



County of El Dorado

Emergency Medical Services Agency

Michelle Patterson, MPH
EMS Agency Administrator

Dr. David Duncan, MD
EMS Agency Medical Director

2900 Fairlane Court
Placerville, CA 95667-4197
Phone (530) 621-6500

*****PARAMEDIC ALERT*****

No. 2023-01

March 3, 2023

TO: EMS Personnel
FROM: El Dorado County EMS Agency
SUBJECT: Levalbuterol Tartrate and Protocol Updates
PURPOSE: Stakeholder information

BACKGROUND:

The El Dorado County EMS Agency (EDCEMSA) is the Local Emergency Medical Services Authority (LEMSA) for the County of El Dorado.

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 updated and published on the public website for immediate implementation.

- Bronchospasm COPD (ANNEX 1)
- Crush Syndrome/Suspension Injuries (ANNEX 2)
- Narrow Complex Tachycardia (ANNEX 3)
- EMS Formulary: Levalbuterol (ANNEX 4)

SUMMARY

- The 'Bronchospasm COPD' and 'Crush Syndrome/Suspension Injuries' protocols have been updated in response to the national shortage of both Albuterol and premixed Albuterol/Ipratropium preparations (Duoneb, Combivent, etc).

- The updated Bronchospasm COPD protocol includes two 'first line' pathways utilizing either Albuterol or Levalbuterol (Xopenex), as well as clarifying how to prepare and deliver either drug with Ipratropium Bromide (Atrovent) as an initial nebulizer therapy.
- The 'Crush Syndrome/Suspension Injuries' protocol (formerly 'Crush Syndrome') has been updated to reflect the addition of Levalbuterol, as well as to incorporate suggestions from the Medical Advisory Committee regarding timelines for adult and pediatric CaCl administration and indications for Sodium Bicarb.
- The 'Narrow Complex Tachycardia' protocol has been updated to correct a discrepancy between the EMS Formulary and the 'Pediatric' section of the protocol. The previous version called for dilution with 3cc NS in preparing a slow IVP, whereas the formulary called for 5cc NS. The two documents now align.
- The EMS Formulary has been updated to include Levalbuterol Tartrate. See bullets above.
- These documents are accessible in electronic form on the '**Prehospital Protocols**' and '**Drug Formulary/Medication Profile**' sections of the EMS Agency Website: <https://edcgov.us/Government/EMS/>
- While none of the updates above draw upon new skills, 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: July 1, 2015

Reviewed: May, 2022

Revised: March 1 2023

Scope: BLS/ALS – Adult/Pediatric

please see signature on file
EMS Agency Medical Director

BRONCHOSPASM/COPD - ADULT

PROTOCOL PROCEDURE: *Flow of protocol presumes that condition is continuing. If the patient is in distress, immediate rapid transport is preferred with treatment performed en route.*

Basic Life Support

EMT

ABCs / ROUTINE MEDICAL CARE –

- Place in position of comfort
- Assess airway and support ventilation with appropriate airway adjuncts as indicated.
- Apply escalated dosing of oxygen if pulse oximetry <94% or signs of hypoperfusion or respiratory distress.
- Allow patient to administer their own respiratory medications as prescribed by their physician, see **Field Policy: BLS Medication Administration.**
- HP-CPR as indicated

Continuous Positive Airway Pressure (CPAP)

(Contraindications: decreased LOC, no gag reflex, vomiting, facial trauma, hypotension)

- Start with valve at 7.5 cmH₂O setting and 100% O₂ flow rate.
- Titrate to patient's condition. If patient's respiratory status does not improve CPAP pressure may be increased every 5 minutes, first to 10.0 cmH₂O and then to a maximum pressure setting of 15 cmH₂O if required.
- Monitor and record vital signs every 5 minutes.
- Be prepared for possible hypotension. If hypotension develops, decrease valve setting.

If patient continues in severe distress, consider assisted breathing with O₂ and BVM

LOSOP

EMT working under Local Optional Scope

FOR EXTREMIS PROXIMATE TO BRONCHOSPASM (Low SpO₂, Inability to speak, and/or ALOC):

Epinephrine Auto-injector, or;

Epinephrine 1:1000 (0.1mg/mL) – 0.5 mg IM. Repeat after 10 minutes as needed.

