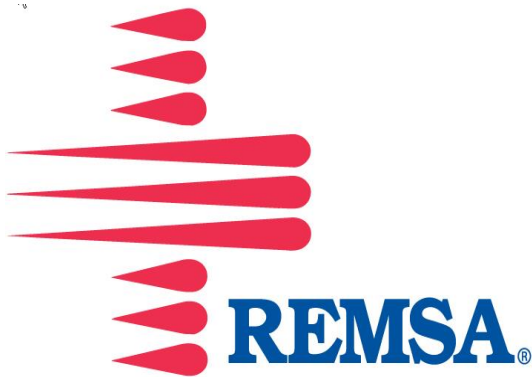


# Washoe County Regional EMS Protocols



WASHOE COUNTY  
**HEALTH DISTRICT**  
ENHANCING QUALITY OF LIFE

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# Washoe County Regional EMS Protocols Signature Page

 11/9/17  
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 10/22/17  
Dr. Wayne Hardwick, Medical Director for Sparks Fire Department and Reno-Tahoe Airport Authority Fire Department

 10/24/17  
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 11/8/17  
Dr. Bradford Lee, Medical Director for REMSA

The Washoe County Regional Protocols were last reviewed and approved on 11/9/17 for use beginning April 2018.

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# Table of Contents

<b>Foreword</b> .....	<b>9</b>
<b>References</b> .....	<b>11</b>
<b>UNIVERSAL PROTOCOLS</b> .....	<b>12</b>
Acute Adrenal Crisis.....	15
Amputation.....	16
General Patient Assessment.....	17
Less than Lethal Munitions Care.....	18
Resuscitation/Prehospital Death Determination.....	19
Spinal Motion Restriction.....	20
Trauma Criteria and Assessment.....	21
<b>ADULT TREATMENT PROTOCOLS</b> .....	<b>23</b>
Acute Coronary Syndrome (Suspected).....	25
Airway Obstruction.....	26
Allergy/Anaphylaxis/Dystonia.....	27
Behavioral Emergency.....	28
Burns.....	29
Cardiac - Arrest.....	31
Cardiac - Bradycardia.....	32
Cardiac - Narrow Complex Tachycardia with Pulses.....	33
Cardiac - Post Arrest Care.....	34
Cardiac - Wide Complex Tachycardia with Pulses.....	35
Childbirth/Labor/Obstetrical Emergency.....	36
Crush Injury.....	37
Hyperglycemia/Hypoglycemia.....	38
Hyperkalemia (Suspected).....	39
Hyperthermia/Heat Emergency.....	40
Hypothermia/Cold Emergency.....	41
Hypothermia Post ROSC.....	42
Medication Assisted Intubation.....	43
Nausea & Vomiting.....	44
Overdose/Poisoning.....	45
Pain Management/Sedation.....	47
Pulmonary Edema.....	48

# Table of Contents

## **ADULT TREATMENT PROTOCOLS (cont.)**

Respiratory Distress.....	49
Seizure.....	50
Sepsis.....	51
Shock-Cardiogenic.....	52
Smoke Inhalation.....	53
Stroke.....	54

## **PEDIATRIC TREATMENT PROTOCOLS..... 55**

Pediatric Airway Obstruction.....	57
Pediatric Allergy/Anaphylaxis.....	58
Pediatric Behavioral Emergency.....	59
Pediatric Burns.....	60
Pediatric Cardiac - Arrest.....	62
Pediatric Cardiac - Bradycardia.....	63
Pediatric Cardiac - Narrow Complex Tachycardia with Pulses.....	64
Pediatric Cardiac - Wide Complex Tachycardia with Pulses.....	65
Pediatric Fever.....	66
Pediatric Hyperglycemia/Hypoglycemia.....	67
Pediatric Hyperthermia/ Heat Emergency.....	68
Pediatric Hypothermia/Cold Emergency.....	69
Pediatric Medication Assisted Intubation.....	70
Pediatric Nausea & Vomiting.....	71
Pediatric Neonatal Resuscitation.....	72
Pediatric Overdose/Poisoning.....	74
Pediatric Pain Management/Sedation.....	76
Pediatric Respiratory Distress.....	77
Pediatric Seizure.....	78
Pediatric Smoke Inhalation.....	79

## **OPERATIONAL PROTOCOLS..... 81**

AMA Decision Tree.....	83
Civil Protective Custody.....	84
Contacting Medical Control.....	85
Destination.....	86

# Table of Contents

## **OPERATIONAL PROTOCOLS (cont.)**

Do Not Resuscitate (DNR/POLST).....	90
Documentation.....	91
Endangerment.....	92
Inter-facility Transfers.....	93
Minors .....	94
Unsolicited Medical Intervention.....	95

## **APPENDIX A: MEDICATIONS..... 97**

Adult Medications.....	99
Pediatric Medications.....	103
Formulary.....	107

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# Foreword

This patient care document has been specifically developed for Washoe County EMS responders. The purpose of this manual is to provide guidance for *ALL* prehospital care providers. In any such protocol, certain assumptions are made regarding the condition of the patient, expected responses to treatment, and the availability of resources. Since these assumptions will not always be true, the emergency medical technician must use these protocols as a guide, as well as, agency specific Medical Director endorsed medications and procedures.

*NOTHING* contained within these protocols is meant to delay rapid patient transport to a receiving facility. Patient care should be rendered while en-route to the hospital when transport is available.

The majority of these protocols generally reflect a conservative and accepted standard for treatment. The technician in charge at an emergency medical incident is encouraged to use judgment in the application of these protocols. If a treatment plan appears to be insufficient for any reason, medical control consultation is encouraged. The medical control physician directing care in the field retains discretion in ordering specific forms of treatment, even if that treatment is in conflict with these guidelines. Obviously, to proceed with an order directed by medical control requires that both the physician and the provider acknowledge and agree that the patient's condition and extraordinary care are not addressed elsewhere within these medical protocols, and that the order is in the best interest in the care of the patient. Additionally, the provider must feel capable, based on the instructions given by the medical control physician, of correctly performing the directed care. Whenever such care is provided, it is necessary for the patient care report (PCR) documentation to describe the circumstances which necessitated the deviation, as well as document the physician's name who gave the order(s), the treatment change and the time of the order.

Occasionally, a situation may arise in which a physician's order cannot be carried out due to the provider's sense that the administration of an ordered treatment would endanger the patient, the particular medication is not available, or that a physician's order is outside of protocol or NRS statute. If this occurs, the provider must immediately notify the medical control physician as to the reason the order cannot be carried out, and indicate on the PCR what was ordered, the time and the reason the order could not be administered.

## **Per Nevada Administrative Code 450B.180 a "Patient" is:**

Any person who is sick, injured, wounded, or otherwise incapacitated or helpless and who is carried in an ambulance or air ambulance or is cared for by an emergency medical dispatcher, emergency medical responder, emergency medical technician, advanced emergency medical technician, paramedic or registered nurse.

## **Pediatric Patient Definition**

- Pediatric treatment protocols are to be used on children who have not yet experienced puberty.
  - Signs of puberty include chest or underarm hair on males, and any breast development on females.

## **Commitment to STAR Care**

The following is a checklist you can use to analyze almost any patient care issue you might encounter. Go through the list in order from top to bottom, and ask yourself if your care meets each criterion. If it does, chances are that you can defend your actions in almost any forum.

- **Safe** - Were my actions safe -- for me, for my colleagues, for other professionals and for the public?
- **Team-Based** - Were my actions taken with due regard for the opinions and feelings of my co-workers, including those from other agencies?
- **Attentive to Human Needs** - Did I treat my patient as a person? Did I keep him/her warm? Was I gentle? Did I use his/her name throughout the call? Did I tell him/her what to expect in advance? Did I treat his/her family and/or relatives with similar respect?
- **Respectful** - Did I act toward my patient, my colleagues, the first-responders, the hospital staff and the public with the kind of respect that I would have wanted to receive myself?

# Foreword

## STAR Care (Continued)

- **Customer-Accountable** - If I were face-to-face right now with the customers I dealt with on this response, could I look them in the eye and say “I did my very best for you.”
- **Appropriate** - Was my care appropriate--medically, professionally, legally and practically – considering the circumstances I faced?
- **Reasonable** - Did my actions make sense? Would a reasonable colleague of my experience have acted similarly, under the same circumstances?
- **Ethical** - Were my actions fair and honest in every way? Are my answers to these questions?

## EMS Agency Medical Directors

Brad Lee, MD, REMSA

John Watson, MD, Reno Fire Department, Truckee Meadows Fire Protection District & Gerlach Volunteer Fire Department

Lisa Nelson, DO, North Lake Tahoe Fire Protection District

Wayne Hardwick, MD, Sparks Fire Department & Reno-Tahoe Airport Authority Fire Department

## Washoe County Hospitals

Incline Village Community Hospital

Northern Nevada Medical Center

Renown Regional Medical Center

Renown South Meadows Medical Center

St. Mary's Regional Medical Center

Veteran's Affairs Sierra Nevada Healthcare System

## Phone Numbers

- |   |  |
|---|--|
| ○ REMSA Dispatch                          | 775-858-6005                               |
| ○ Sparks Dispatch                         | 775-353-2231                               |
| ○ Reno Dispatch                           | 775-334-2306                               |
| ○ TMFPD Dispatch                          | 775-785-4253                               |
| ○ RPD/WCSO Dispatch                       | 775-334-3855                               |
| ○ Nevada Highway Patrol Dispatch          | 775-688-2830                               |
| ○ Northern Nevada Medical Center ER       | 775-356-4040                               |
| ○ Renown Main ER                          | 775-785-6295                               |
| ○ Renown South Meadows ER                 | 775-982-7373                               |
| ○ Saint Mary's ER                         | 775-322-9424                               |
| ○ Veteran's Affairs (VA) ER               | 775-328-1200                               |
| ○ State of Nevada Elderly Services        | 888-729-0571 or 775-784-8085 (after hours) |
| ○ Washoe County Child Protective Services | 775-785-8600 or 775-784-8090 (after hours) |
| ○ Poison Control Center                   | 1-800-222-1222                             |

From time to time, protocols may be added or revised with approval of Medical Direction. Recommendations are welcome and appreciated at anytime. Recommendations may be submitted to the Washoe County Health District EMS Coordinator for consideration and referral to the Medical Directors via email at [EMSProgram@washoecounty.us](mailto:EMSProgram@washoecounty.us).

