



County of El Dorado

Emergency Medical Services Agency

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PARAMEDIC ALERT

No. 2023-02

June 19th, 2023

TO: EMS Personnel
FROM: El Dorado County EMS Agency
SUBJECT: Updates to Protocols and Procedures
PURPOSE: Stakeholder information

Background:

1. The El Dorado County EMS Agency (EDCEMSA) is the Local Emergency Medical Services Authority (LEMSA) for the County of El Dorado.
2. Pursuant to CCR Title 22 § 100148, EDCEMSA shall establish policies and procedures governing the delivery of EMS services within its jurisdiction, including field procedures, policies and protocols.

ALERT:

The following documents have been published on the public website. See below for details on immediate implementation of updated formulary and protocols, as well as the effective dates for new policies forthcoming.

Protocols

Annexes 1-3

- Pain Management (*effective 08/01/23*)
- Hemorrhage Control (*effective 08/01/23*)
- Seizures (updated)

Formulary

Annexes 4-7

- Acetaminophen (updated)
- Ketamine (updated)
- Midazolam (updated)
- Tranexamic Acid (no update)

SUMMARY:

- The 'Pain Management' and Hemorrhage Control' protocols are new policies that have been in the works for some time. The final versions are a result of close collaboration with base hospitals and local provider agencies. There are no new skills or devices associated with these protocols, but EDCEMSA is providing training for the medications and related procedures in anticipation of the 8/1/23 effective date.
- The update to the 'Seizures' protocol derived from a need to adjust guidance on Magnesium Sulfate infusion timing, as well as correct discrepancies with the Midazolam formulary; the latter requiring revision due to its inclusion in the new Pain Management protocol. Changes to the IM adult and pediatric dosing are also implemented based on Medical Director discretion.
- The Acetaminophen formulary entry was published in advance of the Pain Management protocol and has been updated to reflect the Medical Director's revision to the pediatric maximum dose.
- The Ketamine formulary entry was published in advance of the Pain Management protocol and has been updated with a minor change in wording. The need to run the IV/IO dose as an infusion (as opposed to a slow push) has been clarified.
- The Midazolam formulary entry was initially revised to include indications for severe anxiety proximate to pain, but the revision was expanded to align existing dosing instructions for all indicated uses, with the most contemporary data.
- The Tranexamic Acid formulary entry was published in advance of the Hemorrhage Control protocol and has not been revised since original publication. It is included in this Alert to provide contextual basis for the protocol referenced.
- These documents are accessible in electronic form on the '**Prehospital Protocols**' and '**Field Procedures**' sections of the EMS Agency Website: <https://edcgov.us/Government/EMS/>

- Field personnel should review the changes carefully to ensure thorough retention and execution.
- Stakeholders are encouraged to stay abreast of future updates by signing up for automatic notifications.

From the link above, use the 'Emergency Medical Services Menu' (upper left) to navigate to any of the pages under the Policies/Procedures/Protocols/Drug Formulary heading. Subscription link is at the top of each page.

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

Reviewed: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

PAIN MANAGEMENT - ADULT

Ensure and document that patient meets indications for medication and does not have contraindications. Simple, non-pharmacologic (BLS) pain management techniques are preferable when appropriate and should always be considered. Document medication dose, route of administration, patient response and pain scales before and after intervention, in the PCR. After the initial treatment, utilizing a different pain medication for the same patient is allowed, but it is preferable to stay with the same medication. Refer to Prehospital Formulary for detailed medication information.

Basic Life Support

EMT

Determine pain level (0-10) using appropriate pain scale:

- **NUMERIC** – Self reporting on a “0” to “10” scale for those age 7 and older. (Preferred scale for those able to communicate their pain level).
- **FLAAC** (Fig.1) – Age 2 months to 7 years or individuals that are unable to communicate their pain (0-10).
- **FACES** (Fig.2) – Self reporting or observed scale for those Age 3 and older (0-10).

