# TAHOE DOUGLAS


# FIRE DISTRICT

**P.O. BOX 919**
**Zephyr Cove, Nevada 89448**
**(775) 588-3039**

## PARAMEDIC AND ADVANCED EMT

# PROTOCOL MANUAL

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# MISSION STATEMENT

Preserve and enhance the quality of life in our community through a professional, highly-trained, well-equipped organization which delivers quality fire suppression, prevention, education, emergency medical service, explosive ordinance disposal, rescue and other services with concern for the well being of our personnel.

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# Table of Contents

## *Pediatric Treatment Protocols*



## *Operational Protocols*

# Foreword

These protocols were developed for the following reasons:

- To provide the EMS provider with a quick field reference guide and;
- To develop written standards of care which are consistent throughout the Tahoe Douglas Fire Protection District.

**Disclaimer:** Users of these protocols are assumed to have knowledge of patient management principles found in EMS textbooks and literature appropriate to the EMS provider's level of training and licensure. You are encouraged to confirm information in this book with other sources, as standards in emergency care change from time to time and state to state. TDFPD and authors of these protocols assume no liability with respect to the accuracy, completeness, or application of the information in this guide. This guide is not designed to cover every aspect of every operation but to ASSIST field personnel. This guide does not replace proper training and should not hinder the decision-making ability of EMS personnel. To use these protocols as they were written it is necessary to know the philosophy, treatment principles, and definitions which guided the physicians and other EMS providers who drafted these protocols.

# INTENT AND USE OF PROTOCOLS

These protocols generally reflect a conservative and evidence-based treatment strategy. The paramedic in charge at a medical incident may use judgement in their use of these protocols. Cases in which any such protocol deviations are made will require closer scrutiny of the run report by the appropriate quality assurance program. In such cases, it is necessary for the documentation to describe the circumstances which justify the deviation. The privileges extended in these protocols come with the responsibility for professional accountability through complete and accurate documentation. The treatment protocols are divided into Universal, Adult, Pediatric, and Operational sections.

**Treatments encompass scopes of practice for both Advanced Emergency Medical Technicians (AEMT) and paramedics. Within each protocol, AEMT scope is indicated in BLUE and paramedic interventions are indicated in RED.**

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# Universal Treatment Protocols

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# Acute Adrenal Crisis

Patient with signs and symptoms of:

- Shock
- Cardiovascular Instability
- Hyperkalemic Arrhythmias

AND

- Have a documented diagnosis of Congenital Adrenal Hyperplasia or another form of adrenal insufficiency

- Assess oxygenation and administer O2 as needed
- Cardiac Monitor, Vital signs (including Blood Glucose)
- Manage Airway
- Obtain IV or IO access
- If available, administer either:
  - Hydrocortisone Sodium Succinate
    - 2 mg/kg IV/IO/IM for children
    - 100 mg IV/IO/IM for adolescents/adults

  OR

  - Methylprednisolone
    - 0.5 mg/kg IV/IO/IM for infants
    - 10 mg/kg IV/IO/IM for children
    - 20 mg/kg IV/IO/IM for adults

**Special Considerations:**

- Acute adrenal crisis is a life threatening emergency caused by a disorder of the adrenal glands (Addison's disease)
- Patients with an adrenal crisis will often present with pain in their lower back or abdomen, severe vomiting or diarrhea, hypotension, loss of consciousness and severe electrolyte disturbances
- The medications listed above will be prescribed to the patient, and this protocol intends for EMS to be able to administer patients home medications for them in the event that they are unable to self-medicate

# Amputation

- Resuscitate and treat other more urgent injuries
- Control bleeding with appropriate measures
  - Tourniquet proximal to injury if other measures ineffective
- Obtain IV access
- Consider Pain Management/Sedation protocol

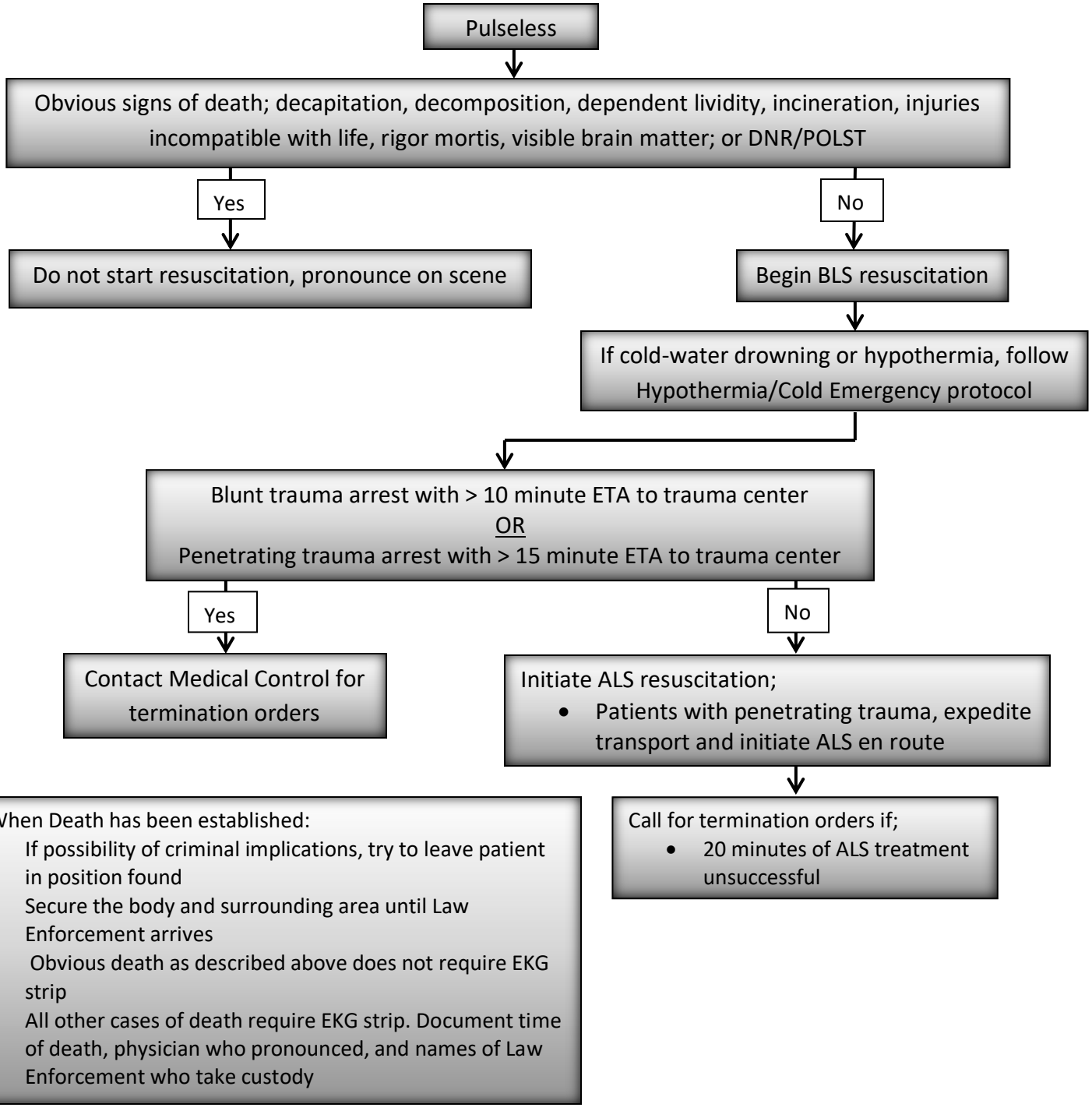
**Amputation**

- Rinse wound with sterile saline, place moist sterile dressing over stump and apply pressure wrap
- Rinse amputated part in sterile saline, wrap in dry pads and place into dry container on ice. Avoid possible cold injury to part. Transport part with patient.

**Partial Amputation**

- Control Bleeding
- Splint in anatomical position and stabilize
- Cover with moist sterile dressing
- Do not remove foreign bodies
- Save any avulsed tissue

# Resuscitation Guidelines




**Special Considerations:**

- Paramedic may cease resuscitation that has been started prior to arrival if there are obvious signs of death or a DNR/POLST is presented
- Arrests from electrical injury; treatment should be timely, aggressive and persistent. Resuscitation efforts have high success rates even when resuscitation durations are prolonged

# General Patient Assessment

- Review dispatch information when en route
- Determine proper PPE
- Evaluate scene safety
- Determine number of patients
- Consider need for additional resources

→ START triage if MCI

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Determine mechanism of injury or nature of illness

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Patient assessment/history with vital signs (blood pressure, heart rate, SpO2, pain scale and when indicated; blood glucose and/or temperature

- Airway
- Breathing
- Circulation
- Disability
- Exposure

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- Consider cardiac monitor or AED
- Consider 12 Lead ECG
- Consider EtCO2 and SpCO2 monitoring
- Consider vascular access and administer fluid as needed
    - Adult – fluid bolus 500mL, reassess, repeat up to 2000mL max
    - Pediatric – fluid bolus 20mL/kg, reassess, may repeat x1
    - Neonate – fluid bolus 10mL/kg, reassess, may repeat x1

↓

Perform ongoing assessment and refer to appropriate protocols based on findings

**This protocol is the foundation for a general patient assessment, under which all patients encountered by Tahoe Douglas Fire are treated within**

# Less Lethal Munitions Care

Less than lethal munitions are discriminate weapons that are explicitly designed and employed to incapacitate personnel while minimizing fatalities and undesired damage to property and the environment. Unlike weapons that permanently destroy targets through blast, fragmentation, or penetration, less than lethal munitions have relatively reversible effects on personnel.

- Any patient who has encountered less than lethal munitions needs to have a full assessment performed in order to identify any injuries or medical conditions which would require treatment and should be transported to the Emergency Department for further evaluation and care, unless the patient has the capacity and competence to refuse care and sign an AMA.
- In any patient, who has been involved in an encounter with law enforcement and who experienced a great deal of physical activity and who has been placed in restraints, the provider should consider the possibility of "In Custody Death." The recent use of drugs, alcohol, obesity, or medical history may increase the risk for sudden cardiac arrest.
- Assess and treat with appropriate protocol according to findings and patient signs and symptoms.

**Pepper Spray/Tear Gas Exposure**

- Avoid cross contamination
- Irrigate with large volumes of normal saline
- Pepper Spray can also be neutralized with commercial wipes
- Always wear gloves and eye protection when treating exposed patients

→ Treat respiratory complaints per respiratory distress protocol

**Taser Dart Care**

- Assess for secondary injuries
- If taser dart has penetrated the eye or other sensitive areas;
  - Immobilize dart
  - Cut wires above dart
  - Transport
- To remove darts from other areas;
  - Pull skin tight
  - Pull dart straight out
- Clean site around wound and advise patient to be aware of signs of infection

**Kinetic Impact Munition Care**

- Common kinetic impact munitions include; bean bag rounds, rubber rounds, wood/plastic rounds
- All kinetic impact munitions have ability to cause severe injury or death
- Persons struck require thorough assessment

# Spinal Motion Restriction

**Conduct a focused spinal exam**

- Can patient participate in exam? Are they in severe distress or do they have any distracting injuries?
- Assess distal CMS, bilateral grips, equal push/pull
- Palpate entire spine on the boney processes one at a time from C1 to L5
- Ask the patient to rotate their head 45 degrees from side to side without assistance

Focused spinal assessment reveals:

- Unresponsive
- Inability to perform spinal exam
- Gross motor or sensory deficits from blunt trauma

Yes → **Full Spinal Motion Restriction**
Application of cervical collar and placement of patient onto long backboard, with head and body secured with straps or tape

No ↓

Focused spinal assessment reveals:

- Abnormal findings from focused spinal exam
- Blunt injury from significant mechanism
- Clinically intoxicated (drugs or alcohol)
- Altered Level of Consciousness
- Distracting injuries
- Gross motor or sensory deficits from penetrating trauma
- Midline upper third thoracic/cervical spine pain or tenderness
- Spine deformity
- Limited cervical spine range of motion

Yes → **Focused Spinal Motion Restriction**
Application of cervical collar and placement of patient in a position of comfort on gurney with normal seat belt straps applied

No ↓

If no to all of the above, focused spinal motion restriction not necessary

Special Considerations:

- Consider modified restriction in patients with arthritis, kyphosis, cancer or other underlying spinal or bone disease who may have an increased risk of spinal compromise
- Any patient may be motion restricted based on EMS provider impression


# Adult Treatment Protocols

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# Acute Coronary Syndrome (Suspected)

- Cardiac Monitor
- Obtain 12 Lead ECG

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- Vascular Access
- OXYGEN – Maintain Sp02 93-97%
- ASPIRIN – 324 mg PO
- NITROGLYCERINE- 0.4 mg SL, repeat q5 min
  - If SBP > 100
  - Consider 1 inch NITROGLYCERINE PASTE if long transport
- Consider *Pain Management/Sedation* with FENTANYL and/or MORPHINE
- Refer to *Nausea/Vomiting* protocol as needed

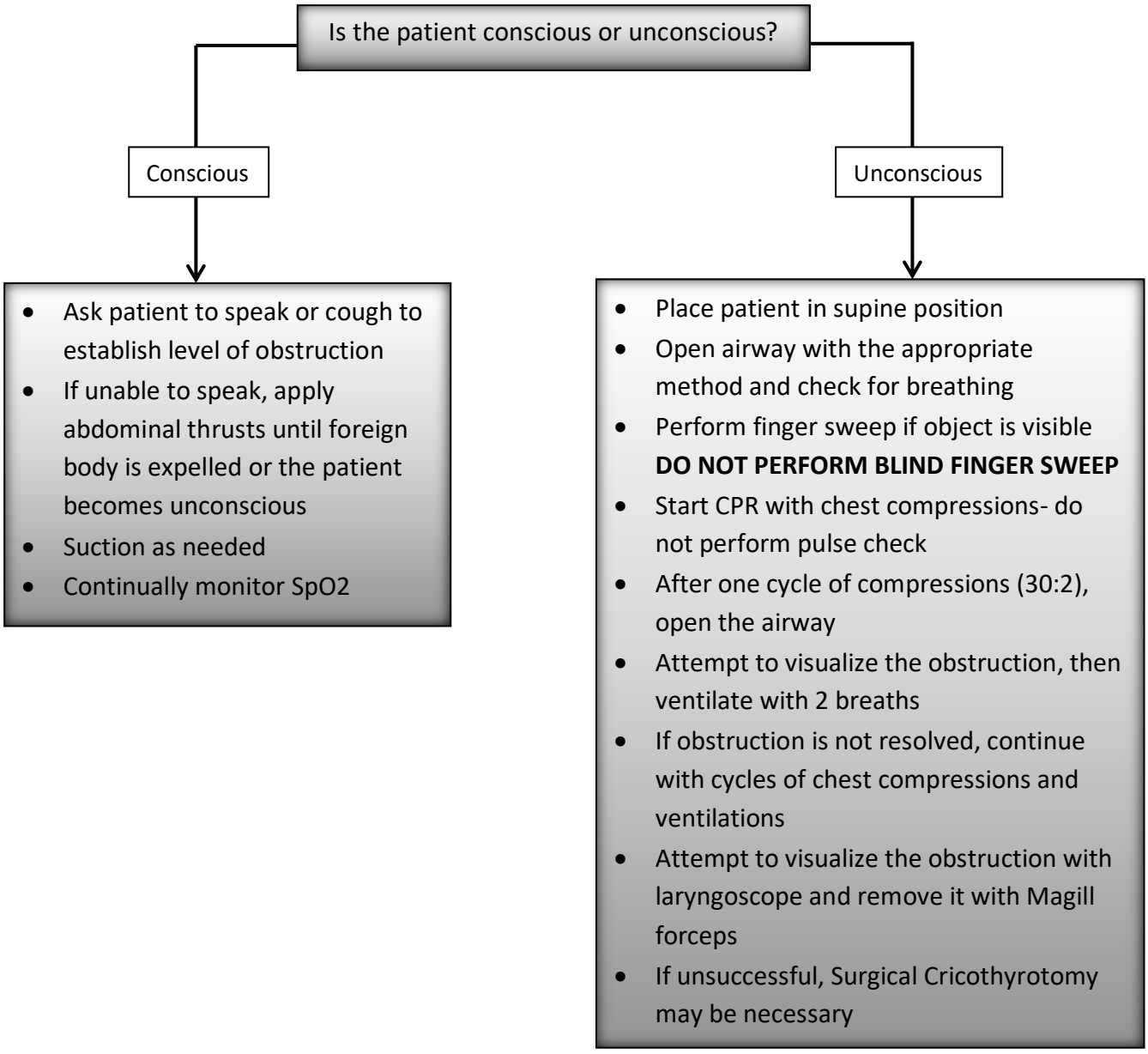
*****STEMI*****

- Transport determination (Paramedics discretion)
  - Stable- Carson Tahoe
  - Unstable- Barton Memorial
- If transporting to Carson Tahoe, attempt to transmit 12 Lead and call STEMI Alert to Carson Tahoe on scene, or as soon as possible

**Special Considerations:**

- 12 Lead ECG should be obtained as soon as reasonably possible
- Consider 15 Lead ECG or alternate lead placement for Inferior MI, suspected ACS with normal 12 Lead, or ST depression in precordial leads
- Diabetic, geriatric, and female patients often have an atypical presentation
- Family history of cardiac disease and/or patients with history of hypertension, hyperlipidemia, diabetes, CAD, stroke, tobacco should be considered significant risk factors
- FENTANYL should be considered as first line analgesic unless otherwise clinically indicated
- Consider 12 Lead ECG on all patients >35 year of age experiencing vague or non-specific jaw/chest/abdominal discomfort

# Airway Obstruction




**Special Considerations:**

- If patient presents with trismus and noisy respirations, insert NPA and attempt to assist ventilations with BVM
- Avoid Hyperventilation
- Maintain ETCO2 at 35-45

# Allergy/Anaphylaxis/Dystonia

- Assess oxygenation and administer Oxygen as needed
- Assess severity of Allergic Reaction

**Allergy/Anaphylaxis**

*MILD*: swelling, itching, redness, hives

- DIPHENHYDRAMINE 25-50 mg IV/IM

*MODERATE*: Mild plus wheezing and difficulty swallowing, mild hypotension

- Obtain IV access, cardiac monitor, NS fluid bolus
- DIPHENHYDRAMINE 25-50 mg IV
- ALBUTEROL 2.5 mg HHN, as needed
- Consider EPINEPHRINE, 0.3 mg 1:1,000 IM
  - Rapid progression of signs/symptoms, or history of severe allergic reaction
- If reaction is worsening despite treatment, move to SEVERE

*SEVERE*: impeding respiratory failure, severe hypotension

- Secure Airway
- EPINEPHRINE 0.3 mg 1:1,000 IM
- DIPHENHYDRAMINE 25-50 mg IV
- EPINEPHRINE 0.3 mg 1:10,000 IV
  - Repeat as needed
- SOLUMEDROL 125 mg SIVP
- Treat signs and symptoms of shock as necessary

**Dystonia**

- Obtain IV Access
- DIPHENHYDRAMINE 25-50 mg IV/IM

# Behavioral Emergency

**Physical Restraints**

- When a patient is a threat to themselves, bystanders, or EMS personnel
- Utilize soft restraints
- Restraining opposite muscle groups (swimmers position) is most effective, never restrain prone/hog-tied position
- Assess distal CMS after restraints, every 10 minutes
- Monitor and maintain oxygenation
- Obtain vascular access as needed
- Apply cardiac monitor as needed (required with chemical restraint)
- Document reasons for restraint
- Incarcerated patients may be restrained at the discretion of Law Enforcement

**Chemical Restraint**

- HALOPERIDOL 5 mg IV/IM, repeat q 5-10 min, max dose 15mg
- DIPHENHYDRAMINE 25-50 mg IV/IM
- MIDAZOLAM 2-5mg IV/IO/IM/IN, repeat as needed
- KETAMINE 2-4mg/kg IM OR 1-2mg/kg IV, repeat as needed

**Special Considerations:**

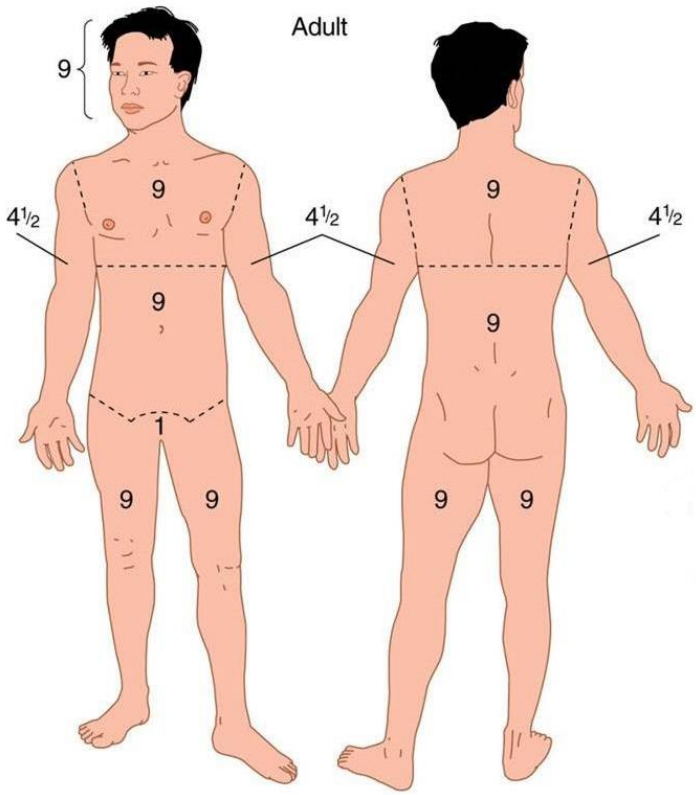
- If using KETAMINE, consider MIDAZOLAM 0.5 -2 mg IV to prevent reemergence phenomenon
- Hostile, angry or unwilling patients who are competent may refuse service
- Ensure the patient is searched for weapons prior to transport
- If patient is prescribed anti-psychotics and/or non-compliant, strongly consider HALDOL administration

