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Version 1

# Whitman County Paramedic Protocols

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# General Paramedic Guidelines

## Management

1. Perform rapid initial assessment with emphasis on ABC's and, if appropriate, spinal immobilization. Initiate ***Rapid Sequence Induction*** protocol when appropriate.

2. Obtain and document baseline vital signs, pulse oximetry and GCS.

3. Obtain chief complaint and pertinent history.

4. Perform secondary assessment as indicated by patient condition

5. Provide treatment, using appropriate protocols.

6. Transport utilizing Whitman County ***Interfacility Transport Guidelines*** when appropriate.

7. Most patients should have supplemental oxygen applied to keep oxygen saturation <95%. In general, unless there are signs of respiratory distress, cardiac and stroke patients should receive oxygen only if their oxygen saturation is <94%.

8. Initiate IV access with NS TKO or saline lock as appropriate. For vasoactive medications, a large bore peripheral IV is preferred. If unable to acquire IV access, consider placing an IO. Humeral Head IO is preferred due to increased flow rate.

9. Monitor and document vital signs, including pulse oximetry. Monitor ETCO2 capnography for all patients with a managed airway, respiratory compromise, and patients with altered level of consciousness. All patients should have a minimum of two vital signs recorded regardless of transport time.
    a. Every 5-10 minutes for scene calls or unstable transports.
    b. Every 15-30 minutes for extended transports with a stable patient.
    c. Prior to re-administering medications.

10. Medications should only be administered after ensuring: right medication, right dose, right route, and right time.

11. All syringes containing medication that is not immediately administered should be labeled with the medication name and concentration.

12. Pediatric patients are defined as < 18 years old. However, most patients with any evidence of secondary sexual characteristics (pubic, axillary, or facial hair; breast development) may be treated per adult protocols.

13. Pediatric medication dosages should not exceed maximum single or total adult dose.

14. The Broselow / length based resuscitation tape is the reference for confirming patient weight and resuscitation dose.

15. All paramedics should have a thorough knowledge of each medication in their inventory.

16. When performing interfacility transfer Paramedics are permitted to administer medications that are not normally in inventory as permitted by online medical control. Paramedics shall have thorough knowledge of all medications being administered to patient prior to leaving hospital. Should a paramedic feel transport is likely to exceed their training and scope of practice, they shall contact medical control for alternate medication / treatment recommendation or refuse interfacility transfer. Reference ***Interfacility Transport Guidelines***.

17. Tidal volumes for ventilation should be 6-8 mL/kg based on predicted ideal body weight in kg:

    **Male:** 50+2.3(height in inches–60)

    **Female:** 45.5+2.3(height in inches–60)

    If actual body weight is less than predicted ideal body weight, use actual weight.

# Altered Mental Status & Behavioral Emergencies

## Indications

- Any patient with alteration in their mental status and or displaying bizarre behavior.

## Medical Management

**1.** Check blood glucose. If suspected cause related to blood glucose see **Diabetic Emergencies.**

2. If opiate intoxication is suspected, see ***Poisoning & Overdose***.

3. Alcohol withdrawals (DT's) or a post seizure confusion administer:

   a. **Lorazepam(Ativan)**

   **Adult:** 1-2 mg IV or IM
   **Elderly:** 0.5-1 mg IV or IM

   **Pediatric:** 0.05-0.1 mg/kg IV or IM, max 2 mg.

4. Consider use of soft physical restraints to ensure safety of the patient and crew. If patient is in limb restraints, check and document distal circulation, sensation, and movement every 15 min.

5. For combative patients with a stable airway that are in eminent danger due to injury or patient's behavior, consider Midazolam, Lorazepam, or Ketamine, see ***Pain Management & Sedation***.

   **a. Haldol**

   Administer to patients with behavioral abnormalities with suspected psychiatric etiology (schizophrenia, dementia, Alzheimer's, etc.)

   **Adult:** 5-10 mg IM or IV

   **Elderly:** 2.5mg IM or IV

6. For Excited Delirium (Cocaine, Methamphetamines, etc.)

   Physical confrontation and restraints should be minimized until chemical sedation is ready to administer.

   **a. Ketamine**

   **Adult:** 4 mg/kg IM

   If possible, give concurrent dose of Lorazepam or Midazolam to blunt emergence phenomenon. See ***Pain Management and Sedation.***

   **b. Midazolam**

   Alternative medication if Ketamine is contraindicated or unavailable.

   **Adult:** 5 mg IM

If patient is no longer able to protect their airway, or continues to pose a safety threat, proceed to ***Rapid Sequence Induction***

# Anaphylaxis & Allergic Reactions

## Indications

Suspected exposure to allergenic substance. Examples are medications (antibiotics or allergy shots), insect bites, toxic substances, and food (nuts, fish, or fruit).

Clinical features may include:

- Erythematous rash, urticaria
- Dyspnea or wheezing
- Hypotension

## Medical Management

There is a continuum between allergic reactions and anaphylaxis. Continuously monitor the airway. Uvular edema is often associated with laryngeal edema and may be an indication of impending respiratory compromise, see ***Rapid Sequence Induction***. Be prepared to perform an advanced airway if necessary.

1. For allergic reactions:
   a. **Diphenhydramine** (Benadryl)
   **Adult and Ped**:1mg/kg (maximum 50 mg IV/IM)
   b. If there are no contraindications, also consider IM Epinephrine (see below) for severe urticaria if needed for patient comfort.

2. For anaphylaxis (respiratory distress, angioedema, hypotension):
   a. **Epinephrine** 1:1000
   **Adult:** 0.3 – 0.5 mg (0.3-0.5ml) IM
   **Ped:** 0.01 mg/kg IM (thigh), Max dose 0.5mg
   b. **Diphenhydramine** (Benadryl)
   **Adult and Ped**:1mg/kg (maximum 50 mg IV/IM)
   **c. Albuterol**
   **Adult and Ped:** 2.5mg by nebulizer every 10 minutes as needed.
   d. Treat hypotension with NS IV bolus
   **Adult:** 500ml
   **Ped:** 20 mL/kg

3. If hypotension or respiratory distress persists after all treatment modalities, administer:
   a. **Epinephrine** 1:10,000
   **Adult:** 0.3 mg SIVP over 2 minutes.
   *Use with caution for patients with history of severe cardiac disease or patients > 55 years of age. There are no contra-indications if cardiovascular or respiratory arrest is imminent.*
   **Ped:** 0.01 mg/kg SIVP over 2 minutes, not to exceed 0.3 mg in a single dose.

4. If hypotension persists after Epinephrine 1:10,000, initiate Epinephrine infusion. Titrate to maintain SBP > 90 in adults and children >10 years old, and > 70 + (2x the age in years) in children < 10 years old.
   a. **Epinephrine** infusion:
   **Adult and Ped > 10 kg**: Start at 1 mcg/min.
   **Ped < 10 kg**: Start at 0.1 mcg/kg/min.

# Asthma & COPD

## Indications

- Shortness of breath with wheezing) not cardiac related) or poor air movement upon auscultation.

Assess for signs of congestive heart failure:

- Crackles
- JVD
- Chest pain

## Medical Management

1. If patient has COPD and is a known CO2 retainer, apply oxygen to maintain a saturation 90-94%; otherwise apply 100% oxygen via a NRB.

2. Consider use of CPAP or Bi-PAP or intubation. See ***CPAP & Bi-PAP*** or ***Rapid Sequence Induction.*** Reassess frequently throughout, and reconsider Rapid Sequence Induction if patient deteriorates.

3. Administer:

   **a. Albuterol**

   **Adult and Ped:** 2.5 mg by nebulizer every 10 minutes as needed.

   **b. Ipratropium**

   **Adult & Ped:** 0.5 mg may be combined with albuterol for the first two nebulized treatments.

   **Ped < 5 y/o:** 0.25 mg (1/2 dose).

   Albuterol and Ipratropium can be administered to patients with a managed airway via inline nebulizer.

4. For **Ped <** 1 y/o, consider **Racemic Epinephrine**, 0.5 mL of 2.25% solution diluted in 2.5 mL NS.

5. For asthma exacerbations without improvement after intensive conventional therapy or for life-threatening exacerbations (impending intubation for respiratory failure):

   a. Consider **Epinephrine** 1:1000.

   **Adult:** 0.3 mg IM. May repeat every 20-min x 2.

   *Use caution in patients with severe coronary artery disease.*

   **Ped:** 0.01 mg/kg IM (thigh), Max dose 0.3 mg.

   May repeat every 20-min x 2.

# Burns & Inhalation Injuries

## Indications

Signs of smoke inhalation

- Facial burns or singed nasal hairs
- Carbonaceous sputum
- Carbon deposits in oropharynx
- Altered Mental Status
- Shortness of Breath
- Burns
- Known thermal, chemical or inhalation exposure.

