Kittitas County
Advanced Life Support Protocols

Medical Program Director

Jackson S. Horsley, MD

Complete Review 2020

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SECTION I – GENERAL & MEDICAL

ADVANCED AIRWAY MANAGEMENT

A. Advanced Airway Management shall be considered for all patients meeting the following criteria:
    1. Patients unable to oxygenate (unable to maintain saturations above 90% through noninvasive means)
    2. Patients unable to ventilate (unable to maintain adequate rate or volume, GCS less than 8)
    3. Patients with poor predicted clinical course (inhalation injuries, severe anaphylaxis, traumatic brain injuries, etc.)

B. All patients who qualify for Advanced Airway Management shall be evaluated and categorized by their clinical presentation and hemodynamics. The patient will be placed in one of the following categories/algorithms:
    1. **Crash Airway –** Cardiac Arrest
    2. **Rapid Sequence Intubation –**
        a. Patients who maintain SPO2 of 95% for 3 minutes or more with noninvasive means
        b. Imminent airway failure: rapidly expanding airway edema (burns, anaphylaxis), copious amounts of fluid, etc.
    3. **Delayed Sequence Intubation -**
        a. Patient's mental state is preventing adequate oxygenation (i.e., agitation)
        b. Patient's clinical presentation requires need for resuscitation:
            i. Oxygenation
            ii. Ventilation
            iii. Blood Pressure

Pre-Intubation Preparation for RSI/DSI Procedures:

C. A complete set of vitals to include blood pressure, respiratory rate, blood glucose, Spo2, ETCO2 and 4-Lead EKG shall be obtained prior to any advanced airway procedure.

D. Evaluate the patient's anatomy for anticipated difficult airway management (M.O.A.N.S, L.E.M.O.N.S).

E. Prior to beginning any advanced airway procedure, ready all the following equipment and supplies:

1. Bag-valve-mask (BVM) and nasal cannula with functioning supplemental oxygen system.
2. Suction unit with rigid pharyngeal tip.
3. OPA and NPA airway adjuncts.
4. Laryngoscope and endotracheal tubes.
5. "Bougie" tube introducer
6. Rocuronium and Succinylcholine
7. Etomidate and Ketamine (for initial induction and continued sedation).
8. Supraglottic Airway Device
9. Cricothyrotomy Kit

Airway Algorithm Selection

F. The appropriate airway algorithm will be selected based on objective findings from the patient's hemodynamic and airway assessments.

G. **Crash Airway –** Any patient identified to be in cardiac arrest. No need for routine pharmacology assisted intubation. Follow current AHA/High Performance CPR recommendations emphasizing successful oxygenation and ventilation over endotracheal tube placement.

1. Apneic Oxygenation – A nasal cannula with high flow oxygen shall be placed with ongoing CPR compressions.
2. Direct or video laryngoscopy should be performed within the first 5 minutes of the resuscitation attempt. If visualization of the vocal cords is not immediately obtained and an endotracheal tube cannot be placed in the first attempt, the provider will place a supraglottic airway device.

H. **Rapid Sequence Intubation –** Patient has met the criteria of either maintaining oxygen saturations ≥95% for ≥ 3 minutes with noninvasive means *OR* is in danger of imminent airway failure due to airway swelling or copious amount of fluid.

1. Ensure that a functioning IV/IO line is in place.

2. Position the patient as to allow for optimal pre-oxygenation, ventilation, and unobstructed view for direct or video laryngoscopy (sniffing position, ramping, etc.)
3. Pre-oxygenate the patient with 100% supplemental oxygen to allow for complete oxygen saturation and nitrogen "washout."
    a. A nasal cannula shall be placed at 15 liters per minute to supplement all preoxygenation procedures and prepare for apneic oxygenation of the patient.
    b. Based on clinical presentation, patient shall be preoxygenated with high flow oxygen by non-rebreather mask, C-PAP or BVM device with a target Spo2 of 95% or greater for 3 minutes.

4. Proper induction is required for sedation and amnesia in the conscious patient who requires intubation or placement of a Supraglottic Airway Device. The paramedic will choose **ONE** of the following medications to achieve adequate sedation and amnesia:
    a. **Ketamine** 2.0mg/kg, IV or IO
    b. **Etomidate** 0.3mg/kg IV or IO

5. To achieve complete relaxation of the patient, a neuromuscular blocking agent shall be administered:
    a. **Rocuronium** 1.0mg/kg IV or IO
    b. **Succinylcholine** 1.5mg/kg for adults, 2.0mg/kg for pediatrics IV or IO

6. Perform direct or video laryngoscopy and place an endotracheal tube per protocol.
    a. Oxygen saturations shall be maintained above 90% between each intubation attempt.
    b. If relaxation is inadequate, administer additional ½ dose of the original neuromuscular blocking agent chosen.
    c. If bradycardia occurs during the intubation attempt, cease intubation efforts and place a supraglottic airway device.
    d. If endotracheal intubation cannot be achieved after 3 attempts, move rapidly to the placement of a supraglottic airway device or quality BVM ventilations.
    e. If supraglottic airway placement or BVM ventilations are unsuccessful at oxygenation or ventilation, move to needle or surgical cricothyrotomy.

I. **Delayed Sequence Intubation -** Patient's clinical presentation requires the need of resuscitation prior to intubation in order to prevent peri intubation cardiac arrest or hypoxemia *OR* the patient's agitated mental state is preventing adequate oxygenation or ventilation.

1. Ensure that a functioning IV/IO line is in place.
2. Proper induction is required for the sedation and amnesia of the Delayed Sequence Intubation patient. The paramedic should administer **Ketamine** 2.0mg/kg slow push over 1 minute.
3. Position the patient as to allow for optimal pre-oxygenation, ventilation and unobstructed view for direct or video laryngoscopy (sniffing position, ramping, etc.)

4. Preoxygenate that patient with 100% supplemental oxygen to allow for complete oxygen saturation and nitrogen "washout."
    a. A nasal cannula shall be placed at 15 liters per minute to supplement all preoxygenation procedures and prepare for apneic oxygenation of the patient.
    b. Based on clinical presentation, patient shall be preoxygenated with high flow oxygen by non-rebreather mask, C-PAP or BVM device with a target Spo2 of 95% or greater for 3 minutes.

5. Patients who are hemodynamically unstable shall be resuscitated prior to any intubation attempt:
    a. Any noted hypotension will be corrected with either a 500cc fluid bolus or vasopressor infusion.
    b. For persistent hypotension with signs of poor perfusion, consider push dose epinephrine of 5-10mcg.

6. To achieve complete relaxation of the patient, a neuromuscular blocking agent shall be administered:
    a. **Rocuronium** 1.0mg/kg IV or IO
    b. **Succinylcholine** 1.5mg/kg for adults, 2.0mg/kg for pediatrics IV or IO

7. Perform direct or video laryngoscopy and place an endotracheal tube per protocol.
    a. Oxygen saturations shall be maintained above 90% between each intubation attempt.

b. If relaxation is inadequate, administer additional ½ dose of the original neuromuscular blocking agent chosen.
c. If bradycardia occurs during the intubation attempt, cease intubation efforts and place a supraglottic airway device.
d. If endotracheal intubation cannot be achieved after 3 attempts, move rapidly to the placement of a supraglottic airway device or quality BVM ventilations.
e. If supraglottic airway placement or BVM ventilations are unsuccessful at oxygenation or ventilation, move to needle or surgical cricothyrotomy.

Post Intubation Management

J. Confirm the proper placement of the endotracheal tube or Supraglottic Airway Device:
    1. Note direct visualization of tube passing through vocal cords, if possible.
    2. Confirm bilateral lung sounds and no noted epigastric sounds.
    3. Obtain waveform AND numeric ETCO2 reading from the cardiac monitor.
    4. Reassess vital signs to include blood pressure, Spo2 and heart rate.

K. Continued sedation and amnesia will be administered to ensure patient comfort:
    1. **Ketamine** 2.0mg/kg IV or IO *__NOTE:__ If Ketamine is chosen for continued sedation, consider additional administration of Versed to reduce the probability of an emergence reaction.**
    2. **Versed** 2.5-5mg, up to 0.1mg/kg IV or IO. *__NOTE:__ Patients must have a systolic BP > 100mmHg to administer. Recheck blood pressure 5 minutes after administration.**

L. Pain management will be considered in addition to sedation to ensure patient comfort:
    1. **Fentanyl** 25-50mcg, IV or IO. *__NOTE:__ Patients must have a systolic BP > 100mmHg to administer. Recheck blood pressure 5 minutes after administration.*
    2. **Morphine** 2.0mg, IV or IO. ***NOTE:** Patients must have a systolic BP > 100mmHg to administer. Recheck blood pressure 5 minutes after administration.*

M. For patients that are combative and continue to struggle despite attempts at continued sedation and pain management, consider continued use of one of the following neuromuscular blocking agents to prevent the airway from becoming displaced:
    1. **Rocuronium** 1.0mg/kg IV or IO

2. **Vecuronium** 0.1mg/kg IV or IO

Contaminated Airway Management

N. When the hypopharynx and/or airway is contaminated with blood or emesis, visualization and successful intubation may become more difficult. The following techniques may be used to help manage the contaminated airway:

1. **SALAD (Suction Assisted Laryngoscopy and Decontamination)**
    a. While placing the laryngoscope or video scope, use the rigid suction tip to suction ahead of the blade to begin to remove contamination from the airway.
    b. Suction around the glottic opening and vocal cords.
    c. Place and leave the rigid suction tip in the esophagus to allow for continued suctioning during the intubation attempt.
    d. Once the endotracheal tube has been successfully placed and the cuff has been inflated, remove the rigid suction tip from the esophagus.
    e. Place a French "soft tip" catheter to suction the endotracheal tube as needed.

2. **SAACI (Suction Assisted Airway Catheter Insertion)** **NOTE – This technique *requires* either a "DuCantor" or "Hi-D" rigid suction tip catheter and is NOT possible with a traditional rigid Yankauer tip catheter.**
    a. With a Ducantor or Hi-D rigid suction tip, perform the "SALAD" technique.
    b. With visualization of the vocal cords, place the rigid suction tip into the glottic opening.
    c. Disconnect the suction tubing while leaving the rigid tip in the glottic opening.
    d. Cannulate the rigid tip catheter with a "bougie."
    e. Remove the rigid tip catheter and reconnect to the suction tubing.
    f. Perform the "SALAD" technique, placing and leaving rigid tip catheter in the esophagus.
    g. Thread the appropriately sized endotracheal tube over the bougie device and through the vocal cords.
    h. Once the cuff has been inflated and the bougie has been removed, remove the rigid tip catheter from the esophagus.
    i. Place a French "soft tip" catheter to suction the endotracheal tube as needed.

Special Considerations

Cardiac Arrest

1. Primary use of a supraglottic airway is an acceptable means to manage the airway and ventilation for a patient in cardiac arrest.
2. If a supraglottic airway is not maintaining adequate ETCO2 waveform, remove the device and intubate.
3. Prior to ceasing resuscitation efforts, consider removing the supraglottic airway device and intubate to confirm accurate ETCO2 levels.
4. Upon Return of Spontaneous Circulation, the paramedic may choose to remove the Supraglottic Airway Device in favor of placing a definitive airway with an endotracheal tube.

Pharmacological Selection

1. In patients with hypotension/hypovolemia:
    a. Dosing of the induction and paralytic agents should be adjusted to account for the patient's unstable blood pressure – **HALF** of the normal dose for induction agents and **DOUBLE** the normal dose of paralytic agents is suggested.

2. *Ketamine* is the preferred induction agent in patients presenting with:
    a. Hypotension/Hypovolemia
    b. Reactive Airway Disease and Restrictive Lung Disease processes
    c. Sepsis and Metabolic Acidosis

3. *Etomidate* is the preferred induction agent in patients presenting with:
    a. Severe Hypertension

4. *Rocuronium* should be considered the preferred neuromuscular blocking agent for the majority of RSI/DSI procedures due to the absence of contraindications and documented incidences of prolonged "safe apnea" times.

5. *Succinylcholine* is **<u>contraindicated</u>** for use in the following situations and Rocuronium will be used as the primary neuromuscular blocking agent:
    a. Patients with suspected hyperkalemia (renal failure, missed dialysis appointments, etc.)
    b. Patients who have sustained significant burns or crush injuries (until the time healing is completed.)
    c. Patients with sepsis

d. Patients with suspected traumatic brain injury or spinal cord injury.

e. Patients who have suffered severe stroke (until at least 6 months past the event).

f. Patients with Neuromuscular diseases such as Multiple Sclerosis or Muscular Dystrophy

Equipment

1. For all adult patients, use child BVM w/adult mask or small adult size bag (not ≥1000 ml = stroke volume 450-725 ml = one/two handed) with appropriate adult size mask. The target volume for a full-sized adult is 450 ml.

Influenza Like Illness – ILI

1. Perform procedures away from the contaminated environment and bystanders whenever possible (outdoors, in the MICU with back doors and windows open and HVAC in the driver's compartment on high.)

2. Use HEPA filters on all airway management procedures that may produce infectious aerosolized droplets.

3. Placing a mask or draping a towel over open ports of devices or BVMs while bagging may also reduce aerosolization.

4. When not in use, place a golf tee or cover the proximal end of the gastric suctioning port of the iGel Supraglottic Device

Metabolic Acidosis

If a patient is suspected of having an underlying metabolic acidosis (aspirin overdose, tricyclic antidepressant overdose, sepsis, diabetic ketoacidosis, etc.) post intubation ventilation rates and ETCO2 will be made to match the patient's pre-intubation values to prevent severe acidosis by overriding the patient's natural compensatory mechanisms.

Note:

LEMON = Look externally, evaluate, Mallampati score, obesity/obstruction, neck mobility

MOANS = Mask seal, obesity/obstruction, age, no teeth, sleep apnea/stiff lungs

Needle Cricothyrotomy

PEDIATRICS < 10 YEARS

Equipment:

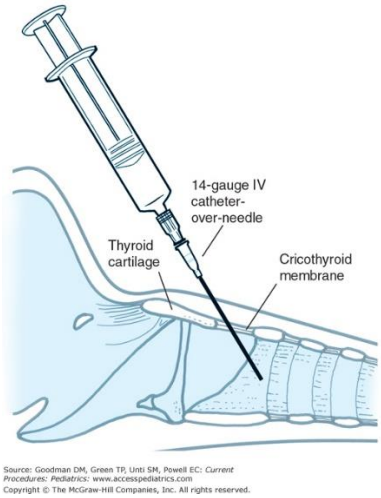
- 14g *NON-SAFETY* AngioCath
- Saline Flush
- Size 3.0 ET Tube → BVM Connector
- Meconium Aspirator (Jet Insufflation ONLY)
- Suction Tubing (Jet Insufflation ONLY)

Procedure:

1. Pop the cap at the end of the 14g AngioCath and attach a 3-5cc Saline Flush.
2. Have your partner hold the patient's head in a hyperextended position.
3. Stabilize the patient's Larynx with your non dominant hand and palpate the cricothyroid membrane with your index finger.
4. With your dominate hand, insert the AngioCath attached to the Saline Flush at a 45* angle through the cricothyroid membrane.
5. Draw back on the plunger of the saline flush to verify placement - **WHEN PLACED CORRECTLY IN THE TRACHEA, BUBBLES WILL APPEAR IN THE SYRINGE**
6. Once placement is confirmed, withdraw the needle of the AngioCath attached to the syringe, keeping the 14g catheter in place.
7. Attach the 3.0 ET Tube connector to the hub of the 14g AngioCath.
8. Attach a BVM to the connector and ventilate.

FOR NEEDLE JET INSUFFLATION **COMPLETE STEPS 1-7 AS STATED ABOVE FOLLOWED BY..**

1. Attach the large end of the Meconium Aspirator to the 3.0 ET Tube Connector.
2. Attach suction tubing to the opposite end of the Meconium Aspirator.
3. Connect the suction tubing to the oxygen tree.
4. Cover the hole of the Meconium Aspirator to deliver ventilations.



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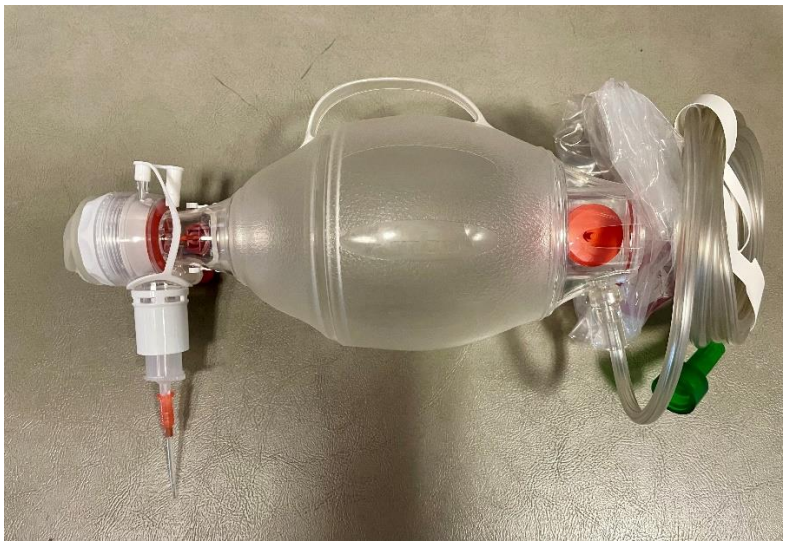
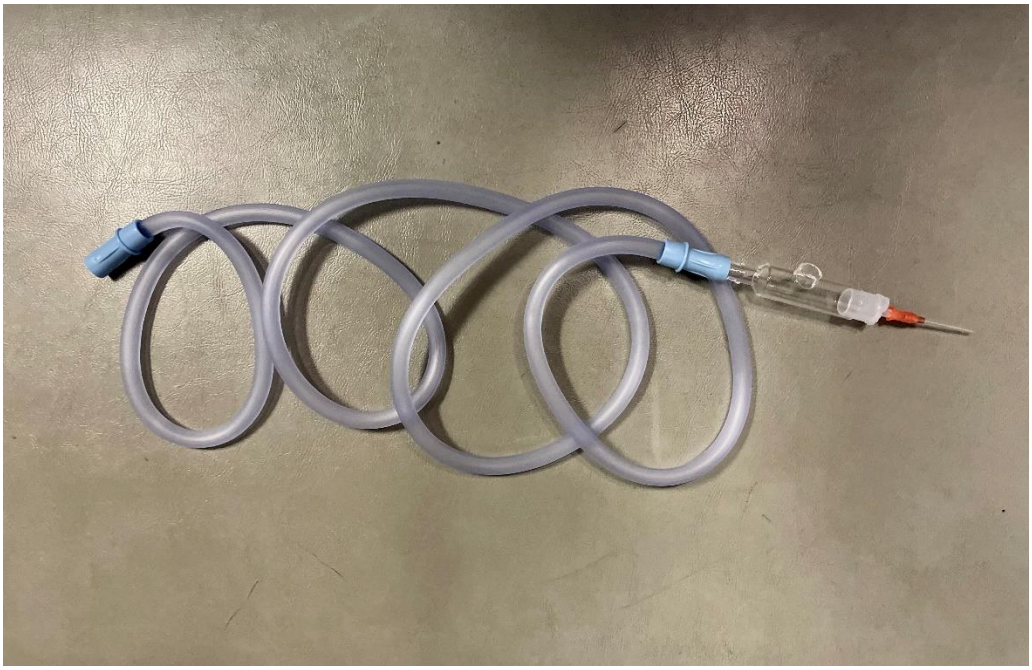




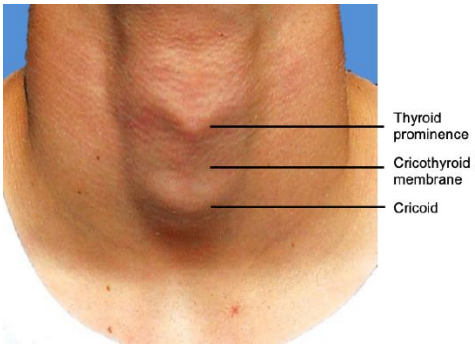
Surgical Cricothyrotomy

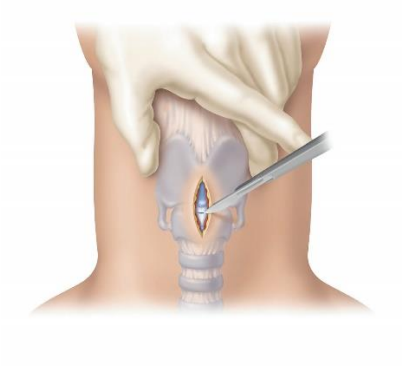
Equipment:

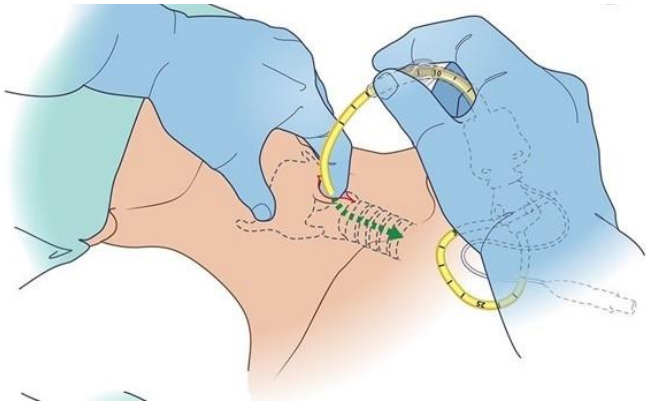
- Size 6.0 ET Tube
- Bougie
- 11 Blade Scalpel

Procedure:

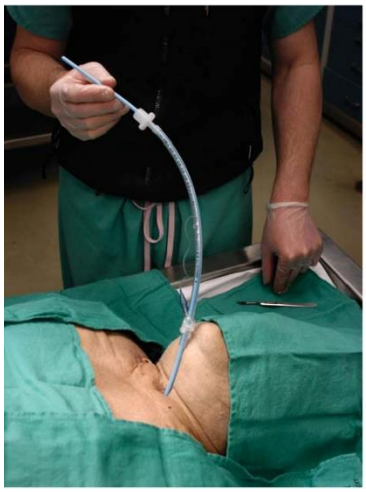
1. Have your partner place and hold the patient's head in the hyperextended position.
2. Stabilize the patient's Larynx with your non dominant hand and palpate the cricothyroid membrane with your index finger.
3. With your dominant hand, use the scalpel to make a long (approximately 1.5") **vertical** incision starting just above the cricothyroid membrane.
4. Place the index finger of the hand stabilizing the larynx into the incision to again palpate and identify the cricothyroid membrane (you will likely be unable to see the membrane due to bleeding from the incision.)
5. Use your scalpel to carefully puncture the membrane and place your finger inside the hole.
6. Place a bougie through the membrane incision until resistance is felt at the Carina.
7. Thread a size 6.0 ET tube over the bougie until the cuff is securely in the Trachea.
8. Inflate the cuff and remove the bougie.
9. Secure the tube by using gauze padding and tape.
10. Ventilate the patient with a BVM device.