MILD PAIN (Pain Scale 1-3)

- Assess Vital Signs
- Apply oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress Provide verbal reassurance and calming measures
- Treat underlying cause for pain using non-pharmacological measures: Ice, Elevation, Repositioning, Compression, Splinting, Traction

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

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Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

Advanced Life Support

Paramedic

MODERATE PAIN (Pain scale 4-6)

- Consider Analgesia Medication
- Consider Vascular Access and Cardiac Monitor

ACETAMINOPHEN: 1 gram IV/IO infusion over 15 minutes (single dose only)

(Ofirmev package insert: https://www.accessdata.fda.gov/drugsatfda_docs/label/2010/022450lbl.pdf)

SEVERE PAIN (Pain scale 7-10)

- Cardiac Monitor, Consider Vascular Access.
- Use caution in the elderly; consider starting with lower initial dosing.
- **ACETAMINOPHEN** may also be utilized for severe pain and may be delivered in combination with any of the other pain medications unless contraindicated.
- "Moderate Pain" that cannot be effectively managed with **ACETAMINOPHEN** may be treated with medications in this section.
- Contact Base for any medication doses desired above protocol maximum.

NITROUS OXIDE 50:50 (50% nitrous oxide / 50% oxygen) via facemask

- Set up equipment (outside of ambulance).
- Explain the procedure and medication to the patient.
- Instruct the patient to:
 1. *Hold the facemask securely over nose and mouth.*
 2. *Breath normally until the pain is relieved, then remove the facemask.*
 3. *Discontinue if patient becomes drowsy or experiences side effects.*
 4. *Always turn off nitrous oxide once inside the ambulance*

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

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EMS Agency Medical Director

FENTANYL (opioid): 25 – 50 mcg slow IV/IO (over 1 minute) or IM/IN

- May repeat every 5 minutes x 4 (maximum cumulative dose = 200 mcg)
- If delivered secondary to MIDAZOLAM or KETAMINE, give lower dose (25 mcg) at least 10 minutes after first medication.

MORPHINE SULFATE (opioid): 2 – 5 mg slow IV/IO (over 1 minute) or IM

- May repeat every 5-10 minutes x4 (max cumulative dose = 20 mg)
- If delivered secondary to MIDAZOLAM or KETAMINE, give lower dose (2 mg) at least 10 minutes after first medication.

KETAMINE (non-opioid): 0.3 mg/kg IV/IO (infusion over 15 minutes), or 0.5 mg/kg IM/IN

- Max single IV/IO dose = 30mg
- Max single IM/IN dose=50mg
- May repeat every 15 minutes x 3 (max cumulative dose = 100 mg)
- If delivered secondary to opioid or MIDAZOLAM, use half dose (0.15 mg/kg IV/IO or 0.25mg/kg IM/IN) at least 10 minutes after first medication.

Anxiety from Severe Pain or Emergence Reactions from Ketamine

MIDAZOLAM (benzodiazepine): 0.5 – 1 mg increments slow IV/IO or IM/IN

- May repeat prn every 5 minutes x 2, (max cumulative dose = 2 mg)
- If delivered following an opioid or KETAMINE, give lower dose increments (0.5mg), and at least 10 minutes after first medication.

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

Reviewed: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

PAIN MANAGEMENT – PEDIATRIC

Basic Life Support

EMT

MILD PAIN (Pain Scale 1-3)

- Assess Vital Signs
- Apply oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress
Provide verbal reassurance and calming measures
- Treat underlying cause for pain using non-pharmacological measures: Ice, Elevation, Repositioning, Compression, Splinting, Traction

Advanced Life Support

Paramedic

MODERATE PAIN (Pain scale 4-6)

- Cardiac Monitor, Consider Vascular Access
- Consider Analgesia Medications

ACETAMINOPHEN (Pediatric dosing If > 2yrs and <50k): 15mg/kg IV/IO, infusion over 15 min.
(max. 750mg - single dose only)

(Ofirmev package insert: https://www.accessdata.fda.gov/drugsatfda_docs/label/2010/022450lbl.pdf)

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

Reviewed: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

SEVERE PAIN (Pain scale 7-10)