Glasgow Coma Scale		
<b>EYE OPENING</b>	Spontaneous	4
	To voice / verbal command / shout	3
	To pain	2
	No response	1
<b>VERBAL RESPONSE</b>	Orientated / Converses (PEDS: Appropriate words, smiles, coos)	5
	Confused (PEDS: Inappropriate words, cries)	4
	Inappropriate words (PEDS: Cries and/or screams, irritable)	3
	Incomprehensible sounds (PEDS: Grunts, restless, agitated)	2
	No response	1
<b>MOTOR RESPONSE</b>	Obeys verbal commands	6
	Localizes pain	5
	Withdraws to pain (PEDS: Flexion, withdrawal)	4
	Flexes to pain (Decorticate rigidity)	3
	Extends to pain (Decerebrate rigidity)	2
	No response	1
<b>GCS Total = Eye Opening + Verbal Response + Motor Response</b>		

APGAR			
DESCRIPTION	0	1	2
<b>Appearance</b>	Blue, Pale	Body: Pink / Ext: Blue	Completely Pink
<b>Pulse</b>	Absent	< 100	> 100
<b>Grimace</b>	No Response	Grimace	Cries
<b>Activity</b>	Limp	Some Flexion	Action Motion
<b>Respirations</b>	Absent	Slow, Irregular	Strong Cry

### Mean Arterial Pressure (MAP)

$$\text{MAP} = ((\text{DBP} \times 2) + \text{SBP}) / 3$$

OR

$$\text{MAP} = \text{DBP} + 1/3 (\text{SBP} - \text{DBP})$$

OR

$$\text{MAP} = \text{DBP} + (\text{PP}/3)$$

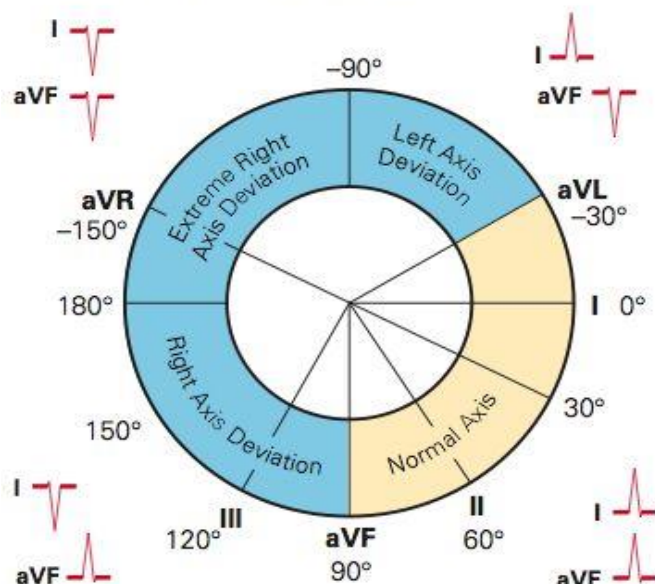
### Bloomsbury Sedation Scale

<b>+3</b>	Agitated/restless
<b>+2</b>	Awake/comfortable
<b>+1</b>	Awake/calm
<b>0</b>	Roused by voice, remains calm
<b>-1</b>	Roused by movement/stimulation
<b>-2</b>	Roused by painful stimulation
<b>-3</b>	Unable to rouse/natural sleep

AGE	HEART RATE	RESPIRATIONS	SBP
<b>Neonates (1-28 days)</b>	120-160	40-60	>60
<b>Infant (1-12 months)</b>	100-120	25-50	70-95
<b>Children (1-8 years)</b>	80-100	15-30	80-110
<b>School Age (8-11 years)</b>	65-110	18-30	97-112
<b>Adolescent (12-15 years)</b>	60-90	12-26	112-128
<b>Adult</b>	60-100	12-18	100-135

## Electrical Axis of the Heart

The electrical axis is the sum total of all electrical currents generated by the ventricular myocardium during depolarization. Analysis of the axis may help to determine the location and extent of cardiac injury, such as ventricular hypertrophy, bundle branch block, or changes in the position of the heart in the chest (from, e.g., pregnancy or ascites). The direction of the QRS complex in leads I and aVF determines the axis quadrant in relation to the heart.



♥ **Clinical Tip:** Extreme right axis deviation is also called indeterminate, "no man's land," and "northwest."

## FAST-ED Stroke Score

Item	FAST-ED Score	NIHSS Score Equivalence
Facial Palsy		
Normal or minor paralysis	0	0-1
Partial or complete paralysis	1	2-3
Arm Weakness		
No drift	0	0
Drift or some effort against gravity	1	1-2
No effort against gravity or no movement	2	3-4
Speech Changes		
Absent	0	0
Mild to moderate	1	1
Severe, global aphasia, or mute	2	2-3
Eye Deviation		
Absent	0	0
Partial	1	1
Forced deviation	2	2
Denial/Neglect		
Absent	0	0
Extinction to bilateral simultaneous stimulation in only 1 sensory modality	1	1
Does not recognize own hand or orients only to one side of the body	2	2

Suspected Infection	2 or more SIRS Criteria	Minimum One indicator of Acute Organ Dysfunction
Pneumonia	HR > 90 bpm	Acute Altered Mental Status
UTI	Temp < 96.9 OR > 100.4°F	SBP < 90 mmHg OR MAP < 70 mmHg
Bacteremia	RR > 20 bpm	SBP decrease > 40 mmHg from baseline
Abscess/Cellulitis	PaCO <sub>2</sub> < 32 mmHg	BS > 140 mg/dl without hx of diabetes
Abdominal	WBC ≤ 4 OR ≥ 14	Acute Hypoxia/Increase in O <sub>2</sub> requirements
Bone/Joint	Bands > 10%	Arterial hypoxemia (PaO <sub>2</sub> /FiO <sub>2</sub> < 300)
Endocarditis		Acute oliguria (< 0.5 mL/kg/hr for 2 hrs)
Meningitis		Creatinine > 2 mg/dl or increase in 0.5 above baseline
		Coagulopathy INR > 1.5, PTT > 60 sec
		Thrombocytopenia Platelets < 100K
		Bilirubin > 2 mg/dl
		Lactate > 2 mmol/L

# **UNIVERSAL TREATMENT PROTOCOLS**

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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 O<sub>2</sub> as needed
- Cardiac monitor
- Manage airway
- Determine blood glucose level
- 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 and adults
  - OR
  - METHYLPREDNISOLONE
    - 0.5 mg/kg IV/IO/IM for infants
    - 10 mg/kg IV/IO/IM for children
    - 20 mg IV/IO/IM for adolescents and adults

- 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 or *Pediatric Pain Management/Sedation* protocol.

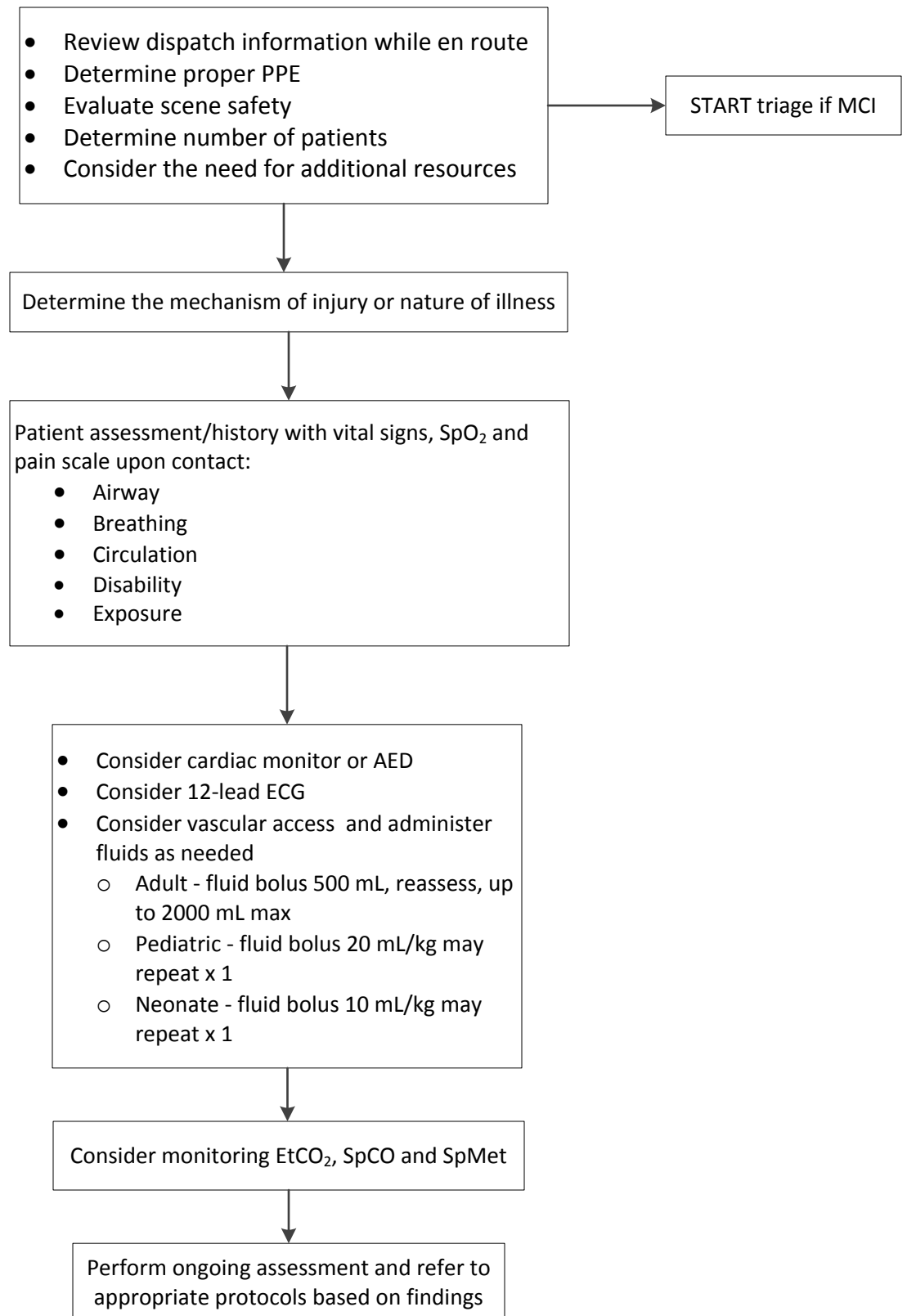
Amputation

Partial Amputation

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

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





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 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 (Oleoresin Capsicum)/ CS Gas (Tear Gas) Exposure Care

