Ketamine (Intermediate Dose) Intravenous Infusion in PACU (SPH ONLY)

Site Applicability

SPH PACU Only

Practice Level

Specialized: Registered Nurses who have completed Critical Care education providing care in PACU

Need to Know

1. Ketamine is a diverse anesthetic agent that has analgesic, dissociative, sedative and amnestic properties.
2. Ketamine is an NMDA receptor antagonist and the NMDA receptor plays an active role in the development of central hyperactive pain states such as hyperalgesia and allodynia.
3. Ketamine infusion can be given via peripheral IV or central IV lines
4. Intermediate dose IV ketamine only to be used in an environment where there is the following:
   - One to one or one to two monitoring by PACU/Critical Care RN staff
   - Health care providers involved in the patients' care are skilled in airway management
5. Ketamine infusions should NOT be administered to persons with hypersensitivity to ketamine or any component of the formulation, untreated/uncontrolled hypertension, glaucoma, previous CVA, severe cardiac decompensation.
6. Patients are not allowed to drive for 24 hours after IV ketamine infusion. If patient does not have a person to drive, notify the APS/Pain Anesthesiologist prior to the initiation of the ketamine infusion.
7. The pre-printed order will be filled out by the APS/Pain anesthesiologist prior to treatment. Pharmacy will provide the standard ketamine solution.

   The ketamine infusion is initiated using an Alaris®PC CareFusion Edition Infusion Pump with Guardrails **set to critical care profile.** The infusion is ordered as a total dose with a starting infusion rate to be titrated by the RN until pain control is adequate or maximum range dose is met. The maximum infusion rate for **ketamine is 100 mg/hr**.

   Important safety: note the total volume to be infused will be determined by the total dose. **Maximum total dose is 500 mg to run no faster than 100 mg/hr**
8. Potential side effects to watch for with an IV ketamine (intermediate dose) infusion include:
   - Tachycardia
   - Hypertension
   - Salivation

- Nausea & vomiting
- Dysphoria (disquiet or restlessness)
- Excitement, agitation or restlessness
- Irrational behaviour
- Confusion
- Hallucinations
- Amnesia

9. The patient may be in a disassociated state for part of the treatment. The co-administration of benzodiazepines and/or anti-nausea medications may help minimize anticipated side-effects of ketamine. Benzodiazepines such as midazolam can cause increased sedation, respiratory depression, apnea, hypotension (low BP), and other CNS depression effects. Due to this, protective airway reflexes may also be impaired and need to be monitored closely. Airway adjuncts and other resuscitative equipment must be available.
10. There are no known antagonists to ketamine.

Equipment and Supplies

1. I.V. Alaris® PC CareFusion Edition Infusion Pump with Guardrails set to the critical care profile and I.V. tubing(s).
2. Premixed Ketamine solution prepared by pharmacy
    a. SAFETY NOTE: The total dose will determine total volume to be infused
3. Bedside Monitor: Cardiac monitor or telemetry unit, ECG electrodes, BP cuff, SpO_2 monitor

Protocol

Assessment

Initial

1. Find the Preop Preprocedure Checklist in the AdHoc forms and complete the entire form.
2. Complete pain assessment, Pulse (P), blood pressure (BP), respiratory rate (RR), Pasero Opioid Sedation Scale (POSS)/Richmond Agitation Sedation Scale (RASS) [Appendix A], oxygen saturation (SPO_2), attach cardiac monitor and print initial rhythm strip
3. Review Allergies
4. Review Acute Respiratory Infection Screening (as applicable)
5. Ask patient if an ECG was performed in the last year. ECG can be found via CareConnect, Results review or Museview, or Anesthesia (APS) may have recent ECG. 12 lead ECG should be performed in PACU if no recent ECG available. Inform provider that an order is required.

Ongoing

1. Continuous cardiac monitoring

2. BP, P, RR, POSS or RASS, SPO_2 and potential side effects Q15MIN for duration of infusion and until 30 minutes post infusion and PRN
3. Pain assessment at completion of infusion.

