
# Protocols V15.9.1

(09.08.2025)

Preface to the 14th edition of the Chaffee County EMS protocols.

These protocols and procedures are a reference for suggested treatments and dosages of medications. They are based on current best practices and evidence. These protocols are guidelines rather than rules that must be followed, clinical judgement is to be used appropriately. No protocol set can anticipate every scenario that might be encountered. The focus of treatments should always be on what is best for patient, not on how EMS providers can adhere to a protocol.

EMS providers must operate within their scope of practice. These protocols lay out what is and is not in each provider's respective scope of practice, however the Colorado Code of Regulations 6 CCR 1015-3 should be consulted when there is any doubt about if something is or is not in your scope of practice.

Skills and medications that are authorized under a state waiver must be followed as written in the protocols for those that are practicing under a waiver.

These protocols are intended only for the use of Chaffee County EMS. Use by any other agency is unauthorized.

Released: 06/06/2022

**Version history**

Version 14.0 released on 06/06/2022.

Version 14.1 released on 07/07/2022.

Version 14.5 released on 02/27/2023.

Version 15.1 released on 04/19/2023

Version 15.2 released on 07/05/2023

Version 15.3 released on 10/24/23

Version 15.4 released on 03/13/2025

Version 15.6 released on 5/29/2025

Version 15.7 released on 6/6/2025

Version 15.8 released on 6/20/2025

Version 15.9 released on 8/28/2025

## Changes to Version 14.0

- Removed glucagon for beta blocker and calcium channel blocker OD. This was due to a lack of evidence of efficacy and logistical and financial constraints of carrying the recommended doses.
- Added esmolol for refractory VF/VT for critical care only. Observational evidence supports this practice, but there is not a large amount of data to support it.
- Added a DNR protocol.
- Added a taser removal protocol.
- Added a cricothyrotomy protocol.
- Adjusted RSI protocol to have Rocuronium instead of Vecuronium.
- Added a termination of resuscitation protocol.
- Changed the refusal protocol to include a section about decision making capacity and removed the requirement to call in. As it is not a recorded phone line and the doctor always says, “we would love to see them, but okay if they don’t want to come in,” there is little utility in this practice.
- Removed any mention of excited delirium.
- Removed ketamine for behavioral health issues.
- Adjusted sodium bicarbonate dose for TCA overdoses.
- Added heated-humidified high flow nasal cannula protocol.
- Removed morphine from the palliative care protocol (no longer carry morphine).
- Update spinal immobilization protocol.
- Updates all ACLS algorithms to the current version.
- Added language to the sepsis protocol.
- Removed therapeutic hypothermia protocol.
- Removed excited delirium protocol.

- Modified Insulin protocol and made insulin a critical care drug (due to the complexity of the patient and sodium and potassium levels).

- Removed Intranasal ketamine and fentanyl from adults (still there for peds). Due to the dose required for efficacy exceeding 1ml per nare.

- Modified midazolam protocol. Changed IM dosing to recommended dose for seizures.

- Added all critical care medications. They were mentioned in a previous document, but there was never a protocol or dosing.
- Dopamine is in the protocols because we might get a transfer with a patient needing a dopamine infusion, it is not intended for the 911 setting.

**Version 14.1 changes**

- Placed all medication doses in only one spot, the medication protocol.
- Added Israeli / H bandage to bleeding control protocol.
- Added chlorhexidine or alcohol as acceptable choice for cleaning the site for IO placement.
- Added that aspiration is not recommended when establishing IO access.
- Added that capnography must be used with an ET tube unless in a wilderness setting or austere environment.
- Removed the medication administration protocol.
- Updated the palliative care protocols, removed dosing for specific medications, and changed the equianalgesic table to give dose in hydromorphone.
- Added language surrounding placing IV's in the feet in the peripheral IV protocol.
- Removed pulse oximetry protocol.
- Changed midazolam dose in RSI to match RSI protocol.
- Changed succinylcholine dose in drug protocol from "2mg/kg" to "1.5mg/kg – 2mg/kg."
- Minor wording revisions in refusal protocol.
- Minor wording revisions in spinal immobilization.
- Minor wording revisions in splinting protocol.
- Minor wording revision in carbon monoxide protocol.
- Removed mention of thrombolytic checklist in CVA protocol.
- Changed etco2 target for uncal herniation in CVA protocol from 30mmhg to 30-35mmhg.
- Changed the word dextrose to read blood glucose level in hyperglycemia protocol.
- Removed the phrase "do not let cooling delay transport" in hyperthermia. Added in that cooling should be started before initiating transport.
- Removed mention of checking core temps from hypothermia protocol as we do not have a way to do that.
- Added suctioning of the nares to pediatric respiratory distress protocol.
- Removed dosage of midazolam from seizures, to only have doses listed under the medication protocol.
- Added "consider cyanide toxicity" in burn protocol.
- Added a blunt trauma cardiac arrest algorithm.

- Changed wording from “consider chest decompression in tension pneumothorax” to “perform chest decompression” in the chest pain protocol.
- Changed the title from “drowning / near drowning” to “drowning / submersion injury.”
- Added “monitor for development of pulmonary edema” to drowning / submersion injury protocol.
- Updated all ACLS algorithm flow charts to 2020 version. V14.0 had the 2015 version.
- Changed the title of “hemorrhage” to “external hemorrhage.”
- Removed Rumack-Mathew nomogram from N-acetyl-cysteine
- Removed pneumonia as an indication for albuterol.
- Wording revision in amiodarone.
- Removed core temperature from the hypothermia protocol.
- Changed “head trauma” to “closed head injury / acute traumatic brain injury.”
- Added transport head of bed elevated to 30 degrees for closed head injury patients.
- Removed “acute mountain sickness” as an indication for methylprednisolone.
- Changed midazolam protocol from “behavioral” to “behavioral / agitation.”
- Improved some wording in naloxone protocol.

**V14.2 changes:**

- Fixed a typo in the ketamine infusion dose (removed and extra zero so the infusion dose is now 0.25mg/kg/hr – 3mg/kg/hr.

V14.3 - voided

V14.4 changes:

- Removed pediatric use of propofol. Propofol is not indicated in patients less than 13 years of age.

V15.0 changes:

- Added acetaminophen.
- Added pantoprazole.
- Changed oxytocin protocol to be more specific on dose.
- Added TXA.
- Added Antiviral infusion.
- Added Cefazolin (Ancef).
- Fixed typo in Ketamine infusion protocol (changed starting dose from 0.025mg/kg/hour to 0.25mg/kg/hour).

V15.1 changes:

- 12 lead ECG added to CVA protocol.

V15.2 changes

- AMAX-4 algorithm added to asthma/anaphylaxis.

V15.3 changes

Epinephrine – Anaphylaxis and Respiratory updated to be in line with AMAX4 algorithm.

V15.4 changes:
Diltiazem protocol updated

V15.5 Changes:
Diltiazem further updated

V15.6 changes:
Added dose for joules for synchronized cardioversion.
Removed Solumedrol from the anaphylaxis protocol.

V15.7
Revised RSI table with ketamine and rocuronium ranges
Removed RSI induction as an indication for Midazolam
Removed RSI induction as an indication for Midazolam
Revised RSI protocol to remove midazolam and versed as induction agents
Added ketamine indication for post RSI/Intubation sedation and analgesia.

V15.8
Changed tPA from critical care to the paramedic scope of practice.

V15.9
Added naltrexone as a contraindication for fentanyl and Hydromorphone
Added verbiage to pain management protocol about multimodal approaches
Added language about using ketamine in patients that opioids would not be preferred.

V15.9.1
Added language to the Ketamine for Analgesia protocol

# Table of Contents:

## Policies:

## Trauma Team Activation

The Trauma Team at Heart of the Rockies Regional Medical Center consists of the ED physician, trauma surgeon, EDRN, respiratory therapy technician, radiology technician and a laboratory technician

After receiving notification from EMS, the emergency department will notify the trauma team. Any pre-hospital provider, EDRN, MD, EDMD or surgeon may activate the Trauma Team for patients who meet criteria. The trauma surgeon, when available for consult, will respond within 10 minutes of the arrival of the patient who meets activation criteria.

- **Trauma Team Activation – Major**
  - GCS< 13 due to trauma.
  - BP <90 systolic, or pulse >120 in an adult patient.
  - BP <70, or pulse >150, or capillary refill time >3 seconds in a pediatric patient (0-12 yrs old).
  - Respiratory rate <10 or >29.
  - Flail chest.
  - Penetrating injury to neck, chest, or abdomen.
  - Spinal cord injury with neurological deficit.
  - Multisystem injury (>2 systems injured).
  - Burns >15% TBSA and/or associated injury including inhalation potential.
  - Falls >20 feet.

- **Trauma Team Activation – Minor**
  - GCS <14 due to trauma.
  - Pulseless extremity.
  - High speed MVA w/ significant vehicle damage.
  - Unrestrained occupant of MVC.
  - Auto vs. pedestrian / bicycle at speeds >20mph or thrown > 15 feet.
  - Separation from conveyance (Includes: horse, ATV, snowmobile, bicycle etc.).
  - Death of same car occupant.
  - Lightning or electrical injury.
  - Contra lateral fractures.

***A trauma team activation may be called at the pre-hospital provider's discretion even if a patient does not meet the above stated criteria. ***

***Please note that the Trauma Team Activation with surgeon applies only when the trauma surgeon is on call and present for consultation in our facility. All other times, State Trauma Protocol for Trauma and Transfer criteria takes precedence***

## PROCEDURES

# Bandaging/Bleeding Control

Authorization: EMT, EMT-IV, and Paramedic
Protocol: EMT, EMT-IV, and Paramedic - Standing Order

A bandage is used to protect and control the bleeding of injuries to the soft tissue.

**Indications:**

- Wounds should be bandaged to protect the injury from further damage or contamination and to control bleeding.

**Contraindications:**

- None.

**Precautions:**

- Ensure proper BSI.
- Ensure distal circulation, sensation and movement is not impaired except in life threatening hemorrhage requiring a tourniquet.

**Procedure:**

- Bandaging
    - Evaluate the site and expose the area.
    - Choose the appropriate dressing material: sterile 4x4s, trauma dressing etc.
    - Place the dressing over the wound.
    - Secure the dressing with Kerlix and tape.
    - Moisten the dressing for burns (Less than 10% TBSA), eviscerations and abrasions. This will prevent the tissue from drying and adhering to the wound.
    - Ensure that circulation is not impaired due to bandaging.
    - For skin tears an Opti-Foam bandage is recommended.

- Bleeding control
    - Attempt direct pressure to control bleeding.
    - In venous bleeding a pressure bandage ( H Bandage, Israeli Dressing) may be used
    - If bleeding cannot be controlled with direct pressure or a pressure dressing place a tourniquet.
    - Life-threatening arterial bleeding in an extremity should have a tourniquet placed immediately.
    - Consider hemostatic agent if a tourniquet cannot be placed.
    - Consider wound packing depending on the location of the wound.

# Central Venous Catheter Use and Maintenance

Authorization: Paramedic

Protocol: Paramedic

**Contraindications:**

- Inability to flush device
- Devices that require a needle for access.
- Indwelling dialysis catheters

**Precautions:**

- Never forcibly flush a VAD (Vascular Access Device) against resistance.
- **Always use a 10ml or larger syringe-nothing smaller**. Flushing with a small diameter syringe or with high force applied to the plunger increases the risk of catheter damage (note some prefilled syringes have an internal lumen size the same as a 10ml and are acceptable to use).

**Procedure:**

**Use the SAS / SASH technique:** (Saline-Administer Medication-Saline or Heparin)

1) Vascular access devices must be flushed after each medication administration and between medication administrations.
2) Scrub the port with an antiseptic wipe and allow to dry completely. It does not matter which port you use.
3) Flush with 10ml of 0.9% sodium chloride using 10 x short bursts of 1ml noting for any resistance encountered.
4) **Never inject against resistance.** If catheter will not flush, establish other venous access as needed.
5) Slowly aspirate with syringe looking for blood return.
6) Administer medications
7) Scrub the port with antiseptic wipe (again).
8) Flush VAD with appropriate solution (0.9% saline -**or**- heparin -**or**-saline then heparin). Unless heparin is specified by the patient or sending facility a 0.9% saline flush should be used.

9) If using heparin use 500 units in 5ml (in a partially filled 10ml syringe). ***Never use heparin from a bag of heparin for infusion for flushing.** *

- Recommended maximum per 24 hours for intermittent flushes should not exceed 2,000 units of heparin.

**Notes:**

- Heparinized devices generally need to be flushed with heparin every 12 hours. Saline is usually sufficient for flushing after a medication administration.
- Multi-lumen catheters- have distal, medial, and proximal ports. Follow manufacturer's recommendations for what medications should be infused in specific ports. Generally, TPN is infused in the medial port.
- Use of ports requiring a needle for access are not in the paramedic scope of practice.

# Cricothyrotomy - Surgical

Authorization: Paramedic

Protocol: Standing order

**Indications:**

- Patients who cannot be ventilated by any other means.

**Contraindications:**

- None in patients that are unable to be ventilated by any other means.

**Procedure:**

- **Wear safety glasses and consider a mask as well.** If the patient is spontaneously breathing, there may be a spray of blood during the procedure.
- Have suction ready
- Find the cricothyroid membrane with your finger.
- Consider making a small vertical incision if there is copious tissue over the surgical site.
- Puncture the cricothyroid membrane with a scalpel. Enlarge the opening as needed being careful to not cut any vasculature in the area.
- There may be significant bleeding during the procedure.
- Insert either a finger or bougie into the opening you created.
- Insert airway device, either an endotracheal tube or tracheostomy or another specialized airway adjunct.
- Inflate the balloon if present.
- Confirm correct placement of the device by auscultation of lungs, end-tidal carbon dioxide and pulse oximeter.
- Secure the airway

**Notes:**

- Care should be used to make the ostomy only as large as needed.
- Avoid lacerating any of the large vessels in the immediate vicinity of the cricothyrotomy.
- Surgical cricothyrotomy is preferred over needle cricothyrotomy.

# End-Tidal CO2 Waveform Capnography

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic – Standing Order

Waveform capnography provides an excellent tool for evaluating a patient's ventilatory status. It also provides reliable (but not infallible) confirmation of proper tube placement during endotracheal intubation, extra-glottic airway use, and in cricothyrotomies.

## Indications:

- Confirmation of advanced airway placement.
- Detect ROSC during CPR.
- Any metabolic/respiratory acidosis or alkalosis.
- Overdose.
- Respiratory distress or respiratory depression.

## Contraindications:

- None.

## Precautions:

- Numerical value must be evaluated in context with the patient's condition.
- Airway secretions can block detector causing a loss of wave form. Replace detector if this occurs.

## Procedure:

- Choose side stream or inline detector as indicated.
- Attach orange connector to port on LP-12.
- Place cannula on the patient or adapter on 15mm connecter.
- After intubation/extra-glottic placement, use BVM to ventilate for six breaths. Assure corresponding waveform and numerical equivalent.
- Continuous waveform capnography is mandatory after advanced airway placement.

## Notes:

- After six breaths a positive waveform strongly indicates correct advanced airway placement, although it is not 100% sensitive or specific.
- Continuous waveform capnography is mandatory after an advanced airway placement. The only exception to this would be in a wilderness setting or other austere environment.
- If no waveform or number appears on home screen check all connections. If it is determined that the equipment is working correctly, and the patient has an advanced airway placed consider esophageal intubation and remove advanced airway.
- Do not withhold oxygen to place cannula detector.
- Normal end-tidal CO2 readings are 35-45mmHg.
- Head injury patients who exhibit obvious signs of herniation should be ventilated to 30mmHg.

## External Jugular Vein IV Insertion

Authorization: Paramedic

Protocol: Paramedic - Standing Order

**Indications:**

- Provider choice when IV access is not obtainable in an extremity.

**Contraindications:**

- Hematoma, trauma, or other abnormality over site.
- Patient does not require an IV.

**Precautions:**

- Keep the patient's head as low as possible to decrease the likelihood of an air embolism

**Procedure:**

- Position the patient: supine with the patient's head turned to opposite side from procedure.
- Cleanse the site with alcohol prep.
- Align the cannula with the vein.
- Make the puncture midway between the angle of the jaw and the midclavicular line, tamponade the vein lightly with one finger above the clavicle.
- Attach IV tubing to catheter.
- Ensure patency of the IV line.
- Secure tubing to patient's neck with tape.

**Notes:**

- Complications: hematoma formation, infection, thrombosis, phlebitis, skin necrosis, punctures of internal jugular vein or carotid artery.
- This should never be attempted as a "blind stick".

## Heated, Humidified, High-flow Nasal Cannula (HHHFNC)

**Authorization:** Critical Care Paramedic
**Protocol:** Standing order

**Dose:**

- **Adult:** Copy the hospital settings and/or titrate as needed.
- **Pediatric*:*** Not for use in patients under 12 years of age. *

**Indications:**

- Hypoxia refractory to other oxygenation methods.

**Contraindications:**

- Abnormalities of the face or nose that prevent the cannula from fitting.
- Not enough oxygen carrying capacity on the ambulance. If the patient's oxygen requirements exceed the amount of oxygen an ambulance can carry with an adequate margin of reserves for safety, the transport should be declined. The transporting ambulance must be able to carry twice the anticipated amount of oxygen needed for the transport. See notes section for tank duration times.

**Procedure:**

- You may transport the patient from the hospital to the ambulance on a non-rebreather and nasal cannula (if needed) rather than set up HHHFNC at the bedside if the patient can maintain their spo2% for this brief period. Trial them on a non-rebreather and cannula if needed for at least 5 minutes before moving them. At higher flows a 'D' tank may not last long enough to transport a patient from their room to the ambulance on a HHHFNC and the NRB and cannula strategy should be attempted.

- Ensure you select the correct size high flow nasal cannula. The nasal prongs on the cannula should not occlude more than 50% of the nares. Airway pressure progressively increases with both increasing flow rate and nasal prong to nares ratio.

- If the patient is not on HHHFNC at the sending facility but you are placing them on HHHFNC for transport, while there is no industry standard, a common practice is to start the patient at a flow of 30L min and titrate in increments of 10% fiO2 per minute.

- The inhalation temperature should be set at 37° C.

- Oxygen is adjusted to maintain an SpO2 of 92% -96% unless the patient has a chronic respiratory condition such as COPD, then the goal SpO2% should be 88%-92%. FiO2 should be titrated in 2-4% increments unless a larger increment is needed.

- If problematic amounts of condensation occur in the exhalation tube, increase the exhalation side temperature.

**Notes:**

- HHHFNC is approved for pediatric patients. However, CCEMS does not have a waiver for / protocols for pediatric RSI. Unless a pediatric patient is well established on HHHFNC and they are nowhere near the upper limits of flow and FiO2 (so there is marked room to increase these parameters if needed) this transport should be declined. For example, if a pediatric patient has been stable at 20L and 30% for the past week it may be prudent for CCEMS to take the transport. Conversely a pediatric patient just placed on HHHFNC at 40L/min and 100% FiO2 should be declined as there is little room to increase respiratory support if the patient worsens.

- Use with extreme caution for patients with a pneumothorax. Always consider the possibility of a pneumothorax if a patient on HHHFNC develops increasing dyspnea or hypoxia

- You must use **sterile water for inhalation purposes** in the H-900 reservoir.

- Do **not** use saline.

- Patients that are newly placed on HHHFNC may need a bit of coaching to become comfortable on this modality. They should be encouraged to concentrate on exhaling fully due to the PEEP effect of HHHFNC. If they do not exhale fully and have real or perceived air hunger or anxiety breath stacking may occur.

- ETCO2 is not reliable when used with high flow nasal cannulas.

- You must ensure you have enough oxygen to complete the transport. **The 2x oxygen margin of safety rule: the minimum required oxygen capacity is 2 times the longest potential anticipated need**. This may make some transports to the Denver area logistically impossible. For example, a patient on 40l/min and 100% fiO2 cannot be safely transported to University/Anschutz due to o2 capacity constraints. An “H” tank, which is the biggest oxygen tank we carry, will last for 2 hours and 37 minutes; therefore, we cannot meet the 2x oxygen rule and transport this patient safely to the Denver area.

- The decision to transport or not is to be made by the transporting paramedic.
  See chart below:

**Oxygen tank duration by cylinder size.**

D Tank

| | | FIO2% D Tank @2000psi x 0.16 = 320L | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 30% | 35% | 40% | 50% | 60% | 70% | 80% | 100% |
| 30L/min | 1h 36m | 1h 4m | 0h 43m | 0h 29m | 0h 21m | 0h 17m | 0h 14m | 0h 11m |
| 35L/min | 1h 22m | 0h 55m | 0h 37m | 0h 25m | 0h 18m | 0h 15m | 0h 12m | 0h 9m |
| 40L/min | 1h 12m | 0h 48m | 0h 32m | 0h 22m | 0h 16m | 0h 13m | 0h 10m | 0h 8m |
| 45L/min | 1h 4m | 0h 43m | 0h 28m | 0h 19m | 0h 14m | 0h 11m | 0h 9m | 0h 7m |
| 50L/min | 0h 58m | 0h 39m | 0h 26m | 0h 17m | 0h 13m | 0h 10m | 0h 8m | 0h 6m |
| 55L/min | 0h 52m | 0h 35m | 0h 23m | 0h 16m | 0h 12m | 0h 9m | 0h 8m | 0h 6m |
| 60L/min | 0h 48m | 0h 32m | 0h 21m | 0h 14m | 0h 11m | 0h 9m | 0h 7m | 0h 5m |

M Tank

| | | FIO2% M Tank @2000psi x1.54 = 3080L | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 30% | 35% | 40% | 50% | 60% | 70% | 80% | 100% |
| 30L/min | 15h 25m | 10h 18m | 6h 51m | 4h 37m | 3h 25m | 2h 44m | 2h 14m | 1h 43m |
| 35L/min | 13h 13m | 8h 50m | 5h 52m | 3h 58m | 2h 56m | 2h 21m | 1h 54m | 1h 28m |
| 40L/min | 11h 34m | 7h 44m | 5h 8m | 3h 28m | 2h 34m | 2h 3m | 1h 40m | 1h 17m |
| 45L/min | 10h 17m | 6h 52m | 4h 34m | 3h 5m | 2h 17m | 1h 50m | 1h 29m | 1h 8m |
| 50L/min | 9h 15m | 6h 11m | 4h 6m | 2h 46m | 2h 3m | 1h 39m | 1h 20m | 1h 2m |
| 55L/min | 8h 25m | 5h 37m | 3h 44m | 2h 31m | 1h 52m | 1h 30m | 1h 13m | 0h 56m |
| 60L/min | 7h 42m | 5h 9m | 3h 25m | 2h 19m | 1h 43m | 1h 22m | 1h 7m | 0h 51m |

H Tank

| | | FIO2% H Tank @2000psi x3.14 = 6280L | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 30% | 35% | 40% | 50% | 60% | 70% | 80% | 100% |
| 30L/min | 31h 26m | 21h 1m | 13h 57m | 9h 26m | 6h 59m | 5h 35m | 4h 32m | 3h 29m |
| 35L/min | 26h 56m | 18h 1m | 11h 58m | 8h 5m | 5h 59m | 4h 47m | 3h 53m | 2h 59m |
| 40L/min | 23h 34m | 15h 46m | 10h 28m | 7h 4m | 5h 14m | 4h 11m | 3h 24m | 2h 37m |
| 45L/min | 20h 57m | 14h 1m | 9h 18m | 6h 17m | 4h 39m | 3h 43m | 3h 1m | 2h 20m |
| 50L/min | 18h 52m | 12h 37m | 8h 22m | 5h 39m | 4h 11m | 3h 21m | 2h 43m | 2h 6m |
| 55L/min | 17h 9m | 11h 28m | 7h 37m | 5h 9m | 3h 48m | 3h 3m | 2h 28m | 1h 54m |
| 60L/min | 15h 43m | 10h 31m | 6h 59m | 4h 43m | 3h 29m | 2h 47m | 2h 16m | 1h 45m |

# HAMILTON-H900 Quick Guide Overview

*Applies to software version 1.10x and later*

**Temperature monitoring window button**

1 Press to show temperature
- At Y-piece
- At chamber exit
- Difference between the two above

2 Press for 5 s to enable Night display

**Auto mode button**

▶ Press for default settings*
- Invasive mode: 37°C
- Noninvasive mode: 31°C
- HiFlow: 35°C
- Temperature gradient: + 2°C (+ 3°C for infant breathing set)

** Factory default settings listed here*

**Power/Standby key**

1 ON: Long-press > 3 s
- Device starts in **Invasive** mode
- Briefly press to (de)activate **Standby**

2 OFF: Long-press > 3 s


**Limb connection status indicators**

**Green**: The limb is inserted correctly

**Orange**: The humidifier is testing the connection

**Red**: The connection is either faulty or nonexistent

**Exp. temp increase button***

▶ ON by default

▶ Increases the temperature in the WHITE expiratory limb to reduce condensation

▶ Press to stop extra heating

**Dual limb, single use breathing circuits only*

**INV/NIV/HiFlow mode button**

▶ Press to switch between **Invasive**, **Noninvasive**, and **HiFlow** modes

**Audio pause key**

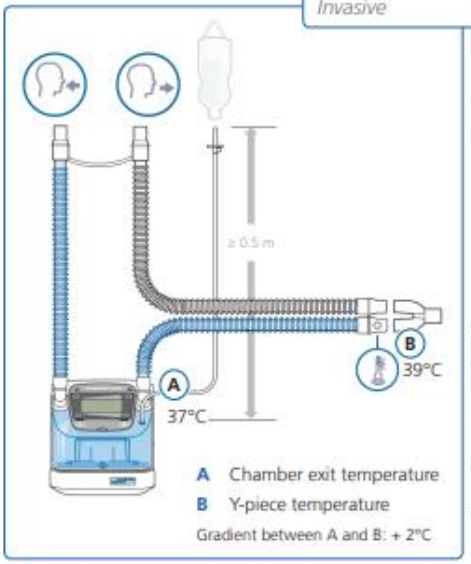
▶ Press (if appropriate for alarm)
- Audible alarm paused for 2 min

See the *HAMILTON-H900 Instructions for use* for detailed information.

HAMILTON MEDICAL
Intelligent Ventilation since 1983

# Display and circuit overview

Example shown:
*Adult, Auto mode, Invasive*




**A** Chamber exit temperature
**B** Y-piece temperature
Gradient between A and B: + 2°C


## Humidifier display

1. Current chamber exit temperature
2. Chamber exit temperature slider
3. Temperature gradient slider
4. Ventilator connection enabled
5. Mode symbols

### Adjust the temperature gradient

Temperature difference between water chamber and Y-piece

- Touch the temperature gradient slider at the current setting*. **Auto mode is deactivated.**
- Drag right to decrease the temperature gradient
- Drag left to increase the temperature gradient
- Release to apply setting

### Adjust the chamber exit temperature

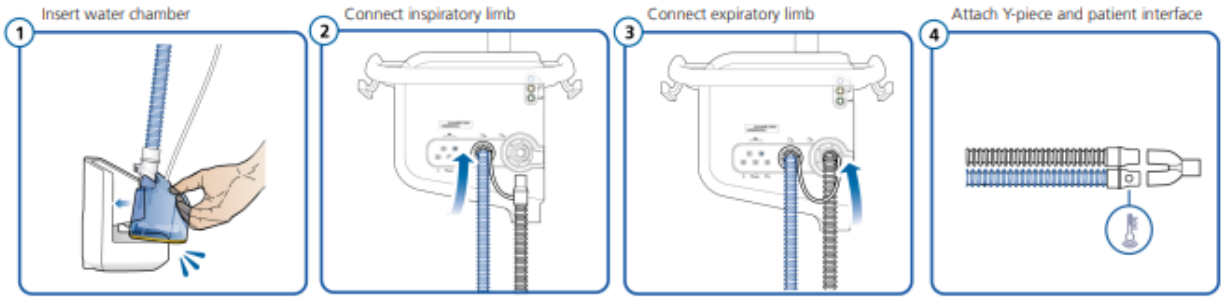
Water chamber exit temperature

- Touch the chamber exit temperature slider at the current setting*. **Auto mode is deactivated.**
- Drag left to decrease the chamber exit temperature
- Drag right to increase the chamber exit temperature
- Release to apply setting

See the *HAMILTON-H900 Instructions for use* for detailed information.

** For illustration purposes, shown as the green zone above/below the associated setting*

# System setup



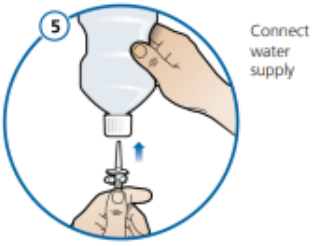

## Optimize settings

Depending on your settings and ambient conditions, condensation can occur. Follow these steps to reduce condensation.

1 Start with lower humidity settings
- First remove any water from the circuit
- Use the lowest **Chamber exit temperature** setting (slider all the way left)
- Set **Temperature gradient** to 1°C
- Check that no condensation is present after 2 hours

2 Optimum
- Humidity is optimal when fine, breath-dependent fogging forms in limbs, tubing, or flow sensor
- If humidity is not optimal, increase chamber temp. by 0.5 °C, recheck in 1 hour

3 Save optimum settings
- Save these settings as new defaults. See the *Instructions for use* for details.




## NOTE

Position of humidifier
- Avoid direct sunlight or flow of air conditioning (AC) onto the humidifier and the breathing circuit to avoid unnecessary condensation.

# Alarms and troubleshooting

See the *HAMILTON-H900 Instructions for use* for detailed information.

## High-priority alarms

Indicated by an audible, repeating alarm sound and a flashing visual red alarm indicator


**Temperature high**

- Check if the breathing circuit is covered by the patient's bed covers
- Check if the breathing circuit or the humidifier chamber is directly exposed to sunlight
- Replace the breathing circuit


**Water level high**

- Empty humidifier chamber to reduce the water level
- Replace humidifier chamber
- Operate humidifier at an angle < 10° relative to the floor

**Humidifier tilt**

- Check the mounting of the humidifier
- Check the ventilator trolley
- Operate humidifier at an angle < 10° relative to the floor

## Medium-priority alarms

Indicated by an audible, repeating alarm sound and a flashing visual yellow alarm indicator


**Temperature low**

- Wait until system heats up completely (approx. 30 min)
- Verify that all settings are correct
- Avoid direct air flow from air conditioner and the like to the humidifier and breathing circuit


**Water level low**

- Check water bottle and refill tubing
- If the water bottle is empty, connect a new water bottle
- Refill or exchange empty humidifier chamber
- Operate humidifier at an angle < 10° relative to the floor

**Check left or right limb**

- Insert or reseat breathing circuits correctly
- Replace breathing circuit set
- Connect the BLUE humidifier inspiratory limb to the ventilator *To patient* inspiratory port

**Check water chamber**

- Insert a new humidifier chamber and connect the breathing circuit

**689562/02** | 2020-04-27

# Intraosseous Cannulation

Authorization: EMT-IV* and Paramedic

Protocol: *EMT-IV – Under direct visual supervision of a Paramedic (See below).

Paramedic – standing order.

A metal catheter is placed into a bone, usually the tibia or humeral head, so that fluids or medications can be infused into the bone marrow. In unresponsive patients 10 years of age or younger the distal femur is also acceptable.

**Indications:**

- Any situation in which IV/IO access is needed and IV access is unobtainable or will require extended time to establish.
- **EMT-IV – May only establish IO access on an adult patient in cardiac arrest or in extremis while under the direct visual supervision of a Paramedic.**

**Contraindications:**

- Fracture of same bone.
- Patient is stable, with no indication of potential instability.
- Replacement of joint on side of procedure.

**Precautions:**

- Limit IO attempt to only one per extremity.
- Conscious patients require Lidocaine administration for local anesthetic.
- Osteoporosis (Insecure placement).

**Procedure:**

- Assemble equipment.
- If the patient is conscious, flush extension set with lidocaine.
- Choose appropriate IO cannula.
- Locate landmarks for the tibial or humeral insertion sites. The distal femur is an option in unresponsive pediatric patients 10 years of age or younger.
- Scrub the insertion site with an antiseptic wipe. Iodine is preferred but alcohol or chlorhexidine are appropriate.
- Without turning on the drill, insert the needle through the skin at a 90-degree angle on the tibial plateau or at the greater tubercle of the humeral head.
- Once through the skin, activate the drill. Place needle into the marrow cavity with gentle, constant pressure. If drill slows, too much pressure may be applied.
- There may be a slight "pop" when the needle goes into the marrow cavity. Stop as soon as the needle flange contacts the patient's skin or a sudden decrease in resistance is felt as the needle enters the medullary canal.
- Attach extension set and/or administration set.
- Aspiration is not recommended and is not necessary for confirmation of correct placement
- Ensure adequate flow with no extravasation of fluid. IO must be flushed to ensure flow or pressure infuser may be used.

- Secure IO cannula.

**Notes:**

- Refer to IV Infusion or specific treatment protocol for more information.
- At this time, any drug that may be given IV may also be given IO and have the same efficacy.

# Intubation

Authorization: Paramedic

Protocol: Standing order

**Indications:**

- Apnea, respiratory failure, patients that are unable to safely protect their own airway.

**Contraindications:**

- Providers are unable to establish confirmation of correct placement.

**Precautions:**

- May exacerbate hypotension
- May cause bradycardia via vagal nerve stimulation
- Any ET tube that cannot be confirmed to be in the trachea must be removed immediately.

**Procedure:**

- Gather all needed supplies: endotracheal (ET) tube, laryngoscope, suction, 10ml syringe, tube holder device, waveform capnography, and a bougie (optional).
- Position patient for optimal intubating conditions. Aligning the ear to the sternal notch is suggested.
- Perform laryngoscopy. Video laryngoscope is strongly preferred.
- Suction as needed.
- Insert endotracheal tube into trachea. Alternatively, EMS providers may insert a bougie into the trachea and slide the ET tube over the bougie.
- Inflate pilot balloon. Few patients need 10ml in the balloon, you only need to inflate it enough to prevent any air from leaking around it.
- Confirm placement of tube by auscultating lungs and epigastrium. Bilaterally lung sounds should be noted, and the epigastrium should be silent. If air is heard in the epigastrium promptly remove the ET tube.
- **EMS providers must confirm tube placement with continuous wave form capnography.** The only exception to this rule is in a wilderness setting or other austere environment where capnography is not available. Hit print on the cardiac monitor to ensure this data is captured for the patient care report.
- Secure the ET tube with device of choice.
- Note the depth of the ET tube at the patient's teeth. The depth should be approximately 3 times the diameter (example: an 8.0 tube should be near 24cm at the teeth).