# Burns

Some patients may bypass the nearest trauma center and be transported directly to a burn center based on the destination protocol

**Thermal Burns**

- Remove clothing which is smoldering and non-adherent to patient
- Assess oxygenation and administer oxygen as needed
- Assess and treat associated trauma/smoke inhalation
- Remove rings, bracelets and other constricting objects
- Determine burned body surface area (BSA only calculated for Full and Partial Thickness burns)
    - If <10% BSA, use moist saline dressing for patient comfort
    - If >10% BSA, use clean, dry dressings
- Obtain vascular access




**Fluid Administration**

Parkland Burn Formula

- 4 mL NS x BSA (%) x Body weight (kg)
- Administer 50% of total fluids over first 8 hours
- Administer 50% of total fluids over next 16 hours

- If transport is greater than 15 min
    - Run Ringer's Lactate at 500 mL/hr
- If transport is less than 15 min
    - Run Ringer's Lactate wide open

**Pain Management**

Aggressively manage pain according to *Pain Management/Sedation* protocol

**Airway Management**

Aggressively manage patients airway, consider *Medication Assisted Intubation* for patients with singed nasal hair and respiratory distress

# Burns

Some patients may bypass the nearest trauma center and be transported directly to a burn center based on the destination protocol

**Chemical Burns**

- Protect rescuer from contamination
- Remove all clothing and brush off any solid chemical remaining on patient
- Assess and treat associated injuries and evaluate for systemic symptoms
- Cover burn with clean, dry dressings
- Keep patient warm
- Contact hospital ASAP with chemical contaminant information, patient might require further decontamination prior to entry into Emergency Department



Consider *Pain Management/Sedation* protocol

**Electrical Burn/Lightning**

- Separate victim from electrical source when safe
- Place patient on cardiac monitor, patients who suffer electrical injuries are at high risk for Cardiac Dysrhythmias
- Obtain vascular access
- Treat associated thermal burns as outlined in *Thermal Burns*



- Consider *Pain Management/Sedation* protocol
- Treat dysrhythmias per protocol

# Cardiac - Arrest

- Unconscious and unresponsive
- Pulseless
- Does not meet any criteria for withholding resuscitation

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- Begin CPR- pulse check/rhythm interpretation every 2 minutes
  - Continue CPR following all pulse checks as indicated by patient condition
- Place patient on cardiac monitor or AED
  - Utilize CPR assist device when feasible
- Manage airway as indicated by patient condition
- Consider reversible causes

## V-Fib, Pulseless V-Tach, Torsades

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- Defibrillate @ 200 J
- 2 min CPR prior to medication administration
- Obtain IV or IO access
- Intubation or insertion of Supraglottic airway device
- Utilize End Tidal CO2 monitoring ASAP

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EPINEPHRINE 1.0 mg 1:10,000 IV/IO q 3-5 min

- Defibrillate @ 200 J

↓

**V-Fib or Pulseless V-Tach**

AMIODARONE 300 mg IV/IO
- repeat once at 150 mg in 3-5 min

**Torsades**

MAGNESIUM SULFATE 2 g IV/IO over 5 min

## Asystole/PEA

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- Obtain IV or IO access
- Intubation or insertion of Supraglottic airway device
- Utilize End Tidal CO2 monitoring ASAP

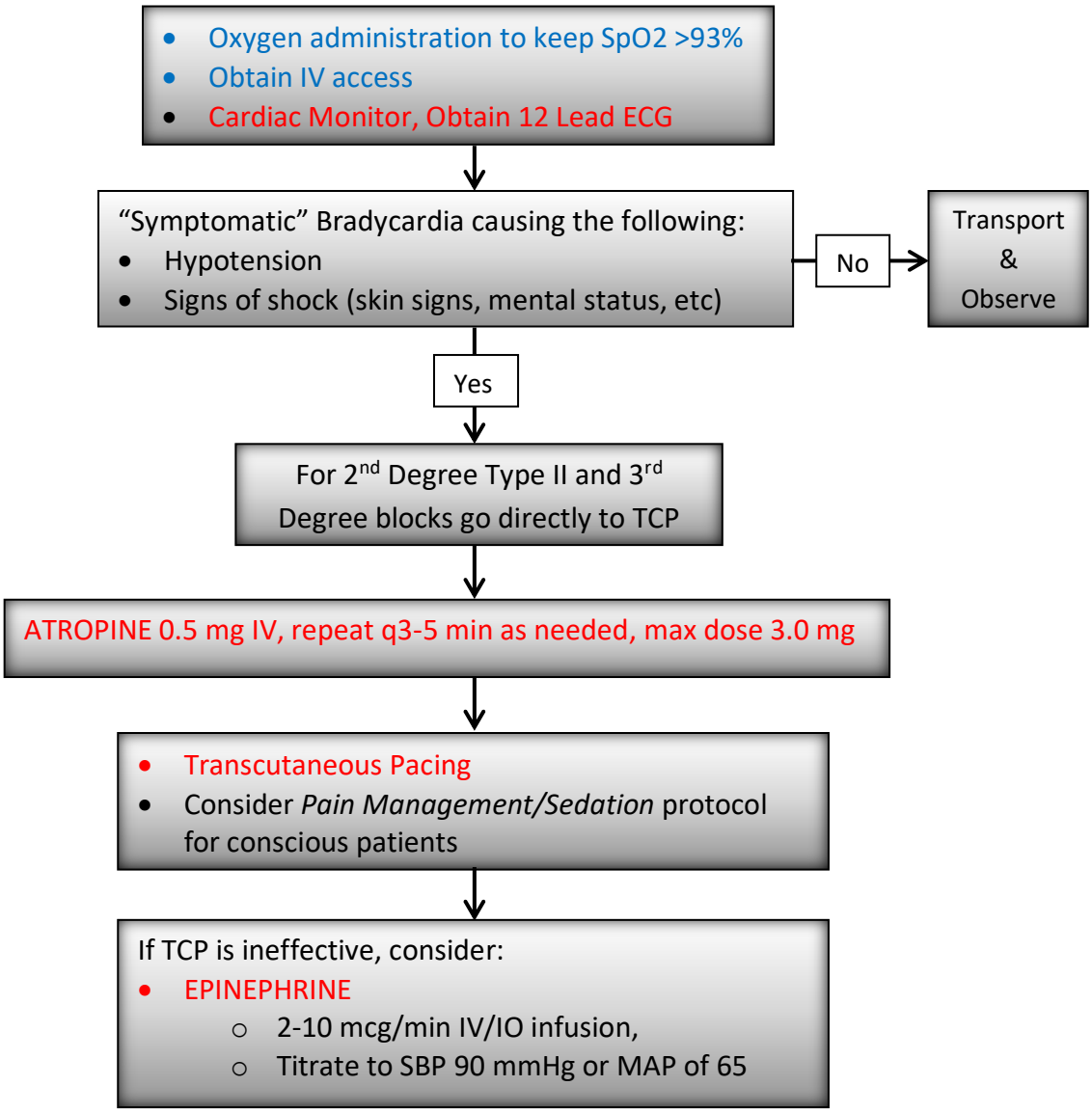
↓

EPINEPHRINE 1.0 mg 1:10,000 IV/IO every 3-5 min

- Check pulse if organized rhythm
- Consider SODIUM BICARBONATE for prolonged downtime
  - 1.0 mEq/kg IV/IO
- Consider consultation with Medical Control for termination of efforts
- Minimum 3 rounds medication are required prior to contact

**Special Considerations:**
- Insert OG tube if time permits, to relieve gastric distention
- Prophylactic use of post conversion AMIODARONE Is not recommended
- For sustained Torsades post MAGNESIUM SULFATE administration, continue with AMIODARONE as indicated
- In traumatic cardiac arrest, consider bilateral needle chest decompression

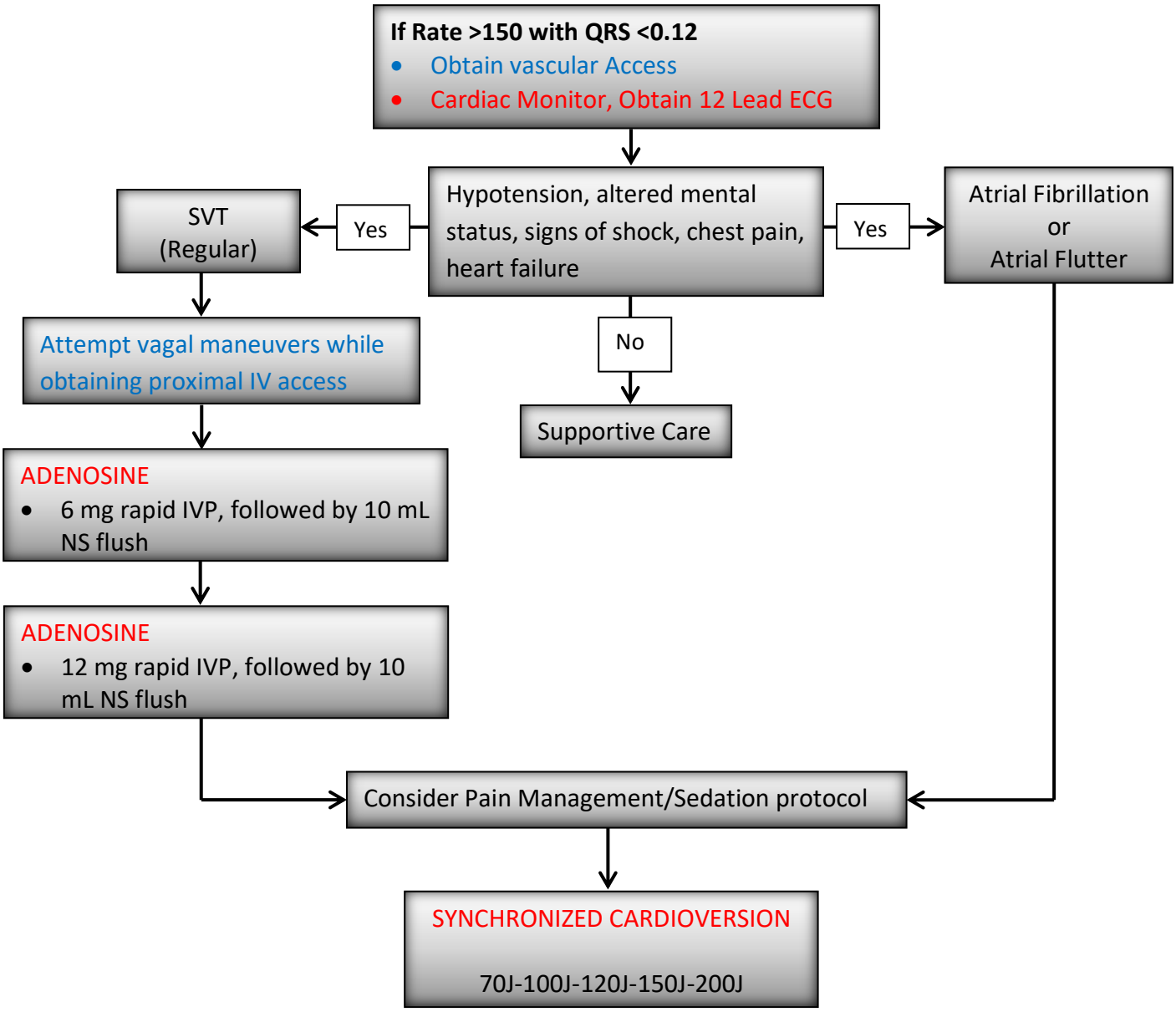
# Cardiac -Bradycardia




**Special Considerations:**

- Mean Arterial Pressure (MAP): MAP = [ (DBP x 2) + SBP ] / 3
- ATROPINE administration should not delay TCP in patients with poor perfusion
- ATROPINE is contraindicated in the presence of Acute Coronary Syndrome ischemia or MI
- Do not delay pacing while waiting for IV access
- Hypoxemia is a common cause of Bradycardia, oxygenate patient and provide ventilatory support as needed

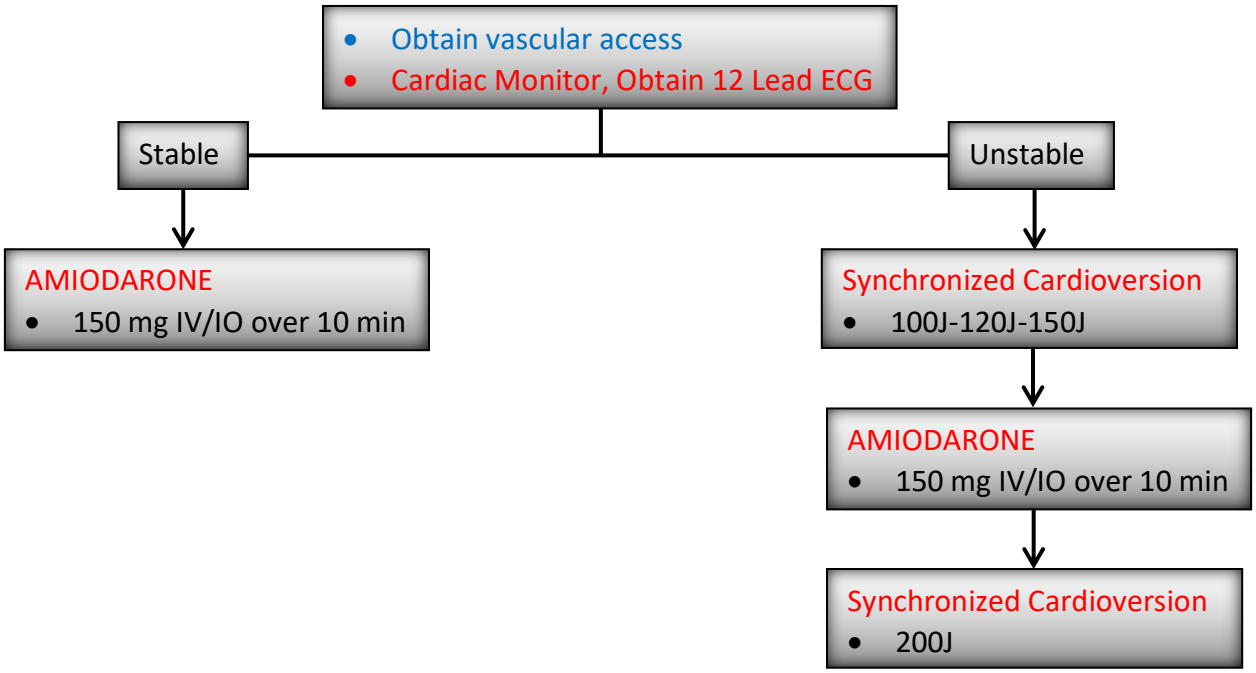
# Cardiac- Narrow Complex Tachycardia with Pulse

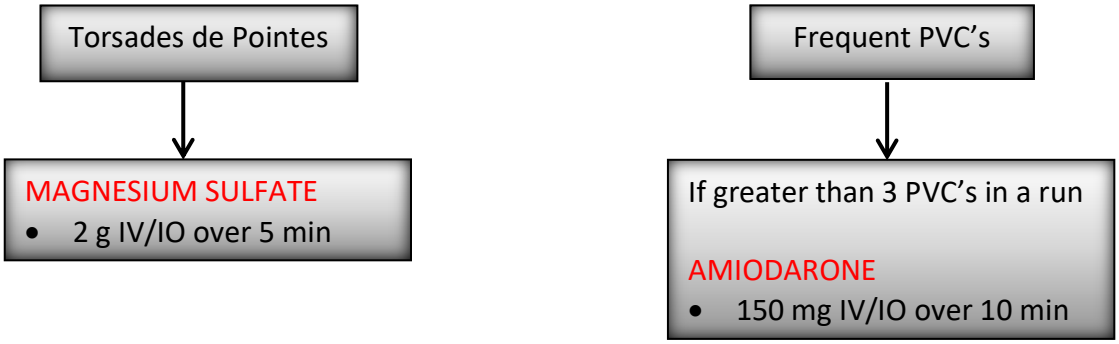



**Special Considerations:**

- Consider postural modification to standard vagal maneuvers if patient condition permits
- Consider all causes of tachycardia (hypovolemia, sepsis, etc)
- May go directly to cardioversion at any time if patient is severely symptomatic or rapidly deteriorating

# Cardiac- Wide Complex Tachycardia with Pulse




**Special Considerations:**

- If cardioversion is successful prior to AMIODARONE administration with continued ventricular ectopy, consider AMIODARONE 150 mg IV/IO over 10 min
- If suspected SVT with aberrancy, see *Narrow Complex Tachycardia with Pulse* protocol
- Consider possibility of Hyperkalemia or other electrolyte disturbance

# Cardiac – Post Arrest Care

- Manage airway as indicated
- Maintain SpO2 between 94-99%
- Maintain EtCO2 at approx. 35-40 mmHg; DO NOT HYPERVENTILATE

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Obtain 12 Lead ECG

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To maintain a MAP of >65 mmHg, administer 500 mL fluid bolus if lung sounds are clear. Repeat and reassess to max 2000 mL

Hypotension refractory to fluid bolus

- LEVOPHED
  - 0.5-20 mcg/min IV/IO
  - Titrate to MAP >65

  OR
- EPINEPHRINE
  - 2-10 mcg/min IV/IO
  - Titrate to MAP >65

**Special Considerations:**

- Be cautious in treating immediate post arrest arrhythmias, they may resolve spontaneously
- Consider transporting post arrest patients to nearest PCI capable facility
- Initial EtCO2 may be elevated immediately post ROSC, do not hyperventilate patient
- Consider EPINEPHRINE (push dose) 10-20 mcg IV, q 3-5 min with fluid bolus prior to initiating EPINEPHRINE or LEVOPHED drip

# Childbirth/Labor/OB Emergencies

**Normal Presentation**
- Puncture amniotic sac, if not already broken
- Deliver and support head
- Suction mouth, then nose; if meconium present repeat several times
- Deliver upper shoulder, then lower shoulder
- Deliver remainder of baby
- Clamp and cut umbilical cord
- If multiple births, repeat steps
- Deliver placenta

**Nuchal Presentation**
- Use palm of one hand to push against motion of the infant and use the fingers of the other hand to unloop the cord from around the neck
- If you are unable to slip the cord around the head, clamp the cord in two places and cut cord between the clamps
- Continue delivery

**Breech Presentation**
- Position patient on elbows and knees with hips elevated
- Support body of baby during delivery of head
- If head does not deliver but body is out, insert gloved hand into vagina and form a "V" with fingers to protect baby's airway from vaginal wall

**Cord Presentation**
- Position patient on elbows and knees with hips elevated
- Wrap cord and keep it moist
- Insert gloved hand to lift baby off cord, obtain and document cord pulse

**Limb Presentation**
- Place patient in left lateral recumbent position

**Uncontrolled Postpartum Hemorrhage**
- Administer 500 mL NS, repeat as needed not to exceed 2000 mL
- Fundal massage
- OXYTOCIN infusion
  - 20 units in 1000 mL NS
  - Administer 10 units(500 mL) over 10-20 minutes
  - Maintenance infusion 2.5 units (125 mL) per hour

**Special Considerations:**
- Document all times (delivery, contraction duration, contraction frequency)
- Some bleeding is normal, copious amounts of blood or free bleeding is abnormal
- Record APGAR at **one** and **five** minutes after birth

# Crush Injury

A crush injury is when a patient or part of the patient's body is entrapped or compressed for a time greater than 30 minutes. It may also apply to a patient who, due to a fall or overdose, has had no movement in an extremity for greater than 4 hours.