## Medical Management

**1.** Monitor airway closely. Strongly consider endotracheal intubation if signs of inhalation injury see, ***Rapid Sequence Induction***. If wheezing, see ***Asthma & COPD.***

**2.** Fluid resuscitation

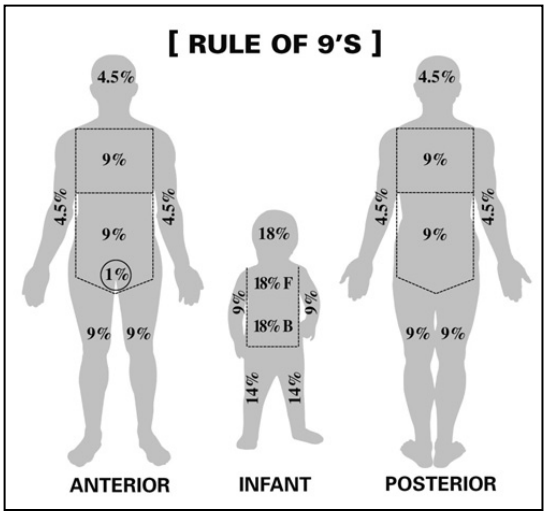
a. Consensus formula:
Fluid volume in first 24 hours = 2-4 mL x weight in kg x % body surface area burned.

**Adults**: 2 mL

**Pediatric**: 3 mL

**Electrical**: 4 mL

Half of this volume should be infused over the first 8 hours; the remaining volume over 16 hours.




**3.** Manage pain, see ***Pain Management & Sedation/ Vomiting & Nausea.*** Burn patients often require massive amounts of narcotics. Consider starting with 10 mg morphine and titrate frequently with 5 mg morphine if there are no contraindications.

**4.** Cover burns with dry clean or sterile linen and monitor for hypothermia.

**5.** Keep patient warm. Monitor temperature every 15 minutes. Utilize heat packs and warming blanket as needed.

**6.** Consider utilizing air medical service for transport to appropriate burn center if patient is stable. Consult with medical control if transport is expected to be delayed > 20 minutes.

# Cardiac Arrest & Dysrhythmias

## Indications

- Pulseless arrest
- Cardiac dysrhythmias

## Medical Management

1. Pulseless cardiac arrests and dysrhythmias will be managed utilizing ACLS and PALS guidelines

2. It is recognized some patients may, depending on their clinical situation, require deviation from these guidelines, but they should be utilized as a general guide to all resuscitation efforts.

3. Manufactures guidelines should be followed for Cardiac Defibrillators used in conjunction with ACLS or PALS guidelines.

# Cardiac Chest Pain

## Indications

- Chest pain of presumed cardiac etiology
- Signs and symptoms may include nausea, shortness of breath, weakness, dizziness, and/ or diaphoresis.

## Medical Management

1. Obtain 12-lead ECG as soon as possible. If confirmed STEMI, notify receiving hospital as soon as possible.

2. Administer:
   a. **Aspirin**
      **Adult:** 162 mg PO unless administered prior to arrival.
   b. **Nitroglycerin**
      **Adult:** 0.4 mg SL if SBP > 90. May repeat x 3 every 3-5 min to relieve chest pain.

   Warning! Nitroglycerin may not be appropriate if patient has been taking phosphodiesterase (PDE) inhibitors (Viagra, Cialis, Levitra). Contact medical control for dosing options.

3. For persistent pain consider:
   a. **Nitroglycerine** infusion. Start at 10 mcg/min. Titrate every 5 min for pain and to maintain a systolic BP > 90. Use caution in right sided infarctions.

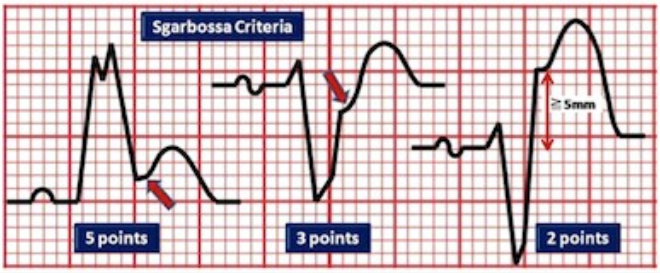
4. If pain is severe or unrelieved with Nitroglycerin and BP remains > 90 systolic:
   a. **Morphine**
      **Adult:** 2-5 mg IV. May repeat every 5 min as needed to relieve pain.
   b. **Fentanyl**
      **Adult:** 50 mcg -100 mcg IV, may repeat 25-50 mcg every 5 min as needed to relieve pain.

5. Consider Lorazepam or Midazolam for anxiety:
   a. **Lorazepam**
      **Adult:** 1-2 mg IV. May repeat every 30 minutes.
   b. **Midazolam**
   c. **Adult:** 2-5 mg IV Repeat every 15-20 minutes. Use cautiously in hypotensive patients.

6. If SBP < 90 and lungs are clear, administer 500 mL NS bolus. May repeat x 3 if lungs remain clear. If unresponsive to fluids, or patient shows signs of CHF, administer Norepinephrine.
   a. **Norepinephrine** infusion
      **Adult:** 2-4 mcg/min, titrate as needed max dose 30 mcg/min.

7. STEMI
   a. Once identified, transport should not be delayed obtaining vascular access.
   b. Transport decision should be based on WA State cardiac level one guidelines.
   c. ST segment elevation > 1mm in two contiguous leads or Sgarbossa Criteria.
   d. Complete AMI Fibrinolysis Screen

| | | | |
|---|---|---|---|
| I Lateral | aVR | V1 Septal | V4 Anterior |
| II Inferior | aVL Lateral | V2 Septal | V5 Lateral |
| III Inferior | aVF Inferior | V3 Anterior | V6 Lateral |




| Sgarbossa ECG Criteria for LBBB | |
|---|---|
| Concordant STE ≥1mm | 5 points |
| STD ≥1mm in V1 – V3 | 3 points |
| Discordant STE ≥5mm | 2 points |

# CPAP

## Indications

Medical patients complaining of moderate - severe respiratory distress meeting ALL of the following criteria:

- Signs and symptoms consistent with CHF/ pulmonary edema, COPD complicated by hypercarbia, hypoxemic respiratory failure (e.g. pneumonia, ARDS) or asthma.
- Systolic BP greater than 90 mmHg.
- Awake, oriented and has the ability to maintain a patent airway.
- At least two of the following:
  - Respiratory rate greater than 25 per minute
  - Pulse oximeter reading is less than 92%
  - Retractions or accessory muscle use.
  - EMS Provider discretion

## Medical Management

1. Explain procedure to patient
2. Ensure adequate oxygen supply to device (100%)
3. Place mask over mouth and nose; secure with straps
4. Start at 5 cm $H_2O$ and increase as tolerated with goal of 10 cm $H_2O$.
5. Check for air leaks
6. Monitor patient's response
7. Continue to coach the patient to keep mask in place and readjust as needed.
8. Follow appropriate treatment protocol based upon patients underlying problem (CHF, asthma, etc.) I.e.: in line nebulization or other therapy.
9. Consider sedation if patient is unable to tolerate the procedure. See ***Pain Management, Sedation & Nausea/Vomiting***.
10. If respiratory status deteriorates, remove device and consider BVM ventilation and/or ***Rapid Sequence Induction***.
11. Notify receiving hospital as soon as possible patient is on CPAP or Bi-PAP so they can prepare.
12. Watch for gastric distention and/or nausea.

## Relative Contraindications

- Respiratory arrest.
- Inability to cooperate, protect the airway, or clear secretions.
- Suspected pneumothorax.
- Hemodynamic instability.
- Tracheostomy
- Active Vomiting
- Inability to maintain mask seal including facial trauma, surgery or deformity.
- Unresponsive patients

# Cricothyrotomy - Needle

## Indications

Patients < 8 years old only when other attempts to establish an airway or ventilate have been unsuccessful and respiratory failure exists. This includes when traumatic injuries or medical conditions make intubation or rescue airway placement difficult or potentially hazardous.

## Medical Management

1. Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck unless C-spine injury is suspected.
2. Palpate the neck in the midline and locate the slight depression just below the inferior border of the thyroid cartilage and just above the cricoid cartilage. This is the cricothyroid membrane. The approximate location of the membrane is three finger breadths (patient's index/middle/ring fingers) above the sternal notch.
3. Prepare the area with Cleansing swab.
4. Stabilize the airway between the thumb and forefingers.
5. Make a shallow incision with the needle bevel directly over the cricothyroid membrane.
6. Insert the reinforced 6 Fr Cook catheter through the skin overlying the cricothyroid membrane at a 30° angle downward toward the lungs. Use a 16 or 18 ga catheter from IV kit for smaller patients.
7. When the needle is through the skin, aspirate for air as you advance to ensure tracheal entry. 1-2 mL of saline in the syringe will help identify presence of air bubbles.
8. Advance the catheter over the needle and seat catheter hub against skin, remove the needle.
9. Attach the 3.0 ETT connector to the hub of the catheter and attach meconium aspirator to the ETT connector. Connect suction tubing from the meconium aspirator to the oxygen outlet. Set oxygen regulator to 15 LPM.
    a. Oxygenate by occluding the thumb port on the meconium aspirator for approximately one second to provide inspiration. Watch for chest rise.
    b. Ventilate with an I:E ratio of approximately 1:4, watching for chest fall during exhalation.
    c. Exhalation will occur through the open thumb port or, in the absence of an upper airway obstruction, through the mouth.
10. Alternatively, a BVM may be connected to the ETT connector and used for ventilations instead of the meconium aspirator.
11. If a 3.0 ETT connector is not available, attach a 10mL syringe (with plunger removed) to the catheter, insert any adult ET tube into the syringe barrel, inflate the tube balloon, and use the ETT connection on the tube to ventilate with the BVM.
12. Confirm correct placement by auscultation for breath sounds, increase in SpO2, and presence of ETCO2 (insert between ETT adapter and meconium aspirator or BVM). ETCO2 readings may be inaccurate but should confirm the needle is in the airway.
13. Secure the catheter with twill tape or the best method available, recognizing that this method may be direct hands-on control of the device. Observe catheter for kinking or dislodgement.
14. In the absence of an upper airway obstruction, occlude the mouth with a mask in order to prevent escape of oxygen during insufflation. Release the mask during exhalation as this will provide some degree of ventilation.

