SEDATION AND ANALGESIA (INTRAVENOUS) – ICU

PURPOSE: To outline the management of the patient receiving intravenous sedation and analgesia.

SUPPORTIVE
DATA: IV sedation and analgesia are produced by the administration of pharmacologic agents directly into the bloodstream and may be administered by continuous infusion or intermittent bolus. Examples of commonly used medications include sedatives (lorazepam/*Ativan*, midazolam/*Versed),* and analgesics (fentanyl/*Sublimaze*, morphine sulfate).

Analgesia/sedation in mechanically ventilated patients (exception, morphine continuous infusions may be used for comfort care in non-intubated patients).
Sedatives for adult mechanically ventilated patients must be titrated to an ordered Richmond Agitation-Sedation Scale (RASS) score. Also, analgesics for mechanically ventilated adult patients must be titrated to a pain scale. Sedative and analgesics for pediatric and NICU patients are titrated per physician order.

This standard is not to be used for procedural sedation.
See "Continuous Propofol (Diprivan) Infusion-ICU/ED" standard for the management of propofol infusion.
See "Dexmedetomidine (Precedex) continuous infusion- ICU/ED" standard for the management of dexmedetomidine infusion.
See "Ketamine continuous infusion for intravenous sedation/analgesia (adults) – ED/ICU"

ASSESSMENT:
1. Assess the following immediately prior to initial administration and a minimum of every hour:
- Vital signs (VS) & oxygen saturation
- Presence of arrhythmias
- Pain score
- Respiratory depression
Note: Special attention to patients with no artificial airway device or patients not receiving adequate mechanical ventilation- (e.g. CPAP mode
2. Determine concentration and verify correct dose upon initiation, within 1 hour of assuming care of the patient, and with each dose change.
3. Assess VS and oxygen saturation prior to each titration or bolus.
4. Assess sedation level by obtaining RASS score for adult patients minimum of:
- Every 2 hours if on continuous sedation
- Every 4 hours if on intermittent sedation
- Prior to initiation and each titration or bolus/ administration to document justification for initiation/titration/bolus/
Note: The RASS score may not be documented more than 30 minutes prior to initiation, administration, titration or bolus.
5. Assess Pain score (for analgesics, for adult and pediatric patients)
- Prior to initiation and each titration or bolus/administration to document justification for titration/bolus administration
- After initiation and each titration or bolus/administration to document effectiveness of titration/bolus administration
Note: Pain score may not be documented more than 30 minutes prior to initiation, administration, titration or bolus
6. Assess for adverse reactions a minimum of every 4 hours including the following:
- Allergic reaction
- Bradycardia/tachycardia
- Respiratory depression

- Hypotension
- Seizure activity
- Nausea/vomiting
- Constipation/diarrhea
- Urinary retention

ADMINISTRATION:

7. Verify provider order and pump settings (limited to continuous fentanyl, morphine sulfate and midazolam) with second RN prior to administration and with any change in bag/bottle/syringe or concentration for correct:
   - Type of medication
   - Dosage of medication
   - Pump settings

8. Ensure that continuous medications are prepared in the following standardized concentrations.
   - Midazolam: 1 mg per mL
   - Lorazepam: 0.1 mg per mL (in glass container)
   - Fentanyl: 10 mcg per mL or 50 mcg per mL
   - Morphine sulfate: 1 mg per mL
   - Hydromorphone: 0.5 mg per mL

9. Administer IV sedation/analgesia as ordered. Order to include:
   - Name of medication
   - Dose (range orders are not acceptable; must be weight based in kilograms for pediatrics/NICU)
   - Route (bolus or continuous infusion)
   - Duration of administration
     - Order must be renewed a minimum of every 7 days
   - Desired RASS or pain scale score (Adults only)
   - Incremental increase or decrease in dose based on RASS or pain score (Adults only)
   - Maximum rate of infusion
   - Notify provider regarding discontinuation of ventilatory support
   - Notify provider of RASS after extubation or after clinical changes

10. Avoid interruption of continuous infusion except as ordered (e.g. for sedation holiday, spontaneous awakening trial).

DISCONTINUATION:

11. Obtain alternate intermittent pain control/sedation as ordered prior to discontinuation.

12. Discontinue gradually as ordered.

SAFETY:

13. Ensure the following:
    - Two RNs verify provider order matches patient and pump settings. Document accordingly (fentanyl, morphine sulfate and midazolam only). Prior to initiation and each bag change.
    - Reversal agent (e.g., naloxone, flumazenil) is available on the unit
    - Infusion pump with Guardrails is used for administration of continuous infusion(s)
    - Drug concentration and dosage calculation are correct and within prescribed parameter(s)
    - Drug compatibility