- Be aware of cross contamination when treating patients
- Severe complications are possible with the following patients:
  - Elderly
  - Cardiac
  - COPD
  - Asthma
- Flush the affected eye(s) with normal saline.
  - Be careful not to flush into an unaffected eye
- Capsicum exposure can also be neutralized with commercial wipes or spray
- Always wear gloves & eye protection when flushing contaminated patients
- If the patient is experiencing eye pain secondary to pepper spray, apply appropriate ophthalmic anesthetic agent to numb the affected eye(s)

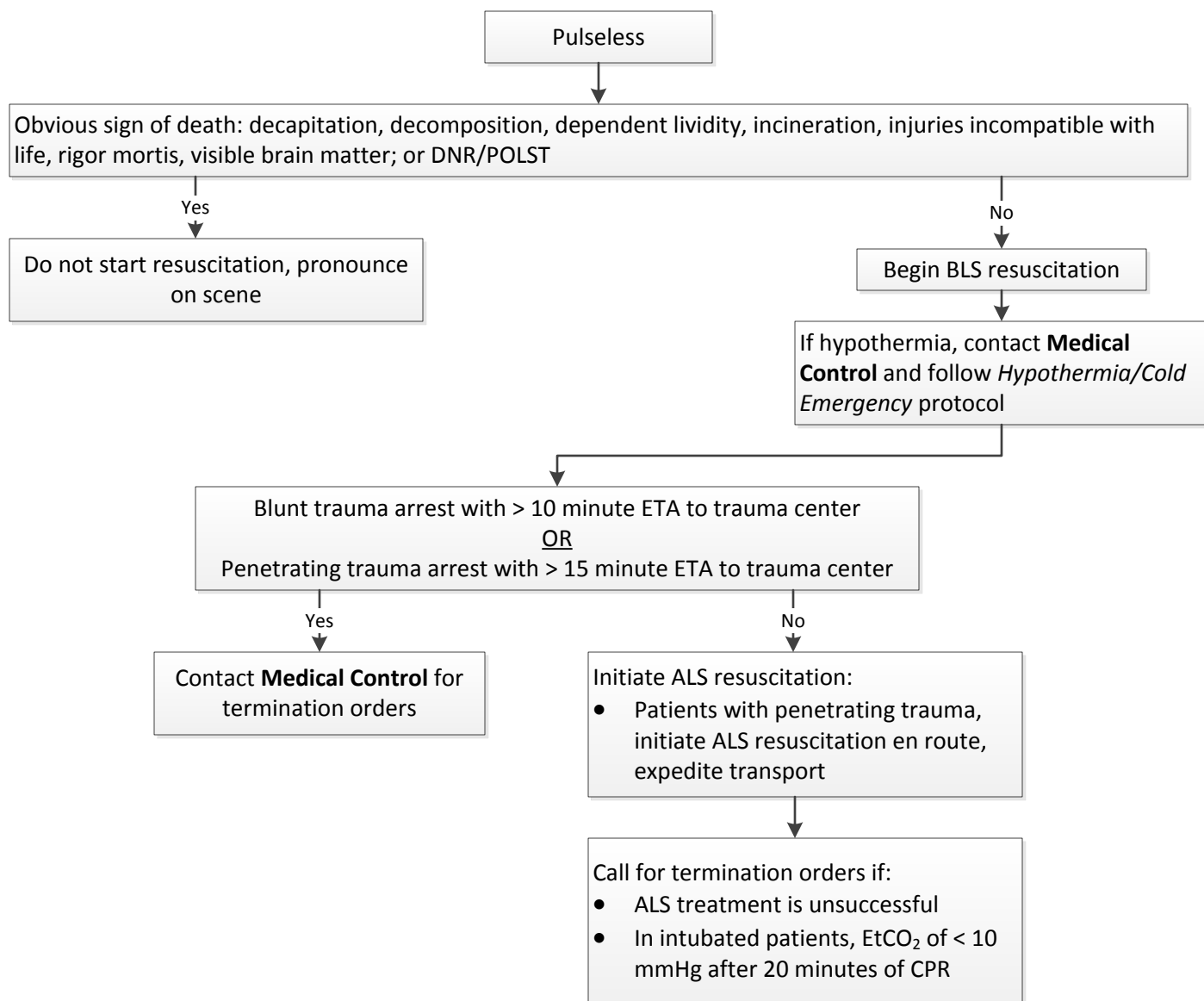
Treat respiratory complaints per  
*Respiratory Distress Protocol*

## Taser Dart Care

- Assess the patient for secondary injuries after Taser application
- Energy from a Taser can ignite flammable liquids and gasses
- If the Taser dart has penetrated the eye or other sensitive area such as the face, neck, or groin:
  - Immobilize the dart; cut the wires right above the dart and transport
- To remove the darts in other areas:
  - Pull the skin taut and pull the dart(s) straight out
- Clean the site around the wound
- Advise the patient to beware for signs of infection

## Kinetic Impact Munition Care

- The common kinetic impact munitions include bean bag rounds, plastic or wooden projectiles, and rubber sting balls
- All kinetic impact munitions have the potential to cause severe injury/death
- Persons struck by these munitions require a thorough assessment
- Some kinetic munitions contain pepper spray or tear gas- use the same cautions listed for these substances



**When death has been established:**

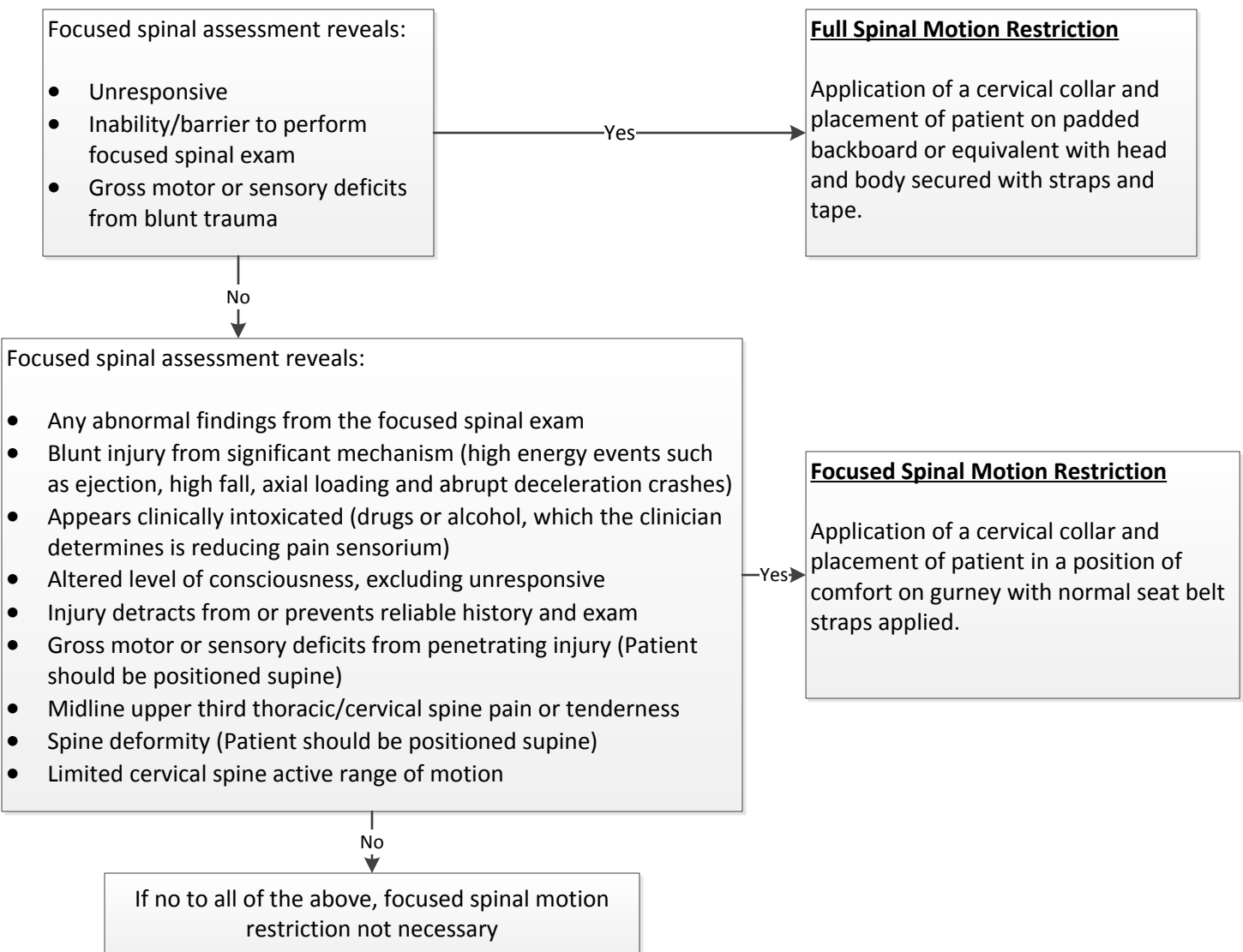
- If possibility of criminal implications, try to leave patient in position found.
- Secure the body and surrounding area until law enforcement arrives.
- Obvious death as described above does NOT require a cardiac monitor strip.
- All other cases of pronounced death MUST have a cardiac monitor strip. Document time of death, name of physician who pronounced death, and the names of law enforcement personnel who take custody of patient if coroner not available.

**Pearls:**

- The paramedic may cease resuscitation if initiated prior to arrival and patient shows obvious and accepted signs of death or if resuscitation is initiated prior to arrival and DNR or POLST is presented.
- Arrests resulting from electrical injury; treatments should be early, aggressive and persistent. Resuscitation efforts have high success rates even when resuscitation attempts are prolonged.

**Conduct a focused spinal exam:**

- Can the patient focus on the exam or are they in severe distress from other injuries or emotional stressors? (distracting injury)
- Assess distal CMS/bi-lateral grips/push-pull.
- Palpate the entire spine on the bony processes one at a time from C1 to L5. Patient should not have focal midline tenderness to palpation or obvious deformity.
- Ask the patient to rotate their head 45 degrees from side to side without assistance, which should be pain free.



**Pearls:**

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

Patient with trauma means a person who has sustained injury and meets the triage criteria used to evaluate the condition of the patient (NAC450B.798).