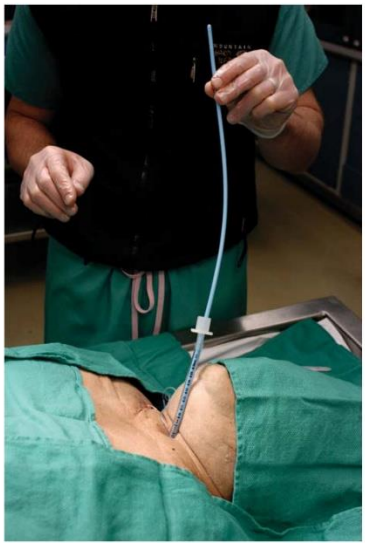


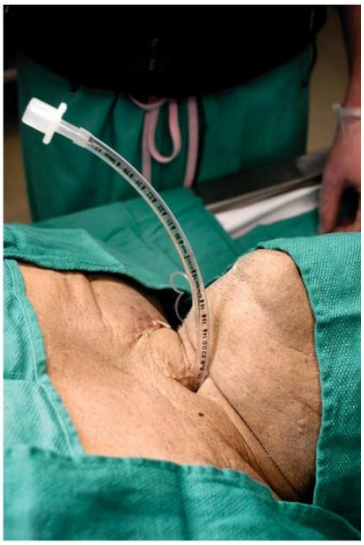




tracheostomy tube over bougie. A 5.5-mm tube may be used in smaller adults







ANAPHYLAXIS

A. Establish and maintain airway.

B. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

C. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. Establish cardiac monitor.

E. Establish large-bore IV access with **Isotonic Crystalloid** @ a rate indicated by clinical findings and vital signs.

F. If normotensive:

1. Administer **Epinephrine** 1:1,000 0.3-0.5 mg IM.
   - **Pediatric dose:** 0.15 mg.

2. Administer **Diphenhydramine**, 25-50 mg, IV or IM.
   - **Pediatric dose:** 1-2 mg/kg

3. Consider **Albuterol** if wheezing present.

G. If hypotensive:

1. Consider fluid bolus and reassess.

2. Administer **Epinephrine** 1:10,000 0.3-0.5 mg IV or IO (repeat q 10 minutes as necessary).
   - **Pediatric dose:** 0.01 mg/kg

3. Administer **Solumedrol** 125mg IV or IO.

BEHAVIORAL EMERGENCIES

A. Utilize verbal de-escalation techniques:

1. Begin by asking the patient to follow your orders.

2. Advise them of the consequences of not following your orders.

3. Finally, order them to do what you want them to do.

B. Requirements for the use of force:

1. You must have legitimate objectives:

   a) For your safety.
   b) For the safety of others.
   c) For the patient's safety.
   d) To facilitate treatment in a mentally incompetent patient.

2. It must be immediately necessary, and law enforcement must be notified.

   a) Request that law enforcement place patient in protective custody.
   b) Document officer's name and agency if they refuse to place patient in protective custody.

3. You must use the minimal amount of effective force initially.

4. It must immediately cease once the objective has been met.

5. Consider chemical restraints

   a) IV/IM/IO: **Ketamine** – 5 mg/kg
   b) IV or IM: **Haldol** 5 mg, may repeat in 30 minutes
   c) IV or IM: **Versed** 2.0-5.0 mg
      - Age <55: Titrate slowly 0.1 mg/kg every 15 min. up to 0.5 mg/kg
      - Age >55: Titrate slowly 0.05 mg/kg every 15 min. up to 0.25 mg/kg
   d) IV or IM: **Lorazepam** 1-2mg (acute anxiety)

6. Consider ETI if necessary, post sedation.

C. Do no use any of the following restraining techniques that could impair breathing.

1. “Hog tying”, where hands and feet are bound behind the patient.

2. Sandwiching the patient between two backboards.

3. Do not restrain patient in prone position during transport.

D. After a patient is under control, use humane techniques to restrain the patient.

E. Once a patient is restrained, *do not* release them.

F. If a patient is still in handcuffs, then a police officer must accompany the patient during transport or remove the handcuffs.

G. The patient’s condition must be closely and continuously monitored.

H. Contact the receiving hospital when feasible.

I. Document all facts regarding the objectives of the restraint.

BLOOD PRODUCT ADMINISTRATION (INITIATION/ADMINISTRATION/MAINTENANCE)

Purpose:

To ensure the safe delivery of **Packed Red Blood Cells (PRBC / Fresh Frozen Plasma (FFP**) for prehospital patients meeting criteria for transfusion. No blood products are carried by Kittitas County ambulance services. Blood products may be acquired through Kittitas Valley Healthcare or air transport service.

Procedure:

1. Consider blood product administration for patients with signs and symptoms of hemodynamic instability, including but not limited to SBP < 90, diaphoresis, delayed capillary refill, tachypnea, altered mental status or suspicion of impending hemorrhagic shock.

2. AND one of the following:

    a. Blunt or penetrating trauma to the torso.

    b. Obvious massive external blood loss from any site.

    c. Patients requiring aggressive volume resuscitation due to hemorrhage or suspected hemorrhage.

3. **Administration Procedure**

    a. Obtain pre-administration vital signs (BP, pulse, respirations, and temperature).

    b. Confirm blood product unit number, blood type, Rh factor and expiration date.

    c. <u>If emergency release / uncross matched blood product -</u>

        i. **Universal Donor / Females – O- (carried by ALNW)**
        ii. **Males – O+ (if available)**

    d. Prior to infusing the initial unit of PRBC / FFP, prime the blood administration tubing with normal saline.

e. No medication should be administered through the same line as blood products at any time.

   i. If only one line is available and medication is required, stop transfusion, clear line with **Isotonic Crystalloid** and or flush port with minimum of 10cc **Isotonic Crystalloid**, give medication, flush line, and restart transfusion.

f. Specific attention should be directed during first 10 minutes of transfusion for evidence of signs/symptoms of a transfusion reaction.
   i. Hives / Itching
   ii. Fever / Chills
   iii. Hypotension

4. Blood Transfusion Reaction:

a. **STOP** the blood product infusion.

b. **Change all tubing** and continue infusion with **Isotonic Crystalloid**.

c. Secure discontinued blood bags and attached tubing in biohazard bag and notify receiving facility of transfusion reaction. Deliver bag of product / tubing directly to receiving facility's Transfusion Services Personnel for further evaluation. **Do not throw away bags of tubing.**

d. For adult patients, administer **Solu-Medrol** 125 mg IV and **Benadryl** 50 mg IV.

5. Documentation Requirements:

a. Blood product type, Unit number, and Rh factor and estimated volume infused.

b. Pre administration vital signs and vital signs at 15 minutes post initiation of blood products.

c. Transfusion reaction observation and intervention if required.

d. The reason for refusal to be documented.

CARDIAC ARREST

A. Verify cardiopulmonary arrest.

B. Initiate CPR & ventilate per pocket mask or BVM, with supplemental O_2 @ 10-15 lpm. For witnessed arrest, defibrillate as soon as possible. For unwitnessed arrest, provide 5 cycles/2 min. CPR.

C. CPR should be interrupted as little as possible.

D. Establish cardiac monitor/defibrillator. One shock attempt every 5 cycles/2 min. of CPR.

E. Place an endotracheal tube and continue ventilations with bag-valve device (or demand valve) with supplemental O_2 @ 10-15 lpm.

1. If unsuccessful after three attempts at tracheal intubation, place a Supraglottic Airway Device

2. If unable to place ETC, continue ventilations with BVM.

E. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

1. If unsuccessful at peripheral venipuncture, including external jugular, establish Intraosseous, or establish central venous access route.

F. Medications administered via peripheral IV, should be followed by a 20 ml bolus of IV fluid.

Ventricular Fibrillation (Pulseless Ventricular Tachycardia or Torsades de Point)

A. If witnessed arrest—

1. Check carotid pulse.

2. If no pulse, attempt defibrillation 1x followed by 5 cycles/2 min. of CPR

B. If unwitnessed arrest – Perform 5 cycles/2 min. of CPR before one attempt to defibrillate (IV and ETI may be completed before defibrillation).

1. Check carotid pulse after 2 sets of 5 cycles/2 min. of CPR (during rhythm check).

2. If no pulse, attempt defibrillation 1x followed by 5 cycles/2 min. of CPR.

C. Administer **Epinephrine 1:10,000** 1mg IV push q 3-5 minutes. If ET tube is established before IV
is established, administer **Epinephrine 1:1000** 2 mg via ET tube with 8 ml NaCl. If unable to
establish IV/IO, administer via ET tube.

D. Defibrillate 1x. If delay in medication administration, continue 5 cycles/2 min. CPR.

E. Administer **Amiodarone,** 300 mg IV push.

F. Defibrillate 1x.

G. Maintain continuous CPR with a pattern of CPR-Shock-CPR-Vasopressor.

H. **Amiodarone** second dose 150 mg IV push

I. If VF recurs after transiently converting, provide 5 cycles/2 min. CPR then defibrillate 1x.

J. Consider reversible causes: Hypovolemia, Hypoxia, Hydrogen ion (acidosis) Hypo/Hyperkalemia, Hypothermia, Tension Pneumothorax, Tamponade, Toxins, Thrombosis, Pulmonary Thrombosis, Coronary

K. If Torsades de Point, consider administration of **Magnesium Sulfate** (optional to carry), 2-4 g IV/IO.

Asystole (or Pulseless Idioventricular)

A. Administer **Epinephrine 1:10,000** 1mg IV push q 3-5 minutes. If ET Tube is established before IV is established**,** administer **Epinephrine 1:1000** 2 mg via ET tube with 8 ml NaCl. If unable to establish IV/IO, administer via ET tube.

B. Consider reversible causes: Hypovolemia, Hypoxia, Hydrogen ion (acidosis) Hypo/Hyperkalemia, Hypothermia, Tension Pneumothorax, Tamponade, Toxins, Thrombosis, Pulmonary Thrombosis, Coronary

C. If unresponsive to medications and other ALS treatment modalities, consider discontinuing resuscitation efforts after discussion with on-line medical control.

Pulseless Electrical Activity (PEA) – SAME AS ASYSTOLE

General Considerations

A. If an automated external defibrillator (AED) has been established by BLS or ILS providers prior to arrival of ALS, allow them to complete defibrillation attempt, as indicated, prior to disconnecting their device.

B. If an ETC has been placed in the *tracheal position* prior to arrival of ALS, consider leaving in place unless there will be an extended transport.

C. If an ETC has been placed in the *esophageal position*, consider replacing with an endotracheal tube.

D. Defibrillation

1. Manual biphasic: device specific (typically 120 J to 200 J)

2. AED: device specific

3. Monophasic: 360 J

CARDIAC ARRHYTHMIAS

A. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

B. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Establish cardiac monitor/defibrillator.

D. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

Ventricular Tachycardia (Stable)

A. In the conscious, stable patient:

1. Administer **Amiodarone,** 150 mg IV infusion over 10 minutes.

2. Start **Amiodarone** drip if converted at 1 mg/min.

Ventricular Tachycardia (Unstable)

A. If patient is unstable (i.e., chest pain, dyspnea, systolic BP < 80 mm Hg, decreased LOC, or signs of pulmonary congestion):

1. Initiate synchronized cardioversion @ 100 j.

2. If no response, initiate synchronized cardioversion at 200 j, with subsequent shocks at 300 j and then 360 j.

3. Prior to shocks, if patient is conscious and no significant delay would result, consider sedation/pain management (keep in the presence of hypotension, pulmonary edema, or unconsciousness).

B. After conversion, or if recurrent after initial attempts at conversion,

1. Administer **Amiodarone** 150 mg IV infusion over 10 minutes.

2. Start **Amiodarone** drip at 1 mg/min.

Wide Complex Tachycardias (of uncertain type in a conscious, stable patient)

A. Establish 12 lead ECG.

B. Consider **Adenosine** 6 mg/rapid IV push only if regular and monomorphic, to be followed by an immediate 5 ml **NaCl** flush.

C. Administer **Amiodarone** 150 mg IV infusion over 10 minutes.

D. Start **Amiodarone** drip at 1mg/min.

Supraventricular Tachycardia / Atrial Fibrillation or Atrial Flutter

A. If systolic BP < 80 mm Hg, or a decreased LOC:

1. Initiate synchronized cardioversion @ 100 j.

2. If no response, initiate synchronized cardioversion at 200 j, with subsequent shocks at 300 j and then 360 j.

3. Prior to shocks, if patient is conscious and no significant delay would result, consider sedation/pain management (keep in the presence of hypotension, pulmonary edema, or unconsciousness).

B. If patient is normotensive but symptomatic (e.g., dyspnea, chest pain, or decreased LOC):

1. Place in Trendelenburg position and have patient perform Valsalva Maneuver (take deep breath and hold).

2. If SVT is irregular or confirmed as atrial fibrillation or atrial flutter, *do not* administer **Adenosine.**

3. Administer **Adenosine**, 6.0 mg rapid IV push, to be followed by an immediate 5 ml **NaCl** flush.

4. If no conversion after 2 minutes, administer **Adenosine** 12 mg rapid IV push, to be followed by an immediate 5 ml **NaCl** flush.

5. Consider obtaining 12 lead ECG.

6. If no conversion with **Adenosine**, consider **Amiodarone** 150 mg IV infusion over 10 minutes.

7. Start **Amiodarone** drip at 1 mg/min.

C. If Atrial fibrillation or atrial flutter is confirmed:

1. Consider **Amiodarone** 150 mg IV over 10 minutes.

2. Start **Amiodarone** drip at 1 mg/min.

3. May consider **Diltiazem** (optional to carry) 0.25 mg/kg SLOW IV push over 2 minutes.

Bradyarrhythmia's/AV Blocks

A. If ECG shows 2nd degree AV block, 3rd degree AV block, junctional rhythm, or bradycardia with a heart rate < 60/minute, and patient symptomatic (e.g., systolic BP < 80 mm Hg, ischemic chest pain):

   1. Administer **Atropine** 1.0 mg IV bolus, up to a total of 3 mg.

   2. Consider external cardiac pacing.

B. Consider **Epinephrine Infusion**, mix 1 mg per 100 ml of **Isotonic Crystalloid** for a concentration of 10 mcg/ml. Administer IV piggyback @ 2-10 mcg/min, until BP ≥ 90 mm Hg systolic.

C. If unresponsive to **Atropine** and pacing, and patient remains hypotensive, may use Levophed. Administer **Levophed** at initial rate of 2-4mcg/min IV/IO, titrated to maintain systolic blood pressure >90mmHg. Consult drip table for rates, rate adjustments should be limited to 2-4 mcg/min every 5 minutes, up to 30mcg/min.

CEREBROVASCULAR ACCIDENT (CVA)

A. Ensure and protect airway.

B. Position patient for airway management or patient comfort as needed.

C. Protect C-spine if evidence of trauma.

D. Perform FAST Assessment (Face/Arms/Speech/Time last normal)

1. If conscious without focal deficit, assess and transport per County Operating Procedures.

2. If unconscious or focal deficits:

- Treat respiratory distress with O_2 @ 12-15 lpm per non-rebreather mask or BVM, and suction PRN. If SP02 < 94%, titrate to > 94%.
- If one component is abnormal, high probability of stroke. Refer to County Operating Procedure #3 – Triage & Transport and the WA Stroke Triage Destination Procedure.
- Early Stroke Team activation ("STROKE ALERT").
  - Specify FAST findings
- Limit scene time with goal of < 15 minutes

E. If airway not maintained with BLS procedures, consider endotracheal intubation.

F. Establish cardiac monitor.

G. Establish peripheral IV access with **Isotonic Crystalloid @ TKO,** with 18 ga. in unaffected arm (affected arm is acceptable if necessary).

1. Avoid glucose-containing and hypotonic solutions.

2. Determine blood glucose level.

- If indicated, administer **D50**, 25 gms, IV.

- If IV not available, consider
  Glucagon 1.0 units.

CHEST PAIN AND SUSPECTED STEMI

General Chest Pain Protocol

A. If stable, administer O_2 @ 4-6 lpm per nasal Cannula.

B. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Establish Cardiac Monitor.

D. Establish 2 peripheral IVs with **Isotonic Crystalloid** @ TKO.

E. Establish 12 lead ECG (include printout with PCR).

F. If 12 lead ECG indicates ST- elevation, myocardial infarction (STEMI).

1. Transport directly to the nearest facility with cardiac Cath lab capabilities.

2. Initiate Heparin protocol.

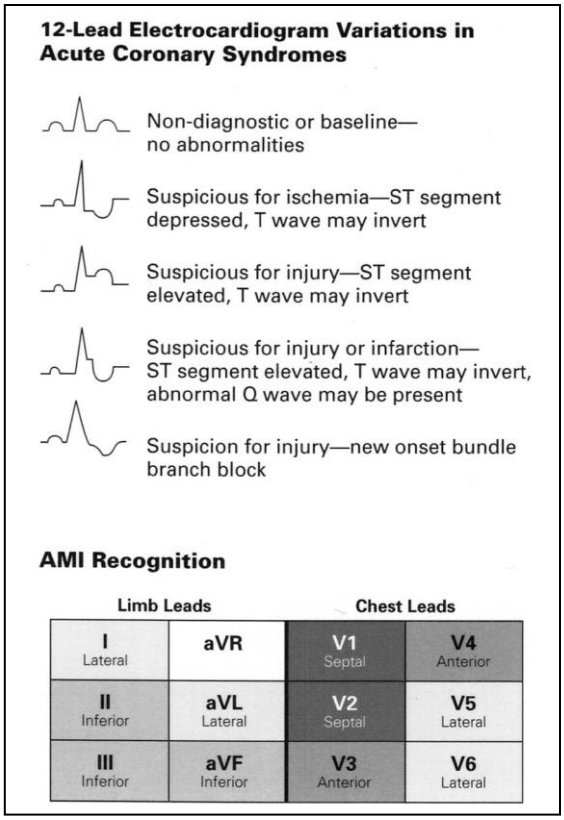
G. **324 mg of ASA** (chewable) if equal radial pulses are present, no aspirin allergy, and have not taken aspirin in the last four hours

H. Administer **Nitroglycerin** 0.4 mg sublingual or spray q 3 minutes, up to a total of 1.2 mg, unless BP < 100 mm Hg systolic. (If hypotension occurs, consider 250 cc fluid challenge.)

I. If pain unrelieved and BP > 100 mm Hg systolic, administer **Morphine** 2-5 mg IV initially, followed in 2 mg increments q 5 minutes, up to a total of 20 mg, or until pain is relieved or BP drops below 100 mm Hg systolic. (If hypotension occurs, consider 250cc fluid challenge.)

1. Should respiratory depression occur secondary to **Morphine** administration, consider **Naloxone**.
2. If patient is allergic/hypersensitive to **Morphine Sulfate,** consider **Fentanyl** 3 mcg/kg, up to 150 mcg in 25 mcg increments.

J. Notify closest Cardiac Cath Lab facility before transporting to confirm willingness to accept patient. If not willing to accept patient, contact next closest Cath Lab and consider air transport as needed.



Adult Heparin Protocol Initial Dosing Chart

For patients <40kg, ***give 60 units/kg loading dose***. ***Maximum does is 4000 units.***

Contraindications:
Heparin should **not** be used in patients:
- with severe thrombocytopenia
- with any uncontrollable active bleeding

Weight (kg)	Initial Loading Dose
40	***2400***
45	***2700***
50	***3000***
55	***3300***
60	***3600***
65	***3900***
>65	***4000***

NOTE: When feasible, ALS units will staff STEMI transfers with a driver and 2 ALS providers.

CHF WITH ACUTE PULMONARY EDEMA

A. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

B. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Place patient in sitting position, or any other position that allows them to breathe easier.