FENTANYL (opioid) - 1 mcg/kg slow IV/IO (over 1 min) or IM/IN

- Max single dose = 50 mcg
- May repeat every 5-10 minutes x 4

MORPHINE SULFATE (opioid) - 0.1 mg/kg slow IV/IO (over 1 minute) or IM

- Max single dose = 5 mg
- May repeat every 5-10 minutes x 4

MIDAZOLAM (benzodiazepine) – 0.05 mg/kg slow IV/IO/IM/IN (maximum 2 mg per dose)

- May repeat once
- If delivered secondary to KETAMINE, reduce dose (0.03 mg/kg) and deliver at least 10 minutes after first medication.

KETAMINE (non-opioid) - 0.3 mg/kg slow IV/IO (infused over 15 min) or IM/IN (maximum single dose = 15 mg)

- May repeat every 15 minutes x 3 (maximum cumulative dose = 50 mg)
- If delivered secondary to MIDAZOLAM, reduce dose (0.15 mg/kg) and deliver at least 10 minutes after first medication.

Anxiety from Severe Pain or Emergence Reactions from Ketamine

MIDAZOLAM (benzodiazepine): 0.05 mg/kg slow IV/IO/IM/IN (maximum 1 mg per dose)

- May repeat once in >5 minutes.
- If delivered following an opioid or KETAMINE, give lower dose (0.03 mg/kg), and at least 10 minutes after the first medication.

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

Reviewed: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

QUICK REFERENCE

CONTRAINDICATIONS	ADVERSE REACTIONS
<p>Acetaminophen (Tylenol):</p> <ul style="list-style-type: none"> Severe liver disease Chronic alcoholism or other hepatic impairment Prior Acetaminophen dose in last 6 hours, or > 2g in last 24 hours <p>Opioids</p> <ul style="list-style-type: none"> SBP < 100 or < normal range for age, RR < 12 or hypoxia ALOC or traumatic brain injury <p>Midazolam</p> <ul style="list-style-type: none"> SBP < 100 or normal range for age, RR < 12 or hypoxia ALOC (except agitation) <p>Ketamine</p> <ul style="list-style-type: none"> SBP < 90 OR > 180 RR < 12 GCS < 14 Pregnancy or possible pregnancy Multi-system trauma or active bleeding Penetrating eye trauma <p>Nitrous Oxide</p> <ul style="list-style-type: none"> Pt unable to hold mask/mouthpiece Severe COPD Decompression sickness Significant Facial or Head injury GCS < 14 Systolic BP < 90 O2 Sat < 91% Pregnancy Sedated or intoxicated Pneumothorax Bowel obstruction Chronic ear or sinus infection Chest / upper back pain 	<p>Acetaminophen (Tylenol):</p> <ul style="list-style-type: none"> Nausea & Vomiting Headache Insomnia Pruritis <p>Opioids</p> <ul style="list-style-type: none"> Nausea & vomiting Respiratory depression Hypotension ALOC Chest wall rigidity (fentanyl) <p>Midazolam</p> <ul style="list-style-type: none"> Respiratory depression Hypotension ALOC <p>Ketamine</p> <ul style="list-style-type: none"> Apnea Laryngospasm/airway obstruction Nystagmus Emergence Reactions Tonic-clonic movements Delirium Increased ICP <p>Nitrous Oxide</p> <ul style="list-style-type: none"> Dizziness/lightheadedness ALOC Nausea/vomiting

EL DORADO COUNTY EMS AGENCY PREHOSPITAL PROTOCOLS

Effective: August 1, 2023

Reviewed: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: July 1, 2023

Reviewed: N/A

Revised: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

HEMORRHAGE CONTROL –ADULT/**PEDIATRIC**

Basic Life Support

EMT

ABCs / ROUTINE MEDICAL CARE:

- Assess airway and support ventilation with appropriate airway adjuncts as indicated
- Apply oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress
- Spinal Precautions if indicated
- Keep patient warm
- Rapid transport
- Notify TRAUMA CENTER ASAP

EXTREMITY BLEEDING:

- Apply direct pressure/pressure bandage
- If bleeding not controlled, use approved hemostatic agent
- Remove improvised/improperly placed tourniquet if indicated
- Apply approved tourniquet if indicated
 - 2-4" proximal to wound
 - Tighten until bleeding has stopped
- If bleeding still not controlled, apply second approved tourniquet just proximal to first
- Document time each device applied. Appropriate applied tourniquet should not be loosened or removed unless time to definitive care will be greatly delayed (> 2 hours).

