

Patient and Family Education:

1. Review the potential signs and symptoms of local anesthetic (i.e. lidocaine) toxicity with patient.
2. Inform patient to report their level of pain (e.g. 0 to 10 pain scale) & quality of their pain (e.g. sharp, achy).
3. Patients must not drive for at least 24 hour following IV lidocaine infusion.

Documentation:

HAU/PACU/ Critical Care areas

Initial documentation:

1. Record on **PACU Patient Record** (PHC-PA015) or **Critical Care Flow sheet** (PHC-IC037) or **Interdisciplinary Progress Notes** (PHC-205)
   - Time patient received from OR in PACU/HAU with low dose IV lidocaine infusion (if applicable).
   - Time patient had low dose IV lidocaine infusion started (if applicable)
   - Any signs & symptoms of local anesthetic toxicity (if applicable)
   - Record Vital Signs as per PACU care protocol NCS6075
2. Record on **24-hour Pain Management Flow sheet** (PHC-NF219)
   - Pain scale, pain location, Quality of pain, Sedation Score and Respiratory rate
   - Lidocaine IV concentration and infusion rate
3. Record on **Medication Administration Record (MAR)**
   - Transcribe order on MAR as written by physician. Confirm concentration, rate and delivered amount is as prescribed on receiving patient from OR. Document and record administration times.
   - If order is to initiate lidocaine infusion in PACU or you are required to change infusion bag a second RN must complete an IDC when using the Alaris SE infusion pump.

Ongoing documentation:

1. Record on **PACU Patient Record** or **Critical Care Flow sheet** or **Interdisciplinary Progress Notes**

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- Pain level, BP & Pulse/HR etc.(as per monitoring protocol)
- Any signs & symptoms of local anesthetic toxicity observed or reported during IV low dose lidocaine infusion (as per monitoring protocol).
- Record when IV low dose lidocaine infusion stopped (if applicable)

2. Record on **24-hour Pain Management Flow sheet**:
   - Pain Scale level, Quality of Pain, Sedation score and Respiratory Rate (as per monitoring protocol).
   - Lidocaine IV concentration and infusion rate
3. Record on **Medication Administration Record (MAR)**
   - When an IDC is completed (e.g. when a new medication bag is initiated). Documenting IDC and initialing of a second RN confirms an IDC of the medication was completed.
   - Initial the time low dose IV lidocaine infused on your shift
   - Initial the time the low dose IV lidocaine infusion stopped (if applicable)

Medical Surgical Areas

Initial documentation:

1. Record on **Interdisciplinary Progress Notes** (PHC-NF205) and **24 hour Patient Care Flowsheet** (PHC-NF204) when used
   - Time patient received from PACU/HAU with low dose IV lidocaine infusion (if applicable).
   - Time patient had low dose IV lidocaine infusion started (if applicable)
   - Quality of pain experienced
   - Pain location, BP & Pulse/HR
   - Any signs & symptoms of local anesthetic toxicity during IV low dose lidocaine infusion (as per monitoring protocol).
2. Record on **24 hour Pain Management Flow sheet**
   - Pain Scale, Quality of pain, Sedation score, and Respiratory rate
   - Lidocaine IV concentration and infusion rate
3. Record on **Medication Administration Record (MAR)**
   - Two RNs independently double check drug concentration (mg/mL), ordered dose (mg/h) and infusion rate in mL/h then cosign MAR when initiated if not using a smart pump

Ongoing documentation:

1. Record on **Interdisciplinary Progress Notes and 24 hour Patient Care Flowsheet** when used
   - Pain location, BP & Pulse/HR (as per monitoring protocol)
   - Quality of pain experienced
   - Any signs & symptoms of local anesthetic toxicity during IV low dose lidocaine infusion (as per monitoring protocol)

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- Record when IV low dose lidocaine infusion stopped.

