

Emergency Medical Practice Advisory Council (EMPAC)—
Ketamine Waiver Guidance

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EMPAC Ketamine Waiver Guidance

Section 1: Ketamine (Ketalar) for Excited Delirium

In the spring of 2013, the Emergency Medical Practice Advisory Council (EMPAC) granted the first set of waivers allowing the use of ketamine to treat patients with a presumptive diagnosis of excited delirium in the field. The intent was to protect both patients and providers from the harm that can come from patients experiencing extreme agitation. Since the initial waivers were granted, a significant number of medical directors across the state have applied for ketamine waivers and ketamine is now one of the most frequently applied for ALS waivers in the state. Because of the large number of waiver applications for ketamine, the EMPAC determined that it was necessary to draft a guidance document, giving clear direction to both medical directors and the council, in order to ensure standardization and consistency in the process. This document is intended solely as guidance for medical directors as they develop protocols for ketamine use in the management of excited delirium that are specific to their agencies and should not be considered the standard of care for management of excited delirium.

The use of ketamine for extreme agitation is an emerging treatment indication; therefore it does not have a large body of evidence-based support in the literature. Across the country, many physicians question the existence of an excited delirium syndrome.

Management of agitation in the field is nothing new. The goal of agitation management is directed at providing the greatest amount of safety for patients and providers while using the most humane and respectful treatments. Agitation that is not thought to be due to an underlying medical or psychological etiology should be managed by police or other public safety providers. EMS providers should not engage in restraining people for law enforcement purposes.

The continuum of agitation

Agitation, like many conditions, has a continuum of severity. Mild agitation should be managed with verbal tools. Moderate to severe agitation should be managed with traditional sedatives including benzodiazepines and anti-psychotics. Extreme agitation, which is rare, should be viewed as a medical emergency requiring prompt aggressive sedation.

Excited Delirium Definition

Excited delirium is a medical emergency in which a person develops extreme agitation, aggressiveness, overheating, and exceptional strength that cannot be managed by routine physical or medical techniques. Excited delirium patients lose their mental capacity to stop resisting and are truly out of control. This type of extreme exertion may result in sudden death.

Treatment of Agitation

Treatment of agitation, even severe agitation, should be with benzodiazepines and/or antipsychotics. Ketamine does not treat the underlying cause of excited delirium but addresses the behaviors exhibited by excited delirium. When necessary, ketamine may be used to treat behavior and rapidly facilitate treatment and transport to the hospital.

Indication for Treatment with Ketamine

Prehospital providers should consider treatment for excited delirium with ketamine when a patient:

- Exhibits severe agitation placing themselves or providers in imminent danger
- Appears to lack the mental capacity to disengage from the struggle
- Has no option other than being restrained

The Denver Health Experience

Although multiple agencies are now using ketamine, Denver represents the majority of doses given for excited delirium. The EMPAC thinks it is wise for interested medical directors to be aware of the preliminary Denver data from July 1, 2013 to June 30, 2015 (24 months):

General

- Denver Paramedics ran 171,188 calls
- 2906 patients received Haldol or versed for agitation (2% of EMS calls)
- 102 patients received ketamine for extreme agitation (3.5% of agitated patients)
- 4/102 patients required rescue medications (Versed)
- The mean initial heart rate for ketamine patients was 141 (range 92-200)
- The mean initial SBP for ketamine patients was 171 (range 110-260)

Intubation

- One ketamine patient was intubated in the field (indication: penetrating neck trauma)
- Of patients receiving ketamine in the field:
 - 35/102 (35%) were intubated in the ED after arrival
 - In the first 6 months 13/26 (50%) were intubated in the ED
 - In the last 6 months 5/27 (20%) were intubated in the ED
- It appears that multiple sedatives prior to ketamine are associated with higher intubation rates:
 - 13 of the 35 patients intubated in the ED received Haldol and/or Versed prior to ketamine administration
 - 14 of the 67 patients not intubated in the ED received Haldol and or Versed prior to ketamine administration

Hospital length of stay

One of 35 of the intubated patients was extubated in the ED. The remaining 34 were admitted to the ICU. All but 8 had an ICU stay of 24 hours or less. The 8 patients with longer stays had conditions not related to the ketamine dosing.