NECK, AXILLA, GROIN or PENETRATING EXTREMITY TRAUMA:

- Pack wound with approved hemostatic gauze and apply direct pressure until external bleeding is controlled. Be aware that internal hemorrhage may still occur.
- Assess airway and support ventilation with appropriate airway adjuncts as indicated

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: July 1, 2023

Reviewed: N/A

Revised: N/A

Scope: BLS/ALS Adult/Pediatric

EMS Agency Medical Director

Advanced Life Support

Paramedic

ABCs / ROUTINE MEDICAL CARE:

- Initiate large bore IV and consider second IV if indicated
- IV crystalloid fluid resuscitation only as required to try and maintain SBP >90, stop IV and recheck vitals after each 20cc/kg is given.
- Cardiac monitor

TRANEXAMIC ACID (TXA) IV/IO: Mix 1gm in 100ml NS, infuse over 10 min

- Must meet all indications and no contraindications
- Report injury time and TXA dose time to receiving trauma center upon arrival.
- TXA should be administered enroute and not on scene, to avoid time delays.

Indications: <ul style="list-style-type: none">• Age 15 years or older, And• Time since injury < 3 hours, And• Blunt or penetrating trauma with suspected hemorrhage including:<ul style="list-style-type: none">• At least one Systolic BP of < 90mmHg (no base contact required) Or• Persistent Tachycardia > 120 (base contact required) Or• Amputation of an extremity, proximal to wrist or ankle, and bleeding not controlled with tourniquets	Contraindications: <ul style="list-style-type: none">• Isolated brain injury• Thromboembolic event (Stroke, MI, PE, DVT) within past 24 hours• Traumatic arrest with > 5min of CPR without ROSC• Hypotension secondary to suspected cervical cord injury OR Spinal shock• Allergy to TXA• Time since injury > 3 hours
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EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: July 1, 2015

Reviewed: July 2021

Revised: June 2023

Scope: BLS/ALS – Adult/Pediatric

EMS Agency Medical Director

SEIZURES - ADULT

PROTOCOL PROCEDURE: Flow of protocol presumes that condition is continuing. Consider etiology: shock, toxic exposure, insulin shock, or head trauma. If patient is in distress, immediate, rapid transport is preferred with treatment performed en route.

Basic Life Support

EMT

ABCs / ROUTINE MEDICAL CARE –

- Assess airway and support ventilation with appropriate airway adjuncts as indicated
- HP-CPR as indicated
- Apply oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress
- Protect patient from injury by loosening any restricting clothing items and/or padding or removing any sharp or dangerous items from the patient's proximity. Do not place anything in the patient's mouth.
- After seizure stops, place patient in left lateral recumbent position and be prepared to suction airway.
- If hypoglycemia is suspected in a known diabetic who is conscious and able to follow simple commands, give the patient a prepared oral dextrose solution or encourage drinking/eating a sugar-containing beverage or food.

LOSOP

EMT working under Local Optional Scope

GLUCOSE LEVEL ASSESSMENT – Via finger stick. Consider confirming test results with second glucose check with blood from a different site (and different meter, if available) if patient's presentation doesn't match the test results.

FOR HYPOGLYCEMIA (blood glucose ≤ 60 mg/dL and conscious):

GLUCOSE - 15 g PO. Repeat if inadequate response and ALS intervention is unavailable.

Advanced Life Support

Paramedic

CARDIAC MONITOR, SpO₂ and CAPNOGRAPHY

VASCULAR ACCESS – establish an IV/IO.

