Manitou Springs Fire Department, Ute Pass Regional Ambulance District, Teller County Sheriff ERT, and Southwest Teller County EMS Medical Protocol

Ketamine Administration

PAIN CONTROL (may be administered with other narcotic pain medications):

1. Intravenous: 0.3 mg/kg IV q 20 minutes prn pain, max of **THREE** doses.
2. Intraosseous: 0.3 mg/kg IV q 20 minutes prn pain (on pressure bag), may of **THREE** doses.
3. Intramuscular: 0.5 mg/kg IM q 20 minutes prn pain, max of **TWO** doses.
4. Intranasal: 0.5 mg/kg intranasal atomizer q 20 minutes prn pain, max of **TWO** doses.
5. **ADDITIONAL DOSES AFTER THE MAXIMUMS LISTED ABOVE MUST BE APPROVED BY MEDICAL CONTROL.**

SEDATION FOR EXCITED DELIRIUM (13 years old and older ONLY):

1. Intramuscular: 5mg/kg IM. May repeat every 20 minutes as needed for sedation **WITH MEDICAL CONTROL PERMISSION**.
2. Intravenous: 1mg/kg IV. May repeat every 20 minutes as needed for sedation **WITH MEDICAL CONTROL PERMISSION**.

RAPID SEQUENCE INTUBATION (for paramedics RSI validation only)

1. Intravenous 2mg/kg IV during RSI induction.
2. Administer paralytic and other sedative after successful intubation.

Indications

1. Analgesia in circumstances of severe pain: which is poorly controlled with opioids, or in which the use of opioids is either contraindicated or would likely result in side effects (e.g., respiratory depression, hypotension etc.) that increase risk to the patient.
2. Chemical restraint of patients with excited delirium when other methods are unsuccessful or less advantageous.
3. Rapid sequence induction for the purpose of intubation; **only by paramedics approved by the Medical Director to perform RSI.**

Precautions

1. Apnea or hypoventilation
2. Combining multiple medications that can enhance effects of the medications
3. Hypersensitivities to medications
4. Renal and hepatic impairment
5. Cardiac history and risk factors (ketamine increases blood pressure and heart rate transiently)
6. Severe traumatic brain injuries (ketamine is controversial due to potential for increased intracranial pressures)
7. Ketamine will NEVER be used for procedural sedation in the prehospital setting!

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Procedure:

1. Preparation
   - 1.1. Attach pulse oximetry, end-tidal CO2, and ECG monitoring (recommended for pain control, **REQUIRED for RSI**)
   - 1.2. Perform standard pre-intubation steps including high flow oxygen prior to giving ketamine for RSI
2. Consider first line pain medications including narcotic pain medicines when used for pain control.
   - 2.1. Ketamine may be considered as an adjunct to opiate (narcotic) pain medicine when treating **pain**, or may be considered individually for pain management
3. Dosing: see chart above
4. Time to effect: 45-60 seconds
5. Duration of action: 10-20 minutes
6. After administration of Ketamine, patient must have maximal monitoring available including SpO2, EtCO2, cardiac monitoring, and frequent vital sign monitoring as soon as available if not already in place. In addition, patient's receiving Ketamine for pain control or excited delirium must have continuous active engagement by the paramedic to continually assess responsiveness, airway, breathing, and circulation.
7. Patients will have nystagmus with ketamine use, as well as may occasionally have twitching effects to the muscles as well as rigid muscles. This should not be confused with seizure activity.

Adverse Reactions:

1. Some patients may develop hypersalivation and pharyngeal irritation that may lead to laryngospasm on rare occasion.
   - 1.1. Administer Atropine 0.5mg IV for antisialogogue effect (or appropriate weight based dosing).
2. Some patients may experience disturbing, vivid dreams as they emerge from the ketamine effects called emergence delirium.
   - 2.1. Treatment of emergence delirium is with a benzodiazapine per protocol dosing.

October 1, 2014

Jeremy DeWall, MD, NRP
Medical Director

Date