Measure vital signs and consciousness: Glasgow Coma Scale  $\leq 13$ , Systolic BP  $< 90$  mmHg, and respiratory rate  $< 10$  or  $> 29$  per minute

No

Assess anatomy of injury:

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- Two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis

Assess mechanism of injury and evidence of high energy impact:

- Falls
  - Adults:  $> 20$  feet (one story is equal to 10 feet)
  - Children:  $> 10$  feet or two to three times the height of the child
- High-risk auto crash
  - Intrusion, including roof:  $\geq 12$  inches occupant side;  $> 18$  inches any side
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle forces consistent with a high risk of injury
- Auto vs. pedestrian/bicyclist thrown, run over, or with significant impact ( $> 20$  mph)
- Motorcycle crash  $> 20$  mph

Yes

Yes

Yes

Transport to a trauma center

Consider contacting **Medical Control** for direction:

Older Adults

- Risk of injury/death increases after age 55 years
- SBP  $< 110$  may represent shock after age 65
- Low impact mechanisms (e.g. ground level falls) may result in severe injury

Children

- Should be triaged preferentially to pediatric capable trauma centers

Anticoagulants and bleeding disorders

- Patients with head injury are at high risk for rapid deterioration

Burns

- Without other trauma mechanism: triage to burn facility
- With trauma mechanism: triage to trauma center

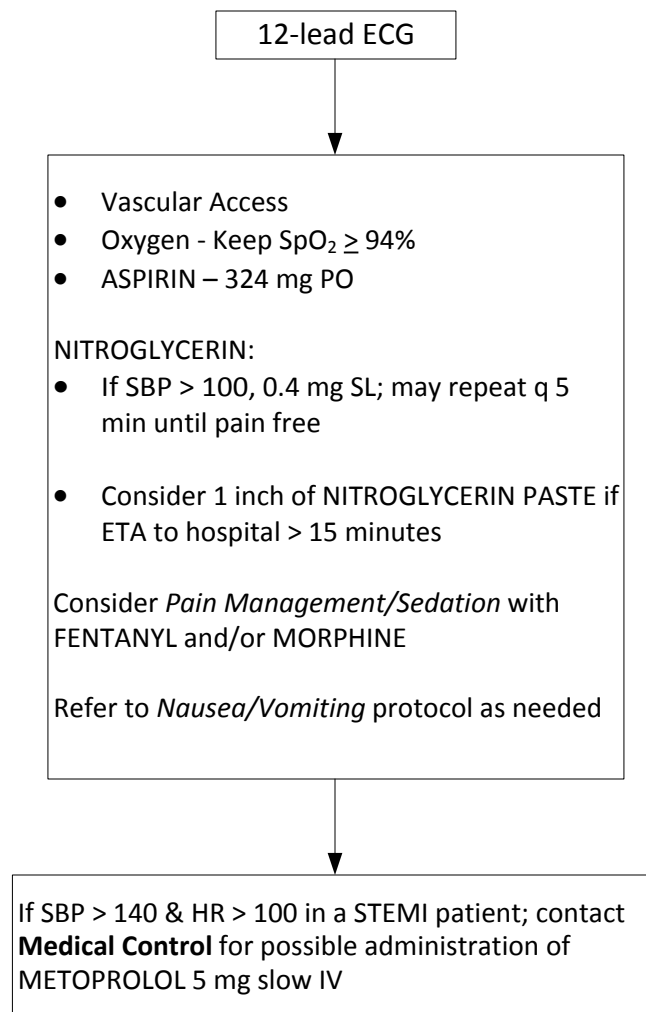
Pregnancy  $> 20$  weeks

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# **ADULT TREATMENT PROTOCOLS**

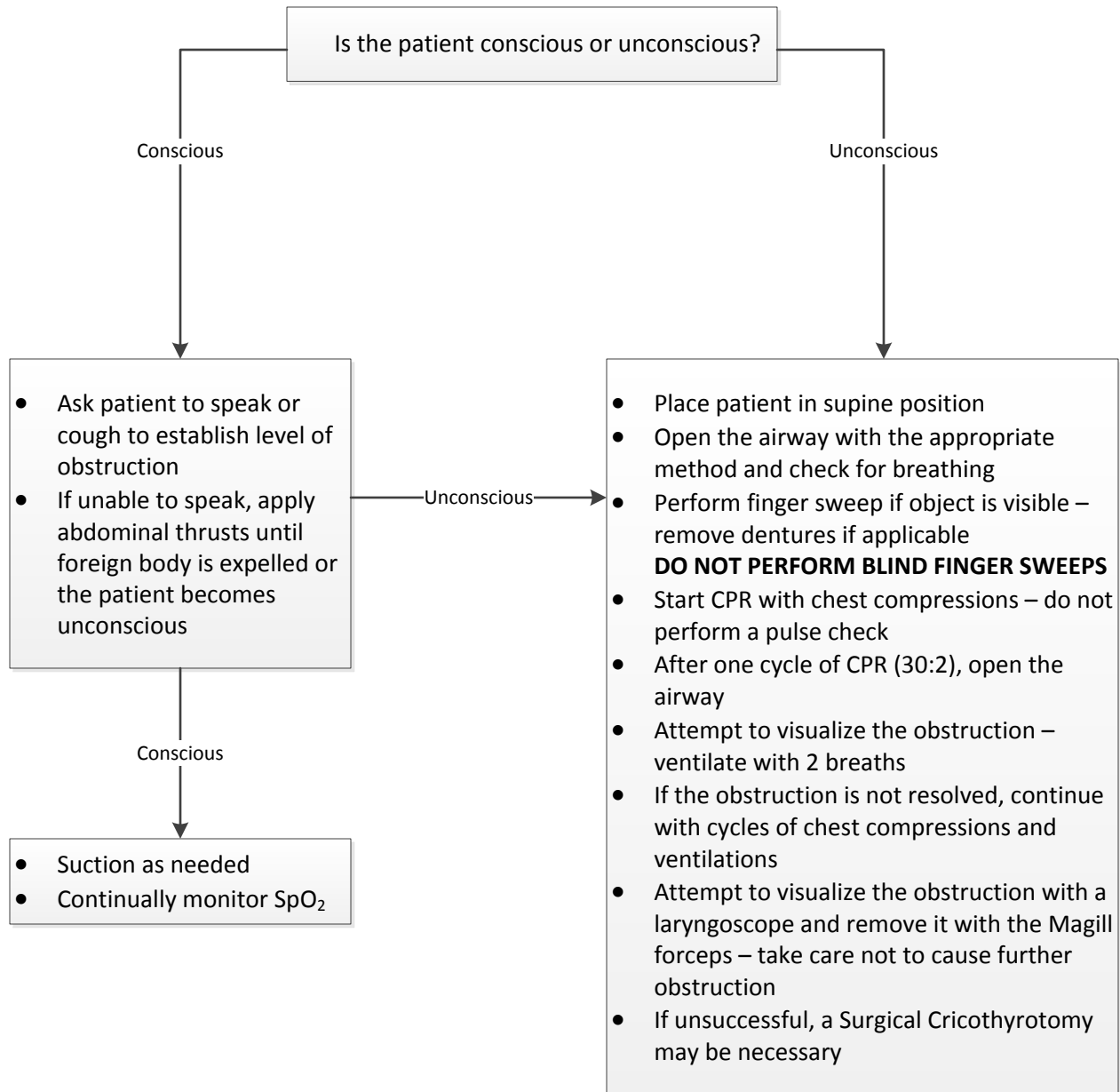
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## Pearls:

- NITROGLYCERIN and MORPHINE are contraindicated in patients with RVI, consider fluid bolus.
- NITROGLYCERIN is contraindicated in patients currently taking phosphodiesterase inhibitors.
- 12-lead ECG should be obtained as soon as reasonably possible.
- Diabetic, geriatric and female patients often have an atypical presentation.
- Perform a 12-lead ECG on all patients 35 years of age or older experiencing vague jaw/chest/abdominal discomfort.
- Consider 15-lead or alternate lead placement for inferior MI, suspected ACS with normal 12-lead, or ST depression in the precordial leads.



## Pearls:

- If the patient presents with trismus and noisy respirations, insert a NPA and attempt to assist ventilations with a BVM.
- Avoid hyperventilation.
- Maintain EtCO<sub>2</sub> at 35-45.

Anaphylaxis is defined as an acute onset of an illness (over minutes to several hours) involving the skin, mucosal tissue, or both (e.g., generalized hives, pruritus or flushing, swollen lips-tongue-uvula) and respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, reduced peak expiratory flow, hypoxemia) and/or reduced BP or associated symptoms of end-organ dysfunction (e.g., hypotonia [collapse] syncope, incontinence).

- Assess oxygenation and administer oxygen as needed
- Assess severity of allergic reaction

## Allergy/Anaphylaxis

*MILD* - Swelling, itching, redness, hives

- DIPHENHYDRAMINE 25-50 mg IM or IV, if established

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

- Obtain IV access; NS fluid bolus
- DIPHENHYDRAMINE 25-50 mg slow IV push
- ALBUTEROL unit dose HHN, as needed
- Consider EPINEPHRINE, 0.3 mg 1:1,000 IM (if not contraindicated) - with rapid progression of signs/symptoms or history of severe allergic reaction
- If reaction is worsening despite treatment, move to *SEVERE*

*SEVERE* - Impending respiratory failure, severe hypotension

- Secure Airway
- EPINEPHRINE 0.3 mg (0.3 mL) 1:1,000 IM (if not contraindicated)
- DIPHENHYDRAMINE 25-50 mg slow IV push
- EPINEPHRINE 0.1 mg (1 mL) 1:10,000 IV repeated up to three times followed by 100 mL NS
- Treat signs and symptoms of shock as necessary

## Dystonia

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

Patient restraint – when patient is a threat to themselves, bystanders or EMS personnel

- Patients may be restrained with soft restraints
- Restraining opposing muscle groups (swimmers position) is most effective; never restrain in prone/hog-tied position
- Assess distal CMS after restraint, every 10 minutes
- Maintain and monitor the oxygenation
- Obtain vascular access as needed
- Apply cardiac monitor as needed – **Required with chemical restraint**
- Document reasons for restraint
- Incarcerated person may be restrained at the discretion of Law Enforcement
  - For handcuffed patients, request Law Enforcement accompaniment



Consider use of a chemical restraint:

- HALOPERIDOL 5-10 mg IV/IM q 5-10 min; max 15 mg
- MIDAZOLAM 2-5 mg slow IV/IO/IM/IN q 5 mins titrated to effect; max dose 10 mg
- KETAMINE 4 mg/kg IM OR 1-2 mg/kg IV

## Pearls:

- KETAMINE is contraindicated for patients with a history of schizophrenia.
- If using KETAMINE, consider MIDAZOLAM 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.