- Administer fluid bolus
  - 20mL/kg for adults, followed by maintenance infusion of 500-1500 mL per hour
- SODIUM BICARBONATE
  - 1 mEq/kg in 1000 mL NS, run wide open (consider this part of fluid bolus)
- If Hyperkalemia suspected, see *Hyperkalemia* protocol
- Extremity management
  - Do not use ice packs or elevation of extremity



- Consider *Pain Management/Sedation* protocol as needed
  - FENTANYL is recommended over MORPHINE due to vasodilatory effects of MORPHINE

# Hyperglycemia/Hypoglycemia

- Establish baseline level of consciousness
- Manage airway and breathing as indicated by patient's condition
- Consider possible reversible causes prior to placement of advanced airway
- Consider cardiac monitor or 12 Lead ECG as indicated

If BGL is <60 mg/dL:

- Consider ORAL GLUCOSE if the patient is alert and able to protect their own airway
- Dextrose D50% 12.5-25.0 g IV/IO, reassess and repeat as necessary

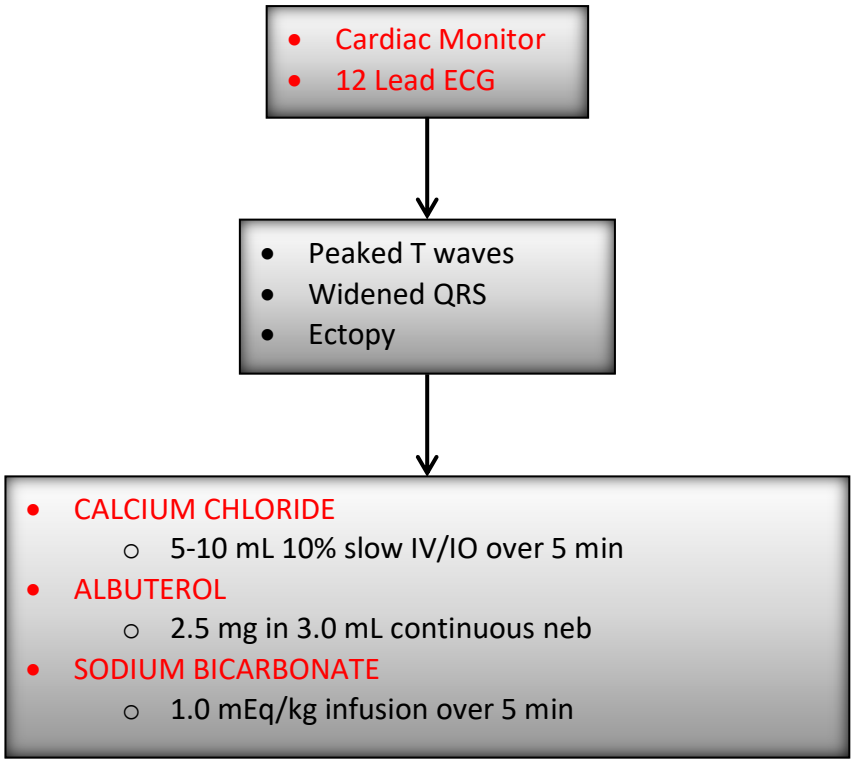
AND/OR

- Dextrose D10% 100 mL IV/IO, reassess and repeat as necessary
- Titrate to achieve blood glucose of ≥ 60 mg/dL
- Consider THIAMINE 100 mg slow IV/IM if chronic alcoholism or malnutrition
- If unable to obtain IV, consider 1 mg GLUCAGON IM

If BGL is >250 mg/dL:

- Consider fluid bolus up to 20 mL/kg
- Consider monitoring EtCO2

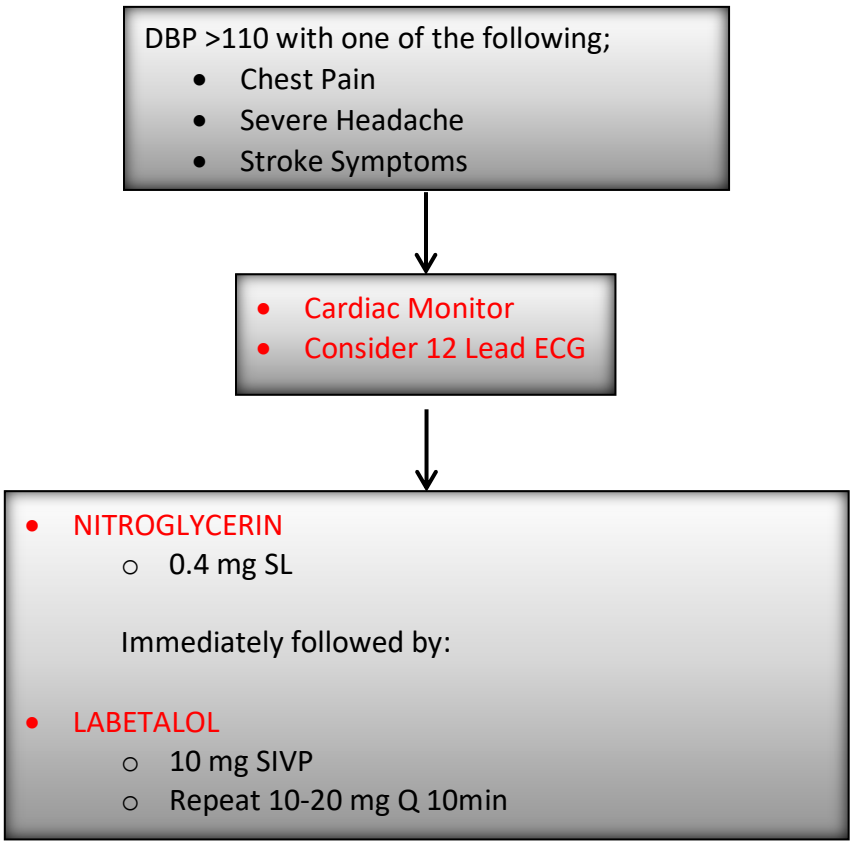
# Hyperkalemia (Suspected)




**Special Considerations:**

- CALCIUM CHLORIDE is contraindicated in patients with suspected digitalis toxicity
- Patients predisposed to hyperkalemia may include *Crush Injury*, chronic renal failure, and TCA overdose
- Hyperkalemia is defined as Potassium level greater than 5.5 mmol/L
- Potassium of 5.5-<6.0 mEq/L – Tall tented T waves
- Potassium of 6.0-<6.5 mEq/L – Increasing PR and QT intervals
- Potassium of 6.5-<7.0 mEq/L – Flattening of P waves and ST segments
- Potassium of 7.0-<7.5 mEq/L – Widening QRS complexes
- Potassium of 7.5-<8.0 mEq/L – Deepening S waves and merging of S and T waves
- Potassium of 8.0-<10.0 mEq/L – Sine wave shaped complexes and idioventricular rhythm
- Potassium of ≥ 10 mEq/L – PEA often sine wave in appearance, VF, VT, and Asystole

# Hypertension




**Special Considerations:**

- Blood pressure should not be pharmacologically managed in patients who have suffered head trauma
- Patients should be transported with head of gurney elevated ~45°

# Hyperthermia/Heat Emergency

**Heat Exhaustion**

- Body temperature up to 104°F/40°C
- Minor CNS changes; weakness, dizziness, syncope
- Nausea, headache, dilated pupils
- Skin clammy, pale and moist
- Muscle cramps/pain

**Heat Stroke**

- Body temperature 104°F/40°C or greater
- Altered mental status or loss of consciousness
- Convulsions
- Tachycardia, hypotension
- Skin hot, dry and red
- Severe vomiting or diarrhea

- Remove patient from hot environment and remove clothing
- Begin active cooling of patient with appropriate measures
- Consider cardiac monitor and attempt to obtain body temperature
- Consider vascular access

Treat signs and symptoms of shock as necessary

Treat seizures per the *Seizure* protocol

**Special Considerations:**

- Heat exhaustion can rapidly progress to heat stroke if untreated
- Heat stroke requires very aggressive cooling
- Active cooling includes application of cold packs, fanning, air conditioning
- Intense shivering may occur as patient is cooled, discontinue aggressive cooling methods
- Sweating generally disappears as body temperatures rise over 104°F/40°C
- Wet sheets without good airflow may increase body temperature
- Patients predisposed to heat emergencies include:
  - Elderly or pediatric
  - Alcohol or drug use
  - Antidepressant, antipsychotic and antiepileptic medications
  - Diuretics, beta blockers or antihistamines

# Hypothermia/Cold Emergency

Remove wet clothing and protect from environment

## Localized cold injury

- Monitor and reassess
- General wound care
- DO NOT rub skin to warm
- DO NOT allow refreezing

## Systemic hypothermia

- Monitor temperature
- Maintain supine position
- Avoid rough movement and excess activity
- Active rewarming measures
- Vascular access
- Cardiac monitor
- Consider warm NS bolus 500 mL IV/IO, repeat as needed
- Monitor and reassess

Transport all severely hypothermic patients regardless of response to treatment. Follow other treatment/transport decisions.

| Patient with pulse | |
|---|---|
| *Temperature* | *Treatment* |
| 93.2°F-96.8°F | Passive rewarming and active external rewarming |
| 86°F-93.2°F | Passive rewarming and active rewarming to trunk areas only |

| Patient without a pulse | |
|---|---|
| Start CPR, defibrillate once if indicated | |
| *Temperature* | Treatment |
| <86°F | CPR, withhold IV medications, limit to one shock for VF/VT/Torsades |
| >86°F | CPR, give IV medications at longer intervals, normal defibrillation as indicated |

**Special Considerations:**

- Extremes of age are more prone to cold emergencies
- If temperature is unknown, treat the patient based on suspected temperature
- For severely hypothermic patients, perform all procedures gently and monitor cardiac rhythm closely
- If available, core temperature monitoring is preferred

# Medication Assisted Intubation

- Pre-oxygenate patient
  - Consider passive oxygenation with high flow nasal cannula
- Prepare all equipment

↓

For analgesia or attenuation of increased ICP:

- FENTANYL 1-3 mcg/kg IV/IO

↓

Sedation and Induction:

- KETAMINE 1-2 mg/kg IV/IO

AND/OR

- VERSED 2-5 mg IV/IO

↓

- As patient jaw relaxes, proceed with intubation
- Consider cricoid pressure (release if vomiting occurs)

↓

If inadequate relaxation is present:

- Repeat VERSED 2-5 mg IV/IO

→

For hypotension post intubation:

- Fluid bolus
- EPINEPHRINE (push dose)
  - 10-20 mcg IV, q 3-5 min

**Contraindications:**

- **Upper airway obstruction**
- **Tracheal Obstruction (foreign body, tumor)**
- **Suspected pharyngeal infection (epiglottitis, peritonsilar or retropharyngeal abscess)**

**Special Considerations:**

- Pharmacological agents are used to assist the Paramedic in performing intubation in patients with high intubation difficulty due to gag reflex. In these instances, protecting the airway is a potentially life-saving maneuver. These patients may include: Head trauma, CVA/Stroke, Multisystem Trauma, Overdose, Status Epilepticus, Acute Pulmonary Edema, Respiratory Failure, Severe Burns, or other patients based on anticipated clinical course.
- In patients with hypovolemia/signs of shock, consider lower drug doses to achieve desired effects
- Consider LIDOCAINE 1.0 mg/kg IV for patients with signs of ICP
- To mix EPINEPHRINE (push dose)
  - 1 mL 1:10,000 pre fill, 9 mL NS
  - Concentration 10 mcg/mL
  - Administer 1-2 mL q 3-5 min as needed for post intubation hypotension

# Nausea/Vomiting

- ONDANSETRON 4-8 mg IV/IO/IM
  - May repeat x1 after 20 min
- DIPHENHYDRAMINE
  - 25-50 mg IV/IO/IM
- PROMETHAZINE 12.5 mg IV
  - Dilute IV doses in 10 mL NS
  - Geriatrics – consider half dose

**Special Considerations:**

- Nausea secondary to motion sickness is primarily driven by H1, consider DIPHENHYDRAMINE as first line
- Consider cardiac origin and utilize cardiac monitoring and 12 Lead ECG when indicated
- PROMETHAZINE may cause severe orthostatic hypotension, consider fluid administration prior to use in patients with signs of dehydration

# Overdose/Poisoning

- Determine cause of overdose/poisoning, treat as indicated below

**Carbon Monoxide (CO)**

- Place patient on CO monitor
- If a patient's SpCO is:
  - 0-5% - Consider normal for non-smokers. When >3% with symptoms, consider oxygen administration and recommend transport.
  - 5-10% - Consider normal for smokers, abnormal for non-smokers. If symptoms present, consider high flow oxygen and recommend transport.
  - 10-15% - Abnormal in any patient. Assess for symptoms, consider high flow oxygen and recommend transport.
  - >15% -Significantly abnormal in any patient. Treat with high flow oxygen and recommend transport.
  - >30% - Consider transport to hyperbaric facility, especially if ALOC or pregnant.

**Opiates**

- Titrate NALOXONE to restore adequate respirations
  - 0.5-2.0 mg IV/IO/IM/IN, may repeat to max total dose 10 mg

**Tricyclic Anti-Depressants**

For patients with any of the following:
- Dysrhythmias or QRS ≥ 120
- Hypotension
- Seizure
- Cardiac Arrest

- SODIUM BICARBONATE 1.0 mEq/kg IV/IO
- If patient is intubated, ventilate patient to maintain EtCO2 level of 28-30 mmHG

**Organophosphate (Insecticide)**

- ATROPINE 1-2 mg IV/IO, repeat Q 3-5 min until cessation of secretions

**Beta Blocker**

- GLUCAGON 2-4 mg IV/IO/IM

**Calcium Channel Blocker**

- CALCIUM CHLORIDE 5-10 mL slow IV/IO

**Special Considerations:**
- Poison Control – (800) 222-1222 OR (775) 982-4129
- For suspected ingestion, consider NG/OG tube placement and administration of ACTIVATED CHARCOAL
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated
- Do not hesitate to contact medical control if needed

# Pain Management/Sedation

- Maintain SpO2 ≥ 93
- Vascular Access
- Consider cardiac monitor

Comfort measures:
- Patient positioning
- Splinting
- Ice

Pain

- NITROUS OXIDE
  - As long as patient is able to follow directions
- FENTANYL 1-3 mcg/kg IV/IO/IN
  - Max single dose 100 mcg
  - May repeat q 5-10 min
- MORPHINE 2-5 mg IV/IO
  - May repeat q 10 min
- KETAMINE 0.1-0.3 mg/kg
  - May repeat x1

Sedation

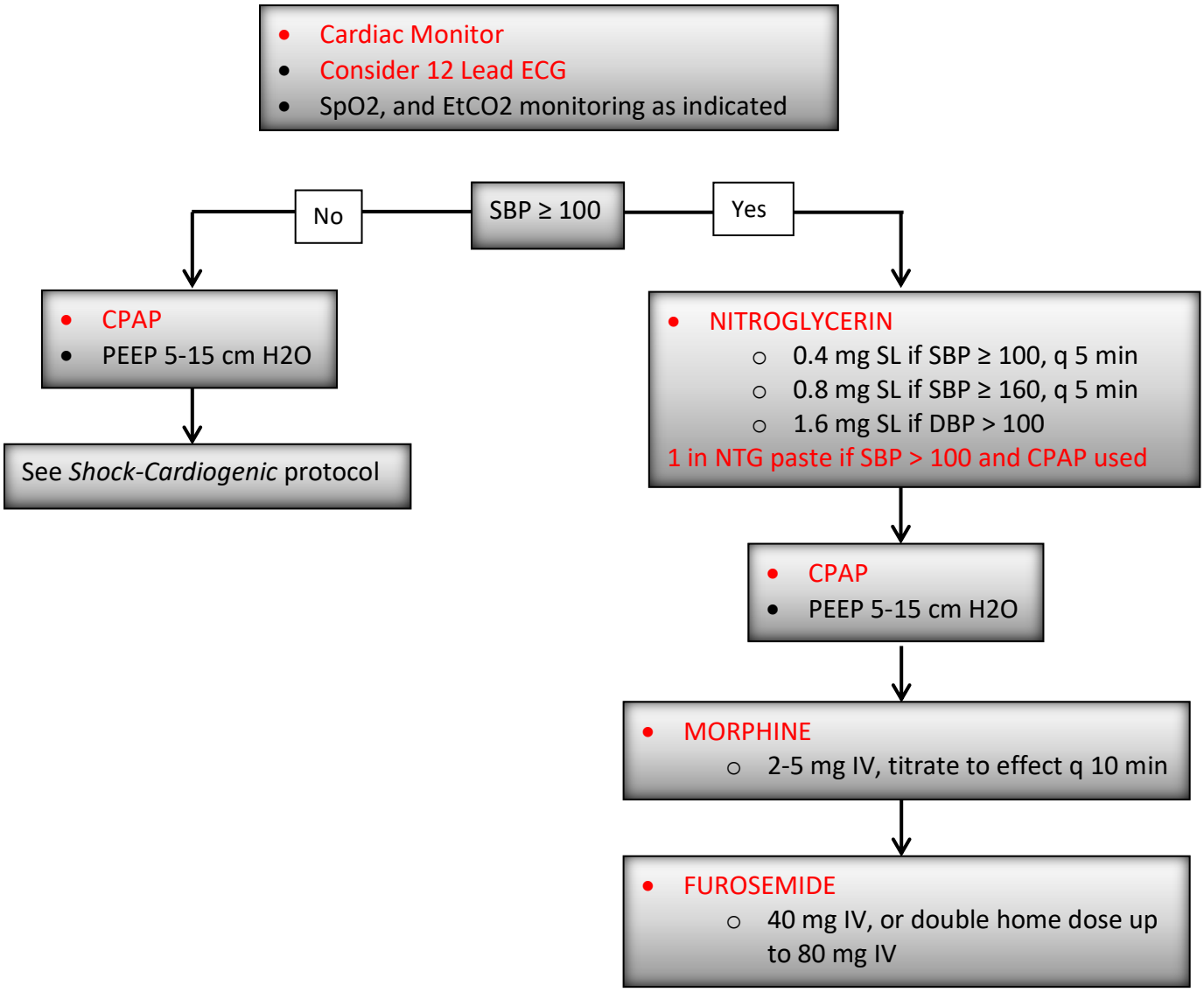
- Cardiac Monitor
- Sidestream End Tidal CO2 Monitoring
- MIDAZOLAM 0.5-5 mg IV/IO/IM
  - Repeat as needed
- KETAMINE
  - 1-2 mg/kg IV
    - Repeat as needed
  - 3-4 mg/kg IM
    - Repeat as needed

*Consider KETAMINE drip after loading dose for long transport or need for continued sedation
  - 1-2 mg/min

*Assess and document Bloomsbury Sedation Score on sedated patients

**Special Considerations:**
- Consider prophylactic ODANSETRON when administering pain medication
- Monitor BP and Respirations closely as sedative and analgesic agents can cause hypotension and respiratory depression
- Burn patients may require more aggressive dosing
- Consider procedural sedation for patients who can't tolerate manipulation during movement, splinting, etc
- Document pain severity (1-10) before and after pain medication administration
- When administering pain medications to patients with a higher potential for adverse reaction (elderly, intoxicated, opiates or depressants already on board, etc), use caution and consider using a lower initial dose to achieve desired effect

# Pulmonary Edema




**Special Considerations:**

- Avoid administering NITROGLYCERIN to anyone taking phosphodiesterase inhibitors
- Administer initial SL NITROGLYCERIN dose prior to placing NITROGLYCERIN PASTE on patients where CPAP will be utilized
- Allow patient to dangle legs, if possible

# Respiratory Distress

- Cardiac Monitor and EtCO2 monitoring as indicated
- Consider 12 Lead ECG

## Asthma/Reactive Airway Disease

- ALBUTEROL
  - 2.5 mg in 3mL
- DUONEB (2nd and 3rd)
  - 0.5 mg Ipratropium with 3.0 mg Albuterol
- Continue ALBUTEROL after 2nd and 3rd DUONEB
- Consider CPAP

- SOLUMEDROL
  - 125 mg SIVP

- MAGNESIUM SULFATE
  - 2 g over 20 min (drip)

**If at any time**
Impending Respiratory Failure:

- EPINEPHRINE
  - 0.3-0.5 mg 1:1,000 IM

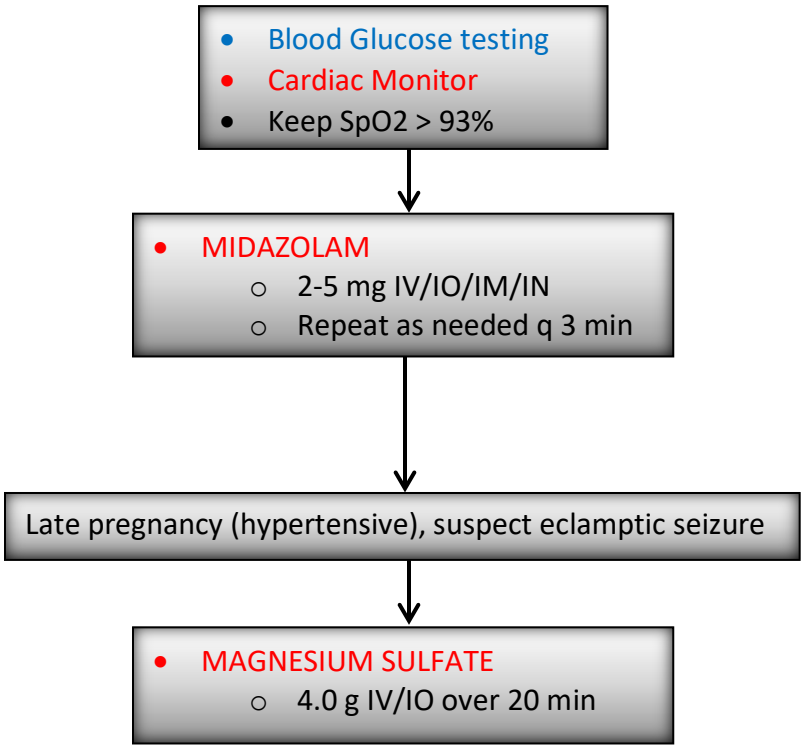
## Chronic Lung Disease with Deterioration