## Notes and Precautions

Hazards in performing this procedure are primarily damage to nearby structures. Major vessels are present on either side of midline. The vocal cords may be injured if the puncture is made too high and a through and through injury of the trachea may occur if the puncture is too deep.

Palpation of the cricothyroid membrane is very difficult in the infant and younger child. The key to success is immobilization of the trachea throughout the procedure.

If all attempts fail and the patient cannot be oxygenated, incise the skin in the area over the membrane and gently dissect until the cricothyroid membrane is visible. Place the needle through the membrane as described above.

# Cricothyrotomy - Surgical

## Indications

Patients > 8 years old only when other attempts to establish an airway or ventilate have been unsuccessful and respiratory failure exists. This includes when traumatic injuries or medical conditions make intubation or rescue airway placement difficult or potentially hazardous.

## Medical Management

1. Place the patient in a supine position with support under the shoulders and mild hyperextension of the neck unless C-spine injury is suspected.
2. Palpate the neck in the midline and locate the slight depression (cricothyroid membrane) just below the inferior border of the thyroid cartilage and just above the cricothyroid cartilage. The approximate location of the membrane is three finger breadths (patient's index/middle/ring fingers) above the sternal notch. Prepare the area with Cleansing swab.
3. Prep skin with Chlorhexidine swabs.
4. Have partner stand at the head of the patient and stretch the skin across the thyroid cartilage, or maintain grasp on thyroid cartilage with non-dominant hand. Make a vertical 2" skin incision, dissecting until you are able to locate the cricothyroid membrane.
5. Puncture the cricothyroid membrane with the tracheal hook. Hook the inferior edge of the thyroid cartilage and lift toward the head.
6. Orient the #10 scalpel transversely and puncture the membrane.
7. Remove the scalpel, cover the blade with the protector, turn the scalpel upside down and place the handle into the incision. Twist the handle to enlarge the hole. Orient scalpel handle vertically and insert bougie next to the handle. Advance the bougie into trachea toward carina. Remove scalpel.
8. Ensure all the air is removed from the ET tube balloon, and slide the tube down the bougie through the membrane. Twisting the ET tube as it contacts the cricothyroid membrane will make it easier to advance.
9. Ensure the balloon is advanced into the trachea until the black vocal cord marker on the tube is just below the membrane. Remove the bougie.
10. Inflate the cuff and ventilate the patient with 100% oxygen.
11. Verify proper tube placement by:
    a. Auscultation of lung fields.
    b. ETCO2 detector or capnography.
    c. Lack of subcutaneous air in the neck.
12. Once position is confirmed, remove the tracheal hook. NOTE: It is not uncommon to mistakenly place the ET tube into a paratracheal position (ie, outside the trachea). Do not remove the tracheal hook until the ET tube is confirmed to be in the trachea and functional. Secure the ET tube using twill tape.
13. Document the name of the receiving physician who verified proper placement of the surgical airway.

## Relative Contraindications

1. Fractured larynx or significant damage to the cricoid cartilage or larynx.
2. Children < 8 years of age. The exact age at which a surgical cricothyrotomy can be safely performed is controversial and largely dependent on the size of the child. Children under twelve years have a smaller cricothyroid membrane and a more funnel shaped, cephalad, and compliant larynx.
3. Coagulopathy.
4. Expanding hematoma in the area of the cricothyrotomy.

# Croup & Epiglottitis

## Indications

- Respiratory distress with signs of upper airway obstruction including apprehension, hypoxia, drooling, nasal flaring, and/or stridor.
- Fever/ill appearance
- Older children and adults may only complain of sore throat and/or voice changes.

## Medical Management

1. Ensure adequate oxygenation and ventilation. If not intubated, administer supplemental oxygen, preferably humidified.

2. Keep patient as calm as possible, sitting position is preferable. Minimize stimulation and consider transporting with parent if patient is pediatric.

**Croup**

Commonly recognized by defined barking cough and history of viral infection of the upper airway. Often presents with low grade fever. Typically occurs at night with children ages 6 months to 4 years.

a. Humidified air or oxygen.

b. If stridorous, administer:

**Racemic Epinephrine** nebulized:

0.5 mL of 2.25% solution added to 2.5 mL normal saline. May repeat every 20-30 min.

**Epiglottitis**

a. DO NOT START IV AND DO NOT LOOK IN THE PATIENT'S MOUTH. Avoid any manipulation, including aggressive physical examination that could precipitate complete airway obstruction.

# Diabetic Emergencies

## Diabetic Ketoacidosis

Signs and Symptoms

- Develops slowly
- Dry mouth and intense thirst
- Abdominal pain & vomiting
- Restlessness
- Weak rapid pulse
- Dry, red warm skin
- Kussmaul breathing

## Medical Management

1. Consider possible causes of DKA such as:
   a. New onset diabetes
   b. Non- compliance
   c. Infection

2. Patients with hypotension/hemodynamic instability:

   **Adult**: Initiate fluid resuscitation with 1000 mL NS bolus. Repeat as needed.

   For maintenance, NS at 250 mL/hr.

   **Pediatric**: 20 mL/kg NS bolus.

3. Place Patient in position of comfort, preferably lying on their side, and be prepared for patient to vomit.

## Hypoglycemia

Signs and Symptoms

- Develops Rapidly
- Dizziness and headache
- Abnormal, hostile or aggressive behavior
- Fainting, convulsions
- Skin pale, cold and clammy
- Copious saliva, drooling

## Medical Management

1. If patient is able to swallow, administer oral glucose or substance high in simple sugar, i.e., honey orange juice with 2-3 tsp. of sugar.

2. If patient is unable to swallow:

   **Adult**: If < 80 mg/dl administer 25 g of **Dextrose 50%** IV.

   **Pediatric:** If < 60 mg/dl administer 2 ml/kg of **Dextrose 25%** IV (D25= dilute D50 1:1 with sterile water or saline).

   **Neonate:** If < 40 mg/dl administer 2 ml/kg of **Dextrose 10%** IV (D10 = dilute D50 1:4 with sterile water or saline).

3. Recheck blood glucose in 15 min and repeat Dextrose PRN.

4. If unable to establish IV:

   a. **Glucagon** IM or SQ
   **Adult**: 1 mg,

   **Pediatric:** 0.1 mg/kg, IM or SQ (Maximum 1 mg)

5. If necessary, IO can be acquired to administer Dextrose.

# Head Trauma

## Indications

Head injury as demonstrated by significant blunt or penetrating trauma, altered mental status, abnormal posturing, or abnormal pupils or extraocular movements

## Medical Management

1. Monitor GCS, pupils, and level of consciousness every 10 minutes.

2. Intubate if GCS < 8, see ***Rapid Sequence Induction***. Document GCS and neurological status before intubating.

3. Treat Seizure activity see Seizures.

4. Consider the need for antiemetic, see ***Pain Management, Sedation, and Nausea/Vomiting.***

5. If patient is intubated, maintain $ETCO_2$ at 33-37.

6. Monitor for signs of increased intracranial pressure/herniation:
   a. In patients with an initial GCS<9, a decrease in the GCS of more than two points.
   b. Asymmetrical, dilated or unreactive pupils.
   c. Decerebrate/extensor posturing.
   d. Cushing reflex (hypertension with bradycardia).

7. If at least two signs of herniation are present, intubate per ***Rapid Sequence Induction*** protocol and initiate mild hyperventilation.
   a. Target an $ETCO_2$ goal of 26-32 for mild hyperventilation.

8. In order to maintain adequate cerebral blood flow, hypotension should be managed with fluid resuscitation and vasopressors as needed to maintain BP > 100/70, MAP > 80, or SBP > 70 + (2 x age in years) in pediatric patients. See ***Hypotension/Shock.***

# Hyperkalemia

## Indications

- Presume hyperkalemia in at risk patients in cardiac arrest or those with ECG changes consistent with hyperkalemia.
- Hyperkalemia associated with diabetic ketoacidosis will correct with fluids and insulin therapy. Do not give bicarbonate to patients in DKA. See ***Diabetic Ketoacidosis***.

## Medical Management

1. The presence of peaked T wave, widened QRS complexes, or ventricular ectopy, indicates a need for treatment with calcium. In the absence of these ECG changes, calcium is rarely indicated.
   a. **Calcium Gluconate 10%**

      **Adult:** 2 grams SIVP over 2 minutes.

      **Pediatric:** 40 mg/kg (0.4 mL/kg) SIVP over 2 minutes.
2. To temporize hyperkalemia by shifting potassium into the cells:
   a. **Sodium Bicarbonate**

      1 mEq/kg IV (max 50 mEq). May repeat if ECG changes or cardiac arrest persist.
   b. **Albuterol**

      2.5 mg in 3 mL nebulized, repeat every 15 minutes x 4 doses.
3. Continually monitor during and after treatment. Re-treat for any ECG changes.