**Notes:**

Nasal intubation is discouraged and should only be performed when no other options are available.

## Law Enforcement Blood Draw

Authorization: EMT-IV, and Paramedic

Protocol: EMT-IV, and Paramedic – Standing Order

Blood draw to obtain samples of venous blood to be used by a law enforcement agency.

**Indications:**

- Law enforcement request.

**Contraindications:**

- None.

**Precautions:**

- May be performed on a patient that is not transported.
- Do not delay the treatment/transport of a critically ill or injured patient to obtain blood draw.

**Procedure:**

- Assemble equipment from sealed package provided by the law enforcement officer.
- Cleanse site with iodine. Do not use alcohol.
- Obtain blood samples.

**Notes:**

<u>The required paperwork includes the following questions</u>

Does the person want any medical care or treatment from CCEMS personnel?

Is the person voluntarily consenting to having their blood drawn by CCEMS personnel?

Was the sealed venipuncture kit(s) provided by the requesting officer?

Was the blood drawn using all of the materials from the sealed kit(s)?

Was the venipuncture site(s) cleaned using only non-alcoholic antiseptic wipe(s) from the provided kit?

Blood specimen obtained using:

Did you witness the sealing of each blood tube?

Did you witness the initialing of all seals?

How many venipuncture attempts were made?

Home many kits were used.

Venipuncture site

**Obtain officer's signature.**

# NG / OG tube Insertion

Authorization: Paramedic

Protocol: Paramedic - Standing Order

NG/OG tubes should be utilized to decompress gastric distention.

**Indications:**

- Patients requiring reduction of gastric distention.
- Prolonged Bag-Valve-Mask ventilations.
- During or post cardiac arrest.
- Patients with advanced airways placed.
- Patients at risk of aspiration from emesis.
- Paralyzed patients (induced or caused by injury).
- Overdose/poisoned patients.
- Patient with decreased level of consciousness.
- Prior to interfacility transport when patient is on a ventilator.

**Contraindications:**

- NG placement should **not** be performed in the patient with maxillary facial injuries (Le Fort Fracture) or evidence of basilar skull fracture.
- OG placement should **not** be performed on patients with an intact gag reflex.

**Precautions:**

- Long term continuous suction of gastric contents can lead to metabolic alkalosis.

**Procedure:**

- Prepare equipment.
- Suction equipment, lubricant, Neo-Synephrine, and cloth tape.
- Measure tube for proper placement.
- Place the distal tip of the NG/OG tube at the distal tip of the xyphoid process, lay the tube up the sternum and around the patient's ear, extend the tube from the superior aspect of the auricle to the tip of the nose (NG) or to the lips (OG). Mark this location with tape or marker.
- NG placement.
- Premedicate the larger nare with Neo-Synephrine.
- Lubricate distal 4cm of tube with lubrication jelly or viscous Lidocaine.
- Place the patient in a neutral position or with slight flexion of neck.
- Insert tube into naris directly posteriorly or with a slight caudal angle, pass tube through the upper airway and have the patient "swallow" if possible. Pass tube to the depth of your mark and secure.
- Test tube by aspiration of gastric contents, auscultation, and relief of distention.

- If tube gets “hung up”, the patient experiences coughing or tube is seen in the mouth, remove tube, reposition the patient and retry placement.

**OG placement**

- Place the patient in a neutral position or with slight flexion of neck.
- Insert tube into the mouth, or suction port on extra glottic device, and pass posteriorly with a slight inferior angle. Pass the tube to the depth of your mark and secure.
- Test the placement of the tube by aspiration of gastric contents, auscultation, and relief of distention.

# Pain Management

Authorization: Paramedic, Paramedic-Critical Care

Protocol: Paramedic and Paramedic-Critical Care – See specific medication protocol

**Indications:**

- Any patient experiencing pain from:
  - Traumatic injury.
  - Acute Coronary Syndrome.
  - Abdominal pain.
  - Intubation / intubated patients.
  - Other painful conditions or procedures.

**Contraindications:**

- While providers may administer opioids and benzodiazepines together for analgesia pursuant to 6 CCR 1015-3, Chapter Two, providers may not use the medications for procedural sedation.

**Precautions:**

- Ensure proper blood pressure, ventilation, and oxygenation are maintained.
- Monitor for hypoventilation and hypoxia.
- Monitor for laryngospasm and hyper-salivation if ketamine is used.

**Procedure:**

- Monitor SPO2, HR, and BP. If situation allows and as indicated, monitor continuous ETCO2 if bradypnea develops.
- Administer indicated analgesia via appropriate route. IV access is often the preferred route for administration, but IO, IM and IN are also acceptable.
- Administer oxygen as indicated to maintain SPO2 >92%.
- Opioids are the preferred first line medication for analgesia. For pediatric doses please refer to the individual medications protocol.
- Clinical judgment should be used – some patients will require more analgesia and some patients will require less analgesia.
- Benzodiazepines may be considered as an adjunct to opioids for analgesia in the setting of severe muscle spasms and for anxiety.
- **Ketamine is not to be used *routinely* as a first line analgesic agent for paramedics operating under the CDPHE waiver. It may be used as a first line analgesic in patients with opioid allergies, opioid use/abuse disorders, patients with a previous history of opioid abuse not wanting opioids, in patients on naltrexone and in other situations based on provider judgement.**

**Notes:**

- In general, all patients that are in moderate to severe pain should receive adequate analgesia to reduce pain to a tolerable level. In adults, this is usually a 2-3/10 or until patient states that they require no further analgesia.
- Each medication has a specific dose, considerations, and precautions.
- Vital signs are unreliable in determining the patient's level of pain and should not be used to determine the validity of a complaint of pain. A patient may present with reported 10/10 pain and still have normal vital signs.
- Consider a multi-modal in severe pain, using a combination of analgesic medications such as Fentanyl and Acetominophen or Ketamine and acetaminophen.

# Palliative Care

Authorization: Paramedic

Protocol: Paramedic

**Background**

EMS is occasionally called to respond to terminally ill patients, some who are actively trying to enroll in hospice. There may be delays in admission to hospice due to unforeseen circumstances. There are also times where a patient is enrolled in hospice and EMS is requested either due to hospice staff being unavailable or the family of the patient is unsure of who to call. Few of these patients would benefit from transport to the ER, often the main goal of requesting EMS is for alleviation of symptoms and due to uncertainty of what to do by family members.

**Goals:**

- To alleviate pain, anxiety, nausea, dyspnea, seizures etc. from a known etiology without removing a patient from their home. To fill in a gap in healthcare where a terminally ill patient would not benefit from emergency room or hospital care, but they are not yet enrolled in hospice, or a heath care provider from hospice is not available.

**Procedures:**

- Common sense applies here – a cancer patient who falls and fractures a femur should go to the ER. If the patient is enrolled in hospice, it is recommended that providers involve the hospice RN in the transport decision if at all possible.
- Discussion with the patient/family members should occur about what the ER can offer for the patient: longer term pain management, respite care with admission, diagnostic tests, etc.
- Discussion about what EMS can offer, including we are not a long-term solution, we are a stop-gap measure and will encourage patients to go to the ER if they need additional help after the initial encounter.

**Treatments:**

There is no role for cardiac, spo2, or hemodynamic monitoring in palliative care unless it relates to treatment of symptoms.

- **Pain:** It may be prudent to establish a small IV to enable titration on analgesia as opposed to multiple IM or IN doses. Providers may start with 0.5-1mg of hydromorphone IV/IM/IN with titration as needed.
    - Fentanyl may be used but it less desirable due its faster metabolism.

Many patients are on high doses of oral opioids. To calculate an effective starting dose consider giving 10-25% of equianalgesic 24-hour dose for chronic pain as an IV bolus dose.

**<u>Equi-analgesic dose of common opioids</u>**

| | | | | | | |
|---|---|---|---|---|---|---|
| 30mg ***Oral*** Morphine | 10mg IV/IM Morphine | 100mcg IV/IN Fentanyl | 1.5mg IV/IN Hydromorphone | 15-20mg Oral OXYcodone | 25mg Oral Hydrocodone | 250mg Oral Tramadol |

**Example: A patient takes 150 mg of oral morphine per day.** Convert that to IV morphine equivalents, which is 50mg per day. Give a rescue dose of 10-15% of the 24-hour dose. The equivalent daily dose would be 2-2.5mg of hydromorphone mg IV. **This patient should receive 0.5mg of hydromorphone as a starting dose for breakthrough pain or not having pain medications on hand.**

- **Nausea:** Administer ondansetron (Zofran) as the first line anti-emetic. Higher doses than usual may be needed. Inapsine should be used only for nausea that is refractory to ondansetron in the elderly. If Inapsine is used, consider starting with a lowest effective dose. Inapsine may produce marked sedation in the elderly and may cause respiratory suppression.

- **Seizures:** Administer Midazolam IM/IV.

- **Dyspnea:** The goal is patient comfort, not to fix the patient. Simple things like a fan blowing across the face or positioning can have a significant impact. Titration of opioids is the preferred pharmacological intervention for dyspnea in the terminally ill patient.

- **Anxiety / Agitation:** Administer midazolam.

**After patient contact, providers must fill out a full PCR with documented refusal and a disposition of "treat and release" in ESO.**

# Peripheral IV Insertion

Authorization: EMT-IV and Paramedic.

Protocol: EMT-IV and Paramedic.

IV access allows a blood draw to be obtained, and fluid/medications to be administer.

**Indication:**

- Any patient requiring or potentially requiring:
  - A blood draw.
  - Fluid administration.
  - Medication administration.

**Contraindications:**

- Do not establish an IV in an arterial/venous fistula unless a life-threatening emergency is present.

**Precautions:**

- Do not start an IV distal to a fracture site or through skin damaged with more than erythema or superficial abrasions.
- Check expiration dates and clarity of fluid.
- Do not delay maintaining Airway, Breathing, or other methods of maintaining circulation to attempt IV access.
- Avoid starting IV on the same side that a mastectomy was performed unless there are no other options.
- The preferred site for an IV is in the hand or arm.
- IV placement in the feet should be avoided unless there are no other options

**Procedure:**

- Explain the procedure to the patient.
- Prepare the equipment.
  - Determine correct fluid to be administered.
  - Choose correct administration set or extension set.
  - If possible, use extension set when using an administration set.
  - Assemble equipment per accepted procedure ensuring asepsis.
- Cleanse site.
- Once venous cannulation is achieved, perform venous blood draw if indicated.
- Attach administration set and/or extension set.
- Flush the line with approximately 10ml of saline to ensure patency.
- Administer fluid at appropriate rate.

**Notes:**

- In patients younger than 12 extreme care should be used to ensure they do not receive too much fluid.
- Pyrogenic reactions due to contaminated fluids become evident in about 30 minutes after starting the IV. The patient will become febrile. Chills, vomiting, nausea, headache, backache and general malaise are indications. If observed, stop and remove IV and immediately save the solution so it may be cultured.

- Complications:  hematoma formation, infection, thrombosis, phlebitis, tissue necrosis, sepsis, pulmonary embolus, catheter fragment embolus, fluid overload, pulmonary edema, cardiac failure, fiber embolus from solution in IV.
- The incidence of phlebitis is particularly high in the leg.  Avoid use of lower extremity if possible.

# Rapid sequence Induction / RSI /DSI:

Authorization: Paramedic (waivered), Critical Care Paramedic
Protocol: Standing order

**Indications:**

- Hypoxia.
- Respiratory failure.
- Inability to protect own airway.
- Anticipated clinical course (ex: airway burns with edema and stridor).

**Contraindications:**

- Pediatric patients (<13 years of age).
- Patient who would not be able to be ventilated by other means if intubation is unsuccessful.

**Precautions:**

- Peri-intubation cardiac arrest is associated with intubating hypoxic and hypotensive patients – attempt to correct hypoxia and hypotension prior to RSI if time / patient stability allows.
- Succinylcholine can cause hyperkalemia – ensure the patient is on a cardiac monitor and watch for signs of developing hyperkalemia (prolonged PR interval, "peaked" T waves, QRS wideining).
- A rising etco2 level and masseter muscle spasm may signal malignant hyperthermia. If this occurs divert to the nearest receiving facility of, advise them of the situation and suggest they have dantrolene ready on arrival.

**Procedure:**

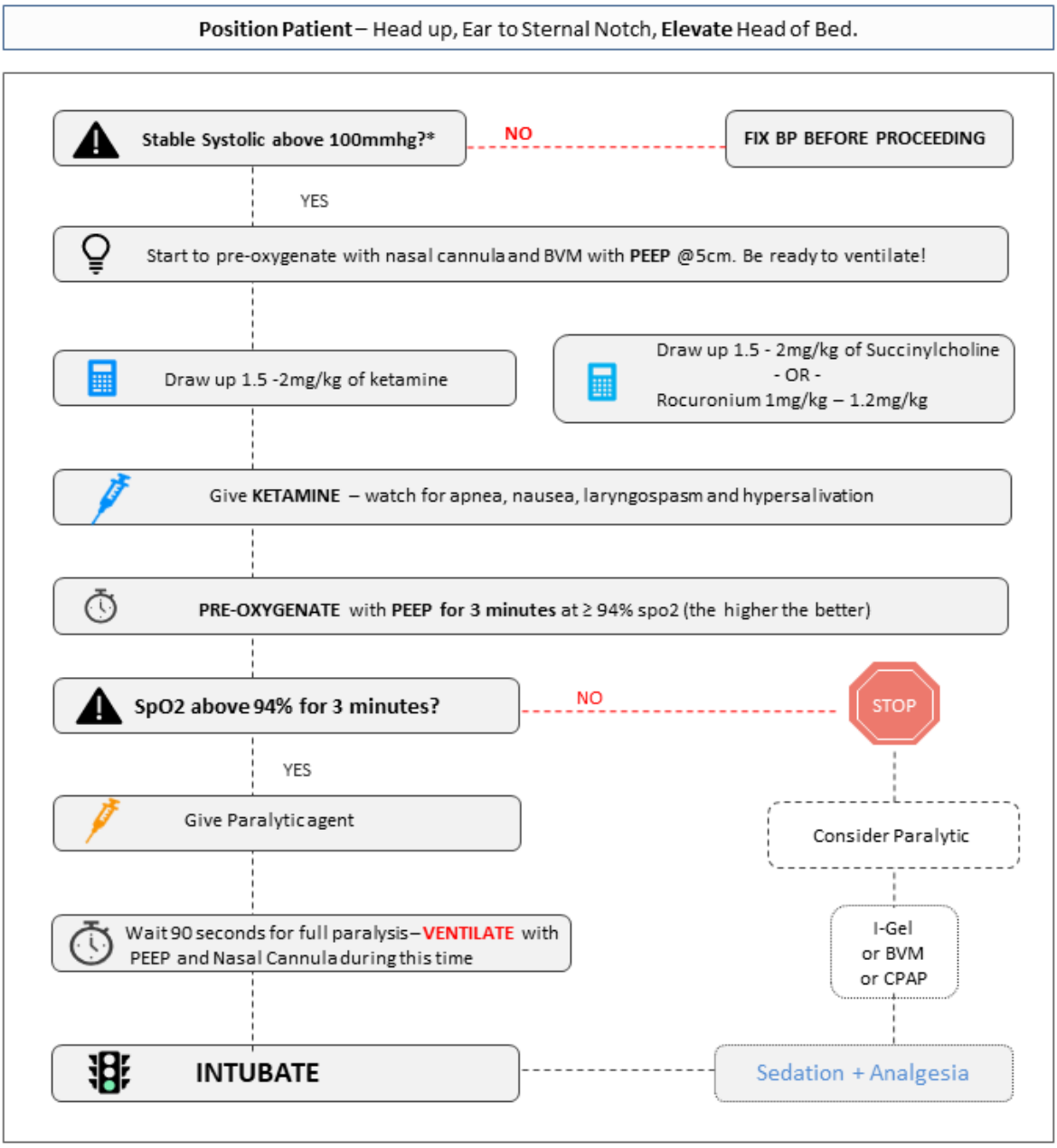
- Determine the patient's weight as accurately as possible.
- Calculate drug dosages needed. If possible, have a second member of Chaffee County EMS confirm the dosages.
- Pre-oxygenate the patient with as much oxygen as they will tolerate. A non-rebreather and etco2 cannula at 15l/min and 6l/min respectively are suggested.
- Prepare equipment. Have a rescue airway, BVM, suction, laryngoscope, tube tie, stethoscope, etco2 sensor, 10cc syringe and cricothyrotomy kit ready.
- If the patient is at their assumed maximal SpO2 level, administer sedative / analgesic agents.
    - Ketamine 1.5mg/kg – 2mg/kg is the suggested induction agent unless the patient is profoundly hypertensive.
- Position patient appropriately – ramp as needed to achieve ear to sternal notch position.
- Pre-oxygenate using a BVM with PEEP of 5cm h20 at highest flow available and nasal cannula at high flow for three minutes. The patient ideally maintains an Spo2 of at least 94% for three consecutive minutes before proceeding.
- You do not need to provide ventilations before administering a paralytic if the patient is spontaneously breathing. Use EtCO2 to assess quality of ventilations.
- After three minutes of maintaining an SpO2 of at least 94% spO2 after ketamine administration, administer Succinylcholine 1.5mg/kg - 2mg/kg or Rocuronium 1mg/kg – 1.2mg/kg. Consider increasing the dose of paralytics in hypotensive patients.
- Allow medication to cause full paralysis – **VENTILATE if needed** and maintain spo2 of at least 94%. If spo2 drops below 94% it is suggested that you oxygenate for 3 minutes at > 94%.

- It may be appropriate to administer sedation, analgesia, and a paralytic and then place an i-gel in predicted difficult airways.
- Intubate the patient. If at any point the Spo2 drops below 90% it is strongly encouraged that you abort the intubation attempts and ventilate the patient, getting the spO2 above 94%.
- If you cannot intubate the patient place an I-gel or BVM with NPA/OPA.
- Confirm correct endotracheal tube placement by auscultation of the epigastrium and both lungs
- After intubation, **CONTINUOUS WAVEFORM END-TIDAL CO2 IS MANDATORY** unless monitoring capabilities are unavailable (ex: back country call). This data must be uploaded to the patient's PCR.

- **Post-intubation analgesia and sedation.**
- Use any of the following (multiple medications may be used or combined, ex: Fentanyl AND Versed, Ketamine and Fentanyl, etc.) as needed and repeat as needed:
    - Fentanyl 1-2mcg/kg
    - Midazolam 2-5mg
    - Ketamine maximum of 0.5mg/kg single dose, (repeat as needed)
        - Critical Care endorsed Paramedics may use Ketamine at any reasonable dose.
- Administering paralytics post RSI should be avoided unless necessary and only considered after optimizing sedation and analgesia.

**SEE FLOWCHART BELOW FOR SUGGESTED SEQUENCE**

## SUGGESTED DSI ALGORITHM




- This is a *suggested* guideline. Some patients that need to be RSI'ed as opposed to DSI'ed, and there may be situations involving "crash airways" that do not conform to this guideline.
- Push Dose Epi is not a long-term solution. Plan on it wearing off in 3-5 minutes and consider starting an infusion BEFORE the patient can get hypotensive again.
- There are patients needing an ET tube / RSI that will never reach an SpO2 of >94. All the above values (Spo2, blood pressure) are suggestions, **not absolute contraindications**. If you MUST RSI to protect an airway but cannot obtain the suggested values, proceed with caution.

| Weight | Ketamine Induction DOSE range (1.5mg/kg – 2mg/kg) | Ketamine Induction VOLUME range @100mg/ml | Rocuronium DOSE range (1 – 1.2mg/kg) | Rocuronium VOLUME @10mg/ml |
|---|---|---|---|---|
| 40kg | 60mg – 80mg | 0.6ml – 0.8ml | 40mg – 48mg | 4ml – 4.8ml |
| 45kg | 67mg – 90mg | 0.67ml – 0.9ml | 45mg – 54mg | 4.5ml – 5.4ml |
| 50kg | 75mg -100mg | 0.75ml – 1.0ml | 50mg – 60mg | 5ml – 6ml |
| 55kg | 82mg – 110mg | 0.82ml – 1.1ml | 55mg – 66mg | 5.5ml -6.6ml |
| 60kg | 90mg – 120mg | 0.9ml – 1.2ml | 60mg – 72mg | 6ml – 7.2ml |
| 65kg | 97mg – 130mg | 0.97ml – 1.3ml | 65mg – 78mg | 6.5ml – 7.8ml |
| 70kg | 105mg – 140mg | 1.05ml – 1.4ml | 70mg – 84mg | 7ml – 8.4ml |
| 75kg | 112mg – 150mg | 1.12ml – 1.5ml | 75mg – 90mg | 7.5ml – 9ml |
| 80kg | 120mg – 160mg | 1.2ml – 1.6ml | 80mg – 96mg | 8ml – 9.6ml |
| 85kg | 127mg – 170 mg | 1.27ml – 1.7ml | 85mg – 102mg | 8.5ml – 10.2ml |
| 90kg | 135mg – 180mg | 1.35ml – 1.8ml | 90mg – 108mg | 9ml – 10.8ml |
| 95kg | 142mg – 190mg | 1.42ml – 1.9ml | 95mg – 114mg | 9.5ml – 11.4ml |
| 100kg | 150mg – 200mg | 1.5ml – 2.0ml | 100mg – 120mg | 10ml – 12ml |
| 105kg | 157mg – 210mg | 1.57ml – 2.1ml | 105mg – 126mg | 10.5ml – 12.6ml |
| 110kg | 165mg – 220mg | 1.65ml – 2.2ml | 110mg – 132mg | 11ml – 13.2ml |
| 115kg | 172mg – 230mg | 1.72ml – 2.3ml | 115mg – 138mg | 11.5ml -13.8ml |
| 120kg | 180mg – 240mg | 1.8ml – 2.4ml | 120mg – 144mg | 12ml – 14.4ml |
| 125kg | 187mg – 250mg | 1.87ml – 2.5ml | 125mg – 150mg | 12.5ml – 15ml |
| 130kg | 195mg – 260mg | 1.95ml – 2.6ml | 130mg – 156mg | 13ml – 15.6ml |
| 135kg | 202mg – 270mg | 2.02ml – 2.7ml | 135mg – 162mg | 13.5ml -16.2ml |
| 140kg | 210mg – 280mg | 2.1ml – 2.8ml | 140mg – 168mg | 14ml – 16.8ml |

**↓↓↓ POST INTUBATION SEDATION AND ANALGESIA ↓↓↓**

**Ketamine** 0.5mg/kg (May repeat as needed)

**Fentanyl** 50-100mcg (May repeat as needed)

**Versed** 2-5mg (May repeat as needed)

***Medications may be combined (example: Fentanyl and versed can be given)

**Mix Epi or Levophed 4mg in 250cc of D5W (start at 8mcg/min and titrate)**
**You may need higher doses than this chart shows**

| Dose | Volume | Per hour | | Gtt/min | Real World |
|---|---|---|---|---|---|
| **2mcg/min** | 0.125ml/minute | 7.5ml per hour | | 7.5 drops per minute | Two drops in 15 seconds |
| **4mcg/min** | 0.25ml/minute | 15ml per hour | One drop every 4 seconds | 15 drops per minute | One drop every 4 seconds |
| **6mcg/min** | 0.375ml/minute | 22.5ml per hour | | 22.5 drops per minute | One drop every 3ish seconds |
| **8mcg/min** | 0.5ml/minute | 30ml per hour | One drop every 2 seconds | 30 drops per minute | One drop every 2 seconds |
| **10mcg/min** | 0.625ml/minute | 37.5ml per hour | | 37.5 drops per minute | Round to 38ml - do 19 drops in 30 seconds |
| **12mcg/min** | 0.75ml/minute | 45ml per hour | | 45 drops per minute | 15 drops in 20 seconds |
| **16mcg/min** | 1ml/minute | 60ml per hour | One drop every 1 second | 60 drops per minute | One drop per second |
| **20mcg/min** | 1.25ml/minute | 75ml per hour | 1.25 drops per second | 75 drops per minute | 25 drops in 20 seconds |

## Refusal of treatment and/or transport

Authorization: EMT, EMT-IV, Paramedic
Protocol: Standing order

**Indications:**

- Patients with potential injuries or illnesses that do not want additional treatment or do not want to be transported to the emergency room via ambulance.

**Contraindications:**

- Any patient that does not have decision making capacity and has an emergent or potentially emergent condition.

**Precautions:**

- Refusals are among the riskiest activities for EMS providers. Numerous cases exist where an EMS provider assumed a patient did not have a significant injury or illness and later the patient had a bad outcome, and the EMS provider was liable.
-

**Procedure:**

- Ensure the patient has decision making capacity (see following pages). If the patient does not have decision making capacity, then they are to be treated under implied consent if there is no proxy/surrogate decision maker or legal guardian present.
- Ensure the patient is making the decision under “informed consent.” The patient must demonstrate an understanding of the risks involved in declining ambulance transport and evaluation and treatment at the emergency room.
- EMS providers may call and consult with the on-duty emergency room physician regarding refusals. In some cases, it may be advisable to have the emergency room physician speak directly with the patient.

**Ensuring decision making capacity in the adult patient (from Uptodate.com)**

## The decision-making abilities, their definitions, and questions to assess them

| Decision-making ability | Definition | Sample questions |
|---|---|---|
| Understanding | The ability to state the meaning of the relevant information (eg, diagnosis, risks and benefits of a treatment or procedure, indications, and options of care). | After disclosing a piece of information, pause and ask the patient: "Can you tell me in your own words what I just said about [fill in the topic disclosed]?" |
| Expressing a choice | The ability to state a decision. | "Based on what we've just discussed about [insert the topic], what would you choose?" |
| Appreciation | The ability to explain how information applies to oneself. | To assess appreciation of diagnosis: "Can you tell me in your own words what you see as your medical problem?"<br>To assess appreciation of benefit: "Regardless of what your choice is, do you think that it is possible the medication can benefit you?"<br>To assess appreciation of risk: "Regardless of what your choice is, do you think it is possible the medication can harm you?" |
| Reasoning | The ability to compare information and infer consequences of choices. | To assess comparative reasoning: "How is X better than Y?"<br>To assess consequential reasoning: "How could X affect your daily activities?" |

Instructions: The usual flow of a capacity assessment begins with the clinician disclosing the relevant facts for a decision and an assessment of the patient's understanding of those facts. Next, the clinician asks for the person's choice, followed by an assessment of their appreciation and reasoning about the choice, and concluding with a reassessment of choice. During the reassessment of choice, pay attention to the logical consistency of the choice based on the reasoning provided.

**Examples of adequate, marginal, and inadequate performance on measures of the four decision-making abilities**

| | Adequate | Marginal | Inadequate |
|---|---|---|---|
| **Understanding** | Patient recalls the content of the item and offers a fairly clear version of it. Specific use of all the terms supplied in the description is not required as long as there is no loss of meaning. | Incomplete or vague response. The patient shows some recollection of the item content but describes it in a way that renders understanding uncertain, even after the clinician has made efforts to obtain clarification. This includes responses that could indicate understanding but are too broad or vague to be sure, or responses that contain some correct pieces of information, but lack key features. | Clearly inaccurate response with serious distortion. For example, the patient does not recall the content of the item, describes it in a way that is clearly inaccurate, describes it in a way that seriously alters its meaning even after efforts to obtain clarification, or offers a response that is unrelated to the question or unintelligible. Responses citing the material verbatim with no other accompanying description do not constitute adequate understanding. |
| **Expressing a choice** | Patient states a clear, single choice. | Patient states more than one choice or ambivalence. | Patient is unable to state a choice at all. |
| **Appreciation of the problem** | Patient acknowledges that they manifest a problem based on sound reasoning. Alternatively, the patient may disagree with the claim, but must offer reasons that are not delusional and have some reasonable or verifiable explanation. | Patient acknowledges manifesting a problem but denies some features that may be considered critical for understanding or solving the problem. For example, a person who admits they only need help with opening their medications, when their problem is known to be remembering to take their medications. This rating may also be given if the patient disagrees or is ambivalent about the existence of the problem but provides reasons that are vague or not clearly defined. | Patient clearly does not believe that they have a problem with the disclosed activity. Reasoning is seriously flawed and is not based on reality or known facts. |
| **Appreciation of the options** | Patient acknowledges at least some potential benefit (or adverse effect) of the option on their situation that is not based on delusional or distorted thinking. Alternatively, the patient sees no benefit (or does not believe the option will have an adverse effect) and offers reasons that are not delusional or distorted to support the claim. The patient may be ambivalent but must give a clear and logical reason for being ambivalent. | Patient may or may not believe that the option will benefit (or have an adverse effect on) their situation, but the reason is vague or may represent delusional or distorted versions of reality. Alternatively, the patient is ambivalent as to the potential benefit (or harm) and the reasoning is vague. | Patient offers reasons that are delusional or a serious distortion of reality, or cannot answer the question. |
| **Reasoning** | Comparative: Patient provides a clear and vivid statement that compares the consequences of one option with another.<br>Consequential: Patient provides a clear and vivid statement of how continuing with the current situation could or could not affect the patient's life.<br>Logical consistency: The patient's final choice follows logically and consistently based on reasoning provided. | Comparative: Patient provides a comparison statement without a statement of specific consequences.<br>Consequential: Patient provides a general statement without details of how the current situation could or could not affect the patient's life.<br>Logical consistency: It is unclear whether the patient's final choice follows logically from the reasoning provided. | Comparative: Patient provides no comparative statements or an illogical comparison.<br>Consequential: Patient provides no everyday consequences or an otherwise illogical answer.<br>Logical consistency: The patient's final choice does not follow logically from the reasoning provided. |

*Adapted from: Assessment of Capacity for Everyday Decision-Making (ACED) Volume I, developed by Jason Karlawish, MD and James Lai, MD.*

# Selective Spinal Immobilization

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic - Standing Order

**Introduction:**

Scientific evidence has shown limited, if any, benefit from the use of spinal immobilization devices in traumatically injured patients. There is some evidence showing potential harm from placing patients on rigid backboards.

The tool provided below will assist providers in deciding when or when not to immobilize a patient.

**Implementation:**

Determine required immobilization technique or determine that no immobilization is indicated

- If full spinal immobilization is indicated:
  - Immobilize the patient on a long spine board, scoop board, gurney, or vacuum mattress.
  - Place properly sized C-collar.
  - Ensure that the patient is adequately padded to avoid further injury.

- If a C-collar is indicated:
  - Place properly sized C-collar.
  - Coach the patient to limit their spinal movement.
  - If the patient is ambulatory, assist the patient in moving to the gurney. If the patient is able to self-extricate after a MVC, this is acceptable and preferred.
  - If the patient is not ambulatory, a Scoop Board should be used to facilitate movement to the gurney.

- If a C-collar or immobilization is not indicated:
  - Treat the patients injures and conditions as indicated.

**General:**

- Log rolling patients should be avoided unless the patient is found in a prone position or there is suspected injury to the posterior aspect of the patient.
- Withhold C-collar placement if it is difficult to place, poorly fitting, or might impair airway management. Other methods of cervical immobilization may be used.
- Risk of aspiration should be considered prior to fully immobilizing a patient. Prophylactic antiemetic administration may be indicated.
- A properly padded Scoop Board may be left in place during transport to ED to facilitate movement of the patient. If padding is not used, Scoop Board should be removed prior to transport.
- Forcefully restraining a patient to initiate spinal immobilization may cause more harm than forgoing immobilization. Sedation may be used if needed (Refer to Patient Restraint Protocol).

## Selective Spinal Immobilization Flow Chart

Rigid spinal immobilization boards use is optional and left to provider discretion. There is little evidence of efficacy for using a rigid board to immobilize a spine and data suggesting rigid spine boards may cause injuries if used for prolonged periods.
Alternatives to a rigid spine board that may be used:

- Scoop stretcher
- Vacuum mattress
- Gurney mattress with seatbelts

**Does the patient have any of the following signs or symptoms and the existence of a mechanism of injury that could cause a cervical fracture?**

- Neurologic deficit following an injury?
- Mid-line neck pain?
- Altered mental status?
- Intoxicated?
- Clinical suspicion of a cervical fracture?

YES →

Apply a cervical collar.

↓ No

Do not apply a cervical collar.

# Splinting

Authorization: EMT, EMT-IV, and Paramedic

Protocol: Standing Order

A splint is a device that immobilizes an injury to the musculoskeletal system.

**Indications:**

- Pain, edema, or deformity in the musculoskeletal system which includes the extremities, head, torso and spine should be splinted to decreases the pain and protect the vasculature, nerves, and soft tissue from further trauma.

**Contraindications:**

- None.

**Precautions:**

- Splinting in multisystems trauma, or critical patients, should be done with a long spine board. Splinting of individual injuries should not delay transport.

- Spinal immobilization can cause the patient harm. Do not immobilize the patient unless it is indicated.

**Procedure:**

- Splinting extremities
    - Expose the injured site.
    - Check for distal pulse, movement, and sensation.
    - Dress and bandage any wounds prior to splinting.
    - Severely angulated fractures may need to be straightened if there are no distal pulses present or if the position prevents extrication or transportation.
    - Joint injuries should be immobilized in the position found.
    - Retraction of bone ends in open fractures is not advisable but may be unavoidable.
    - Immobilize the joint above and below the fracture site.
    - There are a variety of splints that can be used. The type of splint will be dependent on the type and location of the musculoskeletal injury.
    - The splint should be secured. It should be secure enough to immobilize the limb but not impair circulation.
    - After the splint has been applied, the patient should be evaluated for distal pulse, movement and sensation.

- Traction splints (Kendrick, HARE, or Slishman)
    - Ensure that the fracture is a closed midshaft femur without fractures to the pelvis, knee or lower leg.
    - Expose the fracture site.
    - Check for distal pulse, movement and sensation.
    - Dress and bandage any wounds prior to splinting.

- Place splint according to manufacturer's recommendations.
- Avoid placing straps over the fracture site or the knee.
- After the splint has been applied, the patient should be evaluated for distal pulse, movement, and sensation.
- Consider immobilization of the spine.

- Spinal immobilization
  - See Selective Spinal Immobilization Protocol.
  - Apply manual stabilization to the head and neck as soon as possible.
  - Check distal circulation, motor function, and sensation in all four extremities.
  - Place a cervical collar of the appropriate size.
  - Pad voids and behind the patient's head.
  - Place the patient onto the long spine board or a scoop with method indicated (Standing placement, logroll, etc.).
  - Attach the torso to the board with straps.
  - Attach the head and cervical spine to the board with head rolls and tape. Do not use sandbags.
  - Check distal circulation, motor function, and sensation.

