

Lidocaine Infusion: Post-Operative Pain Management

Site Applicability:

SPH surgical program areas, critical care units and MSJ (HAU/PACU)

Practice Level:

Advanced skill

Registered Nurses knowledgeable about pharmacology, principles of pain management and with infusion pump education (Q2 yearly review) working in Surgical areas (10 A,B,C only at SPH), in Critical Care Areas, and MSJ (PACU/HAU only).

Requirements:

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. Lidocaine infusions require cardiac monitoring for the first hour of infusion prior to transfer to the surgical program area.

Need to Know:

1. Lidocaine IV infusions should NOT be used if there is an epidural infusion or perineural infusion or within the period of action of other local anesthetic interventions with BUPIVACAIN or ROPIVACAIN. Cumulative effects of local anesthetics can be detrimental to the patient.
2. Lidocaine infusions are generally initiated in the operating room but may be initiated in critical care area with cardiac monitoring capability post operatively.
3. Lidocaine infusions can only run for a maximum of 48 hours without continuous ECG monitoring. Infusions lasting greater than 48 hours require continuous ECG monitoring.
4. IV lidocaine infusion of 0.5 to 1.5 mg/kg/hour will be ordered based on **ideal body weight** at no more than 120 mg/hr (i.e. max 1.5 mg/kg/hr at 80 kg) Note the ideal body weight will be identified as 'weight in order' and may differ from patient's actual weight. Always refer to 'weight in order' for pump programming.
5. Lidocaine IV infusions can be given via peripheral IV or central IV lines.
6. IV lidocaine should be administered using an Alaris CareFusion IV pump using a separate, dedicated labelled IV line (grey lidocaine label). Pump should be set to the "Adult General" drug library, utilizing the **Lidocaine Cont Post Op Pain** selection, and dosed as mg/kg/hr.
7. Note: An independent double check (IDC) is required when an RN initiates the lidocaine infusion or changes to pump programming or when changing the lidocaine medication bag.
8. Lidocaine has anti-nociceptive, anti-hyperalgesic and anti-inflammatory actions. Lidocaine IV works in both the central and peripheral nervous systems

9. The prescribing of IV lidocaine infusions for post-operative pain is restricted to Anesthesiologists and Acute Pain Services physicians
10. Persons allergic to “amide” type medication (e.g. BUpivacaine, procainamide, etc.) should not receive lidocaine.
11. 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
12. 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.
13. Potential signs/symptoms of local anesthetic systemic toxicity (LAST) to IV lidocaine are dose-related and include:

Signs and Symptoms of Local Anesthetic Systemic Toxicity (LAST)		
Mild Symptoms	Moderate Symptoms	Severe Symptoms
<ul style="list-style-type: none"> • Perioral Numbness and tingling • Metallic taste in mouth • Ringing in ears • Lightheadedness • Dizziness • Visual disturbances • Confusion 	<ul style="list-style-type: none"> • Nausea and vomiting • Severe dizziness • Decreased hearing • Tremors • Changes in heart rate and blood pressure (hyper/hypotension) • Confusion 	<ul style="list-style-type: none"> • Drowsiness POSS 3 or 4 • Confusion • Muscle twitching • Convulsions • Loss of consciousness • Cardiac arrhythmias • Cardiac arrest

Equipment:

1. I.V. infusion pump: Alaris CareFusion PC with Guardrails
2. IV Tubing
3. Grey lidocaine label
4. Pharmacy or manufacturer prepared lidocaine solution (in IV med bag) as ordered

Protocol

Assessment:

- Continuous cardiac monitoring for 1 hour post initiation of lidocaine infusion

- Vital Signs: *q15min for 1 hour, then q1h for 4 hours, then q4h and PRN*
- Sedation Scale: *q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion*
- Pain Scale: *q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion*
- Local Anesthetic Systemic Toxicity Assessment (LAST): *Observe for local anesthetic systemic toxicity q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion. Signs and symptoms of local anesthetic systemic toxicity (LAST) include: (CNS) tinnitus, metallic taste, light headedness, perioral numbness, headache, slurred speech, seizures, CNS depression, coma, (CVS) myocardial depression, bradycardia, hypotension, CVS collapse*

Interventions:

Stop the infusion and notify the treating provider Acute Pain Service (SPH) or Anesthesiologist-on-call (MSJ) if :

- POSS 3 or 4 see [Appendix A](#).
- RR less than 8
- **Any** signs & symptoms of local anesthetic systemic toxicity (LAST)
- Note symptoms can occur up to an hour post stopping lidocaine infusion – call APS (SPH) or Anesthesia (MSJ) if patients experiencing any of the above symptoms
- If patient experiencing severe symptoms of LAST – Call Code Blue and bring intralipids 20 % to bedside for administration by code team. Intralipids can be found in Omnicell on 10 A, B, C & PACU at SPH and PACU/HAU at MSJ.