D. Establish cardiac monitor.

E. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

F. Administer **NTG**, 0.4 mg sublingual q 3 min. x 3 doses if systolic BP is >100 mm Hg**.**

G. Consider **Morphine** 2-5 mg initially, followed by 2 mg increments q 5 min. IV. If patient is allergic/hypersensitive to **Morphine Sulfate,** or **Morphine Sulfate** is ineffective, consider **Fentanyl** 3 mcg/kg, up to 150 mcg in 25 mcg increments. Contraindicated in hypotension BP <100 mm Hg.

H. Consider **Lasix** 40 mg (or double the patient's daily dosage up to 160 mg) IV slowly if systolic BP >100 mm Hg.

I. Consider **Albuterol** breathing treatment, 2.5 mg, into acorn nebulizer for bronchospasm.

J. Consider C-PAP

K. For severe pulmonary compromise, consider elective endotracheal intubation.

COMA OF UNKNOWN ETIOLOGY

A. Establish and maintain airway.

B. Administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Ventilate or assist ventilations with BVM and supplemental O_2 @ 12-15 lpm if hypoventilation or apnea is present.

D. Determine underlying causes of unconsciousness.

E. Establish cardiac monitor. Consider ET intubation.

F. Establish blood sugar level by finger stick or during IV start.

G. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

H. If history of acute/chronic alcohol abuse, administer **Thiamine**, 100 mg IV bolus, prior to administration of **D50**.

I. In the presence of hypoglycemia, consider administration of **D50**, 25 gms, IV bolus.

J. If no response, consider **Naloxone** 0.4mg, up to a total dose of 10mg. Titrate to a return of respiratory drive and to a point where the patient can be managed.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) & ASTHMA

A. Establish and maintain airway.

B. Administer O_2 @ 2-6 lpm per nasal cannula for COPD patient. Asthma patient may need higher concentration of O_2.

C. If hyperventilating, assist ventilations with BVM.

D. If patient exhibits signs of hypoxia, consider increase in O_2 to 12-15 lpm per non-rebreather mask. Monitor respiratory status regularly.

E. Establish cardiac monitor.

F. Establish peripheral IV access with **Isotonic Crystalloid** TKO.

G. Consider **Albuterol**, 2.5 mg in normal saline, per nebulizer mask.

H. Consider **Ipratropium Bromide**, 0.5 mg, per nebulizer mask.

I. Consider CPAP

J. Consider **Magnesium Sulfate**, 1-2g, slow IV-Push.

K. Consider **Epinephrine** 1:1,000 0.3 mg subcutaneously in those patients < 65 years old.

L. For severe pulmonary compromise, consider elective endotracheal intubation utilizing paralysis with sedation.

BILEVEL & CONTINUOUS POSITIVE AIRWAY PRESSURE (BiPAP & CPAP)

BiPAP & CPAP are alternative methods to maintain oxygenation in some patients. BiPAP/CPAP should
never be used if a patient is in severe distress that requires Intubation.

- BiPAP is the preferred device for ALS providers.
- CPAP is an allowed device for EMT-IV Technician's with transport agency, MPD approved training, and protocol acknowledgement.

BLS/ILS (CPAP)

Advise receiving hospital ASAP when patient is placed on CPAP so preparation can be made for patient arrival.

Indications

1. Acute Congestive Heart Failure
2. Acute hypoxic respiratory failure (including asthma)
3. Severe worsening COPD
4. Patient's preference to avoid intubation.

Exclusion Criteria/Contraindications

1. Pediatric patients less than 12 years of age
2. Facial deformity
3. Hemodynamic instability/Systolic BP<100 mmHg
4. Inability to clear secretions
5. Inability to tolerate mask.
6. Inability to maintain airway or respiratory drive.
7. Patient is unable to follow directions due to altered mental status.
8. Suspected pneumothorax/chest trauma
9. Uncontrolled Upper GI bleeding

Initiating CPAP Therapy

1. Explain therapy to patient.
2. Attach CPAP device to oxygen source per manufacturer's instructions.
3. Prepare circuit to apply to patient.
4. Initiate setting at pressure of 5 cmH_2O, may increase to maximum of 10 cmH_2O, titrate to clinical effect. Initiate therapy with pressure (PEEP) prior to increasing FiO_2.
5. Apply mask manually, then tighten straps to stop any leaks.
   a. Any leaks will be manifested with the sound of air hissing when the patient is not breathing.
      i. Press the mask firmly on the patient's face and hissing should stop.

ii. Re-adjust straps if necessary.

b. Oxygen supply will be rapidly consumed if there is a mask leak.

6. Reassess patient status frequently. Therapy goal is a SpO_2 of 94-98% and decreased work of breathing.
7. If a patient is failing CPAP therapy, consider BVM assisted ventilations.
8. Call for ALS rendezvous if available

ALS

BI-LEVEL VENTILATION (BiPAP)

Indications

1. Respiratory distress and hypoxia consistent with CHF, pulmonary edema, COPD, or hypoxemic respiratory failure.
2. May be used for preoxygenation of select patients prior to intubation.

Contraindications

1. Systolic blood pressure <100 in adult patients
2. Pediatric patients less than 12 years of age
3. Respiratory arrest
4. Inability to cooperate.
5. Inability to protect and maintain airway.
6. Presence of tracheostomy or recent esophageal anastomosis
7. Inability to maintain adequate mask seal.
8. Active vomiting

Adverse Effects/Complications

1. Barotrauma Increased, intra-thoracic pressure, decreased venous return to the heart, decreased cardiac output (Presenting as hypotension & tachycardia)
2. Gastric insufflation which may result in vomiting.
3. Drying of mouth and nasal passages
4. Skin and facial irritation from mask and harness
5. Non-invasive ventilation associated pneumonia.

Procedure

1. Assemble equipment per manufacturer's recommendations.
2. If available, place $EtCO_2$ monitoring nasal cannula on patient under mask.
3. Explain the process to the patient.
4. Select non-invasive ventilation mode on the ventilator (NIV or NPPV)
5. Set initial CPAP/PEEP/EPAP to 5 cmH_2O.
6. Set initial PS to 10 cmH_2O or IPAP 15 cmH_20.

7. Once ready to initiate BiPAP, manually place the mask on the patient, allow patient to become comfortable with the mask, then secure the harness firmly around the patient's head.
8. Alternate increasing CPAP/PEEP/IPAP and FiO_2 to maintain SpO_2 of 94-98%, or >90% in asthmatics & patients with chronic respiratory conditions (ARDSNET Scale).
9. If the patient is hypercapnic ($EtCO_2$ > 45 mmHg) increase PS/IPAP in increments of 5 cmH2O to achieve $EtCO_2$ of 35-45 mmHg. Some COPD patients have baseline hypercapnia and elevated $EtCO_2$ is permissible.
10. Check for air leaks, adjusting the mask and harness as needed.
11. Continuously reassess the efficacy of ventilations via physical findings (e.g., chest rise, auscultation, skin signs) and monitoring equipment (e.g., PIP's, $ETCO_2$, SpO_2) keeping in mind that $EtCO_2$ monitoring may be unreliable in BiPAP patients.
12. If high pressure alarm sounds, immediately reassess equipment for kinked tubing, and coach the patient on their breathing, if appropriate.
13. If low pressure alarm sounds, immediately reassess for leaks or disconnection.

Considerations

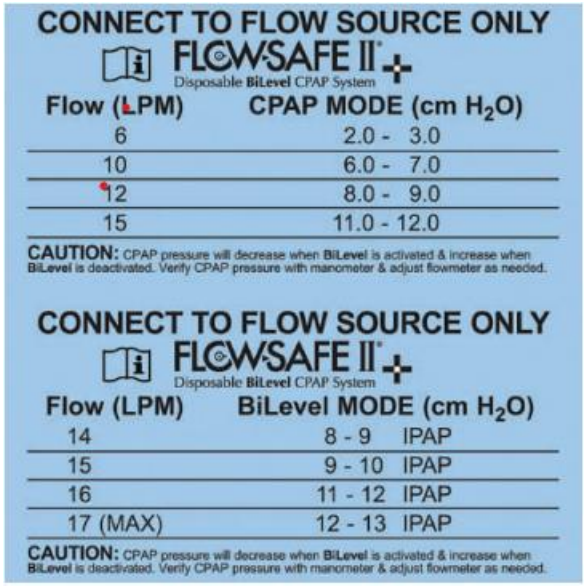
1. All BiPAP patients must have continuous waveform capnography, pulse oximetry, and ECG monitoring.
2. BiPAP can be very uncomfortable. Provide reassurance and coaching to the patient.
3. BiPAP patients can deteriorate rapidly, be prepared to intubate if the patient's mental or respiratory status declines.
4. Consider administering a light dose of Fentanyl or Lorazepam to aid with air hunger or anxiety.

FLOWSAFE II+ Instructions
Equipment

FLOWSAFE II+ is the preferred (MPD approved) device in Kittitas County
BiPAP/CPAP unit, face mask with tubing

Procedure

1. Explain the procedure to the patient.
2. Ensure adequate oxygen supply to BiPAP or CPAP device (see FLOWSAFEII+ chart below).

a. 

3. Place the patient on continuous pulse oximetry.
4. Ensure ECG monitor in place (for ALS only).
5. Place $EtCO_2$ nasal cannula on patient under mask to monitor $EtCO_2$.
6. Place CPAP mask over patient's mouth and nose.
7. Secure the mask with provided straps or other provided devices.
8. Use <u>5 - 10cmH_2O of PEEP valve</u>
    a. 5 cmH_2O max for COPD and Asthmatic patients
    b. 10 cmH_2O max for other qualifying patients
9. Check for air leaks.
10. Monitor and document the patient's respiratory response to treatment.
11. Check and document vital signs every 5 minutes.
12. Administer appropriate medications per protocols based upon signs and symptoms present (per ALS or BLS protocol).
13. Consider low dose Fentanyl or Lorazepam for anxiety.
14. Continue to coach the patient to keep mask in place and adjust as needed.
15. Contact ED to advise them of BiPAP initiation.
16. If respiratory status deteriorates, remove device, and consider intermittent positive pressure ventilation via BVM and/or placement of endotracheal tube (for ALS only).

Special Considerations & Removal Procedure for C-PAP

1. BiPAP & CPAP therapy needs to be continuous and should not be removed unless the patient cannot tolerate the mask **<u>or</u>** begins to vomit **<u>or</u>** experiences respiratory arrest.
2. Intermittent positive pressure and/or placement of an endotracheal tube should be considered if the patient is removed from BiPAP or CPAP therapy (ALS only).
3. If the patient is to be removed from BiPAP/CPAP and mechanically ventilated, the device replacing BiPAP/CPAP (BMV or transport ventilator) must have the ability to set and maintain PEEP at the appropriate pressure for the patient's condition.

BIPAP NOTES (FLOWSAFEII+):

- This device is flow driven. This will result in the device being very “oxygen hungry”.
- Mask utilized is a non-vented mask. Masks can be used with the KVH BiPAP with a whisper swivel in line to ensure exhaled Co2 is blown off.
- The system has no leak detection or leak compensation. Paramedics will need to ensure a good fit and shave facial hair if needed in the field.
- System can be used for both CPAP and BiPAP.

GENERAL NOTES:

- CPAP is an optional procedure, at the agency’s request, for EMT-IV Technicians with an ALS transport agency in Kittitas County. EMT-IVs affiliated with ALS transport agencies must receive and maintain MPD approved training and protocol acknowledgement.
- BiPAP is NOT an approved procedure for EMTs in WA State.

DECOMPRESSION OF A PNEUMOTHORAX

Suspected Tension Pneumothorax

In the event of a suspected tension pneumothorax, and the patient is deteriorating rapidly, perform the following:

A. Prepare all necessary equipment.

B. Identify the second intercostal space at the mid-clavicular line or the fifth intercostal space at the mid-axillary line.

C. Cleanse and prep the site with Povidone-iodine.

D. Use a 12 ga catheter over-the-needle (16 ga for pediatric patients) device, attached to a one-way flutter valve, or an MPD-approved commercial device.

E. Insert the needle above the third rib, into the second intercostal space, until you hear a "pop."

F. Advance the catheter an additional 1-2 cm and withdraw the needle (or as recommended by the manufacturer, if using a commercial device).

G. Secure with tape and an occlusive dressing.

H. Continually monitor lung sounds and respiratory status.

DIATBETES MELLITUS

Suspected Hyperglycemia/Ketoacidosis

A. Establish and maintain airway.

B. Administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Establish cardiac monitor.

D. Establish peripheral IV access with **Isotonic Crystalloid** @ rate dependent on clinical findings.

Suspected Hypoglycemia

A. If good airway and patient conscious, administer some type of sugar solution, PO.

B. Establish Peripheral IV access with Normal Saline @ TKO.

C. Determine blood sugar using chemical strip.

D. Administer **D50**, 25 gms, IV bolus (administer **Thiamine** if suspected alcohol abuse). IV should be wide open during administration of **D50**.

E. If pediatric patient, administer **D25**, 0.5 gms/kg.

F. If unable to establish peripheral IV, administer **Glucagon**, 1.0 unit, IM.

G. Patient may have option of not being transported if:

- patient has history of diabetes with ongoing medical management
- patient is alert and oriented x 3
- patient is observed eating a sandwich
- adult is present
- glucose reading appropriate/normal for patient
- clinical situation indicates further care is not needed

EXTERNAL CARDIAC PACER

Bradyarrhythmias/AV Blocks

A. If unresponsive to Atropine, establish external cardiac pacing unit, and set rate @ 60 ppm, and output @ 70 mA.

   1. If no response, gradually increase output to 150 mA, and set rate @ 80 ppm, or until BP is $\geq$ 90 mm Hg systolic.

   2. Consider sedation if pain is intolerable.

B. If external cardiac pacer is unsuccessful, proceed with further protocols.

GRAND MAL SEIZURES/STATUS EPILEPTICUS

A. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

B. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Physical assessment and history.

D. Patient may have option of not being transported if ALL are verified:
- seizure terminates spontaneously
- patient has history of previous seizures with ongoing medical management of those seizures
- adult is present, and
- the overall clinical situation dictates

E. If witnessed continuous seizure activity with respiratory compromise, or repetitive seizures without return of consciousness:

1. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

2. Administer one of the following:

   a. **Lorazepam**, 1-4 mg, slow IV push or IM. May repeat in 10-15 minutes.

   b. **Midazolam** Weight based administration IV, IO, IM, and IN. May administer IN if unable to establish an IV or IO as secondary medication option for those unaffected by Lorazepam.

      IV/IO/IM: Age < 55: Titrate slowly 0.1 mg/kg every 15 min. up to 0.5 mg/kg
      Age > 55: Titrate slowly 0.05 mg/kg every 15 min. up to 0.25 mg/kg

      IN: 0.2 mg/kg, not to exceed 5 mg (for pediatrics see "Pediatric Seizures")

3. Establish cardiac monitor.

4. If medications prove ineffective to control seizure activity, consider RSI to protect airway and ensure adequate oxygenation.

INDICATIONS FOR THE USE OF 12 LEAD

A. Non-traumatic Chest Pain

B. Shortness of Breath if suspected to be cardiac origin

C. Dizziness

D. Symptoms associated with Cardiac Ischemia

   1. Nausea

   2. Vomiting

   3. Pain (arm, neck, back or jaw)

E. Syncope

F. New onset arrhythmias or unexplained rhythm disturbance

G. New bilateral leg edema

NOTE: ECG Rhythm Strips should accompany the patient care report whenever there is cause to run a rhythm strip (4 or 12 lead).

INTERFACILITY TRANSPORTS

GENERAL PRINCIPLES

Interfacility transport may occur at BLS, ALS, and Critical Care (hospital staff only) levels within the following special categories:

- Transfer between facilities for admission for services not available at initial facility
- Transfer and return of patient to facility for diagnostic evaluations at second facility
- Transfer from hospital to extended care facility
- Transfer of patient between facilities at patient and/or physician request

As a general rule, it is the responsibility of the transferring facility to ensure that the medical necessities for safe patient transfer are met. Medical instructions from the attending physician and registered nurses will be followed unless specifically contrary to EMS protocols. If treatment is recommended that is contrary to protocol or beyond the scope of training of the EMS personnel, transport should not be initiated. Consider air ambulance transport or assistance by qualified hospital staff.

The responsibility for transfer to another facility resides with the transferring facility. Patients will not be transferred to another facility without first being stabilized. Stabilization includes evaluation and initiation of treatment to ensure that transfer of a patient will not, within reasonable medical probability, result in the following: material deterioration of the conditions, loss and/or serious impairment of bodily functions, parts, organs, or death. Furthermore, the benefits of transfer to the next facility outweigh the risks of transfer to the facility. Evaluation and treatment of patients prior to transfer are to include the following:

- Establish and ensure adequate airway and ventilation
- Cardiac monitoring and emergency defibrillation, when indicated
- Establish control of hemorrhage if possible
- Stabilize and splint the spine or fractures, when indicated
- Establish and maintain adequate access routes for fluid administration
- Administer adequate fluid and/or blood replacement

- Determine that the patient's vital signs (blood pressure, pulse, respiration, and urinary output, if indicated) are sufficient to sustain adequate perfusion. Initiate important therapeutic regiments that can be started in a timely fashion and safely continued during transport.

For requests for transports not meeting the above criteria, the following may apply:

- The transporting personnel may request compliance with the above criteria

- If the transporting personnel do not think the plan for transfer can be safely accomplished, contact appropriate agency supervisor

It is also the transferring facility's responsibility to establish the need for BLS, ALS, or Critical Care transport. If a BLS transport is requested and it is the judgment of the BLS crew that the patient needs to be transported by ALS or Critical Care team, it is mandated that the appropriate agency supervisor be contacted.

Similarly, if an ALS transport is requested and it is the judgment of the ALS crew that the patient needs to be transported by a Critical Care team, the hospital should provide or obtain the appropriate staffing. Under no circumstances should an EMS crew transport a patient, if in their judgment, the patient requires a higher level of care than that crew can provide (Mass-casualty incidents are an exception).

Specific conditions requiring the presence of a Critical Care RN or Respiratory Therapist, during transport (parameters outside ALS scope of practice):

- Complicated IV infusions
- Patients on a ventilator for primary respiratory support which may include:
    - Significant Non-compliant lung issues
    - Ventilator settings outside of normal limits
    - BiPap
    - Ventilator along with other complicated patient treatment plans (medications, pumps, etc)

At the discretion of the Paramedic, under specific conditions, may request a Critical Care RN or Respiratory Therapist:

- Cardiogenic Shock
- Post cardiac arrest (acute)
- Unstable arrhythmias
- Severe or worsening ischemic chest pain
- Complicated patients who have a fibrinolytic infusion may require a Critical Care RN according to physician's discretion
- Unsuccessful fibrinolytic infusion
- Patients on a ventilator not for primary respiratory support

A Paramedic level ALS crew may transfer patients on a ventilator, IV infusions and/or drugs not typically used for prehospital care, provided the following conditions are met:

- Automatic Ventilator per protocol (w/approved MPD training) –
  - Intubated patient without significant non-compliant lung issues (COPD, aspiration, etc.)
  - Only Ventilator settings needed (all within normal limits): Respiratory Rate, tidal volume, inspiratory time, O2 concentration, and PEEP.
  - KVH transport ventilator is connected to patient and patient is being adequately ventilated, prior to paramedic arrival.
  - All providers are comfortable with plan after RT/nurse/doctor provide review of patient status and treatment plan.
  - All fittings, tubing and other supplies are provided at time of transport.

- The rate of administration is controlled by a mechanical pump and was established prior to transfer.

- The Paramedic in charge during the transfer has had specific MPD approved training relevant to the effects and potential side effects of the IV infusions and/or drugs involved. MPD approved training may be just in time training provided by qualified hospital staff. Appropriate drug reference sheet should be provided or available electronically.

If during patient transport, an emergency condition develops that was not anticipated prior to transport, prehospital patient care procedures and protocols will immediately apply. Medical Control may be contacted for concurrence and any orders as appropriate. The receiving facility should be contacted ASAP to inform them of changes in the patient's condition.

LEVEL OF CERTIFICATION OF EMS PERSONNEL TO ATTEND THE PATIENT DURING TRANSPORT

1. State law requires that at least one individual certified at the EMT level must be attending the patient in the back of an ambulance. A total of two certified EMS providers must staff the ambulance on transports. For more details, see WAC 246-976-260-Licenses required, WAC 246-976-390 - Trauma verification of prehospital EMS services and RCW 18.73.150 - Ambulance personnel requirements.
   - https://app.leg.wa.gov/wac/default.aspx?cite=246-976-260
   - https://app.leg.wa.gov/wac/default.aspx?cite=246-976-390
   - https://app.leg.wa.gov/rcw/default.aspx?cite=18.73.150

2. The EMS provider with the highest level of certification may allow an EMT to attend the patient during transport, provided that, in the highest-level provider's judgment, the patient's illness or injury is stable and that any anticipated treatment would not be

better rendered by a higher level of certified individual, care is not outside the scope of practice of the EMT, and both providers are comfortable with this decision.