- ALBUTEROL
  - 2.5 mg in 3mL
- DUONEB (2nd and 3rd)
  - 0.5 mg Ipratropium with 3.0 mg Albuterol
- Continue ALBUTEROL after 2nd and 3rd DUONEB
- Consider CPAP

**Special Considerations:**

- Signs of impending respiratory failure include: altered mental status, inability to maintain respiratory effort, cyanosis
- Administer EPINEPHRINE with caution in patients > 45 yrs and patients with cardiac history

# Seizure




**Special Considerations:**

- Eclamptic seizure/ob patients showing signs of Magnesium Sulfate Toxicity (respiratory depression, hypotension, or bradycardia)
  - Consider administering CALCIUM CHLORIDE, 5 mL slow IV/IO
- Status Epilepticus is defined as two or more seizures successively without an intervening lucid period, or a seizure lasting more than five minutes

# Sepsis

Suspect Sepsis if suspected infection and 2 or more of the following:

- Temperature > 100.4° F or < 96.8° F
- Respiratory rate > 20
- Heart rate > 90

Suspect severe Sepsis if one of the following in addition to the above:

- Acute Hypoglycemia or Hyperglycemia
- Systolic BP < 90 mmHg or Mean Arterial Pressure < 65 mmHg
- EtCO2 < 25 mmHg

↓

- Keep SpO2 > 93%
- Vascular access, large bore preferred, obtain two if possible
- Cardiac Monitor
- EtCO2 Monitoring
- Obtain blood glucose
- Manage airway as indicated by patient's condition
- Assess lung sounds
    - If clear: Administer 30 mL/kg fluid bolus to max 3000 mL
    - Reassess lung sounds after each 500 mL given

↓

If unable to maintain SBP > 90 mmHg or MAP > 65 mmHg with fluid administration:

- LEVOPHED
    - 0.5-20 mcg/min
    - Titrate to maintain SBP > 90 mmHg
    - Blood pressure assessed every 5 min while titrating LEVOPHED
    - Continuous cardiac monitoring required during LEVOPHED administration

**Special Considerations:**

- Hypotension can be defined as a SBP < 90 mmHg or MAP < 65 mmHg. This is not always reliable and should be interpreted in context with patients typical BP, if known.
- Shock may be present with a normal BP initially
- Mean Arterial Pressure (MAP): MAP = [(DBP x2) + SBP] / 3
- Ringer's Lactate is preferred fluid in Sepsis

# Shock

- Keep SpO2 > 93%
- Vascular access, large bore preferred, obtain two if possible
- Consider EtCO2 monitoring
- Cardiac monitor and obtain 12 Lead ECG

## CARDIOGENIC

- Most often seen in the presence of late-stage CHF, STEMI, and post cardiac arrest
- Fluid bolus 500 mL NS
  - Repeat to max 2000 mL
- LEVOPHED
  - 0.5-20 mcg/min IV/IO
  - Titrate to MAP >65

  OR
- EPINEPHRINE
  - 2-10 mcg/min IV/IO
  - Titrate to MAP >65

## NEUROGENIC

- A form of distributive shock caused by unopposed parasympathetic response after the disruption of the spinal cord (typically mid-thoracic T-6 or above)
- Make all attempts to limit spinal motion
- **Manage circulatory collapse aggressively**
- Fluid bolus 500 mL NS or LR
  - Repeat to max 2000 mL
- LEVOPHED
  - 0.5-20 mcg/min IV/IO
  - Titrate to MAP >65

  OR
- EPINEPHRINE
  - 2-10 mcg/min IV/IO
  - Titrate to MAP >65

**Special Considerations:**

- In the presence of a STEMI, LEVOPHED is the preferred pressor because it will not increase myocardial oxygen demand
- In Neurogenic Shock:
  - LEVOPHED is preferred pressor in the absence of bradycardia
  - EPINEPHRINE is preferred pressor if patient is hypotensive and bradycardic
  - Consider ATROPINE 0.5 mg IV for isolated bradycardia
- Hypotension can be defined as a SBP < 90 mmHg or MAP < 65 mmHg
  - Mean Arterial Pressure (MAP): MAP = [(DBP x2) + SBP] / 3
- End tidal monitoring is an invaluable tool, will typically indicate signs of hypoperfusion earlier than BP

# Shock

## HYPOVOLEMIC

- Fluid bolus 500 mL
  - May repeat up to 2000 mL
  - Assess and document lung sounds

## HEMORRHAGIC

- Take aggressive measures to identify and control external hemorrhage
- Aggressively manage and monitor for signs of hypothermia
- Administer Ringer's Lactate IV
  - Permissive hypotension
  - Only administer fluids to maintain MAP >65
- TRANEXAMIC ACID
  - 1 g over 10 min (drip)

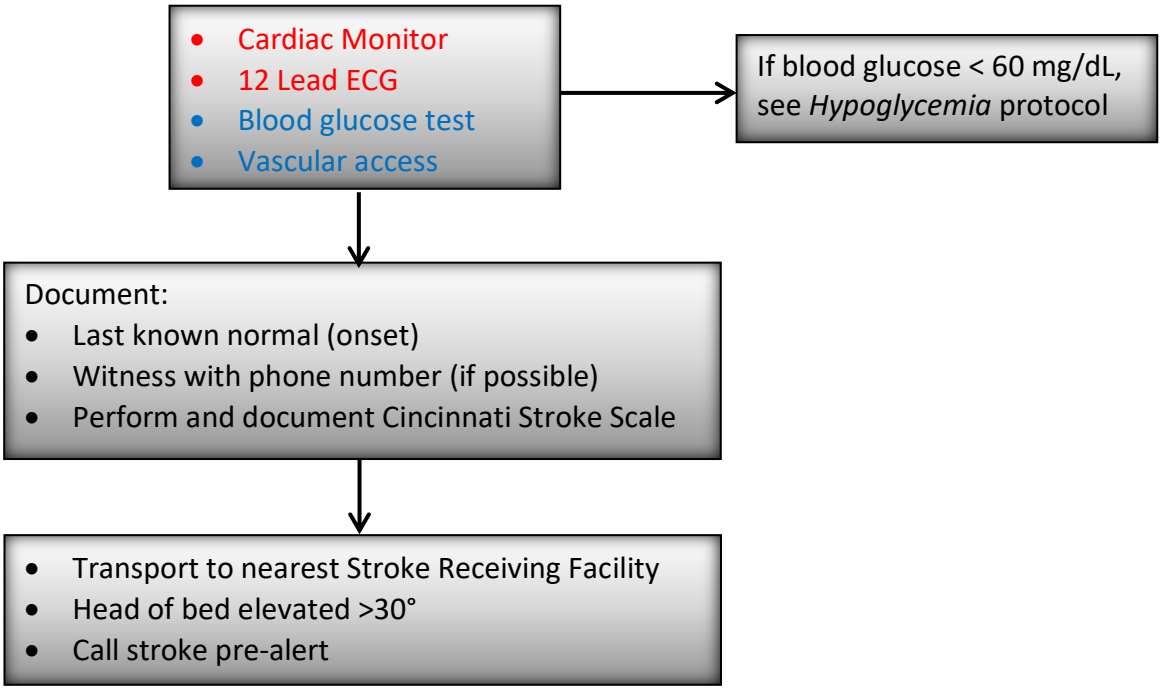
## OBSTRUCTIVE

- Most often seen in the presence of:
- Tension Pneumothorax
  - Absent lung sounds affected side, JVD, hypotension, tachycardia
  - NEEDLE CHEST DECOMPRESSION
- Pulmonary Embolism
  - Respiratory distress, hypoxia, "pinpoint" chest pain, pulmonary edema, ECG pattern (S1Q3T3, precordial T-wave inversion, RAD)
  - Maximize oxygenation, consider CPAP for pulmonary edema, NS bolus up to 1000 mL
  - LEVOPHED 0.5-20 mcg/min
- Cardiac Tamponade
  - Narrowing pulse pressures, muffled heart tones, JVD
  - Identify, notify receiving facility and expedite transport

**Special Considerations:**

- Hypovolemic Shock
  - Consider common causes (vomiting, diarrhea) and be aware for ECG changes consistent with electrolyte disturbances
- Hemorrhagic Shock
  - Consider "other than obvious causes": ruptured ectopic pregnancy, GI bleed
    MAKE ALL ATTEPTS TO RECOGNIZE AND LIMIT RISK OF
  - *Hypothermia*: exposure, peripheral vasoconstriction, thermoregulatory (meds, alcohol, CNS)
  - *Acidosis*: IV fluid administration, peripheral vasoconstriction, tissue hypoxia
  - *Coagulopathy*: hemodilution, pharmacological, patient history
- Obstructive Shock
  - Assess and document risk factors: smokers, recent travel, sedentary lifestyle, history of DVT, birth control use, etc

# Stroke (CVA)




**Special Considerations:**

- If intracranial hemorrhage is suspected, consider transport to Renown Regional Medical Center

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# Pediatric Treatment Protocols

# Pediatric Airway Obstruction

Is the patient conscious or unconscious?

## Conscious

- Ask patient to speak or cough to establish level of obstruction
- If unable to speak, use age appropriate techniques to dislodge the obstruction:
  - Infants < 1 year – 5 back blows and 5 chest compressions until foreign body is relieved or patient becomes unconscious
  - ≥ 1 year – provide abdominal thrusts until foreign body is relieved or patient becomes unconscious

## Unconscious

- Place patient in supine position
- Open airway with the appropriate method and check for breathing
- Perform finger sweep if object is visible **DO NOT PERFORM BLIND FINGER SWEEP**
- Start CPR with chest compressions- do not perform pulse check
- After one cycle of compressions open the airway
- Attempt to visualize the obstruction, then ventilate with 2 breaths
- If obstruction is not resolved, continue with cycles of chest compressions and ventilations
- Attempt to visualize the obstruction with laryngoscope and remove it with Magill forceps
- If unsuccessful, Needle Cricothyrotomy may be necessary

**Special Considerations:**

- If patient presents with trismus and noisy respirations, insert NPA and attempt to assist ventilations with BVM
- Avoid Hyperventilation
- Maintain ETCO2 at 35-45

# Pediatric Allergy/Anaphylaxis

- Assess oxygenation and administer Oxygen as needed
- Consider IV access and cardiac monitor
- Assess severity of Allergic Reaction

*MILD*: swelling, itching, redness, hives

- DIPHENHYDRAMINE
  - 1.0 mg/kg IV/IM/IO (max 25 mg)

*MODERATE*: Mild plus wheezing and difficulty swallowing, mild hypotension

- Obtain IV access, cardiac monitor, NS fluid bolus
- DIPHENHYDRAMINE
  - 1.0 mg/kg IV/IM/IO (max 25 mg)
- ALBUTEROL
  - 2.5 mg in 3 mL unit dose, as needed
- Consider EPINEPHRINE
  - 0.01 mg/kg 1:1,000 IM (max 0.3 mg)
  - Anterior thigh preferred site

*SEVERE*: impending respiratory failure, severe hypotension

- EPINEPHRINE
  - 0.01 mg/kg 1:1,000 IM (max 0.3 mg)
- DIPHENHYDRAMINE
  - 1.0 mg/kg IV (max 25 mg)
- EPINEPHRINE
  - 0.01 mg/kg 1:10,000 IV followed by 100cc NS bolus, repeat as needed
- SOLUMEDROL
  - 2.0 mg/kg SIVP

# Pediatric Behavioral Emergency

**Physical Restraints**

- When a patient is a threat to themselves, bystanders, or EMS personnel
- Utilize soft restraints
- Restraining opposite muscle groups (swimmers position) is most effective, never restrain prone/hog-tied position
- Assess distal CMS after restraints, every 10 minutes
- Monitor and maintain oxygenation
- Obtain vascular access as needed
- Apply cardiac monitor as needed (required with chemical restraint)
- Document reasons for restraint
- Incarcerated patients may be restrained at the discretion of Law Enforcement

↓

Consider *Pediatric Pain Management/Sedation* protocol

# Pediatric Burns

Some patients may bypass the nearest trauma center and be transported directly to a burn center based on the destination protocol

**Thermal Burns**

- Remove clothing which is smoldering and non-adherent to patient
- Assess oxygenation and administer OXYGEN as needed
- Assess and treat associated trauma
- Remove rings, bracelets and other constricting objects
- Determine burned body surface area (BSA only calculated for Full and Partial Thickness burns)
  - If <10% BSA, use moist saline dressing for patient comfort
  - If >10% BSA, use clean, dry dressings
- Obtain vascular access
- Administer IV fluids as follows:
  - ≤ 5 years old – 125 mL/hr
  - 6-12 years old – 250 mL/hr

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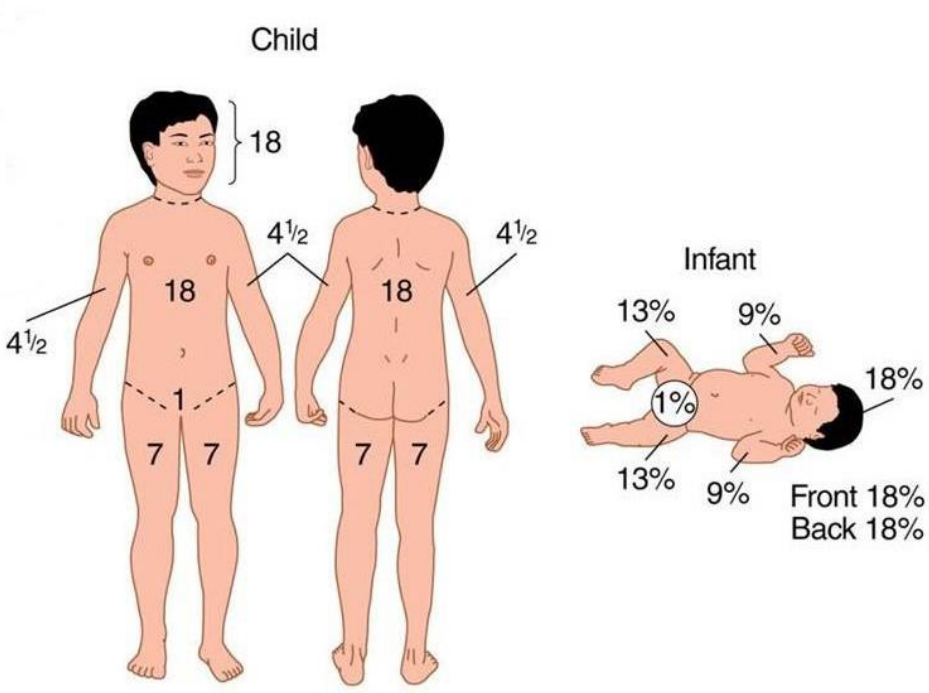
Consider *Pediatric Pain Management/Sedation* protocol



# Pediatric Burns

Some patients may bypass the nearest trauma center and be transported directly to a burn center based on the destination protocol

**Chemical Burns**

- Protect rescuer from contamination
- Remove all clothing and brush off any solid chemical remaining on patient
- Assess and treat associated injuries and evaluate for systemic symptoms
- Cover burn with clean, dry dressings
- Keep patient warm
- Contact hospital ASAP with chemical contaminant information, patient might require further decontamination prior to entry into Emergency Department

↓

Consider *Pediatric Pain Management/Sedation* protocol

**Electrical Burn/Lightning**

- Separate victim from electrical source when safe
- Place patient on cardiac monitor, patients who suffer electrical injuries are at high risk for Cardiac Dysrhythmias
- Obtain vascular access
- Treat associated thermal burns as outlined in *Thermal Burns*
- Assess for other injuries

↓

Consider *Pediatric Pain Management/Sedation* protocol

# Pediatric Cardiac - Arrest

- Unconscious and unresponsive
- Pulseless
- Does not meet any criteria for withholding resuscitation

↓

- Begin CPR- pulse check/rhythm interpretation every 2 minutes
  - Continue CPR following all pulse checks as indicated by patient condition
- Place patient on cardiac monitor or AED
  - Utilize CPR assist device when feasible
- Manage airway as indicated by patient condition
- Consider reversible causes

## V-Fib, Pulseless V-Tach, Torsades

↓

- Defibrillate @ 2 J/kg
- Obtain IV or IO access
- Consider Intubation airway device
- Utilize End Tidal CO2 monitoring ASAP

↓

- EPINEPHRINE
  - 0.01 mg/kg 1:10,000 IV/IO q 3-5 min

↓

Shockable Rhythm

↓

- Defibrillate @ 4 J/kg
- AMIODARONE
  - 5.0 mg/kg IV/IO
  - May repeat q 5 min x2 if refractory VF/VT (max total dose 15 mg/kg)

## Asystole/PEA

↓

- Obtain IV or IO access
- Consider Intubation
- Utilize End Tidal CO2 monitoring ASAP

↓

- EPINEPHRINE
  - 0.01 mg/kg IV/IO 1:10,000 q 3-5 min

↓

Use V-Fib, Pulseless V-Tach protocol as indicated

- Check pulse if organized rhythm
- Consider SODIUM BICARBONATE for prolonged downtime
  - 1.0 mEq/kg IV/IO
- Consider consultation with Medical Control for termination of efforts
- Minimum 3 rounds medication are required prior to contact

**Special Considerations:**

- Hypoxia is the leading cause of Cardiac Arrest in pediatric patients
- Efforts should be directed at high quality CPR, early defibrillation and continuous compressions with limited interruptions
- Maintain ETCO2 at 35-45, DO NOT HYPERVENTILATE
- If unable to obtain IV/IO access, EPINEPHRINE can be administered down ET tube (0.1 mg/kg 1:1,000)

# Pediatric Cardiac - Bradycardia

- Ventilation management (primary cause of Bradycardia in pediatrics is hypoxia)
- Cardiac Monitor
- Establish vascular access

↓

HR < 60 causing hypotension, poor perfusion, altered mental status or shock

↓

- CPR
- EPINEPHRINE
  - 0.01 mg/kg 1:10,000 IV/IO q 3-5 min

↓

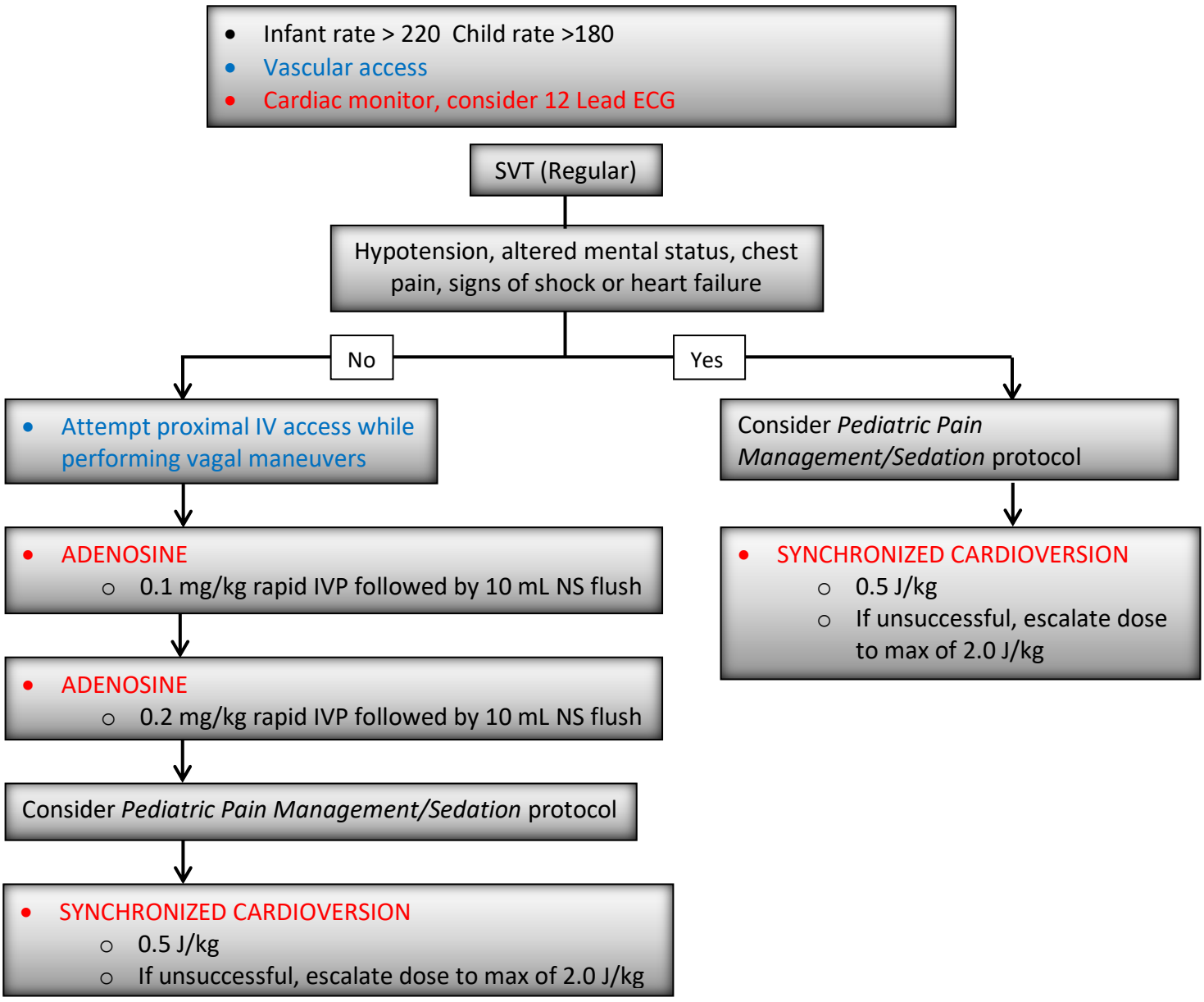
**If Refractory:**

- ATROPINE for primary AV block or increased vagal tone
  - 0.02 mg/kg IV/IO q 5 min
  - Min single dose 0.1 mg
  - Max single dose 0.5 mg
- Consider transcutaneous pacing
  - Utilize *Pediatric Pain Management/Sedation* protocol