Consider BVM and SGA if required

Advanced Life Support

Paramedic

FIRST LINE:

Albuterol option:

Combine and Nebulize:
ALBUTEROL .083% (2.5 mg)

and,

IPRATROPIUM .02% (0.5mg)

followed by an additional
ALBUTEROL .083% (2.5 mg).

If symptoms persist, initiate continuous
ALBUTEROL .083% (2.5 mg) (Max. 15 mg/hr).

Levalbuterol (Xopenex) option:

Combine and Nebulize:
LEVALBUTEROL (1.25 mg)

and,

IPRATROPIUM .02% (0.5mg)

followed by an additional
LEVALBUTEROL (1.25 mg).

If symptoms persist, initiate continuous
LEVALBUTEROL (1.25 mg) (Max. 10 mg/hr).

Breathing treatments may be given concurrently with CPAP.

VASCULAR ACCESS - establish an IV/saline lock.

MAGNESIUM SULFATE – 2 g in 100 mL normal saline IV/IO over 20 minutes

FOR EXTREMIS PROXIMATE TO BRONCHOSPASM (Low SpO₂, Inability to speak, and/or ALOC):

EPINEPHRINE 1:1,000 (1 mg/mL) 0.5 mg IM. (Repeat doses q 10 minutes prn).

FOR STRIDOR: (Moderate to severe croup/airway burns/laryngeal edema/anaphylaxis)

NEBULIZED EPINEPHRINE 1:1,000 (1mg/mL) – 5 mg (5 mL) via nebulizer over 10 minutes.
Repeat q 10 minutes prn.

Note: If heart rate increases > 20%, visible tremors, or increased arrhythmias/palpitations, discontinue treatment and contact Base Hospital.

BRONCHOSPASM - PEDIATRIC

PROTOCOL PROCEDURE: Flow of protocol presumes that condition is continuing. If the patient is in distress, immediate rapid transport is preferred with treatment performed en route.

Basic Life Support

EMT

ABCs / ROUTINE MEDICAL CARE –

- Place in position of comfort
- 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.
- Allow patient to administer their own respiratory medications as prescribed by their physician, see **Field Policy: BLS Medication Administration**.

Continuous Positive Airway Pressure (CPAP) may be utilized in patients 12 yrs or older - if mask fits appropriately

(Contraindications: decreased LOC, no gag reflex, vomiting, facial trauma, hypotension)

- Start with valve at 5 cmH₂O setting and 100% O₂ flow rate.
- Titrate to patient's condition. If patient's respiratory status does not improve CPAP pressure may be increased by 2.5 cmH₂O every 5 minutes, to a maximum pressure setting of 15 cmH₂O if required.
- Monitor and record vital signs every 5 minutes.
- Be prepared for possible hypotension. If hypotension develops, decrease valve setting.

If patient continues in severe distress, consider assisted breathing with O₂ and BVM

LOSOP

EMT working under Local Optional Scope

FOR EXTREMIS PROXIMATE TO BRONCHOSPASM (Low SpO₂, Inability to speak, and/or ALOC):

Pediatric Epinephrine Auto-injector, or;

Epinephrine 1:1000 (0.1mg/mL):

- 15-30 kg (33-66 lb.): 0.15 mg IM (lateral thigh is preferred). Repeat in 10 minutes prn.
- > 30 kg (> 66 lb.): 0.3 mg IM
- > 50 kg (> 110 lb.): 0.5 mg IM

Advanced Life Support

Paramedic

FIRST LINE:

Albuterol option:

Combine and Nebulize:
ALBUTEROL .083% (2.5 mg)

and,

IPRATROPIUM .02% (0.5mg)

If symptoms persist, initiate continuous
ALBUTEROL .083% (2.5 mg) (Max. 15 mg/hr).

Levalbuterol (Xopenex) option:

Combine and Nebulize:
LEVALBUTEROL (1.25 mg)

and,

IPRATROPIUM .02% (0.5mg)

If symptoms persist, initiate continuous
LEVALBUTEROL (1.25 mg) (Max. 10 mg/hr).

Breathing treatments may be given concurrently with CPAP.

NORMAL SALINE – establish an IV/IO/saline lock.

FOR EXTREMIS PROXIMATE TO BRONCHOSPASM (Low SpO₂, Inability to speak, and/or ALOC):

EPINEPHRINE 1:1,000 (1 mg/mL) 0.01 mg/kg IM. Maximum single dose 0.5mg. (Repeat dose in 10 minutes prn).