Patient and Family Education:

1. Review the potential signs and symptoms of local anesthetic systemic toxicity (LAST) with patient and encourage patient or family to tell their nurse if experiencing any side effects.
2. Inform patient and family they will be assessed around the clock and woken up for assessment in the first 24 hours.
3. Encourage your patients to inform you if their pain level is unacceptable.
4. Pain assessment – explain the pain scale and how to use it.

Documentation: Cerner

Interactive View and I & O: See [Appendix B](#)

Related Standards & Resources:

1. [B-00-13-10064](#) – Lidocaine infusion (Intravenous): Intermediate dose in PACU/HAU/Critical care
2. [B-00-13-10128](#) –Lidocaine (Intravenous) for Patient Receiving in Palliative Care Unit.
3. Lexicomp Drug Reference: [Lidocaine](#)
4. Parenteral Drug Therapy Manual: [Lidocaine](#)

References:

1. Abdourahamane, K.; Laurent, S.R.; Detroz, B.J.; Sessler, D. I.; Durieux, M.E.; Lamy, M.L. & Joris, J.L. (2007). Intravenous lidocaine infusion facilitates acute rehabilitation after laparoscopic colectomy. *Anesthesiology*, 106(1), 11-18.
2. Alberta Health Services Practice Support Protocol Document (2015). Lidocaine continuous intravenous infusion for analgesia—adult
3. Chemali, M & Eslick, G (2017). Postoperative pain management in colorectal surgical patients and the effect on length of stay in an enhanced recovery after surgery (ERAS) setting. *Clinal Journal of Pain* 33 (1), 87-92. Doi:10.1097/AJP000000000000370
4. Dunn, LK. & Durieux, M. E.(2017) Perioperative use of intravenous lidocaine. *Anesthesiology* 126 (4). 729-737 doi: 10.1097/ALN.0000000000001527
5. Foo, I., Macfarlane, A. Sroavastava, D/. Bjaslar, A., Barker, H., Knaggs, R., Eipe, N, Smith, A (2020) Guidelines: The use of intravenous lidocaine for the postoperative pain and recovery: international consensus statement on efficacy and safety. *Anesthesia* 2020, doi:10.1111/anae.15270
6. Nygren, J.;Thacker, J et al. (2013). Guidelines for Perioperative Care in Elective Rectal/Pelvic Surgery, *World Journal of Surgery*, 37, 285-305.
7. Peixoto, R. D. & Hawley, P. (2015). Intravenous lidocaine for cancer patients with electrocardiac monitoring: a retrospective review. *Journal of Palliative Medicine*, 18(4), 373-377.
8. Sun,Y.; Li, T.; Wang, N. et al. (2012). Perioperative systemic lidocaine for postoperative analgesia and recovery after abdominal surgery: a meta-analysis of randomized controlled trials. *Dis Colon Rectum*, 55, 1183-1194.

Persons/Groups Consulted:

Acute Pain Service Physicians
RN, Neuromodulation/outpatient anesthesia clinic nurse
PHC Head of Anesthesiology
Pain Specialist, Internist
Pharmacist
Clinical Nurse Specialist, Surgery
Nurse Educator, Surgery (SPH)
Nurse Educators, PACU (MSJ and SPH)