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

## **Chemical Burns/Hazmat Contamination**

- Protect rescuer from contamination
- Remove all clothing and solid chemical which might provide continuing contamination
- Decontaminate patient using running water for 15 minutes if patient is stable
- Assess and treat associated injuries and evaluate for systemic symptoms
- Wrap burned area in clean dry cloth
- Keep patient warm after decontamination
- Contact hospital as soon as possible with type of chemical contamination for consideration of additional decontamination prior to entry into ED



Consider *Pain Management/Sedation* protocol

## **Electrical Burn/Lightning**

- Protect rescuers from live electric wires
- Separate victim from electrical source when safe for rescuers
- Initiate CPR as needed
  - For victims in cardiac arrest, treatment should be early, aggressive, and persistent
  - Victims with respiratory arrest may require only ventilation and oxygenation to avoid secondary hypoxic cardiac arrest
  - Resuscitation attempts may have high success rates and efforts may be effective even when the interval before the resuscitation attempt is prolonged
- Place patient on cardiac monitor
- Obtain vascular access
- Treat any thermal burns as outlined above
- Assess for other injuries



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

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

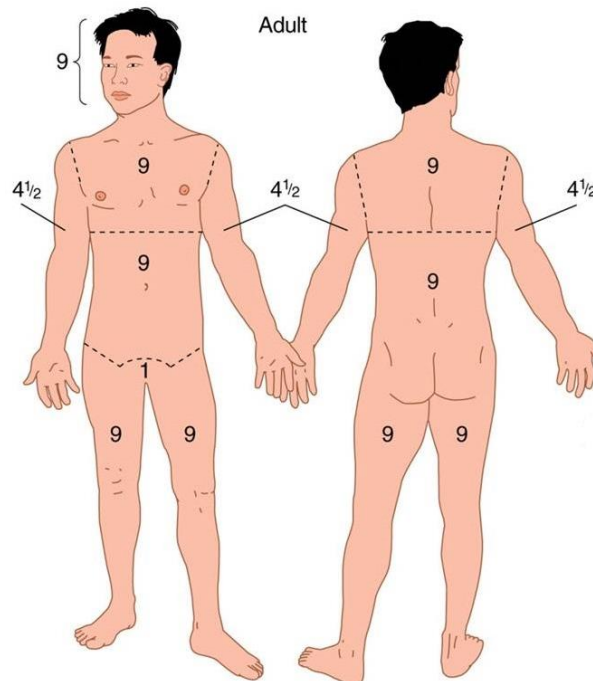
## Thermal Burns

- Remove clothing which is smoldering and non-adherent to the patient
- Assess oxygenation and administer Oxygen as needed
- Assess and treat associated trauma/smoke inhalation
- Remove rings, bracelets and other constricting objects
- Determine burn body surface area (BSA)
  - If  $\leq 10\%$  body surface area burned, use moist saline dressing for patient comfort
  - If burn is moderate to severe ( $> 10\%$  BSA), cover with clean, dry dressings
- Obtain vascular access

Administer IV fluids as follows:

- If transport time is greater than 15 minutes administer 500 mL per hour
- If transport time is less than 15 minutes, run IV at wide open rate

Consider *Pain Management/Sedation* protocol



## **Pearls:**

- Parkland Burn Formula –  $4 \text{ mL NS} \times \text{BSA} (\%) \times \text{body weight (kg)} = \text{total fluids}$ .
  - Administer 50% of total fluids in first 8 hours from time of injury
  - Administer 50% of total fluids over next 16 hours
- BSA is calculated for partial thickness and full thickness burns.

- Unconscious and unresponsive
- Pulseless
- Does not meet *Resuscitation/Prehospital Death Determination* protocol

- 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 MFE pads and CPR assist devices, if available
- Manage airway as indicated by patient condition
- Consider reversible causes

VF, pVT, TdP

- Defibrillate
- 2 min CPR prior to medication administration
- Obtain vascular access
- Intubation or insertion of supraglottic airway device
- Utilize EtCO<sub>2</sub> as soon as possible

- EPINEPHRINE 1.0 mg IV/IO every 3-5 min
- Defibrillate
  - 2 min CPR

**If VF/pVT**

AMIODARONE 300 mg IV/IO, may repeat at 150 mg in 3-5 min, for sustained VF, pVT  
OR

LIDOCAINE 1.0-1.5 mg/kg IV/IO, followed by 0.5-0.75 mg/kg IV/IO every 5 min to 3 mg/kg max

If the patient converts to a perfusing rhythm after administration of LIDOCAINE, start LIDOCAINE infusion at 2-4 mg/min IV/IO

**If TdP**

MAGNESIUM SULFATE 2 gm IV/IO over 5 min

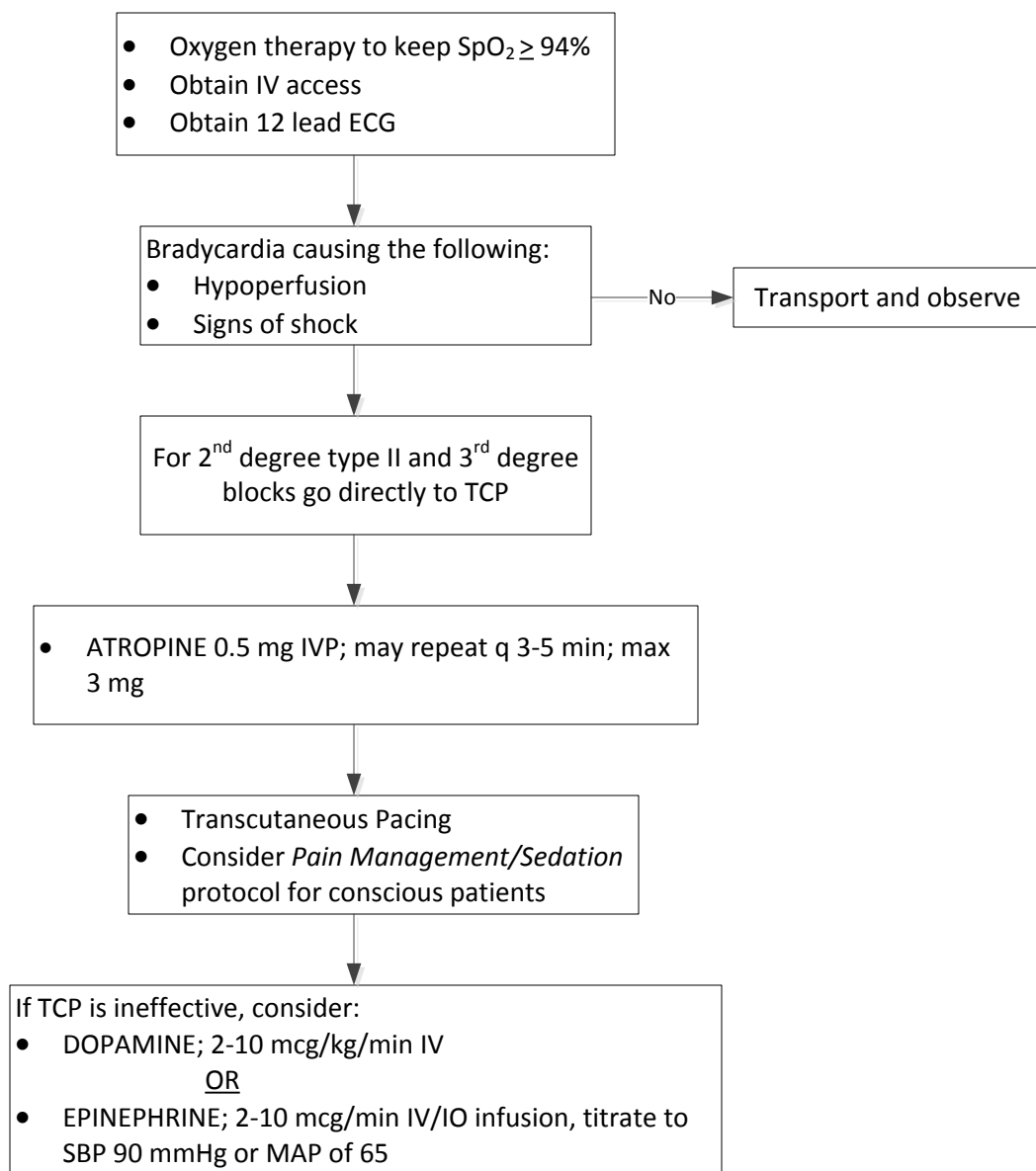
Asystole/PEA

- Obtain vascular access
- Intubation or insertion of supraglottic airway device
- Utilize EtCO<sub>2</sub> as soon as possible

- EPINEPHRINE 1.0 mg IV/IO every 3-5 min

- Check pulse if organized rhythm
- Consider consultation of **Medical Control** for termination of efforts
- Minimum of 3 rounds of medication are required prior to contact