**Notes:**

- Cold packs and elevation will slow the swelling process. Use care with cold packs so that the soft tissue is not damaged by the cold.

## TASER Probe Removal

Authorization: EMT, EMT-IV, Paramedic

Protocol: Standing order

**Indications:**

- People who have been tased and still have the taser probes in them.

**Contraindications:**

- TASER probe embedded in the eye, genitals, or close to major neurovascular structures should not be removed by EMS. In these cases, transport the patient to an emergency department for removal.

**Procedure:**

- Be alert for any medical conditions which may ensue following physical struggle.
- Confirm the TASER has been shut off and the barb cartridge has been disconnected.
- Using a pair of shears cut the TASER wires at the base of the probe.
- Place one hand on the patient in area where the probe is embedded and stabilize the skin surrounding the puncture site. Using the other hand (or use pliers) firmly grasp the probe.
- In one uninterrupted motion, pull the probe out of the puncture site maintaining a 90° angle to the skin. Avoid twisting or bending the probe.
- Repeat the process for any additional probes.
- Once the probes are removed, inspect, and assure they have been removed intact. In the event the probe is not removed intact or there is suspicion of a retained probe, the patient must be transported to the emergency department for evaluation.
- Cleanse the probe site and surrounding skin and apply sterile dressing.
- Advise patient to watch for signs of infection including increased pain at the site, redness swelling or fever.

## Venous Blood Draw

Authorization: EMT-IV, and Paramedic

Protocol: EMT-IV, and Paramedic – Standing Order

A blood draw obtains samples of venous blood, in various tubes, that can be used for testing at the receiving hospital.

**Indications:**

- Any patient who receives a peripheral IV or EJ in the field
    - A blood draw may be forgone altogether or withheld until a second IV is place at the providers discretion.

**Contraindications:**

- None.

**Precautions:**

- Treatment of unstable patients should not be delayed obtaining blood samples.
- In young patients blood draws should be avoided due to their volume status.

**Procedure:**

- After initiating an IV and removing the needle, attach the vacutainer holder to the hub of the IV catheter. (This is accomplished using the luer adaptor attached to the vacutainer holder).
- Fill all the desired blood tubes in appropriate order per system requirements. Generally the order the tubes should be drawn is is red, blue, green, and lavender
- Tubes should be gently inverted. Do not shake the tube, as this could cause hemolysis, which could interfere with test results.
- Tubes should be placed in bag and kept with the patient.
- Provide filled sample tubes to receiving facility.

**Notes:**

- Pediatrics receiving an IV should have at least a red tube and lavender top tube drawn. The red top may be filled only halfway and the lavender only 1/4 of the way to do the needed tests. If available, red and lavender pediatric tubes may be used.
- The blue top tube must be filled exactly to be usable; the amount of vacuum in the tube is pre-established to draw the proper amount of blood into the tube.

## ACLS TREATMENT PROTOCOLS:

# Acute Coronary Syndrome

This protocol serves as a guide to the treatment of a patient who is having cardiac, or suspected cardiac, chest pain or other signs/symptoms associated with Acute Coronary Syndrome

| Procedure | EMT | EMT-BIV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive, or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| Administer Aspirin as indicated | x | x | x |
| Continuously monitor cardiac rhythm | | | x |
| Serial 12-lead ECGs with consideration of right-sided or posterior leads as indicated | | | x |
| Determine if the patient meets STEMI Alert criteria | | | x |
| IV: 1-2, and draw blood if possible (Dark green top) | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Maintain systolic BP ≥ 90mmHg with fluid or a vasopressor as indicated | | x | x |
| Administer Nitroglycerine as indicated | | (Assisted DO) | x |
| Administer opioid of choice as indicated | | | X |
| Treat dysrhythmias as indicated | | | X |

**Notes:**

- Consider BGL evaluation as well as bi-lateral blood pressure determination.
- Appropriate pain and anxiety control may significantly improve patient outcomes.

# Do Not Resuscitate (DNR) Orders:

Authorization: EMT, EMT-IV and Paramedic.
Protocol: Standing Order.

**Indications:**

Patients in cardiac arrest, respiratory arrest, and patients in peri-arrest states.

**Background:**

In the state of Colorado, 6 CCR 1015-2 details the regulations surrounding this issue. 6 CCR 1015-2 defines a DNR order as a physician order to refrain from cardiopulmonary resuscitation. More frequently encountered by EMS providers is a "CPR Directive." A CPR Directive is legally valid and effectively the same as a DNR order if it expresses the patients wishes regarding what care they want should they require Resuscitation.

Both CPR directives and DNR Orders are acceptable for withholding resuscitation attempts.

Nothing in these rules shall be construed to require EMS providers to initiate CPR in the absence of a CPR Directive.

**What is the definition of CPR in Colorado?**

- "CPR" includes, but is not limited to, artificial ventilation, chest compression, delivering electric shock, placing tubes in the airway to assist breathing, or other basic and advanced resuscitative therapies.

**What counts as a DNR Order?**

- A DNR order is an order from a physician to withhold CPR and is signed by the physician.

**What counts as a CPR Directive?**

- A bracelet or Necklace.
- A valid CPR Directive that has been photocopied, scanned, faxed, or otherwise reproduced shall be honored.
- Any document or item of information or instruction that clearly communicates the individual's wishes or intent regarding CPR may be regarded as valid and the individual's wishes honored.

**Who can Revoke a DNR/CPR Directive?**

- A CPR Directive may be revoked at any time by the declarant who is the subject of such directive or by the authorized agent for the declarant. However, only those CPR Directives executed originally by a guardian, agent, or proxy decision maker may be revoked by a guardian, agent, or proxy decision maker.

- Family or bystanders, who are not the declarant or the declarant's authorized agent, may NOT revoke a CPR directive.

# Cardiac Arrest - Medical

This protocol serves as a guide in the treatment of a patient in cardiac arrest from a medical cause

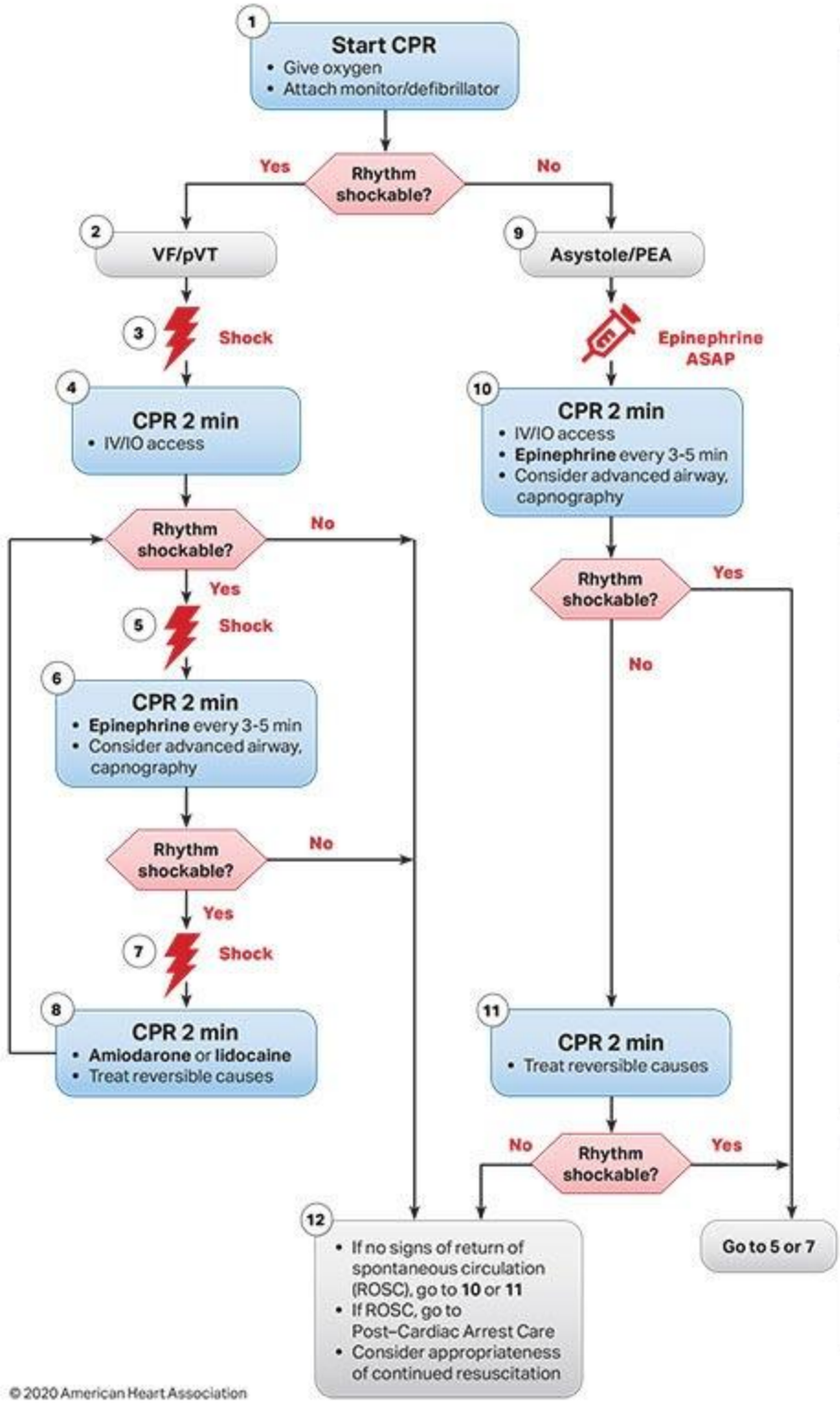
| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Initiate CPR (Follow current AHA guidelines) | x | x | x |
| Ventilate with BVM and high flow O2 | x | x | x |
| Suction as needed | x | x | x |
| Insert OPA/NPA | x | x | x |
| Monitor cardiac rhythm and if the patient is in a shockable rhythm: | | | |
| • Consider 2min of CPR prior to defibrillation | x | x | x |
| • Defibrillate manually or with AED (Certification level dependent) | x | x | x |
| IV: 1-2 IV with Crystalloid fluid 20ml/kg if indicated | | x | x |
| IO if unable to obtain IV with Crystalloid fluid 20ml/kg if indicated | | | x |
| Administer medications as indicated | | x | x |
| Insert advanced airway: Extra-glottic Device or Oral ETT (**Do not stop compressions to insert an advanced airway)** | X<br>I-gel only | X<br>I-gel only | x |
| Consider and treat reversible causes of cardiac arrest | x | x | X |
| **CPR INDUCED AWARENESS** - If patient is agitated/combative/aware and in pain during CPR administer VERSED IV/IO as needed. | | | X |
| **If ROSC:** | | | |
| • Begin transport after ensuring stability | x | x | x |
| • Monitor vital signs | x | x | x |
| • Perform 12-lead ECG | | | x |
| • Treat hypotension and arrhythmias as indicated | x | x | x |
| • Consider sedation if advanced airway is in place and the patient shows signs of neurologic function | | | x |

**Notes:**

- See Traumatic Cardiac Arrest, and Neonate Resuscitation for specific Protocol
- Prioritize treatments during cardiac arrest. Do not interrupt compressions unnecessarily. Advanced airway insertion allows continuous compressions to occur.

- Swap compressors every two minutes, if possible.
- **If ROSC occurs, consider an appropriately extended scene time to ensure that all needed interventions are complete; and that enough personnel are present if the patient rearrests to provide needed treatments.**

## Adult Cardiac Arrest Algorithm (VF/pVT/Asystole/PEA)






**CPR Quality**

- Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If $PETCO_2$ is low or decreasing, reassess CPR quality.

**Shock Energy for Defibrillation**

- **Biphasic**: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic**: 360 J

**Drug Therapy**

- **Epinephrine IV/IO dose:** 1 mg every 3-5 minutes
- **Amiodarone IV/IO dose:** First dose: 300 mg bolus. Second dose: 150 mg. *or* **Lidocaine IV/IO dose:** First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.

**Advanced Airway**

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

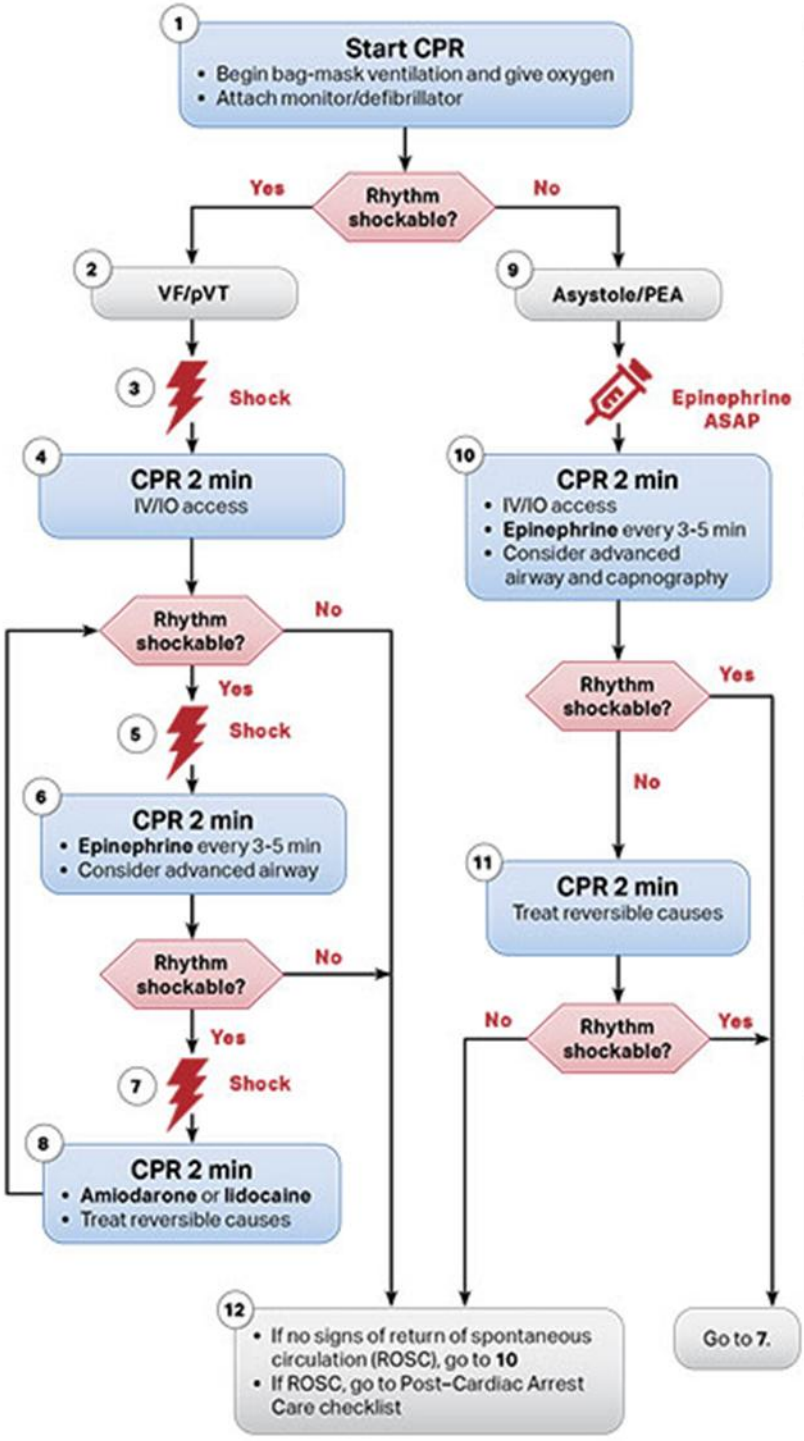
**Return of Spontaneous Circulation (ROSC)**

- Pulse and blood pressure
- Abrupt sustained increase in $PETCO_2$ (typically ≥40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

**Reversible Causes**

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

## Pediatric Cardiac Arrest Algorithm




**CPR Quality**

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

**Shock Energy for Defibrillation**

- First shock 2 J/kg
- Second shock 4 J/kg
- Subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

**Drug Therapy**

- **Epinephrine IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT
  *or*
  **Lidocaine IV/IO dose:** Initial: 1 mg/kg loading dose

**Advanced Airway**

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

**Reversible Causes**

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypoglycemia
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

# Dysrhythmias

This protocol serves as a guide to the treatment of a patient who is experiencing cardiac dysrhythmias

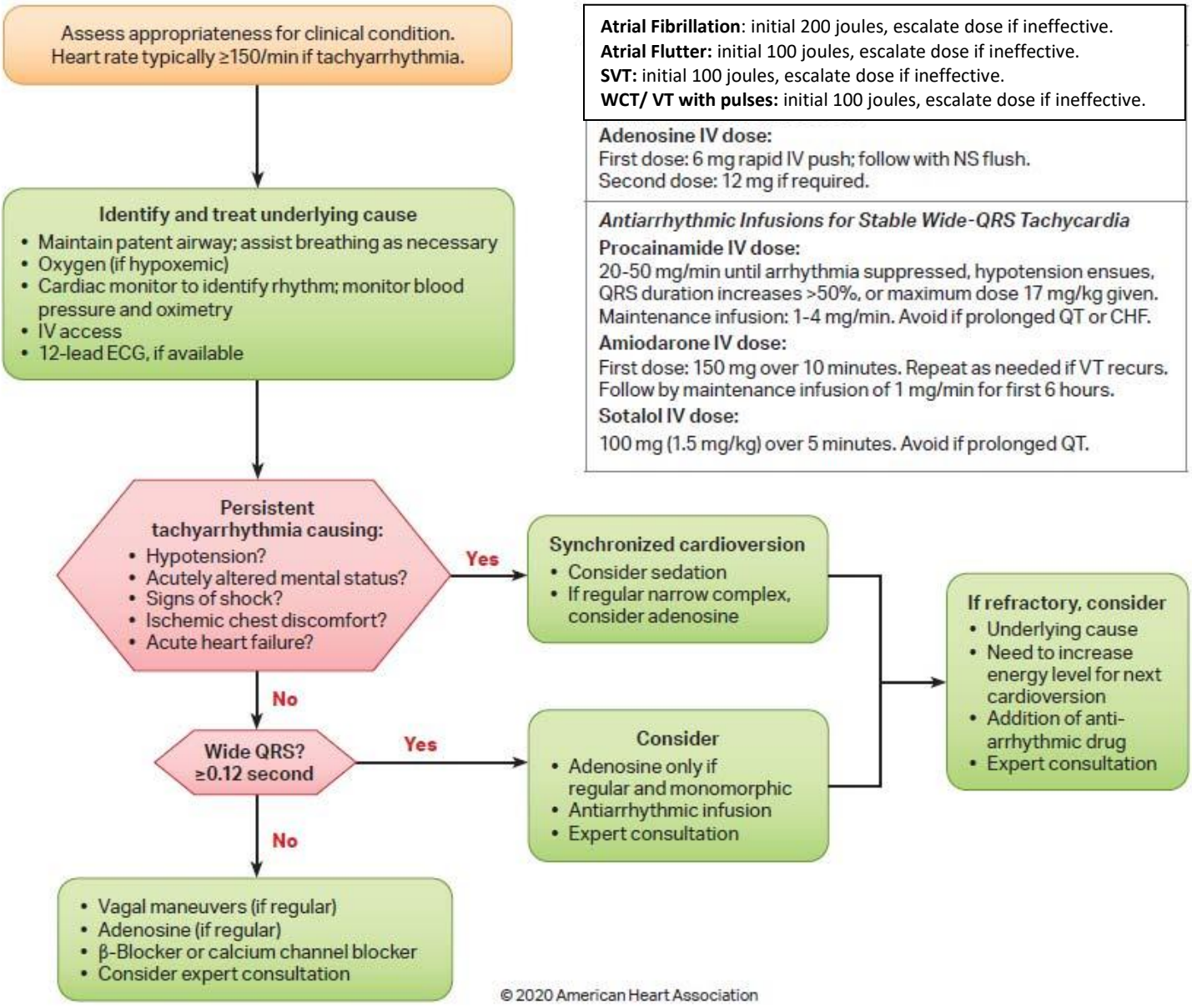
| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive, or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs and cardiac rhythm | | | x |
| IV: 1- 2, and draw blood if possible (Dark green top) | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| See Acute Coronary Syndrome Protocol if signs of ACS | x | x | x |
| **If unstable with systolic BP ≤ 90mmHg or symptomatic:** | | | |
| • Consider fluid bolus | | x | x |
| • Administer appropriate pharmacological intervention, if indicated | | | x |
| • Synchronized cardioversion if indicated. Start with 200j. | | | x |
| • Overdrive pacing | | | x |
| **If stable with systolic BP > 90mmHg:** | | | |
| • Consider fluid bolus | | x | x |
| • Administer appropriate pharmacological intervention, if indicated | | | x |
| • Consider synchronized cardioversion if indicated | | | x |
| • Consider overdrive pacing | | | x |

**Notes:**

- Consult Base Physician for advice if needed
- Wide complex tachycardias can be very difficult to differentiate. If unable to differentiate and perfusion is adequate, administer Adenosine first. If this is not effective, treat the dysrhythmia as ventricular tachycardia. If the patient is hypotensive with associated signs/symptoms, synchronized cardioversion is indicated
- If pulses are not palpable and the patient is unconscious, begin CPR and treat accordingly
- Many dysrhythmias are caused by or enhanced by hypoxia. Be sure that the patient is receiving high flow O2 and ventilating adequately

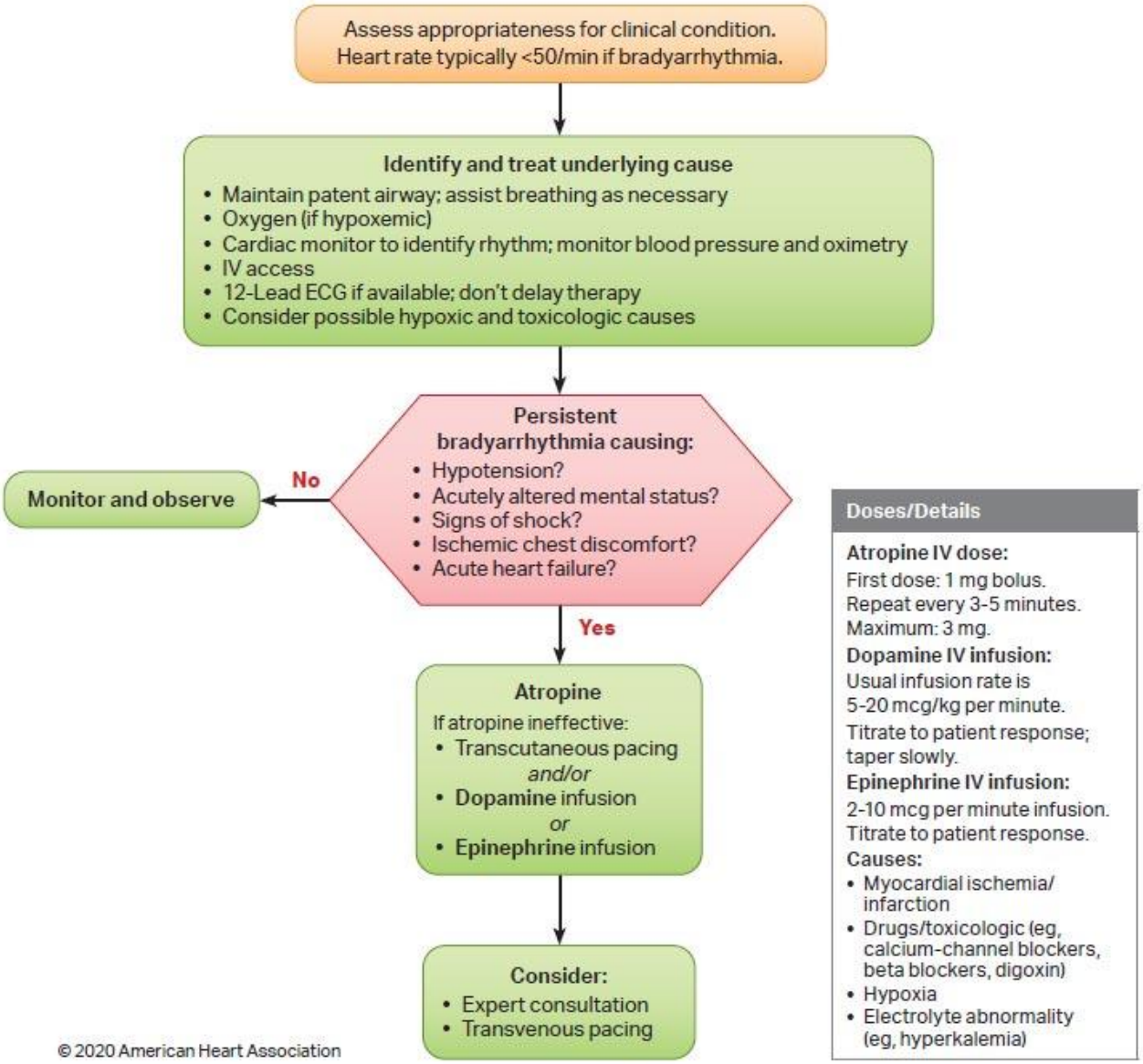
# Adult Tachycardia (With pulse)

## Adult Tachycardia With a Pulse Algorithm

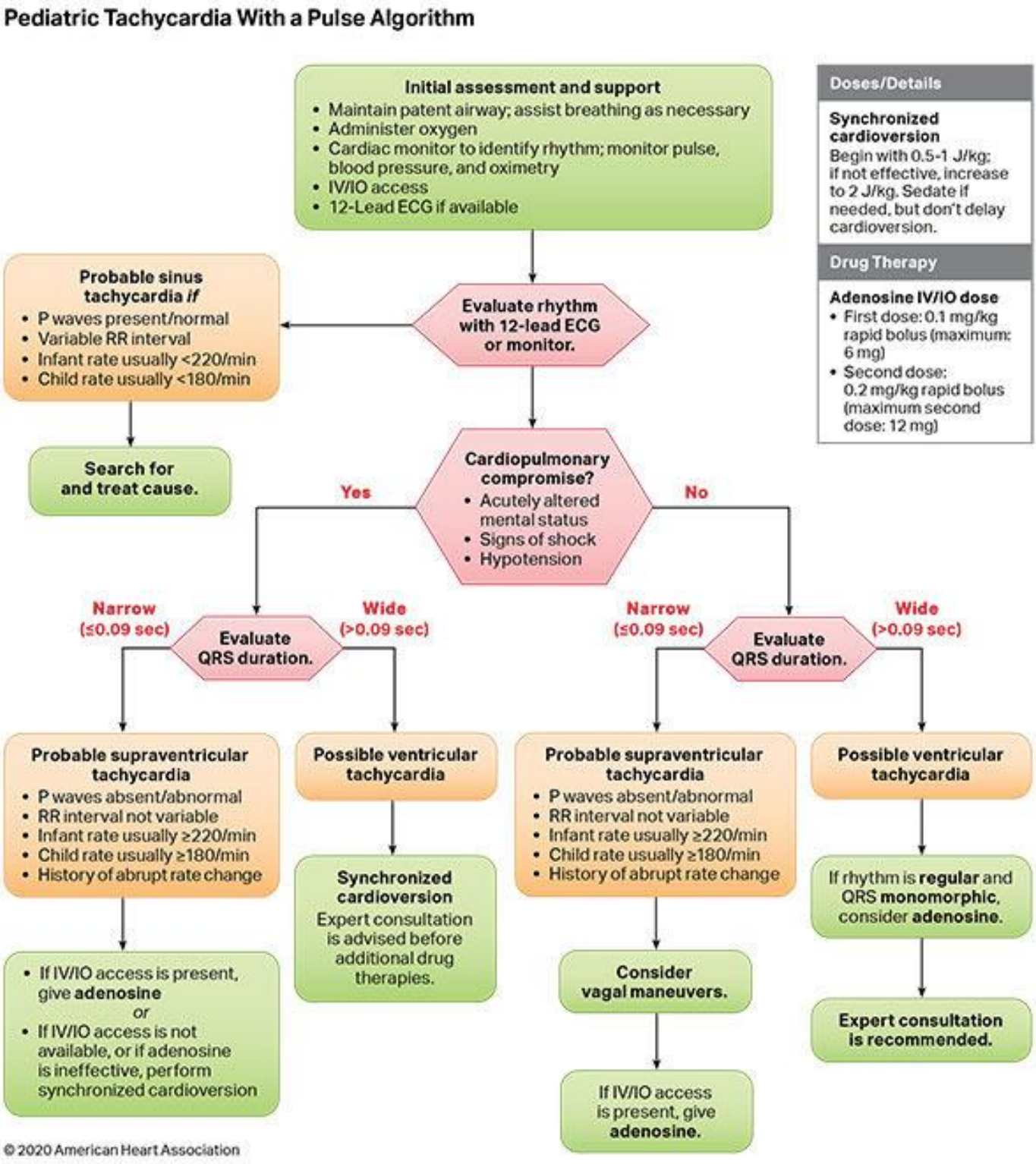


# Adult Bradycardia (With pulse)

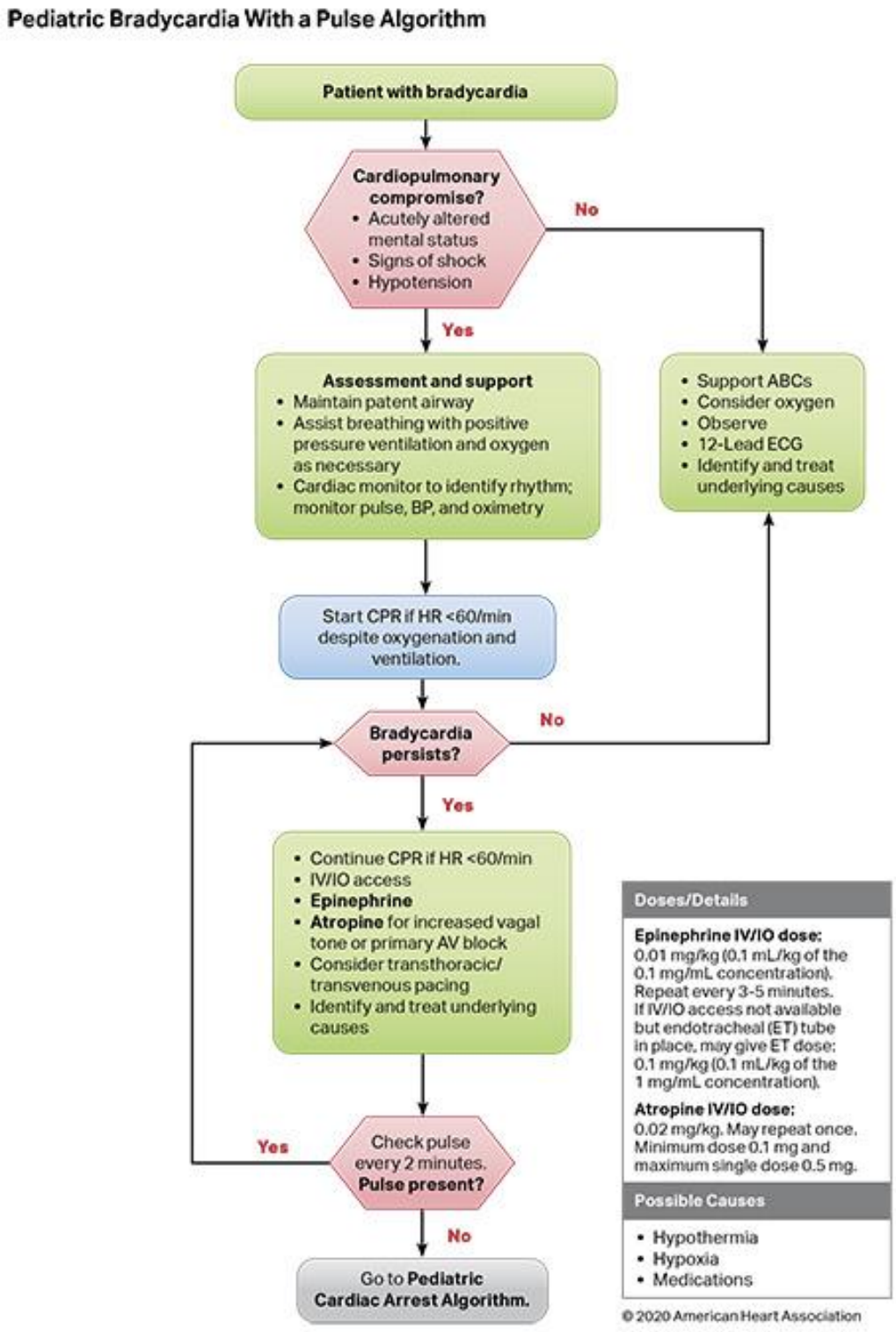
**Adult Bradycardia Algorithm**



# Pediatric Tachycardia (With pulse)



## Pediatric Bradycardia (With pulse)



# Hypertension

This protocol serves as a guide to the treatment of a patient who is hypertensive

| Procedure | EMT-B | EMT-BIV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV: 1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Continuously monitor cardiac rhythm if indicated | | | x |
| Perform stroke evaluation | x | x | x |
| • Consider Diltiazem if signs/symptoms of hypertensive encephalopathy are present | | | x |
| • Consider analgesia administration | | | x |
| • Consider nitroglycerin if pulmonary edema is present | | | x |
| • Consider nicardipine for interfacility transfers or Critical Care | | | x |

**Notes:**

- **The goal of treatment, if indicated, should be to lower the MAP by no more than 10-20%.**
- Hypertension secondary to stress or pain will usually have high systolic pressures but not high diastolic pressures. These rarely need to be treated in the field.
- Causes of hypertension include pulmonary edema, CHF, CVA, hypoglycemia, myocardial infarctions, head injuries, seizures, drugs or stress. Treat the underlying cause first if possible.
- Using a BP cuff that is too small can give falsely high blood pressure readings.
- Prior to therapeutic intervention, the blood pressure should be auscultated multiple times, on both sides, to ensure that the hypertension was not a transient event.
- Hypertension secondary to a CVA or head injury should not be treated in the field. Elevated BP in these instances is a compensatory response to maintain blood flow to the brain, lowering the blood pressure will worsen cerebral ischemia

# ST Segment Elevation Myocardial Infarction (STEMI) Alert

This criterion is to determine when to call a Cardiac/ STEMI Alert.