# Hyperthermia

## Indications

Heat Exhaustion

- Diaphoresis/moist skin
- Weakness/dizziness
- Nausea
- Headache
- Tachycardia

Heat Stoke

- Core temperature may exceed 106° F
- Skin is red, hot, and dry
- Severe headache
- Altered mental status ranging early in course from confusion, irrational behavior, and agitation to psychosis, delirium, coma and seizures

## Medical Management

1. Remove from the hot environment
2. Remove clothing and monitor temperature with oral or rectal thermometer.
3. Lightly mist patient with room temperature fluid and increase air movement over patient. Keep patients moist.
4. For heat exhaustion, oral rehydration is as beneficial as IV, but NS may be administered as needed.
5. If available, treat with ice bath immersion for core temperatures > 105.8°F
6. If ice bath immersion unavailable or temp is <105.8°F
   a. Place cold packs to axilla and groin.
   b. Administer cool normal saline in 500 mL boluses or 20 mL/kg for pediatrics
7. Discontinue cooling measures when temperature reaches 102°F to avoid overshooting. If wet, dry patient and cover with dry sheets/blankets once temperature of 102°F attained.
8. Treat hypotension with continued boluses of cool saline or vasopressors as needed. Switch to room temperature saline once target temperature is attained.
9. If shivering, administer:
   **a. Lorazepam**

   **Adult:** 1-2 mg IV. Repeat as needed to a maximum of 5 mg.

   **Ped:** 0.05-0.1 mg/kg IV.

# Hypotension / Shock



## Indications

- Adult: SBP < 90
- Ped: SBP < 70 + (2 x age in years)
- Must be accompanied by signs of poor perfusion:
- Dizziness or lightheadedness
- Pallor/diaphoresis
- Poor Peripheral Pulse
- Mental Status Change

## Medical Management

1. Consider Obstructive cause of shock, e.g. tension pneumothorax

2. **Anaphylactic Shock**
   See ***Anaphylaxis and Allergic Reaction***

3. **Hypovolemic Shock**

   a. Administer IV Fluids:

   **Adult**: 1000 mL NS bolus if pulmonary edema is not present. Repeat up to 3 liters if improvement noted, and lungs remain clear. Consider 500 mL boluses if there is mild pulmonary edema.

   **Ped:** 20 mL/kg NS bolus. Repeat PRN, may need as much as 100 mL/kg. Pulmonary edema is not an absolute contraindication to giving IVF in pediatric patients, but use with caution and administer boluses of 5-10 mL/kg. Pediatric patients with pulmonary edema should be evaluated for myocarditis or cardiogenic shock.

   **Newborn:** 10 ml/kg NS Bolus. Repeat PRN.

4. **Cardiogenic Shock**

   a. Administer IV Fluids:

   **Adult**: 250 mL NS bolus. May repeat 3x if no pulmonary edema present.

   **Ped**: 5-10 mL/kg NS bolus. May repeat 3x (maximum is 60 mL/kg) if no pulmonary edema is present.

   If unresponsive to fluids, initiate Norepinephrine (Levophed). Titrate to achieve a SBP > 90 in the adult patient, or SBP > 70 + (2 x age in years) in the pediatric patient.

   **Norepinephrine (Levophed):**
   **Adult:** 0.5-30 mcg/min
   **Ped:** 0.05-2 mcg/kg/min, not to exceed 30 mcg/min.

5. **Septic Shock**

   a. Administer IV Fluids for target MAP ≥ 65 mmHg, or SBP > 70 + (2 x age in years) in pediatric patient.

   **Adult**: 30 mL/kg NS bolus. Repeat PRN. More than 3-4 liters may be required.

   **Ped**: 20 mL/kg NS bolus. Repeat PRN. More than 100 mL/kg may be required.

   b. Adult Patients: If unresponsive to fluid bolus, initiate norepinephrine (Levophed) infusion. Titrate to achieve MAP ≥ 65.

   **Norepinephrine (Levophed):**

   **Adult:** start 2-4 mcg/min, titrate as needed max dose 30 mcg/min.

   If norepinephrine fails to increase MAP to target, consider supplementing with Epinephrine infusion.

   **Epinephrine** infusion:

   **Adult:** Start at 1 mcg/min.

   c. Pediatric Patients

   The clinical diagnosis of septic shock is made in children who have a suspected infection manifested by hypothermia or hyperthermia, and have clinical signs of inadequate tissue perfusion including any of the following:

   - Decreased or altered mental status
   - Cold Shock: prolonged capillary refill of > 2 seconds, diminished pulses, or mottled cool extremities.
   - Warm Shock: flash capillary refill < 2 seconds or bounding peripheral pulses and wide pulse pressure.

# Hypotension / Shock



## Medical Management

*Pediatric Patients continued*

Hypotension is not necessary for the clinical diagnosis of septic shock; however, its presence in a child with clinical signs suggestive of an infection is confirmatory.

If unresponsive to 60 mL/kg fluids, initiate vasopressor infusion. Titrate to reverse clinical signs of shock and/or achieve a SBP > 70 + (2 x age in years).

**Norepinephrine (Levophed):**

0.05–2 mcg/kg/min, not to exceed 30 mcg/min.

6. **Spinal Trauma and Neurogenic Shock**

   a. Neurological assessment should include evaluating all extremities for motor and sensory deficits.

   b. Administer IV NS to maintain SBP>90

   c. If patient remains hypotensive after 2 liters, initiate **Norepinephrine (Levophed)** infusion. Titrate to maintain SBP>90:

      **Adult:** 0.5-30 mcg/min

      **Ped:** 0.05-2 mcg/kg/min, not to exceed 30 mcg/min.

   d. Monitor Respiratory pattern for absence of chest movement or diaphragmatic breathing. Consider intubation if patient tires or exhibits diaphragm breathing, see ***Rapid Sequence Induction.***

# Overdose & Poisoning



## Indications

- Medical control should be contacted prior to transport once agent of poisoning is identified. Transport to alternate destination may be indicated.

## Medical Management

**Opioid Overdose**

1. Administer
   a. **Naloxone**
   **Adult:** 0.4 mg IV, repeat as indicated.
   **Ped:** 0.1mg/kg IV, max single dose of 0.4 mg. Repeat as indicated.
2. The goal of naloxone administration is restoration of adequate ventilation, not a normal level of consciousness.
3. Synthesized opioids can take higher than normal doses of Naloxone.
4. If no respiratory improvement after 4 mg IV Naloxone, advanced airway should be placed.

**Beta Blocker Overdose**

Indications:

- Hypoglycemia
- Bradycardia & Hypotension
- Delirium
- Coma
- Seizures
- Bronchospasm

1. Hypoglycemia- Treat with dextrose.
2. Bradycardia
   a. **Atropine**
   **Adult:** 0.5mg, repeat every 3 minutes to a maximum total dose of 0.04 mg/kg
3. Hypotension- IV fluid boluses and epinephrine.
   a. **Epinephrine**
   **Adult:** Start at 1 mcg/min and titrate to maintain a MAP of 60.
4. **Calcium Gluconate**: 3 grams SIVP repeat every 15 minutes as needed to a total of 3 doses.

**Calcium channel-blocker overdose**

Indications:

- symptomatic bradycardia
- hypotension
- altered mental status

1. **Calcium gluconate**
   **Adult:** 3 grams SIVP repeat every 15 minutes as needed to a total of 3 doses.
   **Ped:** Call medical control for dosing.
2. **Atropine**
   **Adult:** 0.5 mg IV, repeated to a max of 0.04 mg/kg. Recognize infranodal heart block is usually resistant to atropine in CCB toxicity.
   **Ped:** Call medical control for dosing.
3. Treat hypotension per cardiogenic shock, see ***Hypotension & Shock***

### Carbon monoxide poisoning

1. Apply 100% oxygen.
2. Intubation may be necessary. If intubation is required, fill cuff with saline in preparation for hyperbaric therapy.
3. Consider transport to nearest facility with emergent hyperbaric capabilities.

**Organophosphate poisoning**

1. **Atropine**
   **Adult:** 2-5 mg SIVP every 15 minutes as needed to a total of 3 doses.
   **Ped:** 0.05 mg/kg IV/IM.
   Repeat every 5 minutes until secretions have substantially decreased. Doses in excess of 10 mg may be needed.
2. Organophosphate poisoning prolongs the duration of action of succinylcholine. Utilize rocuronium if intubation is necessary.