FOR STRIDOR: (Moderate to severe croup/airway burns/laryngeal edema/anaphylaxis)

NEBULIZED EPINEPHRINE 1:1,000 (1mg/mL) – 0.5 mg/kg, maximum single dose of 5mg (5mL) via nebulizer over 10 minutes. Repeat q 10 minutes prn. For doses less than 3mL dilute with NS to 5mL to allow for nebulization (May repeat q 10 minutes).

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: July 29, 2013

Reviewed: July 2021

Revised: March 1 2023

Scope: BLS/ALS – Adult/Pediatric

EMS Agency Medical Director

CRUSH SYNDROME/SUSPENSION INJURIES-ADULT

PROTOCOL PROCEDURE: flow of protocol presumes patient has had a full extremity (or more) crushed, pinned, or otherwise immobile with severely impaired circulation for **at least two (2) hours** or presumes patient been suspended for at least (10) minutes and is unconscious. It is advisable in these situations for BLS personnel to **wait for ALS personnel** before attempting extrication. **Early notification to the hospital is essential for proper triage and notification of surgical personnel – particularly if a field amputation by surgical staff may be required.**

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 MOBILITY RESTRICTION as indicated.

SPLINT the affected limb(s) at heart level.

Keep patient warm.

Advanced Life Support

Paramedic

<u>EXTRICATION PREP</u>	<u>EXTRICATION IMMINENT</u> <i>(Crush injury only)</i>	<u>POST EXTRICATION</u> <i>(Crush and Suspension)</i>
<p>CONSIDER AIR AMBULANCE</p> <p>EKG - Apply and continuously monitor patient's cardiac rhythm.</p> <p>VASCULAR ACCESS - Establish 2 large bore IVs via blood administration or macro drip tubing. Place IO if unable to establish IV.</p> <p>NORMAL SALINE - Give 20 mL/kg IV/IO bolus prior to release of compression. If patient is in shock or is compensating for impending shock, refer to SHOCK protocol.</p> <p>PAIN MANAGEMENT per Pain Management Protocol</p>	<p>Continuous nebulizer, pre and post extrication, of either:</p> <p>ALBUTEROL 5.0 mg in 6 ml NS,</p> <p>or,</p> <p>LEVALBUTEROL 2.5 mg in 6 ml</p> <p>If signs and symptoms of rhabdomyolysis are present (i.e. tachycardia, altered LOC, fever, peaked T waves or prolonged PR), consider:</p> <p>SODIUM BICARBONATE 1 mEq/kg up to 100 mEq IVP/IO over at least 5 minutes. Repeat x 1 in >10 minutes.</p>	<p>RAPID TRANSPORT – For Suspension injuries keep the patient in the semi-Fowler's position keeping the upper body at a 30–40-degree angle, then slowly bringing them toward supine in 30–45 minutes.</p> <p>CALCIUM CHLORIDE – If suspected hyperkalemia (Compression ≥4 hrs and EKG findings of absent P waves, peaked T waves, and/or prolonged QRS) 1 g IV/IO slowly over 5 minutes. Repeat x1 in >10 minutes if indicated.</p> <p>May forego base contact if pt is in arrest.</p>

Do not run Sodium Bicarbonate and Calcium Chloride concurrently. Always flush well after use of either drug.

CRUSH SYNDROME/SUSPENSION INJURIES-PEDIATRIC

PROTOCOL PROCEDURE: Flow of protocol presumes patient has had their lower extremities/pelvis/torso crushed, pinned, or otherwise immobile with severely impaired circulation for **at least two (2) hours**. It is advisable in these situations for BLS personnel to **wait for ALS personnel** before attempting extrication. **Early notification to the hospital is essential for proper triage and notification of surgical personnel.**

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** as indicated.
- **SPLINT** the affected limb(s) at heart level.

Keep patient warm.