**Indications:**

- Noted 1mm or more of ST segment elevation in two or more anatomically contiguous leads on the 12 lead ECG (ST segment elevation that does not meet this criteria may suffice if the provider is familiar with more subtle MI patterns that may present)
- Patients presenting with active chest pain/ discomfort or other symptoms consistent with Acute Coronary Syndrome
- (Optional criteria) Corresponding reciprocal depression in opposite or nearby leads on the 12 lead ECG. Reciprocal changes may be noted in the following locations:
    - Anterior MI: Posterior leads
    - Inferior MI: High-lateral leads
    - High/Low-lateral MI: Inferior leads
    - Posterior MI: Anterior leads

**Contraindications:**

- Presence of Left Bundle Branch Block
    - Unless provider is comfortable applying modified Sgarbossa's Criteria (see bullet points below).
        - ≥ 1mm concordant ST elevation in two or more anatomically contiguous leads

          or
        - ≥ 1mm concordant ST depression in V1, V2, or V3

**Procedure:**

- Treat the patient according to the Acute Coronary Syndrome Protocol.
- Contact receiving hospital and request a "STEMI Alert".

**STEMI Mimics:**

- Left Ventricular Hypertrophy (LVH):
    - Choose largest S wave in V1 or V2 add it to the largest R wave in V5 or V6.
    - If >35mm = LVH.
    - Strain indicated by a ST segment slanting the opposite direction as the R or S wave deflection.
- Hypothermia:
    - Osborne waves.
- Pericarditis:
    - Global or near global ST segment elevation and PR segment depression.
- Early Repolarization:
    - ST segment elevation with no reciprocal changes.
    - J-point notching.
    - PR depression.
    - Concave ST segment elevation.
    - Normal R wave progression.
    - 12-lead does not change over time.
- Ventricular paced rhythms.
- Hyperkalemia.

- Interventricular conductions delays/defects.

# Termination of Resuscitation

Authorization: Paramedic.

**Indications:**

This protocol serves as guidance for when an attempted resuscitation of a patient with cardiac arrest can be stopped. Providers have the discretion to continue resuscitation attempts if they believe it will lead to resuscitation of the patient. This protocol serves both adult and pediatric patients.

This is not a protocol for determining if resuscitation should be attempted.

**Criteria: Must have at least 2 criteria for termination of resuscitation.**

- Arrest was unwitnessed.
- No bystander CPR was performed with prolonged down time (greater than 10 minutes).
- Asystole/PEA for >20 minutes during resuscitation attempt. A shockable rhythm restarts this process.
- End Tidal Carbon Dioxide in ORALTRACHEAL INTUBATED PATIENT ONLY < 10mmhg.
- Injuries incompatible with life.

**Notes:**

- **Refractory** pulseless VT/ VF should go to the ER.
- Providers may stop administering 1mg of epinephrine q3-5minutes after the 3$^{rd}$ dose.

## MEDICAL EMERGENCY TREATMENTS:

# Abdominal Pain

This protocol serves as a guide to the treatment of a patient with abdominal pain.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort (See Pregnancy Protocol or Acute Coronary Syndrome Protocol as indicated) | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive, titrated to SPO2 ≥ 94%, or if significant bleeding is present | x | x | x |
| Monitor vital signs | x | x | x |
| IV: 1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Continuously monitor cardiac rhythm if indicated | | | x |
| Opioid/analgesic agent of choice as indicated | | | x |
| **If unstable with systolic BP ≤ 90mmHg:** | | | |
| • Fluid bolus to maintain systolic BP ≥ 90mmHg: | | x | x |

**Notes:**

- Historically some EMS providers mistakenly believed that patients with abdominal pain should not receive analgesia. This has been disproven. Please treat abdominal pain like any other kind of pain.

# Adrenal Insufficiency

This protocol serves as a guide to the treatment of a patient who has known or suspected adrenal insufficiency.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/Indicated position | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or hypoxic. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| Monitor blood glucose level and treat as indicated | | x | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Administer Solu-Medrol | | | x |
| Monitor for hypotension and hyperkalemia. Treat as indicated | x | x | x |

**Notes:**

- <u>For patients with confirmed adrenal insufficiency, administer:</u>
  - Hydrocortisone (Solu-Cortef - preferred) 2mg/kg to maximum 100 mg IV, IM or IO.
  - Or Methylprednisolone ( Solu - Medrol) 2mg/kg to maximum 125 mg IV, IM or IO.

- Many patients with adrenal insufficiency carry an emergency Act-O-Vial of Solu-Cortef.
- Solu-Cortef is included in the medication formulary, making it acceptable for paramedics to administer the patient's own medication to the patient or to assist the patient in administering his/her own Solu-Cortef. Only a Paramedic may assist or administer the patient's own medication.
- Patients at risk include: Addison's Disease, Chronic Adrenal diseases, and chronic steroid use.
- Hypotension is a late sign of shock. Monitor for: altered mentation, agitation, restlessness or tachycardia.

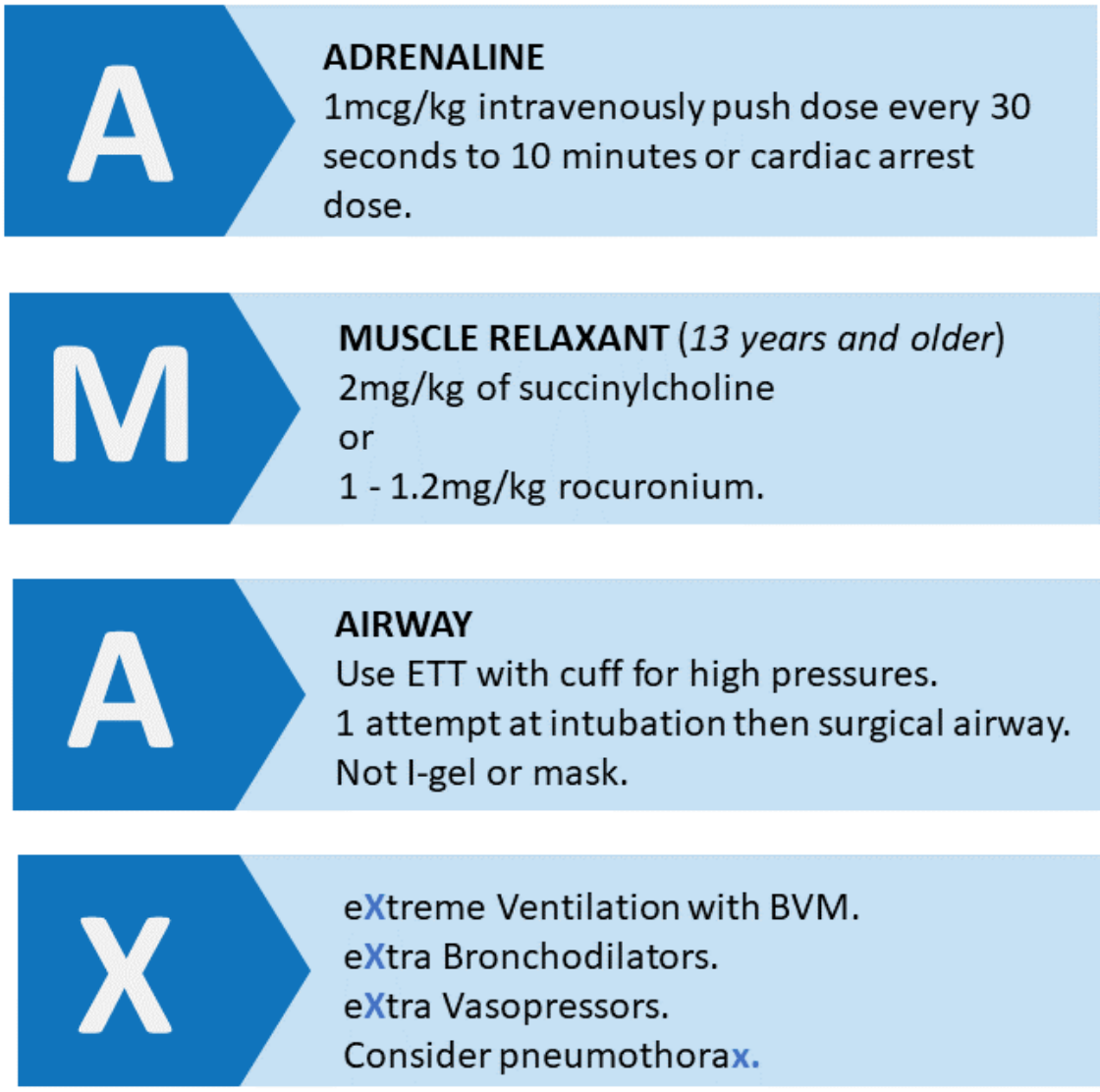
## Allergic Reaction, Anaphylaxis, and Anaphylactic Shock

This protocol serves as a guide to the treatment of a patient who is experiencing an allergic reaction, anaphylaxis, or anaphylactic shock.

*Note: as of 5/29/2025 Solu-medrol has been removed from the treatment pathway for allergic reactions and anaphylaxis/anaphylactic shock.*

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove injection mechanism if a bee or wasp sting | x | x | x |
| Remove the patient from allergen or allergen from the patient if possible | x | x | x |
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive. Titrate to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV :1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| **Allergic Reaction (Localized reaction with no airway or vascular involvement)** | | | |
| • Diphenhydramine (Consider IM administration while obtaining IV/IO access) | | | x |
| **Anaphylaxis - SEE AMAX-4 algorithm below for severe asthma or anaphylaxis** | | | |
| • Epinephrine IM administration | DO | DO | x |
| • Consider IV epinephrine infusion for anaphylaxis refractory to IM epinephrine | | | x |
| • Albuterol | | x | x |
| • Diphenhydramine | | | x |
| **Anaphylactic Shock (Hypotension due to anaphylaxis)** | | | |
| • Epinephrine IM administration preferred. | Assisted DO | Assisted DO | x |
| • Fluid bolus as indicated | | x | x |
| • Diphenhydramine | | | x |

FOR PATIENTS WITH ASTHMA OR ANAPHYLAXIS THAT ARE UNCONSCIOUS OR NEEDING VENTILATION




In 2020, the World Allergy Organization added acute onset bronchospasm alone **(without skin symptoms)** after exposure to a likely trigger as part of anaphylaxis diagnostic criteria

## Behavioral and psychiatric disorders

This protocol serves as a guide to the treatment of a patient who has suffering, or potentially suffering, from a behavioral or psychiatric disorder.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Restrain if necessary (Refer to Patient Restraint Protocol) | x | x | x |
| • Consider administration of Inapsine (Droperidol) or Midazolam (Versed) as indicated | | | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV: 1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Continuously monitor cardiac rhythm if possible | x | x | x |
| Check blood glucose level (Glucometer) | x | x | x |
| • Administer Oral Glucose if indicated | x | x | x |
| • Administer Dextrose if indicated | | x | x |
| • Administer Glucagon if indicated | | | x |

**Notes:**

- Psychiatric patients and/or patients with abnormal behavior may have an organic etiology. Do not overlook the possibility of head injuries, hypoxia, hypoglycemia, drug ingestion, or neurological disorders by assuming that it is just a psychiatric disorder.
- If the patient is suicidal, do not leave them alone. Either remove dangerous objects or have someone else remove them.

# Behavioral Issues / Agitation / Combative Patient

Authorization: Paramedic / Paramedic - Critical Care

Protocol: Standing Order

**The Spectrum of Agitation:**

- Mild agitation should be managed with verbal coaching.
- Moderate to severe agitation should be managed with sedation using benzodiazepines or Inapsine.
- Extreme agitation is a medical emergency that should be managed with benzodiazepines or Inapsine.

**Indications for chemical restraints**

- The patient continues to be violent, combative, or presents a danger to themselves or others despite attempts to verbally de-escalate the situation.
- Any patient struggling against physical restraints.

**Contraindications:**

- None in the setting of a patient exhibiting extreme agitation or violent behavior that presents a danger to themselves or others.

**Precautions:**

- Treat medical causes (hypoglycemia, etc.) if possible.
- Be prepared to manage the airway.
- Place patients on monitoring equipment such as etco2, ECG, SpO2, and obtain vital signs as soon as possible.
- Never transport in a position that restricts breathing. Do not hobble or transport patients in prone position. Deaths from positional asphyxia have occurred due to patients being transported prone.
- Be prepared for sudden deterioration in patients.
- Patients may become hyperthermic, monitor temperature and initiate cooling as needed.

**Notes:**

- Place patients on high flow oxygen if able to safely do so.
- Establish IV access on these patients if able to safely do so.
- At the time of publication Ketamine is not allowed to be used a chemical restraint or for sedation of an agitated or violent patient.
- The term “excited delirium” has fallen out of the lexicon and should not be utilized.
- **Providers must document RASS score in patient care report pre and post sedation/ chemical restraint.**
- **Place patient on SpO2, ETCO2, ECG and obtain vital signs as soon as possible.**

| RASS – Richmond Agitation Severity Scale | | |
|---|---|---|
| **+4** | Combative | Violent. Presents an immediate danger to self or others. |
| **+3** | Very Agitated | Pulls at or removes tubes, catheters, devices. May be aggressive. |
| **+2** | Agitated | Frequent non-purposeful movements, fights ventilator. |
| **+1** | Restless | Anxious or apprehensive. Movements are not vigorous or aggressive. |
| **0** | Alert and Calm | |
| **-1** | Drowsy | Not fully alert but arousable to voice. Opens eyes for >10 seconds. |
| **-2** | Light Sedation | Briefly awakens to voice. Opens eyes for < 10 seconds. |
| **-3** | Moderate sedation | Movement or eye opening to voice, does not make eye contact. |
| **-4** | Deep sedation | No response to voice. Movement or eye opening to physical stimulus. |
| **-5** | Unarousable | No response to physical or verbal stimulus. |

# Carbon Monoxide Monitoring, Exposure, and Treatment

This protocol serves as a guide to the treatment of a patient who is suffering from Carbon Monoxide poisoning

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 via NRB if symptomatic | x | x | x |
| Monitor Carboxyhemoglobin level if available | x | x | x |
| • If the patient is asymptomatic and reading:<br>○ 0-5% carboxyhemoglobin: No further medical evaluation needed<br>○ >5% carboxyhemoglobin: Administer oxygen and reassess after 15min. Consult Base Physician if reading remains >5% | | | |
| • If the patient is symptomatic: Treat and transport the patient | | | |
| • If the patient is pregnant or could be pregnant and reading >5%: Treat and transport the patient | | | |
| Monitor vital signs | x | x | x |
| Continuously monitor ECG if indicated | | | x |
| IV: 1-2, and draw blood | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |

**Notes:**

- A fetus is at high risk when exposed to carbon monoxide. Fetal hemoglobin has a greater affinity for CO than adult hemoglobin. A pregnant woman maybe asymptomatic while the fetus may be in danger or distress.

# Cerebral Vascular Accident – Stroke and Stroke Alert

This protocol serves as a guide to the treatment of a patient who has suffering, or potentially suffering, from cerebral vascular accident.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Establish the time the patient was last known to be well, if possible | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV : 1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Perform 12 lead ECG | | | x |
| Check blood glucose level (Glucometer) | x | x | x |
| • Administer Oral Glucose if indicated | x | x | x |
| • Administer Dextrose if indicated | | x | x |
| • Administer Glucagon if indicated | | | x |
| Notify receiving facility of Stroke | x | x | x |

**Notes:**

- With suspected CVA the highest pre-hospital priorities should include treatment of life threats, immediate transport, and a obtaining a thorough history. Immediate transport is important because if tPA is to be used it must be given within 3 hours of the onset of the CVA. If the patient exhibits symptoms suggestive of a CVA do not delay transport to obtain a patient history, however when dealing with an aphasic patient, a few minutes spent on scene obtaining a description of events and last time the patient was normal from family or bystanders is important and may save time in the long run in terms of patient care.
- If the patient requires artificial ventilation, **do not hyperventilate the patient**. Hyperventilation will decrease the patient's level of carbon dioxide and cause cerebral vasoconstriction and further ischemia.
- The goal should be an ETCO2 of 35mmhg unless there are signs or symptoms of uncal herniation noted. If uncal herniation is suspected target an ETCO2 of 30 - 35mmhg.
- Alert the ED that you are en-route with a potential stroke patient as soon as possible. Even if the patient has been symptomatic for up to 12 hours, they may be eligible for interventions.
- If the CVA causes an increase in intracranial pressure, the signs and symptoms will mimic a closed head injury. These patients will present the same as a patient suffering from a traumatically induced injury by displaying possible combativeness, posturing, and Cushing's triad. Refer to "Head Injury Protocol" for additional information.
- Do not treat hypertension of suspected CVA patient.
- The goal with a CVA patient is to get the patient to definitive care.

# Hyperglycemia

This protocol serves as a guide to the treatment of a patient with hyperglycemia.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV: 1-2, and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Continuously monitor cardiac rhythm if indicated | x | x | x |
| Check glucose level (Glucometer) | x | x | x |
| Fluid bolus as indicated | | x | x |

**Notes:**

- Hyperglycemia is often a slow onset. It usually develops over a period of days, not hours.
- The buildup of ketones can sometimes be detected on the patient's breath. There may be an odor of acetone or fruity smell.
- Because of the dehydration, DKA and HHNK patients may have a rapid, weak pulse, decreased blood pressure, orthostatic changes, and dry, flushed, warm skin.
- **ETCo2 values of less than 21mmhg are highly suggestive of DKA in the diabetic patient.**
- Be aware of the upper limits of glucometer. If reading is above that limit, glucometer may read “Hi”.
- Slightly elevated blood glucose levels may be due to any hypermetabolic state or sympathetic response.
- The determination between HHNK and DKA can only be made with blood chemistry and is unimportant in the field.
- If possible, attempt to determine the cause of hyperglycemia, such as an acute infection.
- Be aware of the possibility of Euglycemic DKA occurring in patients on specific medications. This is most commonly found in patients on SGLT-2 inhibitors (Dapagliflozin/Farxiga, Empagliflozin/Jardiance, Canagliflozin/Invokana).

# Hyperthermia

This protocol serves as a guide to the treatment of a patient with hyperthermia due to an environmental cause.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove from hot environment and place the patient in a position of comfort | x | x | x |
| Remove clothing as needed. Cool with cool water or cold packs in the groin, neck and armpits. Be careful not to chill the patient. Fan the patient if needed. A wet sheet with air flowing over it will provide evaporative cooling. | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive, titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs, including temperature | x | x | x |
| Continuously monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 and draw blood if possible | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Crystalloid fluid bolus as indicated | | x | x |
| Treat seizures with benzodiazepine of choice | | | x |
| Check blood glucose level if altered mental status is present | x | x | x |

**Notes:**

- In life threatening hyperthermia, initiate cooling before transporting.
- When cooling a patient, be careful not to chill him/her. Shivering will increase the body temperature and exacerbate the problem.
- Heat cramps are due to electrolyte imbalance causing muscle spasms in the legs and abdomen. Severe pain, nausea, and vomiting are normal. Patient will not be hypotensive and will have a normal core temperature.
- Heat Stroke is due to failure of the normal cooling mechanisms failing. Skin may be hot, dry, and flushed. Patient may have mental status changes, nausea, vomiting, seizures, and hypotension. Temperature will be greater than 104F. Treat the patient for shock and cool aggressively. Treat for seizures as needed.
- Hyperthermia should only be treated with cooling if due to environmental or exertional causes.

# Hypoglycemia

This protocol serves as a guide to the treatment of a patient with hypoglycemia.

| Procedure | EMT | EMT – IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| Check blood glucose level (Glucometer) | x | x | x |
| **If the patient is hypoglycemic:** | | | |
| Administer oral glucose if indicated | x | x | x |
| Establish IV and draw blood if possible | | x | x |
| Administer D10% as indicated | | x | x |
| **If unable to establish IV:** | | | |
| Consider IM Glucagon administration | | | x |
| IO if the patient condition does not change with Glucagon | | | x |
| Recheck blood glucose stick after Dextrose or Glucagon administration | x | x | x |

**Notes:**

- Infiltration of IV dextrose may cause severe tissue necrosis.
- Hypoglycemia can present as: seizures, coma, diaphoresis, chest pain, behavioral disorders, appear to mimic alcohol intoxication, confusion or stroke-like with neurological deficits (particularly in elderly patients).
- Patients who are elderly or who have been hypoglycemic for prolonged periods of time may be slower to regain normal mental status.
- Administration of dextrose in the malnourished patient with depleted thiamine stores may precipitate Wernicke's or Korsakoff's syndrome. However, do not withhold dextrose from a patient who is hypoglycemic.
- Do not give to possible CVA or head injury patients unless there is documented hypoglycemia.
- The medication/reason that the patient's blood glucose level is below acceptable limits may cause a second drop in blood glucose.
- In a newborn, hypoglycemia is any reading <50mg/dL.
- Blood glucose levels may not raise, or may have a secondary drop, after Glucagon administration.

# Hypothermia

This protocol serves as a guide to the treatment of a patient with hypothermia.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove from cold or windy environment and remove wet clothing | x | x | x |
| Re-warm the patient passively. Cover with warm blankets, place in warm environment, and consider heat packs on the chest, abdomen, axilla, neck, or groin areas. Do not place hot packs directly on skin. | x | x | x |
| Start CPR if pulses are not palpable<br>• Limit defibrillation to 1 shock<br>• Extend period between drug administrations and limit to 2 rounds<br>• Refer to specific cardiac arrest protocol for additional information | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive, or titrated to SPO2 ≥ 94%. Note pulse oximeter may not be accurate. | x | x | x |
| Monitor vital signs | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: 1-2 with warmed crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |

- **Notes:** It is crucial that hypothermic patient be handled gently. The heart becomes very irritable when it is cold and will fibrillate easily.
- Successful resuscitation has been documented in a patient with a core temperature as low as 64.4F. When in doubt, begin CPR and be prepared for extended resuscitation times. **All patients with a core temperature <91F should be transported unless cardiac arrest preceded the hypothermia or obvious signs of death are present.**
- Consider early activation of aeromedical resources and transport to a facility capable of ECMO.

# Frost bite

This protocol serves as a guide to the treatment of a patient with frost bite.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove from cold or windy environment and remove wet clothing | x | x | x |
| Protect areas from pressure, trauma, or friction. Do not break any blisters present. Do not allow the patient to ambulate if possible. Do not attempt to rewarm in the field | x | x | x |
| Under extenuating circumstances, such as prolonged or complicated transport, rewarm by submersion in warm water (100 degrees) for 20 minutes | DO | DO | x |
| Cover the patient with warm blankets, place in warm environment, and consider heat packs on the chest, abdomen, axilla, neck, or groin areas. Never place hot packs directly on skin | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs | x | x | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Monitor blood glucose level | x | x | x |
| Treat pain as indicated with agent of choice | | | x |

**Notes:**

- Do not allow a limb to thaw if there is a danger it will refreeze. Partial rewarming or refreezing will cause further tissue damage. Thawing should only be done under controlled conditions.
- Patients with frostbite will often be hypothermic.
- Signs of cold injury to an extremity range from red skin to completely frozen tissue.

## OB-GYN Emergencies:

## OB-GYN: Childbirth

This protocol serves as a general guide to the treatment of a patient with imminent childbirth.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| If delivery is not imminent, transport immediately with the patient on her left side | x | x | x |
| Obtain prenatal and maternal history. Consider immediate transport if pregnancy has complications | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 to achieve SPO2 100% (NC as NRB will probably not be tolerated) | x | x | x |
| Monitor vital signs including: HR, BP, and SPO2 | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 with NS TKO | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Treat maternal bleeding, hypotension, chest pain, decreased level of consciousness, respiratory distress, or any other condition/symptom as indicated | x | x | x |
| • Warm ambulance/delivery area | x | x | x |
| • Place the patient on her back with knees flexed | x | x | x |
| • Remove clothing to waist and establish clean delivery area | x | x | x |
| • Prepare neonatal resuscitation and delivery equipment | x | x | x |
| • Visualize vaginal opening and identify presenting part | x | x | x |
| ○ Cord prolapse<br>▪ Place mother in a knee to chest/face down position and begin immediate transport. Attempt to manually relieve pressure on the cord to maintain fetal perfusion | x | x | x |
| ○ One foot or one arm presentation<br>▪ Place mother in a knee to chest/face down position and begin immediate transport | x | x | x |
| ○ Breach: Buttock, both arms, or both legs presenting<br>▪ Begin immediate transport. Urge mother not to push but assist with delivery if delivery proceeds. Presentation complicates delivery, but field delivery is possible | x | x | x |
| ○ Cephalic presentation | x | x | x |

| | | | |
|---|---|---|---|
| ▪ Proceed with field delivery. Assess for nuchal cord as soon as possible | | | |
| ○ Additional complications:<br>▪ Nuchal cord: Attempt to remove cord from neck. If unable to do so, clamp the cord and cut it<br>▪ Cephalopelvic disproportion/Shoulder dystocia: Attempt McRobert's Maneuver | x | x | x |
| • Support the infant's head as it emerges, using gentle pressure, prevent the infant from an explosive delivery | x | x | x |
| • Wipe mouth and nose. Have bulb suction available | x | x | x |
| • Support infant as it rotates to allow shoulder delivery | x | x | x |
| • When infant is delivered, clamp cord in two places<br>○ Approximately 8-10 inches from the infant and cut the cord in between. Use only sterile materials<br>○ You may wait until the cord stops pulsations if the parent prefers | x | x | x |
| • Dry and stimulate the infant. Place in blanket and place cap on infant. DO NOT ALLOW INFANT TO BECOME HYPOTHERMIC | x | x | x |
| • **Place infant on mother's chest to warm** and allow it to nurse (may not be realistically achieved during transport) | x | x | x |
| • Prepare for multiple deliveries if needed | x | x | x |
| Use bulb suction only if infant has respiratory distress | x | x | x |
| Note meconium if present. Suction only if infant has respiratory distress | x | x | x |
| Asses BGL and administer D10% through IV or IO if indicated. Reassess BGL frequently in distressed infants | | x | x |
| Administer Narcan if indicated (Consider IN administration) | x | x | x |
| **Ensure infant is kept warm** | x | x | x |

**Notes:**

- **Withhold supplemental oxygen from the infant during routine deliveries.**
- **DO NOT** pull on the cord; it may cause the placenta to separate from the uterus or the cord may tear loose from the placenta and either condition may cause catastrophic hemorrhage.
- Babies are slippery. Be prepared and take steps to avoid dropping them.

## OB-GYN: Pregnancy Induced Hypertension and Eclampsia

This protocol serves as a general guide to the treatment of a female patient with pre-eclampsia or eclampsia.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Attempt to remove all stimuli: Dim lights, do not use siren, allow mother to cover her eyes, keep the patient calm and relaxed | x | x | x |
| Transport the patient on her left side | x | x | x |
| Obtain prenatal and maternal history | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 to achieve SPO2 100% (NC as NRB will probably not be tolerated) | x | x | x |
| Monitor vital signs including HR, BP, ECG and SPO2 | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: 1-2 TKO | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| **If the patient experiences a seizure:** | | | |
| Support airway and breathing | x | x | x |
| Administer Midazolam first | | | x |
| Administer Magnesium Sulfate second | | | x |

**Notes:**

- Pre-eclampsia is a pregnancy-induced hypertension. The patient will have a history of a rapid weight gain in the second and third trimester. Hypertension of greater than 140/100 will be present in these patients.
- Eclampsia is the onset of seizures. These are often set off by loud noises and bright flashing lights. Be sure to turn off the emergency lights on the ambulance and rescue vehicles.
- Eclampsia can occur weeks after delivery. Eclampsia should be considered in any patient having a seizure with a recent history of pregnancy.

## OB-GYN: Vaginal Bleeding

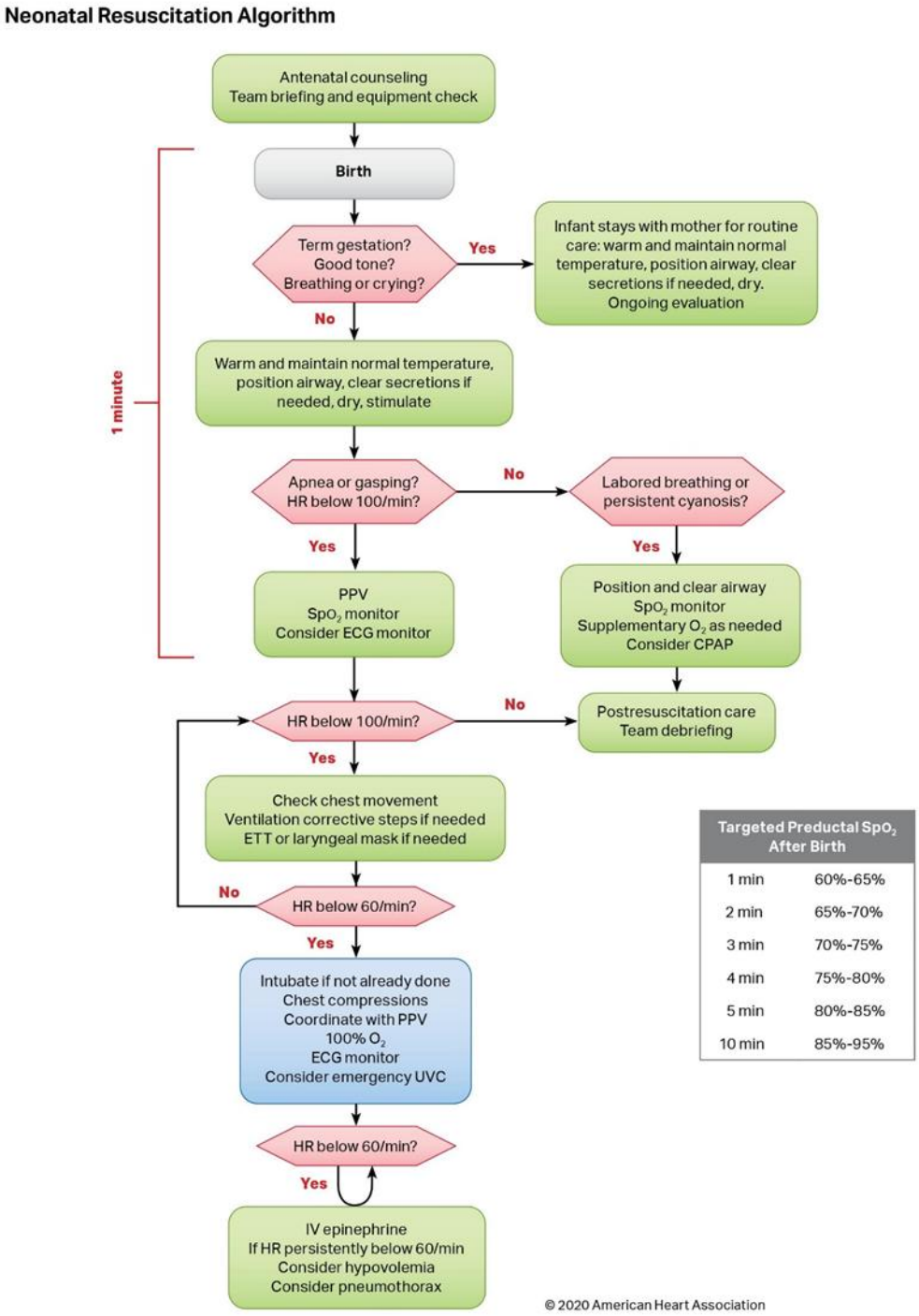
This protocol serves as a general guide to the treatment of a patient with vaginal bleeding.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| If pregnant and >20wks gestation, transport the patient on her left side | x | x | x |
| Obtain prenatal and maternal history | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 to achieve SPO2 100% (NC as NRB will probably not be tolerated) | x | x | x |
| Monitor vital signs including HR, BP, ECG and SPO2 | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 | | x | x |
| **Permissive Hypotension is contraindicated in pregnant patients** | | | |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Administer fluid bolus as indicated | | x | x |
| Administer Fentanyl as indicated | | | x |

**Notes:**

- Always consider pregnancy as a cause of vaginal bleeding.
- Ectopic pregnancies can be life threatening. If it is located in the fallopian tubes, rupture of the tube and peritoneal hemorrhage will usually occur 3-8 weeks after conception.
- Consider placenta previa and placenta abruptio as a possible causes of vaginal bleeding.
- Absorb blood but do not pack the vagina.
- In pregnancy plasma volume can increase by up to 50%. Do not wait for objective hypotension to develop – as this represents a loss of at least 20 -30% of their blood volume.
- Vasopressors may decrease placental blood flow.

# OB-GYN: Neonatal Resuscitation Algorithm



## Poisons and Overdoses

This protocol serves as a guide to the treatment of a patient who has suffered an overdose or poisoning.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove contaminate from the patient if possible/safe to do so | x | x | x |
| Place the patient in position of comfort | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath, hypotensive or titrated to SPO2 ≥ 94%. If the patient has been exposed to a simple or chemical asphyxiant, administer high-flow O2 | x | x | x |
| Monitor vital signs including, but not limited to: BP, ECG, SPO2, SPCO, BGL, and core temperature | x | x | x |
| 12 lead ECG and continuous ECG monitoring as indicated | | | X |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Treat specific poising/overdose/exposure as indicated | x | x | x |
| Obtain information on specific treatment if needed | x | x | x |

**Notes:**

- **POISON CONTROL CENTER TELEPHONE NUMBER: (303) 629-1123 or (800) 222-1222.**
- Ensure that scene is safe during all overdoses, poisoning, and exposures.
- Many poisonings, overdoses, and exposures are treated symptomatically with airway, breathing, and circulatory support.
- Do not induce vomiting or administer an antidote unless instructed to do so by Poison Control or the Base Physician.