# Overdose & Poisoning



## Medical Management

### Tricyclic antidepressant overdose

1. Cardiac rhythm should be monitored continuously
2. QRS > 100 msec, hypotension, seizures or life-threatening arrhythmias require treatment with alkalinization or hyperventilation. Goal is a pH of 7.45- 7.55. Alkalinization with IV sodium bicarbonate is preferred to overcome sodium channel blockade.
3. If decreasing mental status occurs, be prepared to intubate.
4. Hyperventilation:
   a. If intubated, hyperventilate until sodium bicarbonate is administered per protocol below.
   b. Hyperventilation should be discontinued after bicarbonate administration.
   c. Decreasing the ETCO2 by 10 will increase the pH approximately 0.08.
5. **Sodium Bicarbonate:**
   a. If QRS complex is > 100 msec, administer 50 meq of sodium bicarbonate IVP.
      Ped: 1 mEq/kg IVP (max 50 mEq)
   b. If QRS complex is > 160 msec, administer 100 meq of sodium bicarbonate IVP.
      Ped: 2 mEq/kg IVP (max 100 mEq)
   c. If sinus tachycardia occurs > 140, administer 50 meq of sodium bicarbonate IVP.
      Ped: 1 mEq/kg IVP (max 50 mEq)
   d. If patient seizes, use IV benzodiazepines, plus 50 meq of sodium bicarbonate.
      Ped: 1 mEq/kg IVP (max 50 mEq)
   e. If hypotension occurs, administer IV bolus of NS, plus 50 meq of sodium bicarbonate.
      Ped: 1 mEq/kg IVP (max 50 mEq)
   f. If symptoms or ECG changes persist, repeat as needed.
6. Severe hypotension unresponsive to fluids and sodium bicarbonate, start pressor and titrate to maintain SPB > 90 in adults and children over 10 years old, and > 70 + (2 x the age in years) in children < 10 years old.
   a. **Norepinephrine** infusion:

      **Adult:** 0.5-30 mcg/minute

      **Ped:** 0.05-2 mcg/kg/min, max 45 mcg/min.
   b. **Epinephrine** infusion:

      **Adult & Ped:** Start at 1 mcg/min.

# Pain Management, Sedation, & Management of Nausea/Vomiting

## Indications

- To maximize patient comfort
- To provide sedation for the intubated patient
- To provide sedation for chemically paralyzed patients
- To maintain control of the severely agitated, combative and/or anxious patient.
- To provide relief of nausea, vomiting and motion sickness.

## Medical Management

1. **Pain Management**

   a. **Morphine Sulfate**

   May repeat every 10 minutes PRN pain.

   Administer morphine when longer acting agent is indicated. (Maximum total dose 20 mg)

   **Adult:** 2-5 mg IV; 5-10 mg IM

   **Pediatric:** 0.1-0.2 mg/kg IV or IM

   b. **Fentanyl**

   May repeat every 10 min PRN pain. (Max dose 200 mcg)

   **Adult:** 0.5-1 mcg/kg IV or IM

   **Pediatric:** 1 mcg/kg IV or IM

   c. **Ketamine**

   May repeat every 10-15 min PRN pain. Should only be administered in conjunction with morphine or fentanyl to decrease the dose necessary for achieving reduction in pain.

   **Adult and Pediatric:** 0.1-0.3 mg/kg IV

2. **Sedation**

   Consider administering a dose of fentanyl or other narcotic (see **Pain Management**, above) to potentiate the actions of lorazepam or midazolam.

   a. **Lorazepam (Ativan)**

   May be used for longer acting sedation. Repeat every 30-45 min PRN.

   **Adult:** 1-2 mg IV or IM

   **Elderly:** 0.5-1 mg IV or IM

   **Pediatric:** 0.05-0.1 mg/kg IV or IM

   b. **Midazolam (Versed)**

   Use cautiously in hypotensive patients. Repeat every15-20 min PRN.

   **Adult:** 1-3mg IV or IM

   0.1 mg/kg IN (max dose 10mg)

   **Pediatric:** 0.05-0.1 mg/kg IV or IM

   0.1 mg/kg IN (max dose 10mg)

   c. **Ketamine**

   Due to short duration of action, use primarily for hypotensive patients requiring sedation after intubation or for agitated patients in which benzodiazepines are contraindicated; or in addition to benzodiazepines in excited delirium.

   **Adult and Pediatric:**

   Loading: 1.0 mg/kg slow IV push (if induction dose not given)

   Repeat: 0.5 mg/kg every 10-15 min PRN

   If possible, give concurrent dose of Lorazepam or Midazolam to blunt emergence phenomenon.

   Avoid in patients with brain masses, hydrocephalus, acute globe injury, schizophrenia or when significant elevations in BP might prove harmful.

3. **Antiemetic**

   Consider administering a dose of antiemetic to provide relief of nausea, vomiting, and motion sickness.

   a. **Ondansetron (Zofran)**

   Ondansetron should not be given to women during 1st trimester of pregnancy.

   May repeat every 15 minutes PRN.

   **Adult:** 4 mg IV or PO (Max total dose 16 mg)

   **Pediatric:** 0.1 mg/kg IV or IM for > 1 month old.

# Pneumothorax & Chest Trauma

## Indications

Tension Pneumothorax. Signs include:

- Hypotension
- Unilateral or bilateral decreased breath sounds
- Tracheal deviation
- JVD
- Respiratory Distress

Consider in:

- Blunt or penetrating trauma patients.
- Intubated patients who become suddenly unstable or difficult to ventilate despite suctioning.
- Patients with known rib fractures and subcutaneous emphysema.

## Medical Management

1. Consider ***Rapid Sequence Induction*** for severe, restrictive chest wall injury or severe respiratory distress.

2. For Penetrating or sucking chest wound, apply a 3-sided dressing. Remove if patient develops tension pneumothorax.

3. If signs of tension pneumothorax with hypotension and/or decreased oxygen saturation perform needle thoracostomy.
   a. Choose a site on the side of the pneumothorax
      - The 2nd intercostal space at the midclavicular line.
      - 5th intercostal space Mid-axillary line if 2nd ICS is complicated. (example: CPR in progress)
   b. prep the site with Chlorhexidine swabs.
   c. Use 6 Fr Cook catheter or 10-14g IV catheter 2” or longer. Connect 10mL syringe to needle.
      - For infants or small children with minimal subcutaneous tissue consider a 16 or 18 g catheter as alternative.
   d. Insert catheter in vertical fashion just above the rib at the chosen site.
   e. Advance the catheter over the superior border of the lower rib into the pleural space until you feel a “pop” and can aspirate air into syringe.
   f. Remove the syringe and needle, leaving the catheter in place.

4. If tension reoccurs, repeat needle decompression.

# Pre-Eclampsia, Eclampsia

## Indications

**Mild Pre-Eclampsia**

- BP > 140/90 and > 300 mg proteinuria in 24 hours.
- Edema

**Severe Pre-eclampsia**

- SBP > 160 or DBP > 110
- Visual disturbances
- Epigastric pain, nausea and vomiting
- Pulmonary edema
- Dyspnea

**Eclampsia**

- Seizures in pregnancy not related to another cause

## Medical Management

1. Place the patient in a left lateral tilt position.

2. Assess maternal vital signs, deep tendon reflexes, and for the presence/absence of clonus initially and at least every 15 min. Assess uterine activity at least every 15 minutes by abdominal palpation or patient reporting.

3. Minimize IV fluid. Goal is total fluids (Normal saline plus magnesium sulfate drip) at ≤ 100 mL/hr.

4. Observe for sudden onset of labor or evidence of abruptio placenta.

5. Administer **Magnesium Sulfate**
   a. Bolus: 6g/100 mL IV, over 20-30 min.
   b. Maintenance infusion: Mix 4g/100 mL NS (or equivalent concentration). Infuse at 2-4g/hr IV

6. Monitor respiratory rate and deep tendon reflexes every 5 min x 3 after initiating treatment and after any dosage change, then every 15 min once stable.

7. Discontinue magnesium sulfate if respiratory rate < 12 or deep tendon reflex absent.

8. If respiratory rate < 8, or cardiac arrhythmias occur, suspect magnesium toxicity.
   a. Administer **calcium gluconate** 1 g of 10% solution IV over 3-5 min.

   Can cause bradycardia and arrhythmias if infused too rapidly.

   Assess for the development/increasing severity of frontal headache, blurred vision, spots before the eyes, nausea, vomiting, and/ or epigastric pain. These indicate central nervous system involvement and a worsening condition. Epigastric pain frequently precedes seizures.

9. Should seizure activity occur, **Magnesium sulfate** is the drug of choice for treatment and to prevent reoccurrence:
   a. Administer an additional 2 g of Magnesium Sulfate over 20-30 min.
   b. If seizure persists more than 2 minutes, consider Lorazepam to control seizure while infusing Magnesium Sulfate, see ***Seizures***.
   c. Increase **Magnesium Sulfate** maintenance infusion by 1 g/hr.
   d. Establish an airway as needed.
   e. Administer oxygen by NRB or BVM.
   f. Protect the patient from harm but do not restrain.

# Pulmonary Edema & CHF

## Indications

- Respiratory distress with chest pain, rales, JVD and/or peripheral edema.

## Medical Management

1. Administer:

   **Nitroglycerin:**

   **Adult**: 0.4 mg SL if SBP > 90. May repeat three times every 2-3 minutes as needed.

2. If no improvement, administer:

   **Nitroglycerin Drip**

   **Adult**: 10 mcg/min IV, rapidly titrate as needed.

   Maintain SBP > 90mmHg.

3. ***CPAP*** protocol.

4. If wheezing present, administer:

   **Albuterol:** 2.5mg by nebulizer every 10 min prn.

   **Ipratropium:** 0.5 mg may be combined with albuterol for the first two nebulized treatments.

5. If respiratory distress does not improve, consider intubation, see ***Rapid Sequence Induction*** protocol.

# Rapid Sequence Induction



## Indications

- Airway obstruction
- Respiratory insufficiency
- Brain injury (GCS < 8)
- Altered Mental Status

Indications for intubation without RSI

- Potential airway compromise
- Cardiac Arrest
- Crash airway- consider paralytics and sedation without pre-oxygenation.