GLUCOSE LEVEL ASSESSMENT – Via venipuncture or finger stick. Consider confirming test results with second glucose check with blood from a different site (and different meter, if available) if the patient's presentation doesn't match the test results.

Treat per **GLYCEMIC EMERGENCY** protocol if indicated.

FOR ACTIVE SEIZURES:

MIDAZOLAM:

- IM: **10 mg (PREFERRED)**. May repeat x2 at 5mg q 5 min for ongoing seizures (Max total dose = 20mg).

- IV/IO: **2.5 mg** diluted in 5mL NS IV/IO push, titrated to effect. May repeat x2 q 5 min for ongoing seizures. (Max dose = 7.5mg)

Contact Base for increased doses.

***Monitor respirations and SPO2 continuously after administration.**

FOR ECLAMPSIA-RELATED SEIZURES:

BLOOD GLUCOSE ASSESSMENT: Via finger stick or venipuncture. Treat as per GLYCEMIC EMERGENCIES protocol.

MAGNESIUM SULFATE: 6 gm diluted in 50-100mL NS or SW, infused over no less than 15 minutes.
Per Base MD order.

SEIZURES - PEDIATRIC

PROTOCOL PROCEDURE: Flow of protocol presumes that condition is continuing. Consider etiology: shock, toxic exposure, insulin shock, or head trauma. If patient is in distress, immediate, rapid transport is preferred with treatment performed en route.

Basic Life Support**EMT****ABCs / ROUTINE MEDICAL CARE -**

- Assess airway and support ventilation with appropriate airway adjuncts as indicated
- HP-CPR as indicated
- Apply oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress. Protect patient from injury by loosening any restricting clothing items and/or padding or removing any sharp or dangerous items from the patient's proximity. Do not place anything in the patient's mouth. After seizure stops, place patient in left lateral recumbent position and be prepared to suction airway.
- If febrile seizures suspected:
- Initiate cooling measures with towels soaked in tepid water; avoid cooling to the point of shivering. Consider treatment (if patient is alert and able to swallow) with ACETAMINOPHEN (15 mg/kg PO) or IBUPROFEN (10 mg/kg PO).
- If hypoglycemia suspected in a known diabetic who is conscious and able to follow simple commands, give the patient a prepared oral dextrose solution or encourage drinking/eating a sugar-containing beverage or food.

LOSOP**EMT working under Local Optional Scope**

GLUCOSE LEVEL ASSESSMENT – Via finger stick. Consider confirming test results with second glucose check with blood from a different site (and different meter, if available) if the patient's presentation doesn't match the test results.

Hypoglycemia in pediatrics is defined as:

Neonate	<1month	(blood glucose ≤ 50mg/dL)
Infant/child	>1month	(blood glucose ≤ 60mg/dL)

ORAL GLUCOSE - 15 g PO. Repeat as indicated.

Advanced Life Support

Paramedic

CARDIAC MONITOR, SpO₂ and CAPNOGRAPHY

VASCULAR ACCESS/NORMAL SALINE – establish an IV/IO

GLUCOSE LEVEL ASSESSMENT – Via venipuncture or finger stick. Consider confirming test results with second glucose check with blood from a different site (and different meter, if available) if the patient's presentation doesn't match the test results.

Treat per **GLYCEMIC EMERGENCY** protocol when indicated.

FOR ACTIVE NON-FEBRILE SEIZURES:

MIDAZOLAM	
<p><u>IM</u> (Preferred)</p>	<p><u>IV/IO</u></p>
<p>0.2mg/kg (Max. 10mg) May repeat at 0.1mg/kg (Max. 5mg)</p>	<p>0.1mg/kg (Max. 2.5mg)</p>
<p>Injected volume should not exceed:</p> <p>Neonate – 3 mo. = 1 mL</p> <p>3 mo. – 12 yr. = 3 mL</p> <p>>12 yrs. = 5 mL</p> <p>Single dose may be divided between two sites (lateral thighs) if needed.</p>	<p>Diluted in 5mL of NS slow IV push over 2-5 minutes.</p> <p>May repeat x1 PRN</p> <p>(Max. total dose = 5mg)</p>
<p>Monitor respirations and SpO₂ after administration.</p>	

A seizure of less than 5-10 minutes, which occurs in response to a fever, will usually be self-limiting. Airway maintenance and cooling measures take priority.