**Specific toxicology emergencies**

| Type of exposure | General information | Signs/symptoms | Treatment |
|---|---|---|---|
| Alcohol overdose | CNS depressant, chronic use causes GI bleeds, liver failure, and cerebral degeneration | Slurred speech, decreased respirations, altered LOC, nausea, vomiting, and coma | Support airway, breathing, and circulation |
| Alcohol withdrawal | Occurs 12-24 hours after last ingestion | Seizures, tremors, coma, and hallucinations | Support airway, breathing, and circulation. Treat symptoms and seizures with benzodiazepine of choice |
| Aspirin (salicylate acid) | Over the counter analgesic and anti-inflammatory | Ringing in the ears, lethargy, nausea, GI bleeding, hyperventilation, seizures, coma, metabolic acidosis, and pulmonary edema | Support airway, breathing, and circulation. Consider sodium bicarbonate for acidosis. Consider benzodiazepine of choice for seizures |
| Acetaminophen | Over the counter analgesic and sleep medication | Nausea, vomiting, diaphoresis, RUQ pain, and liver failure | Support airway, breathing, and circulation |
| Barbiturates | CNS depressant, sedation, deep coma, anti-convulsant medication | Slurred speech, altered LOC, dilated pupils, decreased respirations, pale, cool skin. | Support airway, breathing, and circulation |
| Benadryl (diphenhydramine) | Over the counter antihistamine | Dry mouth, dilated pupils, flushed dry skin, tachycardia, and anticholinergic effects. May block potassium channels. | Support airway, breathing, and circulation. Benzodiazepines for agitation and seizure. |
| Benzodiazepine | CNS depressant and tranquilizer | Sedation, coma, anticonvulsant, slurred speech, altered LOC, dilated pupils, decreased respirations, pale, cool skin. | Support airway, breathing, and circulation |

| | | | |
|---|---|---|---|
| Beta Blocker or Calcium Channel Blocker | Negative inotrope and negative chronotrope | Decreased LOC, hypotension, bradycardias, and pulmonary edema. | Support airway, breathing, and circulation. Consider epinephrine or norepinephrine infusion. Use transcutaneous pacing if needed |
| Carbon Monoxide | CO binds to the hemoglobin in the blood and causes cellular asphyxia | Headache, dyspnea, angina, syncope, seizures, coma, cherry red skin. | Support airway, breathing, and circulation. Administer high-flow oxygen. See specific protocol |
| Cocaine / CNS stimulants | Vasoconstrictor, and CNS stimulation | Euphoria, agitation, psychosis, seizures, MIs, CVAs, dyspnea, increased HR and BP, dilated pupils. | Support airway, breathing, and circulation. Consider Benzodiazepine of choice. Do not administer antiarrhythmics. |
| Caustics | The caustics will burn soft tissue | 1st, 2nd, and 3rd degree burns to any tissue contacted. | Support airway, breathing, and circulation |
| Hallucinogens | Causes auditory and visual hallucination. | Psychosis, dilated pupils, headache, secondary trauma. | Support airway, breathing, and circulation. Consider benzodiazepine of choice. |
| Opioids | Analgesic that acts as a CNS depressant | Sedation, pinpoint pupils, respiratory depression, bradycardia, and pulmonary edema. | Support airway, breathing, and circulation. Consider Narcan administration. |
| Tricyclic anti-depressant | Prescription antidepressant. | Anticholinergic response, tachycardia, dry, flushed skin, dilated pupils, coma, seizures, hypotension, and wide-complex QRS. | Support airway, breathing, and circulation. Consider Sodium Bicarbonate and vasopressor administration. |
| Anticholinergic toxidrome | Antihistamines, TCA, phenothiazines, Nightshade, Mandrake, and Moonflower. | Flushed skin, psychosis, hyperthermia, dry mucosa, dilated pupils, and tachycardia. | Support airway, breathing, and circulation. Consider benzodiazepine of choice administration. |
| Cholinergic toxidrome | Organophosphates. | Salivations, lacrimation, urination, defecation, bronchial secretions, bronchoconstriction, and bradycardia. | Support airway, breathing, and circulation. Consider Atropine administration. |

# Respiratory Distress - Asthma

This protocol serves as a general guide to the treatment of a patient with respiratory distress due to asthma.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| Remove extrinsic stressor if possible | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2 | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: 1-2 with NS | | x | x |
| Consider administration of crystalloid fluid bolus | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider Albuterol | x | x | x |
| Consider Atrovent (May mix with Albuterol) | x | x | x |
| Consider Solu-Medrol if more than one Albuterol treatment is needed | | | x |
| Consider Epinephrine when asthma is refractory to inhaled bronchodilators | | | x |
| Consider CPAP | x | x | x |
| Consider Magnesium Sulfate (IV infusion only) in severe cases | | | x |
| Monitor for pneumothorax | x | x | x |

**Notes:**

- Asthma consists of three components: spasms of the bronchial smooth muscles, increased mucous secretions and inflammation of the bronchial tissue.

## Respiratory Distress - Congestive Heart Failure

This protocol serves as a general guide to the treatment of a patient with respiratory distress due to congestive heart failure.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort / position to best maintain airway (Upright with legs dependent, if possible) | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2 | x | x | x |
| Monitor cardiac rhythm | | | x |
| Treat cardiac arrhythmias as indicated | | | x |
| 12- Lead ECG if indicated | | | x |
| IV: 1-2 with buff cap or LR TKO | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider Nitroglycerine administration | | | x |
| Consider CPAP | DO | DO | x |
| Consider vasopressor administration if the patient is hypotensive | | | x |
| Consider Albuterol administration if significant, documented, bronchospasm is present and pulmonary edema is treated | | | x |

**Notes:**

- Some patients with fulminant pulmonary edema may have Sudden Acute Crashing Pulmonary Edema (SCAPE) syndrome. These patients will present with a sudden onset of anxiety, shortness of breath, pulmonary edema, and significant hypertension. High doses of nitroglycerin should be employed with these patients. Administer 400 – 1200mcg every 5 minutes until symptoms abate or the blood pressure drops past their normal baseline.

## Respiratory Distress - COPD

This protocol serves as a general guide to the treatment of a patient with respiratory distress due Chronic Obstructive Pulmonary Disease (COPD).

| Procedure | EMT | EMT IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort / position to best maintain airway | x | x | x |
| Remove extrinsic stressor if possible | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2 | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: 1-2 with crystalloid | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider Albuterol | x | x | x |
| Consider Atrovent (May mix with Albuterol) | x | x | x |
| Consider Solu-Medrol if more than one Albuterol treatment is needed | | | x |
| Consider Epinephrine when bronchoconstriction is refractory to inhaled bronchodilators | | | x |
| Consider CPAP | x | x | x |
| Consider nasal suction if obstructed with secretions | x | x | x |
| Consider Magnesium Sulfate in severe cases | | | x |
| Monitor for pneumothorax | x | x | x |

## Respiratory Distress - General

This protocol serves as a general guide to the treatment of a patient with respiratory distress**.**

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, ETCO2, SPO2, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider specific cause of shortness of breath and treat per protocol | x | x | x |

**Notes:**

- Consider and treat specific cause if possible.

## Pediatric Respiratory Distress

This protocol serves as a general guide to the treatment of a pediatric patient with respiratory distress due to some common causes.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| **Avoid stressing the patient if possible** | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Consider suctioning nares | x | x | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2, temperature | x | x | x |
| Monitor cardiac rhythm as indicated | | | x |
| IV: 1-2 if the patient is unstable | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Assist ventilations with BVM if needed | x | x | x |
| Consider intubation for patients in profound distress or near respiratory failure | | | x |
| Consider nebulized Racemic Epinephrine | | | x |
| Consider nebulized saline, and/or Albuterol | DO | DO | x |
| Consider Atrovent | | | x |
| Consider Magnesium Sulfate IV infusion only (Do not nebulize) | | | x |
| Consider Solu-Medrol administration if IV/IO has been previously established | | | x |

**Notes:**

- Bronchiolitis is a viral infection of the bronchioles. It is caused primarily by the Respiratory Syncytial Virus (RSV) but influenza and the Rhinovirus can also be the cause.
- Children <6mo old that are exposed to other children, like a day care environment, are at the greatest risk. Other risk factors include: premature delivery, exposure to smoke and congenital abnormalities.
- Signs and symptoms include: low grade fever, tachypnea, tachycardia, dyspnea, and runny nose.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| **Epiglottitis** | | | |
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| **Avoid stressing the patient** | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2, temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| Assist ventilations with BVM if needed | x | x | x |
| Consider intubation for patients in profound distress or near respiratory failure and BVM ventilation is ineffective (Oral). If intubation fails consider cricothyrotomy in adult patients.<br>Extra glottic airways will not be effective and should not be attempted | | | x |
| IV: peripheral access with Crystalloid fluid if the patient is unstable | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |

**Notes:**

- Epiglottitis is a life-threatening bacterial infection of the upper airway causing the Epiglottis to swell and occlude the larynx. This is most commonly caused by the Haemophilus Influenza Type B (Hib) but can be caused by other bacterial and viral infections as well as trauma related causes.
- Children 2-6yrs are most commonly affected, but any may occur at any age. Due to pediatric vaccinations Epiglottitis is becoming less frequent but it remains a concern. Risk factors include weakened immune systems, crowded conditions such as day care, and congenital abnormalities.
- Signs and symptoms include High fever, sore throat, painful swallowing, dyspnea, drooling, and cyanosis
- Palliative treatment is the preferred pre-hospital course of action. Invasive procedures such as IV, and advanced airway management should be a last resort and performed by the most proficient provider on scene. Typically, the provider will only have one chance at an advanced airway and extra-glottic devices will be ineffective.
- Nebulized medications can be detrimental and are rarely effective.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| **Croup** | | | |
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| Avoid stressing the patient if possible | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Nebulized Racemic Epinephrine (If the patient has stridor at rest) | | | x |
| Monitor vital signs including HR, BP, SPO2, ETCO2, temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: with NS if the patient is unstable | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Assist ventilations with BVM if needed | x | x | x |
| Consider intubation for patients in profound distress or near respiratory failure | | | x |
| Consider Solu-Medrol if IV/IO has been previously established | | | x |
| Consider nebulized NS (Limited effectiveness) | x | x | x |
| Consider nebulized Albuterol (Limited effectiveness) | DO | DO | x |
| Consider nebulized Atrovent (Limited effectiveness) | | | x |

**Notes:**

- Croup is caused by a viral infection typically the parainfluenza virus and is usually not serious.
- Children <5yrs are the most affected with the most severe cases in children <3yrs. Premature deliveries are at a greater risk due to their smaller airways.
- Signs and Symptoms of Croup include barking cough (seal bark), high fever >103f, dyspnea, and difficulty swallowing.

## Seizures

This protocol serves as a guide to the treatment of a patient who has suffered or is suffering a seizure.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort / position to best maintain airway | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. If the patient is actively seizing, administer high flow O2 via NRB | x | x | x |
| Continuously monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 with crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider specific cause of seizure and attempt to reverse if possible | x | x | x |
| Consider spinal immobilization if injuries are consistent w/ spinal immobilization criteria | x | x | x |
| Check blood glucose level (Glucometer) | x | x | x |
| **If seizure activity persists (status) or reoccurs:** | | | |
| • Administer Midazolam | | | x |
| • Consider endotracheal intubation if needed | | | x |

**Notes:**

- Control of the airway can be very difficult during a seizure because the jaws are often closed. Do not attempt to force the teeth open. This can cause oral trauma and bleeding which will obstruct the airway. Consideration should be given to Rapid Sequence Intubation if the patient is at risk for hypoxia.
- Protect the patient from harm during the seizure. Restrain the patient only if needed to prevent injury.
- A patient who has a first-time seizure should be transported by ambulance.
- A pediatric patient who has suffered a suspected febrile seizure should be transported by ambulance.
- Causes of seizures include hypoxia, hypotension, hypoglycemia, CVA, fever, pregnancy (hypertension), medication overdose, medication under dosage, ETOH withdrawal, tumor, and epilepsy.

# SIRS / Sepsis / Septic Shock

Systemic inflammatory response syndrome (SIRS) is defined as a dysregulated inflammatory response to a non-infectious insult. Sepsis is defined as a person having an infection that has led to a dysregulated inflammatory response causing organ dysfunction. Septic shock when a patient has sepsis and documented hypotension.

**Screening**

There are multiple tools available for screening for sepsis and septic shock. QSOFA is no longer recommended as a screening tool for sepsis and septic shock. Screening tools should supplement a provider's clinical judgment and diagnostic acumen, not replace them. There is no perfect screening tool for detecting SIRS/sepsis/septic shock.

**Signs and symptoms commonly found in patients with SIRS/sepsis/septic shock.**

- Respiratory rate > 20/min in adults.
- Heart rate > 90/min in adults.
- Unexplained hyperthermia >38 C in adults.
- Unexplained hypothermia < 36 C in adults.
- Unexplained acutely altered mental status.
- Unexplained hyperglycemia (>140mg/dl).
- Mottled skin.
- Capillary refill > 3 seconds.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94 | x | x | x |
| Continuously monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Vasopressors as indicated | | | x |
| Check blood glucose level (Glucometer) | x | x | x |

**Notes:**

- In some patients an initial fluid bolus of 30ml/kg may be appropriate, in other patient's this amount of fluid could prove deleterious. It may be prudent to evaluate fluid responsiveness with smaller aliquots of fluids (250 – 500ml) and assessing responsiveness. Clinical judgment should guide the amount of fluid a patient receives.
- Only ~50% of patients in septic shock will be responsive to fluids.
- The improved hemodynamic effects from fluid administration is often short lived and may last less than an hour in some patients.

- There is no preferred crystalloid fluid for infusion. However, in acidotic patients it may be prudent to use Ringer's Lactate instead of crystalloid fluid due to the lower chloride load it contains and lower incidence of anion gap acidosis with Ringer's lactate.
- It may be prudent to administer vasopressors at the same time as initiating a fluid bolus or fluid challenge in the setting of severe hypotension.
- Both epinephrine and norepinephrine are acceptable first-line vasopressors in septic shock. A general guideline for choosing which vasopressor to use is to assess the temperature of the patient's extremities. If the extremities are warm, they may benefit more from norepinephrine as they are not yet maximally vasoconstricted. If the patient has cold extremities, they may benefit more from the increased inotropic effects of an epinephrine infusion.
- In patients that are on high doses of norepinephrine but remain hypotensive the addition of a low dose infusion of epinephrine may improve perfusion and allow for the norepinephrine to be down titrated.
- When titrating vasopressors, it takes approximately 5 half-lives to reach a steady state, this is generally between 15-25 minutes. Do not be too hasty in titrating these medications up or down.
- Unless the patient has profound hypertension at their baseline a suggested target for fluids and vasopressors is a MAP of 65mmhg.

# Shock

This protocol serves as a guide to the treatment of a patient that has inadequate perfusion.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Control bleeding | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Keep the patient warm | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor blood glucose level if indicated | | x | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider spinal immobilization if indicated | x | x | x |
| **Treat for specific type of shock** | | | |
| • Consider repeated fluid boluses and vasopressor of choice for septic/distributive shock | | x (Fluid Bolus) | x |
| • Consider Epinephrine or Norepinephrine infusion for cardiogenic shock | | | x |
| • Control bleeding, warm, and transport for hemorrhagic shock. Consider fluid boluses to systolic BP 80mmHg | x | x | x |
| • Needle decompression for obstructive shock due to a tension pneumothorax | | | x |

**Notes:**

- When treating hypotension attempt to maintain a systolic blood pressure of 90mmHg or MAP of ≥ 65mmHg in patients with shock, with the following exceptions: pregnant patients and isolated head injuries may require higher blood pressures.
- Hypotension is a late sign of shock. Monitor for: altered mentation, agitation, restlessness, or tachycardia. Consider history and physical assessment.
- Consider the cause of rales/rhonchi prior to withholding fluid bolus. A patient with pneumonia may have isolated, unilateral, rales; in this patient fluid is safe, if indicated.

# Syncope

This protocol serves as a guide to the treatment of a patient who has suffered a syncopal event**.**

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort | x | x | x |
| Consider spinal immobilization if indicated | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor blood glucose level | | x | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Obtain 12-lead if syncope is suspected of being cardiac in origin | | | x |
| Treat dysrhythmias as appropriate | x | x | x |
| Treat hypotension as appropriate | x | x | x |
| Treat underlying cause as indicated | x | x | x |

**Notes:**

- Syncope is a transient state of unconsciousness from which the patient regains consciousness.
- Syncope that occurs when the patent sits up or stands up is often due to hypovolemia such as a GI bleed or dehydration. Syncope at rest or while recumbent is often caused by cardiac arrhythmias.

# Unresponsive Patient

This protocol serves as a guide to the treatment of a patient who is unresponsive upon arrival of EMS**.**

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Place the patient in position of comfort/position to best maintain airway | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. If the patient is actively bleeding or hypotensive, administer high flow O2 | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider spinal immobilization if injuries are consistent w/ spinal immobilization criteria | x | x | x |

**Notes:**

- Attempt to determine cause of unconsciousness so that treatment can be focused.
- If no cause can be determined, continue supportive treatment and transport.

# TRAUMA TREATMENTS

## Amputation Injuries

This protocol serves as a guide in the treatment of a patient who has suffered an amputation injury.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Control bleeding | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| Bandage wound with sterile, moistened, gauze | x | x | x |
| Preserve amputated tissue by wrapping in moist gauze and keeping cool | x | x | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider spinal immobilization if indicated | x | x | x |
| Consider pain control as indicated with agent of choice | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |

**Notes:**

- Time is of great importance in attempts to reattach the severed part. If transport time will be delayed, consider sending the amputated part to the hospital ahead to be prepared for reattachment.
- Partial amputations should be dressed and splinted in anatomical position to insure optimal blood flow.

## Burns

This protocol serves as a guide in the treatment of a patient who has suffered a burn injury.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Remove any clothing/jewelry that is removable | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer high flow O2 if indicated | x | x | x |
| Keep the patient warm and cover with sterile dressing | x | x | x |
| If burn is <10% TBSA: A moist sterile dressing should be used | x | x | x |
| If burn is > 10% use dry sterile dressings or a burn sheet | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 large bore | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Begin fluid resuscitation at:<br>• 500ml/hr if age >14yrs<br>• 250ml/hr for age 3-14yrs<br>• 125ml/hr if age <3yrs<br>Determine age as close as possible | | x | x |
| Consider spinal immobilization if indicated | x | x | x |
| Consider pain control as indicated with agent of choice | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |

**Notes:**

- Burn patients with airway injury are at risk for obstruction due to edema. Consider early airway control if: stridor/wheezing is present.
- Consider carbon monoxide and other poisonous gas inhalation if burns occurred during a fire in a confined space.
- Consider myocardial infarction and cyanide toxicity in firefighters or patients who have collapsed during a fire.
- Consider helicopter transport for critical or pediatric burns.

## Cardiac Arrest - Trauma

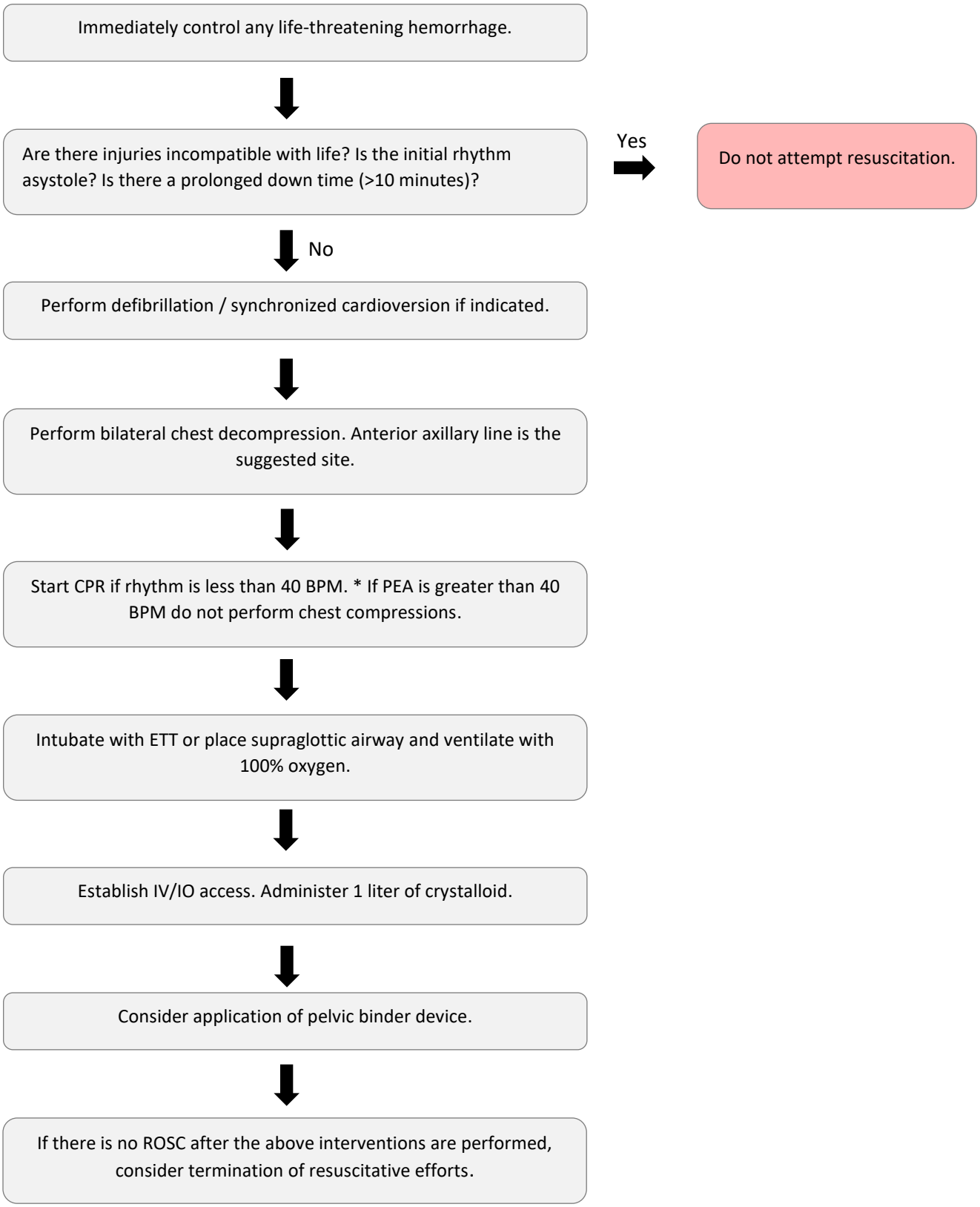
This protocol serves as a guide in the treatment of a patient in cardiac arrest due to traumatic injuries.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Perform triage as indicated | x | x | x |
| Determine patient viability | x | x | x |
| Consider manual/spinal immobilization | x | x | x |
| Initiate CPR (Follow current AHA guidelines) | x | x | x |
| Ventilate with BVM and high flow O2 | x | x | x |
| Suction as needed | x | x | x |
| Insert OPA/NPA | x | x | x |
| Monitor cardiac rhythm and if the patient is in a shockable rhythm: | | | |
| • Consider 2min of CPR prior to defibrillation | x | x | x |
| • Defibrillate manually or with AED (certification level dependent) | x | x | x |
| Perform bilateral needle decompression if appropriate | | | x |
| IV: 1-2 IV with Crystalloid fluid 500-1000mL if in PEA | | x | x |
| IO if unable to obtain IV | | | x |
| Administer medications as indicated | x | x | x |
| Insert advanced airway: Extra-Glottic or Oral ETT (do not stop compressions to insert an advanced airway) | x | x | x |
| If there is no response to treatment, consult Base Physician and terminate resuscitation efforts | | | x |
| **If ROSC:** | | | |
| • Begin transport | x | x | x |
| • Monitor vital signs | x | x | x |
| • Treat hypotension and arrhythmias as indicated | x | x | x |

**Notes:**

- Swap compressors every two minutes, if possible.
- Trauma arrests carry over 99% mortality. If there are multiple patients, these patients should be bypassed to treat viable patients. Triage should not be circumvented or delayed by focusing on traumatic arrests.

**Blunt trauma cardiac arrest algorithm**






* There is no role for ACLS medications in traumatic arrest.

# Chest Pain – Traumatic.

This protocol serves as a guide in the treatment of a patient who is suffering chest pain from a traumatic injury.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Control bleeding | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Consider spinal immobilization if indicated | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| Assess anterior and posterior breath sounds | x | x | x |
| Seal open chest/neck wounds with chest seal | x | x | x |
| IV: 1-2 IVs established | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider pain control as indicated with agent of choice | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |
| Impaled objects should be stabilized in place unless that interfere with the airway | x | x | x |
| Perform chest decompression for tension pneumothorax. Anterior axillary at the 4$^{th}$ or 5$^{th}$ intercostal space is preferred. Mid-clavicular at the 2$^{nd}$ intercostal space can be an alternate site for decompression. | | | x |
| If ventricular ectopy is present due to possible cardiac contusion, consider antiarrhythmic of choice | | | x |

**Notes:**

- Consider rapid transport to nearest trauma center and limit scene time if possible.
- Sucking chest wounds should be covered with a chest seal and burped or decompressed as needed.
- Splinting a flail segment is no longer recommended.

# Crush Injury

This protocol serves as a guide in the treatment of a patient who has suffered a traumatic crush injury.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Control bleeding as indicated | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Consider spinal immobilization if indicated | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer high flow O2 if indicated | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Continuously monitor cardiac rhythm. Watch for signs of hyperkalemia. | | | x |
| IV: x 2 | | x | x |
| IO if unable to obtain IV | | | x |
| Fluid bolus of 20ml/kg for renal protection | | x | x |
| In prolonged extrications, for renal protection, administer 1000ml per hour of crystalloid for the first 2 hours, then 500ml per hour after that. For pediatric patients administer 20ml/kg for the first 2 hours and then 10mg/kg after that. | | | |
| Consider pain control as indicated with agent of choice | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |
| **If the patient has:**<br>• **Compression of a full upper or lower extremity for greater than 4 hours**<br>• **Compression of chest or abdomen for greater than 4 hours**<br>• **Has signs of hyperkalemia** | | | |
| Administer 1meq/kg Sodium Bicarbonate diluted in 250mL D5W just prior to relief of compression. | | | DO |
| Administer 5mg Albuterol | DO | DO | x |
| Consider Calcium Gluconate | | | x |
| Treat hypotension as indicated. Control airway and breathing as indicated | x | x | x |

**Notes:**

- Saline may be preferred over Lactated Ringers due to the amount of potassium in LR. If no saline is available use LR.
- Avoid Succinylcholine administration in these patients.

# Drowning / Submersion injury

This protocol serves as a guide in the treatment of a patient who has drowned or had a near drowning event.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Stabilize spine spine if indicated | x | x | x |
| Initiated CPR if needed: refer to Cardiac Arrest Protocol | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm | | | x |
| IV: as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Monitor for hypothermia: Refer to Hypothermia Protocol | x | x | x |
| Monitor for the development of pulmonary edema | | | |
| Consider CPAP administration | x | x | x |

**Notes:**

- Consider transport of all near-drowning patient. Even if the patients initially appear fine, they can deteriorate.
- Beware of neck injuries - they often go unrecognized.
- Under current ACLS standards, Heimlich maneuver is not indicated.

## Fractures, Dislocations, and Sprains

This protocol serves as a guide in the treatment of a patient who has suffered an injury to a bone or joint.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Consider spinal motion restriction if indicated | x | x | x |
| Control bleeding | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Assess for circulation and neurologic function in extremity. Reposition as needed to restore circulation if absent | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| Apply sterile, non-stick, moist dressing to open fractures or open wounds | x | x | x |
| Splint injured extremity | x | x | x |
| Elevate and apply ice packs | x | x | x |
| IV: as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider pain control as indicated | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |

**Notes:**

- Do not apply ice or cold packs directly to skin or use them under bandages as this will cause tissue damage
- Fractures do not necessarily lead to loss of function. For example, impacted fractures may cause pain but little or no loss of function.
- When splinting, evaluate the patient's pulse, movement, and sensation before and after applying the splint. Document findings
- Fractures should be splinted in the position they are found unless there is diminished distal circulation, or the position prevents transportation. If an angulated fracture is to be realigned, gentle traction should be used to return it to the anatomical position. Document the neurovascular exam before and after the realignment.
- Dislocations should not be relocated in the field. If the distal circulation is impaired, contact the Base Physician for advice.

## Closed head injury / Acute traumatic brain injury

This protocol serves as a guide in the treatment of a patient who has suffered a significant traumatic injury to the head.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Consider spinal immobilization if indicated | x | x | x |
| Control bleeding | x | x | x |
| Place the patient in position of comfort/Indicated position | x | x | x |
| Transport with head of the gurney elevated to 3o degrees if possible | | | |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94% | x | x | x |
| Monitor vital signs including HR, BP, ECG, BGL, and temperature | x | x | x |
| Monitor cardiac rhythm if indicated | | | x |
| IV: 1-2 with Crystalloid fluid bolus as indicated | | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider benzodiazepine of choice if the patient experiences a seizure or is combative | | | x |
| Monitor blood glucose level | X | X | x |

**Notes:**

- Ventilate the patient at a rate to achieve EtCO2 of 35-45mmHg if the patient requires ventilation. Do not hyperventilate unless the patient exhibits signs of herniation; then ventilate to 30 - 35mmHg EtCO2.
- Early signs of increased intracranial pressure include confusion, restlessness, anxiety, combativeness, headache, and nausea. Late signs are changes in vital signs, posturing and changes in pupils. Do not wait until the patient is unconscious before you suspect a head injury.
- If a patient has trauma to the head, and is taking Coumadin or another blood thinner, the patient should be encouraged to consent to transport. An AMA refusal must be obtained if the patient refuses transport.
- Consider early activation of flights / flying from scene to a level I trauma center in the setting of severe head trauma.
- In isolated head trauma use fluid challenges or vasoactive medications as needed to ensure systolic BP meets the minimum for cerebral perfusion by age group (see table below).

| Age | Minimum systolic BP |
|---|---|
| 0 -14 years | >50$^{th}$ percentile - 90 mm Hg + (2 x age in years) |
| 15 – 49 years | >110mmhg |
| 50 – 69 years | >100mmhg |
| 70+ years | >110mmhg |

## External hemorrhage

This protocol serves as a guide in the treatment of a patient who has suffered an injury and is bleeding.

| Procedure | EMT | EMT-IV | Paramedic |
|---|---|---|---|
| Control significant bleeding with any of the following: | x | x | x |
| • Immediately apply a tourniquet in life threatening limb bleeding | x | x | x |
| • Apply direct pressure and bulky dressing | x | x | x |
| • Apply hemostatic agent – topical or wound packing | | | |
| Bandage wounds and splint as needed | x | x | x |
| Ensure the patient does not become hypothermic | x | x | x |
| Place the patient in position of comfort/indicated position | x | x | x |
| Support airway and breathing as indicated | x | x | x |
| Administer O2 if the patient is short of breath or titrated to SPO2 ≥ 94%. | x | x | x |
| Monitor vital signs including HR, BP, ECG, and temperature | x | x | x |
| Monitor cardiac rhythm if applicable | | | x |
| IV: establish 2 if possible. | | x | x |
| Use permissive hypotension. Titrate to MAP of 65mmhg | x | x | x |
| IO if unable to obtain IV and the patient is unstable | | | x |
| Consider pain control as indicated | | | x |
| Consider anxiety control as indicated with benzodiazepine of choice | | | x |

**Notes:**

- Most hemorrhaging can be controlled with aggressive direct pressure to the injury. If the initial dressing soaks through continue with pressure and add more dressing. Ten minutes or more may be required for an adequate clot to form. Do not remove dressings from a wound, always add more.
- Patients taking ASA, anti-coagulants or with coagulopathy may need longer periods of direct pressure or more aggressive control techniques.
- Permissive hypotension – elevation of the MAP above 65mmhg may dislodge clots that are forming. Large amounts of crystalloids may cause a dilutional coagulopathy and should be avoided. Titrate fluids to a MAP of 60-65mmng and no higher. If a blood pressure is not available, titrate fluids to the end point of maintaining a radial pulse.

## MEDICATIONS:

# Acetaminophen (Ofirmev / Tylenol)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

A non-opioid agent used as a monotherapy for mild to moderate pain or for a multi-modal approach to moderate to severe pain.

*****Must be given as a 15-minute infusion*****

**Dose:**

- **Adult dose:**
  - < 50kg: 15mg/kg every 6 hours up to a max dose of 75mg/kg/day.
  - > 50kg: 1000mg every 6 hours, not to exceed 4g per day.

- **Pediatric dose:**
  - Age 2 - 12 years of age, 15mg/kg every 6 hours up to a max dose 75mg/kg/day.
  - Not for use in patients under 2 years of age.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | IO: No | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- Minor to moderate pain, may be used as a monotherapy.
- Moderate to severe pain, used in addition to other analgesics as a multi-modal approach to pain management.

**Contraindications:**

- Liver failure
- Advanced liver disease
- Liver impairment

**Precautions:**

- **Must be given as a 15-minute infusion.**
- **Ensure patient will not exceed 4 grams in the past 24 hours including PO medications (Tylenol, cold medicine, etc.)**
- Administration of acetaminophen in doses higher than recommended may result in hepatic injury, including the risk of severe hepatotoxicity and death.
- Pregnancy category: C.

**Effects**

- Analgesia
- Antipyretic

**Side effects:**

- The most common adverse reactions in patients treated with OFIRMEV were nausea, vomiting, headache, and insomnia in adult patients and nausea, vomiting, constipation, pruritus, agitation, and atelectasis in pediatric patients.

**Notes:**

- Intravenous acetaminophen is less hepatotoxic than orally administered acetaminophen.
- If you are not using an IV pump for an adult > 50kg, **give Acetaminophen 1000mg in 100ml at 6 ml per minute** for 16 and a half minutes (until the bag is empty).
- **Pregnancy category: C**

# Acetylcysteine (Mucomyst)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Acetylcysteine is used in the treatment of acetaminophen overdose. Acetylcysteine maintains and/or replenishes depleted glutathione reserves in the liver which inactivates hepatotoxic metabolites of acetaminophen metabolism.

**Effects:**

- **Adult and Pediatric dose:**
  - Loading Dose: 150 mg/kg in 200 mL of 5% dextrose intravenously over 60min (Max: 15g)
  - Second Dose: 50 mg/kg in 500 mL 5% dextrose intravenously over 4hrs (Max: 5g)
  - Third Dose: 100 mg/kg in 1000 mL of 5% dextrose intravenously over 16hrs (Max: 10g)

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Acetaminophen overdose.
- Mucolytic therapy.

**Contraindications:**

- Allergy (relative) – Treat with diphenhydramine and continue infusion if benefit > risk.

**Precautions:**

- Can cause bronchospasm.
- Increase in bronchial secretions.

**Side effects:**

- May cause rash, urticaria and pruritus.
- Nausea.

**Effects:**

- Protects the liver against toxic metabolites of acetaminophen toxicity.
- Mucolytic agent for use in cystic fibrosis.

**Notes:**

- If plasma levels cannot be obtained it is reasonable to treat based on suspected acetaminophen overdose.
- Some formulations of acetaminophen may be extended release.
- Pregnancy category: B.

# Adenosine

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Adenosine in an endogenous nucleoside that is used to treat reentry supraventricular tachycardias by slowing conduction through the AV node.

**Dose:**

- **Adult dose:**
  - 12mg IV rapid bolus. Repeated in 1 – 3 minutes if rhythm has not converted.
  - Adenosine is administered as a fast push and the IV line should be immediately flushed with a 20mL Crystalloid fluid or LR bolus.
  - 24mg max dose.