## Medical Management

1. Open airway and if possible pre-oxygenate with 100% oxygen by NRB for 5 min. The addition of a nasal cannula at 6 lpm under the NRB mask will improve oxygenation, and increasing the nasal cannula flow rate to 15 lpm after sedation will help maintain oxygen saturations during apnea. Alternatively, pre-oxygenate with 8 vital capacity breaths. Ventilate the patient with BVM only if $SpO_2$ < 94%.

2. Have all required equipment, including suction unit available and ready.

3. Attach patient to cardiac monitor, when feasible, and observe for dysrhythmias. Monitor pulse oximetry.

4. Ensure IV access is secure.

5. Check for ear-to-sternal notch patient positioning (non- trauma patients).

6. Pediatric < 1 month: Pre-medicate with Atropine 0.02 mg/kg IV. (Minimum dose 0.1 mg).

7. **Ketamine or Midazolam for induction:**

   a. **Ketamine** (drug of choice for most patients) **Adult and Pediatric:** 2 mg/kg slow IV push one minute prior to paralytic administration
   Avoid in patients with brain masses, hydrocephalus, acute globe injury, schizophrenia or when significant elevations in BP might prove harmful (e.g., aortic dissection, acute myocardial infarction, angina).

   b. **Midazolam (Versed)**

   Use cautiously in hypotensive patients.

   **Adult:** 0.1 - 0.3mg/kg IV or IM (max dose 20 mg) three minutes prior to paralytic administration if possible. Use 0.1 mg/kg if hypotensive, history of severe systemic disease or if premedicated with narcotics prior to induction.

   **Pediatric:** 0.05 - 0.1mg/kg IV or IM

8. **Succinylcholine**

   **Adult and Pediatric** (> 10 years): 1 – 1.5 mg/kg

   **Pediatric** (< 10 years): 2 mg/kg IV.

   In pediatrics, use for emergency intubation only due to the rare risk of acute rhabdomyolysis and hyperkalemia.

   If no IV/IO access, consider succinylcholine, 4 mg/kg IM to maximum of 150 mg. Maximum 5 mL per injection site. Administer IM Succinylcholine with caution. Onset and duration of drug may be unpredictable and prolonged secondary to altered hemodynamics and metabolic status.

9. Do not repeat Succinylcholine in the intubated patient as repeat doses may cause bradycardia or asystole. Use Rocuronium if an additional paralytic dose is needed or if succinylcholine is contraindicated (e.g., hyperkalemia, muscular dystrophy, myopathy, previous history of burns).

   a. **Rocuronium**

   **Adult and Ped:** 1 mg/kg IV or 1.8 mg/kg IM.

# Rapid Sequence Induction



## Medical Management

10. Once patient is paralyzed, perform intubation. If you are unable to intubate before SpO2 begins to drop, stop and ventilate the patient for 30-60 seconds and consider making a change in technique or equipment. Two intubation attempts per team member is the maximum. (4 total attempts maximum) If intubation attempts fail, consider rescue airway or continued BVM if able to ventilate.

11. If bradycardia occurs during intubation:
    a. Halt intubation attempts and hyperventilate with 100% O2 via BVM.
    b. If bradycardia persists, administer

       **Atropine**

       **Adults:** 0.5 mg IV to maximum of 3 mg

       **Pediatric:** 0.02 mg/kg IV (min dose 0.1 mg)

12. In addition to ETCO2, verify placement by at least two separate techniques:
    a. Auscultate for bilateral breath sounds and absent gastric sounds.
    b. Observe for equal chest rise and fall.
    c. Maintenance or increase in SpO2.
    d. Misting of tube.

13. Consider placement of c-collar to decrease ETT displacement during transport and moving patient.

14. After ETT placement, maintain sedation for patient comfort, see ***Pain Management, Sedation & Nausea/Vomiting***.

15. It is not necessary to maintain paralysis on every patient; sedation only after intubation is preferred. To maintain paralysis, administer:

    **Rocuronium**

    **Adult and Pediatric:** 0.3 - 0.5 mg/kg IV
    Repeat approximately every 30 min or PRN.

    To initiate paralysis in the intubated patient who is no longer paralyzed, administer:

    **Rocuronium**

    **Adult and Ped:** 1 mg/kg IV or 1.8 mg/ kg IM

# Seizures

## Indications

- General tonic-clonic seizure activity

## Medical Management

1. Maintain a patent airway. Do not force anything between teeth. A NPA may be useful. Suction as needed.

2. Consider possible causes. Check blood glucose. Monitor cardiac rhythm. Refer to ***Diabetic Emergencies*** for hypoglycemic protocols.

3. If actively seizing on arrival or seizure activity persists > 2 minutes, administer benzodiazepine.

   a. **Lorazepam**:

      **Adult**: 2-4mg IV or IM. Repeat every 5 minutes as needed.

      **Pediatric**: 0.1 mg/kg IV or IM. Max 4mg per dose. May repeat every 5 minutes as needed.

   b. **Midazolam**:

      **Adult & Ped**: 0.1 mg/kg IV or IM (maximum dose 5mg.) May repeat every 10 minutes as needed.

4. Continue to monitor airway, especially after seizure end. If hypoventilating or apneic, ventilate with BVM. Intubate if respiratory rate does not improve.

# Whitman County
# Drug Appendix

# Paramedic

# Acetylsalicylic Acid (Paramedic / AEMT / EMT)

| | |
|---|---|
| **Other Names:** | Aspirin |
| **Class:** | Anti-platelet, NSAID, antipyretic |
| **Indications:** | Signs and /or symptoms of acute coronary syndrome |
| **Contraindications:** | Hypersensitivity |
| **Precautions:** | None |
| **Route:** | PO chewed |
| **Suggested Dosage:** | ***Adult:*** 162 mg |
| | ***Pediatric:*** Not indicated |

**Notes:** Drug is to be used as soon as MI is suspected.

# Adenosine (Paramedic)

**Other Names:** Adenocard

**Class:** Anti-dysrhythmic

**Indications:** Paroxysmal supraventricular tachycardia when vagal maneuvers are unsuccessful.

**Contraindications:** Wide complex tachycardia, 2nd and 3rd degree heart blocks, sick sinus syndrome. Caution in patients with asthma and COPD

**Precautions:** Severe bradycardia, VF, VT, atrial fibrillation, asystole, bronchospasm, unstable angina

**Route:** Rapid IV bolus followed by 10 ml NS flush

**Suggested Dosage:** ***Adult:*** 6 mg; 12 mg 2nd dose if first is ineffective.

***Pediatric:*** 0.1 mg/kg; 0.2 mg/kg 2nd dose if first is ineffective.

**Notes:** Pediatric dose should not exceed adult dose.

# Albuterol (*Paramedic / AEMT / #EMT)

| | |
|---|---|
| **Other Names:** | Proventil, Ventolin |
| **Class:** | Adrenergic beta-2 agonist |
| **Indications:** | Treatment of moderate to severe bronchospasm.<br>*Signs and symptoms of hyperkalemia. |
| **Contraindications:** | None |
| **Precautions:** | Arrhythmias, tachycardia, chest discomfort |
| **Route:** | Nebulized, Metered Dose Inhaler |
| **Suggested Dosage:** | ***Adult:*** 2.5 mg<br>***Pediatric:*** 2.5 mg |

**Notes:** #EMT allowed to assist with patients prescribed metered dose inhaler.

*Albuterol for treatment of hyperkalemia is a **Paramedic** treatment and should be done with continuous cardiac monitoring.

# Amiodarone (Paramedic)

**Other Names:** Cordarone

**Class:** Anti-dysrhythmic

**Indications:** VF or VT

**Contraindications:** Second and third-degree AV block

**Precautions:** None

**Route:** IV, IO

**Suggested Dosage:** ***Adult:*** 300 mg 1st dose, 150 mg 2nd dose,
IV Drip: 150 mg over 10 min

***Pediatric:*** Contraindicated

**Notes:**

# Atropine (Paramedic)

| | |
|---|---|
| **Other Names:** | Generic |
| **Class:** | Anticholinergic parasympatholytic |
| **Indications:** | Symptomatic bradycardia.<br>Organophosphate poisoning.<br>Cholinergic poisoning (e.g. mushrooms) |
| **Contraindications:** | HR: greater thank 180 |
| **Precautions:** | Tachycardia, nausea, ventricular ectopy |
| **Route:** | IV, IO |
| **Suggested Dosage:** | *Bradycardia*<br>***Adult:*** 0.5 - 1 mg IV q 3-5 min up to 0.04 mg/kg or 3 mg<br>***Pediatric:*** 0.02 mg/kg (minimum 0.1 mg) may repeat once<br>*Organophosphate & Cholinergic poisoning*<br>**Adult & Pediatric:** See ***Cholinergic Poisoning*** |

**Notes:**

# Calcium Gluconate (Paramedic)

| | |
|---|---|
| **Other Names:** | Generic |
| **Class:** | Mineral and electrolyte replacement / supplement. |
| **Indications:** | Treatment of hyperkalemia, hypermagnesemia, and calcium channel blocker agent toxicity. |
| **Contraindications:** | Hypercalcemia |
| **Precautions:** | Patients receiving digoxin (digitalis glycosides) |
| **Route:** | IV, IO |
| **Suggested Dosage:** | ***Adult:*** 2 grams over 2 min, repeat every 10 min |
| | ***Pediatric:*** 20 mg/kg over 2 min |

**Notes:** Monitor vital signs and ECG frequently. May cause vasodilation with resulting hypotension, bradycardia, arrhythmias. Use a large, secure vein; subcutaneous infiltration can cause tissue necrosis.