INTRAOSSEOUS VENOUS ACCESS (IO)

Intraosseous Venous Access utilizing the EZ-IO device may be warranted when intravenous fluids or medications are needed and a peripheral IV cannot be established in 2 attempts or 90 seconds **AND** the patient exhibits one or more of the following:

A. Cardiopulmonary arrest (Medical or Trauma)

B. An altered mental status (GCS of 8 or less)

A. Impending Respiratory Failure (SaO2 <80% after appropriate oxygen therapy or rate <10 or >40)

B. Hemodynamic Instability (Systolic BP <80 mmHg)

Contraindications

A. Fracture of the bone selected for IO insertion.

B. Excess tissue at the insertion site with the absence of anatomical landmarks.

C. Previous significant orthopedic procedures (IO within previous 24 hours, prothesis, previous bone / joint replacement).

D. Infection at the site selected for insertion.

Equipment

EZ-IO Driver
EZ-IO AD or EZ-IO PD Needle Set
EZ-Connect Set
Alcohol and Betadine Swabs
10cc Syringe
Tape
Gauze
Isotonic Crystalloid
IV Extension Set
Pressure Bag or Infusion Pump
2% Lidocaine
EZ-IO Yellow Wristband

Procedure

A. Determine indications for IO access and rule out contraindications.

B. Identify anatomical landmarks and locate appropriate insertion site per instructions of device.

C. Cleanse insertion site using an aseptic technique.

D. Prepare EZ-IO device driver and needle set.

E. Stabilize site and insert EZ-IO needle set.

F. Remove EZ-IO driver from needle set while stabilizing catheter hub.

G. Remove stylet from needle and safely dispose of stylet in approved sharps container.

H. Confirm placement.

I. Connect primed EZ-connect.

J. For **conscious** patient, slowly administer 2% Lidocaine
   - EZ-IO AD (Adults) – slowly administer 20-50mg 2% **Lidocaine**
   - EZ-IO PD (Pediatrics) – slowly administer 0.5mg/kg 2% **Lidocaine**

K. Flush EZ-IO catheter with 10cc normal saline through the EZ-connect

NO FLUSH = NO FLOW

L. Place pressure bag on solution and begin infusion (or utilize IV pump if available)
   - Pressure on IV bag should be up to 300 mmHg, or firm enough to generate a flow fluids.

M. Dress and secure site and monitor for signs of extravasation.

N. Attach IO notification wristband.

Procedure for Removal

Removal of IO devices should be performed infrequently in the field. If asked to assist with removal in the Emergency Department, please use the following procedure:

A. Attach a sterile syringe to the hub.

B. Support the patient while rotating the catheter (clockwise – if using the syringe to keep it from becoming detached) and gently pull the catheter out

C. Be sure to maintain a 90-degree angle while rotating the catheter.

D. Do **NOT** rock the catheter while rotating. Rocking may cause the catheter to separate from the hub.
   - If hub catheter separation occurs, use hemostat to grasp and remove the catheter while rotating and gently removing.

E. Once the catheter is removed, immediately dispose of it in a sharp's container.

OBSTETRICAL EMERGENCIES

A. Obtain history and perform physical assessment.

B. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

C. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. If multiparous patient, and contractions < 2 minutes apart, and transport time > 15 minutes, prepare to deliver.

1. When head begins to emerge, support gently to prevent explosive delivery.

2. Clear infant's airway as soon as face delivers.

3. Determine APGAR score and record time of delivery.

4. Clamp cord approximately 8 inches from infant in two places (approximately 2 inches apart) and cut.

E. Consider delivering placenta while en route to hospital. Once the placenta has been delivered, control bleeding by massaging the fundus. Save the placenta.

F. Keep infant warm and provide supportive measures as necessary.

G. Establish large-bore peripheral IV with 1,000 mL bag of **Isotonic Crystalloid** @ TKO.

H. After delivery, administer **Oxytocin**, 40 units in 1,000 mL **Isotonic Crystalloid**, and titrate to control post-partum bleeding as needed. 10 units IM if no IV access.

I. If post-partum bleeding is severe, increase **Oxytocin** rate. Expedite transport.

J. If post-partum hemorrhage profuse and patient exhibiting signs of shock massage uterus firmly, treat hypovolemia with positioning, oxygen and IV Fluids. **Contact Medical Control if considering TXA administration.**

J. For mothers who suffer cardiopulmonary arrest, for whatever reason, and who are in their third trimester of pregnancy, full resuscitative measures should be continued, even if it is obvious that the mother will not survive. An emergency C-section at the hospital may potentially save the infant.

K. In the presence of eclamptic seizures, administer **Magnesium Sulfate** 2-4g IV, IO, or IM and repeat to max dose of 10 g total (optional to carry).

PAIN MANAGEMENT

A. Appropriate management of acute pain is an essential part of patient care in the prehospital setting. The paramedic shall choose the appropriate medication to best match the patient's clinical presentation and alleviate symptoms, recognize that not all patients will respond to the same medications in the same way. Special care shall be given in the management of pediatric and geriatric populations to avoid unwanted side effects of pain management medications.

B. Based on the patient's clinical presentation, the paramedic will choose a medication from among the following classes to treat the patient's symptoms, to achieve adequate symptom relief, the paramedic may choose to use a combination of medications across the different classes. The paramedic will recognize the synergistic effects of such medications and take care to avoid unwanted side effects.

****REFERENCE COUNTY MEDICATION PROTOCOLS FOR SPECIFIC INFORMATION PERTAINING TO INDICATIONS, CONTRAINDICATIONS, AND SIDE EFFECTS. ****

1. **OPIOID ANALGESICS**

   i. **Fentanyl Citrate**
   Adult:
   IV, IO, or IM: 25-50 mcg/kg, not to exceed a total dose of 3 mcg/kg.
   IN: 1-3 mcg/kg, not to exceed 3 mcg/kg

   Pediatrics:
   IV, IO, or IM: 25-50 mcg, not to exceed a total dose of 3 mcg/kg.
   IN: 1-2 mcg/kg, not to exceed 100 mcg

   ii. **Morphine Sulfate**
   Adults:
   Cardiac Pain Management – 2-5mg IV, IO, or IM. May repeat 2mg doses until pain is relieved, respiratory depression ensues, or hypotension.

   Non-Cardiac Pain Management – Initial dose of 0.1mg/kg IV, IO, or IM. May repeat one-half of the initial dose every 5-10 minutes as needed.

   Sedation Management – 2mg IV, IO, or IM. May repeat every 5 minutes as needed to a total dose of 0.1mg/kg.

   Pediatrics: 0.1 mg/kg IV, IO, or IM up to 5mg.

   ****NOTE: NARCOTIC ADMINISTRATION REQUIRES A SYSTOLIC BLOOD PRESSURE > 100mmHg PRIOR TO ADMINISTRATION****

iii. **Hydromorphone (Dilaudid)**
Adults:
IV, IO, or IM: 0.5-1mg. May repeat dose every 30 minutes as needed.

Pediatrics:
IV, IO, or IM: 0.015mg/kg. May repeat dose every 30 minutes as needed.

NOTE: Max dose will vary secondary to transport time and patient severity. If a patient becomes hypotensive or has respiratory depression, cease administration, and contact medical control if needed.

2. **SEDATIVE/HYPNOTICS**

i. **Ketamine**
Adults:
IM: 0.3 mg/kg, to max dose of 10 mg/kg
IV/IO: 0.5-4.5 mg/kg, to max dose of 5 mg/kg

Pediatrics:
IM: 0.3 mg/kg, to max dose of 10 mg/kg
IV/IO: 0.5-4.5 mg/kg, to max dose of 5 mg/kg

ii. **Lorazepam (Ativan)**
Adults:
IV, IO, or IM: 1mg (used commonly in combination with opioid analgesics).

Pediatrics: Not currently recognized.

iii. Midazolam (Versed)
Adults:
IN: 0.2 mg/kg, not to exceed 5 mg

Pediatrics:
IN: 0.1 mg/kg, not to exceed 0.2 mg/kg

iv. **Nitrous-Oxide**
Adults: 50% Nitrous-oxide and 50% oxygen blend, inhaled and self-administered.

Pediatrics: 50% Nitrous-oxide and 50% oxygen blend, inhaled and self-administered.

3. **NONSTEROIDAL ANTI-INFLAMMATORY (NSAID)**

   i. **Toradol (Ketorolac, Tromethamine)**
   Adults:
   IV/IO: 30mg
   IM: 60mg

   Pediatrics: PATIENTS MUST BE >2 YEARS OLD
   IV, IO, or IM: 0.5 mg/kg, up to 30mg MAXIMUM.

C. Nausea and allergic reactions may occur following administration of some pain management medications. The paramedic will consider administering **Zofran** 4-8mg IV, IO, IM or PO for nausea and **Benadryl** 25-50mg IV, IO or IM for allergic reaction.

PATIENT ASSESSMENT

A. Primary Survey

A Primary Survey must be done initially on every patient, and repeated periodically as indicated. This will occur as follows:

1. Determine responsiveness.

2. Evaluate the patency of the airway and correct any obstructions.

3. Evaluate the adequacy of breathing and correct any compromising factors.

4. Determine the presence of a pulse, and evaluate bleeding, and correct.

B. Secondary Survey

A secondary survey should be completed as indicated by the patient's condition, and will occur as follows:

1. Determine level of consciousness.

2. Obtain brief history of illness or injury from patient, family, or bystanders, as indicated.

3. Perform head-to-toe assessment as indicated.

4. Obtain and record vital signs, to include at least pulse, blood pressure, respirations, skin color, and pupils.

5. Obtain serial vital signs every few minutes for the more seriously ill or injured patient.

POISONING AND OVERDOSE

General

A. Establish and maintain airway.

B. If patient alert, transport.

C. Unconscious or depressed LOC:

1. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

2. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. History to include search for evidence of toxins (pill bottles, drug paraphernalia, etc.), and bring to emergency department.

E. Contact Poison Control or Emergency Department for advice.

F. Establish cardiac monitor if indicated.

G. Consider endotracheal intubation if appropriate.

H. If prolonged transport (> 20 minutes), administer **Activated Charcoal** per manufacturer's instructions, PO.

I. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

J. Types of overdoses & treatments:

- Calcium Channel Blocker: **Calcium Chloride** 500 mg IV/IO may repeat @ 3-5 minutes to max dose of 1g total.
    - **Pediatric dose:** 20 mg/kg up to total 500 mg per dose.

- Organophosphate Poisoning: **Atropine** 2-5 mg IV/IO
    - **Pediatric dose:** 0.05 mg/kg

- Beta Blocker: **Glucagon** 3-10 units (mg) IV/IO slow IV push over 1 minute. May be followed by infusion of 2-5 units/hour.

- Tricyclic Anti-Depressant: **Sodium Bicarbonate** 1 mEq/kg IV/IO

- Opioid: **Narcan** 0.4-2 mg IV, IO, IM, IN

- **Pediatric dose**: 0.005 mg/kg up to 2 mg total initial dose, maximum total dose 10 mg.

POST RESUSCITATIVE CARE

A. Once Return of Spontaneous Circulation (ROSC) has been achieved, factors that contributed to the individual's cardiac arrest should be considered as soon as possible to prevent re-arrest. Post resuscitative care should focus on adequate oxygenation and perfusion to help protect all systems from hypoxic injury. The patient should be stabilized, loaded, and transported to the closest, most appropriate medical facility as soon as possible.
B. If ROSC is achieved *before* endotracheal intubation, consider RSI to ensure protection of the patient's airway. Always ensure adequate oxygenation and ventilation to target Spo2 $\geq$ 95% and ETCO2 35-45mmHg.

C. Obtain blood glucose check.

D. Obtain a 12-Lead EKG as soon as it is practical to do so.

E. If the patient has been successfully resuscitated from pulseless ventricular tachycardia or ventricular fibrillation, consider an **Amiodarone** infusion, 1mg/min.

F. Systolic blood pressure during post resuscitated care should be targeted between 90-100mmHg to ensure end organ perfusion. If the patient is hypotensive:

    a. Begin a fluid challenge of 500cc-1000cc of isotonic crystalloid – be alert to signs and symptoms of fluid overload.

    b. If the patient remains hypotensive, consider an infusion of **ONE** of the following vasopressors:

        i. Consider **Levophed** drip for persistent hypotension <90 or MAP <65. Consult drip table for rates, rate adjustments should be limited to 2-4 mcg/min every 5 minutes, up to 30mcg/min.

        ii. **Epinephrine 1:1,000** 1 mg per 100ml Isotonic crystalloid for a concentration of 10mcg/ml. Administer at a rate of 2-10mcg/min.

G. Continuously monitor EKG, pulse quality and vitals every 5 minutes.

H. If the patient begins to regain consciousness, consider sedation, and pain management per RSI protocol as blood pressure allows.

UNEXPLAINED HYPOTENSION

A. Establish and maintain airway.

B. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

C. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. Serial vital signs.

E. Establish cardiac monitor.

F. Establish large-bore IV access with **Isotonic Crystalloid** and bolus in 250-500 mL increments based on patient's BP and clinical findings, up to a total max of 2L.

G. If no improvement and no signs of CHF, establish second large bore IV with **Isotonic Crystalloid**.

H. If hypotension is still present and not secondary to dysrhythmia or volume depletion,

1. If the BP is < 70 mm Hg (MAP ≤ 65), consider **Levophed** if no response or inadequate response to fluid challenges. Initial rate of 2-4 mcg/min IV/IO titrated to maintain systolic blood pressure >90mmHg. Consult drip table for rates, rate adjustments should be limited to 2-4mcg/min every 5 minutes, up to 30mcg/min.

2. If the BP is < 80 mmHg (MAP ≤ 65), consider **Epinephrine** infusion. Mix 1 mg **Epinephrine** per every 100 ml **Isotonic Crystalloid** for a concentration of 10 mcg/ml. Infuse at a rate of 2-10 mcg/min.

3. Should severe tachycardia occur at any time decrease or discontinue administration of **Levophed or epinephrine.**

UPPER AIRWAY OBSTRUCTION

A. If complete foreign body obstruction:

1. Use abdominal compressions or chest thrusts. Use chest thrusts for pregnant patients.

2. Post-removal, suction PRN.

3. Administer O_2 @ 12-15 lpm per non-rebreather mask.

B. If partial obstruction and patient breathing satisfactorily, administer O_2 and transport ASAP in position of comfort.

C. If BLS procedures unsuccessful, perform direct laryngoscopy with attempt at removal with Magill Forceps.

D. Follow with ET intubation if necessary.

E. If ventilation still not possible, consider needle or surgical cricothyroidotomy with supplemental oxygen at maximum flow rates.

PORTABLE VENTILATOR

1) Indications

a. Inter-facility transport of an intubated patient.
b. Mechanical ventilation of a patient intubated in the field.

2) Contraindications

a. Intubated patient with a known pneumothorax without a chest tube in place.
b. Patients less than 20 kg **except** for inter-facility transfers with physician orders.

3) Adverse Effects/Complications

a. Increased intra-thoracic pressure.
b. Decreased venous return to the heart and decrease cardiac output (hypotension, tachycardia)
c. Increased V/Q ratio (ventilation/perfusion ratio)
d. Decreased blood flow to the kidneys with resultant fluid retention (edema)
e. Air trapping and intrinsic PEEP (Auto PEEP)
f. Barotrauma
g. Nosocomial infections of the lungs and sinuses
h. Respiratory alkalosis
i. Agitation and increased respiratory distress
j. Increased work of breathing

4) Procedure

a. If the patient is an interfacility transfer, use the ventilator settings recommended by Respiratory Therapy or the Attending Physician
b. If there are no instructions on ventilator settings or if the ventilator is established in the field, Lung Protection Strategy Settings will be utilized unless Obstructive Strategy is indicated by the patient's physiologic status
c. The ventilator settings in this procedure are intended to be guidelines; settings should be appropriately adjusted based on the patient's physiologic presentation and the attending paramedic's, training, clinical experience, and best judgement
d. **Lung Protection Strategy (all patients except COPD/Emphysema/Asthma/Anaphylaxis)**
- Assemble per manufacturer's recommendations and if available set PEEP to 5 cm H_2O

- A Heat and Moisture Exchange Filter should be used to heat inspired air, add moisture, and filter out debris and pathogens
- Select a volume control mode (Synchronized Intermittent Mandatory Ventilation (SIMV) or Assist Control A/C)) SIMV, SIMV may be better in the prehospital setting at preventing patient/ventilator asynchrony. If the patient is fully paralyzed and sedated, there is no functional difference between SIMV and A/C
- Determine patient's height and IBW using chart and select appropriate tidal volume starting at 6 mL/kg
- Set initial respiratory rate to 18 breaths/minute (this RR will equal an I:E ratio of 1:2 and allows for complete exhalation)
- Initially set FiO_2 to 1.0 (100%)
- Set inspiratory time (0.5-2 seconds for adults, 0.5-1 second for pediatrics)
- Set pressure support to 10-15 cm/H_2O if available

a. Once the patient is intubated and tube placement is confirmed attach the ventilator circuit and begin ventilation.

b. Allow the ventilator to operate for two minutes then assess for the following:

i. Plateau Pressure: maintain at less than 30 cmH_2O. If Plateau Pressure exceeds 30 cmH2O, decrease Tidal Volume by 10% every two minutes until the target pressure is achieved. If the ventilator alarms "Low Minute Volume" and the Plateau Pressure is less than 30 cmH_20, Tidal Volume may be increased by 10% every two minutes until the alarm is satisfied provided the Plateau Pressure remains below 30 cmH_2O

ii. $EtCO_2$: Maintain between 35-45 mmHg. If $EtCO_2$ is high, increase respiratory rate every 2 minutes until target is achieved. If $EtCO_2$ is low, decrease respiratory rate every 2 minutes until target is achieved. Use caution in metabolic acidosis and closed head injury patients (see Special Considerations below)

iii. SpO_2: After 2 minutes reduce FiO_2 to 0.3 (30%) and monitor. SpO_2 target should be 90-98%. If SpO_2 falls below 90% increase FiO_2 and PEEP stepwise using the ARDSNET chart below, FiO_2 and PEEP should increase and decrease in tandem to achieve target SpO_2

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7
PEEP	5	5	8	8	10	10	10	12

FiO_2	0.7	0.8	0.9	0.9	0.9	1.0
PEEP	14	14	14	16	18	18-24

e. Obstruction Patients (COPD, Emphysema, Asthma)

- Assemble per manufacturer's recommendations and if available set PEEP to 0-3 cm H_2O
- A Heat and Moisture Exchange Filter should be used to heat inspired air, add moisture, and filter out debris and pathogens.
- Determine patient's height and IBW using chart and select appropriate tidal volume starting at 6 mL/kg
- Set initial respiratory rate to 10 breaths/minute (this RR will equal an I:E ratio of 1:6 and allows for complete exhalation)
- Initially set FiO_2 to 1.0 (100%)
- Set inspiratory time (0.5-1 second for adults, 0.5-1 second for pediatrics)
- Set pressure support to 10-15 cm/H_2O if available
- Once the patient is intubated and tube placement is confirmed attach the ventilator circuit and begin ventilation.
- Allow the ventilator to operate for two minutes then assess for the following:
    - **i.** Plateau Pressure: maintain at less than 30 cmH_2O. If Plateau Pressure exceeds 30 cmH_2O, decrease Tidal Volume by 10% every two minutes until the target pressure is achieved.
    - ii. $EtCO_2$: Air trapping is the primary problem with COPD/Emphysema/Asthma patients. Allowing for complete exhalation is essential. These patients may have elevated $ETCO_2$. Hypercarbia up to 80 mmHg is acceptable for short term transport. Increasing the respiratory rate to adjust the $EtCO_2$ is ineffective as this will interfere with exhalation and potentially cause barotrauma.
    - iii. SpO_2: After 2 minutes reduce FiO_2 to 0.3 (30%) and monitor. SpO_2 target should be 90-98%. If SpO_2 falls below 90% increase FiO_2 by 0.1-0.2 (10-20%) every 1-2 minutes to achieve target SpO_2 PEEP should not need to be adjusted above physiologic normal (5 cmH_2O)
    - iv. If the patient continues to show signs of Auto PEEP (increasing Plateau Pressure, inspiratory volume exceeds expiratory volume, chest wall distention), pause ventilations, disconnect ventilator to allow complete exhalation, resume ventilations at a lower respiratory rate
    - v. A respiratory rate of 6-10 per minute with elevated $EtCO_2$ is acceptable during transport as long as the patient has adequate oxygenation/SpO_2.

c. Monitoring ventilator patients during transport

- Continuously monitor Plateau Pressure (or Peak Pressure if Plateau Pressure is not available), $EtCO_2$, SpO_2, lung sounds, chest rise and adequacy of sedation.
- Verify respiratory rate by checking the ventilatory frequency (f) as displayed by the ventilator.
- If pressure-limit alarm sounds, immediately reassess equipment and patient for kinked tubing, airway obstruction, Auto PEEP, tension pneumothorax, etc.
- Always have BVM device with PEEP valve in place available for use in the event of ventilator failure.