Complications

- 7/102 (7%) experienced hyper salivation
- 3/103 (3%) experienced laryngospasm

Protocols for Agitation

All EMS agencies should have a protocol that clearly defines the continuum of agitation and how to treat patients falling anywhere on that continuum. Sample guidelines for the management of agitated patients in the field and for use of ketamine for suspected excited delirium are included at the end of this section.

Medical Oversight

Ketamine is a drug that has been shown to be effective for the treatment of excited delirium. However, it is also associated with a significant potential for complications and may lead to the need for intubation and admission to the Intensive Care Unit. Because of its potential safety concerns, ketamine is not within scope of practice as defined by Chapter Two Rules (**6 CCR 1015-3 CHAPTER TWO - RULES PERTAINING TO EMS PRACTICE AND MEDICAL DIRECTOR OVERSIGHT**). It is only allowed by special waivers, given to EMS agency medical directors, when recommended by the EMPAC and approved by the Colorado Department of Public Health and Environment (CDPHE).

Approval of a ketamine waiver for excited delirium typically requires significant medical oversight by the EMS agency medical director receiving the waiver, over the EMS providers to whom the medical director extends this practice. Included in this medical oversight is ongoing review of all cases by the medical director and reporting of data to the EMPAC. The EMPAC recommends that the medical director record and report the following data on patients treated with ketamine in the field for excited delirium:

- Demographics – age, sex
- Indication for Use
- Vital signs – initial SBP, Heart rate, RR, (EtCO₂, SaO₂, and cardiac rhythm; as soon as is reasonable to obtain)
- All sedative medications administered; dose and timing relative to administration of ketamine
- ETOH & drug ingestions psych comorbidities (if known)
- Documentation of airway / respiratory status and management
- Prehospital intubation; Reason for Intubation
- Complications including hyper-salivation, laryngospasm
- Patient Disposition: D/C from ED, Admission to floor or ICU, Death
- If a death occurs, was the death related to the agitation, treatment, or other disease process
- Medical Director's documentation of review and appropriateness of use and treatment

Submission and Approval

Ketamine has multiple indications for which waivers have been previously approved including:

- A sedative for excited delirium
 - Indication of clear and present danger to patient, provider and/or public must exist prior to use
- A sedative adjunct during pain management
- An induction agent in RSI (as part of any RSI Waiver)

- Note: Although ketamine is approved as an induction agent for RSI, the use of ketamine as a continuous infusion for post-intubation sedation is not within the scope of practice for EMS providers below the Paramedic with critical care endorsement level, and therefore should be submitted as a separate waiver application

Any completed waiver application submitted to the EMPAC will be reviewed and discussed by the council. The council will then make a recommendation to the department to either approve or deny the application. Additionally, applications may be withdrawn by the applicant or tabled by the council during the course of discussions. If an application is withdrawn or tabled, the medical director will be notified why the council felt they were unable to evaluate the waiver application well enough to make a decision.