# Dextrose (Paramedic / AEMT)

**Other Names:** D50W

**Class:** Caloric

**Indications:** Symptomatic hypoglycemia

**Contraindications:** Hyperglycemia

**Precautions:** None

**Route:** IV, IO

**Suggested Dosage:** ***Adult:*** 25 grams Dextrose 50%

***Pediatric:*** 2 ml/kg Dextrose 25% (D25 = dilute D50 1:1 with sterile water or saline)

***Neonate:*** 2 ml/kg Dextrose 10% (D10 = dilute D50 1:4 with sterile water or saline)

**Notes:**

# Diltiazem (Paramedic)

**Other Names:** Cardizem

**Class:** Calcium Channel Blocker

**Indications:** Supraventricular tachy-dysrhythmias, rapid ventricular rates in atrial flutter or fibrillation.

**Contraindications:**
- Hypersensitivity
- Sick Sinus Syndrome
- $2^{nd}$, $3^{rd}$ degree AV block (unless artificial peacemaker is in place)
- Recent MI or Pulmonary blockage
- Systolic BP < 90 mm/hg

**Precautions:** Sever Hepatic and renal impairment

**Route:** IV, IO

**Suggested Dosage:** ***Adult:*** 0.25 mg/kg over 2 min, $2^{nd}$ dose in 15 min of 0.35 mg/kg over 2 min. Maintenance infusion (5-15 mg/hour) for up to 24 hrs.

***Pediatric:*** Not indicated

**Notes:**

# Diphenhydramine (Paramedic)

| | |
|---|---|
| **Other Names:** | Benadryl® |
| **Class:** | Antihistamine |
| **Indications:** | Anaphylaxis, allergic reaction, dystonia, akathisia caused by droperidol |
| **Contraindications:** | Anticholinergic poisoning, hypersensitivity |
| **Precautions:** | None |
| **Route:** | IM, IV, IO |
| **Suggested Dosage:** | ***Adult:*** 25-50 mg |
| | ***Pediatric:*** 1 mg/kg maximum dose 25 mg |

**Notes:**

# Epinephrine (*PARA / AEMT / EMT / #EMR)

**Other Names:** Adrenalin®

**Class:** Sympathomimetic

**Indications:** Anaphylaxis, *bradycardia, *hypotension, *severe bronchospasm, *cardiac arrest.

**Contraindications:** None

**Precautions:** May cause cardiac ischemia in the elderly or patients with known cardiac disease

**Route:** Nebulized, IM, IV, IO, ETT.

**Suggested Dosage:**

***Adult:***

Anaphylaxis: 0.3 mg 1:1,000;
*0.1mg/kg 1:1,000 max 0.5 mg; repeat as needed.

*Hypotension: 2-10 mcg/min

*Cardiac Arrest: AHA guidelines

*Bradycardia: AHA guidelines

***Pediatric:***

Anaphylaxis: 0.15 mg 1:1,000;

*0.1mg/kg 1:1,000; max 0.5 mg; repeat as needed.

*Cardiac Arrest: AHA guidelines

**Notes:** *Paramedic level treatment.

#EMR is only permitted to use epinephrine auto injector.

# Fentanyl Citrate (Paramedic)

**Other Names:** Fentora, Astiq, Duragesic, Abstral

**Class:** Narcotic analgesic

**Indications:** Severe pain

**Contraindications:** Hypersensitivity

**Precautions:** Consider lower doses in patients with evidence of alcohol use, elderly, or chronically ill patients.

**Route:** IV, IO, IM, IN

**Suggested Dosage:** ***Adult:*** 0.5-1 mcg/kg, repeat every 10 minutes as needed. (Maximum dose 200 mcg)

***Pediatric:*** 1 mcg/kg, repeat every 10 minutes as needed.

**Notes:**

# Glucagon (Paramedic / AEMT / *EMT)

| | |
|---|---|
| **Other Names:** | GlucaGen |
| **Class:** | Endocrine |
| **Indications:** | Hypoglycemia with an inability to establish IV access. Calcium channel blocker toxicity and beta blocker toxicity. |
| **Contraindications:** | None |
| **Precautions:** | Patients who receive glucagon should be transported and receive repeat blood glucose measurement. |
| **Route:** | IM |
| **Suggested Dosage:** | ***Adult:*** 1 mg<br>***Pediatric:*** 0.1 mg/kg, Max dose of 1 mg |

**Notes:** ***EMT** can administer but must have specific MPD approval.

# Ketamine (Paramedic)

**Other Names:** Ketalar

**Class:** Non-barbiturate anesthetic

**Indications:** Primarily for hypotensive patients requiring sedation, as an inductions agent for patients during RSI, as an adjunct to opioids for uncontrolled pain and for treatments of excited delirium.

**Contraindications:** Avoid in patients with brain masses, hydrocephalus, acute globe injury, psychotic mental health disorder such as schizophrenia or when significant elevations in BP might prove harmful (e.g., aortic dissection, acute myocardial infarction, angina).

**Precautions:** Emergence syndrome:

Patients who receive Ketamine may experience delusions, hallucinations and “out of body” experiences that may last up to 3 hours. May be treated reassurances and benzodiazepines if needed.

**Route:** IM, IV, IO

**Suggested Dosage:** ***Sedation:*** 1mg/kg SIVP. Repeat 0.5 mg/kg every 10-15 minutes.

***Induction:*** 2 mg/kg SIVP

***Analgesic:*** 0.1-0.3 mg/kg SIVP

***IM sedation:*** 4 mg/kg IM

**Notes:** If possible, give concurrent dose of Lorazepam or Midazolam to blunt emergence phenomenon.

# Oral Glucose (Paramedic / AEMT / EMT)

| | |
|---|---|
| **Other Names:** | Glutose®, Insta-glucose® |
| **Class:** | Caloric |
| **Indications:** | Patient with an altered mental status and a known history of diabetes. |
| **Contraindications:** | Unconscious patients or unable to swallow |
| **Precautions:** | Use caution to prevent aspiration |
| **Route:** | PO |
| **Suggested Dosage:** | ***Adult:*** 10-15 grams |
| | ***Pediatric:*** 10-15 grams |

**Notes:** Ask the patient to swallow before administration to make sure they are capable.

# Haloperidol (Paramedic)

**Other Names:** Haldol®

**Class:** Antipsychotic

**Indications:** Sedation of combative or violent patients

**Contraindications:** Known ingestion of CNS depressants, angle closure glaucoma, severe liver disease.

**Precautions:** May cause QT prolongation, extrapyramidal side effects, muscle stiffness, akathisia.

**Route:** Slow IV, IM

**Suggested Dosage:** ***Adult:*** 5-10 mg

***Pediatric:*** Not indicated

**Notes:**

# Ipratropium Bromide (Paramedic / AEMT)

**Other Names:** Atrovent

**Class:** Anticholinergic. Blocks the muscarinic acetylcholine receptors in the smooth muscles of the bronchi in the lungs.

**Indications:** Initial treatment of moderate to severe bronchospasm administered with albuterol.

**Contraindications:** None

**Precautions:** Arrhythmias, tachycardia, chest discomfort

**Route:** Nebulized

**Suggested Dosage:** ***Adult:*** 2.5 mg diluted to 3 ml with NS

***Pediatric:*** ≥ 2 years old, 1.5 mg

< 2 years old, 0.75 mg

**Notes:**

# Labetalol (Paramedic)

| | |
|---|---|
| **Other Names:** | Trandate |
| **Class:** | Antihypertensive |
| **Indications:** | Hypertension, Pressure control in stroke, |
| **Contraindications:** | Uncompensated heart failure, pulmonary edema, cardiogenic shock, heart block. |
| **Precautions:** | Renal impairment, Hepatic impairment, diabetes (can cause hypoglycemia) |
| **Route:** | IV |
| **Suggested Dosage:** | ***Adult:*** contact Medical Control |
| | ***Pediatric:*** contact Medical Control |

**Notes:** Labetalol is for interfacility transfers as ordered by sending physicians. Labetalol should be acquired from sending facility at time of transfer.

# Lidocaine 2% (Paramedic)

**Other Names:** Xylocaine®

**Class:** Anti-dysrhythmic

**Indications:** Pulseless VF/VT, stable VT, frequent PVC's, after IO insertion for awake patients.

**Contraindications:** Narrow complex SVT, heart block, WPW, a-fib with RVR.

**Precautions:** None

**Route:** IV

**Suggested Dosage:**

***Adult:*** 1-1.5 mg/kg every 5-10 minutes, maximum total dose of 3mg/kg

***Infusion:*** Maintenance drip 2-4 mg/minute

***IO insertion:*** 20-50 mg before flush

***Pediatric:*** 1 mg/kg IV every 5-10 minutes, maximum total dose of 3mg/kg

**Notes:**

# Lorazepam (Paramedic)

**Other Names:** Ativan®

**Class:** Benzodiazepine

**Indications:** Seizure, sedation, anxiety

**Contraindications:** Myasthenia gravis

**Precautions:** May cause hypotension

**Route:** IV, IM, IO, IN

**Suggested Dosage:** ***Adult:*** 1-2 mg, repeat every 5 minutes as needed

***Elderly:*** 0.5-1 mg, repeat every 5 minutes, not to exceed total dose of 2 mg.

***Pediatric:*** 0.05-0.1 mg/kg

**Notes:** Use with caution when treating elderly patients.

# Magnesium Sulfate (Paramedic)

**Other Names:** Generic

**Class:** Mineral

**Indications:** Pre-eclampsia, eclampsia, Torsades des Points, hypomagnesemia, refractory VF/VT.

**Contraindications:** Heart block, patients treated with paralytic agents.

**Precautions:** Observe for hypotension, loss of deep tendon reflexes, CNS depression, pulmonary edema and paralysis.

**Route:** IV, IO

**Suggested Dosage:** ***Adult:*** Eclampsia: 6 grams over 10 min.
Toresades des Points: 2 grams over 5 min.
Bronchodilations: 2 grams over 5 min.
***Pediatric:*** 25-50 mg/kg over 5 minutes, max 2 grams.