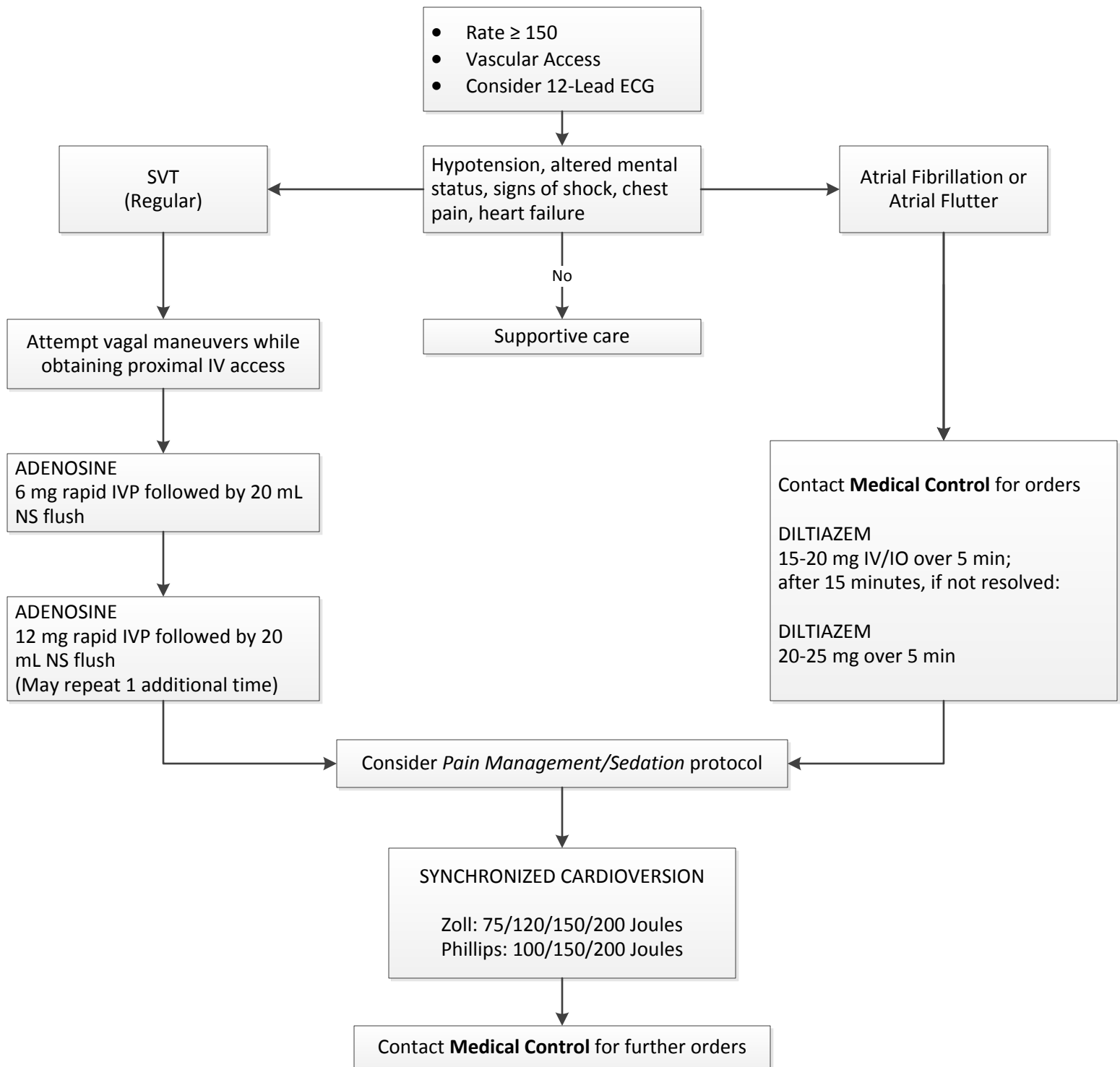
- Pearls:**
- EPINEPHRINE dose via ETT is 2.5 mg 1:1,000, diluted in 10 mL NS.
  - LIDOCAINE dose via ETT is 3 mg/kg x 2.
  - Routine use of LIDOCAINE is not recommended.
  - Prophylactic use of post conversion AMIODARONE is not recommended.
  - For sustained TdP post MAGNESIUM SULFATE administration, continue with AMIODARONE as indicated.
  - Use caution when administering two or more ventricular antidysrhythmics, as it may have a proarrhythmic effect.



## Pearls:

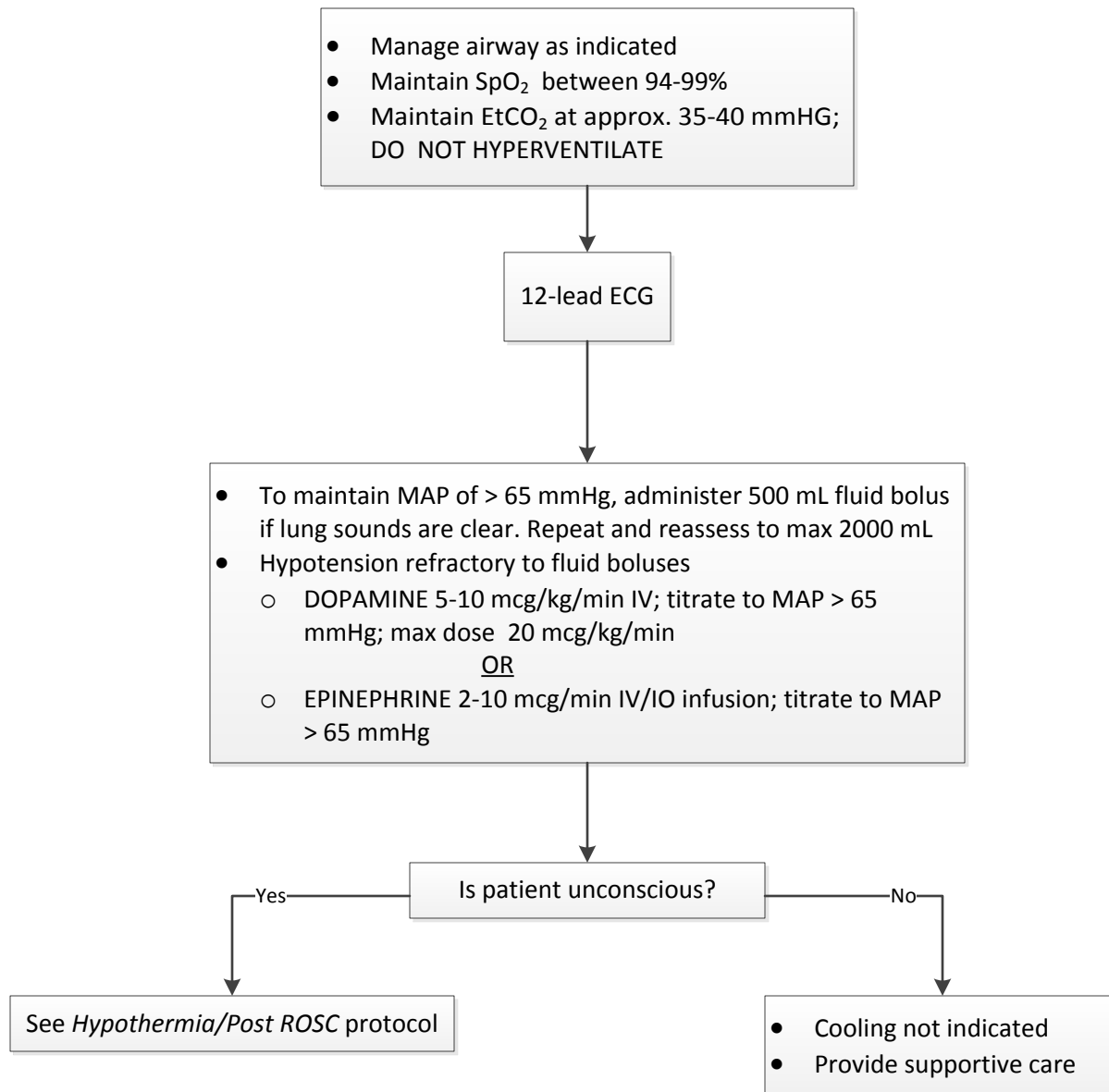
- **Mean Arterial Pressure (MAP):**  $MAP = ((DBP \times 2) + SBP) / 3$ .
- ATROPINE administration should not delay TCP in patients with poor perfusion.
- ATROPINE is contraindicated in the presence of acute coronary ischemia or MI.
- Consider calling **Medical Control** for GLUCAGON for patients with suspected beta blocker or calcium channel blocker overdose.
- Consider calling **Medical Control** for CALCIUM CHLORIDE for patients with suspected calcium channel blocker overdose.
- Repeat 12-lead ECG for evolving STEMI.
- Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.
- Signs and symptoms of bradycardia may be mild and are typically < 50 BPM.
- Do not delay pacing while waiting for IV access.
- Hypoxemia is a common cause of bradycardia; be sure to oxygenate the patient and provide ventilation support as needed.





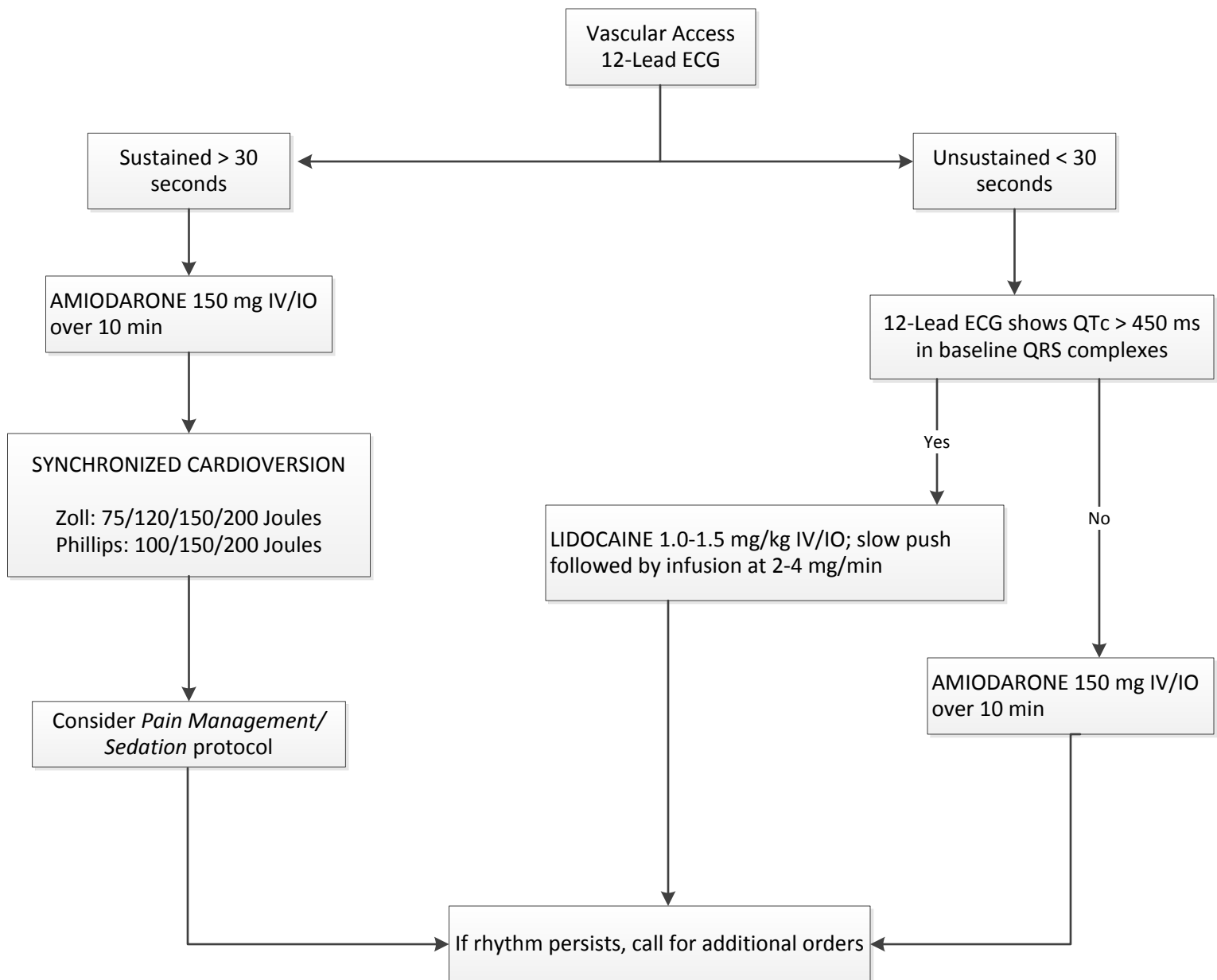
**Pearls:**

- Should consider DILTIAZEM maintenance infusion 5-15 mg/hr titrated to heart rate when contacting **Medical Control**.
- Determining onset of atrial fibrillation or atrial flutter guides treatment options when contacting **Medical Control**.
- May go directly to cardioversion at any time if severely symptomatic or patient deteriorating.