Interventions

1. An **independent double check** (IDC) is required with **initial programming** of the pump **AND** with any **changes to the pump programming.** 2 RN's (or RN and anesthesiologist) then co-sign on the MAR and in the Pain Modalities section in PowerChart.

   Note: Total volume to be infused (VTBI) is related to the total dose. It is often NOT the volume provided. **VTBI needs an IDC.**

   - Independent Double Check (IDC) is a process where two health care clinicians work independently to verify the medication and pump settings. The second health clinician performs another check of the medication without assistance or prior knowledge of the conclusions and steps followed by the first clinician. Results are compared and any discrepancies addressed before any action is taken with the medication.

2. IV Ketamine to be infused intravenously using an Alaris®PC CareFusion Edition Infusion Pump with Guardrails set to critical care profile. The ketamine infusion is maintained by PACU/ Critical Care nurse and may be adjusted/titrated based on patient's experience of side effects. Total volume to be infused will be related to the total dose ordered by the APS/Pain Anesthesiologist.

   Safety Note: When the programmed VTBI is infused (dose completed) the Alaris pump will convert to TKVO (to keep vein open) rate of 5 mL/h. The infusion needs to be stopped immediately once dose completed

3. Stop the infusion and notify the APS/Pain anesthesiologist if:

   POSS 3 or greater and respiratory rate less than 6/min **OR** RASS **+**3 or **-** 4

   - If dysphoric symptoms persist
   - Patient's experience of the listed potential side effects becomes distressing to the patient.
   - New onset tachycardia or increase in BP by 20%

4. Nurse in a quiet, calm space (if possible), and minimize verbal and tactile stimulation of the patient. Close the curtains if possible and encourage use of sleep masks/towel to cover eyes, ear plugs, or headphones to listen to music.
5. High dose Ketamine infusions have a hard stop time and specific duration. This means, once this time/duration is reached, the infusion must be stopped regardless of how much medication has been infused. This can be found in the order details:

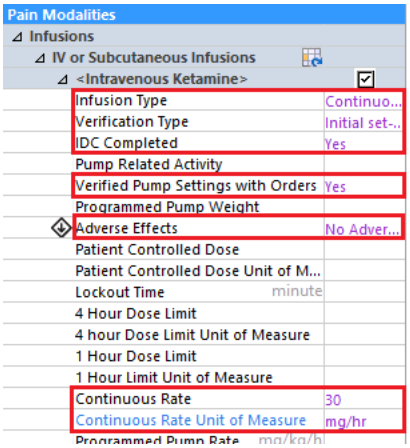
ketamine additive 250 mg + dextrose 5% premix 250 mL

Details | Additional Info | History | Comments | Validation | Results | Ingredients | Pharmacy

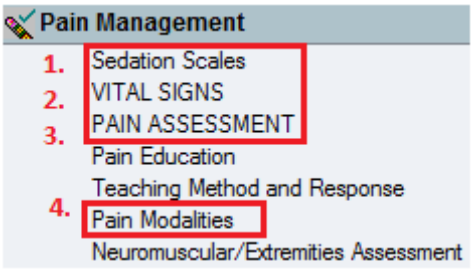
Ingredients	
ketamine additive	250 mg, 250 mL, Every Bag
Details	
Volume Dose	250
Volume Dose Unit	mL
Freetext Rate	titrate
Route of Administration	IV
Starting Rate	30 mg/h
Minimum Rate	0 mg/h
Maximum Rate	80 mg/h
Titrate Instructions	Titrate between Minimum and Maximum rate in 10 to 20
Duration	6
Duration Unit	hour
First Dose Priority	Routine
Start Date/Time	07-Jul-2020 08:01 PDT
Stop Date/Time	07-Sep-2020 13:59 PDT
Bag Volume	250