- **Pediatric dose:**
  - 0.1mg/kg (IV, IO). Repeat x2 at 0.2mg/kg in 1-3min if rhythm has not converted.
  - Max single dose not to exceed adult dose.
  - Each bolus of Adenosine is administered as a fast bolus and flushed with Crystalloid fluid or LR bolus.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- Paroxysmal supraventricular tachycardias (AVNRT, AVRT, SNRT).
- Tachycardias that are undifferentiated, wide-complex, monomorphic, and regular.

**Contraindications:**

- Contraindicated in severely hypotensive or unstable patients – these patients should receive cardioversion.
- Contraindicated in patients with known history of 2nd degree AV block, 3rd degree AV block, or sick sinus syndrome, without a functioning pacemaker in place.
- **Atrial fibrillation is an absolute contraindication**. Rhythm must be regular to administer adenosine.
- Tachycardias secondary to sympathomimetic/CNS stimulant use.

**Precautions:**

- Known hypersensitivity to Adenosine.
- Patients on Dipyridamole (Permole, Persantine) for cardiac and vascular disease should be given ¼ of the normal dose since a full dose will cause prolonged adverse effects.

**Effects**

- Interrupts reentry pathway abnormalities in AVNRT, AVRT, SNRT, and allows the normal sinus pathway to function by slowing conduction at the AV node.
- Interrupts AV node function.

- May also covert some Ventricular tachycardias.

**Side effects:**

- Side effects: headache, anxiety, chest pain, hypotension, and arrhythmias.

**Notes:**

- Patients who use caffeine or theophylline, may require higher doses to achieve conversion.
- Safe in WPW (AVRT) when the rhythm is regular.
- Unsafe to use in WPW when the rhythm is atrial fibrillation or irregular.
- Pregnancy category: C.

# Albuterol (Proventil, Ventolin)

Authorization: EMT, EMT-IV, and Paramedic

Protocol: Paramedic - Standing Order

EMT, EMT-IV – Direct Order

Albuterol is a beta-adrenergic agent that stimulates the Beta 2 receptor sites of the sympathetic nervous system. This causes smooth muscle dilation, which relieves bronchospasms.

**Dose:**

- 2.5mg (nebulized).
  - Set the O2 at 6-8 liters/minute.
  - May repeat as needed or provide continuous nebulization.
  - May use inline nebulizer on CPAP, ETT, or extra-glottic device.

- Pediatric dose: 2.5mg (nebulized).
  - May repeat as needed.

**Route:**

| IV: No | IO: No | IM: No | IN: No | **Neb: Yes** | Oral: No | SL: No |
|---|---|---|---|---|---|---|

**Indications:**

- Respiratory distress due to asthma, allergies, anaphylaxis, or COPD.
- Suspected hyperkalemia (Paramedic only).

**Contraindications:**

- None.

**Precautions:**

- Use with care in patients who are hypertensive, severely tachycardic, have coronary artery disease, CHF or a known sensitivity to beta agonists.
- Bronchoconstriction secondary to pulmonary edema may cause wheezing, AKA cardiac asthma.

**Side effects:**

- Slight increase in heart rate and blood pressure.
- Anxiety.
- Tremor.

**Effects:**

- Bronchodilation
  - May use inline nebulizer on CPAP, ETT, or extra-glottic device.

**Notes:**

- Patients who are in severe respiratory distress and have low or minimal tidal volume will not benefit from Albuterol since the drug cannot reach the distal bronchioles. Consider epinephrine IM or IV.
- . Consider having the patient rinse mouth with water if previous MDI treatments have been administered.
- Beta blocker use may limit effectiveness.
- Pregnancy category: C.

# Amiodarone

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Amiodarone has Class I, II, III and IV antiarrhythmic properties.

**Dose:**

- **Cardiac Arrest with VF / VT: 300mg (IV, IO) bolus**
  - **May administer an additional 150mg bolus after 3-5min if VT/VF is refractory**.
  - Stable wide complex tachycardias, runs of VT, or post arrest, after successful conversion, if ectopy / tachyarrhythmias persist: 150mg diluted in 100ml of fluid given over approximately 10 minutes.

- **Pediatric Cardiac Arrest: 5mg/kg (IV, IO) bolus.**
  - Pediatric stable wide complex tachycardia, 5mg/kg (IV, IO) diluted in crystalloid fluid or LR: Give over 20-60min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Pulseless VT or VF refractory to defibrillation.
- Stable VT or wide complex tachycardias (rapid infusion method) or symptomatic runs of VT.
- Following successful defibrillation/synchronized cardioversion if tachyarrhythmias or ectopy persist.

**Contraindications:**

- None in cardiac arrest with VF or VT.
- 2nd or 3rd degree AV block.
- Sick Sinus Syndrome.
- Cardiogenic shock/Hypotension.
- Bradycardia (Including ventricular escape beats of IVR/AIVR).

**Precautions:**

- Wide complex, irregular rhythms with pulse.
- May prolong the QT interval.

**Side effects:**

- Hypotension and bradycardia

**Effects:**

- Prolongation of the action potential duration and the refractory period.
-

**Notes:**

- Do not administer in same line as Sodium Bicarbonate
- 12-lead should be performed when applicable
- Pregnancy category: D

# Antibiotic Infusions

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Antibiotics that you infuse.

**Dose Effects:**

- **Adult:**
  - Administer as ordered.

- **Pediatric:**
  - Administer as ordered.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Sending physician has ordered them.

**Contraindications:**

- Refer to specific antibiotic agent.

**Precautions:**

- Refer to specific antibiotic agent.

**Side effects:**

- Refer to specific antibiotic agent.

**Effects:**

- Refer to specific antibiotic agent.

**Notes:**

- Pregnancy category: Refer to specific antibiotic agent.

# Aspirin (Acetylsalicylic acid)

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic - Standing Order

ASA inhibits clotting and prevents clots from growing.

**Dose:**

- 324 mg
  - Administer 4 chewable 81mg aspirin (PO), if the patient can protect his or her own airway.
  - If patient has taken ASA, for the event, prior to EMS arrival, supplement patient dose up to 324mg.

**Route:**

| IV: No | IO: No | IM: No | IN: No | Neb: No | **Oral: Yes** | SL: No |
|---|---|---|---|---|---|---|

**Indications:**

- Acute Coronary Syndrome.
- Symptoms suspected of being Acute Coronary Syndrome in origin.

**Contraindications:**

- Contraindicated in patients allergic to ASA or ASA products.

**Precautions:**

- Active GI bleeding or other severe bleeding.
- Use with caution in patients with asthma.
- Not to be given for analgesic purposes such as headaches or orthopedic injuries.
- Use with caution in patients with liver dysfunction and impaired renal function.

**Side Effects:**

- May precipitate an asthma attack in patients with asthma.
- May cause GI upset.

**Effects**

- Inhibition of platelet aggregation.

**Notes:**

- Patients who normally take regular doses of ASA or ASA compounds can have gastrointestinal disorders such as GI hemorrhage.
- Patients taking warfarin (Coumadin), clopidogrel (Plavix), or other anti-coagulant/antiplatelet medications may be given aspirin.
- Pregnancy category: D.

# Assisted Medication Administration – Epinephrine (Adrenaline, EpiPen) Auto Injector

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic - Standing Order

Epinephrine is an endogenous catecholamine that is secreted by the adrenal medulla, which has potent alpha and beta adrenergic effects.

**Dose:**

- Adults: Automated. Usually 0.3 – 0.5mg.

- Pediatric: Automated. Usually 0.15 – 0.3mg.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | **IM: Yes** | IN: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Anaphylaxis and anaphylactic shock.
- Consider in severe asthma.

**Contraindications:**

- None.

**Precautions:**

- MAOI use is not a contraindication in anaphylaxis.
- Cardiac/ Coronary artery disease.
- Hypertension.
- Advanced age.
- Increased cardiac oxygen demand can precipitate angina and/or an MI in susceptible individuals.
- Should be used with caution in patients with peripheral vascular/cerebral vascular insufficiency.
- Hyperthyroidism.

**Side effects:**

- Tachydysrhythmias.
- Angina/MI.
- Hypertension.
- Anxiety, tremors, and nausea/vomiting.

**Effects:**

- Bronchodilation.
- Vasoconstriction.

**Administration:**

- Remove safety cap and place tip of injector firmly against the mid-lateral thigh until the mechanism activates.
- Remove needle from injection site and place in sharps container.
- Document injection, time, response, and initiate transport.

**Notes:**

- Epinephrine may have serious side effects and should only be used on patients experiencing life-threatening implications of a serious anaphylactic reaction. Airway management, oxygenation, ventilation, and circulatory support should not be delayed in favor of epinephrine auto-injector.
- Should not be used for allergic reactions unless circulatory or respiratory compromise is present.
- Wheezing in an elderly patient is may be pulmonary edema or a pulmonary embolus.
- Beta blocker use may limit effectiveness.
- Pregnancy category: C.

# Assisted Medication Administration – Albuterol Prescribed Inhaler

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT -IV Paramedic - Standing Order

Albuterol is a beta-adrenergic agent that stimulates the Beta 2 receptor sites of the sympathetic nervous system. This causes smooth muscle dilation, which relieves bronchospasms.

- EMT, and EMT/IV may provide assistance in the administration of a patient's own physician prescribed Metered Dose Inhalers (MDI) in situations where the patient is unable to self-administer the medication. Providers may not initiate administration of MDI's administer medication that is not specifically prescribed for the patient or administer MDI's to patients who do not meet the criteria listed below.

**Dose:**

- Adults: use as directed.

.

- Pediatric: use as directed.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | IM: No | IN: No | **Neb: Yes** | Oral: No | SL: No |

**Indications:**

- Respiratory distress due to asthma, or COPD.

**Contraindications:**

- None.

**Precautions:**

- Use with care in patients who are hypertensive, severely tachycardic, or have coronary artery disease, CHF or a known sensitivity to beta agonist.

**Side effects:**

- Increase in heart rate and blood pressure.
- Anxiety and tremor.

**Dose/Administration:**

- Check medication, assure medication is prescribed for the patient, and check the expiration date.

- Call base physician for direct order.
- Shake the inhaler vigorously.
- Instruct the patient to exhale deeply and place their lips around the spacer or MDI mouthpiece.
- Fully depress the inhaler and instruct the patient to breathe deeply and hold their breath for 1-2secs.
- Document time, dose, base physician and response to the inhaler.
- Repeat as instructed by base physician.

**Notes:**

- Beta blocker use may limit effectiveness.
- Pregnancy category: C.

# Assisted Medication Administration - Nitroglycerin

Authorization: EMT, EMT-IV, and Paramedic

Protocol: Paramedic - Standing Order

EMT, and EMT-IV - Direct Order

Nitroglycerine produces vasodilation.

- EMT/BIVs may aid in the administration of a patient's own physician prescribed sublingual nitroglycerine in situations where the patient is unable to self-administer the medication. EMT/BIVs may not initiate administration of nitroglycerine, administer medication that is not specifically prescribed for that patient, or administer nitroglycerine to patients who do not meet the criteria listed below.

**Dose**

- Administer 0.4mg sublingual nitroglycerin by tablet or spray.
- May repeat after 5min to a total of 3 doses or until pain is relieved, systolic BP decreases below 100mmhg, or ALS arrives.
- Repeat vital signs 5 min after each administration.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | IM: No | IN: No | Neb: No | Oral: No | **SL: Yes** |

**Effects:**

- Vasodilation.
- Decreased preload and afterload.

**Indications:**

- Cardiac or presumed cardiac chest pain.
- Angina.

**Contraindications:**

- Hypotension (Systolic BP < 90mmHg)
- HR > 100bpm or < 50bpm
- Phosphodiesterase 5 inhibitor use:
  - Viagra (sildenafil), Levitra (vardenafil), or Stendra (avanafil) within 24hrs.
  - Cialis (tadalafil) within 48hrs.
  - Other PDE5 inhibitors are currently in clinical trials and may become available in the USA.

**Side effects:**

- Hypotension and tachycardia.
- Headache.

**Notes:**

- Do not delay transport/ALS rendezvous to administer.
- Onset within 2min and duration of 30min.
- Pregnancy category: C.

# Atropine Sulfate

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Atropine is an acetylcholine antagonist that inhibits the effects of the parasympathetic nervous system by blocking muscarinic receptors.

**Dose/Administration:**

- **Adult**
- **Bradycardia:** 1mg bolus. Repeat every 5min to a max dose of 3mg.

- **Organophosphate poisoning**: 2-4mg bolus.
  - Repeat every 5min until patient is no longer symptomatic.

- **Pediatric**
- **Bradycardia**: 0.02mg/kg.
  - Repeat at 0.04mg. Minimum single dose 0.1mg. Max dose not to exceed adult dose.

- **Organophosphate poisoning:** 0.02mg/kg.
  - Repeat every 5min until patient is no longer symptomatic.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Effects:**

- Increases SA and AV node conduction.
- Reduces the motility of the GI tract.
- Reduces the action of the urinary system.
- Causes pupil dilation.
- Dries mucosal membranes.
- Dilation of the bronchioles.

**Indications:**

- Symptomatic bradycardia.
- Reverse effects from organophosphate and nerve gas poisonings.

**Contraindications:**

- A-Fib and A-Flutter.

**Precautions:**

- Bradycardias in the setting of a myocardial infarction

- Do not treat bradycardias unless the patient is symptomatic to the bradycardia: chest pain, fatigue, dizziness, hypotension, altered LOC, or other symptoms.
- Closed angle glaucoma.

**Side effects:**

- Anticholinergic toxidrome.
- Headache.
- Altered vision.

**Notes:**

- Small doses or slow administration may cause a paradoxical bradycardia.
- Pregnancy category: C.

## **Blood and Blood Products** (PRBCs, Fresh Frozen Plasma, Cryoprecipitate, Platelets)

Authorization: Paramedic, Critical Care Paramedic

Protocol: Paramedic, Critical Care Paramedic – Standing Order

**Dose/Administration:**

- **PRBCs for Anemia**- start with a slower infusion rate for the first 5 minutes, generally 50ml/hour. After 5 minutes if no reaction appears to be occurring increase rate up to a maximum of 200ml/hour. One unit of PRBCs will raise the hemoglobin and hematocrit by about 1 and 3.

- **PRBCs for life threatening hemorrhage/exsanguination** - infuse as rapidly as possible. Consider administering calcium chloride or calcium gluconate when performing a massive transfusion protocol. Administer calcium in a separate IV line.

- **Platelets -**start with a slower infusion rate for the first 5 minutes, generally 50ml/hour. After 5 minutes if no reaction appears to be occurring increase rate up to a maximum of 300ml/hour. Platelets are often given as six units of pooled platelets or one apheresis unit. A general rule of thumb is that transfusion of six units of pooled platelets or one apheresis unit should increase the platelet count by approximately 30,000/microL in an adult of average size.

- **Fresh Frozen Plasma -** Each unit will contain 200-250ml. Start with a slower infusion rate for the first 5 minutes, generally 50ml/hour. After 5 minutes if no reaction appears to be occurring increase the rate to:
  3 mL/kg/hour (ie, approximately one unit in 1.5 hours) in healthy patients.
  1ml/kg/hour in patients with heart failure or volume overload.

- **Cryoprecipitate** - For most adult patients, an appropriate dose of Cryoprecipitate is one to two five-unit "pools," equivalent to 5 to 10 units. Thus, a typical dose is provided in a volume of 50 to 200 mL. In the average patient, each unit raises the plasma fibrinogen concentration by at least 7 to 10 mg/dL; thus, 10 units will raise the fibrinogen by approximately 70 to 100 mg/dL in a 70 kg recipient. For factor XIII deficiency, a typical dose to treat bleeding is approximately one unit (bag) per 10 kg of body weight (eg, one five-unit pool in a 50 kg person). **Infusion rate** — The infusion rate for Cryoprecipitate is similar to other blood and plasma components (eg, 1 to 2 mL per minute in a patient without hypervolemia). In trauma cases or other emergent situations, the administration rate can be increased. Cryoprecipitate should be infused through a standard blood transfusion filter.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Contraindications:**

- Religious or personal objections.
- Do not administer medications in the same IV lines with blood and blood products running.
- Unrefrigerated for more than 4 hours.

**Precautions:**

- Transfusion reactions and hypersensitivity reactions can occur after the onset of blood product infusion.

- Consider slower rate of infusion in patients with CHF or who are at risk for volume overload.
- Massive transfusions may cause hypocalcemia due to EDTA. Consider administering calcium if hypocalcemia is suspected.
- Blood products must be used within 4 hours of removal from refrigeration.

**PROCEDURE:**

- Procedure: All blood products should be administered through blood specific tubing with a filter.
- Document blood product number (with pen or sticker) to permanent medical record and pre-hospital trip sheet left at receiving facility.
- Ensure consent for blood products has been signed if applicable.
- Ensure correct patient- double check arm band and have patient state name and DOB.
- Check the expiration date on the product.
- Check the blood bank identification number and the blood type.
- Check that the Donor number and ABO/Rh on bag match the transfusion form.
- **Always prime the tubing with 0.9% saline solution.**
- An IV pump is recommended except in the case of resuscitation or exsanguinating hemorrhage.
- **Never co-administer IV medications in a line with blood or blood components**.
- **For PRBCs, platelets, FFP and Cryoprecipitate: Vital signs including temperature must be obtained and documented before starting the transfusion and at minutes: 5, 15, 30, and hourly until transfusion is complete.**

**Complications:**

**IF A TRANSFUSION REACTION IS SUSPECTED IMMEDIATELY STOP THE TRANSFUSION.** Return the blood products and IV tubing to the lab. Complete the blood transfusion reaction information on the back of the transfusion form.

Signs and symptoms of a transfusion reaction include: fever, chills, muscle aches, nausea, vomiting, diarrhea, anxiety, back pain and chest pain, hypotension, tachycardia, tachypnea, hematuria, rashes, itching and hives. A rise of more than 2 degrees Fahrenheit is considered a fever for this protocol. *Any rise of less than 2 degrees should be noted, and the rate of infusion should be slowed (consider reducing the rate to half) but need not be stopped. It is also acceptable to stop the transfusion for a few minutes and observe the patient and then continue the transfusion at half of the initial rate.*

Should a transfusion reaction occur consider diphenhydramine (25-50mg IM/IV) and the use of saline infusions and vasopressors if needed.

**TRALI** (Transfusion-Related Acute Lung Injury).
TRALI should be considered whenever a patient develops hypoxemic respiratory insufficiency during or shortly after transfusion of any blood product. TRALI resembles ARDS and may in fact co-exist with ARDS in "transfused ARDS." Should a patient develop TRALI, it may be managed on a spectrum from providing supplement oxygen to CPAP/BiPAP all the way to intubation and mechanical ventilation depending on the severity of the injury. Patients may need hemodynamic support with saline infusions or vaso-active medications.

**TACO** (Transfusion Acquired Circulatory Overload). TACO is more common than TRALI. The possibility of TACO should be considered in any patient who has respiratory distress (dyspnea, orthopnea) or hypertension during or within six hours of completing a transfusion, especially in individuals with underlying heart disease, in the setting

of positive fluid balance, and in the ICU. TACO usually presents without fever and the astute provider may notice JVD. Consult with medical direction for the use of diuretics should this occur during transport.

**Anaphylactic Transfusion Reaction:** Occurs relatively quickly after starting the infusion and presents like anaphylaxis (wheezing hives, hypotension, etc.) and should be treated like anaphylaxis.

**Hypocalcemia in massive transfusion:** Due to the citrate binding of calcium, hypocalcemia can develop in a massive blood transfusion. This is especially important to consider if patients with poor liver function. For each 500 mL of blood infused consider administering 10-20ml of calcium gluconate (in a different IV).

**Notes:**

- Paramedics may take blood and blood products with them on a transfer should the need for administration arise. It is suggested that the paramedic discuss the criteria for initiation with the sending physician before leaving the hospital.

# Calcium Gluconate

Authorization: Paramedic, Critical Care Paramedic
Protocol: Paramedic, Critical Care Paramedic - Standing Order

Calcium Gluconate is used for the stabilization of patients with known or suspected life-threatening hyperkalemia. Calcium gluconate is also used for the treatment of various overdoses, to replace calcium in hypocalcemia and to counteract the effects of hypermagnesemia. It is generally packaged as 1g per 10ml (10 mL of a 10 percent solution).

**Dose**

***Always administer over approximately 5 minutes. Never give as a rapid bolus***

- **Hyperkalemia:** 1-3g intravenously over 5 minutes.
  - Consider diluting initial dose of 2g in 100cc bag of NS. Repeat as needed.
- **Beta blocker / calcium channel blocker overdose**: 1-3g intravenously over 5 minutes.
  - Repeat as needed.
- **Hypermagnesemia:** 1-3g intravenously (IV) infused over 5 minutes.
- **Hydrofluoric acid injury:** Mix with lubricant at 25% calcium and 75% lube to make a paste.
- **Massive blood transfusion:** Consider 1 gram of calcium gluconate over 5 minutes with first unit of PRBC's and then give 1 gram of calcium gluconate over 5 minutes with every 2-4 units of PRBC's.

- Pediatric dose for hyperkalemia and calcium channel blocker/beta blocker overdose: 30mg/kg (0.3ml/kg) up to adult dose given over 5 minutes.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Effects**

- Stabilization of cardiac myocyte action potential in severe hyperkalemia
- A source of calcium for known hypocalcemia or a calcium channel blocker or beta blocker overdoses

**Indications**

- **Known or suspected hyperkalemia**
- Bradycardia of unknown etiology where hyperkalemia is considered a possibility
- Cardiac arrest with known or suspected hyperkalemia
- Significant hyperkalemia (history and ECG findings, crush injury with ECG changes, etc.)
- Known or suspected calcium channel blocker / beta blocker overdoses
- In patients receiving massive blood transfusions consider after every 4$^{th}$ unit of PRBC's or signs or symptoms of hypocalcemia are noted
- Known or suspected hypocalcemia
- Topical for hydrofluoric acid injuries
- Hypermagnesemia (generally only for patients receiving magnesium sulfate such as in obstetrical patients)

**Contraindications**

- Digitalis use
- IV line of uncertain patency
- Do not administer in the same IV line as sodium bicarbonate is being given.

**Precautions**

- Do not administer with sodium bicarbonate as it may precipitate out.

- May cause tissue necrosis if extravasation occurs.
- Rapid administration may cause bradycardia or death, always give slowly and preferably diluted.

**Side effects**

- May cause vascular irritation at the site of infusion.

**Dose**

**Always administer over approximately 5 minutes. Never give as a rapid bolus.**

# Cefazolin (Ancef)

Authorization: Critical Care Paramedic

Protocol: Critical Care Paramedic - Standing Order

Cefazolin is a broad spectrum cephalosporin antibiotic.

**Dose:**

- **Adult dose:**
  - **2 grams.** Give over 1-2 minutes by slow IV push.

- **Pediatric dose:**
  - **25-50mg/kg.** Max dose of 2 grams.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- Open fractures.
- Large/deep wounds over a joint with a suspected injury to ER time of greater than 2 hours.
- Deep dirty wounds with a suspected injury to ER time of greater than 2 hours.

**Contraindications:**

- Hypersensitivity.

**Precautions:**

- None.

**Effects**

- Broad spectrum antibiotic.

**Side effects:**

- Diarrhea.

**Notes:**

- Pregnancy category B.

# Dextrose 10%

Authorization: EMT-IV and Paramedic

Protocol: EMT-IV and Paramedic - Standing Order

Dextrose is a 6-carbon sugar, which is the principal form of carbohydrates used by cells for energy.

**Dose:**

- Adult: 25g (250mL of D10%) (IV, IO) slow infusion.
  - Administer through IV or IO until patient mentation returns or 250mL administered.
  - Recheck blood glucose level after infusion is complete.
  - Stop administration when patient mentation returns to desired level.

*If infiltration does occur, stop administration immediately, leave IV in place and notify receiving facility. *

- Pediatrics dose: Newborn – 12yrs: 2-4mL/kg D10%.
  - Use buretrol or administer with a syringe to allow proper dosing.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Effects:**

- Raises blood glucose level.

**Indications:**

- Hypoglycemia.

**Contraindications:**

- Non-patent IV line.

**Precautions:**

- Ensure IV is patent before and during administration.
- Chronic malnutrition (Wernicke's and Korsakoff's).

**Side effects:**

- Tissue necrosis with extravasation.
- Vascular necrosis.

**Notes:**

- Patient may require repeat doses.
- Frequently assess BGL on pediatric patients that are distressed. Their BGL may lower quickly.
- Hypoglycemia is any reading <50mg/dL in a newborn.
- Pregnancy category: C.

# Diltiazem (Cardizem)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Diltiazem is a calcium channel blocker that reduces both heart rate and blood pressure.

**Dose/Administration:**

- **Adult:** IV, IO: 0.25mg/kg over 2 minutes. May be given in 5mg increments up to 0.25mg/kg. Repeat if no effect in 10 minutes at 0.35mg/kg. **Continuous infusion**: 5-15mg/hour.

- **Pediatric:** IV, IO: 0.25mg/kg over 2 minutes. Repeat if no effect in 10 minutes at 0.35mg/kg. **Continuous infusion:** 0.05-0.15 mg/kg/hr.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypertensive emergency.
- Supra ventricular arrhythmia (atrial fibrillation, SVT, etc.) with symptoms.
- **<u>As a general rule, patients with asymptomatic Afib/SVT should not be treated with Diltiazem.</u>**

**Contraindications:**

- **Hypotension (systolic BP < 100mmhg).**
- **Heart failure with reduced ejection fraction** (HFrEF) - defined as an EF < 50%
- **Severe heart failure**
- Recent use of nitroglycerin
- **Asymptomatic atrial fibrillation/atrial flutter.**
- Do not use diltiazem with Atrial fibrillation/atrial flutter **WITH WPW**, or short PR tachycardias associated with accessory bypass tract.
- Sick Sinus Syndrome
- AV blocks
- Recent IV beta blocker administration
- Patients in VT

**Precautions:**

- Give diltiazem slowly, rapid administration may precipitate hypotension.
- Diltiazem can increase the effects of benzodiazepines by 3-4 fold.
- Diltiazem is excreted in breast milk – nursing mothers should receive notice of the potential and should be advised to consult with a physician before resuming breastfeeding.
- **Atrial fibrillation is often a compensatory response to other conditions; ensure the patient is not experiencing atrial fibrillation as a compensatory response to a condition (for example, hypoxia, sepsis, hypovolemia, etc.) before administering diltiazem.**
- **Giving Diltiazem to patients with a reduced ejection fraction is controversial and potentially harmful. Many patients will not know what their ejection fraction is. Be sure to ask about the use**

**of diuretics and ask the patient if they know what their EF is. Also, check for pedal edema and rales in the lungs. This will help determine if CHF is present.**

**Side effect**

- Hypotension.
- Bradycardia / AV blocks.

**Notes:**

- Pregnancy category: C.
- Hemodynamically unstable patients in tachy-arrythmias should receive cardioversion, not IV diltiazem.

# Diphenhydramine (Benadryl)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Diphenhydramine is an antihistamine and anticholinergic with anti-emetic and sedating effects.

**Dose:**

- Adult: 25-50mg (IV, IO) slow push or deep (IM) injection.

- Pediatric: 2mg/kg (up to adult dose).

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IM: Yes** | IN: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Anaphylaxis.
- Severe allergic reactions.
- Counteract acute dystonic reactions due to antipsychotic drugs.
- Sedation (Paramedic only).
- Antiemetic (Paramedic only).

**Contraindications:**

- None.

**Precautions:**

- May have synergistic effect with alcohol or other CNS depressants.
- Glaucoma.
- Pregnancy.
- MAOI use may prolong/intensify anticholinergic effects.

**Side effects:**

- Sedation.
- Anticholinergic effects
- Hypotension

**Effects**

- Antihistamine
- CNS depression
- Anti-emetic

**Notes:**

- Diphenhydramine is not the first-line drug for anaphylaxis/anaphylactic shock – epinephrine is.
- Treat dystonic reactions which are often caused by certain antipsychotic drugs known as phenothiazines (Such as Haldol, Thorazine, and Compazine) with 25-50mg of diphenhydramine. Signs and symptoms of a dystonic reaction include oculogyric crisis, acute torticollis, and grimacing.
- Pregnancy category: B.

# Dobutamine (Inotropin)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Dobutamine increases inotropy by stimulation of the cardiac $\beta_1$ Receptors.

**Dose: Effects:**

- **Adult**: 2.5 - 20 mcg/kg/min

- **Pediatric:** 2.5 - 20 mcg/kg/min

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Cardiogenic shock.
- Need for increased inotropy.
- As an adjunct to other vasoactive medications to increase perfusion.

**Contraindications:**

- Dobutamine is contraindicated in patients with aortic stenosis.

**Precautions:**

- Increase in myocardial oxygen demand.
- May cause a decrease in blood pressure due to peripheral vasodilatory effects.
- Seldom used as a first line or monotherapy.

**Side effects:**

- Hypertension.
- Hypotension.
- Angina.
- Arrhythmia. May cause rapid ventricular response in patients with atrial fibrillation.
- Nausea.

**Effects:**

- Increases cardiac output via increased inotropy.

**Notes:**

- Increase in inotropy may be negated by the peripheral vasodilation.
- Pregnancy category: B.

## Dopamine

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Dopamine is a vasoactive medication that increases heart rate and blood pressure by alpha and beta effects.

**Dose:**

- **Adult:** 5mcg/kg/min – 50mcg/kg/min. Beta effects predominate in the 2-10mcg/kg/min range. Above 10mcg/kg/min effects are primarily alpha.
    - Titrate by 1-4mcg/kg/min q10 minutes.

- Pediatric: 1-5 mcg/kg/min IV, increased to 5-20 mcg/kg/min; not to exceed 50 mcg/kg/min

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypotension.
- Bradycardia.
- Renal protection.

**Contraindications:**

- Pheochromocytoma.

**Precautions:**

- Arrythmias.
- Dopamine may be arrythmogenic.
- Extravasation may cause tissue necrosis.
- Reduce dose if patient has recent MAOI use.

**Side effects:**

- Prolonged infusions through peripheral lines may cause necrosis.

**Effects:**

- Vasoconstriction

**Notes:**

- Pregnancy category: C.

# Droperidol (Inapsine)

Authorization: Paramedic

Droperidol is an antipsychotic medication that is also a potent anti-emetic.

**Dose:**

- **Adult Agitation / psychosis**: Intramuscular 5 – 10mg IM, Intravenous 2.5 -10mg IV.
- **Adult Nausea:** 0.625mg – 2.5mg IV/IM.
- **Migraine:** 2.5mg, repeat 1 time if needed.
    - If administering IV, drawing up the medication in a 1ml syringe and adding it to a 100cc bag of saline and infusing over several minutes is recommended. It is typically packaged as 2.5mg per ml (*5mg per 2ml vial*), if using this concentration add 0.25ml (0.625mg) to 0.50ml (1.25mg) to a 100cc bag. ***Always check your concentration on hand*** Concentrations may vary by manufacturer.

- **Pediatric:** Contraindicated in patients less than 12 years of age.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IM: Yes** | IN: No | Neb: No | Oral: No | SL: No |

**Contraindications**

- **Patients less than 12 years old.**
- **Patients with known long QT syndrome or known QTc >450ms.**
- Use extreme caution in patients with bradycardia (<50 bpm), cardiac disease, concurrent MAO inhibitor therapy, Class I and Class III antiarrhythmics or other drugs known to prolong QT interval, and electrolyte disturbances (hypokalemia or hypomagnesemia).
- Hemodynamically unstable patients.

**Indications:**

- Psychosis in patients greater than 12 years old.
- Agitation in patients greater than 12 years old.
- Nausea in patients greater than 12 years old.
- Nausea with migraine in patients greater than 12 years old.

**Notes**

- May cause extrapyramidal symptoms (EPS), including pseudoparkinsonism, acute dystonic reactions, akathisia, neuroleptic malignant syndrome, and tardive dyskinesia.
    - For treatment of severe dystonic reactions administer 50mg of diphenhydramine.
    - For treatment of severe akathisia (anxiety, feelings of inner restlessness) consider benzodiazepine administration.

# Epinephrine – Anaphylaxis and Respiratory

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Epinephrine is an endogenous catecholamine that is secreted by the adrenal medulla, which has potent alpha- and beta-adrenergic effects. *See epinephrine infusion protocol for infusion and push-dose dosing information*.

**Dose:**

- **Adult:** Obstructive pulmonary/anaphylaxis/anaphylactic shock:
  - **Initial: IM dose** 0.3mg (0.3mL of 1:1,000).
  - **For patients refractory to IM dosing or in extremis**: push dose epinephrine at a dose of **1mcg/kg may be given IV/IO** and repeated as needed. Be prepared for frequent redosing, generally 30 seconds to 10 minutes apart. Consult the AMAX4 protocol for more information.
    - Consider an epinephrine infusion if the condition is refractory or requires continuous treatment.
  - For **stridor / upper airway issues**: nebulize 1mg of epinephrine (1mg per ml, AKA 1:1,000). Repeat as needed up to a total of 5mg.

- **Pediatric:** Asthma / anaphylaxis / anaphylactic shock: **IM** 0.01mg/kg (0.01mL/kg of 1:1,000**).**
- **IM is the preferred INITIAL route for epinephrine administration in anaphylaxis.** The lateral thigh is the preferred injection site.
- **For patients refractory to IM dosing or in extremis: push dose epinephrine at a dose of 1mcg/kg may be given IV/IO** and repeated as needed. Be prepared for frequent redosing, generally 30 seconds to 10 minutes apart. No single dose should be higher than the cardiac arrest dose of epinephrine. Consult the AMAX4 protocol for more information.
  - Consider Epinephrine infusion if the condition is refractory or requires continuous treatment.
- For **stridor / upper airway issues:** nebulize 0.5mg/kg of epinephrine (1mg per ml, AKA 1:1,000) to a maximum of 5mg total.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes** | **Neb: Yes** | Oral: No | SL: No |

**Indications:**

- Pulseless cardiac arrest including Ventricular fibrillation, Asystole, and PEA.
- Anaphylaxis, with airway or circulatory compromise, and Anaphylactic shock.
- Severe asthma refractory to Albuterol.
- Pediatric Dyspnea with stridor at rest (Racemic epinephrine is preferred).
- Obstructive pulmonary disease refractory to inhaled bronchodilators (Use cautiously in elderly patients).

**Contraindications:**

- None.