REPORTABLE CONDITIONS:	14.	Discontinue infusion and notify provider immediately for the following: • Significant change in VS & oxygen saturation • Respiratory depression
	15.	Notify the provider for: • Allergic reaction • Inability to achieve/maintain desired effect within ordered parameter(s) • Unexpected change in LOC • Nausea/vomiting/diarrhea/constipation • Urinary retention • Seizure activity
PATIENT/CAREGIVER EDUCATION:	16.	Instruct on the following: • Rationale for sedative/analgesic • Side effects including need to notify nurse for the following: - Dizziness/change in LOC - Seizures - Difficulty breathing - Nausea/vomiting/diarrhea/constipation - Persistent pain - Persistent anxiety/ agitation
ADDITIONAL STANDARDS	17.	Refer to the following as indicated: • Confused Patient • Neuromuscular Blocking Agents • Pain Management • Central Venous Catheter & Midline Peripheral Catheter (part 1 & 2) • Intravenous Therapy • Restraints: Non-Violent or Self-Destructive Behavior • Ketamine Continuous Infusion for Intravenous Sedation/Analgesia (Adults) - ED/ICU • Ketamine Continuous Infusion, Sub-Dissociative Dose (Analgesia), Progressive Care Unit (PCU) / ICU • Propofol (Diprivan) Continuous Infusion ICU/ED • Dexmedetomidine (Precedex) Continuous Infusion ICU/ED
DOCUMENTATION:	18. 19.	Document in accordance with "documentation standards". Both RNs document in accordance with High Alert Medication Policy

Richmond Agitation Sedation Scale (RASS) *

Score	Term	Description	
+4	Combative	Overtly 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 but movements not aggressive vigorous	
0	Alert and calm		
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to *voice* (≥10 seconds)	Verbal Stimulation
-2	Light sedation	Briefly awakens with eye contact to *voice* (<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	Physical Stimulation
-5	Unarousable	No response to *voice or physical* stimulation	

Procedure for RASS Assessment

1. Observe patient

   a. Patient is alert, restless, or agitated.   (score 0 to +4)

2. If not alert, state patient's name and *say* to open eyes and look at speaker.

   b. Patient awakens with sustained eye opening and eye contact.   (score –1)

   c. Patient awakens with eye opening and eye contact, but not sustained.   (score –2)

   d. Patient has any movement in response to voice but no eye contact.   (score –3)

3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.

   e. Patient has any movement to physical stimulation.   (score –4)

   f. Patient has no response to any stimulation.   (score –5)

* Sessler CN, Gosnell M, Grap MJ, Brophy GT, O'Neal PV, Keane KA et al. The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care patients. Am J Respir Crit Care Med 2002; 166:1338-1344.

* Ely EW, Truman B, Shintani A, Thomason JWW, Wheeler AP, Gordon S et al. Monitoring sedation status over time in ICU patients: the reliability and validity of the Richmond Agitation Sedation Scale (RASS). JAMA 2003; 289:2983-2991.

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Short, J. (2010). Use of Dexmedetomidine for Primary Sedation in a General Intensive Care Unit. Critical Care Nurse, 30(1), 29-39.

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Addendum A:

Opioids & Benzodiazepines – Continuous Infusion
ICU, ED

Medication Names & Pharmacologic Category	**Analgesic, Opioid** • Fentanyl (Sublimaze) • Morphine Sulfate **Sedative, Benzodiazepine** • Midazolam (Versed) • Lorazepam (Ativan)
Mechanism of Action	• **Opioid**: Binds to opiate receptors in the CNS. Alters the perception of and response to painful stimuli while producing generalized CNS depression • **Benzodiazepines**: Acts at many levels of the CNS to produce generalized CNS depression. Effects may be mediated by GABA, an inhibitory neurotransmitter
Indication/ Use	• Analgesia/sedation for mechanically ventilated patients (exception, morphine continuous infusions may be used for comfort care in non-intubated patients)
Usual Dosage	Adults: • Fentanyl (Sublimaze): 25-300 mcg/hr • Morphine Sulfate: 2-10 mg/hr • Midazolam (Versed): 1-20 mg/hr • Lorazepam (Ativan): 1-15 mg/hr • Titrate to ordered Pain score (for analgesics) or Richmond Agitation Sedation Scale (RASS) score (for sedatives)
Administration	• Fentanyl, Morphine and Midazolam require independent double check to ensure order matches medication, pump settings and patient prior to initiation and each bag change • Perform Spontaneous Awakening Trial (SAT) as ordered
Reversal Agents	**Opioids**: Naloxone (Narcan) **Benzodiazepines**: Flumazenil (Romazicon)

Nursing Physical Assessment/Monitoring	• Assess the following prior to initial administration and a minimum of every hour
	  - VS & Oxygen saturation
	  - Presence of arrhythmia
	  - Respiratory depression
	  - Note: Special attention to patients with no artificial airway device or patients not receiving adequate mechanical ventilation-(e.g. CPAP mode

	• Assess VS and oxygen saturation prior to each titration or bolus
	• Assess sedation level for sedatives (obtain RASS score):
	   - Every 2 hours
	   - Prior to initiation and each titration or bolus
	   - The RASS score must be documented within 30 minutes prior to initiation/titration/ bolus
	• Assess Pain score for analgesics
	   - Every 2 hours
	   - Prior to and after initiation and with each titration or bolus
	   - Pain score must be documented within 30 minutes prior to initiation, titration or bolus

Adverse Reactions	• Allergic reaction • Bradycardia/tachycardia • Hypotension • Seizure activity • Nausea/vomiting • Constipation /diarrhea • Urinary retention • Respiratory depression