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RE: Best Practice Recommendations for Ketamine Utilization by EMS Personnel and EMS Systems

To all Tennessee EMS Leadership and EMS Medical Directors,

The following are recommendations from members of the Tennessee Chapter of the National Association of EMS Physicians (NAEMSP). They are meant as recommendations of best practices in the clinical application of ketamine for pain control and sedation of patients in the prehospital arena.

This document will be kept as up to date as possible, however, as science and national standards change, it is always recommended to reevaluate and cross-reference these recommendations on a routine basis. These recommendations can only be implemented after discussion with and approval of the EMS Medical Director for the representative agency.

[Click HERE for online access to the maintained document.](#)

Thank you for all your time and effort in making our communities safer and healthier, and please feel free to contact us with any questions, suggestions or concerns on this or any other topic regarding EMS Medicine in the State of Tennessee.

Sincerely,

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Joint Recommendations for EMS Best Practices: *Prehospital Ketamine Utilization*



Overview:

- Ketamine is well studied and commonly used in the prehospital setting. Ketamine functions as a dissociative anesthetic by blocking the NMDA (excitatory) receptors and binding to the sigma-opioid receptors in the brain.
- Ketamine has a high safety profile including minimal effect on the patient's respiratory system which makes it an ideal primary or secondary agent for use in patients requiring pain control or sedation.
- Caution should be used when using ketamine with other sedating medications (i.e. opioids and benzodiazepines), as concomitant use can potentiate the risks of respiratory depression. We recommend discussion with medical control prior to the combined use of sedating medications whenever possible.
- Capnography (End-tidal CO₂ monitoring) should always be used to monitor ventilatory status (if available) when sedating medications such as ketamine are given--as long as its use does not cause a danger to the patient or EMS provider.
- EMS personnel should be adequately trained on the proper indications, contraindications, and the proper administration of ketamine. They should also be educated on the expected side effects (i.e. dissociative state), the possible rare adverse effects (i.e. apnea, laryngospasm, etc.), and how to intervene if necessary.
- Ketamine should generally not be used off-line as a sedative for painful procedures (i.e. splinting or extrication). If alternative pain medications are not working or available, these cases should be discussed with online medical control prior to administration.

Ketamine for Sedation - Acute Agitation/Excited Delirium:

- The safety of EMS providers is of utmost importance and should always be the first priority when developing protocols or approaching a scene/patient.
- Law enforcement (or other personnel properly trained in deescalation/restraint techniques/devices) should always accompany EMS providers on any patient who poses a possible threat to the EMS providers' safety.
- Patients with excited delirium pose a threat not only to the EMS providers, but also themselves. States of excited delirium can cause patients to develop cardiac dysrhythmias, hyperthermia, and other life-threatening conditions. Physical stimulation and use of restraints should be minimized with these patients. Early, aggressive use of chemical restraint followed by close monitoring should be instituted as soon as safely possible.
- Sedation in these patients has historically been avoided due to the possible respiratory depression of Versed (midazolam) and similar benzodiazepines. This side effect is essentially avoided with the proper use of ketamine.
- **Chemical restraint (i.e. sedation) should only be used when the patient can be adequately monitored by a paramedic, critical care nurse, or EMS physician..**
- Route
 - Medications should generally be administered in a manner providing the quickest onset for the patient and with the least risk of injury (e.g. needle stick) to the EMS Provider or other bystanders.
 - Patient contact should be minimized with patients demonstrating evidence of excited delirium. Intravenous or intraosseous access should be deferred (if possible) until the patient has been calmed.
 - Intramuscular (IM) administration is strongly recommended over attempting to place an IV/IO when intranasal routes are not available.
 - In general, intranasal (IN) administration of sedating medications is safe and effective, and when safely available should be considered.

- Dosing
 - The likelihood of significant side effects, such as laryngospasm or apnea, is rare when ketamine is administered properly. These generally only occur when very large doses are given rapidly (i.e. IV push).
 - When given intranasal (IN) or intramuscular (IM), ketamine dosing should be 2-5 mg/kg to ensure adequate sedation and decrease the likelihood of additional doses being required.
 - If given IV, ketamine should be given slowly if possible. Dosing should generally be 1-2 mg/kg.
 - Redosing may be required. Online medical control should be contacted to direct treatment on any patient requiring more than 2 doses of ketamine, or if an additional sedative agent is considered.