**Precautions:**

- MAOI use.
- Cardiac/ coronary artery disease.
- Hypertension.
- Advanced age.
- Increased cardiac oxygen demand can precipitate angina and/or an MI in susceptible individuals.
- Should be used with caution in patients with peripheral vascular/cerebral vascular insufficiency.
- Hyperthyroidism.

**Side effects:**

- Tachydysrhythmias.
- Angina/MI.
- Hypertension.
- Anxiety.
- Nausea/vomiting.

**Effects:**

- Increased heart rate (Increased chronotropy).
- Increased rate of conduction (Increased dromotropy).
- Increased force of contractility (Increased inotropy).
- Vasoconstriction.
- Bronchodilation.

**Notes:**

- Anaphylaxis is an allergic reaction with 2 or more body systems involved.
- Nonimmunologic Anaphylaxis replaces the term anaphylactoid reactions and should be treated the same as an anaphylactic reaction. Nonimmunologic reactions involve agents or events that cause sudden mast cell degranulation and resultant histamine release. It is not important for providers to differentiate immunologic versus nonimmunologic reactions in patients, but it is important for providers to recognize patients with life threatening conditions that would benefit from epinephrine.
- Wheezing in an elderly patient is often pulmonary edema or a pulmonary embolus. Thoroughly evaluate the patient and remember that epinephrine's side effects, especially in the elderly, can be significant.
- Inactivated by alkaline solutions and exposure to light.
- Do not mix with Sodium Bicarbonate, do not use the same IV line as Sodium Bicarbonate.
- Beta blocker use may limit effectiveness.
- Pregnancy category: C.

# Epinephrine Infusion/Push Dose

Authorization: Paramedic

Protocol: Paramedic – Standing Order

**Dose/Administration:**

- **Adult Bradycardia/hypotension:**
- 2-10mcg/min continuous infusion or slow IV/IO push.
- May need higher doses 0.1-0.5mcg/kg/min, in some situations such as beta-blocker overdoses and post-ROSC.
- Titrate to effect. Generally, a MAP of 65mmhg is a suggested goal.
    - Mix 4mg Epinephrine 1:1000 (4mL of 1mg per ml) into 250mL D5W to achieve 16mcg/ml.

- **Pediatric**: 0.1-0.5mcg/kg/min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Symptomatic bradycardia refractory to Atropine.
- Symptomatic bradycardia in patients when Atropine is contraindicated.
- Symptomatic bradycardia in patients that capture is not obtained during TCP.
- Maintenance treatment of bronchospasm (Status asthmaticus, anaphylaxis, COPD, etc.).
    - Patient should be refractory to inhaled bronchodilators.
- Obstructive/anaphylaxis/anaphylactic shock that is refractory to other treatments or requires continuous treatment.
- Cardiogenic shock.
- Distributive shock.

**Contraindications:**

- Hypovolemic shock is a relative contraindication.

**Precautions:**

- MAOI use.
- Pheochromocytoma.

**Side effects:**

- Tachycardia.
- Hypertension.
- Anxiety.

- Increased lactate levels.

**Effects:**

- Increases blood pressure and cardiac output.

**Infusion rate:**

| 16mcg/ml | |
|---|---|
| **Micro drops/minute** | **Dose/minute** |
| 7gtts/min | 2mcg/min |
| 15gtts/min | 4mcg/min |
| 22gtts/min | 6mcg/min |
| 30gtts/min | 8mcg/min |
| 37gtts/min | 10mcg/min |

**Note:**

- Mix the infusion in the bag BEFORE spiking the IV line. Ensure that the IV line is flushed with saline and epinephrine solution, otherwise it will be a long time until the patient receives any epinephrine.

**Push Dose**

*This method should only be used as a temporary measure until a vasopressor drip can be established or in cases when hypotension is expected to resolve quickly.*

- Discard 9mL of Epinephrine 1:10,000. Draw 9mL of NS into the medication syringe. This will produce Epinephrine 1:100,000 with a concentration of 10mcg/ml.
- Administer 5-20mcg via slow IV/IO push. Repeat as needed until an infusion can be established.

# Epinephrine – Cardiac Arrest

Authorization: EMT-IV*, Paramedic

Protocol: Paramedic – Standing Order
*EMT-IV – under direct paramedic supervision with patients in cardiac arrest.

Epinephrine is an endogenous catecholamine that is secreted by the adrenal medulla, which has potent alpha- and beta-adrenergic effects. *See epinephrine infusion protocol for infusion and push-dose dosing information*.

**Dose:**

- **Adult: Cardiac arrest:** 1mg (10mL of 1:10,000 solution) every 3- 5min.
  - Providers may cease adminstration after a total of 3mg in adult cardiac arrest.
  - Do not administer in the same IV line as Sodium bicarbonate if possible. If there is only one IV/IO ensure the IV line is well flushed between administering sodium bicarbonate and epinephrine.

- **Pediatric**: **Cardiac arrest:** 0.01mg/kg (0.1mL/kg of 1:10,000 solution) every 3- 5min.
  - Do not administer in the same IV line as Sodium bicarbonate if possible. If there is only one IV/IO ensure the IV line is well flushed between administering sodium bicarbonate and epinephrine.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Pulseless cardiac arrest including Ventricular fibrillation, Asystole, and PEA.

**Contraindications:**

- None.

**Precautions:**

- None in cardiac arrest.

**Side effects:**

- None in cardiac arrest.

**Effects:**

- Increased heart rate (Increased chronotropy).
- Increased rate of conduction (Increased dromotropy).

- Increased force of contractility (Increased inotropy).
- Vasoconstriction.
- Bronchodilation.

**Notes:**

- Inactivated by alkaline solutions and exposure to light.
- **Do not mix with Sodium Bicarbonate, do not use the same IV line as Sodium Bicarbonate if possible.**
- Beta blocker use may limit effectiveness.
- Pregnancy category: C.

# Esmolol (Brevibloc)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Esmolol is a selective $\beta_1$ blocker that will decrease inotropy, HR, and BP.

**Dose: Effects:**

- **Adult:**
  - Load: 0.5 mg/kg IV over 1 min. Then:
  - Maintenance infusion: Start infusion at 0.05 mg/kg/min IV for the first 4 min, then increase by 0.05 mg/kg up to 0.2 mg/kg/min as needed.

- **Pediatric:**
  - Load: 0.5 mg/kg IV over 1 min. Then:
  - Maintenance: Start 0.05 mg/kg/min IV for 4 min, may increase by 0.05 mg/kg up to 0.2 mg/kg/min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- SVT (Including atrial fib / atrial flutter / non-compensatory sinus tach (Ex: POTS)
- Hypertension
- Refractory VT/VF after standard ACLS algorithm has been followed to a logical end point (It is suggested that 3 consecutive attempts at defibrillation, 300mg of amiodarone, and 3 doses of 1mg epinephrine have been given before administering esmolol).
- May be given sooner if than detailed above if the arrest is due to inhalant abuse and sudden sniffing death syndrome is suspect.

**Contraindications:**

- Severe sinus bradycardia
- Heart block greater than first degree
- Sick sinus syndrome
- Decompensated heart failure
- Cardiogenic shock
- Pulmonary hypertension
- Known hypersensitivity to esmolol

**Precautions:**

- Use with caution in patients with reactive airway diseases
- May raise serum potassium
- Avoid in Prinzmetal's angina as it may cause unopposed alpha stimulation
- Not recommended for sympathomimetic overdose

**Side effects:**

- Hypotension

- Bradycardia
- Heart blocks

**Effects:**

- Reduces Blood pressure
- Reduces heart rate

**Notes:**

- Pregnancy category: C

# Fentanyl Citrate

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Fentanyl is an opioid analgesic.

**Dose:**

- **Adult:** 1-3mcg/kg (IV, IO, IM) Repeat as indicated.
  - Administer over 2-5min (IV, IO).
  - IN administration is discouraged in adults due to the volume required for efficacy exceeds 1ml per nare.
  - Post RSI: 50-100mcg (IV/IO) repeat as needed

- **Pediatric:** 1-3mcg/kg (IV, IO, IN, IM) Repeat as indicated.
  - Administer over 2-5min (IV, IO).
  - For IN administration give 2-3x the IV dose.
  - Remember to account for the Atomizer having a dead space of 0.1ml.
  - Do not exceed 1ml per nare.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IN: Yes** | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Pain relief due to traumatic or medical causes (cardiac chest pain, extremity trauma, acute abdomen, etc.).
- Post RSI analgesia
- Fentanyl administration requires close monitoring of vital signs.

**Contraindications:**

- Myasthenia Gravis.
- **Should be avoided in patients receiving Nicardipine due to decreased hepatic metabolism of fentanyl.**
- **Do not administer to patients on Naltrexone as it will not provide analgesia.**

**Precautions:**

- CNS and respiratory depression.
- Hypotension.

**Side effects:**

- Hypotension.

- Respiratory depression.
- Sedation.
- Bradycardia.
- Chest wall rigidity (with rapid administration).

**Effects:**

- Analgesia.
- Decrease sympathetic tone.

**Notes:**

- Effects increased by other CNS depressants (Alcohol, benzodiazepines, muscle relaxants, opiates, etc.).
- Continuous patient monitoring is required.
- Patients may develop apnea without manifesting significant mental status changes.
- Fentanyl does not cause a histamine reaction.
- Pregnancy category: C.

# Fosphenytoin (Cerebyx)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Fosphenytoin is an anticonvulsant drug that is believed to work by sodium channel blockade. The dose, concentration, and infusion rate of CEREBYX should always be expressed as phenytoin sodium equivalents (PE).

**Dose: Effects:**

- **All doses are in PE units.**
- Prior to IV infusion, dilute CEREBYX in 5% dextrose or 0.9% saline to a concentration of 1.5 to 25 mg PE/ml.
- The loading dose of CEREBYX is 15 to 20 mg PE/kg administered at 100 to 150 mg PE/min.
- Because of the risk of hypotension, CEREBYX should be administered no faster than 150 mg PE/min.
- Maintenance dose is 4 – 6 mg PE/kg/day in divided doses.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Control and prevention of seizures.

**Contraindications:**

- Hypersensitivity.
- Sinus bradycardia.
- AV blocks (Type 1-3).
- Adams-Stokes syndrome.

**Precautions:**

- May cause hypotension.
- May cause arrhythmias, maintain continuous ECG monitoring.

**Side effects:**

- Hypotension.
- Arrhythmias.
- Purple glove syndrome.
- Ataxia / stupor.

**Effects**

- Anti-convulsant
- Seizure prophylaxis

**Notes:**

- Always dilute before administration.
- Pregnancy category: D.

# Glucagon

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Glucagon is a hormone that stimulates the liver to release glycogen, thus raising the level of glucose in the blood and causes smooth muscle relaxation. At higher doses, increases inotropy and chronotropy due to increase in cAMP.

**Dose:**

- **Adult: Hypoglycemia** without IV access: IM, IN: 1mg. Repeat as needed.
- **Adult: Refractory or life-threatening asthma / anaphylaxis**: IV, IO, IM: 2mg.

- **Pediatric: Hypoglycemia:** IM, IN: 0.1mg/kg
- **Pediatric: Refractory or life-threatening asthma / anaphylaxis:** IV, IM, IN, IO: 1mg of glucagon

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IN: Yes** | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Symptomatic hypoglycemia when IV access is unsuccessful.
- Anaphylaxis if the patient is known or suspected to be on beta blockers or if refractory following epinephrine administration.
- Severe, life threatening, refractory asthma.

**Contraindications:**

- Known hypersensitivity to this drug.

**Precautions:**

- Use with caution in patients with a history of cardiovascular disease, renal disease, pheochromocytoma or insulinoma.

**Side effects:**

- Tachycardia.
- Headache.
- Nausea/vomiting – consider prophylactic administration of 4mg of ondansetron.
- Hyperglycemia.

**Effects:**

- Increases blood glucose level.

- Increased heart rate (Increased chronotropy).
- Increased force of contractility (Increased inotropy).
- Bronchodilation.

**Notes:**

- The use of glucagon for removal of an esophageal food bolus has been removed from the protocols. Glucagon has failed to demonstrate efficacy for this purpose and often causes undesirable side effects.

- The use of glucagon for beta blocker overdose and calcium channel blocker overdose has been removed from the protocols. Glucagon does not have evidence of efficacy against beta blocker or calcium channel blocker overdoses and presents logistical challenges to providing the suggested dose for this indication.

- Pregnancy category: B

## Heparin

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Heparin is an anti-coagulant. This protocol exists to double check correct dosing on interfacility transfers.

**Dose:**

- **Adult:** Depends on the indication (see below). Dosing may be adjusted based on Heparin Xa levels.
    - . DVT/PE:
        - Loading dose: 80 units/kg (max 10,000 units).
        - Maintenance infusion: 18units/kg/hour (max 2000 units per hour).
    - Acute MI / Unstable angina WITHOUT thrombolytics or GP IIb/IIIa antagonists (abciximab, tirofiban, and eptifibatide).
        - Loading dose: 60 units/kg (max 4,000 units).
        - Maintenance infusion: 12 units/kg/hour (max 1000 units/hour).
    - Acute MI / Unstable angina **WITH** thrombolytics or GP IIb/IIIa antagonist use (abciximab, tirofiban, and eptifibatide).
        - Loading dose: 60 units/kg (max 4,000 units).
        - Maintenance infusion: 12 units/kg/hour (max 1000 units/hour).

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- DVT.
- PE.
- Myocardial Infarction.
- Coagulopathies.

**Contraindications:**

- Bleeding.
- Heparin-induced thrombocytopenia.
- Platelet count is 100,000/mm or lower.

**Precautions:**

- Bleeding risk
- May cause thrombocytopenia.

**Side effects:**

- Inactivates thrombin formation in the coagulation cascade.

**Effects:**

- Vasoconstriction.
- Increased heart rate.

**Notes:**

- Pregnancy category: C.

# Hydromorphone (Dilaudid)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Hydromorphone is a semi-synthetic opioid analgesic.

**Dose/Administration:**

- **Adult:** IM, IV, IO: 0.5mg – 1.0mg. Repeat as needed.

- **Pediatric:** IM, IV, IO: 0.01mg/kg. Repeat as needed.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Longer term analgesia needed.

**Contraindications:**

- Hypotension.
- Do not administer to patients on naltrexone as it will not provide analgesia.

**Precautions:**

- Head injury.
- Renal impairment (2-fold effect).
- Hepatic impairment (4-fold effect).

**Side effects:**

- Hypotension.
- Respiratory depression.

**Notes:**

- 1mg hydromorphone has approximately, the same effectiveness as 10mg of Morphine or 100mcg of fentanyl.
- Caution should be exercised to avoid causing respiratory depression. Narcan and resuscitative equipment should be available prior to administration.
- Consider dilution prior to (IV) administration.
- Onset 5min, peak 15-60min, duration 1-4hrs.
- Pregnancy category: C.

- For shorter duration calls, such as routine 911 calls, fentanyl is the preferred analgesic agent. Hydromorphone should be used in situations where longer term analgesia is needed, for example a backcountry call or on a transfer.

# Insulin

Authorization: Critical Care Paramedic Only

Protocol: Critical Care Paramedic - Standing Order

Insulin allows cells to utilize glucose as a fuel and may improve myocardial function in calcium channel blocker or beta blocker overdoses.

*****Must be in a solitary designated IV line with no ports or filters*****

- See DKA protocol for more information -

**Dose:**

- **Adult:**
  - **DKA / Hyperglycemia**: Start insulin at 0.14 Units/kg/hour.
    - The optimal rate of blood glucose decrease is 50 - 70 mg/dL/h. Do not allow serum glucose to drop by more than 100mg/dl per hour.
    - If serum glucose does not fall by 50-70mg/dl in the first hour, double the dosage of insulin.
    - If serum glucose drops by more than 100mg/dl per hour or is below 300mg/dl adjust insulin administration rate to 0.05 Units/kg/hour.
    - End point for DKA is a serum glucose of 200mg/dl
    - End point for HHNK/HHS is 300mg/dl
  - **Antidote for beta blocker OD / Calcium Channel Blocker OD.**
    - Administer 250ml of D10 or 50ml of D50 before giving insulin
    - First: Short acting insulin – 1 unit / kg bolus
    - Then infusion of short acting insulin – start at 0.5 units/kg/hour and titrate to a maximum of 5units/kg/hour. Titrate to resolution of hypotension/bradycardia.
      - Administer 25 grams of dextrose per hour – D10 or D50 to ensure serum glucose is between 100 – 250 mg/dl.
      - Check serum glucose q20 minutes and titrate dextrose as needed.

- **Pediatric:**
  - **DKA / Hyperglycemia**: Start insulin at 0.14 Units/kg/hour.
    - The optimal rate of blood glucose decrease is 50 - 70 mg/dL/h. Do not allow serum glucose to drop by more than 100mg/dl per hour.

- If serum glucose does not fall by 50-70mg/dl in the first hour, double the dosage of insulin.

- If serum glucose drops by more than 100mg/dl per hour or is below 300mg/dl adjust insulin administration rate to 0.05 Units/kg/hour.

- End point for DKA is a serum glucose of 200mg/dl.

- End point for HHNK/HHS is 300mg/dl

- **Pediatric Antidote for beta blocker OD / Calcium Channel Blocker OD.**

  - Administer 0.5g/kg of dextrose solution up to adult dose of 25 grams.

  - First: administer short acting insulin: 1 unit/kg bolus.

  - Then infusion of short acting insulin – start at 0.5 units/kg/hour and titrate to a maximum of 5units/kg/hour. Titrate to resolution of hypotension/bradycardia.

    - administer 25 grams of dextrose per hour – d10 or d50 to ensure serum glucose is between 100 – 250 mg/dl.

    - Check serum glucose q20 minutes and titrate dextrose as needed.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hyperglycemia (DKA, HHNK).
- Calcium channel blocker overdose / Beta blocker overdose.

**Contraindications:**

- Serum potassium < 3.3 mEq/L. Administer potassium to achieve a level >3.3 mEq/L before administering insulin.

**Precautions:**

- **Ensure Potassium levels are maintained**
  - Do not administer if the serum potassium is <3.3mEq/L.
  - If serum potassium is between 3.3 mEq/L and 3.9 meq/L give 10 meq of potassium per hour x 4.
  - If serum potassium is 4.0 -5.0 mEq/L give 10 meq/L of potassium per hour x 2.

- If serum potassium is > 5.0 mEq/L do not administer potassium.

- **Ensure sodium levels are maintained.**
  - If sodium is low (< 135 mEq/L corrected sodium level) administer 0.9% saline at 250-500 ml per hour.

  - If sodium is normal or high (>135 mEq/L) administer 0.45% ("half-normal") saline at 250-500ml per hour.

- Some IV-line filters may absorb insulin.

- Volume repletion alone can initially reduce the serum glucose by 35 to 70 mg/dL

**Side effects:**

- Hypoglycemia – monitor serum glucose levels frequently, at least q 1 hour. Administer dextrose if the patient becomes hypoglycemic (serum glucose <70 or signs and symptoms of hypoglycemia are noted).
- Hypokalemia.

**Effects:**

- Allows the cells to utilize glucose as a fuel.
- Increases myocardial function in beta blocker or calcium channel blocker overdoses.

**Notes:**

- Patient must be on a cardiac monitor due to potential potassium level changes.

- Pregnancy category: Unknown. However survival of the mother is of the utmost importance for survival of a fetus.

# Ipratropium Bromide (Atrovent)

Authorization: EMT and Paramedic
Protocol: EMT and Paramedic – Standing Order

Ipratropium is an anticholinergic agent that causes bronchodilation when nebulized. It is generally administered in combination with albuterol. It is not generally used as a monotherapy.

**Dose:**

- **Adults and Children > 2 years of age**:
  - 0.5mg in nebulizer.

- **Children < 2 years of age:**
  - 0.25mg in nebulizer

**Route:**

| IV: No | IO: No | IN: No | IM: No | **Neb: Yes** | Oral: No | SL: No |
|---|---|---|---|---|---|---|

**Indications:**

- Bronchospasm due to asthma, and COPD.

**Contraindications:**

- Hypersensitivity to this drug, Atropine (Anticholinergics), or bromide.

**Precautions:**

- Children < 2yrs.
- Use cautiously in patients with coronary artery disease.
- Use cautiously in patients with glaucoma.
- Pneumonia.

**Side effects:**

- Tachycardia.
- Headache.
- Anxiety.
- Dry mucus membranes.
- Can cause paradoxical bronchospasm. If this occurs, discontinue treatment.

**Effects:**

- Bronchodilation.
- Drying of secretions.

**Notes:**

- Cautions about soy and peanut allergy applies only to MDI use and does not apply to nebulized liquid Ipratropium Bromide.
- Pregnancy category: B.

# Ketamine for Analgesia

Authorization: Paramedic, and Critical Care Paramedic

Protocol: Paramedic, and Critical Care Paramedic – Standing Order

Ketamine has a variety of effects, including anesthesia, analgesia, hallucinogen, and sympathetic stimulation.

## Dose

*Ketamine is generally not recommended as a first line analgesic. Opioid administration should be considered prior to administering ketamine in most patients.*
**Always draw up in a 1ml Syringe (unless diluting in a saline flush).**

- **Adult:**
  - 0.1 - 0.3mg/kg IV. (0.1 – 0.3ml of 100mg/ml)
  - 0.5 mg/kg IM (note: IN use is not recommended in adults).
  - Infusion for continued analgesia and/or sedation (**Critical Care only**): 0.25-2mg/kg/hour.

- **Pediatric:**
  - 0.1 - 0.3mg/kg IV
  - 0.5 mg/kg IM and IN
  - Infusion for continued analgesia and/or sedation (**Critical Care only**): 0.25-2mg/kg/hour.

## Indications:

- Significant pain refractory to IV/IN/IO opioid administration
- *May be used as a first line analgesic for patients with significant pain when opioids are not the preferred medication (history of abuse, naltrexone use, clinical judgement, etc.)

## Contraindications:

- Age less than 1 year old.
- Pregnancy.
- MAY NOT BE USED TO FACILITATE A PROCEDURE / MAY NOT BE USED FOR PROCEDURAL SEDATION.

## Precautions:

- Transient periods of apnea (1-2minutes) have occurred with IV ketamine administration, especially with a rapid infusion.
- Relative contraindication for penetrating eye injury.
- May cause laryngospasm.
- May cause hypersalivation.
- **DEAD SPACE IN A 1ML SYRINGE WITH A 21 GAUGE NEEDLE IS 0.12ML.** If you are injecting into a 100ml bag of saline, you do NOT need to account for dead space if you flush the syringe with the saline while the needle in in the port of the bag.

## Side effects:

- Emergence reaction, consider administration of benzodiazepine if applicable.

- Increased airway secretions – consider atropine as an antisialagogue if needed.
- Nystagmus.
- Laryngospasm – rare.

**Notes**

- Onset 30-45secs, duration 10-20min.
- Attenuate dose by 50-75% in hemodynamic compromised patient.
- ***Vital signs (BP, ETCO2, SPo2%, HR, RR) must be continually monitored whenever possible. If this is logistically impossible, (back-country, etc.) the patient must be under direct Paramedic supervision at all times***

# Ketamine For RSI /DSI

Authorization: Paramedic,

Protocol: Paramedic – standing order

Ketamine has a variety of effects, including anesthesia, analgesia, hallucinogen, and sympathetic stimulation

**Dose:**

- **Adult:**
  - 1.5-2mg/kg IV/IO (strongly preferred route of administration).
  - 4-5mg/kg IM (Only if unable to establish an IV/IO – i.e., a combative head injured patient).
  - Reduce dose by 50-75% if hemodynamic compromise or catecholamine depletion is suspected.
  - Post RSI sedation under the state waiver - 0.5mg/kg, repeat as needed.

- **Pediatric:**
  - **Not permitted / outside of protocol.**

***Vital signs (BP, ETCO2, SPo2%, HR, RR) must be continually monitored whenever possible. If this is logistically impossible, (back-country, etc.) the patient must be under direct Paramedic supervision at all times. ***

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Induction agent for DSI.
- Post RSI sedation and analgesia

**Contraindications:**

- Allergy.
- **Pediatric RSI is not in CCEMS acts allowed.**
- Age <13 y/o.
- Pregnancy.
- MAY NOT BE USED TO FACILITATE A PROCEDURE / MAY NOT BE USED FOR PROCEDURAL SEDATION.

**Precautions:**

- Transient periods of apnea (1-2minutes) have occurred with IV ketamine administration, especially with a rapid infusion.
- Relative contraindication for penetrating eye injury.
- May cause laryngospasm.
- May cause hypersalivation.

**Side effects:**

- Emergence reaction, consider administration of benzodiazepine if applicable.
- Increased airway secretions – consider atropine as an antisialagogue if needed.
- Nystagmus.
- Laryngospasm – rare.
- Negative inotropy in catecholamine depleted patients – may cause hypotension.

**Effects:**

- Analgesia.
- Sedation.

****Vital signs (BP, ETCO2, SPo2%, HR, RR) must be continually monitored whenever possible. If this is logistically impossible, (back-country, etc.) the patient must be under direct Paramedic supervision at all times****

**Notes**

- Onset 30 - 45secs, duration 10-20min.

# Ketorolac (Toradol)

Authorization: Paramedic

Protocol: Standing order

Toradol is a non-steroidal anti-inflammatory drug (NSAID) used for the treatment of acute moderate to severe pain.

**Dose Effects**

- **Adults:** For use in adults between 18 to 65 of ages.
  - 15mg. May repeat 1 time if needed.

- **Pediatric:**
  - Not indicated.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | IO: No | IN: No | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications**

- Management of moderate to severe to acute pain when opioids are not desirable or appropriate.
- Headache without suspected intracerebral hemorrhage.

**Contraindications**

- **Renal impairment / renal failure/renal transplant.**
- **Cerebral hemorrhage or suspected cerebral hemorrhage or any significant bleeding risks.**
- NSAID hypersensitivity / NSAID use in the past 6 hours.
- Peptic ulcer disease.
- Gastrointestinal bleeding or history of gastrointestinal bleeding.
- Pregnancy.
- Trauma with non-compressible bleeding or intracranial hemorrhage.
- Age > 65 years of age or age < 18.
- On anticoagulants or if the patient has any blood clotting disorder.
- Patients potentially needing surgery (for example a femur fracture).
- Breast feeding.

**Dose**

- Analgesic.
- Anti-inflammatory.

# Labetalol (Normodyne)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

**Dose:**

- **Adult:** 20 mg IV over 2 minutes initially, then 40-80 mg IV q10min; total dose not to exceed 300 mg.

- **Pediatric:** 0.4-1 mg/kg/hour by continuous IV infusion; not to exceed 3 mg/kg/hour.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypertension.

**Contraindications:**

- Hypersensitivity.

**Precautions:**

- Use with caution in the presence of severe reactive airway disease.

**Side effects:**

- Nausea.
- Bradycardia.

**Effects:**

- Labetalol is a mixed α and β adrenergic antagonist that is used to treat hypertension.

**Notes:**

- Pregnancy category: C.

# Levetiracetam (Keppra)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Levitiracetam is an anticonvulsant drug believed to work by blocking pre-synaptic calcium channels.

**Dose:**

- **MUST BE DILUTED IN 100ML OF NS**
- **Adult:** 500mg over 15min, twice per day.

- **Pediatric dose:**
  - 1 month to < 6 months Initiate at 7 mg/kg twice and day and titrate to 21 mg/kg twice a day.
  - 6 months to 4 years Initiate at 10 mg/kg twice and day and titrate to 25 mg/kg twice a day.
  - 4 years to 16 years initiate 20 mg/kg in 2 divided doses (10 mg/kg twice daily).

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Seizures.
- Prophylaxis of seizures.

**Contraindications:**

- Adjust dose if patient has renal impairment.

**Precautions:**

- Dosing adjustments required for patients with impaired renal function.
- MUST BE DILUTED IN 100ML OF NS.

**Side effects:**

- Somnolence.

**Effect:**

- Seizure prevention.

**Notes:**

- Pregnancy class: C.

# Lidocaine

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Lidocaine is an antiarrhythmic and can be used as a local anesthetic for establishing an IO in a conscious patient.

**Dose**

- **Adult:**
  - **IO initial flush:**
    - Fill extension set with lidocaine. The extension set volume is 0.9ml, this provides 18mg of 2% lidocaine. May repeat 1x.
  - **Arrythmias:**
    - VT/VF without a pulse: 1-1.5mg/kg slow IV push. Repeat doses of 0.5-0.75 mg/kg in 5-10 minutes up to 3 mg/kg total if refractory VF or pulseless VT.
    - Hemodynamically stable VT with a pulse: 1 – 1.5mg/kg slow IV push, repeat doses of 0.5-0.75 mg/kg in 5-10 minutes up to 3 mg/kg total.
    - Infusion dose: 1-4 mg/min continuous infusion

- **Pediatric:**
  - **IO initial flush:**
    - 0.5mg/kg up to the adult dose.
  - **Arrythmias:**
    - 0.5 – 1.0mg/kg slow IV push not to exceed 100mg total.
    - Infusion dose: 20-50 mcg/kg/min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Analgesia for establishing an IO in a conscious patient.
- Ventricular arrythmias.

**Contraindications:**

- Heart blocks.

**Precautions:**

- Lidocaine may be able to cause malignant hyperthermia (MH). If a patient exhibits signs and symptoms of MH (rising etco2, masseter spasm) transport rapidly to the closes emergency department.
- May cause discomfort at infusion site.

**Side effects:**

- Hypotension.
- Nausea.
- Headache.
- Dizziness.

**Notes:**

- Pregnancy category: Unknown, no testing has been performed.

## Magnesium Sulfate

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Magnesium is an electrolyte that has a variety of effects including smooth muscle relaxation, calcium channel blockage, CNS depression, prolongs action potential, and shortens the QT interval.

**Dose:**

- Adult: Cardiac indications (Torsades des Pointes): 2g over 1-2 minutes.
- Adult: Eclampsia: 4 grams infused over 20-30 minutes. Do not wait for magnesium to terminate status seizures in the eclamptic patient – use midazolam first line and then infuse magnesium.
- Adult Asthma: 2 grams IV over 2-5min.

- Pediatric Asthma: 25-50 mg/kg IV over 20-30min.
- Torsades des Pointes: 25 – 50 mg/kg IV.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Seizures secondary to eclampsia.
- Torsades Des Pointes.
- Cardiac arrest due to hypomagnesaemia.
- Status asthmaticus (Refractory to other treatments).
- Lab confirmed hypomagnesaemia.

**Contraindications:**

- AV heart blocks (Except in Torsade's and cardiac arrest).

**Precautions:**

- Hypotension.
- Respiratory depression.
- Bradycardia.

- CNS depression.
- Digitalis toxicity.
- Renal failure.

**Side effects:**

- AV heart blocks.
- Flushing/sweating.

**Effects:**

- Bronchodilation.
- Decrease blood pressure and relieve cerebral vasospasm.
- Shortens the QT interval.

**Notes:**

- Be prepared to assist ventilations.
- Monitor for hypotension. Discontinue administration if hypotension occurs.
- Pregnancy category: A.

# Mannitol

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Mannitol is a large sugar molecule used for its osmotic properties to treat increased intracranial pressure.

***** Must be used with a filtered IV set. *****

**Dose:**

- **Adult:**
  - **Increased intracranial pressure:**
    - 0.25 - 2 g/kg over 30 to 60 minutes. Generally given at 1.25g/kg dose.

- **Pediatric:**
  - **Increased intracranial pressure:**
    - 0.25 - 1g/kg over 30 to 60 minutes.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Increased intracranial pressure.
- Increased intraocular pressure.
- To promote excretion of certain intoxicants.

**Contraindications:**

- Anuria.
- Severe hypovolemia.
- Pulmonary edema.
- Active intracranial bleeding.

**Precautions:**

- Do not administer in the same IV line as blood products.
- May cause discomfort at infusion site.

**Side effects:**

- Renal failure.
- Headache, seizure.
- Hypovolemia.

**Effects**

- Mannitol is an osmotic diuretic that will induce the movement of intracellular water to the extracellular and vascular space.

**Notes:**

- Pregnancy category: Unknown. Mannitol crosses the placenta and may cause fluid shifts that could potentially result in adverse effects in the fetus.

# Methylprednisolone (Solu-Medrol)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Methylprednisolone is a synthetic steroid that stimulates the increased release of anti-inflammatory mediators and decreases the production of pro-inflammatory mediators. Methylprednisolone also decreased the degranulation of mast cells and the lysis of other leukocytes.

**Dose:**

- **Adult:**
  - 125mg bolus. Use promptly after reconstitution.
  - May be given as an infusion for spinal cord injuries, multiple sclerosis, inflammatory conditions, and COVID-19.
    - Initial dose is 30mg/kg over 15 minutes followed by 5.4 mg/kg/hour or as directed.

- **Pediatric:**
  - 1 - 2mg/kg bolus. Use promptly after reconstitution.
  - May be given as an infusion for spinal cord injuries, multiple sclerosis, inflammatory conditions, and COVID-19.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes*** | Neb: No | Oral: No | SL: No |

**Indications:**

- Asthma/COPD.
- Croup/Bronchiolitis – If IV/IO previously established.
- Suspected Addisonian crisis (Cardiovascular collapse in patient at risk for adrenal insufficiency).
- Spinal cord injury (interfacility transfer only with physician order).
- Other inflammatory conditions.

**Contraindications:**

- Hypersensitivity to methylprednisolone.
- Active GI bleeding.
- IM route is contraindicated in idiopathic thrombocytopenic purpura.
- **Avoid injection into deltoid muscle due to high incidence of subcutaneous atrophy.**

**Precautions:**

- ***Do not administer IM in the deltoid**. Gluteal injection is preferred. Injection of SOLU-MEDROL may result in dermal and/or subdermal changes forming depressions in the skin at the injection site. Injection into the deltoid muscle should be avoided because of a high incidence of subcutaneous atrophy.

- History of diabetes – will increase blood glucose levels.

- Average and large doses of corticosteroids can cause elevation of blood pressure, salt and water retention, and increased excretion of potassium; dietary salt restriction and potassium supplementation may be necessary; all corticosteroids increase calcium excretion.

- Psychological derangements may appear when corticosteroids used, ranging from euphoria, insomnia, mood swings, personality changes, and severe depression, to frank psychotic manifestations; also, existing emotional instability or psychotic tendencies may be aggravated by corticosteroids.

**Side effects:**

- None with short-term treatment/use

**Effects:**

- Anti-inflammatory
- Suppresses the immune/allergic response

**Notes:**

- Be aware that the effect of methylprednisolone is generally delayed for approximately 1hr. Administer as early in the course of treatment as appropriate, but do not delay transport or other treatments to administer.