**El Dorado County Emergency Medical
Services Agency**
Quick Reference

Revised Date: June 19, 2020

Medication Profile

Acetaminophen
(Tylenol)

Class:

Non-opioid analgesic, antipyretic

Action:

The action is not precisely known; however, it is thought to be centrally mediated. It may reduce the production of prostaglandin in the brain. Prostaglandins are chemicals that cause inflammation and swelling.

Onset: 10-15 minutes

Peak: 1-hour

Duration: 4-6 hours

Adult Administration:

1 gram IV/IO over 15 min. (single dose)

Pediatric Administration:

15mg/kg IV/IO over 15 min. Max 750mg (single dose)

15mg/kg PO every 4 hours

- Pediatric Febrile Seizure patient who have either not been given any antipyretics or who have been given ibuprofen without a marked reduction in fever.

Indications:

Mild to moderate pain
Adjunct to other analgesics for severe pain
Pediatric febrile sz (not given antipyretics
Or ibuprofen has not reduced fever)

Contraindications:

Hypersensitivity/allergy
Liver Disease or complications (e.g.
Transplant)

Side Effects:

GI: Nausea, vomiting, constipation
CNS: Headache, insomnia

Pregnancy:

Category B

Notes:

- Should be administered within 6 hours of opening the package.
- May be used as a longer lasting adjunct to other analgesics for severe pain.
- Useful for patients with mild to moderate pain who are not already taking acetaminophen.
- Useful for patients with renal insufficiency, pediatrics, and geriatrics who are not candidates for ketorolac.



El Dorado County Emergency Medical Services Agency

Quick Reference

Revised Date: June 19, 2023

Medication Profile

Ketamine
(Ketalar)

Class:

Dissociative anesthetic

Action:

N-methyl-D-aspartate (NMDA) receptor antagonist with a potent anesthetic effect. Induces a trance-like state while providing pain relief, sedation, and memory loss.

Onset: 1-2 minutes

Peak: Immediate

Duration: 15-20 minutes

Adult and Pediatric Administration:

0.3mg/kg IV/IO, mixed in a 100mL and infused over 10-15 minutes (Max single dose = 30mg)

- or -

0.5mg/kg IN/IM (Max single dose = 50mg).

May repeat every 15 minutes x 2 prn pain. (Max dose for all routes combined = 100mg)

Indications:

Severe pain

Contraindications:

Hypersensitivity/allergy

GCS < 15

RR < 12

SBP < 90

Pregnancy

Side Effects:

CV: Hypertension, tachycardia, arrhythmias

CNS: Seizure like activity

Other: Laryngospasm, dysphoria, emergence reactions

Pregnancy:

Unknown

Notes:

- Fast IV administration is more likely to cause side effects
- Infuse IV over 10-15 minutes by mixing in a small "piggyback" bag
- May be used for severe pain (similar to fentanyl) or for moderate pain that is not managed by Acetaminophen or Nitrous Oxide (if supplied).



El Dorado County Emergency Medical Services Agency

Quick Reference

Revised Date: June 19, 2023

Medication Profile

Midazolam Hydrochloride (Versed)

Class:

Short-acting benzodiazepine/CNS agent
Sedative-Hypnotic
Anticonvulsant

Action:

CNS depressant with muscle relaxant, anticonvulsant, and anterograde amnesic effects. Intensifies activity of gamma-aminobenzoic acid (GABA), a major inhibitory neurotransmitter of the brain, by interfering with its reuptake and promoting its accumulation at neural synapses. Also provides some retrograde amnesic effects, making it useful after cardioversion.

Onset: 1-10 minutes

Peak: 20-60 minutes

Duration: 2-6 hours

Adult Administration:

Seizures or Severely Agitated Patient (No IV):

10mg IM. May repeat at 5mg prn every 5 minutes x 2 for ongoing seizures or severe agitation. (Max total dose = 20mg). Monitor for respiratory depression.