Ketamine for Pain Management:

- Ketamine should never be the primary medication used in pain management, other non-sedating medications should be used preferentially.
- *Route:* IV/IO route is preferred in adults. IN route is preferred in pediatrics. IM route is generally discouraged for use as an analgesic.
- *Dose:* When used for pain management a dose of 0.25-0.5 mg/kg or similar should be employed to minimize dissociative effects.
- When given for pain, ketamine should be given slowly over 5-10 minutes. This is best accomplished by placing the dose in a small bag of fluid (e.g. 50-100 mL) and infusing it slowly.

Ketamine for Drug-Assisted Intubation(DAI)/Rapid Sequence Induction (RSI)

- Ketamine is an ideal induction (sedation) agent for DAI/RSI due to minimal effects on respiratory drive, quick onset, and analgesic properties. Ketamine is more hemodynamically stable than other induction agents (i.e. etomidate, versed) and tends to cause an increase in heart rate and blood pressure, making it an ideal choice for the hypotensive prehospital patient. Increases in heart rate, blood pressure and intracranial pressure are transient and have not been shown to be clinically significant.
- Dosing should generally be similar to sedation use (2 mg/kg IV/IO).

Ketamine use in Other Circumstances

- Ketamine use in other conditions in the prehospital arena have been less well studied and less utilized, but may be considered on an individual agency/situation basis, including in:
 - Acute asthma exacerbations due to its bronchodilatory effects.
 - Refractory seizures due to its inhibition of excitatory neurotransmission.
- **Pediatrics**
 - While ketamine is likely very safe in children, its usage for pain control and chemical restraint should *generally be reserved for adults*. If used in the pediatric population, we recommend discussion with online medical control to ensure appropriate usage and dosing.
 - The use of ketamine for induction in DAI/RSI is recommended, as with the adult population.

EMS Clinical Guidelines & Other Resource Documents for the Novel Coronavirus (COVID-19)



Knoxville:

[Drug-Assisted Intubation/RSI](#)

[Pain/Fever Management](#)

[Sedation/Chemical Restraint](#) (including Excited Delirium)

[Physical Restraint](#)

Other Resources

Joint Position Statement from the American College of Surgeons Committee on Trauma (ACS-COT), the American College of Emergency Physicians (ACEP), the National Association of State EMS Officials (NAEMSO), the National Association of EMS Physicians (NAEMSP) and the National Association of EMTs (NAEMT) :

<https://www.tandfonline.com/doi/full/10.1080/10903127.2020.1801920>

Morgan, M.M., et al. (2020) Ketamine Use in Prehospital and Hospital Treatment of the Acute Trauma Patient: A Joint Position Statement, Prehospital Emergency Care

American College of Emergency Physicians (ACEP): Subdissociative Dose Ketamine for Analgesia Position Statement:

<https://www.acep.org/globalassets/new-pdfs/policy-statements/sub-dissociative-dose-ketamine-for-analgesia.pdf>

ACEP Subdissociative Dose Ketamine for Analgesia Policy Resource and Education Paper (PREP):

<https://www.acep.org/globalassets/new-pdfs/preps/sub-dissociative-dose-ketamine-for-analgesia---prep.pdf>

National Association of EMS Physicians (NAEMSP) Position Statement: Patient Restraint in EMS:

<https://naemsp.org/NAEMSP/media/NAEMSP-Documents/Restraint-position-statement-Approved-Version-for-PEC.pdf>

NAEMSP Statement on Ketamine Use:

<https://naemsp.org/about-us/press-releases/ketamine-use-in-prehospital-settings-should-remain/>

ACEP/ASA Joint Statement on Ketamine Use:

<https://www.emergencyphysicians.org/press-releases/2020/8-26-20-american-college-of-emergency-physicians-and-american-society-of-anesthesiologists-issue-joint-statement-on-ketamine-use>

Note: the state supports appropriate medical use of ketamine by EMS, but opposes any sedation to “chemically incapacitate someone solely for a law enforcement purpose”.