Revised By

Clinical Nurse Specialist, Pain Management
Nurse Educator, Surgery

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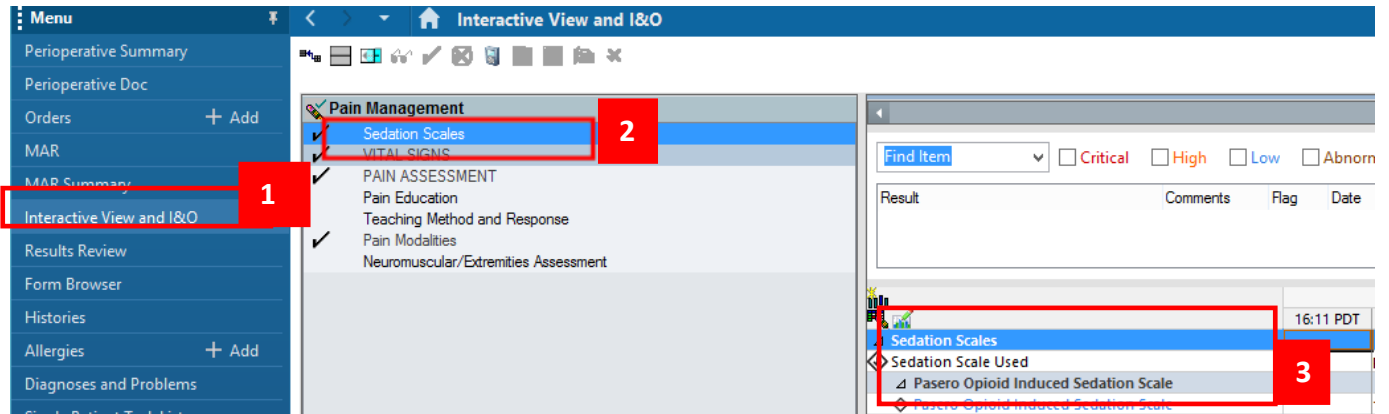
Appendix A: Pasero Opioid-Induced Sedation Scale

(used if on opioids concurrently)

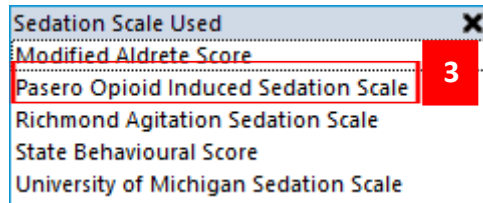
Pasero Opioid-Induced Sedation Scale (POSS)		
Score	Meaning of Score	
S**	Sleep	Acceptable; no action necessary; may increase opioid dose if needed **NOTE: During the first 24 hours after surgery and/or lidocaine infusion the patient must be woken. Documenting 'S' score is not acceptable during this time period
1	Awake and alert	Acceptable; no action necessary;
2	Slightly drowsy, easily roused	Acceptable; no action necessary;
3	Frequently drowsy, rousable, drifts off to sleep during conversation	Unacceptable; remove PCA button if patient has PCA, do not give any other opioids or sedating medication Notify APS for direction regarding lidocaine infusion, anticipate decreasing dose or stopping lidocaine infusion Monitor vital signs, respiratory status and POSS closely, until POSS is 2 or better, respiratory status is satisfactory and vital signs within 20% of baseline
4	Somnolent, minimal or no response to verbal and physical stimulation (use trapezius muscle squeeze for physical stimulation - do not use sternal rub)	Unacceptable; <ul style="list-style-type: none"> Stop Lidocaine infusion Oxygen by mask 10 L/min) and monitor vital signs Call Code Blue, page APS/Anesthesiologist STAT. (Ensure to inform them that patient is on a lidocaine infusion) Bring Intralipid 20% to bedside for administration by code team (located in Omnicell)

Appendix B Documentation

Sedation Scale

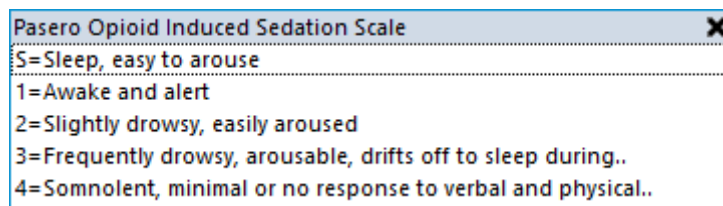


- 1** Go to Interactive view and I & O on the dark blue under the menu bar on the far left
- 2** Go to Pain Management Band – all your assessments related to lidocaine will be found in this band.
- 3** Under Sedation Scale Used choose Pasero Opioid Induced Sedation Scale