**Pearls:**

- **Mean Arterial Pressure (MAP):**  $MAP = ((DBP \times 2) + SBP) / 3$ .
- Do not cool post traumatic arrest or pregnant patients.
- Initial EtCO<sub>2</sub> may be elevated immediately post resuscitation but will normalize.
- If ROSC in previously hypothermic patient (core temp < 93°F or 34°C), refer to *Hypothermia/Cold Emergency* protocol.
- Use caution in treating immediate post arrest arrhythmias, as they may resolve spontaneously.
- All post arrest patients, excluding trauma, should be transported to nearest PCI capable facility.



### Pearls:

- If patient is hemodynamically unstable, consider Cardioversion as primary treatment.
- For Torsades de Pointes, 2g MAGNESIUM SULFATE diluted in NS IV/IO, over 5 min.
- Consider ADENOSINE if regular, monomorphic, and undifferentiated.
- If cardioversion is successful prior to AMIODARONE administration with continued ventricular ectopy, consider AMIODARONE 150 mg IV/IO over 10 minutes.
- If suspected SVT with aberrancy, see *Narrow Complex Tachycardia* protocol.
- It is recommended not to mix antidysrhythmic medications during the course of patient treatment.
- Unsustained WCT can be considered frequent runs or salvos of WCT.

## Normal Presentation

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

## 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' 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

## Nuchal Presentation

- Use palm of one hand to push against the 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 gently cut the cord between the clamps
- Continue delivery

## 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; Give 10 units (500 mL) over 10-20 minutes, then maintenance infusion 2.5 units (125 mL) per hour

## **Pearls:**

- Document all times (delivery, contraction duration and frequency).
- Some bleeding is normal; copious amounts of blood or free bleeding is abnormal.
- Record APGAR at **one** and **five** minutes after birth as a measure of overall cardiopulmonary and neurologic function.

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 be applied to a patient who, due to fall or overdose, has had no movement in an extremity for greater than 4 hours.

- Administer fluid bolus
  - 20 mL/kg for adults, followed by maintenance infusion of 500-1500 mL/hour
  - It is recommended a minimum of 500-1000 mL be given prior to releasing the patient or extremity from the compression
- SODIUM BICARBONATE 1 mEq/kg in 1000 mL of NS wide open (consider this part of fluid bolus)
- If Hyperkalemia suspected, see *Hyperkalemia* protocol
- Extremity management
  - Do not use ice packs or elevation of extremities

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

## Pearls:

- Compartment syndrome is usually due to a crush injury and because of prolonged compression or pressure the interstitial pressure within a closed anatomical space exceeds the perfusion pressure. It occurs most commonly in the pelvis and lower extremities, but may also occur in the upper extremities or trunk. Compartment syndrome may result in ischemic swelling, muscle infarction, nerve injury and permanent loss of extremity function.

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

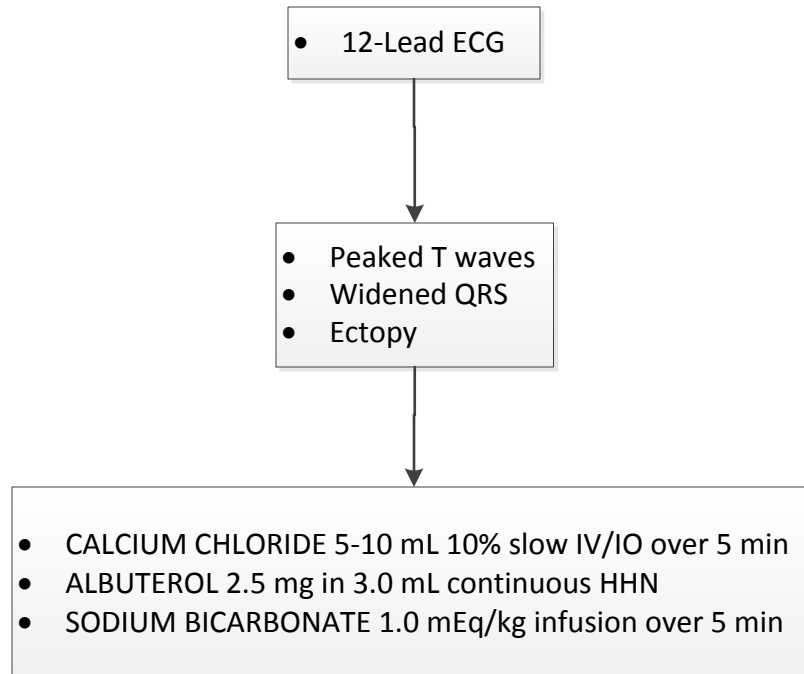
- If BGL is < 60 mg/dl:
- Consider ORAL GLUCOSE if the patient is alert/able to protect their own airway
  - Establish IV access as applicable
  - 12.5-25 gm Dextrose D50% IV/IO, reassess/repeat as needed
  - AND/OR
  - 100 mL Dextrose D10% IV/IO, reassess/repeat as needed
  - Titrate to achieve blood glucose of  $\geq 60$  mg/dl and/or level of consciousness
  - Consider THIAMINE 100 mg slow IV/IM for chronic alcoholism/malnutrition
  - If unable to obtain an IV, administer GLUCAGON 1 mg IM
  - If GLUCAGON is ineffective, establish an IO
    - Administer 100 mL Dextrose D10% IO, reassess/repeat as needed
  - OR
  - Administer 12.5-25 gm Dextrose D50% IO, reassess/repeat as needed
  - Reassess BGL after each intervention as necessary

If BGL is > 250 mg/dl

- Consider Fluid bolus up to 20 mL/kg, reassess
- Consider monitoring EtCO<sub>2</sub>

**Pearls:**

- Consider DKA or Hyperglycemic Hyperosmolar Syndrome on the patient that is a known person with diabetes and had a recent illness or injury.



## Pearls:

- CALCIUM CHLORIDE is contraindicated in patients with suspected digitalis toxicity.
- Patients predisposed to hyperkalemia may include *Crush Injury*, chronic renal failure, and TCA overdoses.
- Hyperkalemia is defined as potassium level higher 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 – Widened 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 – Sinewave shaped complexes and idioventricular rhythm.
- Potassium of  $\geq 10$  mEq/L - PEA often sine wave in appearance, VF, VT and Asystole.

## Heat Exhaustion

- Body temperature up to 104°F/40°C
- Minor CNS changes, weakness, dizziness, fainting
- Nausea, headache, dilated pupils, no appetite
- 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, seizures
- Tachycardia, hypotension
- Skin (hot, red, dry)
- 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

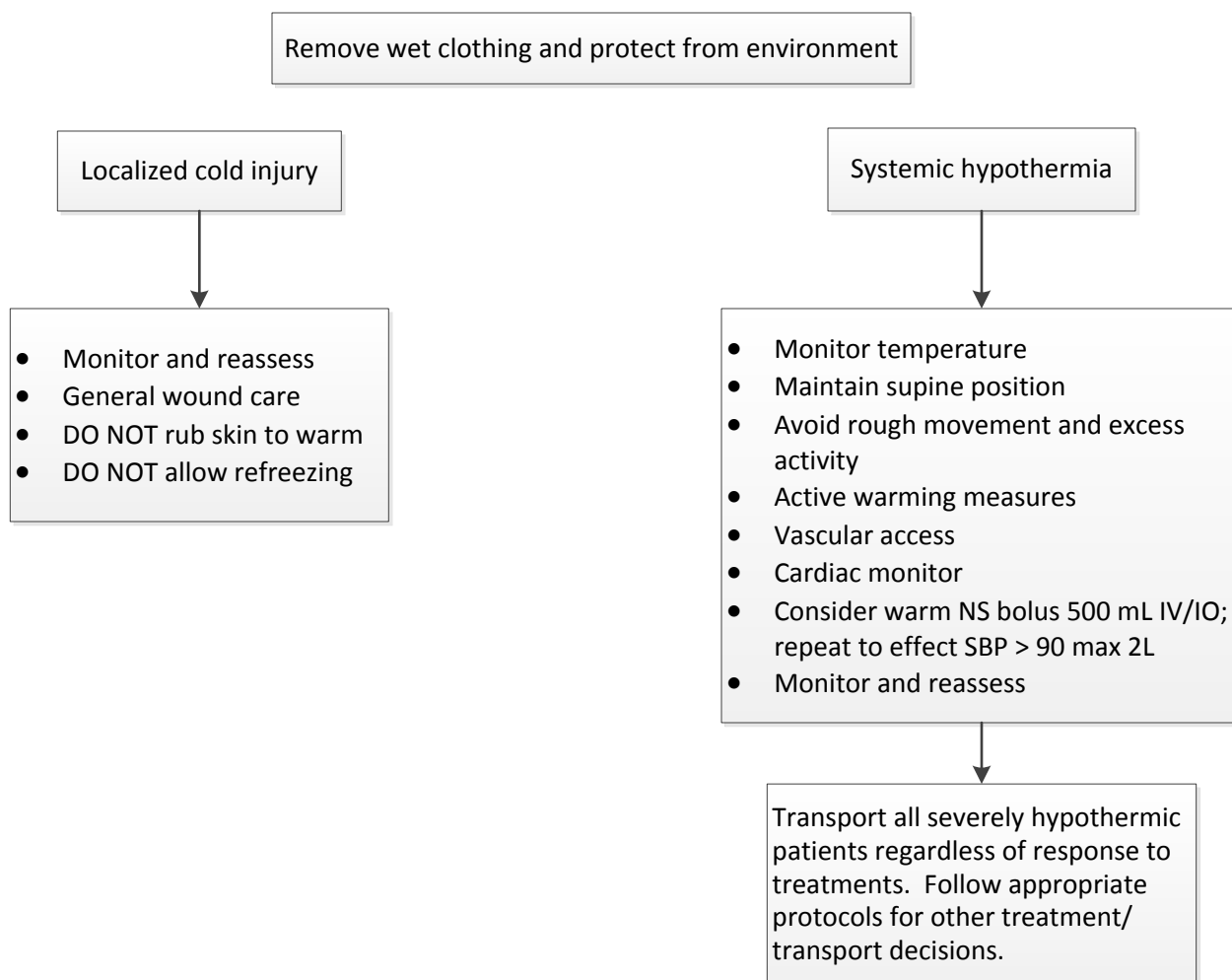
Treat signs and symptoms of shock as necessary

Treat seizures per the *Seizure* protocol

### Pearls:

- Heat exhaustion can rapidly progress to heat stroke if untreated.
- Heat stroke requires very aggressive cooling.
- Active cooling includes application of cold packs (not directly on skin), fanning, air conditioner or air movement.
- 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, antipsychotics and antiepileptic medications
  - Diuretics, beta blockers or antihistamines





Patient with pulse	
Core Temperature	Treatment
93.2°F – 96.8°F	Passive re-warming and active external re-warming
86°F – 93.2°F	Passive re-warming and active external re-warming to trunk areas only

Patient without a pulse	
Start CPR, defibrillate once if indicated	
Core 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, repeat defibrillation for VF/VT/Torsades, passive re-warming and active external re-warming to trunk areas only

**Pearls:**

- Extremes of age are more prone to cold emergencies.
- If temperature is unknown, treat the patient based on suspected temperature.
- For the severely hypothermic patient, perform procedures gently and monitor cardiac rhythm closely.
- Active warming includes hot packs that can be used on the armpit and groin; care should be taken not to place the packs directly on the skin.
- If available, core temperature is preferred.