**Special Considerations:**

- Emergency TCP is indicated in bradycardia due to complete heart block or sinus node dysfunction unresponsive to ventilation, oxygenation, chest compression, and medications; especially if it is associated with congenital or acquired heart disease
- If unable to obtain IV/IO access, EPINEPHRINE can be administered down ET tube (0.1 mg/kg 1:1,000)

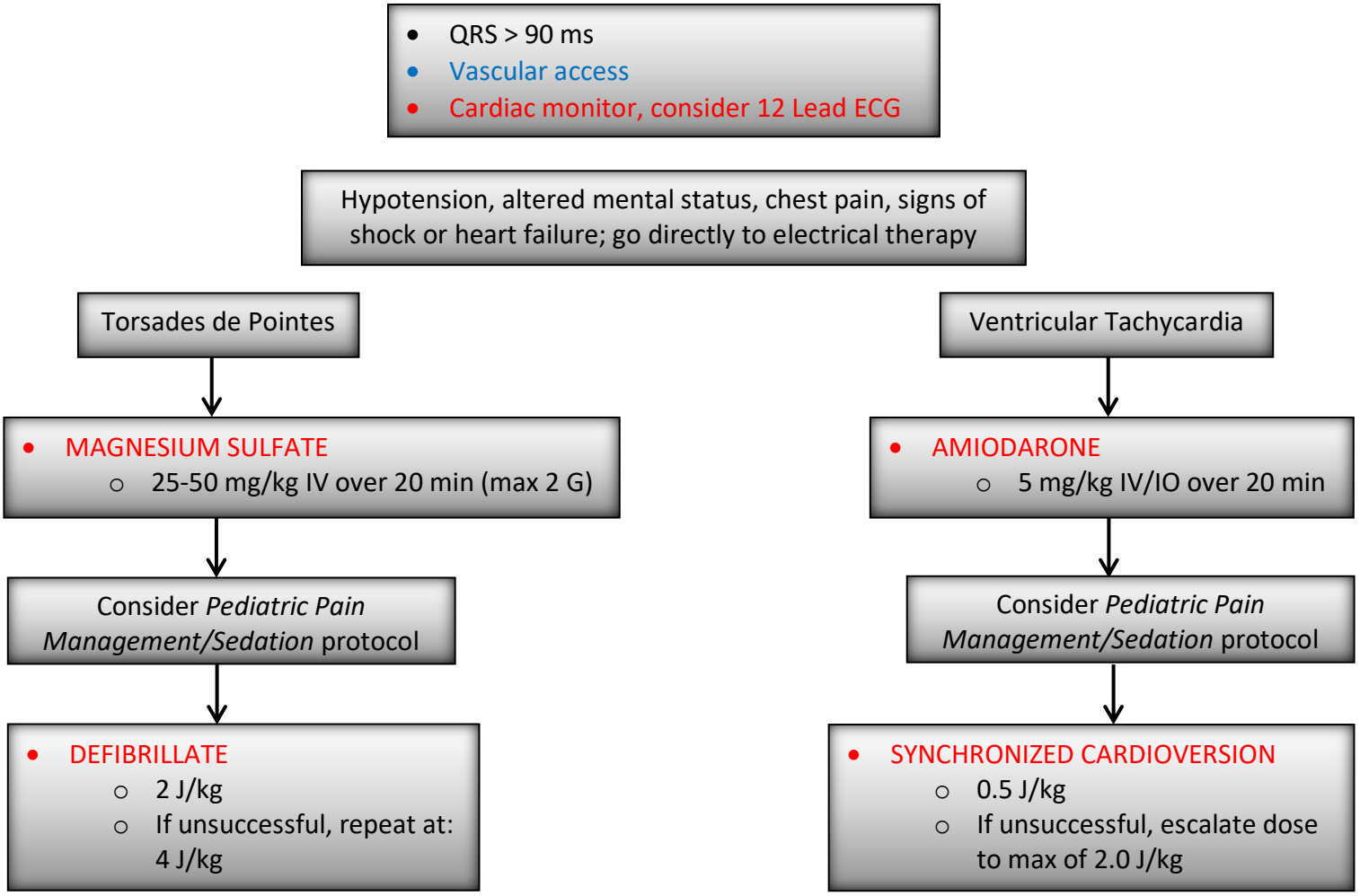
# Pediatric Cardiac – Narrow Complex Tachycardia with Pulses




**Special Considerations:**

- QRS width > 90 ms is considered wide and possibly SVT with aberrancy and rarely VT
- May go directly to Synchronized Cardioversion at any time if severely symptomatic or patient deteriorating
- Consider alternate causes such as fever, dehydration, caffeine/energy drink consumption, electrolyte imbalance, drug use, etc

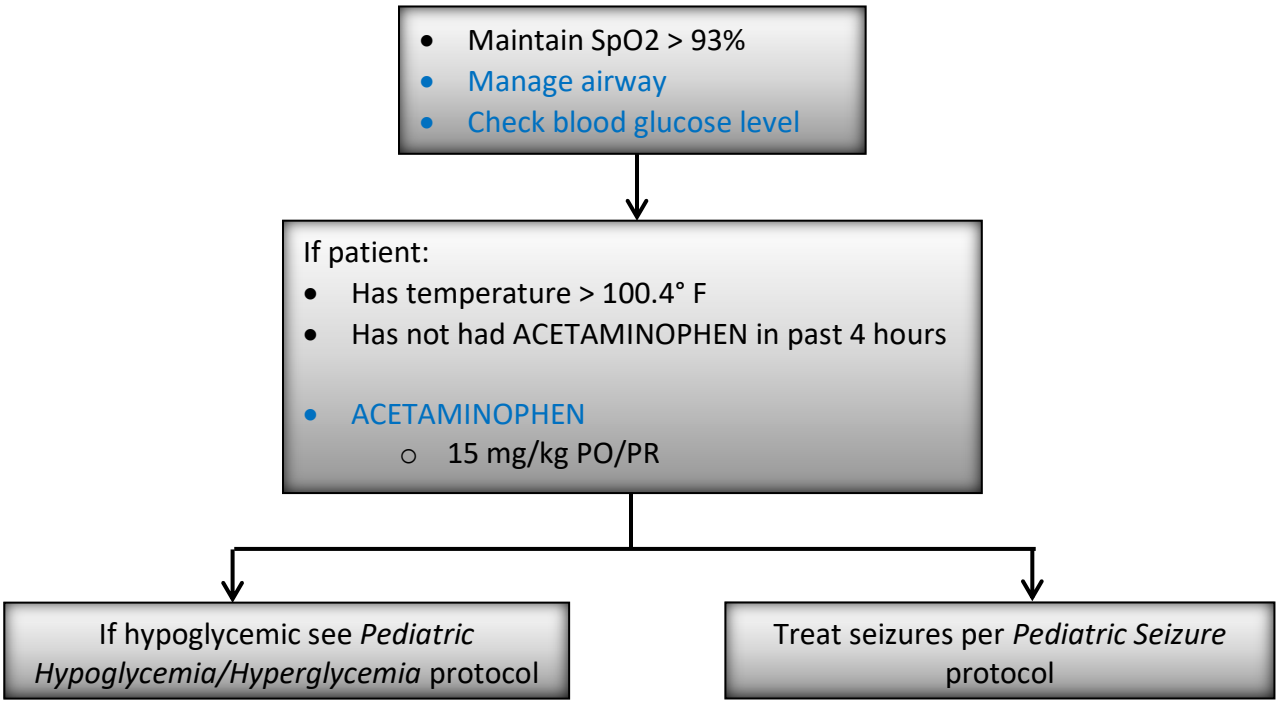
# Pediatric Cardiac – Wide Complex Tachycardia with Pulses




**Special Considerations:**

- Consider most wide complex tachycardia in children as an aberrantly conducted SVT
- Obtain 12 Lead ECG if practical, but do not delay treatment
- May go directly to defibrillation in Torsades de Pointes if severely symptomatic

# Pediatric Fever




**Special Considerations:**

- Do not utilize cooling measures in pediatric patients < 28 days of age
- Excessive fluid boluses provided to febrile children may lead to complications – administration of IV boluses should be undertaken with extreme caution
- Consider a pediatric patient to have Meningitis or Sepsis until proven otherwise
- Sweating generally disappears as body temperatures rise over 104° F
- Removing clothing and initiation of passive cooling measures is acceptable, do not use cold packs
- Dropping temperature of pediatric patient rapidly may lead to seizures

# Pediatric Hyperglycemia/Hypoglycemia

- Establish baseline level of consciousness
- Manage airway and breathing as indicated by patient's condition
- Consider possible reversible causes prior to placement of advanced airway
- Consider cardiac monitor

If BGL is <60 mg/dl (< 40 mg/dl in Neonates):

- ORAL GLUCOSE if the patient is alert and able to protect their own airway
- ≤ 28 days D10, 2 mL/kg IV/IO/UV
- ≥ 28 days D25, 2 mL/kg IV/IO
- Titrate to achieve blood glucose of ≥ 60 mg/dl
- GLUCAGON if unable to obtain IV
  - 0.5 mg IM (< 20 kg)
  - 1.0 mg IM (> 20 kg)

If BGL is >250 mg/dl:

- Consider fluid bolus 10-20 mL/kg

**Special Considerations:**

- Neonate considerations for infants ≤ 28 days old (4 weeks)
- Heel stick for patients < 6 months old
- Fluid management in DKA is complex and may contribute to risk of cerebral edema

# Pediatric Hyperthermia/Heat Emergency

**Heat Exhaustion**

- Body temperature up to 104°F/40°C
- Minor CNS changes; weakness, dizziness, syncope
- Nausea, headache, dilated pupils
- Skin clammy, pale and moist
- Muscle cramps/pain

**Heat Stroke**

- Body temperature 104°F/40°C or greater
- Altered mental status or loss of consciousness
- Convulsions
- Tachycardia, hypotension
- Skin hot, dry and red
- Severe vomiting or diarrhea

- Remove patient from hot environment and remove clothing
- Begin active cooling of patient with appropriate measures
- Consider cardiac monitor and attempt to obtain body temperature
- Consider vascular access

- IV Fluid bolus
  - 20 mL/kg NS
  - Titrate to age appropriate SBP

Treat seizures per *Pediatric Seizure* protocol

**Special Considerations:**

- Heat exhaustion can rapidly progress to heat stroke if untreated
- Heat stroke requires very aggressive cooling
- Active cooling includes application of cold packs, fanning, air conditioning
- Intense shivering may occur as patient is cooled, discontinue aggressive cooling methods
- Sweating generally disappears as body temperatures rise over 104°F/40°C
- Wet sheets without good airflow may increase body temperature
- Neonate ≤ 28 days fluid bolus 10 mL/kg IV/IO

# Pediatric Hypothermia/Cold Emergency

- Remove wet clothing and protect from environment
- Monitor temperature

**Localized cold injury**

- General wound care
- DO NOT rub skin to warm
- DO NOT allow refreezing

**Systemic hypothermia**

- Active rewarming measures
- Vascular access
- Cardiac monitor
- Consider warm NS bolus
  - 10-20 mL/kg NS
  - Titrate to age appropriate SBP

Transport all severely hypothermic patients regardless of response to treatment. Follow other treatment/transport decisions.

| Patient with pulse | |
|---|---|
| *Temperature* | *Treatment* |
| 93.2°F-96.8°F | Passive rewarming and active external rewarming |
| 86°F-93.2°F | Passive rewarming and active rewarming to trunk areas only |

| Patient without a pulse | |
|---|---|
| Start CPR, defibrillate once if indicated | |
| *Temperature* | Treatment |
| <86°F | CPR, withhold IV medications, limit to one shock for VF/VT/Torsades |
| >86°F | CPR, give IV medications at longer intervals, normal defibrillation as indicated |

**Special Considerations:**

- Extremes of age are more prone to cold emergencies
- If temperature is unknown, treat the patient based on suspected temperature
- For severely hypothermic patients, perform all procedures gently and monitor cardiac rhythm closely
- If available, core temperature monitoring is preferred

# Pediatric Medication Assisted Intubation

- Pre-oxygenate patient
  - Consider passive oxygenation with high flow nasal cannula
- Prepare all equipment

↓

For analgesia or attenuation of increased ICP:

- FENTANYL 1-3 mcg/kg IV/IO

↓

Sedation and Induction:

- KETAMINE 1-2 mg/kg IV/IO

AND/OR

- VERSED 0.2 mg/kg IV/IO

↓

- As patient jaw relaxes, proceed with intubation
- Consider cricoid pressure (release if vomiting occurs)

↓

If inadequate relaxation is present:

- Repeat VERSED 0.2 mg/kg IV/IO

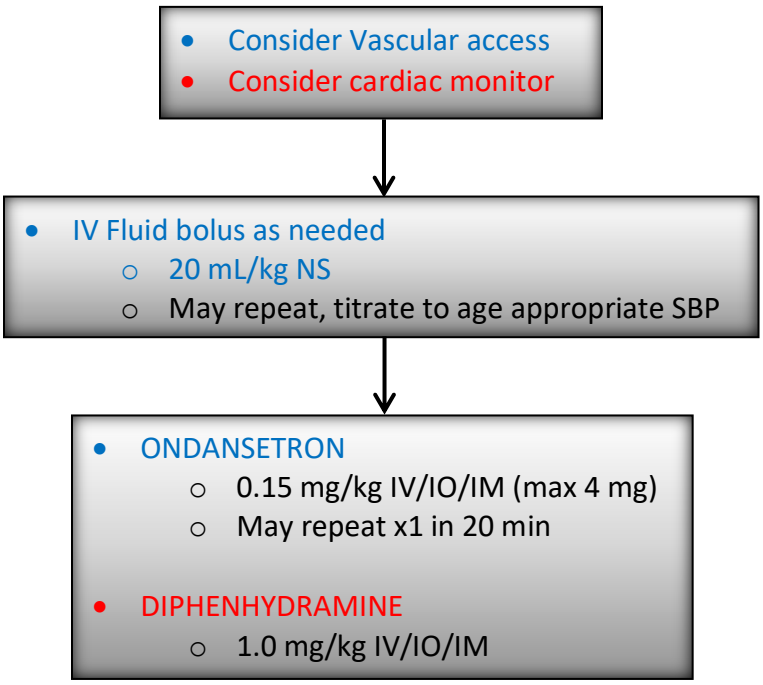
**Contraindications:**

- **Upper airway obstruction**
- **Tracheal Obstruction (foreign body, tumor)**
- **Suspected pharyngeal infection (epiglottitis, peritonsilar or retropharyngeal abscess)**

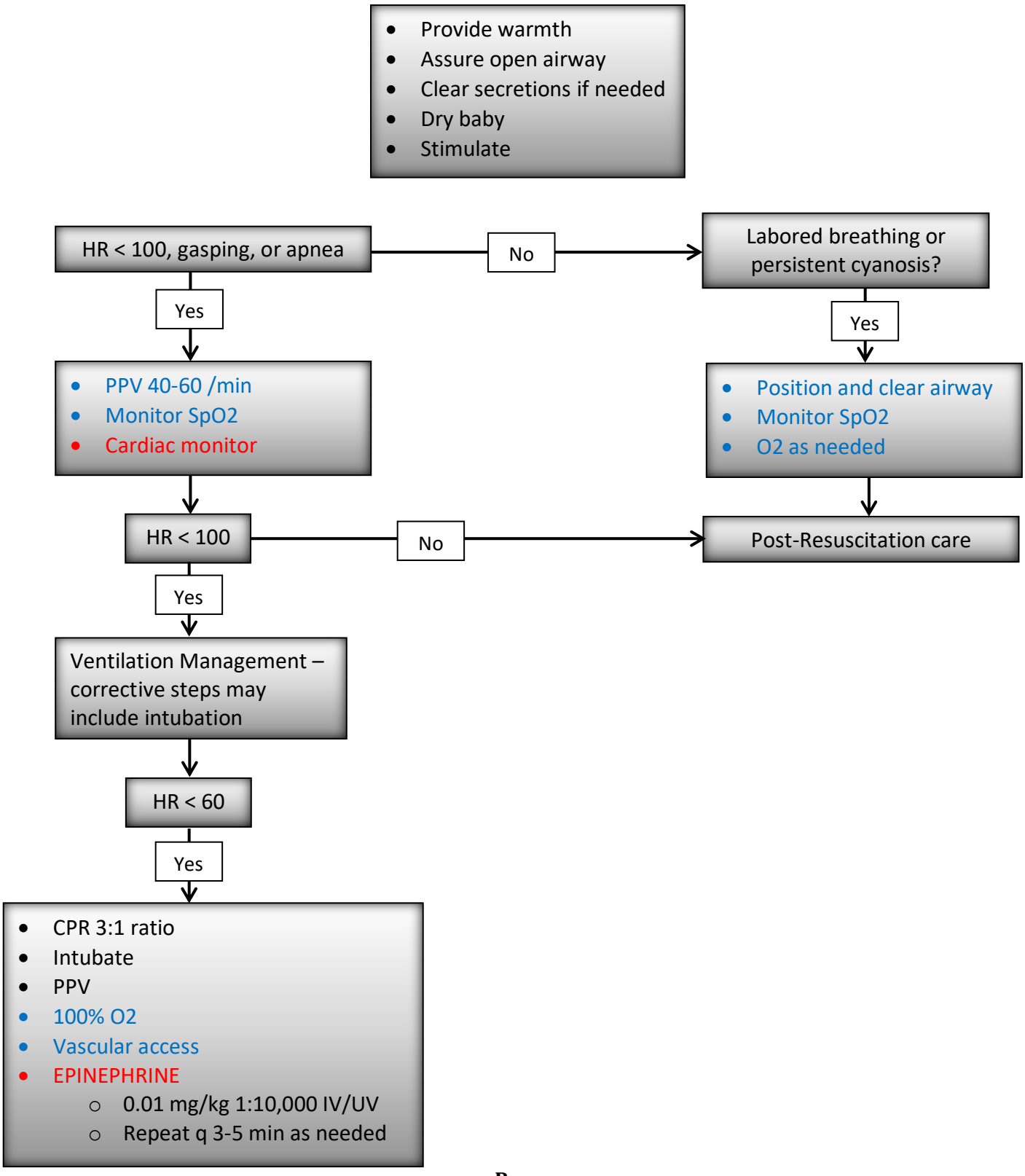
**Special Considerations:**

- Pharmacological agents are used to assist the Paramedic in performing intubation in patients with high intubation difficulty due to gag reflex. In these instances, protecting the airway is a potentially life-saving maneuver. These patients may include: Head trauma, CVA/Stroke, Multisystem Trauma, Overdose, Status Epilepticus, Acute Pulmonary Edema, Respiratory Failure, Severe Burns, or other patients based on anticipated clinical course.
- Most pediatric airways can be effectively managed with BLS interventions

# Pediatric Nausea/Vomiting



# Pediatric Neonatal Resuscitation



# Pediatric Neonatal Resuscitation

| Targeted pre-ductal SpO2 after birth | |
|---|---|
| 1 minute | 60% - 65% |
| 2 minute | 65% - 70% |
| 3 minute | 70% - 75% |
| 4 minute | 75% - 80% |
| 5 minute | 80% -85% |
| 6 minute | 85% - 95% |

| APGAR | Score = 0 | Score = 1 | Score = 2 |
|---|---|---|---|
| **Activity/Muscle Tone** | Absent | Arms/legs flexed | Active Movement |
| **Pulse** | Absent | Below 100 | Above 100 |
| **Grimace/Reflex Irritability** | No Response | Grimace | Sneeze, cough, pulls away |
| **Appearance/Skin Color** | Blue – Grey, pale all over | Normal, except extremities | Normal |
| **Respiration** | Absent | Slow, irregular | Good, crying |

**Special Considerations:**

- Neonate considerations for infants ≤ 28 days (4 weeks)
- Routine deep suctioning is no longer recommended
- Most newborns requiring resuscitation will respond to BVM, compressions and Epi. For those that do not, consider hypovolemia, pneumothorax, and/or hypoglycemia (BGL < 40)
- Document APGAR at 1 min and 5 min after birth
- Ideal pulse oximetry placement is on the right hand for pre-ductal SpO2
- Pre-term newborns are susceptible to oxygen toxicity
- Transport mother and infant together whenever possible
- Maintaining temperature of newborn is essential

# Pediatric Overdose/Poisoning

- Determine cause of overdose/poisoning, treat as indicated below

**Carbon Monoxide (CO)**

- Place patient on CO monitor
- If a patient's SpCO is:
  - 0-5% - Consider normal for non-smokers. When >3% with symptoms, consider oxygen administration and recommend transport.
  - 5-10% - Consider normal for smokers, abnormal for non-smokers. If symptoms present, consider high flow oxygen and recommend transport.
  - 10-15% - Abnormal in any patient. Assess for symptoms, consider high flow oxygen and recommend transport.
  - >15% -Significantly abnormal in any patient. Treat with high flow oxygen and recommend transport.
  - >30% - Consider transport to hyperbaric facility, especially if ALOC or pregnant.

