



Sub-dissociative Ketamine for Adult Patient Analgesia in the Emergency Department

Purpose:

Pain management is an important issue in the emergency department (ED). The ability to provide safe and adequate dosages of pain medications in a timely manner is a mainstay of patient care in the ED. Ketamine is a non-competitive N-methyl-D-aspartate (NMDA) and glutamate receptor antagonist that provides analgesia and anti-hyperalgesia, it also decreases central sensitization, "wind-up" phenomenon, and pain memory, making it an ideal selection for pain control in the emergent setting. Ketamine, at sub-dissociative doses (0.1-0.4 mg/kg), provides significant analgesia, results in no serious adverse effects and maintains preservation of protective airway reflexes, spontaneous respiration, and cardiopulmonary stability. Additionally, in sub-dissociative doses, it has been shown to provide some opioid-sparing effects when use in conjunction with opioids and to be effective as a single agent in providing analgesia for acute, chronic and opioid-tolerant pain conditions in a variety of settings. It's use in the ED, however, is associated with significant rates of minor but bothersome side effects (dizziness, nausea, feeling of unreality) that are transient and are often not requiring rescue medications.

INDICATIONS for use:

- Acute traumatic pain (e.g., fractures, dislocations, lacerations, burns)
- Acute non-traumatic pain (e.g., abdominal, flank, musculoskeletal pain, back pain, headache)
- Chronic pain conditions
 - Visceral pain (e.g., chronic pancreatitis, gastroparesis)
 - Neuropathic pain (e.g., CRPS, PHN, DN, sciatica, fibromyalgia)
- Analgesic-resistant HA
- Sickle cell pain crisis

Competencies:

- According to the Texas Board of Nursing guidelines, LVNs do not possess the skill set to administer IV forms of anesthetic medication
- RNs will review this protocol during the first 90 days (probationary period) of employment or orientation period in the Emergency Department.

The following are **CONTRAINDICATIONS** for use:

- Pregnancy:
Relative contraindication, (listed as class C drug, as are all opioids), recommend not to use in the first trimester but can consider to use in second and third trimester after having discussion of risk/benefits with patient.
- Acute Psychosis:
Recommend not using for pain management in the acute psychotic patient, may consider as use for sedation but this is out of the scope of this guideline.
- Acute Alcohol Intoxication:
Not intended for use for treatment of acute withdrawal or acute intoxication symptoms at this dosage and therefore is out of the scope of this guideline.
- Altered mental status:
Do not recommend use for undifferentiated AMS for pain management, if considering for sedation would not be at this dosing and so is out of the scope of this guideline.
- Cardiovascular disease:
Should not be used for acute pain management for ACS or Acute decompensated heart failure patients or those at risk for either of those issues during their hospital course.

Dosing and Administration (as a single agent OR as adjunct to opioids):

- **IV bolus:**
 - **0.3 mg/kg** of Ketamine diluted in 10ml NS and administered as IV slow push over 5 minutes, maximum dose 45 mg (150 kg person)
- **IN dosing:**
 - **0.75-1 mg/kg** (ideally 0.3-0.5 ml into each nostril, no more than 1mL per nare)
- **SQ dosing:**
 - **same as IV dosing**

Monitoring:

All patients should be monitored using continuous pulse oximetry and telemetry.

Prior to administration, baseline VS will be obtained and documented.

During and after administration, frequent VS monitoring and documentation will be conducted every 5 minutes X 3, then every 10 minutes X 3.

Side effects:

- No serious side effects are anticipated.
- Mild but unpleasant side effects would include: nausea, dizziness, feeling disoriented or feeling of unreality, it is recommended to advise the patient about the possibility of this reaction ahead of time.
 - Consider use of prophylactic dosing of Zofran, especially if administered in conjunction with opioids.
- Rarely emergence reaction can be seen, please see below.

Rescue medications:

- Emergence reaction (extremely rare):
 - 0.5—1 mg of midazolam should be administered to patient.
- If pain persists despite adequate weight based dosing
 - Rescue opioid therapy should be used



References:

1. Galinski MM, Dolveck FM, Combes XM, et al. Management of severe acute pain in emergency settings: ketamine reduces morphine consumption. *Am J Emerg Med.* 2007;25:385-390
2. Lester LM, Braude DM, Niles CM, et al. Low-dose ketamine for analgesia in the ED: a retrospective case series. *Am J Emerg Med.* 2010;28:820-827.
3. Richards JM, Rockford RM. Low-dose ketamine analgesia: patient and physician experience in the ED. *Am J Emerg Med.* 2013;31:390-394.
4. Beaudoin F, Lin C, Guan W, et al. Low-dose ketamine improves pain relief in patients receiving intravenous opioids for acute pain in the emergency department: results of a randomized, double-blind, clinical trial. *Soc Acad Emerg Med.* 2014;21:1193-1202.
5. Miller J, Schauer S, Ganem V, et al. Low-dose ketamine vs morphine for acute pain in the ED: a randomized controlled trial. *Am J Emerg Med.* 2015; <http://dx.doi.org/10.1016/j.ajem.2014.12.058>.
6. Ahern T, Herring A, Stone M, et al. Effective analgesia with low-dose ketamine and reduced dose hydromorphone in ED patients with severe pain. *Am J Emerg Med.* 2013; 31:847-851.
7. Goltser A, Soleyman-Zomalan E, Kresch F, Motov S. Short (low-dose) ketamine infusion for managing acute pain in the ED: case-report series. *Am J Emerg Med.* 2015 Apr;33(4):601.e5-7.
8. Ahern TL, Herring AA, Miller S, Frazee BW. Low-Dose Ketamine Infusion for Emergency Department Patients with Severe Pain. *Pain Med.* 2015 Jul;16(7):1402-9.
9. Motov S, Rockoff B, Cohen V, Pushkar I, Likourezos A, et al. Intravenous Subdissociative-Dose Ketamine Versus Morphine for Analgesia in the Emergency Department: A Randomized Controlled Trial. *Ann Emerg Med.* 2015 Sep;66(3):222-229