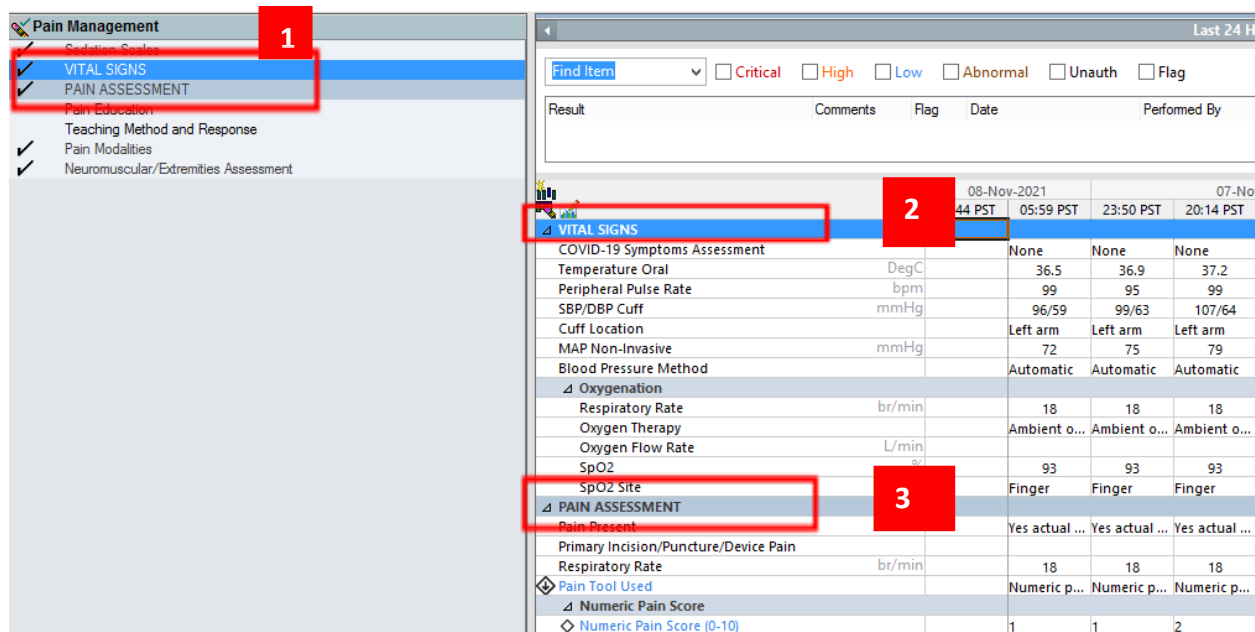


Choose the number that correlates with your assessment.

Assess Sedation Scale q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion



Vital Signs and Pain Assessment



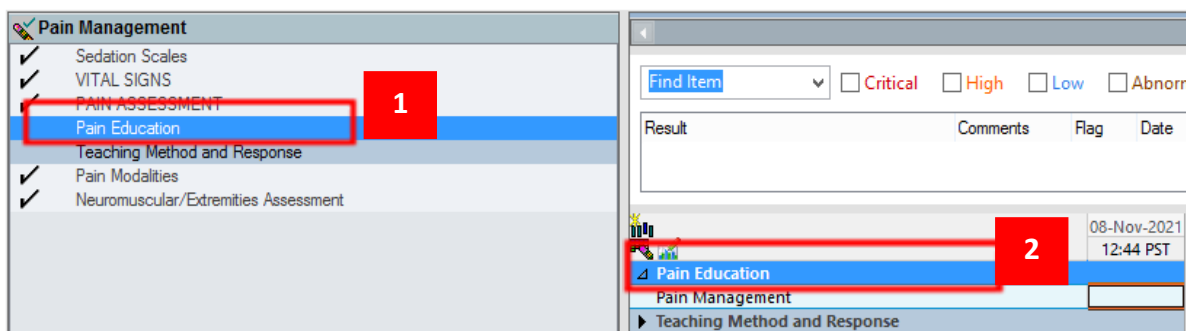
Find Item	<input type="checkbox"/> Critical	<input type="checkbox"/> High	<input type="checkbox"/> Low	<input type="checkbox"/> Abnormal	<input type="checkbox"/> Unauth	<input type="checkbox"/> Flag
Result	Comments	Flag	Date	Performed By		
08-Nov-2021 07-Nov-2021						
44 PST 05:59 PST 23:50 PST 20:14 PST						
VITAL SIGNS						
COVID-19 Symptoms Assessment		None	None	None		
Temperature Oral	DegC	36.5	36.9	37.2		
Peripheral Pulse Rate	bpm	99	95	99		
SBP/DBP Cuff	mmHg	96/59	99/63	107/64		
Cuff Location		Left arm	Left arm	Left arm		
MAP Non-Invasive	mmHg	72	75	79		
Blood Pressure Method		Automatic	Automatic	Automatic		
Oxygenation						
Respiratory Rate	br/min	18	18	18		
Oxygen Therapy		Ambient o...	Ambient o...	Ambient o...		
Oxygen Flow Rate	L/min					
SpO2	%	93	93	93		
SpO2 Site		Finger	Finger	Finger		
PAIN ASSESSMENT						
Pain Present		Yes actual ...	Yes actual ...	Yes actual ...		
Primary Incision/Puncture/Device Pain						
Respiratory Rate	br/min	18	18	18		
Pain Tool Used						
Numeric Pain Score		Numeric p...	Numeric p...	Numeric p...		
Numeric Pain Score (0-10)		1	1	2		