**Organophosphate (Insecticide)**

- ATROPINE
  - 0.02 mg/kg IV/IO (min dose 0.1 mg, max 0.5 mg)
  - repeat Q 3-5 min until cessation of secretions

**Beta Blocker**

- GLUCAGON
  - 50 mcg/kg IV/IO/IM over 1-2 min
  - May repeat once

**Opiates**

- NALOXONE
  - 0.1 mg/kg IV/IO/IM/IN
  - Max single dose 0.5 mg, max total dose 10 mg

**Tricyclic Anti-Depressants**

For patients with any of the following:
- Dysrhythmias or QRS ≥ 120
- Hypotension
- Seizure
- Cardiac Arrest

- SODIUM BICARBONATE 1.0 mEq/kg IV/IO
- If patient is intubated, ventilate patient to maintain EtCO2 level of 28-30 mmHG

**Calcium Channel Blocker**

- CALCIUM CHLORIDE
  - 0.2 mL/kg slow IV/IO

**Special Considerations:**
- Poison Control – (800) 222-1222 OR (775) 982-4129
- For suspected ingestion, consider NG/OG tube placement and administration of ACTIVATED CHARCOAL
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated
- Do not hesitate to contact medical control if needed

# Pediatric Pain Management/Sedation

- Maintain SpO2 ≥ 93
- Vascular Access
- Consider cardiac monitor

Comfort measures:
- Patient positioning
- Splinting
- Ice

Pain

- NITROUS OXIDE
  - As long as patient is able to follow directions
- FENTANYL 1.0 mcg/kg IV/IO/IN
  - May repeat q 5-10 min
- MORPHINE 0.1 mg/kg IV/IO/IM
  - May repeat q 10 min
- KETAMINE 0.1-0.3 mg/kg
  - SIVP or Drip (see below)
    - 1.0 mg/kg into 100 mL NS bag
    - Administer half of bag over 3-5 min
    - May administer repeat dose (second half of IV bag) after 5 min

Sedation

- Cardiac Monitor
- Sidestream End Tidal CO2 Monitoring
- MIDAZOLAM 0.2 mg/kg IV/IO/IM
  - Repeat as needed
- KETAMINE
  - 1-2 mg/kg IV
    - Repeat as needed
  - 3-4 mg/kg IM
    - Repeat as needed
- Assess and document Bloomsbury Sedation Score for sedated patients

**Special Considerations:**
- Consider prophylactic ODANSETRON when administering pain medication
- Monitor BP and Respirations closely as sedative and analgesic agents can cause hypotension and respiratory depression
- Burn patients may require more aggressive dosing
- Document pain severity (1-10) before and after pain medication administration

# Pediatric Respiratory Distress

- Cardiac Monitor and SpO2
- EtCO2 monitoring as indicated

**Bronchospasm/Asthma/Reactive Airway**

- ALBUTEROL
  - 2.5 mg in 3mL
- DUONEB (2nd and 3rd )
  - 0.5 mg Ipratropium with 3.0 mg Albuterol
- Continue ALBUTEROL after 2nd and 3rd DUONEB

**Suspected Croup**

- < 6 months 0.25 mL RACEMIC EPINEPHRINE
- > 6 months 0.5 mL RACEMIC EPINEPHRINE

↓

**If patient's condition deteriorates, consider:**

- EPINEPHRINE
  - 0.01 mg/kg 1:1,000 IM, max 0.3 mg
  - Repeat q 3-5 min

**Impending Respiratory Failure:**

- EPINEPHRINE
  - 0.01 mg/kg 1:10,000 IV, max 1.0 mg
  - Repeat q 3-5 min

↓

- SOLUMEDROL
  - 2.0 mg/kg SIVP

↓

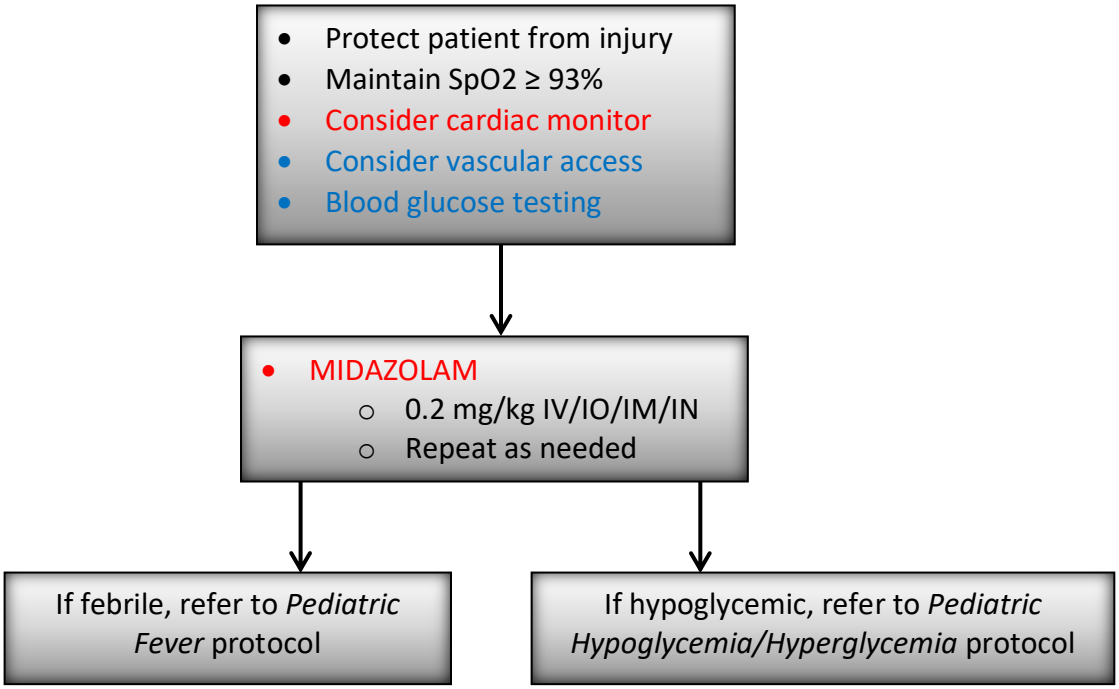
**Status Asthmaticus**

- MAGNESIUM SULFATE
  - 25-50 mg/kg, max 2 g
  - Mix in 100 mL, administer over 20 min

**Special Considerations:**

- Signs of impending respiratory failure include: altered mental status, inability to maintain respiratory effort, cyanosis
- Respiratory distress secondary to drowning may require PEEP and/or nebulizer treatment
- Croup may respond positively to cold environment and nebulized saline

# Pediatric Seizure




**Special Considerations:**

- Benzodiazepines are well tolerated in pediatrics, do not delay IM/IN administration while initiating IV
- Status epilepticus is defined as two or more seizures without an intervening lucid period, or a seizure lasting more than five minutes
- Grand mal seizures are associated with a loss of consciousness, incontinence or trauma
- Focal seizures affect only part of the body and are not usually associated with a loss of consciousness
- Be prepared to address airway issues and support ventilations as needed


# Operational Protocols

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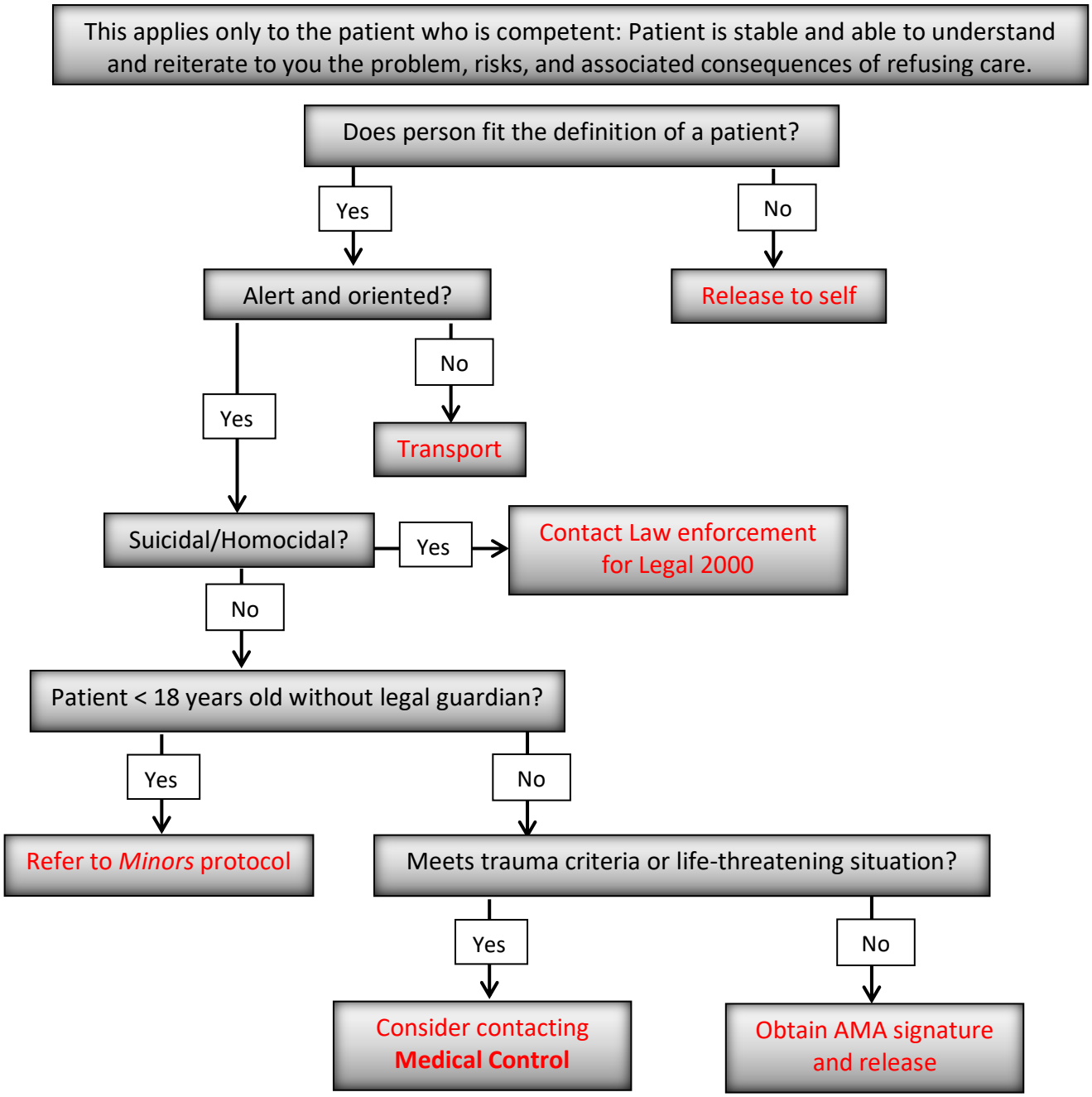
# AMA Decision Tree



# Behavioral Crisis

For patients ≥ 18 years old, who are seeking treatment for a behavioral health crisis or substance abuse/dependence, consider transport to the Mallory Behavioral Health Crisis Center.

Exclusion Criteria:

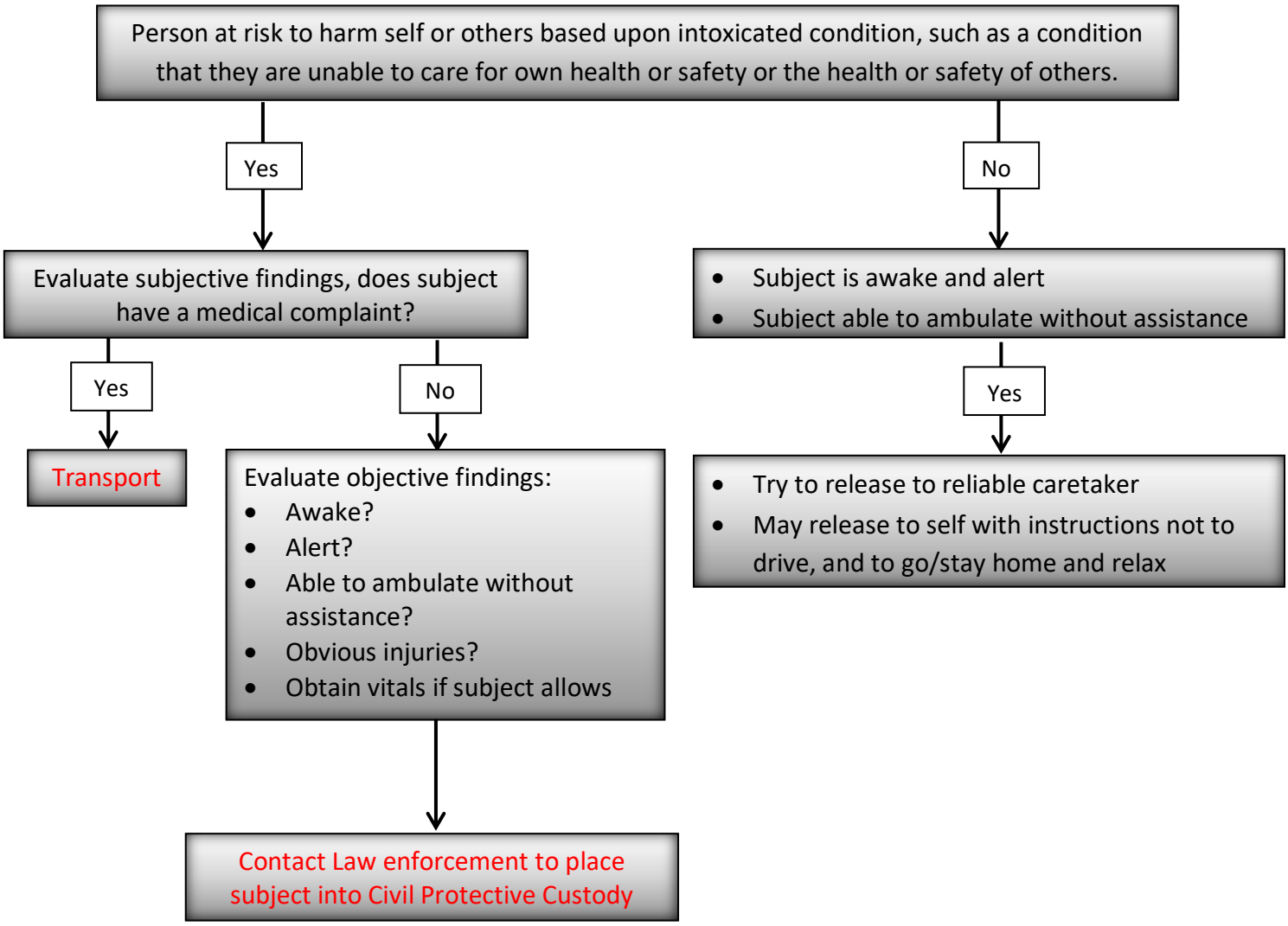
- Abnormal vital signs:
  - SBP > 190 or < 90, DBP >100
  - Pulse > 120
  - SpO2 < 89%
  - Respiratory rate >30 or <10
  - Temperature > 100.5 F
  - Blood Glucose <60 or >350
- New irregular heartbeat
- Trauma, such as injuries requiring x-rays, wounds requiring sutures, head trauma, etc
- Difficulty rousing or excessive somnolence
- Known or suspected ingestion or overdose
- Violent behaviors that are beyond capabilities of Crisis Center to control
- Any medical complaint (ie: chest pain, shortness of breath, syncope, abdominal pain, etc)
- Breathalyzer >0.3

Contact Mallory Behavioral Health Crisis Center to have patient accepted for treatment prior to transport

- (775) 445-8889

# Civil Protective Custody

**NRS 458.270 states "a person who is found in any public place under the influence of alcohol, in such a condition that the person is unable to exercise care for his or her health or safety or the health or safety of other persons, must be placed under civil protective custody by a peace officer"**



# Contacting Medical Control

**Contact Medical Control When:**

- EMS judgement suggests consultation with Medical Control physician necessary
- EMS provider needs assistance in termination of resuscitation
- Patient condition not addressed in protocols

**Communication Failure:**

- In the event Medical Control cannot be contacted, care will be delivered in the best interest of the patient at the Paramedic's discretion

**Document:**

- Treatment requests/approved physician orders
- Time of contact and Medical Control physician's name

# Destination

**Nearest Appropriate Facility**: Providers should transport patients the nearest definite care facility that meets the needs/criteria based on the findings during their assessment. Transport decisions should be made based on the best interest of patient care. Transport to alternate facilities due to operational limitations, weather, and hospital diversions may be considered. Patients may determine transport destination unless the patient is excluded due to clinical conditions defined below, the hospital choice is on divert status, or other factors defined above. For any special considerations contact medical control.

**Trauma (special resources):** Patients who meet State Trauma Criteria shall be transported to the closest Trauma Center; see *Trauma Transport Destination* for guidance on when to transport to Level 1, Level 2, or Level 3 centers.

**Nearest Facility:** If a patient and/or family member has no hospital preference, the transport shall be to the destination hospital in which the scene is closest to.

**Neurological/Suspected Stroke:** Patients with stroke symptoms, with duration of symptoms less than eight hours will be transported to a Stroke Receiving Facility. With the exception of divert status for an internal disaster, stroke patients cannot be diverted. If a patient, the patient's family or the patient's physician request another hospital, the patient will be taken to the requested hospital.

**Pediatrics:** Consider transport to Renown Regional Medical Center for patients who might require hospital admission or ICU services.

**Acute Coronary Syndrome (special resources):** Any patient who meets the following criteria is taken to a hospital with interventional cardiology capabilities (CTRMC):

- 12 Lead ECG shows evidence of an active STEMI
- History of angioplasty, stent placement, or coronary artery bypass graft AND symptoms suggesting acute coronary syndrome

**Burns (special resources):** Any patient who meets the following criteria should be transported by Helicopter to a Burn Unit, unless the burns are complicated by major trauma:

- 2nd or 3rd degree burns > 20% BSA
- 2nd or 3rd degree burns > 10% BSA in patients under 10 or over 50 years of age
- Significant burns that involve the face, hands, feet, genitalia, perineum, or major joints
- Electrical burns, including lightning injuries
- Chemical burns

# Destination Capabilities

**Barton Memorial Hospital (BMH)**
- EMD (General)
- Level 3 Trauma Center

**Carson-Tahoe Regional Medical Center**
- EMD (General)
- STEMI Receiving Facility
- Stroke Receiving Facility

**Carson Valley Medical Center (CVMC)**
- EMD (General)

**Renown South Meadows Medical Center (RSMMC)**
- EMD (General)

**Renown Regional Medical Center (RRMC)**
- EMD (General)
- Level 2 Trauma Center
- STEMI Receiving Facility
- Stroke Receiving Facility
- Emergency Department Accepting Pediatrics (EDAP)
- Plastics

**Saint Mary's Regional Medical Center**
- EMD (General)
- STEMI Receiving Facility
- Stroke Receiving Facility

**Reno VA Hospital**
- EMD (General): MUST call prior to transport for facility acceptance.
- Name, DOB, SS#, and C/C.

**UC Davis Medical Center**
- EMD (General)
- Level 1 Trauma Center
- Burn Unit
- STEMI Receiving Facility
- Stroke Receiving Facility
- Emergency Department Accepting Pediatrics (EDAP)
- Plastics

# DNR/POLST

**Valid POLST indicating DNR or State Issued DNR:**

- Official document with both patient/legal representative and physician signature on site
- Faxed, copied or electronic version legal and valid
- Verify patient identification
- Verbal instructions from family or friends DO NOT qualify as valid DNR/POLST

**Special Considerations:**

- DNR/POLST is **INVALID** if patient indicated they wish to receive life sustaining treatment. Document presence of order and how they indicated it was to be revoked. Relay information to future medical providers.
- Family cannot revoke DNR/POLST unless they hold DPOA/legal guardianship
- Document presence of DNR/POLST for with patient's name, physician name, and license number if documented
- POLST provides instruction of degree of resuscitation
- Nevada providers can accept DNR/POLST of other states
- If there is concern about the validity of the DNR/POLST begin BLS and contact **MEDICAL CONTROL**

# Endangerment

**NRS 432B.220** Persons required to make report; when and to whom reports are required; any person may make report; report and written findings if reasonable cause to believe death of child caused by abuse or neglect; certain persons and entities required to inform reporters of duty to report.