5) Considerations:

- All ventilated patients must be monitored for waveform capnography, pulse oximetry, and ECG monitoring.
- For patients where adequate oxygenation with acceptable P-Plat is not achievable, Pressure Control modes may be used per Kittitas County Ventilator Training Course.
- Ensure adequate sedation and analgesia throughout the transport.
- Patients with suspected metabolic acidosis (diabetic ketoacidosis, sepsis, ASA, or TCA poisonings, etc.) that present with $EtCO_2$ less than 32 mmHg should be maintained at their initial $EtCO_2$ value as the patient is compensating for acidosis through increased ventilatory rate.
- Maintain SpO_2 level of 90 to 98%. Asthma patients may be permissively allowed to stay in the range of 88-92% to prevent excessive pressures.
- If the high-pressure alarm alerts or if the patient is unable to maintain SpO_2 values above 90%, remove the ventilator, resume ventilations with BVM with 5 cmH_2O PEEP, and 100% O_2, and evaluate for the following:
    - Displaced tube,
    - Tension pneumothorax
    - Post intubation hemodynamic collapse
    - Air trapping in the lungs (Auto PEEP)
    - ET tube cuff leak
    - Obstruction of the ET tube
    - Obstruction of the ventilation circuit
    - Failure of the oxygen source,
    - Equipment failure.
- If patient has sudden decrease in SpO_2, BP, increase in P-Plat, and/or increase/decrease in HR evaluate for developing Tension Pneumothorax.
- $EtCO_2$ is notoriously inaccurate in patients with hypovolemia, chest/pulmonary trauma, and closed head injuries. $EtCO_2$ should not be used as a target value in these patients.

A ventilatory rate of 10-18 breaths per minute to maintain an SpO_2 of 90-98% and maintaining a SBP > 90 mmHg should be the target goal.

MALES				Patient	FEMALES			
IBW	**6ml**	**7ml**	**8ml**	**Height**	**IBW**	**6ml**	**7ml**	**8ml**
22.4	134	157	179	**4'0"**	17.9	107	125	143
24.7	148	173	198	**4'1"**	20.2	121	141	162
27	162	189	216	**4'2"**	22.5	135	158	180
29.3	176	205	234	**4'3"**	24.8	149	174	198
31.6	190	221	253	**4'4"**	27.1	163	190	217
33.9	203	237	271	**4'5"**	29.4	176	206	235
36.2	217	253	290	**4'6"**	31.7	190	222	254
38.5	231	270	308	**4'7"**	34	204	238	272
40.8	245	286	326	**4'8"**	36.3	218	254	290
43.1	259	302	345	**4'9"**	38.6	232	270	309
45.4	272	318	363	**4'10"**	40.9	245	286	327
47.7	286	334	382	**4'11"**	43.2	259	302	346
50	300	350	400	**5'0"**	45.5	273	319	364
52.3	314	366	418	**5'1"**	47.8	287	335	382
54.6	328	382	437	**5'2"**	50.1	301	351	401
56.9	341	398	455	**5'3"**	52.4	314	367	419
59.2	355	414	474	**5'4"**	54.7	328	383	438
61.5	369	431	492	**5'5"**	57	342	399	456
63.8	383	447	510	**5'6"**	59.3	356	415	474
66.1	397	463	529	**5'7"**	61.6	370	431	493
68.4	410	479	547	**5'8"**	63.9	383	447	511
70.7	424	495	566	**5'9"**	66.2	397	463	530
73	438	511	584	**5'10"**	68.5	411	480	548
75.3	452	527	602	**5'11"**	70.8	425	496	566
77.6	466	543	621	**6'0"**	73.1	439	512	585
79.9	479	559	639	**6'1"**	75.4	452	528	603
82.2	493	575	658	**6'2"**	77.7	466	544	622
84.5	507	592	676	**6'3"**	80	480	560	640
86.8	521	608	694	**6'4"**	82.3	494	576	658
89.1	535	624	713	**6'5"**	84.6	508	592	677
91.4	548	640	731	**6'6"**	86.9	521	608	695
93.7	562	656	750	**6'7"**	89.2	535	624	714
96	576	672	768	**6'8"**	91.5	549	641	732

SECTION II – TRAUMA

BLEEDING & BANDAGING

Bleeding

Managing bleeding so that it stops completely as quickly as possible is a primary goal of EMS responders.

Specific information needed:

A. Mechanism of injury and forces involved
B. Past medical problems and medications

Specific objective findings:

A. Vital signs, including neurologic assessment

B. Level of sensory and motor deficit: presence of any evidence of neurologic function below level of injury (attempt GCS)

C. Physical exam, with careful attention to organs or limbs which may not have sensation

General treatment:

A. Control hemorrhage as indicated below.
B. Assess airway and breathing: treat life-threatening difficulties, use controlled ventilations for high cervical cord injury associated with abdominal breathing, and maintain inline cervical immobilization while managing ABC's
C. Administer O2
D. Immobilize cervical, thoracic, and lumbosacral spine if indicated per protocol**.**
E. Obtain initial vital signs and neurologic assessment
F. Monitor airway, vital signs and neurologic status frequently at scene and during transport
G. Keep patient warm

<u>Advanced Skills -</u>

H. Establish venous access. If signs of hypovolemia, fluid bolus 10-20cc/kg to maintain SBP>100
I. Consider narcotic analgesia per protocol

J. In the setting of hemorrhagic shock from trauma less than 3 hours old, with anticipated need for massive blood transfusion due to marked internal or external blood loss, the criteria for Tranexamic acid administration are:

1. Adult traumas patients equal to or greater than 16 years of age.
2. Traumatic injury less than 3 hours old.
3. Hemorrhagic shock due to trauma: systolic BP 90mmHg or less: and/or sustained heart rate more than 110 bpm
4. Patient has received at least 500mL of crystalloids and other hemorrhagic control measures have been initiated, i.e., direct pressure, etc.

Tranexamic acid (TXA) 1-gram IVP administered over 10 min. in 100mL or 250mL Isotonic Crystalloid (may piggy-back). Notify receiving facility that TXA was initiated in the field.

Control external bleeding with:

- **Direct pressure** – Direct pressure stops the majority of bleeding. Using BSI, apply firm pressure by fingertips or full hand directly to the point or area of blood loss for ***no less than 5 minutes***. Using a dry dressing is helpful. Consider pressure dressing if available.
- **Coagulant impregnated bandage or topical coagulant** – see below. Not required on aid unit or ambulance. Optional per agency preference.
- **Tourniquet** – see below.
- ***Wound packing – see below.*** Commercial wound packing products not required on aid unit or ambulance at this time. Optional per agency preference. Commercial wound packing dressings are recommended to include the radiopaque pattern marker, but regular roller gauze may be used. Wound packing must be effectively communicated and documented to receiving facility.
- Dress and Bandage wound when bleeding has stopped.

Coagulant Impregnated Bandage or Topical Coagulant

Indication -

- Expose wound. Identify active bleeding tissues.
- Apply coagulant impregnated bandage or topical coagulant product.
- Apply firm direct pressure for at least 5 minutes or per manufacturer's instructions.
- Ensure bleeding has stopped completely.
- Dress and Bandage wound. Allow for distal circulation assessment.
- Notify staff at hospital or responders during transfer of care what product has been used and specific brand name.

Tourniquet

Indication - Tourniquets are used for uncontrolled arterial bleeding from an extremity (arm or leg) when direct pressure is not sufficient, or significant bleeding has occurred from an extremity wound (i.e. bleeding equivalent to 2-12 oz cans of soda = tourniquet)

- A commercially produced tourniquet is preferred, ***at least 1.5" minimum*.**
- Expose the limb completely if possible. Tourniquets can be applied over clothing.
- When possible, visualize the wound and apply the tourniquet above and near the wound. If removing clothing is not possible or too slow, apply the tourniquet high and tight (i.e. police uniform, cold exposure/ski pants). Do not apply above or across joints if possible.
- Tighten tourniquet until bleeding stops.
- Write the time of application on the patient's skin (ex: TQ 1645)
- Consider second tourniquet above the first if bleeding is still not controlled.
- Dress, bandage and immobilize affected extremity. Consider coagulant bandage or topical coagulant to aid bleeding control. (Regardless of the type of tourniquet used, once applied, do not remove it if the patient is in shock, the limb was amputated, there are obvious arterial disruptions, the tourniquet has been on for an extended period, or you will be transferring care and can no longer observe the patient.)
- Keep tourniquet exposed.
- Expect increased pain from the tourniquet.
- Initiate rapid transport, notifying ER of tourniquet placement.
- Consider advanced care for IV fluids.
- Consider use of compression dressing with or without coagulant as an alternative or in addition to tourniquet.

Wound packing

Indication/background – Wound packing is relevant for wounds where the bleeding source may not be directly compressible with direct hands-on pressure but can be transmitted directly by packing gauze in the wound area. Wound packing generally must pack against a firm backdrop. Hence, wound packing is not effective for bleeding coming from a cavity (i.e. abdomen or thorax) as the packing will not compress the bleeding source but instead just fill up the cavity.

- Packing should be placed firmly and as close to the bleeding source as possible in an effort to compress the bleed between the gauze and anatomic firm structures.
- Work to maintain constant pressure throughout the process while you layer in additional gauze filling the cavity.
- Overfill the cavity with gauze so that you can overlay a pressure dressing that will assure ongoing compression.

Epistaxis (nosebleed)

BLS Care

- Have the patient sit down and lean forward.
- Pinch and hold nostrils closed for 5-10 minutes.
- Discourage patient from swallowing blood.
- If the patient loses consciousness, place in recovery position.

ALS Care – Administration of Oxymetazoline Hydrochloride (AFRIN®) may help slow intranasal bleeding.

- Adult and Children (6 years and older) - 2 or 3 sprays in each bleeding nostril.
- DO NOT exceed 2 doses in any 24-hour period.

Dressing and Bandaging reminders:

1. Maintain body substance isolation (BSI) by wearing appropriate personal protective equipment.
2. Large, easily removed debris, such as glass, splinters, or gravel can be removed before bandaging. Secure large, deeply imbedded fragments or projectiles in place with the bandage.
3. If possible, leave patient's fingers or toes exposed.
4. Check circulation by feeling for a distal pulse or checking capillary refill.
5. Elevate or immobilize the injured extremity, if possible, help control bleeding and pain.
6. Cover eviscerated abdominal contents with a large multi-trauma dressing soaked with saline. Then apply an occlusive dressing, if available, to retain heat and moisture. Secure as needed.
7. Document well to include time, product type and name, and if wound is packed.

BURNS

A. Remove patient from hazardous environment.

1. Remove constricting items and smoldering or non-adherent clothing.

2. Brush any dry solids off patient.

3. Dilute and rinse any chemicals with water.

B. Ensure an adequate airway.

C. If critical burns, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. Determine location, extent, and depth of burns, and any associated trauma or complications.

E. Cover small burns with sterile dressing moistened with normal saline.

F. Cover moderate to severe burns with dry, sterile dressings.

G. If hands or feet involved, separate digits with sterile gauze pads.

H. Cover to conserve body heat and keep patient warm.

I. Obtain history to include: mechanism or source of burn; time elapsed since burn; whether patient was in a confined space with smoke or steam, and how long; and whether there was a loss of consciousness.

J. If critical burns, such as 2° and/or 3° burns (involving greater than 15% of the total body surface area (TBSA)), facial burns, or respiratory involvement:

1. Establish cardiac monitor

2. Establish large bore IV with Lactated Ringers (IV catheter may be placed in burned areas if needed).
   - Controlled and calculated approach with the use of the Consensus Formula:
     - 2ml x kg x % TBSA = 24 hr. fluid total (give half in the first 8 hours).
       - Pediatric patients less than 30kg use 3ml x kg x % TBSA

Note: The lactate helps to buffer metabolic acidosis that may occur in early burn injury. Over and under resuscitation has major implications to mortality – organ dysfunction, compartment syndrome, ARDS.

3. Continue to monitor airway status and treat as indicated.

4. Consider pain management (see protocol).

CHEST INJURIES

A. Establish and maintain airway.

B. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

C. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

D. Establish cardiac monitor.

E. Consider placement of endotracheal tube. Monitor closely for signs of tension pneumothorax.

F. If BP < 90 mm Hg:

1. Establish peripheral IV access with **Isotonic Crystalloid** @ rate dependent on clinical findings.

2. Always establish a large-bore line; consider two lines.

G. If tension pneumothorax develops, decompress chest using needle thoracostomy @ the second intercostal space mid-clavicular line, or fifth intercostal space mid-axillary line.

CRUSH INJURY SYNDROME / SUSPENSION TRAUMA / HYPERKALEMIA

Patients with CIS or suspension trauma may not survive if treatment is not initiated before removal from the situation. It is imperative that patients be pretreated before extrication or movement.

Hallmark signs experienced by the CS/CI patient include the "5 P's": pain, pallor, paresthesia, poikilothermy (cold skin) and pulselessness.

A. Manage airway as indicated – if intubation necessary, **DO NOT use Succinylcholine**, consider **Vecuronium** 0.1 mg/kg IV.
B. Apply oxygen.
C. Establish peripheral IV access with **Isotonic Crystalloid** @ rate dependent on clinical findings. Always establish a large-bore line; consider two lines.
D. **Albuterol** 2.5 mg in 3.0 ml **Isotonic Crystalloid** continuously.
E. The initial dosage for **Sodium Bicarbonate** is 1.0 mEq/kg IV bolus, after 10 minutes infuse 100 mEq S**odium Bicarbonate** / 1000 ml of **Isotonic Crystalloid** @ 150 ml/hr. Volume replacement and pre-alkalization should take place immediately after CIS identified.
F. ECG monitor.
G. If dysrhythmias, stabilize excitable tissue with 1 amp (500 mg) of **Calcium Chloride** IV push over 2 – 5 minutes.
H. If prolonged extrication, consider 1-amp (50 ml or 25 gm) **D50W**. Monitor blood glucose levels and consider giving an additional amp **D50W**.
I. Consider **MS** 2 mg every 2 minutes or **Fentanyl** 25 µg IV every 5 – 10 minutes
J. Consider **Midazolam** 2 mg increments to a maximum dose of 0.1 mg/kg or 10 mg for sedation.

HEAD INJURY

General

A. Secure airway while providing C-spine immobilization.
B. Control bleeding using direct pressure. Do not stop bleeding from nose, ears if CSF leak is suspected.
C. If stable, administer O2 @ 4-6 lpm per nasal cannula.
D. If unstable, administer O2 @ 12-15 lpm per non-rebreather mask.
E. Ventilate or assist ventilations with BVM and supplemental O2@ 12-15 lpm if hypoventilation or apnea.
F. If unconscious or decreased LOC:
    a. Place ET tube and ventilate with BVM and supplemental O2 @ 12-15 lpm.
    b. Establish capnography monitoring and ventilate to achieve ETCO2 of 35-40mmHg.
G. Establish large bore peripheral IV access with **Isotonic Crystalloid** @ TKO and maintain systolic BP of >90mmHg.
H. Check blood glucose level (or complete Chem8+ panel if I-Stat available).
I. Elevate head of bed 15-30 degrees.
J. If paralysis for intubation, using **Succinylcholine** is necessary, 1.5 mg/kg IV bolus. For pediatric patient, administer **Atropine,** 0.02 mg/kg, IV bolus.
K. If patient has signs or symptoms of hypovolemia secondary to other trauma, treat shock first as per protocol.
L. Monitor and document serial vitals q 10 minutes, if possible, to include:
    a. GCS score
    b. BP
    c. HR
    d. RR
    e. SPo2
    f. ETCo2
    g. Pupillary exam
M. Consider transport to trauma facility with neurological intervention capabilities.

MULTI-SYSTEM TRAUMA GENERAL GUIDELINES

A. Establish and maintain airway.

B. Protect and immobilize C-spine.

C. Administer O_2 @ 12-15 lpm per non-rebreather mask.

D. Ventilate or assist ventilations if with BVM and supplemental O_2 @ 12-15 lpm, hypoventilation or apnea is present.

E. Control severe external hemorrhaging as indicated.

F. Establish minimum of two large-bore IVs with **Isotonic Crystalloid** running at a rate to maintain systolic BP at 90.

G. In the setting of hemorrhagic shock from trauma less than 3 hours old, with anticipated need for massive blood transfusion due to marked internal or external blood loss, the criteria for Tranexamic acid administration are:

1. Adult traumas patients equal to or greater than 16 years of age.
2. Traumatic injury less than 3 hours old.
3. Hemorrhagic shock due to trauma: systolic BP 90mmHg or less: and/or sustained heart rate more than 110 bpm
4. Patient has received at least 500mL of crystalloids and other hemorrhagic control measures have been initiated, i.e., direct pressure, etc.

Tranexamic acid (TXA) 1-gram IVP administered over 10 min. in 100mL or 250mL Isotonic Crystalloid (may piggy-back). Notify receiving facility that TXA was initiated in the field.

G. Rapid transport to medical facility (spend the minimum necessary time at the scene). Do not delay transport to treat minor injuries or splint minor fractures.

H. Establish cardiac monitor.

I. Consider air transport if:

1. Prolonged (>20 minutes) extrication procedures and prolonged transport time (> 30 minutes) is anticipated.
2. Patient condition warrants a trauma center.
3. Landing site is available & securable. Hoist mission will require M.A.S.T.

J. **Air Medical Resources** may be dispatched prior to medical unit arrival after discussion between in route paramedics and on-scene agency (State Patrol, Sheriff, fire department) regarding resources required at scene. When possible, and medically necessary, the patient(s) should be accompanied in the helicopter by a paramedic if advance level care is not available on the air transport unit.

K. Consider placement of endotracheal tube, if indicated. End tidal $C0_2$ monitor, maintain $C0_2$ between 35-40.

SPINAL TRAUMA & SPINAL MOTION RESTRICTION (SMR) ALGORITHM

Specific information needed:

D. Mechanism of injury and forces involved: be suspicious with falls, decelerations, diving incidents, and motor vehicle incidents
E. Past medical problems and medications

Specific objective findings:

A. Vital signs, including neurologic assessment
B. Level of sensory and motor deficit: presence of any evidence of neurologic function below level of injury (attempt GCS)
F. Physical exam, with careful attention to organs or limbs which may not have sensation

General treatment:

K. Assess airway and breathing: treat life-threatening difficulties, use controlled ventilations for high cervical cord injury associated with abdominal breathing, and maintain inline cervical spine motion restriction while managing ABC's
L. Administer O2 per protocol, and/or
M. Control hemorrhage
N. Spinal motion restriction of the cervical, thoracic, and lumbosacral spine as indicated below.
O. Obtain initial vital signs and neurologic assessment

Advanced Skills (F & G)-

P. Establish venous access. If signs of hypovolemia, fluid bolus 10-20cc/kg to maintain SBP>100
Q. Consider narcotic analgesia per protocol
R. Monitor airway, vital signs and neurologic status frequently at scene and during transport

CLINICAL INDICATIONS FOR FULL SPINAL MOTION RESTRICTION:

A. Restrict patient movement with a **rigid device** (backboard, scoop stretcher, or vacuum mattress (peds) and cervical collar for any of the following conditions:
    - Blunt trauma and altered level of consciousness
    - Thoracic or lumbar spinal pain or tenderness
    - Neurologic complaint (e.g. numbness or motor weakness) following trauma
    - Anatomic deformity of the spine following trauma
    - High energy mechanism of injury AND:
        - Alcohol intoxication or drug induced impairment
        - Inability to communicate
        - Distracting injury
    - GSW to head or neck (in general penetrating wounds do not require a rigid device for spinal motion restriction, unless evidence of spinal injury)

B. Patients complaining of isolated cervical pain or tenderness following trauma can be managed by application of a cervical collar and securing the patient firmly to the stretcher, if the following criteria are met:
    - Normal level of consciousness (GCS-15)
    - No thoracic or lumbar (midline) spine tenderness or anatomic abnormality
    - No neurologic findings or complaints
    - No intoxication or drug induced impairment

C. Patients who have no complaints of cervical or back pain and no tenderness should not be placed in a cervical collar or on a rigid device if they meet the following:
    - Normal level of consciousness (GCS-15)
    - No neurologic findings or complaints
    - No intoxication or drug induced impairment

D. These guidelines do not preclude use of a rigid device for extrication or moving the patient.

E. Efforts should be made, especially in the light of extended transport times, to minimize the discomfort associated with a rigid device. Padding under the knees if appropriate, light padding on the board such as a blanket or a Back Raft and other comfort measures may benefit the patient without compromising the goal of spinal motion restriction. Also, the scoop /clam stretcher provides spinal motion restriction while extricating and can be more easily removed once on the stretcher and is an excellent option.