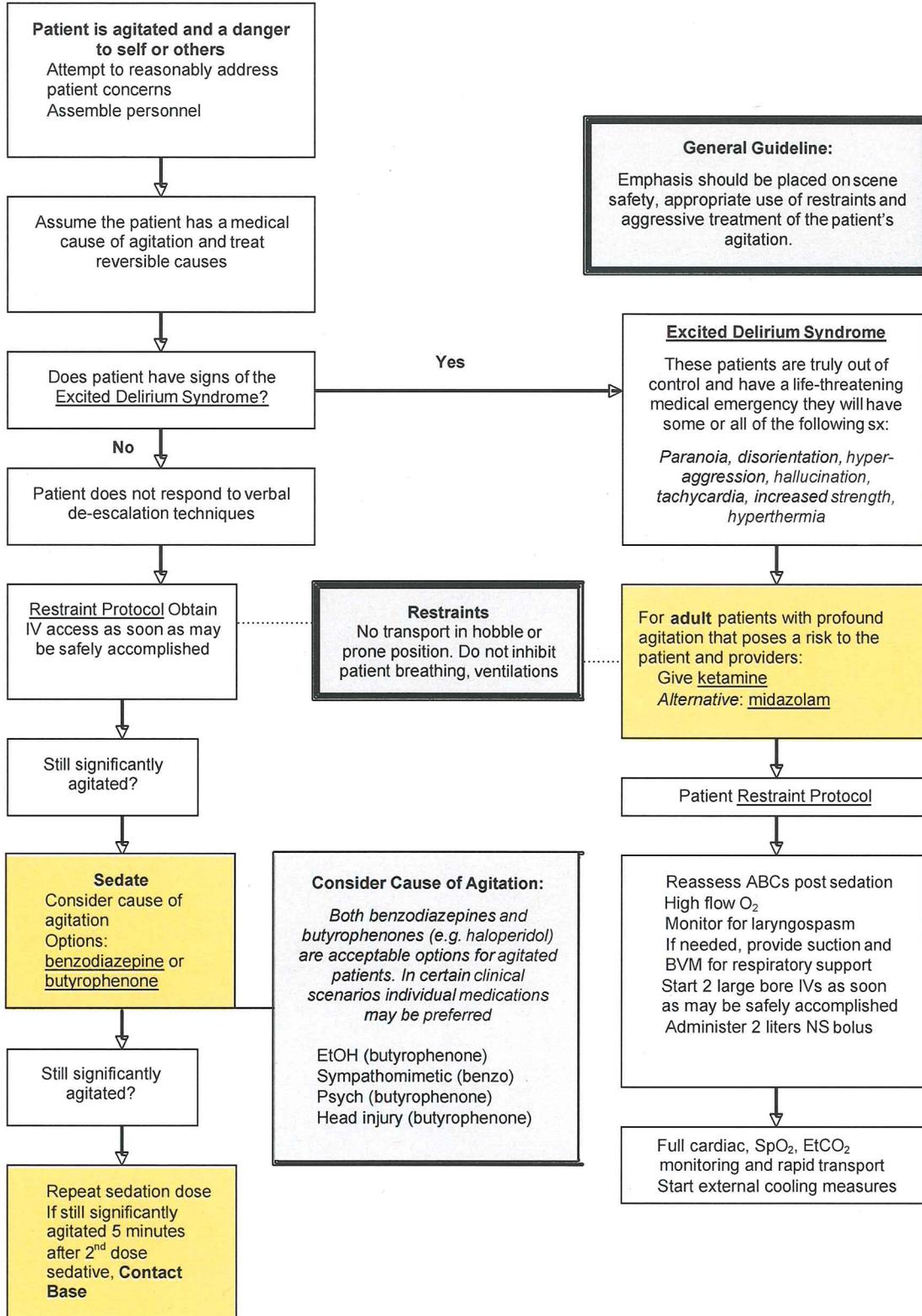
Ketamine waivers for excited delirium are generally:

- Approved for 3 years
- Require annual reporting of data to the council
- For patients 13 years of age and older
- IM dosing only
- Maximum of 5 mg/kg - single dose only

Summary

In order to provide the best possible care of EMS patients exhibiting agitation and to ensure the safety of EMS providers, the EMPAC recommends that medical directors provide their agencies with protocols that clearly define the appropriate treatment for patients who fall anywhere on the continuum of agitation and the tools necessary to accomplish those treatment guidelines. Each medical director is encouraged to equip their agency with the treatments and training most beneficial to their patients based upon where they fall on the agitation continuum and the needs and constraints of their local system. The EMPAC also recommends that ALS providers treat severe agitation appropriately, when indicated. Ketamine may be used for management of patients exhibiting such severe agitation that they are placing themselves and/or their providers in imminent danger. However, ketamine may be associated with high in-hospital intubation and ICU admission rates; therefore the use of ketamine should be approached with caution. Ketamine should not be used for patients who can be managed safely with traditional therapies.

SAMPLE AGITATED/COMBATIVE PATIENT GUIDELINE



MEDICATIONS

KETAMINE

Description

Ketamine is a non-competitive NMDA receptor antagonist and dissociative, amnestic, analgesic anesthetic agent.

Onset & Duration

Onset: 1-5 minutes after IM administration.

Duration: 10-15 minutes

Indications

Adult patient with signs of excited delirium where the safety of patient and/or providers is of substantial concern

Contraindications

Relatively contraindicated in penetrating eye trauma

Relative contraindication in patients with known cardiovascular disease. (ketamine causes tachycardia)

Side Effects

Laryngospasm: this very rare adverse reaction presents with stridor and respiratory distress. After every administration of ketamine:

- a. Prepare to provide respiratory support including bag-valve-mask ventilation and suction which are generally sufficient in rare cases of laryngospasm.
- b. Institute cardiac monitoring, pulse oximetry and continuous waveform capnography
- c. Establish IV or IO access, check blood glucose
- d. Establish and maintain physical restraint.