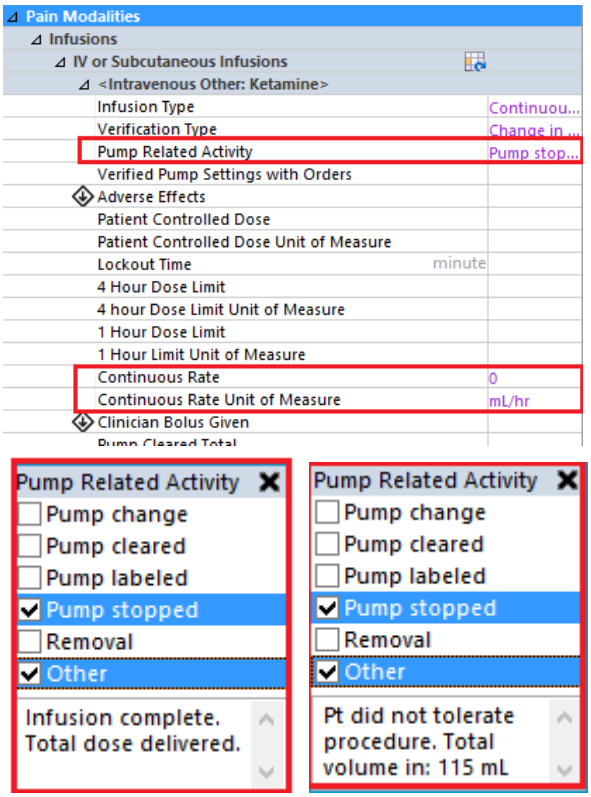
Documentation

1. Document in the Pain Modalities section in PowerChart. Record any time the infusion is interrupted or dose adjusted and reasoning.



2. Document pain assessment before and after the treatment.
3. Record the initial assessment: POSS/RASS, BP, HR, RR & SpO_2, printed cardiac rhythm strip
4. Document POSS/RASS, BP, HR, RR and SpO_2 and the every 15 minutes until 30 minutes post treatment completed.
5. Also document in pain modalities every 15 minutes to ensure “Adverse effects” are captured. If no dysphoric symptoms/adverse effects present, this can be noted as “No Adverse Effects”.

6. 

7. Mount an initial ECG rhythm strip ECG Record and analyze strip and ST segment prior to beginning ketamine infusion.
8. On Medication Administration Record (MAR) and in the Pain Modalities section, confirm the following:
    - The concentration of ketamine
    - Who initiated the infusion and the time the infusion is initiated. When the nurse initiates the infusion, ensure the time the infusion is started is accurately documented on the MAR and in the Pain Modalities section
    - An IDC must be completed and documented on the MAR and in the Pain Modalities section by ensuring that a witness inputs their username and password to confirm.
    - Document clearly in the Pain Modalities section the time the infusion was stopped and include a comment regarding the treatment:
    - 

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Patient and Family Education

1. Review the potential side effects of ketamine.
2. Reinforce that patient must not drive for 24 hours after treatment.

Related Documents

1. B-00-13-10047 - Ketamine (Low Dose): Continuous Intravenous Infusion
2. BD-00-07-40034 – Independent Double Check and Double Check of Medication
3. Parenteral Drug Therapy Manual Monographs - Ketamine

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Persons/Groups Consulted

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Nurse Educator PACU

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Anesthesiology Pain Specialists

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Effective Date:	30-MAY-2011
Posted Date:	31-MAR-2022
Last Revised:	31-MAR-2022
Last Reviewed:	31-MAR-2022
Approved By:	PHC
	Professional Practice Standards Committee
Owners:	PHC
	PACU/Pain Service

Appendix A – Sedation Scales

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 & calm	
- 1	Drowsy	Not fully alert, but has sustained awakening to voice (eye opening and contact greater or equal to 10 seconds
- 2	Light sedation	Briefly awakens to voice (eye opening & 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

POSS PASERO OPIOID INDUCED SEDATION SCALE	
S	Sleep, easy to rouse
1	Awake and alert
2	Slightly drowsy, easily roused
3	Frequently drowsy, rousable, drifts off to sleep during conversation
4	Somnolent, minimal or no response to verbal and physical stimulation (use trapezius muscle squeeze for physical stimulation - do not use sternal rub)