**NRS 200.5093** Report of abuse, neglect, exploitation, isolation or abandonment or older person; voluntary and mandatory reports; investigation; penalty

**Child Report (under 18):**

- Contact appropriate Law Enforcement agency if immediate protection needed
- **Notify receiving facility RN and Social Worker**
- Notify BC and follow department policy for reporting procedures

**Elder Report (over 18):**

- Contact appropriate Law Enforcement agency if immediate protection needed
- **Notify receiving facility RN and Social Worker**
- Notify BC and follow department policy for reporting procedures

# Minors

Except for circumstances specifically prescribed by law, a minor is not legally competent to consent to (or refuse) medical care. A "minor" is any person under the age of 18.

An "emancipated minor" is a minor who is at least 16 years of age, who is married or living apart from his or her parents or legal guardian, and who has petitioned the juvenile court for a decree of emancipation.

**Life-Threatening Situation**

Immediate treatment and/or transport to a medical facility should be initiated

**Non-Life-Threatening Situation**

If a minor has any illness or injury, EMS personnel should make a reasonable attempt to contact a parent or other legally qualified representative before initiating treatment or transport. If this is not possible, EMS personnel should transport the patient to the closest hospital with "implied consent". Parental consent is not needed for care in non-life-threatening situations when:

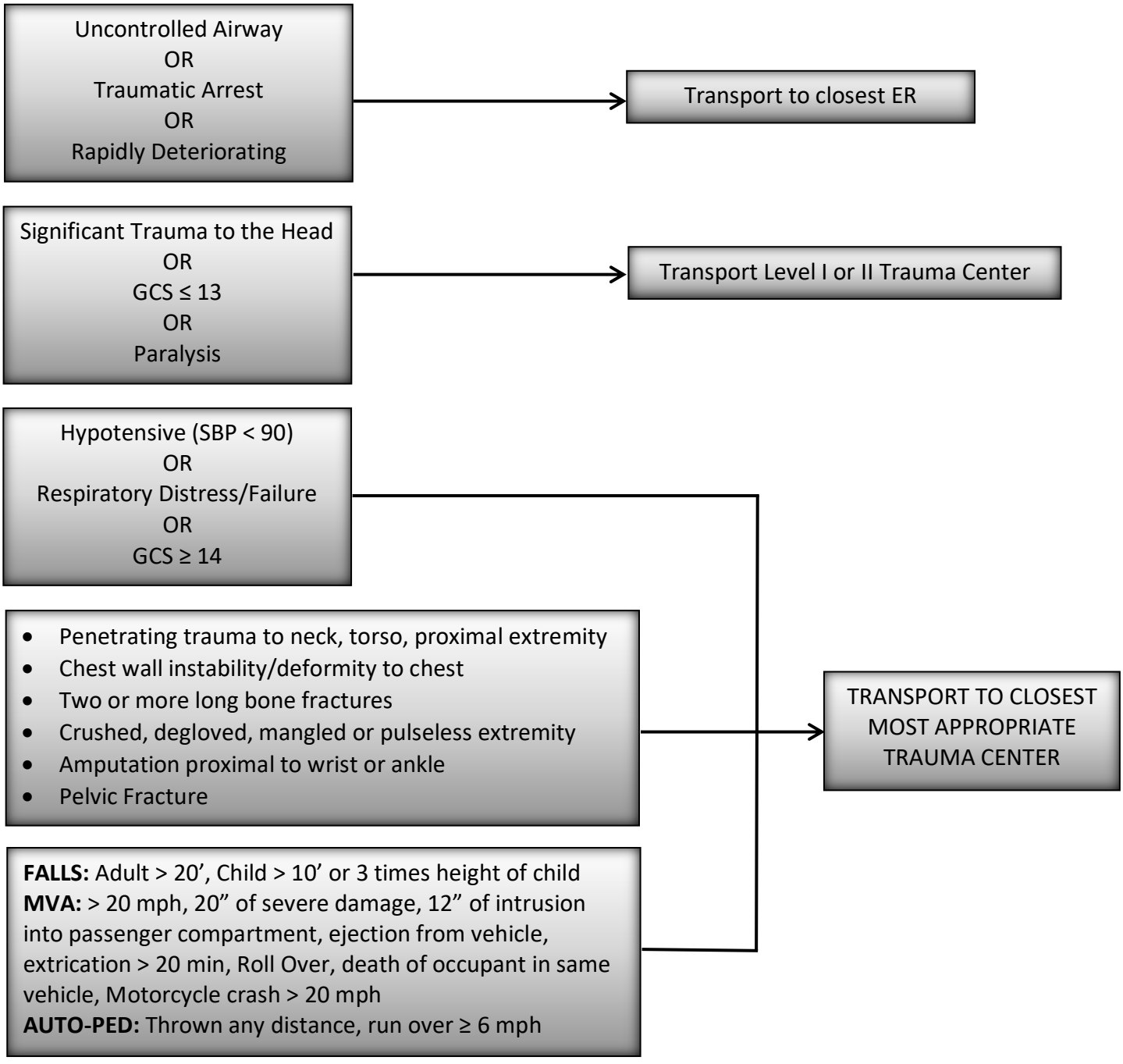
- Minor is emancipated
- Parent has given written authorization to procure medical care to any adult (18 or over) taking care of the minor
- Minor is an alleged victim of sexual assault
- Minor seeks prevention or treatment of pregnancy or sexually transmitted infection

**Minors who Refuse Care**

If a non-emancipate minor refuses any indicated treatment or transport, EMS field personnel should:

- Attempt to contact parents or other legally qualified representative for permission to treat and transport the minor
- Contact appropriate Law Enforcement agency and request that patient be taken into temporary custody in order for treatment or transport to be instituted
- Consider contacting base hospital to advise them of the situation

# Trauma Transport Destination




Helicopter Transport can be utilized at the paramedic's discretion for any patient

# Unsolicited Medical Intervention

Once a physician has identified him/her self as such on scene, thank them for their offer of assistance. Then advise him/her that you are operating under the authority of the State of Nevada and under protocols approved by the State of Nevada, which does not allow you to take an order from any physician other than an on-duty base station physician or your Medical Director. You are also delivering care under the authority of a Medical Director and standing medical orders.

To avoid confusion and expedite patient care, no individual should intervene in the care of the patient unless the individual is:

- Requested by the attending EMS provider
- Is authorized by the base station physician
- Is capable of delivering more extensive emergency medical care at the scene

If the on-scene physician assumes patient management, he/she accepts responsibility for patient care until the transfer of care is made to the receiving hospital's physician. This requires the physician to accompany the patient to the emergency department.

If the physician assumes this responsibility, he/she must document this by handwriting their note on a hospital chart form upon arrival at the ED and sign accordingly. The completion of the physicians note will become part of the patient's hospital record, and the medic should document the completion of this note in the patient's ePCR along with the physician's name and medical license number, if possible. The narrative of the ePCR should reflect what care was performed by the physician upon assuming care.

A physician who has initiated care of a patient before the arrival of EMS personnel has accepted responsibility for the management of the patient. EMS personnel should offer all appropriate assistance and support within their scope of practice. Consultation with the base physician should be made to manage conflicts in patient management.

If a physician other than the EMS Medical Director assumes care of patient, use agency procedures for reporting.


TAHOE DOUGLAS FIRE
FIRE
EMS
EOD
RESCUE
LAKE TAHOE, NEVADA. EST. 1946

# References

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# References

## ***Phone Numbers***

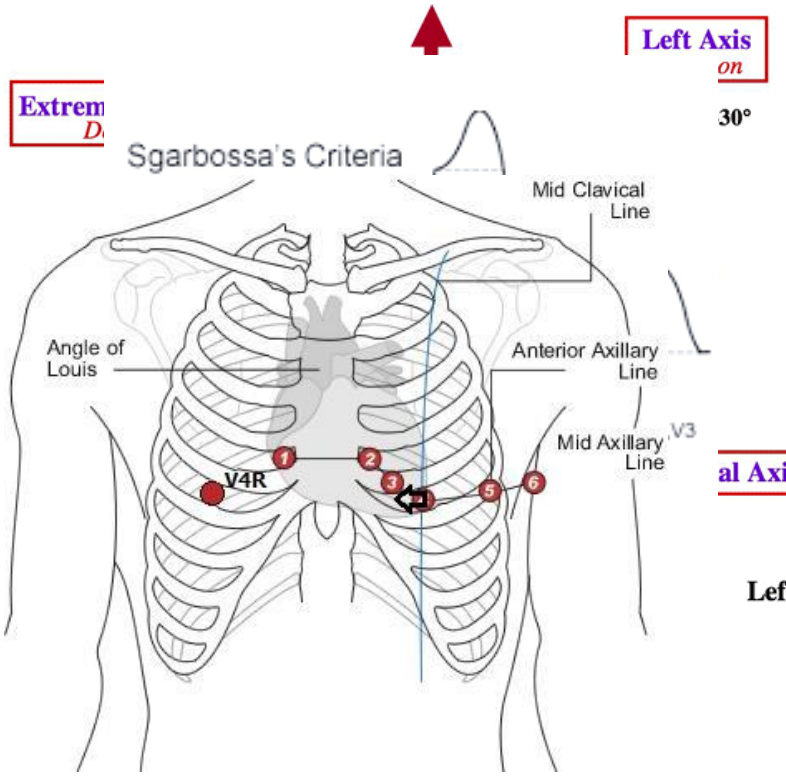
Douglas County Dispatch…… 775-782-5126
Nevada Highway Patrol Dispatch…… 775-688-2830
Barton ER…… 530-543-5890
Carson Tahoe ER…… 775-445-8000
Renown Main ER…… 775-785-6295
Renown South Meadows ER…… 775-982-7373
Saint Mary's ER…… 775-322-9424
Reno VA ER…… 775-328-1200
Mallory Behavioral…… 775-445-8889

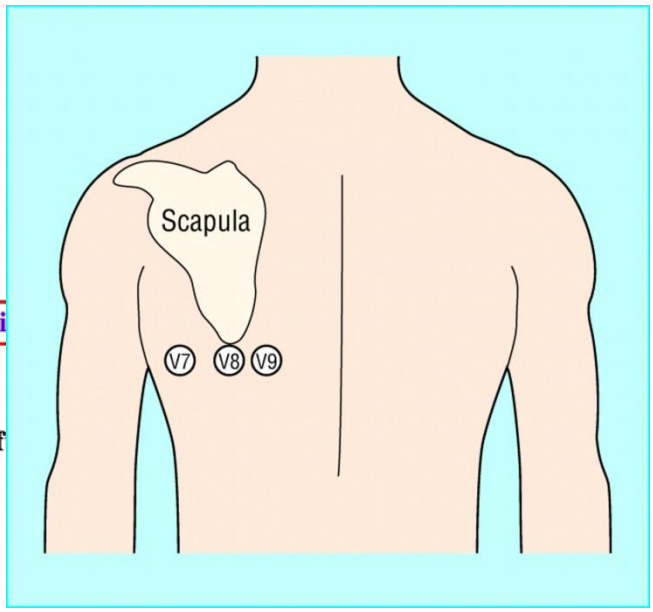
## ***Radio Channels***

Barton ER……Med 7
Carson Tahoe ER……Med 1
Carson Valley ER……Med 2
Renown ER……Hail REMSA Dispatch on Med 10 for patch
Renown South Meadows ER……Hail REMSA Dispatch on Med 10 for patch
Saint Mary's ER……Hail REMSA Dispatch on Med 10 for patch

# References

| STEMI and Reciprocal Changes | | |
|---|---|---|
| **Location** | **Leads** | **Reciprocal Leads** |
| Inferior | II, III, AVF | I, AVL |
| High Lateral | I, AVL | II, III, AVF |
| Anterior | V1, V2, V3, V4 | V8, V9 |
| Posterior | V8, V9 | V1, V2, V3, V4 |



# References

| Glascow Coma Scale | | |
|---|---|---|
| **Eye Opening** | Spontaneous | 4 |
| | To Voice | 3 |
| | To Pain | 2 |
| | No Response | 1 |
| **Verbal Response** | Oriented | 5 |
| | Confused | 4 |
| | Inappropriate Words | 3 |
| | Inappropriate Sounds | 2 |
| | No Response | 1 |
| **Motor Response** | Obeys verbal commands | 6 |
| | Localizes Pain | 5 |
| | Withdraws to Pain | 4 |
| | Flexes to Pain | 3 |
| | Extends to Pain | 2 |
| | No Response | 1 |

| Pediatric Glascow Coma Scale | | |
|---|---|---|
| **Eye Opening** | Spontaneous | 4 |
| | To Voice | 3 |
| | To Pain | 2 |
| | No Response | 1 |
| **Verbal Response** | Smiles, follows movement | 5 |
| | Cries, but consolable | 4 |
| | Inconsistently inconsolable | 3 |
| | Inconsolable, agitated | 2 |
| | No Response | 1 |
| **Motor Response** | Moves spontaneously | 6 |
| | Withdraws from touch | 5 |
| | Withdraws from Pain | 4 |
| | Flexes to Pain | 3 |
| | Extends to Pain | 2 |
| | No Response | 1 |

| Pediatric Vital Signs | | | |
|---|---|---|---|
| **AGE** | **HEART RATE** | **RESPIRATIONS** | **SBP** |
| **Neonates (0-28 days)** | 120-160 | 40-60 | >60 |
| **Infant (1-12 months)** | 100-120 | 25-50 | 70-95 |
| **Children (1-7 years)** | 80-100 | 15-30 | 80-110 |
| **School Age (8-11 years)** | 65-110 | 18-30 | 100-110 |
| **Adolescent (12-15 years)** | 60-90 | 12-26 | 110-130 |

| Bloomsbury Sedation Score | |
|---|---|
| +3 | Agitated/Restless |
| +2 | Awake/Comfortable |
| +1 | Awake/Calm |
| 0 | Roused by voice, remains calm |
| -1 | Roused by movement/stimulation |
| -2 | Roused by painful stimulation |
| -3 | Unable to rouse |

# References

Epinephrine Drip:

- 1.0 mg Epinephrine 1:1,000 into 1000 mL Normal Saline bag
- Concentration = 1mcg/mL
- Use 10gtts/mL drip set to flow at appropriate rate (20-100 gtts/min)

Levophed Drip:

- 1.0 mg Levophed into 1000 mL Normal Saline Bag
- Concentration = 1mcg/mL
- Use 10gtts/mL drip set to flow at appropriate rate (5-100 gtts/min)

Ketamine Drip:

- 250 mg into 250 mL Normal Saline Bag
- Concentration = 1mg/mL
- Use 10gtts/mL drip set to flow at appropriate rate (10-20 gtts/min)

Amiodarone Drip:

- 150 mg into 100 mL Normal Saline Bag
- Run entire 100mL over 10 minutes
- Use 10gtts/mL drip set, flow at 100gtts/min

Magnesium Sulfate Drip:

- 2g into 100 mL Normal Saline Bag
- Run entire 100mL over 20 minutes
- Use 10gtts/mL drip set, flow at 50gtts/min

Oxytocin Drip:

- 20 units in 1000 mL NS
- Administer 10 units (500 mL) over 10-20 minutes
- Use 10gtts/mL drip set, flow at 250-500/min (wide open)

# References

# Approved Medications

| Advanced EMT | |
|---|---|
| Acetaminophen (Tylenol) | Naloxone (Narcan) |
| Activated Charcoal | Nitroglycerin |
| Albuterol Sulfate (Albuterol) | Nitrous Oxide |
| Aspirin | Ondansetron (Zofran) |
| Diphenhydramine (Benadryl) | Oxygen |
| Dextrose | Phenylephrine (Neo-Synephrine) |
| Epinephrine 1:1,000 | Thiamine |

*May assist ALS provider, under direct supervision, with the administration of any ALS medication

| Paramedic | |
|---|---|
| All approved Advanced EMT Medications PLUS: | |
| Adenosine | Lidocaine |
| Amiodarone | Magnesium Sulfate |
| Atropine | Methylprednisolone (Solu-medrol) |
| Calcium Chloride | Midazolam (Versed) |
| Epinephrine | Morphine Sulfate |
| Fentanyl | Norepinephrine (Levophed) |
| Furosemide (Lasix) | Oxytocin (Pitocin) |
| Glucagon | Phenergan (Promethazine) |
| Haloperidol (Haldol) | Racemic Epinephrine |
| Ipratropium (DuoNeb) | Sodium Bicarbonate |
| Ketamine | Tranexamic Acid |
| Labetalol | |

References

# Approved Procedures

## Advanced EMT:

AED
IV Access
IO Access
Blood Glucose Testing
Medication administration from approved list
Oral Intubation
King Airway Insertion
Defibrillation (manual mode with ALS provider)

## Paramedic:

**In addition to Advanced EMT skills**

CPAP
Defibrillation
Cardioversion
ECG Rhythm interpretation
Medication administration from approved list
Nasal Intubation
Needle/Surgical Cricothyrotomy
Needle Thoracotomy
NG/OG Tube insertion
Transcutaneous pacing
Umbilical Vein Cannulation


# Drug Formulary

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# ACETAMINOPHEN (TYLENOL)

Pharmacology and Actions

- Thought to produce analgesia by blocking generation of pain impulses, probably by inhibiting prostaglandin synthesis in the CNS or the synthesis or action of other substances that sensitize pain receptors to mechanical or chemical stimulation.
- It is thought to relieve fever by central action in the hypothalamic heat-regulating center.

Indications

- Fever

Contraindications and Precautions

- Contraindicated in patients with hypersensitivity to acetaminophen
- Avoid concomitant use with ethanol and this increases the risk of hepatic damage

Side Effects and Special Notes

- Use cautiously in patients with suspected pre-existing liver disease, chronic alcohol use, or chronic hepatitis/jaundice because hepatotoxicity has occurred after therapeutic doses
- Many OTC products contain acetaminophen, be aware of this when calculating dosages
- Acetaminophen may produce false positive decreases in blood glucose levels in home monitoring systems

# ACTIVATED CHARCOAL

Pharmacology and Actions

- Inhibits gastrointestinal absorption of drugs and chemicals

Indications

- Suspected overdose or accidental ingestion of drugs or chemicals

Contraindications and Precautions

- Ingestion of caustic, corrosive, or petroleum distillates
- ALOC of inability to swallow (unless administered via OG/NG)

Side Effects and Special Notes

- Most effective when administered within 30 minutes of ingestion
- Milk products ingested prior to activated charcoal can reduce its effectiveness

# ADENOSINE (ADENOCARD)

Pharmacology and Actions

- Naturally-occurring amino acid
- Slows conduction through the AV node
- Has no effect on accessory tracks such as found in WPW or LGL syndromes
- Extremely short duration of action (<10 seconds)
- May cause brief period of asystole which spontaneously reverts
- Almost all patients will report varying degrees of chest pressure or pain after administration of this drug
- Many patients will revert to the previous rhythm even after conversion to normal sinus rhythm

Indications

- Stable Narrow Complex SVT

Contraindications and Precautions

- Second or third degree heart block, poison or drug induced tachycardia
- Atrial fibrillation, atrial flutter, or Ventricular Tachycardia will not be converted by Adenosine
- Reduce initial dose to 3 mg if given through a central line
- Larger doses may be required in patients taking theophylline or caffeine

# ALBUTEROL (PROVENTIL, VENTOLIN)

Pharmacology and Actions

- Albuterol relaxes bronchial smooth muscle by stimulating Beta 2 adrenergic receptors.

Indications

- Primarily used to treat bronchial asthma, COPD and reversible bronchospasm.

Contraindications and Precautions

- Causes decrease in serum potassium and should be used with caution in patients with profound hypokalemia.

Side Effects and Special Notes

- Adverse effects include tremor, nervousness, tachycardia, palpitations and occasionally hypertension
- Most patients will have a decrease in heart rate and blood pressure with relief of bronchospasm
- Therefore, do not withhold therapy in patients with hypertension and/or tachycardia.

# AMIODARONE (CORDARONE)

Pharmacology and Actions

- Considered a Class III antiarrhythmic. Complex drug with effects on Sodium, Potassium and Calcium channels as well as alpha and beta adrenergic blocking properties. Thought to prolong the refractory period and action potential duration. Amiodarone has an extremely long half-life (up to 40 days).

Indications

- Indicated for the treatment of shock, CPR and Vasopressor refractory VF/pulseless VT
- Indicated in other life threatening arrhythmias like recurrent and/or hemodynamically unstable VT.

Contraindications

- None in VF/Pulseless VT
- Endotracheal administration is contraindicated.

Precautions

- May produce vasodilation and hypotension
- May have negative inotropic effects
- May produce prolonged QT interval
- Use with caution in the presence of renal failure.

# ASPIRIN

Pharmacology and Actions

- Inhibits platelet aggregation and arterial constriction by blocking formation of thromboxane A2. This reduces overall ACS mortality, reinfarction, and CVA.

Indications

- Indicated in all patients with ACS
- Indicated in any person with symptoms suggestive of ischemic pain

Contraindications and Precautions

- Relatively contraindicated in patients with active ulcer disease
- Contraindicated in patients with known hypersensitivity to aspirin.

# ATROPINE

Pharmacology and Actions

- Atropine is anticholinergic, inhibits acetylcholine at the parasympathetic neuroeffector junction, blocking vagal effects on the SA node; thus enhancing conduction to the AV note and increasing the heart rate

Indications

- Atropine is indicated for symptomatic bradycardia and bradyarrhythmias (junctional or escape rhythm)
- It is also indicated in cases of organophosphate poisoning
- It can be administered prior to endotracheal intubation to diminish secretions and block cardiac vagal reflexes
- Excellent for vagally induced bradycardia in pediatric patient being intubated.