Specific precautions:

A. Be prepared to turn entire board on side if patient vomits.
B. Be sure respirations remain adequate.
G. If hypotension is unresponsive to simple measures, it is likely due to other injuries. Neurologic deficits make these other injuries hard to evaluate. Cord injury above the level of T-8 removes tenderness, rigidity and guarding as clues to abdominal injury.
H. Spinal motion restriction in patients with penetrating trauma is required only when neurologic deficits or altered mentation exists.
I. Removal from transition device once the patient is on the stretcher is appropriate for patients reindicating the (recommended prior to entering ambulance)
J. Assess the need for SMR and evaluate the risk vs. the benefits of SMR for each patient.
K. Providers may consider NOT taking spinal motion restriction precautions on patients with significant mechanism if (what is considered significant may vary by patient):

    - No spine or neck pain/tenderness/deformity on palpation or otherwise
    - No neurologic deficit
    - No major distracting pain or long bone injuries
    - No altered mental status / head injury of any significance
    - Not chemically altered (alcohol or drugs)

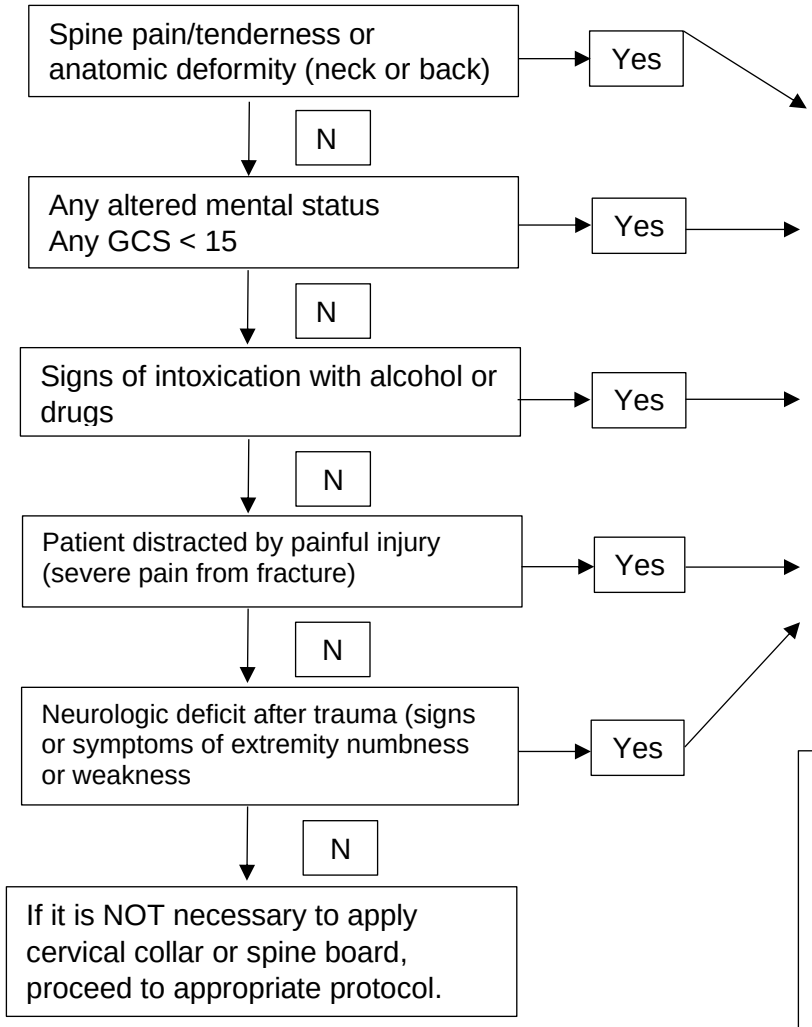
- No pain to back or neck with cough
- No priapism
- No language or communications barrier

NOTE: ***Pertinent negatives for NOT taking spinal motion restrictions with significant mechanism (applicable to patient) are to be documented in patient care report.***

SPINAL MOTION RESTRICTION ALGORITHM

ASSESSMENT OF SPINAL INJURIES

A. Patients with the following symptoms or mechanisms of injury should be assessed to determine whether restriction of spinal motion is required.



Restrict Spinal Motion

Apply Rigid Cervical Collar

If ambulatory

Allow patient to move to stretcher mattress with minimal spinal motion.

If non-ambulatory

Use backboard, scoop/orthopedic stretcher, vacuum mattress, or other device to move patient to stretcher with minimal spinal motion.

WARNING: Criteria cannot be assessed on any patient with a language or communications barrier that prevents understanding and appropriately responding to the assessment questions. If there is any doubt about whether the patient meets any of the clinical criteria listed above restrict spinal motion.

NOTE: Exclusion criteria should be used to assess the use of spinal motion restriction and is not definite assessment of whether the patient has a spinal injury. Exclusion criteria should be documented.

Special Considerations:

C-collar may be used to further restrict spinal motion.

Transport on stretcher mattress without backboard if patient ambulatory or if scoop/orthopedic stretcher can be removed with minimal patient motion.

In the event that standard c-collar sizes are not appropriate for your patient(s) the following may be utilized:

1. Blocks and tape.
2. Towel rolls on either side of patient's head and tape.
3. Other approved device for c-spine immobilization.

TASER WEAPON PENETRATING TRAUMA

Unlike other forms of penetrating foreign bodies, Taser Weapon barbed darts, because of their short length (1/4 in.), may be safely removed by EMS personnel when requested by law enforcement.

General

A. The darts should only be removed in the field if they do not involve the eye, face, neck, breast, and groin. Patients with retained darts in these areas should be transported to a hospital to have them removed by a physician.

B. The individual must be in police custody and EMS personnel must be convinced that the patient is adequately restrained.

C. Gloves must be worn.

D. Ensure that wires are disconnected from the device, or the wires have been cut.

E. Push on the body part which the barbed dart is imbedded and simultaneously pull the dart straight out. Examine the dart to ensure that it is completely intact, and no pieces are left behind.

F. Apply alcohol or iodine to the puncture area and dress as needed.

G. Treat the dart as a “contaminated sharp”. The darts should be placed in a biohazard sharps container and turned over to law enforcement. Consult law enforcement present for proper packaging for evidence preservation.

H. All patients must be thoroughly assessed to determine if other medical problems or injuries are present.

I. If the individual does not have any other presenting injury/illness, they may be left in the custody/care of law enforcement.

J. If transported to the hospital, follow the Patient Care Protocol regarding restraints for aggressive or violent patients.

SECTION III – PEDIATRICS

PEDIATRIC CARDIAC ARRHYTHMIAS

A. If stable, administer O_2 @ 4-6 lpm per nasal cannula.

B. If unstable, administer O_2 @ 12-15 lpm per non-rebreather mask.

C. Establish cardiac monitor/defibrillator.

D. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

Bradyarrhythmia

A. Symptomatic, including unconsciousness and hemodynamic instability:

1. Administer **Epinephrine**, 1:10,000, 0.01 mg/kg q 3 minutes, IV or IO.

2. If only ET route available, administer **Epinephrine**, 1:1,000, 0.1 mg/kg q 3 minutes.

3. Administer **Atropine**, 0.02 mg/kg, IV, IO, or ET (0.1 mg minimum single dose). Repeat once in 5 minutes, up to a total 0.5 mg in children, and 1.0 mg in adolescents.

B. Consider CPR if heart rate < 80/minute in an infant, or 60/minute in a child.

SVT

A. 12- Lead ECG if therapy won't be delayed.

B. Consider vagal maneuvers.

C. Consider **Adenosine** 0.1 mg/kg IV (maximum first dose 6 mg).

D. May give second dose **Adenosine** 0.2 mg/kg IV (maximum second dose 12 mg).

E. Consider **Amiodarone** 5 mg/kg IV over 20-60 minutes.

F. Consider cardioversion 0.5-1 joules/kg.

1. May increase to 2 joules/kg if initial dose ineffective.

2. Sedate before cardioversion.

VENTRICULAR TACHYCARDIA with a pulse

A. Symptomatic, including unconsciousness and hemodynamic instability:

B. 12- Lead ECG if therapy won't be delayed.

C. Consider **Amiodarone** 5 mg/kg IV over 20-60 minutes.

D. Consider cardioversion 0.5-1 joules/kg.

1. May increase to 2 joules/kg if initial dose is ineffective.

2. Sedate before cardioversion.

PEDIATRIC CARDIOPULMONARY ARREST

A. Establish and maintain airway.

B. Verify cardiopulmonary arrest.

C. Initiate CPR and ventilate per pediatric BVM with supplemental O_2 @ 12-15 lpm.

D. Place ET tube and continue ventilations with BVM.

E. Establish cardiac monitor.

F. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

G. Consider intraosseous route if patient < 12 years old, or external jugular.

Asystole / Pulseless Electrical Activity (PEA)

A. Attempt to identify underlying cause of PEA and treat as per protocols.

B. Administer **Epinephrine**, 1:10,000, 0.01 mg/kg q 3 minutes, IV or IO.

C. If only ET route available, administer **Epinephrine**, 1:1,000, 0.1 mg/kg q 3 minutes.

D. In PEA, consider fluid challenge of **Isotonic Crystalloid** @ 20 cc/kg.

Ventricular fibrillation (Pulseless VT)

A. Defibrillate ASAP @ 2 joules/kg. Second and subsequent shocks shall be at 4 joules/kg.

B. Administer **Epinephrine**, 1:10,000, 0.01 mg/kg q 3 minutes, IV or IO.

C. If only ET route available, administer **Epinephrine**, 1:1,000, 0.1 mg/kg q 3 minutes.

D. Immediately following first dose of **Epinephrine**, administer **Amiodarone**, 5 mg/kg, IV or IO.

E. Repeat defibrillation @ 4 joules/kg as necessary.

PEDIATRIC RESPIRATORY DISTRESS

A. Establish and maintain airway. Treat any airway obstructions as per AHA protocol for obstructed airway.

B. Administer O_2 @ 12-15 lpm per non-rebreather mask. If not tolerated, administer blow-by oxygen. Allow the child to assume a position of comfort.

C. If decreased LOC, assist ventilations with BVM as indicated.

D. If a patient is unresponsive to BVM ventilation, consider endotracheal intubation.

E. In the unconscious or slow to respond patient, establish peripheral IV access with **Isotonic Crystalloid** @ TKO. Consider intraosseous route if, indicated.

F. Establish cardiac monitor.

Asthma

A. Consider **Albuterol**, 2.5 mg in 2-3 cc normal saline, per nebulizer mask. May give up to two additional times. Continue, if no theophylline preparation is being taken by patient.

B. Consider **Ipratropium Bromide** 0.25 mg via small volume nebulizer.

C. For Refractory Asthma,

1. Consider **Magnesium Sulfate** 25-50 mg/kg to maximum dose of 2g.
2. Consider **Epinephrine 1:1,000** 0.15 mg IM.

D. Transport ASAP and monitor status.

E. Establish cardiac monitor.

Croup

A. Administer **Albuterol**, 2.5 mg in 2-3 cc normal saline, per nebulizer mask. May repeat q 20 minutes up to two additional times.

B. Transport ASAP and monitor status.

Epiglottis

A. In a conscious child with suspected epiglottitis, avoid invasive procedures that may cause agitation.

B. If child loses consciousness or develops periods of apnea and/or respiratory depression, ventilate with BVM and supplemental O_2 @ 12-15 lpm.

C. If BVM ventilation is unsuccessful, perform endotracheal intubation using ET tube one size smaller than normal for age.

D. If attempts at ET intubation are unsuccessful, consider needle cricothyroidotomy.

PEDIATRIC SEIZURES

A. Establish and maintain airway.

B. Administer O_2 @ 12-15 lpm per non-rebreather mask. If not tolerated, administer blow-by oxygen.

C. Allow the child to assume a position of comfort.

D. Determine if seizure is febrile etiology. If so, administer **Acetaminophen** 15 mg/kg (oral).

E. Consider ambulance versus family transport in febrile seizures, after consultation with hospital (regardless of mode of transport, pediatric seizure patients must be evaluated by a physician).

F. If seizure activity persists, or repetitive seizures:

1. Establish peripheral IV access with **Isotonic Crystalloid** @ TKO.

2. After two unsuccessful attempts at peripheral venipuncture, and patient remains unconscious, consider intraosseous infusion.

G. Consider the following:

1. **Lorazepam,** 0.05 mg/kg IV or IM**,** not to exceed 2 mg. May repeat in 10-15 minutes.

2. If not able to establish an IV or an IV would delay care then administer **Lorazepam,** 0.05 – 0.1 mg/kg rectal**,** not to exceed 4 mg OR Midazolam 0.1-0.2 mg IN. May repeat in 10-15 minutes.

3. If **Lorazepam** is not effective, administer **Midazolam** (see protocol for pediatric dosage)

- 1-1.5 mg IV, IO, or IM
- 0.1-0.2 mg/kg IN

NOTE: If medications prove ineffective at controlling status seizure activity, consider RSI to protect airway and ensure adequate oxygenation.

SUDDEN INFANT DEATH SYNDROME

The goals of prehospital care in the case of Sudden Infant Death Syndrome (SIDS) are to provide resuscitative treatment to the infant, if indicated, as well as supportive care to the family, until other resources can be mobilized.

A. If no signs of obvious or prolonged death:

1. Verify cardiopulmonary arrest.

2. Refer to pediatric cardiopulmonary arrest protocol.

B. If obvious signs of death: disfiguration of face with “squashed nose”; frothy, blood-tinged mucous around infant’s mouth or nose; rigor mortis; or liver mortis (pooling of blood in dependent body areas; may appear as blotching):

1. Do not attempt resuscitation unless family refuses to acknowledge infant’s death.

2. Request appropriate law enforcement agency to the scene.

3. Acknowledge the parent’s and family’s feelings of grief, and provide calm, authoritative support and guidance.

4. Consider activation of Critical Incident Stress Debriefing (CISD) Team after the incident.

SECTION IV – MEDICATIONS

ACETAMINOPHEN

ACTION:

Analgesic, Antipyretic

INDICATIONS:

Fever in pediatric patients during long transports with oral temperature of 100.5 degrees
Fahrenheit or equivalent.

CONTRAINDICATIONS:

Hypersensitivity to the drug.
Hepatic failure or impairment

SIDE EFFECTS:

DOSAGE:

15 mg/kg

Not to exceed 50 mg/kg/24 hours

ROUTE:

Oral

ACTIVATED CHARCOAL

ACTION:

Absorbs toxins by chemical binding with large surface area.

INDICATIONS:

Poisoning following emesis or where emesis is contraindicated.

SIDE EFFECTS:

None in severe poisoning.

DOSAGE:

Two tablespoons (50 grams) mixed in a glass of water (slurry).

ROUTE:

Oral

PEDIATRIC DOSE:

1 gram/kg; avoid **Charcoal** with **Sorbitol.**

ADENOSINE (ADENOCARD)

ACTION:

Transient slowing of sinus rate and AV nodal conduction.

INDICATIONS:

Acute Termination of PSVT.
Differentiating PSVT with aberration from V-Tach.

CONTRAINDICATIONS:

Rapid A-Fib/A-Flutter

PRECAUTIONS:

Needs to be administered Rapid IV bolus. Because half-life is measured in seconds PSVT may be likely to re-occur.

SIDE EFFECTS:

May cause high degree transient AV nodal block, Bradycardia, PVC's (short lived).

DOSAGE:

6 mg rapid IV push.
Flush line with normal saline.
If no change within 1-2 minutes -> 12 mg rapid IV push.

ROUTE:

Rapid IV bolus only

PEDIATRIC DOSE:

37.5 ug/kg successively in increments until a total of 350 ug/kg is reached.

ALBUTEROL (PROVENTIL)

ACTION:

Bronchodilation, some positive chronotropic properties

INDICATIONS:

Bronchial Asthma, reversible bronchospasm associated with chronic bronchitis and emphysema.
Hyperkalemia – Dialysis patient with tall, peaked T waves.
Crush Injury Syndrome

CONTRAINDICATIONS:

Patient with hx of hypersensitivity.

PRECAUTIONS:

Blood pressure, pulse and EKG must be constantly monitored.

SIDE EFFECTS:

Palpitation, anxiousness, headache

DOSAGE:

Bronchodilation: 2.5 mg nebulized, may repeat as needed.
Hyperkalemia: 10-20 mg nebulized
Crush Injury Syndrome: continuous nebulized solution.

ROUTE:

Inhalation
Endotracheal Tube

PEDIATRIC DOSE:

0.1 mg/kg

AMIODARONE HCI (CORDARONE)

ACTION:

Persistent or recurrent V-Fib or V-Tach**,** Atrial Fibrillation

INDICATIONS:

- Cordorone I.V. is indicated for initiation of treatment and prophylaxis of frequently recurring ventricular fibrillation and hemodynamically unstable ventricular tachycardia in patients' refractory to other therapy.
- Cordorone I.V. also can be used to treat patients with VT/VF for whom oral Cordorone is indicated, but who are unable to take oral medication.

CONTRAINDICATIONS:

- Known hypersensitivity to any of the components of Cordorone I.V.
- Cardiogenic shock.
- Marked sinus bradycardia.
- Second- or third- degree AV block unless a functioning pacemaker is available.

PRECAUTIONS:

SIDE EFFECTS:

- Hypotension
- Bradycardia and AV Block

DOSAGE:

Administer 300 mg IV push.
If VF/pulseless VT recurs, consider administration of a second dose of 150 mg IV.
Maximum cumulative dose = 2.2 g over 24 hours.
150 mg over 10 min. for atrial fibrillation for rate control, followed by a maintenance drip of 1 mg/min.

ROUTE:

IV Push / IO

PEDIATRIC DOSE:

5mg/kg, IV or IO

ATROPHINE SULFATE

ACTION:

Blocks acetylcholine receptors, positive chronotrope

INDICATIONS:

Symptomatic bradycardia, 2nd and 3rd degree heart block, and organophosphate poisoning

CONTRAINDICATIONS:

None when used in emergency situations.

PRECAUTIONS:

Do not administer less than 0.5 mg. Dose of 3.0 mg should not be exceeded except in cases of organophosphate poisoning.

SIDE EFFECTS:

Palpitation, headache, dry mouth

DOSAGE:

Bradycardia: 0.5 - 1.0 mg every 5 minutes to a maximum of 3.0 mg.
Organophosphate poisoning: 2 - 5 mg.

ROUTE:

IV / IO

PEDIATRIC DOSE:

Bradycardia: 0.02 mg/kg
Organophosphate Poisoning: 0.05 mg/kg

CALCIUM CHLORIDE

ACTION:

Positive Inotrope: increase of myocardial automaticity.

INDICATIONS:

Currently used for the reversal of calcium channel blocking type medications, hyperkalemia, black widow spider bites, and dysrhythmias in the presence of Crush Injury Syndrome.

CONTRAINDICATIONS:

Patients receiving digitalis.

PRECAUTIONS:

Flush IV line if sodium bicarbonate has been administered.

SIDE EFFECTS:

DOSAGE:

500 mg may repeat @ 3-5 minutes with total dose at 1 gram.

ROUTE:

IV / IO

PEDIATRIC DOSE:

20 mg/kg

Onset 1-3 minutes, duration 30-60 minutes

D50 & D25

ACTION:

Rapid elevation of blood glucose level.

INDICATIONS:

Hypoglycemia or Coma of unknown etiology.

CONTRAINDICATIONS:

None in the emergency setting.

PRECAUTIONS:

Draw blood, determine blood glucose level. Do not allow vein extravasation. Thiamine should be administered if there is suspicion of chronic alcohol use.

SIDE EFFECTS:

Local venous irritation.

DOSAGE:

25 grams (50 mL)

ROUTE:

IV

PEDIATRIC DOSE:

0.5 gm/kg as **D25** solution slow IV

DIAZEPAM (VALIUM) – **Approved for backup medication as needed.**

ACTION:

Anticonvulsant, Skeletal muscle relaxant, Sedative, Adjunct for pain control of long bone fractures, Pelvic fractures, Vertebrae fractures, and Major burns

INDICATIONS:

Major motor seizures, Status epilepticus, Premedication prior to cardioversion, Acute anxiety status. Pain not controlled with Morphine 2° to long bone fractures, Vertebrae fractures, Pelvic fractures, and Major burns.

CONTRAINDICATIONS:

Patient with hypersensitivity, Shock, Disorientation, or Decreased LOC.

PRECAUTIONS:

Can cause local venous irritation, short duration of effect, do not mix with other drugs (precipitation).

SIDE EFFECTS:

Drowsiness, Hypotension, Respiratory depression

DOSAGE:

Status epilepticus: 5-10 mg IV or rectally
Acute anxiety: 2-5 mg IV
Premedication prior to cardioversion: 5-15 mg IV
Pain management: 2.5 mg IV (as adjunct)

ROUTE:

IV (no faster than 1 mL/min.)
buccal
rectally

PEDIATRIC DOSE:

Status epilepticus: 0.3-0.5 mg/kg IV, IO or rectally

DILTIAZEM (CARDIZEM)

ACTION:

Calcium Channel Blocker, Coronary Vasodilator, Antidysrhythmic.

INDICATIONS:

Atrial Fibrillation or Atrial Flutter.

CONTRAINDICATIONS:

1. Sick sinus syndrome, except in the presence of a functioning ventricular pacemaker.
2. Patients with second- or third-degree AV block, except in the presence of a functioning ventricular pacemaker.
3. Patients with severe hypotension, or cardiogenic shock.
4. Patients who have demonstrated hypersensitivity to the drug.
5. Intravenous Diltiazem and intravenous beta-blockers should not be administered together, or in close proximity (within a few hours).
6. Patients with atrial fibrillation, or atrial flutter associated with an accessory bypass tract such as in WPW syndrome, or short PR syndrome.
7. Patients with ventricular tachycardia.

PRECAUTIONS:

Additive effects in prolonging AV conduction when using beta-blockers or digitalis concomitantly with Diltiazem HCL.

SIDE EFFECTS:

Nausea, vomiting, and hypotension, almost always when administered to the conscious patient.

DOSAGE:

Adult: 0.25 mg/kg as a bolus administered over 2 minutes. If response is inadequate, a second dose of 0.35 mg/kg may be administered after 15 minutes.

ROUTE:

IV / IO

PEDIATRIC DOSE:

Rarely used.

Note: Optional to be carried by agency.

DIPHENHYDRAMINE (BENADRYL)

ACTION:

Blocks histamine receptors, some sedative effects

INDICATIONS:

Anaphylaxis, allergic reactions, sedation, motion sickness

CONTRAINDICATIONS:

Asthma, nursing mothers

PRECAUTIONS:

Hypotension

SIDE EFFECTS:

Sedation, dries bronchial secretions, blurred vision, headache, and palpitations.

DOSAGE:

25-50 mg

ROUTE:

Slow IV Push / IO
Deep IM

PEDIATRIC DOSE:

1-2 mg/kg

DOPAMINE (INTROPIN)

ACTION:

Positive Inotrope, selective dilation of blood vessels of kidney, mesentery, brain, and heart. Alpha response at high dose.