1 Under Pain Management band, click on Vital Signs

2 Document vital signs—this area pulls in from anywhere you document vital signs
Assess Vital Signs - *q15min for 1 hour, then q1h for 4 hour, then q4h and PRN*

3 Document pain assessment—Choose a scale appropriate for your patient, and use the same scale every time, unless your patient status changes
Assess Pain *q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion*

Patient Education



Find Item	<input type="checkbox"/> Critical	<input type="checkbox"/> High	<input type="checkbox"/> Low	<input type="checkbox"/> Abnorm
Result	Comments	Flag	Date	
08-Nov-2021 12:44 PST				
Pain Education				
Pain Management				
Teaching Method and Response				

- 1 Under Pain Management band, click on Pain Education
- 2 Document pain education regarding pain management once per shift and prn

Pain Management ✕

- ☐ Verbalizes understanding
- ☐ Demonstrates
- ☐ Needs further teaching
- ☐ Needs practice/supervision
- ☐ Independent
- ☐ Other

Pain Modalities

Pain Management

- ✓ Sedation Scales
- ✓ VITAL SIGNS
- ✓ PAIN ASSESSMENT
- ✓ Pain Education
- ✓ Teaching Method and Response 1
- ✓ Pain Modalities
- ✓ Neuromuscular/Extremities Assessment

Find Item ▼

☐ Critical
 ☐ High
 ☐ Low
 ☐ Abnormal

Result	Comments	Flag	Date
08-Nov-2021 12:43 PST			
4 Pain Modalities			
4 IV or Subcutaneous Infusions			
4 Intravenous Lidocaine Standard			
Infusion Type		2	
Verification Type			
IDC Completed		3	
Pump Related Activity			
Verified Pump Settings with Orders		4	
Programmed Pump Weight			5
Adverse Effects		6	
Pruritus Score			
Patient Controlled Dose			
Patient Controlled Dose Unit of Measure			
Lockout Time			minute
4 Hour Dose Limit			
4 hour Dose Limit Unit of Measure			
1 Hour Dose Limit			
1 Hour Limit Unit of Measure		7	
Continuous Rate			8
Continuous Rate Unit of Measure			
Programmed Pump Rate		9	mg/kg/h

- 1 Choose Pain Modalities
- 2 Infusion type: Continuous Infusion
- 3 IDC required for initial set up and any change to pump programming/bag change, otherwise leave blank
- 4 Verify pump settings with orders

Infusion Type ✕

- ☒ Continuous infusion 2
- ☐ Patient controlled
- ☐ Programmed intermittent bolus
- ☐ Clinician Bolus

Verified Pump Settings with Orders ✕

- ☒ Yes 4
- ☐ No

5 Programmed pump weight is referring to 'weight in order' and weight programmed in Alaris Care Fusion IV Pump and weight is identified

6 Observe and document for local anesthetic systemic toxicity q15min for 1 hour, then q1h for 4 hours, then q2h and PRN for the duration of the infusion
Signs and symptoms of local anesthetic systemic toxicity (LAST) include: (CNS) tinnitus, metallic taste, light headedness, perioral numbness, headache, slurred speech, seizures, CNS depression, coma, (CVS) myocardial depression, bradycardia, hypotension, CVS collapse

Adverse Effects
<input type="checkbox"/> No Adverse Effects
<input type="checkbox"/> Hypotension
<input type="checkbox"/> Insomnia
<input type="checkbox"/> Nausea
<input type="checkbox"/> Pruritus
<input type="checkbox"/> Respiratory depression
<input type="checkbox"/> Sedation
<input type="checkbox"/> Signs or symptoms of local anesthetic toxicity
<input type="checkbox"/> Urinary retention
<input type="checkbox"/> Vomiting
<input type="checkbox"/> Dysphoria
<input type="checkbox"/> Other

7 Document the mL/hr of the continuous rate as verified with pump programming

8 Continuous rate of measure is ordered as mL/hr

Continuous Rate Unit of Measure
<input type="checkbox"/> mg/hr
<input type="checkbox"/> mcg/hr
<input type="checkbox"/> mL/hr

9 Document the ordered mg/kg/hr (e.g.: **1.5 mg/kg/hr**) as verified with pump programming

Programmed Pump Rate	9	mg/kg/h	1.5
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