2. Record on **24 hour Pain Management Flow sheet** (PHC-NF219)
   - Pain Scale level, Quality of pain, Sedation score and Respiratory Rate (as per monitoring protocol).
   - Lidocaine IV concentration and infusion rate
3. Record on **Medication Administration Record (MAR)**
   - Two RNs independently double check drug concentration (mg/mL), ordered dose (mg/h) and infusion rate in mL/h then cosign MAR when initiated or medication bag changed if not using a smart pump
   - Bracket and initial time low dose IV lidocaine infused on your shift
   - Initial the time the low dose IV lidocaine infusion stopped.

For Outpatient Anesthesia Pain Clinic

1. Record on **Pain Clinic Anesthesia Treatment Record** (PHC-OP094)
   - Time of initiation of low dose IV lidocaine infusion, lidocaine concentration and infusion rate
   - Quality of pain experienced
   - Pain Scale level, Respiratory Rate, Sedation Score, Pain Location, BP, P/HR (as per monitoring protocol)
   - Any signs & symptoms of local anesthetic (i.e. lidocaine) toxicity (as per monitoring protocol)
   - Initial the time of the low dose IV lidocaine infusion stopped.
2. Record on **Medication Administration Record (MAR)**
   - Two RNs independently double check drug concentration (mg/mL), ordered dose (mg/h) and infusion rate in mL/h then cosign MAR when initiated or medication bag changed if not using a smart pump
   - Initial the time the low dose IV lidocaine infusion stopped.

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Approved By: Professional Practice Standards Committee

Date of Creation/Review/Revision:

March 2016 (revised from NCS6421)
April 2016 (Minor revision)

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Appendix A: Pasero Opioid-Induced Sedation Scale

(used if on opioids concurrently)

Pasero Opioid-Induced Sedation Scale (POSS)		
Score	**Meaning of Score**	
S	Sleep, easy to rouse	**Acceptable**; no action necessary; may increase opioid dose if needed
1	Awake and alert	**Acceptable**; no action necessary; may increase opioid dose if needed
2	Slightly drowsy, easily roused	**Acceptable**; no action necessary; may increase opioid dose if needed
3	Frequently drowsy, rousable, drifts off to sleep during conversation	**Unacceptable;** remove PCA button if in use, hold next oral dose of opioid **and** NOTIFY prescriber /MD for adjustment of opioid orders monitor respiratory status and sedation level closely until sedation level is stable at less than 3 and respiratory status is satisfactory • consider administering a non-sedating, non-opioid analgesic for pain i.e. acetaminophen or NSAID
4	Somnolent, minimal or no response to verbal and physical stimulation (use trapezius muscle squeeze for physical stimulation - do not use sternal rub)	**Unacceptable;** • stop opioid • oxygen by mask 10 L/min (if not COPD) and monitor vital signs • administer naloxone as per order • IMMEDIATELY page MD/ Prescribing Service physician STAT • **PROVIDE AIRWAY and BREATHING SUPPORT** • **DO NOT re-commence opioid therapy prior to patient being seen by the prescribing service physician**

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Appendix B: Richmond Agitation and Sedation Scale (RASS)

(used if not on opioids concurrently)

Richmond Agitation and Sedation Scale (RASS)		
+ 4	Combative	Violent, immediate danger to staff
+ 3	Very Agitated	Pulls or removes tube(s) or catheter(s); aggressive
+ 2	Agitated	Frequent non purposeful movement, fights ventilator
+ 1	Restless	Anxious, apprehensive but movements not aggressive or vigorous
0	Alert and calm	
- 1	Drowsy	Not fully alert, but has sustained awakening to voice (eye opening and contact greater than or equal to 10 seconds)
- 2	Light Sedation	Briefly awakens to voice (eye opening and contact less than 10 seconds)
- 3	Moderate Sedation	Movement or eye opening to voice but no eye contact
- 4	Deep Sedation	No response to voice, but movement or eye opening to physical stimulation
- 5	Unarousable	No response to voice or physical stimulation

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