INDICATIONS:

Cardiogenic shock, Hypovolemia ONLY AFTER VOLUME REPLACEMENT.

CONTRAINDICATIONS:

Hypovolemic shock if complete fluid replacement has not occurred.

PRECAUTIONS:

Do not administer in the presence of severe tachyarrhythmias, ventricular fibrillation or ventricular irritability.

SIDE EFFECTS:

Ventricular tachyarrhythmias, hypertension. There is ALPHA VASOCONSTRICTION at high doses and rates > 20 ug/kg/min.

DOSAGE:

Dopaminergic: 2-5 ug/kg/min

Predominately Beta: 5-20 ug/kg/min

Pure Alpha: 20+ ug/kg/min

ROUTE:

2-20 ug/kg/min. – IV / IO

PEDIATRIC DOSE:

2-20 ug/kg/min

EPINEPHRINE 1:1,000

ACTION:

Bronchodilation, positive Inotrope, positive Chronotrope

INDICATIONS:

Bronchial asthma, Anaphylaxis, Bradyarrhythmias

CONTRAINDICATIONS:

Patients with underlying cardiovascular disease, hypertension, pregnancy, and patients With tachyarrhythmias.

PRECAUTIONS:

Protect from light. Blood pressure, pulse and EKG must be monitored.

SIDE EFFECTS:

Palpitations, anxiousness, headache

DOSAGE:

0.3-0.5 mg in anaphylaxis
Drip administration at 2-10 mcg/min with 1mg per every 100 ml **Isotonic Crystalloid** for a concentration of 10 mcg/ml.
2mg ET for cardiac arrest (2 mg mixed with 8cc Normal Saline)

ROUTE:

IM
IV Infusion
ET

PEDIATRIC DOSE:

0.01 mg/kg for anaphylaxis
0.15 mg IM for severe allergic reaction
0.1 mg/kg ET for Cardiac Arrest

EPINEPHRINE 1:10,000

ACTION:

Positive Chronotrope, positive Inotrope, causes bronchodilation

INDICATIONS:

Ventricular fibrillation, asystole, PEA, anaphylaxis, or severe allergic reaction.

CONTRAINDICATIONS:

None when used in situations listed above.

PRECAUTIONS:

Should be protected from light, can be deactivated by alkaline solutions.

SIDE EFFECTS:

Tachyarrhythmias.

DOSAGE:

Cardiac Arrest (IV): 1.0 mg repeat every 3-5 min.
Anaphylaxis or Severe Allergic Reaction: 0.3-0.5 mg (1.5-2.5 mL).

ROUTE:

IV, ET, IO, Intracardiac (not recommended)

PEDIATRIC DOSE:

0.01 mg/kg repeat initial IV dose only in cardiac arrest.

ETOMIDATE (AMIDATE)

ACTION:

Sedative-Hypnotic.

INDICATIONS:

Adjunct in rapid sequence intubation.

CONTRAINDICATIONS:

None in setting of rapid sequence intubation unless prior hypersensitivity to Etomidate.

PRECAUTIONS:

Causes rapid and deep hypnosis usually within 1 minute (sometimes as fast as 15 seconds). Should only be used in the process of rapid sequence intubation with appropriate personnel and equipment ready to support ventilation.

SIDE EFFECTS:

May cause the following:

1. Rapid and deep sedation.
2. Mild local burning and venous irritation at site of injection.
3. Myoclonus (muscular contractions).
4. Nausea and vomiting may occur if used without paralytics.
5. Adrenal suppression (when used continuously as in the ICU setting).

DOSAGE:

0.3 mg/kg

ROUTE:

IV over 30-60 seconds, or IO

SPECIAL NOTES:

1. Etomidate is a general sedative-hypnotic agent used for rapid sedation of a patient undergoing intubation.
2. It provides rapid, complete, and reproducible sedation at a standard dose without the adverse cardiovascular effects often seen with other sedative agents.
3. The onset of sedation-hypnosis is about 1 minute with duration of sedation about 3-10 minutes. Recovery time may be shortened by co-administration with Fentanyl.

FENTANYL (SUBLIMAZE)

SUBJECT: FENTANYL (SUBLIMAZE)

ACTION:

Narcotic analgesic.

INDICATIONS:

Moderate-severe pain, and adjunct for procedural sedation, rapid sequence intubation.

CONTRAINDICATIONS:

Hypersensitivity, and shock or volume depletion.

PRECAUTIONS:

Co-intoxicants, and caution in elderly patients.

DRUG INTERACTION:

Other CNS depressants.

1. Alcohol.
2. Benzodiazepines.
3. Antiemetics.
4. Sedative-hypnotics (e.g. Etomidate).

DOSAGE:

Adults

3 mcg/kg IV, IO, or IM (recommend 25-50 mcg increments) q 3-5 minutes, not to exceed 3 mcg/kg.

1-3 mcg/kg IN, not to exceed 3 mcg/kg. IN used only if unable to establish IV access or IV would delay care of pain or sedation.

Pediatric

3 mcg/kg IV, IO, or IM (recommend 25-50 mcg increments)

1-2 mcg/kg IN, not to exceed a total dose of 100 mcg.

SPECIAL NOTES:

1. Less nausea, histamine release less than Morphine, or Demerol.
2. Note 10-fold decrease in amount used: micrograms, not milligrams.

FUROSEMIDE (LASIX)

ACTION:

Inhibits reabsorption of NaCl, promotes prompt diuresis, vasodilation.

INDICATIONS:

Congestive heart failure, pulmonary edema.

CONTRAINDICATIONS:

Pregnancy and dehydration

PRECAUTIONS:

Protect from light.

SIDE EFFECTS:

Few in emergency usage.

DOSAGE:

40 mg or double patient's daily dose up to 160 mg.

ROUTE:

IV / IO

PEDIATRIC DOSE:

1 mg/kg

GLUCAGON

ACTION:

Causes breakdown of glycogen to glucose.
Inhibits glycogen synthesis.
Elevates blood glucose level.
Positive Inotrope.
Positive Chronotrope

INDICATIONS:

Hypoglycemia
Beta Blocker Overdose

CONTRAINDICATIONS:

Hypersensitivity to the drug.

PRECAUTIONS:

Only effective if there are sufficient stores of glycogen within the liver.
Use with caution in patients with cardiovascular or renal disease.
Draw blood glucose prior to administration.

SIDE EFFECTS:

Few in emergency situations

DOSAGE:

Hypoglycemia: 1 unit may repeat in 10-20 minutes if no response.

Beta Blocker Overdose: 3-10 units IV over 1 minute. May be followed by an infusion of 2-5 units/hr.

Note: 1 unit = 1 mg

ROUTE:

IV / IO / IM

PEDIATRIC DOSE:

Rarely used.

HALDOL

ACTION:

Chemical Restraint ONLY

INDICATIONS:

Method of restraining patient when traditional restraints are ineffective to protect patients or EMS Personnel.

CONTRAINDICATIONS:

Pregnant or breast-feeding patients
Head injured patients.

PRECAUTIONS:

Hypotension
When used with narcotics can cause respiratory depression.

SIDE EFFECTS:

Acute Torticollis – muscle spasm of the neck or tongue
Administer **Benadryl** 50mg/IV.

DOSAGE:

IV or IM: 5 mg Chemical Restraint, may repeat in 30 minutes.

ROUTE:

IV / IO / IM

PEDIATRIC DOSE:

Rarely used.

HEPARIN

ACTION:

Anticoagulant.

INDICATIONS:

Prevention of clotting in arterial and cardiac surgery.

CONTRAINDICATIONS:

Heparin sodium should not be used in patients:

- with severe thrombocytopenia
- with any uncontrollable active bleeding

PRECAUTIONS:

SIDE EFFECTS:

Hemorrhage
Local Irritation
Hypersensitivity

DOSAGE:

60 units/kilogram up to a maximum of 4000 units

Adult Heparin Protocol Initial Dosing Chart

For patients <40kg, give 60units/kg loading dose.

Maximum does is 4000 units

Weight (kg)	Initial Loading Dose
40	***2400***
45	***2700***
50	***3000***
55	***3300***
60	***3600***
65	***3900***
>65	***4000***

ROUTE:

IV / IO

PEDIATRIC DOSE: None

HYDROMORPHONE (DILAUDID)

CLASS:

Narcotic analgesic

ACTION:

CNS depressant, peripheral vasodilation, and decreases pain.

INDICATIONS:

Severe pain, burns, isolated extremity fractures, and kidney stones.

CONTRAINDICATIONS:

Head injury, volume depletion, known hypersensitivity, pregnancy, and altered mental status.

PRECAUTIONS:

Respiratory depression (Narcan should be available), hypotension, and hepatic or renal impairment.

Note: Narcan does not reverse hypotension caused by narcotic administration.

SIDE EFFECTS:

Dizziness, bradycardia, altered level of consciousness, potential hypotension, nausea, vomiting, and respiratory depression.

DOSAGE:

0.5 – 1.0 mg every 30 minutes prn

ROUTE:

IV / IO / IM

PEDIATRIC DOSE:

0.015 mg/kg.

IPRATROPIUM BROMIDE

ACTION:

An anticholinergic (parasympatholytic) agent that inhibits vagally mediated reflexes by antagonizing the action of acetylcholine, resulting in bronchodilation. Also dries respiratory tract secretions and reduces bronchospasm.

INDICATIONS:

Bronchospasm due to reactive airway diseases (COPD) and Asthma

CONTRAINDICATIONS:

A. Known hypersensitivity to Ipratropium Bromide
B. Known hypersensitivity to Atropine or its derivatives.

PRECAUTIONS:

Should be used with caution in patients with narrow-angle glaucoma, with specific attention made to protect the patient's eyes at all times.

SIDE EFFECTS:

Anxiety, Nausea, Vomiting, Heart Palpitations

DOSAGE:

0.5mg via Nebulizer q 10-15 minutes PRN, not to exceed three doses.
Can be used in conjunction with 2.5mg **Albuterol.**

ROUTE:

Inhalation

PEDIATRIC DOSE:

0.25mg via Small Volume Nebulizer

KETAMINE (KENTANEST, KETASET, KETALAR)

PHARMACOLOGY:
Hypnotic Analgesic

ACTION:
Ketamine is a dissociative anesthetic agent, structurally similar to Phencyclidine (PCP). In addition, it stimulates many different receptors, including opioid and catecholamine receptors. It provides analgesia in addition to the amnestic and sedative effects. The sympathomimetic effects cause an increase in heart rate, blood pressure, and cardiac output. It is a bronchodilator and may be beneficial in patients with bronchospasm requiring intubation.

INDICATIONS:
- Induction agent for rapid sequence intubation (RSI)
- Sedative/analgesic adjunct in trauma patients
- Excited Delirium / Chemical Restraint
- Pain Management for Cardioversion / Cardiac Pacing

CONTRAINDICATIONS:
- Known hypersensitivity to Ketamine.

PRECAUTIONS:
- Increased blood pressure due to catecholamine release. Ketamine should be avoided in patients requiring intubation who also have a markedly elevated blood pressure.
- Reemergence phenomenon. As with any intubated patient, continued sedation must be provided. Emergence phenomenon can be markedly reduced by the use of a benzodiazepine.
- Increased ICP has been a theoretical concern, however studies have not shown a significant increase in ICP with the use of Ketamine and therefore it is felt to be an appropriate induction agent for patients with possible increased ICP, unless they have markedly elevated blood pressure.

SIDE EFFECTS:
- Reemergence phenomenon
- Myoclonic movements are possible and should not be confused for fasciculations due to a depolarizing neuromuscular blocking agent, seizure activity, or emergence from sedation.
- Possible enhanced secretions

DOSAGE:
Pain management: 0.3 mg/kg
Rapid Sequence Induction: 2 mg/kg
Excited Delirium / Chemical Restraint: 5 mg/kg (IM/IO/IV)

PEDIATRIC DOSE: Pain management: 0.3 mg/kg
Rapid Sequence Induction: 2 mg/kg

ROUTE: IV, IM, IO

KETOROLAC TROMETHAMINE (TORADOL)

ACTION:

Nonsteroidal anti-inflammatory (NSAID)

INFORMATION:

Ketorolac is not a narcotic and is not habit-forming. It is 30 times the strength of aspirin. It will not cause physical or mental dependence, as narcotics can. However, ketorolac is sometimes used together with a narcotic to provide better pain relief than either medicine used alone.

INDICATIONS:

Used for pain that occurs after an operation, kidney stones, back pain or spasms.

CONTRAINDICATIONS:

- Allergies to Aspirin or NSAIDs
- Severe renal disease or kidney transplant
- A closed head injury or suspected traumatic brain injury
- A stomach ulcer or known intestinal bleeding.
- If breast-feeding a baby
- Decreased femoral or absent femoral pulse.
- Abdominal mass (suspected AAA)
- Hypotension
- Anticoagulant or antiplatelet medications

PRECAUTIONS:

If it is suspected the patient will require surgery, with-hold administration of Toradol. Use caution in a patient already taking “blood thinning” or anticoagulant medications.

SIDE EFFECTS:

Nausea, vomiting, bloating, gas, loss of appetite, sweating, dizziness, drowsiness, blurred vision, dry mouth, irritation at the injection site and abnormal tastes may also occur. Stomach upset is the most common side effect.

DOSAGE:

Adult: 30mg IV/IO or 60mg IM

ROUTE:

IV / IO / IM

PEDIATRIC DOSE:

PATIENT MUST BE GREATER THAN 2 YEARS OLD
0.5mg/kg IV/IO/IM up to 30mg MAX

LIDOCAINE (XYLOCAINE)

ACTION:

Suppresses ventricular ectopy activity, increases ventricular fibrillation threshold, reduces velocity of electrical impulses through conduction system.

INDICATIONS:

Symptomatic, ventricular tachycardia, ventricular fibrillation
Premedication for intubation with head injury
Use as flush through IO for all conscious patients.

CONTRAINDICATIONS:

High degree heart blocks, PVC's in conjunction with bradycardia.

PRECAUTIONS:

Dosage should not exceed 300 mg/hour, monitor for CNS toxicity, bolus should be followed by an infusion.

SIDE EFFECTS:

Anxiety, nausea, convulsions, widening of QRS.

DOSAGE:

Bolus: Initial 1 mg/kg IN THE STABLE PATIENT followed by one-half the initial dose every 8-10 minutes, 1.5 mg/kg IN THE UNSTABLE PATIENT, not to exceed 3 mg/kg total dose.

IV Infusion: 2-4 mg/minute (2 grams in 500 mL D5W)
IO: slowly administer 20-50 mg

ROUTE:

IV push / IV drip / IO

PEDIATRIC DOSE:

IV: 1 mg/kg
IO: slowly administer 0.5 mg/kg

LORAZEPAM (ATIVAN)

ACTION:

Anticonvulsant, skeletal muscle relaxant, sedative, adjunct for pain control of long bone fractures, pelvic fractures, vertebrae fractures, and major burns

INDICATIONS:

Major motor seizures, status epilepticus, premedication prior to cardioversion, acute anxiety status. Pain not controlled with Morphine 2° to long bone fractures, vertebrae fractures, pelvic fractures, and major burns.

CONTRAINDICATIONS:

Patient with hypersensitivity, shock, disorientation, or decreased LOC.

PRECAUTIONS:

Can cause local venous irritation, short duration of effect, do not mix with other drugs (precipitation).

SIDE EFFECTS:

Drowsiness, hypotension, respiratory depression

DOSAGE:

Status epilepticus: 1-4 mg IV, IM, or IO. May repeat in 10-15 minutes.
Acute anxiety: 1-2 mg IM or IV
Premedication prior to cardioversion: 1-4 mg IV
Pain management: 1 mg IV

Note: HIGHER DOSES MAY BE REQUIRED

ROUTE:

IV / IO / IM / Rectal

PEDIATRIC DOSE:

Status epilepticus: 0.05 mg/kg IV, IM, or IO. May repeat in 10-15 minutes.
0.05-0.1 mg/kg Rectal. May repeat in 10-15 minutes.

MAGNESIUM SULFATE

ACTION:

An electrolyte necessary for normal function of the nervous and cardiovascular systems. 50% of the element is deposited in bone, 45% exists as an intracellular cation, and 5% is in the extracellular fluid.

INDICATIONS:

- Eclampsia (including eclamptic seizures).
- Cardiac dysrhythmias:
    - Torsades de Point (drug of choice).
    - Ventricular fibrillation.
    - Ventricular tachycardia.
- Digoxin toxicity (may help with second- and third-degree heart block).
- Tricyclic overdose with associated cardiac dysrhythmias. Mag should only be used after Sodium Bicarbonate and Lidocaine have been found ineffective.
- Known or suspected hypomagnesaemia.
- Refractory Asthma

CONTRAINDICATIONS:

- Second degree heart block Type II (**not in digoxin toxicity/poisoning**).
- Third degree heart block (**not in digoxin toxicity/poisoning**).

***EXCEPTION**:* if the patient is taking digitalis and there is a high likelihood of digitalis toxicity, magnesium sulfate may be useful in treating Second- and Third-degree heart block.

PRECAUTIONS:

- Renal disease (magnesium is excreted solely by the kidneys).
- Give slowly in an awake patient to avoid hypermagnesemia.

SIDE EFFECTS:

- Large doses may lead to respiratory depression, cardiac arrest, and CNS depression.
- Hypermagnesemia (rare) resulting in muscle weakness, ECG changes, hypotension and confusion may occur with magnesium administration.
- Nausea and diarrhea

DOSAGE:

- Cardiac dysrhythmias, digitalis toxicity, and hypomagnesaemia:
    - Adult: 2 - 4 g IV/IO
    - Pediatric: 25-50 mg/kg IV/IO, to a max dose of 2 g
- Eclampsia: 2 - 4 g IV/IO or IM; may repeat to 10 g total
- TCA overdose 1-2 g IV/IO
- Refractory Asthma
    - Adult: 2 g IV/IO
    - Pediatric 25-50 mg/kg, to a max dose of 2 g
- Reduce the dose in patients with known renal impairment.

ROUTE: IV, IM, or IO

Note: Optional to be carried by agency.

MIDAZOLAM (VERSED)

SUBJECT: MIDAZOLAM (VERSED)

ACTION:

CNS depressant.

INDICATIONS:

Continued sedation/amnesia post-elective endotracheal intubation. Premedication prior to cardioversion. Possible secondary medication for status epilepticus seizures.

CONTRAINDICATIONS:

Patients with known hypersensitivity, shock, coma, pregnancy, acute alcohol intoxication or acute narrow angle glaucoma.

PRECAUTIONS:

Administer slowly. Decrease dosage for elderly or debilitated patients. Monitor blood pressure after each administration. Titrate the dosage to maintain desired level of sedation without causing hypotension.

SIDE EFFECTS:

Decreased tidal volume and decreased respiratory rate.
Apnea as well as variations in blood pressure (hypotension) and pulse rate. May also cause hiccups, cough, nausea, and vomiting.

DOSAGE:

Adult:

IV/IO/IM:

Age < 55: Titrate slowly 0.1 mg/kg every 15 min. up to 0.5 mg/kg

Age > 55: Titrate slowly 0.05 mg/kg every 15 min. up to 0.25 mg/kg

IN: 0.2 mg/kg up to a maximum of 5 mg

Pediatric:

IN: 0.1 mg/kg to a maximum of 0.2 mg/kg

IV: 6 mo. to 5 years: initial dose – 0.05-0.1 mg/kg, with evaluation for sedation. If an optimal sedation level is not reached after 2-3 minutes, doses may be readministered q 2-3 minutes, up to a max. dose of 0.6 mg/kg, not to exceed 6 mg.

6 to 12 years: Initial dose – 0.025-0.05 mg/kg, with evaluation for sedation. If an optimal sedation level is not reached, doses may be readministered q 2-3 minutes, up to a maximum dose of 0.4 mg/kg, not to exceed 10 mg.

MORPHINE SULFATE

ACTION:

CNS depressant causes peripheral vasodilation and decreases pain.

INDICATIONS:

Severe pain, pulmonary edema, isolated extremity fracture, and kidney stones

CONTRAINDICATIONS:

Head injury, volume depletion, patients with hypersensitivity, hypotension, and altered mental status.

PRECAUTIONS:

Respiratory depression (Narcan should be available), hypotension and nausea.

Note: Narcan does not always reverse hypotension caused by narcotic administration.

SIDE EFFECTS:

Dizziness, altered level of consciousness, potential hypotension, and respiratory depression.

DOSAGE:

Cardiac Pain Management-

IV: 2-5 mg followed by 2 mg until pain is relieved or respiratory depression ensues.

Non-Cardiac Pain Management-

IV: Initial dose is 0.1 mg/kg may repeat one-half the initial dose every 5-10 minutes.

Sedation Management-

IV: 2 mg/IV if BP is >100 systolic. Check BP after 5 minutes. If BP is >100 systolic repeat 2 mg/IV dose. The 2 mg dose IV may be repeated q 5 minutes up to 0.1mg/kg checking BP before each administration.

Note: Check blood pressure every 5-10 minutes after administering dosage or sooner if indicated by symptoms.

ROUTE:

IV / IO / IM

PEDIATRIC DOSE:

0.1 mg/kg via IV up to 5 mg.

NALOXONE (NARCAN)

ACTION:

Reverses the effects of opioids.