Seizures or Severely Agitated Patient (IV established):

2.5mg IV/IO diluted in 5mL NS slow push, titrated to effect. May repeat prn every 5 minutes x 2 for ongoing seizures. (Max total dose = 7.5mg) Monitor for respiratory depression.

Severe Anxiety or Emergence Reaction from Ketamine:

0.5mg – 1mg, slow IV/IO or IM every 5 minutes prn x 3 (Max total dose = 3mg)
Use lower increments (0.5mg) if given following opioid or ketamine medications.

Pacing/Cardioversion:

1-2mg slow IVP (lower dose for elderly, debilitated or smaller adults).
May repeat x 2 PRN. (Max total dose = 3mg)

Pediatric Administration:

Seizures (No IV):

0.2mg/kg IM (Max. 10mg). May repeat at 0.1mg/kg (Max. 5mg) in 5 minutes x 1 for ongoing seizures. (Max total dose = 15mg)

Divide IM volume between bilateral thighs based on age maximums:

- Neonate – 3months = **1ml**
- 3 months – 12 years = **3ml**
- 12 years – Adult = **5ml**

Monitor for respiratory depression

Seizures (IV established):

0.1mg/kg in 5mL NS slow IVP over 2-5 minutes. Max single dose = 2.5mg (May repeat x1 PRN)
(Max total dose = 5mg)

Pacing/Cardioversion/Severe Anxiety or Agitation:

0.05mg/kg in 5ml NS slow IVP over 2-5 minutes. Max single dose = 1mg (May repeat x1 PRN)

0.1mg/kg IM, single dose

Contact base station for additional doses

All doses administered from different routes apply to the total max dose.

Indications:

Seizures
Sedation
Severely agitated
Cardioversion
Transcutaneous Pacing

Contraindications:

Hypersensitivity/allergy
Hypotension

Side Effects:

CV: Fluctuations in vital signs, hypotension

CNS: Oversedation, headache, retrograde amnesia, euphoria, drowsiness, coma

RESP: Respiratory depression, respiratory arrest, cough, laryngospasm

GI: Nausea, vomiting, hiccough (diaphragmatic spasm producing a cough/noise)

EENT: Blurred vision, diplopia (seeing two objects), nystagmus

Pregnancy:

Category D

Notes:

- Midazolam Hydrochloride is an effective chemical restraint and should be used early in the restraint process especially with patients showing signs of excited delirium.
- May cause apnea, especially in children and the elderly. Be prepared to monitor and support respirations.
- Effects are intensified by ETOH or other CNS depressant medications. Carefully monitor vital signs including EKG and pulse oximetry.
- Midazolam is a schedule IV medication under the Controlled substance Act of 1970.



**El Dorado County Emergency Medical
Services Agency**
Quick Reference

Revised Date: July 1, 2020

Medication Profile

Tranexamic Acid (TXA)

Class:

Antifibrinolytic agent

Action:

TXA inhibits fibrinolysis by displacing plasminogen from fibrin.

Onset: Immediate

Peak: Immediate

Duration: 3 hours

Adult Administration:

Mix 1 gram in 100mL/NS and infuse over 10 minutes.

Pediatric Administration:

Not used in patients younger than 15 years.

Indications:

Blunt or Penetrating Trauma

Of the thoracic or abdominal region

- Hemorrhagic shock (including SBP<90)
- Significant hemorrhage not controlled by:
 - Direct pressure
 - Hemostatic agents
 - Commercial tourniquet

Contraindications:

Age less than 15

Allergy to TXA

Thrombolytic Event (MI,PE,Stroke
within 24 hours)

Traumatic Arrest with greater than 5 min of
CPR without ROSC

Hypotension 2nd to suspected cervical cord
Injury with motor deficit or spinal shock
Drowning
Hanging

Side Effects:

- Hypotension
- Nausea
- Vomiting
- Diarrhea
- Anaphylaxis

Pregnancy:

Category B