Contraindications and Precautions

- The action of atropine cause mydriasis (dilated pupils)
- Use with caution in presence of myocardial ischemia
- Routine use during PEA or Asystole is unlikely to have therapeutic benefit
- Unlikely to be effective for hypoxic bradycardia, Type II AV Block, and Third Degree with wide QRS complexes.

# CALCIUM CHLORIDE

Pharmacology and Actions

- Positive inotrope which increases contractility (the strength of the contraction). Stabilizes myocardial muscle membrane in the setting of hyperkalemia.

Indications

- Known or suspected hyperkalemia
- Hypocalcemia
- As an antidote for toxic effects from calcium channel blocker and beta blocker overdose
- MgSO4 overdose.

Contraindications

- Hyperkalemia due to digitalis toxicity
- Do not mix with Sodium Bicarbonate.

# DEXTROSE

Pharmacology and Actions

- Dextrose is a sugar called glucose or grape sugar containing six carbon atoms. Dextrose is important because it is the primary energy source for the brain

Indications

- Indicated for the treatment of known hypoglycemia.

Contraindications and Precautions

- Contraindicated in intracranial or intraspinal hemorrhage

Side Effects and Special Notes

- Extremely hypertonic
- Should be administered into a rapid-running IV established in a large vein
- Inadvertent extravasation will lead to tissue sloughing and necrosis.

# DIPEHNHYDRAMINE HYDROCHLORIDE (BENADRYL)

Pharmacology and Actions

- Diphenhydramine competes with histamine for H1 receptor sites on effector cells. Prevents, but does not reverse histamine-mediated responses, particularly histamine's effects on the smooth muscle of the bronchial tubes, gastrointestinal tract, uterus and blood vessels.

Indications

- One of the most widely used antihistamines for the treatment of anaphylaxis and several allergic reactions
- Also used to treat motion sickness and extrapyramidal symptoms

Contraindications and Precautions

- Contraindicated in acute asthmatic attack
- Should be used cautiously in glaucoma, asthmatic, hypertensive or cardiac patients.

Side Effects and Special Notes

- Adverse reactions include drowsiness, occasional nausea and dry mouth
- Used with Epinephrine in severe anaphylaxis (if not contraindicated)

# EPINEPHRINE

Pharmacology and Actions

- Epinephrine is an endogenous catecholamine with both alpha and beta adrenergic activity. Epinephrine increases heart rate, myocardial contractility, pulse pressure, cardiac output, systolic and diastolic blood pressure, automaticity, systemic vascular resistance and myocardial work and oxygen consumption. Epinephrine also lowers the threshold for defibrillation and causes bronchodilation.

Indications

- Cardiac arrest/post cardiac arrest
- Sepsis
- Bradycardia
- Distributive shock
- Bronchial asthma
- Croup
- Anaphylaxis
- Hypotension

Contraindications and Precautions

- Age > 45, or previous cardiac history (in some settings, consult medical control)
- Epinephrine will lower the threshold for ventricular fibrillation. Epinephrine's positive inotropic and chronotropic effects can precipitate or exacerbate cardiac ischemia.

Side Effects and Special Notes

- Epinephrine should not be mixed in the same infusion bag with alkaline solutions or be given concurrently with sodium bicarbonate
- May be given via an endotracheal tube if IV access is not available
- Higher doses may be required to treat poison or drug induced shock

# FENTANYL

Pharmacology and Actions

- Binds with opiate receptors in the CNS, altering both perception of and emotional response to pain through an unknown mechanism.

Indications

- Relief of severe acute and severe chronic pain

Contraindications and Precautions

- Contraindicated in patients with known tolerance to the drug
- Additive effects when given with CNS depressants, general anesthetics, hypnotics, MAO inhibitors, other narcotic analgesics, sedatives, and tricyclic antidepressants

Side Effects and Special Notes

- For better analgesic effect, administer drug before patient has intense pain
- Monitor respiratory status carefully, drug may cause respiratory depression. Naloxone may be used to reverse Fentanyl
- Rapid administration may cause chest wall rigidity.

# FUROSEMIDE (LASIX)

Pharmacology and Actions

- Furosemide is a diuretic that works in the loop of henle. The onset of diuresis following IV administration is within five minutes, with the peak effect occurring within the first half hour.

Indications

- Furosemide is the indicated therapy in acute pulmonary edema.

Contraindications and Precautions

- Contraindicated in anuria and in patients with known hypersensitivity.
- Excessive diuresis may result in dehydration and reduction in blood volume with circulatory collapse.
- Patients should be observed for signs of fluid and electrolyte imbalances, namely hyponatremia, hypochloremic alkalosis and hypokalemia.

Side Effects and Special Notes

- Digitalis therapy may exaggerate metabolic effects of hypokalemia, especially with reference to myocardial activity.

# GLUCAGON

Pharmacology and Actions

- Raises blood glucose level by promoting catalytic depolymerization of hepatic glycogen to glucose.

Indications

- Hypoglycemia
- Beta blocker and calcium channel blocker overdose/poisoning

Contraindications and Precautions

- Known hypersensitivity to the drug

Side Effects and Special Notes

- Use only the diluent supplied by the manufacturer.
- Unstable hypoglycemic diabetic patients may not respond to Glucagon, and will require IV dextrose.
- As soon as patient is alert enough to swallow, follow up with a meal, orange juice, D50, etc.

# HALOPERIDOL (HALDOL)

Pharmacology and Actions

- A butyrophenone that blocks postsynaptic dopamine receptors in the brain.

Indications

- Management of psychotic disorders

Contraindications

- Known hypersensitivity to medication
- Coma or CNS depression

Side Effects and Special Notes

- Extrapyramidal reactions
- Tardive dyskinesia
- Sedation
- Tachycardia
- Hypotension
- Dry mouth

# IPRATROPIUM BROMIDE (ATROVENT)

Pharmacology and Actions

- Anticholinergic bronchodilator

Indications

- Relief of acute bronchospasm (reversible airway obstruction).

Contraindications and Precautions

- Allergy or known hypersensitivity to Atrovent
- Hypersensitivity to Atropine (chemically related)
- Those with a history of hypersensitivity to soya lecithin or related food products, such as soy beans and peanuts
- Use with caution in patients with heart disease, hypertension, glaucoma and the elderly.
- Ipratropium may worsen the condition of glaucoma if it gets into the eyes. Having the patient close their eyes during nebulization may prevent this.

Side Effects and Special Notes

- More common: cough, dry mouth or unpleasant taste.
- Less common or rare: vision changes, eye burning or pain, dizziness, headache, nausea, nervousness, palpitations, sweating, trembling, increased wheezing or dyspnea, chest tightness, rash, hives or facial swelling.

# KETAMINE

Pharmacology and Actions

- Dissociative Anesthetic Agent. It has amnestic and sedative effects, but it also provides analgesia. It has a rapid onset of 45-60 seconds when give IV. Its duration of action is 5-10 minutes IV, or 12-25 minutes IM. Ketamine preserves respiratory drive and is unlikely to cause hypotension. The patient may exhibit behavior consistent with an awake state (eyes open, responds to pain) after receiving Ketamine, but is dissociated from the noxious event, making Ketamine a suitable choice for short-term sedation and analgesia.

Indications

- Short-term management of pain and anxiety related to noxious events such as pain related injury, immobilization, movement of patient, or manipulation of injured extremities.
- Indicated for sedation, behavioral emergencies, and medication assisted intubation.

Side Effects and Special Notes

- Patients may have a re-emergence reaction when recovering from Ketamine that manifests as hallucinations or drams that may be unpleasant. In general, this is reduced by concomitant use of benzodiazepines.
- May cause hypersecretions.
- Avoid rapid administration of Ketamine IV, which can cause HTN or respiratory depression.

# LABETALOL

Pharmacology and Actions

- Alpha and Beta adrenergic antagonist

Indications

- Severe hypertension
- Excessive sympathetic stimulation such as that in cocaine or amphetamine toxicity

Contraindications and Precautions

- Bronchial asthma
- Congestive heart failure
- 2nd and 3rd degree heart block
- Bradycardia
- Cardiogenic shock

Side Effects and Special Notes

- May cause dizziness, hypotension, dyspnea, flushing or diaphoresis
- Use cautiously in patients with bronchial asthma, overt cardiac failure, greater than 1st degree AV block, chronic bronchitis, emphysema, pre-existing peripheral vascular disease, and pheochromocytoma
- Monitor BP carefully
- Be aware that when administered IVP/IO for hypertensive emergencies, Labetalol produces a rapid, predictable fall in blood pressure within 5 – 10 minutes

# LIDOCAINE (XYLOCAINE)

Pharmacology and Actions

- Lidocaine attenuates phase four diastolic depolarization and decreases automaticity. It raises the ventricular fibrillation threshold.

Indications

- Acute management of ventricular arrhythmias
- Prophylactic use in the acute myocardial infarction remains a subject of debate
- Prevents the increased intracranial pressure associated with rapid sequence intubation.

Contraindications and Precautions

- Use with caution in patients with severe heart block (may block the only pacemaker present).

Side Effects and Special Notes

- Overdose of Lidocaine usually results in signs of central nervous system or cardiovascular toxicity.
- Airway maintenance should be ensured in the event of seizures or signs of respiratory depression. Seizures may be treated with benzodiazepines. Should circulatory depression occur, vasopressors may be used. Clinical signs of CNS toxicity may include light-headedness, nervousness, apprehension, euphoria, confusion, dizziness, drowsiness, tinnitus, blurred or double vision, vomiting, sensations of heat, cold or numbness, twitching, tremors, convulsions, unconsciousness, respiratory depression and arrest.
- Cardiovascular reactions are usually depressant in nature and are characterized by bradycardia, hypotension and cardiovascular collapse.

# MAGNESIUM SULFATE

Pharmacology and Actions

- Magnesium Sulfate acts as a smooth muscle relaxant, especially for uterine smooth muscle and a mild bronchodilator. Also acts as an antiarrhythmic agent, which may be effective in decreasing arrhythmias related to acute myocardial infarction. Acts as a central nervous system depressant and may cause respiratory depression or apnea.

Indications

- Pregnancy induced hypertensive disorders (preeclampsia or eclampsia) to prevent convolutions. May transiently lower blood pressure at therapeutic levels. Can also be used as a tocolytic in pre-term labor.
- May be used in irretractable ventricular tachycardia/fibrillation, especially in Toursade's de Pointes.
- Ventricular arrhythmias associated with digitalis toxicity.
- Respiratory distress secondary to asthma refractory to other medications.

Contraindications and Precautions

- Use cautiously in patients with renal failure.

Side Effects and Special Notes

- Monitor respiratory rate every 5 minutes. For respiratory depression, discontinue Magnesium infusion and maintain airway/ventilation as needed.
- 1-2 grams of Calcium Gluconate or Calcium Chloride is the physiologic antidote for Magnesium Sulfate toxicity.

# METHYLPREDNISOLONE (SOLU-MEDROL)

Pharmacology and Actions

- Synthetic corticosteroid and anti-inflammatory with potent anti-inflammatory properties. Related to the natural hormones secreted in the adrenal cortex. The pharmacological effects of steroids are vast and complex. Effective as anti-inflammatory agents, they are used in the management of allergic reactions, asthma, and anaphylaxis. It is considered an intermediate-acting steroid with a plasma half-life of 3-4 hours.

Indications

- Severe anaphylaxis, asthma, or COPD
- Urticaria
- Spinal cord injury

Contraindications and Precautions

- Single dose is all that should be given in the prehospital setting.
- Long term steroid therapy can cause gastrointestinal bleeding, prolonged would healing, and suppression of adrenocortical steroids.

Special Notes and Side Effects

- Fluid retention, Congestive heart failure, Hypertension, Abdominal distention, Vertigo, Headache, Nausea, Malaise, Hiccups

# MIDAZOLAM (VERSED)

Pharmacology and Actions

- Versed is a short acting benzodiazepine with CNS depressant and anti-seizure actions.

Indications

- Agent for short periods of sedation and to reduce agitation
- Seizures

Contraindications and Precautions

- Use with caution in patients with respiratory compromise/distress or decreased mental status
- Should not be used on patients with known hypersensitivity to benzodiazepine or narrow angle glaucoma.

Side Effects and Special Notes

- Constant monitoring of cardiopulmonary status of patient required.
- For short term sedation and not the drug of choice when long term sedation is required.

# MORPHINE SULFATE

Pharmacology and Actions

- Acts as a narcotic analgesic and produces central nervous system depression. It also manifests mild hemodynamic effects. It increases venous capacitance and systemic vascular resistance, relieving pulmonary congestion.

Indications

- Relief of severe acute and severe chronic pain.
- May be used for ischemic pain in ACS unrelieved by nitrates.
- Acute cardiogenic pulmonary edema.

Contraindications and Precautions

- Use caution in the patient with RV infarction.

Side Effects and Special Notes

- The most common side effects are respiratory depression and orthostatic hypotension (which can be corrected with IV fluids).
- Monitor for respiratory depressions, continuous pulse oximetry may aid in assessing respiratory depression.
- Naloxone should be readily available for administration in the event of severe respiratory depression.

## NALOXONE (NARCAN)

Pharmacology and Actions

- Displaces previously administered opioid narcotic analgesics from their receptors (competitive antagonism).

Indications

- Known or suspected opioid induced respiratory depression.

Contraindications and Precautions

- May cause withdrawal symptoms in addicted individuals.

Side Effects and Special Notes

- Administer slowly in an amount sufficient to reverse respiratory depression only.
- The duration of the narcotic may exceed that of Naloxone

# NITROGLYCERIN

Pharmacology and Actions

- Dilates arterial and venous vessels resulting in venous pooling
- Reduces preload and afterload resulting in decreased myocardial workload and reduced oxygen demand
- Relaxes all smooth muscle
- Dilates coronary vessels resulting in increased perfusion of the myocardium
- Relieves coronary vasospasm

Indications

- Myocardial ischemia
- Malignant hypertension
- Congestive heart failure

Contraindications and Precautions

- Contraindicated in patients with known hypersensitivity, hypotension, uncorrected hypovolemia, increased intracranial pressure, inadequate cerebral circulation, and pericardial tamponade.
- Contraindicated with phosphodiesterase inhibitors (tadalafil within 48 hours and sildenafil/vardenafil within 24 hours).
- Maintain systolic and limit blood pressure drop to 30% of pre-treatment blood pressure.

Side Effects and Special Notes

- Headache is the most frequent adverse reaction.
- Sublingual Nitroglycerin can be beneficial in the clinical diagnosis of cardiac disease. Sublingual Nitroglycerin is the initial drug of choice in the patient with classic cardiac pain.

# NITROUS OXIDE

Pharmacology and Actions

- A selective antagonist of a specific type of serotonin receptor located in the CNS at the area postrema (chemoreceptor trigger zone) and in the peripheral nervous system on nerve terminals of the vagus nerve. The drug's blocking action may occur at both sites.

Indications

- Acute or exacerbation of chronic pain

Contraindications and Precautions

- Head injury with altered level of consciousness
- Recent ingestion of alcohol or illicit drugs
- Major facial injuries or trauma
- Thoracic trauma
- Known or suspected bowel obstruction
- Known or suspected cardiac ischemic chest pain
- Patient developing cyanosis or respiratory distress with use of Nitrous Oxide – oxygen
- Inability to comply with instructions regarding use of Nitrous Oxide – oxygen
- Pulse oximeter ready indicating oxygen saturation less than 90% prior to Nitrous Oxide – Oxygen mixture use

Side Effects and Special Notes

- Euphoria or dissociation

# NOREPINEPHRINE (LEVOPHED)

Pharmacology and Actions

- Norepinephrine acts predominantly on alpha-adrenergic receptors to produce vasoconstriction, thereby increasing systemic blood pressure and coronary artery blood flow. Norepinephrine also acts on beta1-receptors, although quantitatively less than epinephrine.

Indications

- Sepsis (shock)
- Cardiogenic Shock
- Distributive Shock

Contraindications and Precautions

- Volume depletion
- Vascular thrombus
- Profound hypoxia
- Hypersensitivity

Side Effects and Special Notes

- Side effects include: hypertension, arrhythmias, asthma exacerbation, ischemic injuries and extravasation necrosis
- Use with caution in pregnant patients if benefits outweigh risks (Category C: animal studies show risk in pregnancy)

# ONDANSETRON (ZOFRAN)

Pharmacology and Actions

- A selective antagonist of a specific type of serotonin receptor located in the CNS at the area postrema (chemoreceptor trigger zone) and in the peripheral nervous system on nerve terminals of the vagus nerve. The drug's blocking action may occur at both sites.

Indications

- Prevention of nausea and vomiting

Contraindications and Precautions

- Known hypersensitivity to the medication

Side Effects and Special Notes

- Use cautiously in patients with liver failure

# OXYTOCIN (PITOCIN)

Pharmacology and Actions

- Selectively stimulates the smooth musculature of the uterus resulting in increased uterine muscle tone, increased frequency of contractions and increased strength of contractions.

Indications

- Normal postpartum – to produce uterine contractions.
- Postpartum hemorrhage – to control excessive uterine bleeding when related to recent childbirth.

Contraindications and Precautions

- Known hypersensitivity to the drug and with retained placenta.

Side Effects and Special Notes

- Side effects include: Cardiac dysrhythmia, pelvic hematoma, hypertonicity of the uterus, uterine rupture, nausea, vomiting and fluid retention.
- Monitor vaginal drainage and uterine tonicity during administration.

# PHENYLEPHRINE (NEOSYNEPHRINE)

Pharmacology and Actions

- Produces long acting vasoconstriction without chronotropic or inotropic actions on the heart

Indications

- Pre-treatment for nasal intubation or NG tube

Contraindications and Precautions

- Severe hypertension
- Ventricular tachycardia

Side Effects and Special Notes

- Headaches
- Excitability
- Restlessness

# PROMETHAZINE (PHENERGAN)

Pharmacology and Actions

- Promethazine is a phenothiazine and acts as an antiemetic.

Indications

- Prophylaxis and treatment of nausea and vomiting.

Contraindications and Precautions

- Contraindicated in patients with central nervous system depression.

Side Effects and Special Notes

- Most common adverse effects are sedation, drowsiness and dry mouth.
- May cause dystonia and extrapyramidal reactions.
    - Treat both with 25-50 mg Diphenhydramine IV
- Before administering IV, dilute in 10 cc of NS to prevent phlebitis.

# RACEMIC EPINEPHRINE (VAPONEPHRIN)

Pharmacology and Actions

- Effects are those of Epinephrine. Inhalation causes local effects on the upper airway as well as systemic effects from absorption. Vasoconstriction may reduce swelling in the upper airway and beta effects on bronchial muscle may relieve bronchospasm.

Indications

- Treatment of life-threatening airway obstruction in croup and epiglottis.

Contraindications and Precautions

- Use with caution in patients with cardiovascular disorders including coronary insufficiency and hypertension.

Side Effects and Special Notes

- Adverse effects of Racemic Epinephrine include tremor, nervousness, tachycardia, palpitations and occasionally hypertension. Since these are also symptoms of hypoxia, be sure to monitor the patient closely.
- Racemic Epinephrine is heat and light sensitive. If the solution is discolored, it should be discarded.
- Clinical improvement in croup can be dramatic after administration of Racemic Epinephrine. Rebound worsening of airway obstruction can occur, however, in one to four hours. Many patients require admission after administration.

# SODIUM BICARBONATE

Pharmacology and Actions

- Sodium Bicarbonate reacts with hydrogen ions to form water and carbon dioxide to buffer metabolic acidosis.

Indications

- Acidosis that accompanies shock and cardiac arrest.
- Treatment of tricyclic antidepressant overdose.
- Preexisting or life threatening hyperkalemia.
- Crush injuries to prevent Rhabdomyolysis.

Side Effects and Special Notes

- Sodium Bicarbonate can inactivate the catecholamines norepinephrine, dopamine and epinephrine. Do not mix with IV solutions of these agents.

# THIAMINE (VITAMIN B1)

Pharmacology and Actions

- Combines with Adenosine Triphosphate to form a coenzyme necessary for carbohydrate metabolism.

Indications

- Administered concurrently with D50 in intoxicated or malnourished patients to prevent Wernicke's encephalopathy.

Contraindications and Precautions

- Known hypersensitivity to the drug.

Side Effects and Special Notes

- IV use: dilute before giving. Administer cautiously - give patient a skin test before therapy if he has a history of hypersensitivity reactions.
- Thiamine malabsorption is most likely in alcoholism, cirrhosis or GI disease.

# TRANEXAMIC ACID

Pharmacology and Actions

- TXA is a synthetic derivative of lysine that inhibits fibrinolysis by blocking the lysine binding sites on plasminogen. Anti-fibrinolytic that inhibits both Plasminogen activation and Plasmin activity thus preventing clot breakdown rather than promoting new clot formation.

Indications

- Hemorrhagic Shock

Contraindications and Precautions

- Injuries > 3 hrs old
- Patient <14 years old
- Evidence of Disseminated Intravascular Coagulation (DIC)
- Hypersensitivity to the drug
- Suspected MI, CVA, PE

Side Effects and Special Notes

- Hypotension (with rapid IV administration)
- Dizziness
- Blurred Vision
- Nausea/Vomiting