INDICATIONS:

ALS -

- Narcotic overdoses including: Morphine, Heroin, Demerol, Dilaudid, Paregoric, Percodan, Fentanyl, Methadone.
- Synthetic overdoses include: Nubain, Talwin, Stadol, Darvon.
- Alcoholic coma and to rule out narcotics in coma of unknown etiology.

BLS - Respiratory compromise, abnormal breathing, RR <8, altered level of consciousness,

pinpoint pupils

CONTRAINDICATIONS:

None when used in a life-threatening emergency.

PRECAUTIONS:

Administer with caution to patients dependent on narcotic as it may cause withdrawal effects. Short acting and should be augmented every 5 minutes.

SIDE EFFECTS:

Opioid withdrawal, agitation, combative behavior, tachycardia, pulmonary edema, nausea, vomiting, and seizures

DOSAGE:

ALS - 0.4 mg-2.0 mg up to a total dose of 10 mg (larger doses may be required to reverse Darvon overdose.)

BLS Nasal –

- **1 mg initial dose, up to a max. dose of 2 mg** (Mucosal Atomization Device - MAD)
- 4.0 mg nasal spray (patient's or other emergency responder)

EMT IM – 0.4 mg up to a total of 0.8 mg

ROUTE:

ALS - IV, IM, or Nasal

BLS –

- **EMT & EMR** – Nasal via MAD or Autoinjector (w/MPD approved training)
- **EMTs w/ALS agencies (only) –** IM (w/MPD approved training)

PEDIATRIC DOSE:

ALS - 0.005 mg/kg

NITROGLYCERIN

ACTION: Dilates coronary and systemic arteries.

INDICATIONS:

Angina pectoris, chest pain associated with AMI, CHF with suspected pulmonary edema. Ointment is ideally used for those patients with an extended transport time to definitive care.

CONTRAINDICATIONS:

- Children under 12
- Hypotension (Baseline systolic BP is below 100 mm/Hg)
- The patient (male or female) has taken tadalafil drugs / vasodilators (Cialis, Levitra, Staxyn, or Viagra are common brands) within the last 48 hours. Tadalafil is an oral drug that is used for treating impotence (ED) and benign prostatic hyperplasia (BPH, enlarged prostrate).
- Head injury suspected (including stroke)

PRECAUTIONS:

- Constantly monitor blood pressure
- Watch for syncopal episode.
- Drug must be protected from light, expires quickly once container is opened.
- Ensure gloves are worn whenever handling Nitroglycerin to prevent accidental exposure.
- Ointment:
    - If the patient requires cardioversion or pacing, avoid placing pads near Nitroglycerin ointment. It may be necessary to remove ointment and wipe off skin prior to placing pads for cardioversion or pacing.
    - Notify receiving hospital of Nitroglycerin ointment location on the patient.

SIDE EFFECTS:

Headache, dizziness, hypotension, change in pulse.
If hypotension ensues, remove Nitroglycerine Ointment, consider bolus of 250 mL Normal Saline prn.

DOSAGE:

Tablets: 1 tablet repeated q 3-5 minutes x 3 (0.4 mg tablets or unit dose spray).
Ointment: 1 inch of 2% ointment topically for transdermal absorption

ROUTE:

Tablets or Spray: Sublingual
Ointment: Transdermal

PEDIATRIC DOSE: Not indicated.

NOTE: Another brand of tadalafil is Adcirca, which is used to treat pulmonary arterial hypertension. Some types of vasodilators may be injectable. Any type of vasodilator should be considered contraindicated unless directed by online medical control.

NITROUS-OXIDE ANALGESIA

Nitronox is a mixture of 50% Nitrous-Oxide and 50% oxygen. This mixture is attained by using two portable "D" size cylinders, one of Nitrous-Oxide and one of oxygen along with an inhalation apparatus. This apparatus is equipped with a special hand-held demand valve so that the patient can administer to himself, a safe and effective analgesic called NITRONOX.

Pain relief in the EMS setting starts within one to three minutes after inhalation. Once discontinued, the effects of this on-the-spot analgesic are reversed in approximately the same time.

ACTION:
Nitronox may be used for almost any patient who is alert and complaining of pain. This includes children who are old enough to self-administer and can make a good mask or mouthpiece fit.

INDICATIONS:
Trauma, Burn Injuries, Acute Abdomen or Kidney Stones, Myocardial Infarction, Childbirth, and any other patient in pain not presenting a contraindication.

CONTRAINDICATIONS:

- The patient is unable to administer Nitronox.
- Patient is not alert and oriented.
- Chest Injury (Blunt or Penetrating) - Possible Pneumothorax.
- Serious Maxillofacial Injuries where a good seal cannot be obtained; unless a mouthpiece is available and can be tolerated.
- Intoxicated or drug sedated patients (due to the possibility of vomiting & unconsciousness.
- COPD patients (because of high oxygen concentrations).
- Female patients who are, or may be, pregnant.
- Caisson's Disease ("Bends" or decompression sickness).

SIDE EFFECTS:
The side effects with Nitronox usually tend to occur in the onset and cessation phases; in other words when the patient is moving from the normal to the analgesic state or vice versa. The occurrence of side effects is slight, and they are relatively mild. The following have been encountered in different studies: Unconsciousness or sleep, Drowsiness, Dizziness, Amnesia, Nausea, Vomiting.

DRUG COMPATIBILITY:
Nitronox appears, so far, to be compatible with all drugs now known to medicine.

NOTE:
It must be remembered that Nitronox must be self-administered by the patient and that the effectiveness varies from 80-90% in adults and 50-70% in children.

NOREPINEPHRINE (LEVOPHED)

ACTION:

Sympathomimetic, Vasopressor

INDICATIONS:

Cardiogenic shock, hypotension, low cardiac output, poor perfusion of vital organs

CONTRAINDICATIONS:

Monoamine oxidase inhibitors (MAOI's-certain anti-depressants) & hypersensitivity

SIDE EFFECTS:

Headache, dizziness, anxiety, cardiac dysrhythmias including bradycardia, dyspnea.

DOSAGE:

Adult:

Initial Dose: 2 -4 mcg/min IV
Dosage Range: 1 – 30 mcg/min

Peds:

Initial Dose: 0.1 mcg/kg/min IV, max of 2 mcg/kg/min

Infusion Table:

Desired Dose # mcg/min	2mg/250ml gtts/min	4mg/250ml gtts/min
2	16	8
4	30	15
6	44	22
8	60	30
10	76	38
12	90	45
14	105	53
16	120	60
18	135	68
20	150	75
22	165	83
24	180	90
26	195	98
28	210	105
30	225	113

ONDANSETRON (ZOFRAN)

ACTION:

Antiemetic

INDICATIONS:

Vomiting/Nausea

CONTRAINDICATIONS:

Patients known to have hypersensitivity to the drug.

PRECAUTIONS:

None

SIDE EFFECTS:

None

DOSAGE:

8 mg ODT (ALS & **BLS)**
8 mg IV / IO (ALS only)

ROUTE:

ALS & BLS - Orally Disintegrating Tablets, place on top of the tongue where it will dissolve in seconds, then swallow with saliva. Administration with liquid is not necessary.
ALS – IV or IO

PEDIATRIC DOSE:

4 through 11 years of age dosage is one 4 mg/IV, or ODT tablet.
12 years of age and older, the dosage is the same as for adults.

NOTE: Zofran (ODT only) is an optional medication to carry for BLS transport agencies in Kittitas County. EMTs affiliated with transport agencies that carry Zofran, must receive and maintain MPD approved ongoing training to administer this medication.

OXYTOCIN (PITOCIN)

ACTION:

Causes uterine contractions, causes lactation, slows post-partum vaginal bleeding.

INDICATIONS:

To actively manage the 3rd stage of pregnancy.

CONTRAINDICATIONS:

Known sensitivity to the drug.

PRECAUTIONS:

It is essential to assure that the placenta has delivered and that there is not another fetus present. Overdosage can cause uterine rupture and hypertension.

SIDE EFFECTS:

Anaphylaxis and cardiac arrhythmias.

DOSAGE:

IM: 10 units

IV: 40 units in 1000 mL **Isotonic Crystalloid** administered to uterine response.

ROUTE:

IM and IV drip

PEDIATRIC DOSE:

Not indicated.

OXYMETAZOLINE HYDROCHLORIDE (AFRIN®)

ACTION:

- Long-acting topical vasoconstrictor that reduces mucosal edema.
- May help slow intranasal bleeding.

INDICATIONS:

- As an adjunct to direct pressure to help control epistaxis
- To facilitate placement of a nasotracheal tube and reduce the likelihood of bleeding associated with this technique.

CONTRAINDICATIONS:

- Hypersensitivity to oxymetazoline hydrochloride

PRECAUTIONS:

- Unlikely to be a benefit in bleeding associated with severe nasal trauma.
- Normal pupillary reflex may be affected if this preparation gets in the eyes.

SIDE EFFECTS:

Possible adverse side effects in patients with the following:

- Heart Disease
- Hypertension
- Thyroid disease
- Diabetes
- Prostatic hypertophy
- Pregnancy
- Nursing mothers

DOSAGE:

- Adult and Children (6 years and older) - 2 or 3 sprays in each bleeding nostril. **DO NOT exceed 2 doses in any 24-hour period.**

ROUTE:

- Nasal

REGLAN

ACTION:

Antiemetic.

INDICATIONS:

Vomiting/Nausea

CONTRAINDICATIONS:

Allergies to Reglan
Head Injuries

PRECAUTIONS:

SIDE EFFECTS:

Acute Torticollis – muscle spasm of neck or tongue
Anxiety

DOSAGE:

IV or IM: 10 mg, may repeat dose x 1 in 10 minutes

ROUTE:

IV / IM

PEDIATRIC DOSE:

Rarely used

ROCURONIUM BROMIDE (ZEMURON)

ACTION:

Nondepolarizing neuromuscular blocking agent.
Muscular paralysis typically lasts between 20 to 60 minutes depending upon dosage and patient.

INDICATIONS:

To achieve temporary paralysis where endotracheal intubation is indicated and where muscle tone prevents it.

CONTRAINDICATIONS:

Hypersensitivity

PRECAUTIONS:

Personnel trained in endotracheal intubation must be present. Resuscitation equipment must be immediately available.

Must be accompanied by adequate anesthesia or sedation.
Rocuronium bromide is physically incompatible when mixed with the following drugs:

Amphotericin	Hydrocortisone Sodium Succinate
Amoxicillin	Insulin
Azathioprine	Intralipid
Cefazolin	Ketorolac
Cloxacillin	Lorazepam
Dexamethasone	Methohexital
Diazepam	Methylprednisolone
Erythromycin	Thiopental
Famotidine	Trimethoprim
Furosemide	Vancomycin

If Rocuronium bromide is administered via the same infusion line that is also used for other drugs, it is important that this infusion line is adequately flushed between the administration of Rocuronium and drugs for which incompatibility with Rocuronium has been demonstrated.

SIDE EFFECTS:

Prolonged paralysis, hypotension, hypertension, tachycardia., Histamine release with possible signs of asthma/bronchoconstriction, arrhythmias, and nausea, vomiting, hiccups.

DOSAGE:

For adults and large children: 1.0 mg/kg

Patients should be pre-medicated with Midazolam, as Rocuronium has no effect on patient's level of consciousness.

ROUTE:

IV / IO

PEDIATRIC DOSE:

Premedicate with Atropine: 0.02 mg/kg

For Infants and Small Children: 1.0 mg/kg

Suspected Head Injury Use:

Premedicate with Lidocaine: 1 mg/kg

NOTE: Shelf life of Rocuronium bromide is 60 days after being removed from refrigeration.

SODIUM BICARBONATE

ACTION:

Combines with excessive acids to form a weak volatile acid, increases pH.

INDICATIONS:

Hyperkalemia, tricyclic anti-depressant overdose, presence of
Crush Injury Syndrome

CONTRAINDICATIONS:

Alkalotic states.

PRECAUTIONS:

Correct dosage is essential to avoid overcompensation of pH, can deactivate catecholamines, can precipitate with calcium.

SIDE EFFECTS:

Alkalosis

DOSAGE:

1 mEq/kg initially followed by 0.5 mEq/kg every 10 minutes until blood gas studies are available

ROUTE:

IV / IO

PEDIATRIC DOSE:

Same as above.

SOLUMEDROL

ACTION:

Anti-inflammatory, glococorticoid

INDICATIONS:

Anaphylaxis and Transfusion reactions

CONTRAINDICATIONS:

Systemic fungal infections, TB, Cushing disease, known hypersensitivity.

PRECAUTIONS:

Sodium retention with resultant of edema and potassium loss may occur in patients receiving corticosteroids, these agents should be used with caution in patients with CHF, hypertension, or renal insufficiency.

SIDE EFFECTS:

None in the emergent setting. Sodium and water retention, CHF, hypertension, headache, vertigo, hypokalemia, seizures, nausea, vomiting, dysrhythmias.

DOSAGE:

125 mg

ROUTE:

Slow IV Push / IO

PEDIATRIC DOSE:

1-2 mg/kg

SUCCINYLCHOLINE (ANECTINE)

ACTION:

Skeletal muscle paralysis.

INDICATIONS:

To achieve temporary paralysis where endotracheal intubation is indicated and where muscle tone prevents it.

CONTRAINDICATIONS:

Hypersensitivity, in the presence of Crush Injury Syndrome

PRECAUTIONS:

Personnel trained in endotracheal intubation must be present. Resuscitation equipment must be immediately available.

SIDE EFFECTS:

Prolonged paralysis, hypotension, and bradycardia.

DOSAGE:

For adults and large children: 1.5 mg/kg

ROUTE:

IV or IO

PEDIATRIC DOSE:

Premedicate with Atropine: 0.02 mg/kg
For Infants and Small Children: .2 mg/kg

Suspected Head Injury Use (Adult & Pediatric):

Premedicate with Lidocaine: 1 mg/kg
For adults and large children 1/10 fasciculating dose followed by main dose once fasciculation is evident. (Also, for patients in hypertensive crisis or with intracranial bleed.)

THIAMINE (BETALIN)

ACTION:

Allows normal breakdown of glucose.

INDICATIONS:

Coma of unknown etiology (especially if alcohol or malnourishment may be involved)

CONTRAINDICATIONS:

None

PRECAUTIONS:

Occasional anaphylactic reactions have been reported.

SIDE EFFECTS:

Rare, if any

DOSAGE:

100 mg

ROUTE:

IV / IO

PEDIATRIC DOSE:

Rarely used

TRANEXAMIC ACID (TXA, Cyklokapron®)

ACTION:

Fibrinolysis inhibitor

INDICATIONS:

- Adult trauma patients equal to or greater than 16 years of age.
    - Trauma injury less than 3 hours old.
    - Hemorrhagic shock due to trauma.
        - Systolic BP 90mmHg or less, and/or
        - Sustained heart rate more than 110 bpm
    - Patient has received 500 ml of Isotonic Crystalloid and other hemorrhagic control measures have been initiated (i.e., direct pressure, hemostatic agents if available, etc.)
- Post-partum hemorrhage (with online medical direction)

CONTRAINDICATIONS:

- Patient less than 16 years of age or less than 50 kg
- Trauma injury more than 3 hours old.

PRECAUTIONS:

- TXA should not delay volume resuscitation for appropriate trauma patients.
- Rapid administration may contribute to hypotension.
- Not to be administered through the same line being used for blood products.
- TXA should be used within 24 hours of being reconstituted.
- Stop infusion if seizure, AMI, CVA, or cardiac arrest occur.
- It should be used with caution in patients with renal failure or known history of thrombotic disorder (DVT or pulmonary embolus).

SIDE EFFECTS:

DOSAGE:

1 gm in a 100 ml bag of Isotonic Crystalloid administered over 10 minutes. May Piggyback Additional 1 gm in a 250 ml bag of Isotonic Crystalloid administered over 8 hours (when applicable and requires a pump)

ROUTE:

IV only (not approved for IO administration)

PEDIATRIC DOSE:

Not recommended in pts under 50 kg or under the age of 16

VECURONIUM BROMIDE

ACTION:

Vecuronium is a non-depolarizing neuromuscular blocking agent. Vecuronium competes for cholinergic receptors at the motor end plate.

Onset of action is usually between 2.5 - 3 minutes. The maximum effect takes 3 - 5 minutes.
25% of muscle control returns in 25 - 40 minutes.
95% of muscle control returns in 45 - 65 minutes.

INDICATIONS:

Consider in combative patients after successful endotracheal intubation.

CONTRAINDICATIONS:

Vecuronium is contraindicated in patients with myasthenia gravis 2° to its profound effect in small doses.

PRECAUTIONS:

SIDE EFFECTS:

DOSAGE:

0.1 mg/kg IV bolus

ROUTE:

IV / IO

PEDIATRIC DOSE:

0.1 mg/kg IV bolus

SECTION V - MISCELLANEOUS

DO NOT RESUSCITATE (POLST Form)

I. Scene Size-up/Primary Patient Assessment

II. Secondary Assessment

A. Determine the patient is in a Do Not Resuscitate status in one of the following ways:

1. The patient has an original or copy, valid POLST or EMS-No-CPR form onsite that is intact and not defaced (bedside, medicine cabinet, bedroom door, refrigerator), or
2. The patient has an EMS-No CPR bracelet that is intact and not defaced. The bracelet may be located on either wrist, either ankle, or on a necklace or neck chain, and worn by the patient, or
3. The patient has other DNR orders, perform the following (the Department of Health encourages medical facilities to use the POLST for)
    - Sometimes health care facilities prefer to use their own health care DNR orders. When encountering other DNR order, perform the following:
        i. Verify that the order has a physician signature requesting "Do Not Resuscitate."
        ii. Verify the presence of the patient's name on the order.
    - Contact on-line medical control for further consultation. In most cases, on-line medical control will advise to withhold CPR following verification of a valid physician signed DNR order.
4. In extended or intermediate care facilities, look for the DNR form in the patient's chart.

III. Management

A. Begin resuscitation when it is determined:

1. No valid DNR order exists.
2. No Compelling Reasons (see definition below)
3. In your medical judgement, your patient has attempted suicide or is a victim of violence.

B. Do Not initiate resuscitation measures when:

1. The patient is determined to be "obviously dead".
    - The "obviously dead" are victims who, in addition to absence of respiration and cardiac activity, have suffered one or more of the following:
        i. Decapitation
        ii. Evisceration of heart or brain

iii. Incineration
iv. Lividity
v. Rigor Mortis
vi. Decomposition

2. When the patient has an existing, valid DNR order:
   - POLST (original <u>or</u> copy)
     i. Provide resuscitation based on patient's wishes identified on the form.
     ii. Provide medical interventions identified on the form.
     iii. Always provide comfort care
   - EMS-No CPR:
     i. Do not begin resuscitation measures.
     ii. Provide comfort care.
     iii. Contact the patient's physician or on-line medical control if questions or problems arise.
   - Other DNR orders:
     i. Follow specific orders contained in the DNR order based on the standard of care allowed by your level of certification and communications with on-line medical control.
   - **Remember** – Do Not Resuscitate does not mean Do Not provide comfort care when necessary.

3. **<u>Compelling Reasons</u>** – compelling reasons to withhold resuscitation can be invoked when written information is not available, yet the situation suggests that the resuscitation effort will be futile, inappropriate, and inhumane.

   <u>Compelling Reasons are</u>:
   - End stage of terminal condition
   - Written or verbal information from family, caregivers, or patient stating that patient did not want resuscitation.
     i. If both criteria are not met, you should initiate a resuscitation effort. If both criteria are met, you should withhold a resuscitation effort. If resuscitation was already started, it should be stopped.
     ii. You must document compelling reasons when they are used as a basis for withholding resuscitation.
     iii. When in doubt, contact medical control.

C. If resuscitative efforts have been started before learning of a valid DNR order, STOP these treatment measures unless continuation is requested by the DNR order and provide comfort care:
   1. Basic CPR
   2. Intubation or other airway adjunct (leave ET tube or adjunct in place but stop any positive pressure ventilations.)

3. Cardiac monitoring and defibrillation
4. Administration of resuscitation medications
5. Any positive pressure ventilation (through bag valve masks, pocket face masks, endotracheal tubes)

D. Revoking the DNR order – The following people can inform the EMS system that the DNR order has been revoked:
    1. The patient (by destroying the order, drawing a diagonal line or the word VOID across the front of the form, or by verbally revoking the order).
    2. The physician expressing the patient's revocation of the directive.
    3. The legal surrogate for the patient expressing the patient's revocation of the directive (The surrogate cannot verbally revoke a patient executed directive).

E. Documentation
    1. Complete the Medical Incident Report (MIR) form approved by the Medical Program Director.
    2. State in writing in the upper left-hand corner of the narrative summary:
        "Patient identified as DNR by POLST, EMS-No CPR, or Other Directive."
    3. Record the name of the patient's physician, and state whether you contacted the physician.
    4. Record the reason why the EMS system was activated.

F. Additional Steps for patients who have expired.
    1. Comfort the family and bystanders when patient has expired.
    2. Notify Dispatch patient has expired. Dispatch will notify the appropriate contacts per *Coroner Investigation Networking Agreement*
        - Law; and / or
        - Coroner's Office

    3. EMS Unit should stay on scene until the arrival of law enforcement or Coroner's office unless:
        - Patient is "expected" death under hospice or home care nurse (in attendance)
        - Patient attended by a medical professional in a controlled environment (i.e., clinic, nursing home, other healthcare facility)