- Avoid routine administration for croup/bronchiolitis. The effect of stressing the child due to a needle may outweigh the benefit of administration in the pre-hospital setting.

- **Only** the SOLU-MEDROL 40 mg vial includes lactose monohydrate produced from cow's milk. This presentation is therefore contraindicated in patients with a known or suspected hypersensitivity to cow's milk or its components or other dairy products because it may contain trace amounts of milk ingredients. The 125 mg vial does not have this issue.

- Pregnancy category: C.

- *5/29/2025 update – Methylprednisolone should no longer be given to patients experiencing anaphylaxis / anaphylactic shock.

# Metoprolol (Lopressor)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Metoprolol is $\beta_1$ selective antagonist that lowers blood pressure and slows heart rate.

**Dose:**

- **Adult:** 5mg, repeat at 2min intervals as needed up to 15mg.

- **Pediatric:** Safety and efficacy not established in children.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypertension.
- Tachycardias.
- Myocardial infarction.
- Hyperthyroid / Thyroid storm.
- Angina Pectoris.

**Contraindications:**

- Hypersensitivity.
- Cardiogenic shock.
- Sick sinus syndrome or bradycardia / AV blocks in absence of pacemaker.

**Precautions:**

- May worsen heart failure.
- May affect reactive airway disease.
- Do not use in cocaine overdose.
- Do not use in untreated pheochromocytoma.

**Side effects:**

- Bradycardia.
- Wheezing.
- Fatigue.

**Effects:**

- Lowers blood pressure.
- Lowers heart rate.
- Decreases myocardial oxygen demand.

**Notes:**

- Pregnancy category: C.

# Midazolam (Versed)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Midazolam possesses anxiolytic, amnestic, and sedative properties.

**Dose:**

- **Adult:**
  - **Seizures:**
    - IM dose: 10mg. Repeat as needed.
    - IV dose: 5mg. Repeat as needed.
  - **Post intubation sedation**
    - Maintenance of intubated patient: 2 – 5mg bolus. Repeat as needed.
    - *Infusion* (interfacility transfer only): 20-100 mcg/kg/hour infusion. Titrate as needed.
  - **Anxiolysis:**
    - 1-2mg, repeat as needed.
  - **Amnestic:**
    - 0.5-3mg for cardioversion.
  - **Vertigo:**
    - 0.5-2mg. Repeat as needed.
  - **Alcohol withdrawal:**
    - 3-5mg initial, repeat as needed, titrating to adequate decrease of symptoms.
    - Patients in alcohol withdrawal may need extremely high doses of benzodiazepines to control symptoms.
  - **Behavioral issues / agitation:**
    - 2.5 -10 mg IM.

- **Pediatric:**
  - **Seizures:**
    - IM/IN: 0.2mg/kg
    - IV: 0.1mg/kg
  - **Anxiety/Analgesia/Sedation**
    - IM/IN: 0.2mg/kg
    - IV: 0.1mg/kg

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IN: Yes** | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Chemical restraint for combative patients.
- Sedation post RSI /Intubation / ventilator
- Seizures.
- Relief of muscle spasm.
- Amnesia for cardioversion.
- Anxiolysis.
- Vertigo.
- Alcohol Withdrawal.

**Contraindications:**

- Hypotension (Except for prior to procedure).
- Respiratory depression (Except for prior to procedure/RSI, or if unable to establish airway control due to combativeness).

**Precautions:**

- Age > 70yrs (consider lower dose).
- CNS/respiratory depression.
- Hypotension.

**Side effects:**

- Hypotension
- Respiratory depression

**Effects:**

- Inhibits neuronal excitability.
- Sedation.
- Anxiolysis.
- Skeletal muscle relaxation.

**Notes:**

- Onset 2-5min, duration 15 - 90min.
- Pregnancy category: D.

# Naloxone (Narcan)

Authorization: EMT, EMT-IV, and Paramedic

Protocol: Standing Order

Naloxone is a competitive opioid antagonist that reverses the symptoms of an opioid overdose.

**Dose:**

- **Adult**:
  - 0.1 - 0.4mg IV. Repeat as needed q2 minutes.
  - 1-2mg IN. Repeat as needed q2 minutes.
  - Titrate to reverse respiratory depression, not full reversal of opioids.

- **Pediatric**:
  - 0.1mg/kg for all routes. Not to exceed adult dose.
  - Titrate to reverse respiratory depression, not full reversal of opioids.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IN: Yes** | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Opioid/suspected opioid overdose.
- Catapres (Clonidine) overdose (Paramedic only).

**Contraindications:**

- None.

**Precautions:**

- Reversal of effects may precipitate anxiety or agitation in those who frequently use opioids.
- Chronic pain – If used in a patient who is habituated to narcotics, the patient may develop condition consistent with narcotic withdrawal.
- Reversal of hypoxia prior to naloxone administration by providing ventilation may reduce agitation and aggression following naloxone reversal of opioid overdose.
- If this is a poly-pharm overdose or suspected combination of drugs such as heroin and cocaine ("speedballing") it may be prudent to defer naloxone administration and provide transport with ventilatory support and airway management as needed.

**Side effects:**

- Sudden narcotic withdrawal.
  - Nausea/vomiting.
  - Combativeness.
  - Pulmonary edema.
- Soreness/headache (If narcotics are not present).

**Effects:**

- Reversal of opioid overdose induced respiratory depression.

**Notes:**

- The duration of some narcotics is longer than Narcan (1-4hrs). Repeated doses of Narcan may be required.
- Large doses (16-20mg) may be needed to reverse propoxyphene (Darvon) overdose.
- Demerol (Meperidine) will not cause pupillary constriction.
- An intracerebral hemorrhage such as a pontine bleed can mimic an opioid OD.
- The number of opioid analgesics, and medications that include an opioid, is extensive. Physical exam and patient assessment is the most useful tool in determining whether or not a patient might have overdosed on an opioid
- Catapres (Clonidine) is an A2 adrenergic agonist whose effects will be reversed with Narcan administration
- Pregnancy category: C

## Nicardipine (Cardene)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Nicardipine is a calcium channel blocker primarily used to lower blood pressure.
***** Nicardipine is not compatible with Lactated Ringers or Sodium Bicarbonate. *****

**Dose:**

- **Adult:** 5mg / hour initially, may be increased by 2.5 mg / hour every 15 minutes; not to exceed 15 mg / hour. Nicardipine is not compatible with Lactated Ringers or Sodium Bicarbonate.

- **Pediatric:** 0.5-3 mcg/kg/min. Nicardipine is not compatible with Lactated Ringers or Sodium Bicarbonate.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypertension.
- Maintenance of blood pressure parameters in stroke, head trauma, AMI, AAA, etc.

**Contraindications:**

- Hypotension.
- Blood pressure is lower than target goal.
- **Do not administer with Fentanyl**. Nicardipine causes decreased hepatic metabolism. Use Hydromorphone for analgesia instead. Nicardipine decreases CYPA4 metabolism, which is where fentanyl is metabolized. Hydromorphone is metabolized at CYP2D6 and does not have these issues.

**Precautions:**

- May cause venous irritation and phlebitis.

**Side effects:**

- Headache.
- Hypotension.
- Tachycardia.

**Effects:**

- Vasodilation.

- Increased heart rate.

**Notes:**

- Pregnancy category: C.

# Nitroglycerin infusion

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Nitroglycerin is a vasodilator primarily effecting the venous system at lower doses.

**Dose:**

- **Adult:** Start infusion at 5mcg/min. Increase by 5 mcg/min q3-5min up to 20 mcg/min, THEN increase dose by 10mcg/min q3-5min. Titrate to relief of pain occurs or systolic BP is less than desired (usually a systolic of 90mmhg). Treatment of pulmonary edema may require very high doses.

- **Pediatric:** Initial: 0.25-0.5 mcg/kg/min IV infusion, may increase by 0.5-1 mcg/kg/min q3-5min PRN. Max dose is 20mcg/min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Angina.
- STEMI/NSTEMI/OMI/Other suspected cardiac chest pain
- Pulmonary edema

**Contraindications:**

- Hypotension (systolic BP < 90mmhg).

**Precautions:**

- May cause a headache.
- Use with extreme caution when patients have bradycardia or significant tachycardia.

**Side effects:**

- Hypotension.

**Notes:**

- Pregnancy category: C.

# Nitroglycerine Sub-Lingual Spray

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Nitroglycerine produces vasodilation and reduces the cardiac workload and can improve some types of pulmonary edema.

**Dose:**

- **Adult**:
  - Chest pain: 0.4mg (one spray) SL q3-5 minutes up to 3 doses provided systolic BP remains above 90mmhg.
  - Pulmonary edema from right ventricle failure: 0.4 - 1.2mg (one to three sprays) SL q3-5 minutes until resolution of respiratory distress of systolic BP less than 100mmhg.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | IN: No | IM: No | Neb: No | Oral: No | **SL: Yes** |

**Indications:**

- Cardiac chest pain / suspected cardiac chest pain.
- Pulmonary edema.

**Contraindications:**

- Hypotension (Systolic BP < 90mmHg).
- Phosphodiesterase 5 inhibitor use:
  - Viagra (sildenafil) within 24hrs.
  - Cialis (tadalafil) within 48hrs.
  - Levitra (vardenafil) within 24hrs.
  - Stendra (avanafil) within 24hrs.
  - Other PDE5 inhibitors are currently in clinical trials and may become available in the USA.

**Precautions:**

- Inferior MI.
- Significant tachycardia or bradycardia.

**Side effects:**

- Hypotension and tachycardia.
- Headache.

**Effects:**

- Vasodilation (Including coronary arteries).
- Decreased preload and afterload.

- Generalized smooth muscle relaxation.

**Notes:**

- Blood pressure should be taken and recorded before and after each administration.
- Nitroglycerine is thought to have a cumulative effect.
- Onset 2min, duration 30min.
- Sub-lingual nitroglycerin does not present an explosion risk.
- Pregnancy category: C.

# Norepinephrine (Levophed)

Authorization: Paramedic
Protocol: Paramedics – Standing Order

Norepinephrine is an α and β agonist that increases inotropy and causes vasoconstriction

**Dose:**

- Adult: Infusion - suggested dose range 2 – 30mcg/min. Some patients may need higher doses, titrate as needed.
- Push dose – 4 – 16mcg as needed, titrate as needed.

- Pediatric: 0.05 – 0.1mcg/kg/min (Max 1-2mcg/kg/min).

**Indications:**

- Hypotension.

**Contraindications:**

- Hypersensitivity.
- Do not give in the same IV line as NaHCO3 (sodium bicarbonate).

**Precautions:**

- Use with extreme caution in concurrent MAOI use.
- May cause arrhythmias.
- Extravasation may cause necrosis.
- Central line is preferred but peripheral IV/IO may be used if there is no central line.

**Side effects:**

- Bradycardia.
- Nausea.

**Effects:**

- Vasoconstriction.
- Increased cardiac output.

**Notes:**

- Consider adding in an epinephrine infusion if the patient remains hypotensive despite receiving 30mcg/min of norepinephrine.

- Pregnancy category: C.

- Frequent checks for extravasation required. If IV extravasation occurs discontinue the norepinephrine infusion in that IV site but leave the IV inserted and place a saline lock as phentolamine may be infused through it at the receiving facility.

## Octreotide (Somatostatin)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Octreotide decreases growth hormone and IGF-1 secretion; suppresses LH response to GnRH secretion and decreases splanchnic blood flow. Although Octreotide has many uses, it is primarily seen in EMS for patients with esophageal or GI bleeding.

**Dose:**

- **Adult:** 25-100 mcg IV bolus (usual bolus dose: 50 mcg); follow by continuous IV infusion of 25-50 mcg / hour.

- **Pediatric:** 1 mcg / kg bolus, then 1 mcg / kg / hour infusion.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- GI bleeding / prevention of GI bleeding.
- Multiple other indications: endocrine related, anti-diarrheal, Sulfonylurea Overdose.

**Contraindications:**

- Avoid administering amiodarone with octreotide as they both increase the QTc interval.
- Avoid administering Droperidol (Inapsine) with octreotide as they both increase the QTc interval.
- Avoid administering Ondansetron (Zofran) with octreotide as they both increase the QTc interval.

**Precautions:**

- May cause QTc prolongation and AV blocks.

**Side effects:**

- Headache.
- Nausea.
- Diarrhea.
- May cause AV blocks.

**Effects:**

- Decreases splanchnic blood flow.

**Notes:**

- Patient must be on a cardiac monitor due to the QTc interval lengthening potential.
- May alter Glucagon or Insulin levels – assess blood glucose levels on initiation and with dose changes.
- Pregnancy category: Unknown.

# Ondansetron (Zofran) ODT

Authorization: EMT, EMT-IV, and Paramedic

Protocol: Paramedic - Standing Order

EMT, and EMT-IV – Direct Order

Orally dissolving tablet for the treatment of nausea.

**Dose:**

- **Adult and Children >3 years old:**
  - 4mg orally dissolving tablet.
  - May repeat once.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | IN: No | IM: No | Neb: No | **Oral: Yes** | **SL: Yes** |

**Indications:**

- Nausea and/or vomiting.
- Potential for nausea and/or vomiting.

**Contraindications:**

- Hypersensitivity.
- Children <3yrs.

**Precautions:**

- Pregnancy/breast feeding

**Side effects:**

- Headache.
- Dizziness.
- Fatigue.

**Effects:**

- Anti-emetic.

**Note:**

- Usually will not cause sedation.
- Effect may be delayed over parenteral administration.
- Pregnancy category: B.

# Ondansetron Injection (Zofran)

Authorization: EMT-IV and Paramedic

Protocol: Paramedic - Standing Order

EMT-IV – Direct Order with Paramedic confirmation

Ondansetron treats nausea.

**Dose:**

- **Adult:** 4mg.

- **Pediatric (>1 years of age):** 0.15mg/kg. Not to exceed adult dose.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | **IN: No** | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Nausea and/or vomiting.
- Potential for nausea and/or vomiting.

**Contraindications:**

- Hypersensitivity.
- Patients less than years of age.
- Congenital long QT syndrome.

**Precautions:**

- Pregnancy/breast feeding.
- Use with caution in patients that have a long QT interval.

**Side effects:**

- Headache.
- Dizziness.
- Fatigue.

**Effects:**

- Antiemetic.

**Note:**

- **EMT-IV – Paramedic must visually confirm the medication and dose with a paramedic prior to administration.**
- Usually will not cause sedation.
- Pregnancy category: B

# Oral Glucose

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic - Standing Order

Oral glucose is a simple sugar will raise a patient's blood glucose level.

**Dose:**

- Adult and Pediatric: 15 grams orally.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| IV: No | IO: No | IN: No | IM: No | Neb: No | **Oral: Yes** | SL: No |

**Indications:**

- Hypoglycemia with blood sugar of 70mg/dl or less with signs and symptoms of hypoglycemia.

**Contraindications:**

- Dysphagia.
- Inability to swallow.
- Inability to protect airway.
- Patient who has decreased level of consciousness and cannot protect their own airway.

**Precautions:**

- Can cause choking/aspiration if the patient unable to protect airway.

**Side effects:**

- Hyperglycemia.
- Stickiness.

**Effects:**

- Raise blood glucose level.

**Notes:**

- Make sure that the patient is sitting in an upright position to help protect airway.
- Re-check blood sugar after administration.
- Sugary foods/drinks, such as soda, may be of benefit and contain higher amounts of sugar.
- Will raise blood glucose level slowly

# Oxygen

Authorization: EMT, EMT-IV, and Paramedic

Protocol: EMT, EMT-IV, and Paramedic - Standing Order

Required by for aerobic metabolism

**Dose:**

- Nasal cannula: 1-6L/min.
  - 4-6L/min will quickly dry mucosa, consider adding humidification.
  - 15L/min for apneic oxygenation during RSI.
- Non-rebreather mask: 10-15L/min.
  - Ensure that reservoir is full prior to placement on the patient.
  - >15L/min for denitrogenating during RSI.
- Bag-valve-mask: 10-15L/min.
  - Ventilate at appropriate rate.
  - Used with mask, endotracheal tube, or extra glottic device.
- Small volume nebulizer: 6-8L/min.
  - Use same volume/min of oxygen when SVN on mask.
- CPAP: 15L/min.
  - EMT, EMT-IV, EMT-I, and Paramedic only. See specific protocol.
- Automated transport ventilator:
  - Critical Care Paramedic only.

**Indications:**

- Hypoxia (SPO2 < 94%).
- Shortness of breath.
- Hypotension/shock states.
- Significant bleeding.
- Pregnancy with complications and during childbirth.
- CO/suspected CO poisoning.
- Poisonous inhalation.

**Contraindications:**

- Paraquat poisoning.

**Precautions:**

- MI/stroke with SPO2 > 94% and no shortness of breath.
- Patients with COPD/other chronic lung disease may have a baseline SPO2 < 94%.

**Side effects:**

- Drying of nasal mucosa.

**Effects:**

- Saturates hemoglobin with oxygen.
- Hasten disassociation of CO from hemoglobin.

**Notes:**

- Oxygen is flammable. Be aware of possible sources of ignition.

# Oxytocin (Pitocin)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Oxytocin is a hormone that promotes uterine contractions.

**Dose:**

- **Adult:** Postpartum hemorrhage only:
  - **10 units IV over the first 30 minutes, give the remaining 20 units over the next 3.5 hours.**
  - Comes as 30 units in a 500ml bag.
  - Set the infusion pump rate to 334 ml/hour for 30 minutes (10 units in 167 ml), then reduce the rate to 95 ml/hour (remaining 20 units) over 3.5 hours.

- **Pediatric:**
  - Not applicable.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- Post-partum hemorrhage.

**Contraindications:**

- Pregnancy. While oxytocin may be used to induce labor, the back of an ambulance is not the right setting for this indication. Oxytocin use by EMS is limited to post-partum hemorrhage only.

**Precautions:**

- Do not administer to pregnant patients.

**Side effects:**

- Hypotension.
- Arrythmias.

**Effects:**

- Uterine contraction.

**Notes:**

- Pregnancy category: X.

## Pantoprazole (Protonix)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Pantoprazole inhibits gastric acid secretion by acting as a proton pump inhibitor. It is also used for GI bleeding.

*****Administer in a dedicated IV line*****

**Dose:**

- **Adult dose:**
  - **Initial Bolus**: 80mg/80ml over 5 minutes.
    - Infusion: 80mg added to 80ml of saline (100ml total), infuse at 8mg/hour (10 ml/hour).

- **Pediatric dose:**
  - Not applicable

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | IO: No | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- History of gastroesophageal reflux disease with erosive esophagitis.
- GI bleeding.

**Contraindications:**

- Hypersensitivity

**Precautions:**

- Protonix comes as a freeze-dried powder. The powder should be reconstituted with 10ml of 0.9% saline and further diluted with 100ml of either 0.9% saline, lactated Ringer's or a 5% dextrose and water (D5W) solution resulting in a final concentration of approximately 0.4mg/ml.
- *****Administer over 15 minutes*****
- *****Administer in a dedicated IV line*****

**Effects**

- Decreased gastric acid secretion.

**Side effects:**

- Abdominal pain.
- Headache.
- Injection site reaction.
- Rhinitis.

**Notes:**

- Pregnancy category: B.
- Not compatible with midazolam in same IV line.
- Requires a dedicated IV line.

# Phenylephrine Spray (Neo-Synephrine)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Alpha 1 adrenergic agonist that is a potent vasoconstrictor.

**Effects:**

- Adult: 0.5 – 1 ml per nare (one to two sprays).

- Pediatric: 0.5ml per nare (one spray per nare).

**Route:**

| IV: No | IO: No | **IN: Yes** | IM: No | Neb: No | Oral: No | SL: No |
|---|---|---|---|---|---|---|

**Indications:**

- May relieve ear blockage and pressure/pain associated with altitude changes.
- Epistaxis.

**Contraindications:**

- None.

**Precautions:**

- Hypertension.
- Hyperthyroidism.
- Cardiovascular disease.

**Side effects:**

- Hypertension.

**Effects:**

- Vasoconstriction.
- Nasal Decongestant.
- Termination of epistaxis.

**Notes:**

- When used to relieve otitis barotrauma, the best results are from pretreatment before descending from altitude.

- Pregnancy category: C.

# Phenytoin (Dilantin)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic – Standing Order

Phenytoin is an anticonvulsant.

**Dose:**

- **Adult:** Load 10-15 mg/kg or 15-20 mg/kg at 25-50 mg/min, then:
  - Maintenance: 100 mg IV/PO q6-8hr PRN.
  - Administer IV slowly; not to exceed 50 mg/min.

- **Pediatric:** Load 10-15 mg/kg or 15-20 mg/kg at 25-50 mg/min, then:
  - Maintenance: 100 mg IV/PO q6-8hr PRN.
  - Administer IV slowly; not to exceed 50 mg/min.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Seizures.
- Seizure prophylaxis.

**Contraindications:**

- Hypersensitivity.
- AV block (type II and type III).
- Adams-Stokes syndrome.
- Sinus bradycardia.

**Precautions:**

- Administration should not exceed 50 mg/min in adults or 1 to 3 mg/kg/min.
- May cause hypotension.

**Side effects:**

- Hypotension.
- Bradycardia.
- Nystagmus / visual disturbances.

**Effects:**

- Anti-epileptic.
- Seizure prophylaxis.

**Notes:**

- Pregnancy category: D.

# Potassium Chloride

Authorization: Paramedic

Protocol: Paramedic – Standing Order

It is potassium in a bag of fluid. It is given to people who need potassium.

**Dose/Administration:**

- **Adult:** 10 mEq/hour maximum infusion rate.

- **Pediatric:** 0.5 mEq/kg/hour infusion rate.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Hypokalemia.

**Contraindications:**

- Hyperkalemia.

**Precautions:**

- Patient must be on continuous cardiac monitoring. Monitor for signs of hyperkalemia. Discontinue if arrythmias related to hyperkalemia or other manifestations of hyperkalemia (Large T waves, 1$^{st}$ degree AV blocks) develop.
- Overdoses of potassium can be fatal.
- May cause discomfort at infusion site.

**Side effects:**

- Hypotension.

**Notes:**

- Pregnancy category: Unknown, no testing has been performed. Potassium is not expected to cause adverse developmental outcomes.
- An infusion of 10mEq will raise a serum potassium approximately 0.13mEq/L.

# Propofol (Diprivan)

Authorization: Critical Care Paramedic
Protocol: Critical Care Paramedic– Standing Order

Propofol potentiates GABA receptors, sodium channel receptors and other receptors to cause sedation and amnesia.

**Dose:**

- **Adult:**
  - **Infusion:** 5mcg/kg/min – 50mcg/kg/min titrated to effect.
  - **Induction:** 0.5mg/kg – 3mg/kg IV push.
  - **Bolus:** for sedation breakthrough: 20mg – 50mg bolus. Repeat PRN.

- **Pediatric:** Not indicated in patients under 13 years of age.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Mechanically ventilated patients.
- Other uses as needed.

**Contraindications:**

- Allergy to eggs.
- Allergy to soy.
- Absolute contraindication in patients under 3 years of age.

**Precautions:**

- May cause apnea.
- May cause pain at injection site.
- May lower blood pressure.
- Abrupt discontinuation may cause anxiety and agitation.
- High doses may cause Propofol Infusion Syndrome (PRIS), presenting with cardiovascular collapse.

**Side effects:**

- Hypotension.

**Effects:**

- Sedation.
- Amnesia.

**Notes:**

- Pregnancy category: B.

- Consider lower dose in hemodynamically compromised patient.

# Rocuronium (Zemuron)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Rocuronium is a non-depolarizing paralytic. Ensure you are prepared to ventilate the patient if you are using Rocuronium.

**Dose:**

- **Adult:** 1 – 1.2mg/kg.
  - Dose may be increased to 2mg/kg in patients with hemodynamic compromise.

- **Pediatric:** Not in protocol.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- RSI / DSI
- Intubated patients on a ventilator.

**Contraindications:**

- Inability to ventilate/oxygenate if intubation is unsuccessful.
- Patient <13yrs.

**Precautions:**

- Increased dose may be needed if the patient is hypotensive.

**Side effects:**

- None.

**Effects:**

- Paralysis.
- Apnea.

**Notes:**

- Onset is within 1-3min, duration is up to 60min.
- Continuous end tidal CO2 and pulse oximetry monitoring is mandatory.
- Does not provide analgesia or sedation. If there is any chance the patient may have awareness you must provide analgesia and sedation.
- Consider withholding long term paralysis if the patient condition warrants. Ensure that appropriate sedation and analgesia are provided.
- Pregnancy category: C.

# Sodium Bicarbonate

Authorization: Paramedic

Protocol: Paramedic –Standing Order

Sodium Bicarbonate will increase the pH of the urine and increase serum sodium. It has limited effect to increase blood and intracellular ph.

**Dose:**

- **Adult:**
- **Tricyclic antidepressant overdose/ sodium channel blocker:** 1-2mEq/kg. If QRS does not narrow or symptoms persist, repeat after 5 minutes. If QRS narrows, add 150 mEq to a 250cc bag of D5W (*remember to remove 150cc from the d5w first*). Establish an infusion of 150 mEq over 60 minutes.

- **Hyperkalemia:** Sodium Bicarbonate is of questionable efficacy for hyperkalemia. It should only be given after calcium and albuterol. Administer 50 mEq over 5 minutes. Only effective if metabolic acidosis is present.

- **Metabolic acidosis:** 1mEq/kg. Repeat as needed. Generally, not indicated unless pH is < 6.9. The effects of sodium bicarbonate on metabolic acidosis are transient at best. Ensure adequate minute ventilation.

- **Pediatric:** 1mEq/kg. Under 1 year of age dilute with 1:1 normal with crystalloid fluid before administering.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Cardiac arrest preceded/potentially preceded hyperkalemia (sodium bicarbonate is only likely effect for this indication if there is also metabolic acidosis.
- Known hyperkalemia.
- Tricyclic antidepressant overdoses with QRS >0.12ms, dysrhythmias, ectopy, or hypotension.
- Massive crush injuries / Rhabdomyolysis.

**Contraindications:**

- Metabolic alkalosis.

**Precautions:**

- None when indicated.

**Side effects:**

- Metabolic alkalosis.
- Paradoxical cerebral/intracellular acidosis.

**Effects:**

- Alkalizes urine to promote excretion of certain substance.
- Provides sodium.

**Notes:**

- Per the American Heart Association, "The value of sodium bicarbonate is questionable during cardiac arrest, and it is not routinely recommended for the routine cardiac arrest sequence."
- Adequate and effective ventilation is the mainstay of treatment for acidosis.
- Carbon dioxide is generated after administration. Effective ventilation is essential to remove the CO2 from the body.
- Must be administered in separate line than catecholamines and calcium chloride or calcium gluconate.
- Pregnancy category: C.

## Succinylcholine Chloride

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Depolarizing acetylcholine nicotinic receptor antagonist that causes paralysis and apnea.

**Dose:**

- **Adult:** 1.5 - 2mg/kg.

- **Pediatric:** Not indicated.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | **IM: Yes** | Neb: No | Oral: No | SL: No |

**Indications:**

- RSI/DSI.
- Trial of paralysis for patients that are difficult to manage on a ventilator.

**Contraindications:**

- Known hyper-sensitivity to any component.
- Personal or family history of malignant hyperthermia.
- Acute narrow angle glaucoma or penetrating eye injuries.
- Inability to ventilate/oxygenate the patient if intubation is not successful.
- Patient <13yrs.

**Precautions:**

- Known or potential hyperkalemia or metabolic acidosis.
- Pregnancy/breast feeding.
- Burns.
- Liver disease.
- Anemia.
- Malnutrition.
- Quinidine or Digitalis use.
- Increased dose may be needed if the patient is hypotensive.

**Side effects:**

- Hyperkalemia.
- Muscle fasciculation.

**Effects:**

- Paralysis.

**Notes:**

- Succinylcholine Chloride does not affect pain or anxiety – administer sedative first.
- Onset within 30secs, duration 4-6min.
- Doses of 2mg/kg have been associated with increased optimal conditions for intubations.
- Pregnancy category: C.

# Tetracaine/Opthaine

Authorization: Paramedic

Protocol: Paramedic – Standing Order

Tetracaine is an ocular anesthetic.

**Dose:**

- 1-2 drops in the affected eye.
    - Medication may be administered prior to flushing eye with crystalloid fluid or sterile water.

**Indication:**

- Pain caused by superficial trauma to the eyes.
- Provide analgesia to facilitate flushing after chemical or foreign body.
- UV burns to the eye.

**Contraindications:**

- Penetrating trauma to the eye.
- Globe not intact.

**Precautions:**

- None.

**Side effects:**

- Tearing.
- Transient burning sensation.
- Blurred vision.

**Effects.**

- Topical ophthalmic analgesic.

**Notes:**

- Pregnancy category: B.

# tPA (Alteplase)

Authorization: Paramedic – Interfacility transfer only
Protocol: Paramedic – Standing Order, on Interfacility transfers only

tPA is an enzyme that aids in dissolution of blood clots.

**Dose:**

- **Adult:**
  - **Ischemic stroke:** 0.9 mg/kg (Max 90 mg) infused over 60min with 10% of the total dose administered as an initial IV bolus over the first minute.
  - **Pulmonary embolism:** 100mg infused over two hours.
  - **Frostbite:** bolus dose of 0.15 mg/kg over 15 minutes, followed by a continuous IV infusion of 0.15 mg/kg per hour for six hours. The maximum total dose is 100 mg.

- **Pediatric:** as directed.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IN: No | IM: No | Neb: No | Oral: No | SL: No |

**Indications:**

- Ischemic stroke.
- Pulmonary embolism.
- Frostbite.

**Contraindications:**

- See tPA screening checklist.

**Precautions:**

- See tPA screening checklist.

**Side effects:**

- Bleeding, especially from gums / nose.
- Intracerebral hemorrhage.

**Effects:**

- Aids in breaking down clots.

**Notes:**

- Pregnancy category: C.
- You must flush the IV line containing tPA after the bag is empty to ensure the patient receives the full dose. After the bag of tPA is empty hang NS and run an additional 50ml through the line at the same rate the tPA was infusing.

# Total Parenteral Nutrition (TPN)

Authorization: Paramedic

Protocol: Paramedic – Standing Order

TPN is a mixture of amino acids, dextrose, and fatty acids used for patients who cannot eat.

*** Requires special filtered IV tubing. ***

**Dose:**

- **Adult:**
  - Administer as ordered. Requires special filtered IV tubing and is not compatible with any other medications.

- **Pediatric:**
  - Administer as ordered. Requires special filtered IV tubing and is not compatible with any other medications.

**Route:**

| IV: No | IO: No | IN: No | IM: No | Neb: No | Oral: No | SL: No |
|---|---|---|---|---|---|---|

**- Central Line only -**

**Indications:**

- Patients that are not able to tolerate oral intake.
- Patients that have a central line placed.

**Contraindications:**

- Peripheral IV.

**Precautions:**

- Catheter related blood stream infection can occur. Symptoms include tachycardia, hypotension, elevated or decreased temperature, increased breathing, decreased urine output, and disorientation.
- Central lines can cause pneumothorax.
- Refeeding syndrome can cause life threatening shifts in electrolytes.

**Side effects:**

- Hyperglycemia.
- Electrolyte abnormalities.
- Refeeding syndrome.

**Effects:**

- Provides nutrition to patients unable to eat.

**Notes:**

- TPN tubing should be changed every 24 hours. Ensure you know the time of the last tubing change if you are taking a patient on TPN on an interfacility transfer.
- Monitor the patient's temperature at start and finish of transport.
- Pregnancy category: Unknown.

# TXA (Tranexamic Acid)

Authorization: Critical Care Paramedic

Protocol: Critical Care Paramedic - Standing Order

Tranexamic acid (TXA) competitively inhibits activation of plasminogen, thereby reducing conversion of plasminogen to plasmin (fibrinolysin), an enzyme that degrades fibrin clots, fibrinogen, and other plasma proteins, including the procoagulant factors V and VIII.

**Dose:**

- **Adult dose:**
  - **1st dose:** 1-2 grams.
    - Mix in 100ml of saline and give over 10 minutes.
  - **2nd dose:** 1 gram over 8 hours.
    - Mix 1 gram in 100ml of saline and infuse over 8 hours (13.75ml/hour)

- **Pediatric dose:**
  - 30mg/kg up to a max dose of 2 grams.

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- Known or suspected hemorrhagic shock from trauma.
- Postpartum hemorrhage.
- Uncontrolled post-operative hemorrhage.
- Suspected non-compressible hemorrhage.

**Contraindications:**

- Unknown time of onset of hemorrhage or injury >3 hours.
- Do not administer in the same IV line as blood products.
- Suspected CVA, AMI, or PE.

**Precautions:**

- Rapid infusion may cause hypotension.

**Effects**

- Inhibition of fibrinolysis.

**Side effects:**

- Nausea, vomiting diarrhea.
- Visual disturbances.
- Hypotension with rapid infusion.
- Venous thromboembolic events.

**Notes:**

- None

# **Vasopressin** (Vasostrict / Anti-diuretic hormone)

Authorization: Paramedic

Protocol: Paramedic - Standing Order

Vasopressin is indicated to increase blood pressure in adults with vasodilatory shock refractory to fluid and catecholamine infusions. It may also be indicated for Diabetes Insipidus.

**Dose:**

- **Adult dose: Shock.**
  - 0.01 units/minute – 0.07 units/minute.
    - Mix 50 units of vasopressin in 500ml of D5W or 0.9% saline.
    - If establishing a new infusion, start at 0.01 units a minute and titrate up by 0.005units/minute at 10–15-minute intervals until hemodynamic goal is met or max dose is reached.
  - **Adult dose: Diabetes Insipidus:**
    - Continuous intravenous (IV) infusion: 0.0005 unit/kg/hour initially, then double dose every 30 minutes to reach desired effect; not to exceed 0.01 unit/kg/hour.

- **Pediatric dose:**
  - Not applicable

**Route:**

| | | | | | | |
|---|---|---|---|---|---|---|
| **IV: Yes** | **IO: Yes** | IM: No | IN: No | Neb: No | Oral: No | SL: No |

**Indications**

- Refractory hypotension.
- Hypotension not amenable to other vasoactive agents.

**Contraindications:**

- Hypersensitivity.

**Precautions:**

- Patients may develop a reversible diabetes insipidus.

**Effects**

- Increased blood pressure by vasoconstriction.

**Side effects:**

- May decrease heart rate.

**Notes:**

- Pregnancy category: Unknown. Use only if risk outweigh the benefits.