Advanced Life Support

Paramedic

EXTRICATION PREP	EXTRICATION IMMINENT (Crush injury only)	POST EXTRICATION (Crush and Suspension)
<p>CONSIDER AIR AMBULANCE</p> <p>EKG- Apply and continuously monitor patient's cardiac rhythm.</p> <p>VASCULAR ACCESS - Establish IV or IO</p> <p>NORMAL SALINE - Give 20 mL/kg Reassess after each bolus and repeat as indicated to max of 60 mL/kg. Refer to shock protocol as indicated</p> <p>PAIN MANAGEMENT per Pain Management Protocol</p> <p>CONTACT BASE - For treatment and destination determination</p>	<p>Continuous nebulizer, pre and post extrication of either:</p> <p>ALBUTEROL - >/ 2 yo: 5 mg in 6 ml NS < 2 yo: 2.5 mg in 3 mL NS, or,</p> <p>LEVALBUTEROL - >/ 2 yo: 2.5 mg in 6 ml < 2 yo: 1.25 mg in 3 mL NS</p> <p>If signs and symptoms of rhabdomyolysis are present (i.e. tachycardia, altered LOC, fever, peaked T waves or prolonged PR), consider:</p> <p>SODIUM BICARBONATE 1 mEq/kg up to 100 mEq IVP/IO over at least 5 minutes. Repeat x1 in >10 minutes.</p>	<p>RAPID TRANSPORT</p> <p>BASE PHYSICIAN ORDER ONLY</p> <p>(Compression >4 hrs and: absent P waves, Peaked T waves, and/or prolonged QRS)</p> <p style="text-align: center;"></p> <p>CALCIUM CHLORIDE 20 mg/kg IV/IO push over 1 minute. Repeat x1 in >10 minutes if indicated.</p>

Do not run Sodium Bicarbonate and Calcium Chloride concurrently. Always flush well after use of either drug.

EL DORADO COUNTY EMS AGENCY

PREHOSPITAL PROTOCOLS

Effective: July 1, 2015

Reviewed: July 1, 2021

Revised: March 1, 2023

Scope: BLS/ALS- Adult/Pediatric

EMS Agency Medical Director

NARROW COMPLEX TACHYCARDIA - ADULT

PROTOCOL PROCEDURE: Flow of protocol presumes that narrow complex tachycardia is continuing. If response or condition changes, move between stable and unstable section or refer to appropriate protocol. Rate-related symptoms are uncommon in rates < 150 BPM.

Basic Life Support

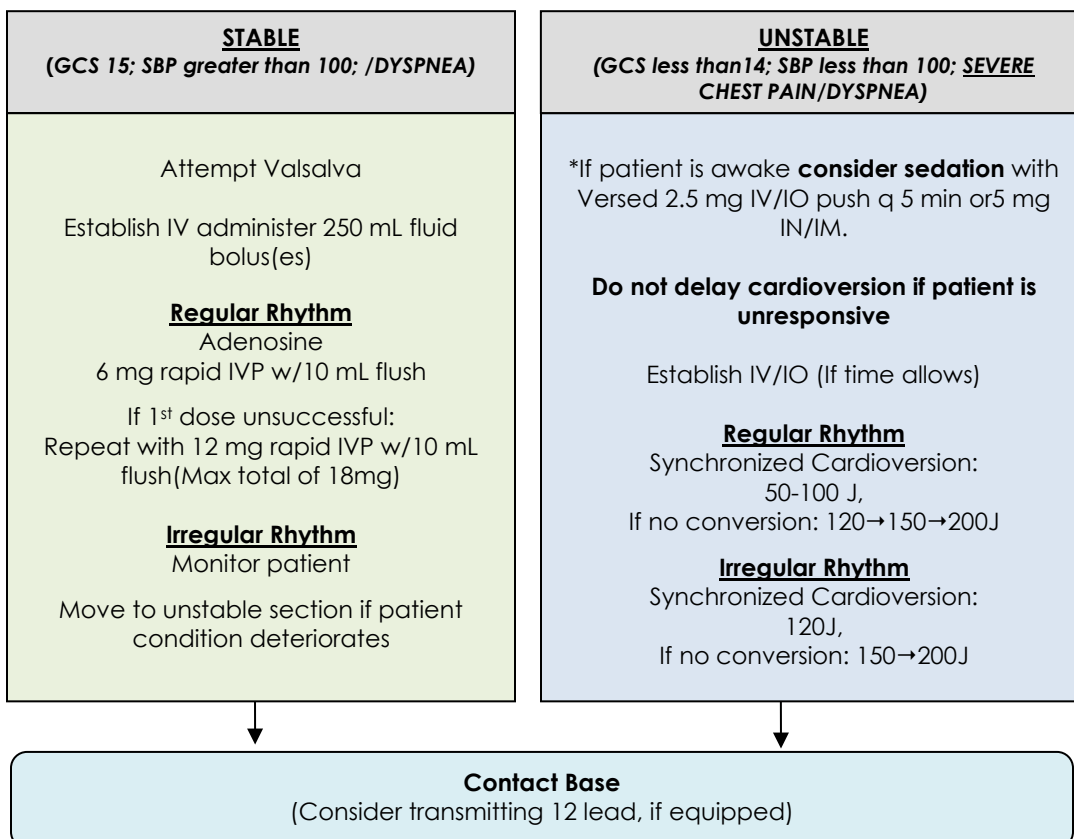
EMT

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
- Place patient in position of comfort.