Emergence reaction: presents as anxiety, agitation, apparent hallucinations or nightmares as ketamine is wearing off. For severe reactions, consider benzodiazepine.

Nausea and Vomiting: always have suction available after ketamine administration. Give antiemetic as needed.

Hypersalivation: Suction usually sufficient. If profound hypersalivation causing airway difficulty, administer atropine 0.5 mg IV.

Dosage and Administration

Adults:

5 mg/kg IM

Contact base for additional doses

Pediatric:

Excited delirium is not reported in children and use of ketamine is not expected in pediatric patients

Special Considerations

Excited delirium is a medical emergency. Expedite rapid and safe transport.

Ketamine is provided for IM administration in 100 mg/mL concentration

All cases of ketamine use will be reviewed by the Medical Director.

ADDITIONAL INTERVENTIONS

- Restraints
- Benzodiazepine

EMPAC Ketamine Waiver Guidance

Section 2: Ketamine (Ketalar) for Pain Management

Ketamine is a noncompetitive N-methyl D-aspartate (NDMA) receptor antagonist that blocks the release of glutamate, an excitatory neurotransmitter, but also binds to mu and kappa opioid receptors, thereby providing anesthesia, amnesia and analgesia. It is highly lipid soluble and thereby rapidly crosses the blood-brain barrier. It has a quick onset of action (peak concentration at 1 minute after IV push) and a short duration of action (5-15 minutes). At sub-dissociative doses (0.1-0.5 mg / kg) as an adjunct to opioid analgesia, ketamine provides good analgesia while preserving airway patency, ventilation, and cardiovascular stability. Ketamine also has bronchodilatory effects.

Indications for Treatment with Ketamine

In EMS, ketamine is indicated as an adjunct to opioid therapy in pain management when standard methods of pain management are ineffective.

Medical Oversight

Ketamine is a drug that has been shown to be an effect adjunct to opioid therapy in pain management. Ketamine is currently not within scope of practice as defined by Chapter Two Rules (**6 CCR 1015-3 CHAPTER TWO – RULES PERTAINING TO EMS PRACTICE AND MEDICAL DIRECTOR OVERSIGHT**). It is only allowed by special waiver, given to EMS agency medical directors, when recommended by the Emergency Medical Practice Advisory Council (EMPAC) and approved by the Colorado Department of Public Health and Environment (CDPHE).

Approval of a Ketamine waiver for the use of Ketamine as an adjunct to opioid therapy in pain management typically requires significant medical oversight by the EMS agency medical director who receives the waiver, over the EMS providers to whom the medical director extends this practice. Included in this medical oversight is ongoing review of all cases by the medical director and reporting of data to the EMPAC. The EMPAC recommends that the medical director record and report the following data on all patients treated with ketamine for pain management:

- Demographics – age, sex
- Indication for Use
- Vital signs – initial SBP, Heart rate, RR, (continuous: EtCO₂, SaO₂, and cardiac monitoring)
- All sedative and opioid medications administered dose and timing relative to administration of ketamine
- Efficacy of Pain Management
- Any Complications

Submission and Approval

Ketamine has multiple indications for which waivers have been previously approved including:

- a sedative for excited delirium
 - Indication of clear and present danger to patient, provider and/or public must exist prior to use
- a sedative adjunct during pain management
- an induction agent in RSI (as part of any RSI Waiver)
 - Note: Although ketamine is approved as an induction agent for RSI, the use of ketamine as a continuous infusion for post-intubation sedation is not within the scope of practice for EMS providers below the Paramedic with critical care endorsement level, and therefore should be submitted as a separate waiver application

A separate waiver is required for each of the above indications.

Any completed waiver application submitted to the EMPAC will be reviewed and discussed by the council. The council will then make a recommendation to the department to either approve or deny the application. Additionally, applications may be withdrawn by the applicant or tabled by the council during the course of discussions. If an application is withdrawn or tabled, the medical director will be notified why the council felt they were unable to evaluate the waiver application well enough to make a decision.