**Notes:**

# Metoprolol (Paramedic)

| | |
|---|---|
| **Other Names:** | Lopressor, Toprol-XL |
| **Class:** | Antihypertensive |
| **Indications:** | Hypertension |
| **Contraindications:** | Uncompensated heart failure, pulmonary edema, cardiogenic shock, heart block, bradycardia. |
| **Precautions:** | Renal impairment, hepatic impairment, can cause hypoglycemia in diabetics. |
| **Route:** | PO, IV, IO |
| **Suggested Dosage:** | ***Adult:*** 5-10 mg |
| | ***Pediatric:*** Not indicated |

**Notes:** Metoprolol is for interfacility transfers as ordered by sending physician. Metoprolol should be acquired from sending facility at time of transfer.

# Midazolam (Paramedic)

**Other Names:** Versed®

**Class:** Benzodiazepine

**Indications:** Seizures, sedation, induction for endotracheal intubation.

**Contraindications:** Hypoglycemia, Hypersensitivity

**Precautions:** May cause CNS depression, hypotension, CNS depressive effects potentiated by administration of opioids.

**Route:** IV, IM, IO

**Suggested Dosage:**

***Adult:*** Induction: 0.1-0.3mg/kg max dose 20mg
Sedation: 1-3 mg
Infusion: 1-2 mg/hr titrated in 1 mg/hr increments every 15 minutes as needed. Max 10 mg/hr.

***Pediatric:*** Induction: 0.1-0.3mg/kg, max 20 mg
Sedation: 0.05-1mg/kg max 3 mg.

**Notes:** Use lower dose in elderly population.

# Morphine Sulfate (Paramedic)

**Other Names:** Generic

**Class:** Narcotic analgesic

**Indications:** Treatment of pain, potentiation of benzodiazepine.

**Contraindications:** Hypotension, hypersensitivity.

**Precautions:** May cause hypotension and CNS depression.

**Route:** IV, IO, IM

**Suggested Dosage:** ***Adult:*** 2-5 mg, repeat every 10 minutes as needed. Not to exceed max total dose of 20 mg.

***Pediatric:*** 0.1-0.2 mg/kg, repeat every 10 minutes as needed. Not to exceed individual adult dose or max total dose of 20 mg.

**Notes:**

# Naloxone (PARA / AEMT / *EMT / *EMR)

| | |
|---|---|
| **Other Names:** | Narcan® |
| **Class:** | Opiate antagonist |
| **Indications:** | Opiate overdose |
| **Contraindications:** | Neonate with possible drug dependence |
| **Precautions:** | May cause nausea |
| **Route:** | IV, IO, IM, IN |
| **Suggested Dosage:** | ***Adult:*** 0.4-2 mg, repeat as needed |
| | ***Pediatric:*** 0.1 mg/kg, not to exceed adult dose |

**Notes:** *EMT & *EMR can administer IN but must have specific MPD approval.

# Nitroglycerin (Paramedic / *AEMT / #EMT)

**Other Names:** Nitrotab®, Nitrostat®, Tridill®

**Class:** Vasodilator, Anti-anginal

**Indications:** Chest discomfort from acute coronary syndrome hypertensive pulmonary edema, congestive heart failure.

**Contraindications:** Patients taking phosphodiesterase inhibitors (e.g. Viagra, Cialis, or Levitra in the past 48 hours) SBP less than 100.

**Precautions:** Hypotension, may cause headache.

**Route:** Sublingual, IV, IO, Transdermal.

**Suggested Dosage:** ***Adult:*** Tablet: 0.4 mg, repeat every 3-5 minutes for maximum of three doses.

Infusion: Start at 10mcg/min, titrate every 5 minutes as indicated maintaining systolic blood pressure above 100.

***Pediatric:*** If indicated contact medical control for dosing.

**Notes:** *AEMT can only administer sublingual tablets.
#EMT basic can assist with patient's prescription.

# Norepinephrine (Paramedic)

| | |
|---|---|
| **Other Names:** | Levophed |
| **Class:** | Vasopressor |
| **Indications:** | Produce vasoconstriction and myocardial stimulation; which may be required after adequate fluid replacement in the treatment of severe hypotension and shock. |
| **Contraindications:** | Hypoxia, hypercarbia, hypotension secondary to hypovolemia. |
| **Precautions:** | Hypothyroidism, cardiovascular disease, can decrease uterine blood flow. |
| **Route:** | IV, IO |
| **Suggested Dosage:** | ***Adult:*** 0.5-30 mcg/kg/min; titrate every 5 minutes as indicated.<br>***Pediatric:*** 0.5-2 mcg/kg/min; titrate every 5 minutes to max dose 30 mcg/min. |
| **Notes:** | |

# Ondansetron (Paramedic)

| | |
|---|---|
| **Other Names:** | Zofran® |
| **Class:** | Antiemetic |
| **Indications:** | Treatment of nausea, motion sickness |
| **Contraindications:** | Hypersensitivity, QTC greater than 450 |
| **Precautions:** | Caution in liver dysfunction |
| **Route:** | PO, IV, IO |
| **Suggested Dosage:** | ***Adult:*** 4 mg, may repeat once.<br>***Pediatric:*** 0.1 mg/kg, max 4 mg. |

**Notes:**

# Oxygen (PARA / AEMT / EMT / EMR)

**Class:** Gas

**Indications:** Indication of hypoxic state, shock, cardiac or pulmonary.

**Contraindications:** COPD consider giving a lower percentage of oxygen

**Precautions:** Respiratory arrest in patients with hypoxic drive.

**Route:** Oxygen therapy using non-rebreather mask(NRB) 10-15 lpm, titrate to SpO2 94%.

Oxygen therapy using nasal cannula(NC) 2-6 lpm, titrate to SpO2 94%.

Oxygen therapy using bag valve mask(BVM) 15 lpm, titrate to SpO2 94%

**Notes:**

# Racemic Epinephrine (Paramedic)

| | |
|---|---|
| **Other Names:** | Racepinephrine |
| **Class:** | Sympathomimetic |
| **Indications:** | Croup with stridor that is non-responsive to humidified air. |
| **Contraindications:** | Hypersensitivity |
| **Precautions:** | None |
| **Route:** | Nebulized |
| **Suggested Dosage:** | ***Pediatric:*** 0.5 mL of 2.25% solution added to 2.5 mL normal saline. May repeat every 20-30 min. |

**Notes:**

# Rocuronium Bromide (Paramedic)

| | |
|---|---|
| **Other Names:** | Zemuron® |
| **Class:** | Non-depolarizing neuromuscular |
| **Indications:** | Procedural paralysis for endotracheal intubation. |
| **Contraindications:** | Hypersensitivity |
| **Precautions:** | Ensure adequate sedation prior to and during use. |
| **Route:** | IV, IO, IM |
| **Suggested Dosage:** | ***Adult:*** 1 mg/kg ideal body weight; repeat dose 0.3-0.5 mg/kg every 30 minutes |
| | ***Pediatric:*** Same as adult |

**Notes:** Duration of action 30-60 minutes. Avoid repeat neuromuscular blockade administration through focus on sedation and analgesia for ventilated patient.

# Sodium Bicarbonate (Paramedic)

**Other Names:** Generic

**Class:** Electrolyte (base)

**Indications:** Tricyclic antidepressant overdose, metabolic acidosis, hyperkalemia, diphenhydramine overdose, dialysis patients in cardiac arrest.

**Contraindications:** Hypertension, hypertensive pulmonary edema.

**Precautions:** Administer slowly

**Route:** IV, IO

**Suggested Dosage:** ***Adult:*** 1 mEq/kg

***Pediatric:*** 1 mEq/kg

**Notes:**

# Succinylcoline (Paramedic)

| | |
|---|---|
| **Other Names:** | Anectine®, Quelicin® |
| **Class:** | Depolarizing neuromuscular blocker |
| **Indications:** | Intubation in patients with intact gag reflex or whose degree of pharyngeal muscle tone prevents intubation. |
| **Contraindications:** | Known hyperkalemia, history of malignant hyperthermia, narrow angle glaucoma. |
| **Precautions:** | Anticipated difficult airway, neuromuscular disorders (e.g. myasthenia gravis, muscular dystrophy, stroke, paraplegia, burns greater than 48 hours post incident.) |
| **Route:** | IV, IO, IM |
| **Suggested Dosage:** | ***Adult:*** 1-2 mg/kg IV/IO, 4 mg/kg IO.<br>***Pediatric:*** 2 mg/kg IV/IO, 4 mg/kg IO. |

**Notes:**