Advanced Life Support

Paramedic



NARROW COMPLEX TACHYCARDIA - PEDIATRIC

PROTOCOL PROCEDURE: Flow of protocol presumes that narrow complex tachycardia is continuing. If response or condition changes, move between stable and unstable section or refer to appropriate protocol. Supraventricular tachycardia is heart rate > 220 in infants < 1 yo and > 180 in children.

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
- Place patient in position of comfort

Advanced Life Support
Paramedic

<p align="center">STABLE (GCS 14 or greater; <u>ADEQUATE PERFUSION</u>; <u>NO SEVERE CHEST PAIN/DYSPNEA</u>)</p>	<p align="center">UNSTABLE (GCS less than 14; <u>INADEQUATE PERFUSION</u>; <u>SEVERE CHEST PAIN/DYSPNEA</u>)</p>
<p align="center">Attempt Valsalva/Ice Pack</p> <p align="center">Establish IV administer 20 mL/kg fluid bolus(es)</p> <p align="center"><u>Regular Rhythm</u> Adenosine 0.1 mg/kg rapid IVP w/5 mL flush (Max. 6 mg)</p> <p align="center">If 1st dose unsuccessful: Repeat with 0.2 mg/kg rapid IVP w/5 mL flush (Max of 0.3 mg/kg) (Max 12 mg)</p> <p align="center"><u>Irregular Rhythm</u> Monitor patient</p> <p align="center">Move to unstable section if patient condition deteriorates</p>	<p align="center">If patient is alert: Consider sedation with Versed 0.1 mg/kg diluted in 5 mL NS slow IV/IO push or 0.1 mg/kg IM or IN. Do not delay cardioversion if patient is unresponsive</p> <p align="center">Establish IV/IO (If time allows)</p> <p align="center">Synchronized Cardioversion: 0.5-1 J/kg. Repeat as needed at 2 J/kg</p>

References: Formulary Versed, Adenosine

Contact Base
(Consider transmitting 12 lead, if equipped)

Levalbuterol Tartrate (Xopenex)

Classification:	Bronchodilator
Actions:	Relaxes bronchial smooth muscle by stimulating beta ₂ receptors resulting in bronchodilation
Indications:	<ul style="list-style-type: none"> • Acute asthma • Allergic reaction • COPD/bronchitis • Bronchospasm
Contraindications:	<ul style="list-style-type: none"> • Prior hypersensitivity reaction to Levalbuterol • Symptomatic tachycardia • Chest pressure
Adverse effects:	<ul style="list-style-type: none"> • Tachycardia • Hypertension • Palpitations • Dizziness • Dysrhythmias • Restlessness • Nausea
Adult Administration:	<p><u>Bronchospasm COPD:</u> 1.25 mg/3 mL NS via nebulizer. If severe distress persists, initiate continuous Levalbuterol via nebulizer, not to exceed 10 mg/hr. May also be administered via facemask, BVM, or ETT.</p> <p><u>Crush Syndrome/Suspension Injuries:</u> 2.5 mg in 6 ml NS via nebulizer. Run continuously before and after extrication.</p>
Pediatric Administration:	<p><u>Bronchospasm:</u> 1.25 mg in 3 mL NS via nebulizer. If severe distress persists repeat at 0.5 mg/kg hr to a maximum of 10 mg/hr.</p> <p><u>Crush Syndrome/Suspension Injuries:</u> < 2 years old: 1.25 mg in 3 mL of NS/SW. > 2 years old: 2.5 mg in 6 ml NS via nebulizer. Run continuously before and after extrication.</p>
Onset:	Within 5 minutes
Duration:	3 - 4 hours
Pregnancy Safety:	Category C
Comments:	<p>Use with caution in patients with:</p> <ul style="list-style-type: none"> • Heart disease • Hypertension • Tachydysrhythmias • Patients being treated with MAO inhibitors • Patients that are hypersensitive to sympathomimetics