Ketamine waivers for pain management are generally:

- Approved for three years
- Require annual reporting of safety data
- For patients of all ages
- Second line medication as an adjunct to opioid therapy
- Relative contraindication – to be used with caution for hemodynamically unstable patients
- IV dose is 0.3 mg/kg q 20 minutes; may repeat times two for a maximum of 3 total doses prior to authorization from direct (online) medical control
- IN/IM dose 0.5 mg/kg q 20 minutes; may repeat once for a maximum of two total doses prior to authorization from direct (online) medical control
- General Patient Care Requirements
 - Continuous SaO₂ monitoring
 - Continuous EtCO₂ monitoring
- General Patient Care Requirements Continued
 - Continuous EKG monitoring
 - Note: In cases where ketamine is used for pain management in the back country environment where full patient care monitoring is not possible constant patient engagement and pulse oximetry are a minimal monitoring requirements for the use of ketamine.

Summary

Ketamine is a tool that can be safely and effectively used as an adjunct to opioid therapy in pain management. However, due to its relative newness to both emergency medicine and emergency medical services, ketamine is currently not within scope of practice in Colorado and therefore currently requires a waiver for its use. It is through the tight medical oversight afforded by the waiver process, that will allow for safety and efficacy of ketamine use in the field to be appropriately evaluated.

SAMPLE ANALGESIA GUIDELINE

Indications

Pain
Intubated patient

Assessment

Assessment should include, but not be limited to pain scale – overall impression of patient's comfort should be considered

Precautions / Contraindications

Apnea or hypoventilation (iatrogenic)
Caution should be used when combining multiple medications
Patient hypersensitivities to certain medications
Renal and hepatic impairment

Procedure

Non-invasive techniques, (eg., calming, splinting and padding) may also be have some efficacy in analgesia

IV access

Consider SpO₂, ETCO₂, or frequent conversation to guard against hypoventilation

Fentanyl should be considered first-line for any patient in pain, including cardiac

Opiates in combination with benzodiazepines may be considered for treatment of pain associated with spasms in orthopedic injury

- Fentanyl and midazolam are the agents of choice due to rapid onset-of-action and short half life
- Fentanyl should always be given first due to synergistic effects of the medications
- Continuous monitoring of ETCO₂ must be used due to the increased concern for hypoventilation

Ketamine should be considered second-line in patients with long transport times; or instances where typical opiate strategy is not desired due to clinical, logistical or patient's concerns

- Consider in pediatrics if no analgesia after two doses of fentanyl

Dilaudid is a third-line medication, most often used for interfacility transfers; or patients from the field where hospital admission is likely

Patients requiring pain management often have an indication for IV access. However, in cases where IV access is logistically or clinically unavailable, consider aerosolized administration.

SAMPLE KETAMINE (KETALAR)—ANALGESIA

Class

Dissociative anesthetic

Action

Provides significant analgesia, anesthesia and amnesia with minimal effect on respiratory drive by interacting with the NMDA receptors at the GABA-receptor complex resulting in neuroinhibition and anesthesia

Short onset-of-action and short half-life

Indications

Analgesia when longer acting effects of are desired

Analgesia in situations where opiates are not desired

- o Scene logistics

- o Patient concerns with opiate use (eg., allergy or addiction concerns)

May NOT be used to facilitate a clinical procedure

Precautions

May increase heart rate and blood pressure

May increase intracranial pressure

May increase intraocular pressure

May provoke salivation / emesis, typically controlled with suctioning

Considerations

Second-line analgesia, typically following fentanyl

- o Should be considered in pediatrics if satisfactory analgesia isn't reached after two doses of fentanyl

The patient should be monitored with cardiac monitor, pulse oximetry and capnography as practical

Analgesia dosing

0.3 mg / kg IV repeat PRN (likely every 20 minutes)

Dose for a typical **adult female** is **18 mg – 24 mg**

Dose for a typical **adult male** is **24 mg – 40 mg**

0.5 mg / kg IN repeat PRN (likely every 20 minutes)

Dose for a typical **adult female** is **30 mg – 40 mg**

Dose for a typical **adult male** is **40 mg – 50 mg**

Must make base contact after three doses

Interfacility analgesia infusion dosing:

0.025 – 1.0 mg/kg/hr is typical although 5.0 mg/kg/hr is possible, consult written orders

Please note: These guidelines are for use by EMS agency medical directors in preparation for submission of ketamine waivers and by the EMPAC during review of submitted ketamine waivers. These guidelines may not be used as the sole basis for approval or denial of a waiver request.