Patients must meet all the following criteria to be eligible for this protocol:

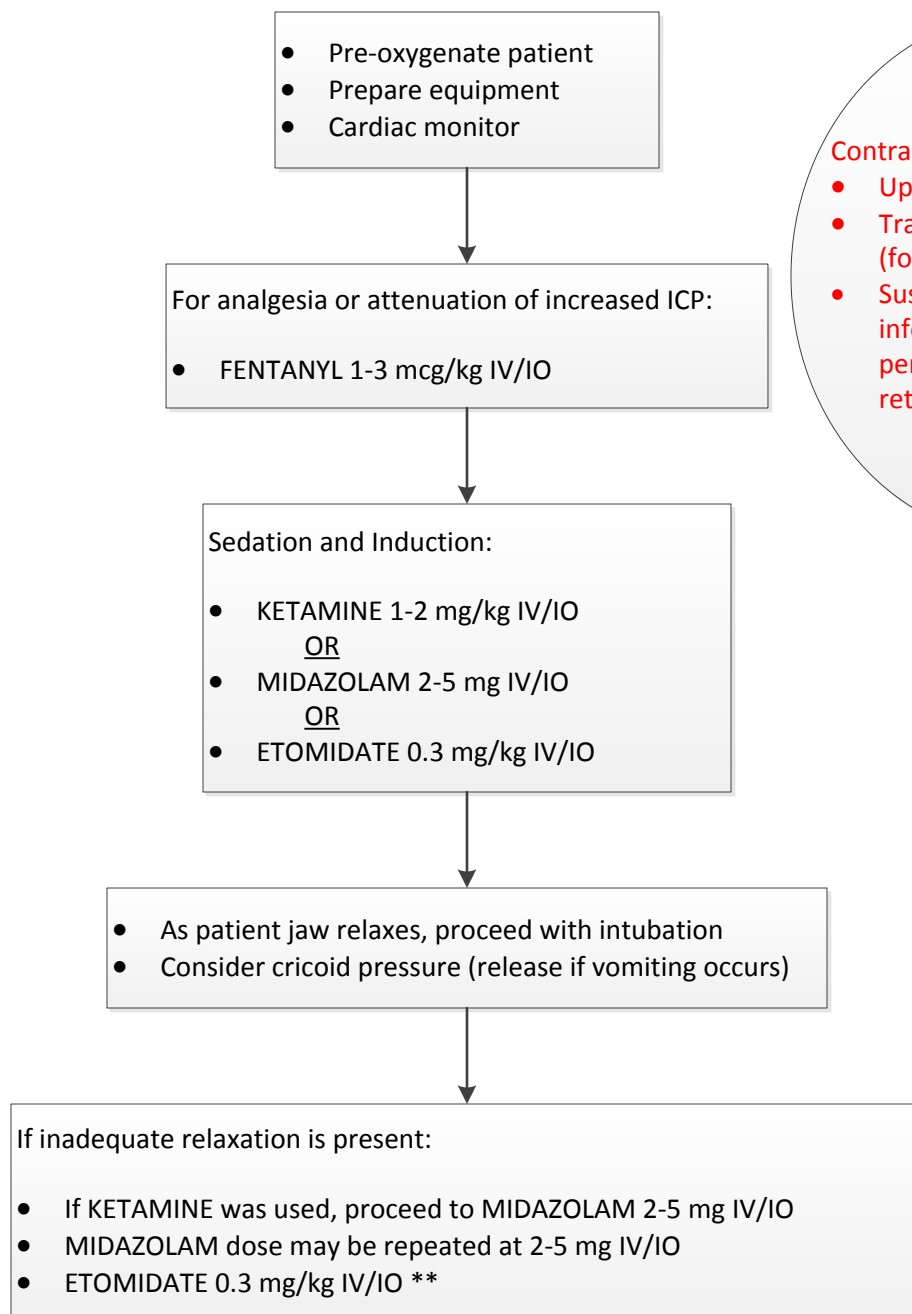
- Have sustained return of circulation post non-traumatic cardiac arrest
- Temperature > 93°F (34°C)
- No purposeful response to voice or pain
- Blood glucose level > 60 mg/dl
- Sustained capnography monitoring in place

The following patients are **NOT** eligible for this protocol:

- Pregnant patients
- Traumatic or hemorrhagic cardiac arrest patients
- ROSC in previously hypothermic patient

- Ensure continuous monitoring of SpO<sub>2</sub> (94%-99%), EtCO<sub>2</sub> waveform, and ECG
- Monitor temperature
- Maintain EtCO<sub>2</sub> 35-40 mmHg
- Expose patient and place cold packs in axilla and groin
- Assess neurological status
- Ensure vitals are appropriate and follow respective protocol
- Avoid and immediately correct hypotension (SBP less than 90 mmHg, Mean Arterial Pressure less than 65 mmHg) during post-cardiac arrest care
- Search for and treat differential causes of arrest
- If cooling causes shivering: MIDAZOLAM 2-5 mg IV/IO; titrate to effect

If ROSC in previously hypothermic patient (core temperature < 93°F/34°C) use *Hypothermia/Cold Emergency* protocol



**Contraindications:**

- Upper Airway Obstruction
- Tracheal obstruction (foreign body, tumor)
- Suspected pharyngeal infection (epiglottitis, peritonsillar, or retropharyngeal abscess)

**Pearls:**

- Pharmacological agents are used to assist the provider in performing intubation in patients with high intubation difficulty due to excessive gag reflex. In these instances, protecting the airway is a potentially life-saving maneuver. These patients may include: Isolated Head Trauma, CVA/Stroke, Multisystem Trauma, Overdose, Status Epilepticus, Acute Pulmonary Edema, Respiratory Failure, Severe Burns, or based on anticipated clinical course.
- Reserve ETOMIDATE for non-septic, non-pediatric patients, and/or for those with suspected head injury.

Consider Cardiac Monitor

```
graph TD; A[Consider Cardiac Monitor] --> B[ONDANSETRON  
• 4 mg IV/IO/IM may repeat x 1 in 20 min  
Second choice, if available:  
PROMETHAZINE  
• 12.5 mg IV/deep IM may repeat x 1 in 15 min  
• Geriatrics - 6.25mg IV/deep IM x 1 no repeat  
• Dilute IV doses in 10 mL of NS];
```

**ONDANSETRON**

- 4 mg IV/IO/IM may repeat x 1 in 20 min

Second choice, if available:

**PROMETHAZINE**

- 12.5 mg IV/deep IM may repeat x 1 in 15 min
- Geriatrics - 6.25mg IV/deep IM x 1 no repeat
- Dilute IV doses in 10 mL of NS

**Pearls:**

- Consider cardiac origin and perform a 12-Lead ECG.
- Use antiemetics with caution in patients with a known history of prolonged QT interval. In general, prolonged QT is defined as a QTc > 450 ms.

Poison Control - (800) 222-1222 OR (775) 982-4129

- Determine cause of overdose/poisoning, treat as appropriate
- Cardiac Monitor

## Carbon monoxide (CO)

- Place patient on CO monitor, do not rely on pulse oximeter readings
- If patient's SpCO is:
  - 0 – 5 % - Considered normal for non-smokers. When > 3% with symptoms, consider high flow oxygen and recommend transport. If asymptomatic, no further medical evaluation necessary of SpCO. Counsel patients on signs and symptoms to watch for, offer transport to ED, if refused, complete AMA.
  - 5 – 10 % - Considered normal for smokers, abnormal for non-smokers. If symptoms are present, consider high flow oxygen and recommend transport to ED.
  - 10 – 15 % - Abnormal in any patient. Assess for symptoms, consider high flow oxygen and recommend transport to ED.
  - > 15 % - Significantly abnormal in any patient. Administer high flow oxygen and recommend transport to ED.
  - > 30 % - Consider transport/referral to hyperbaric facility (consider referral to hyperbaric facility if > 25% for patients with ALOC or pregnant).
- If patient has altered LOC, neurological impairment, or > 25% SpCO, treat with 100% O<sub>2</sub> and transport to nearest appropriate facility
- Continue supportive therapies as needed

## Opiates

- Titrate NALOXONE to restore adequate respirations
  - 0.5 - 2 mg IV/IO/IM/IN may repeat to max total dose of 10 mg

## Tricyclic Anti-Depressants

- For patients with any of the following:
- Dysrhythmias or QRS of  $\geq 120$  ms
  - Hypotension
  - Seizure
  - Cardiac Arrest
  - Administer SODIUM BICARBONATE 1.0 mEq/kg IV immediately call for orders for additional dose
  - If patient is intubated, ventilate patient to maintain EtCO<sub>2</sub> level of 28-30 mmHg

## Organophosphate Poisoning (Insecticide)

- ATROPINE 1-2 mg every 3-5 minutes until cessation of secretions

## Agents:

- ACETAMINOPHEN: Initially normal or N/V. Tachypnea and AMS may occur later. Renal dysfunction, liver failure and/or cerebral edema may manifest.
- **Beta blocker overdose:** call for possible administration of GLUCAGON.
- **Calcium channel blocker:** call for possible administration of CALCIUM CHLORIDE and/or GLUCAGON.
- Depressants: Decreased HR, BP, temp and RR.
- Anticholinergic: Increased HR, increased temperature, dilated pupils and AMS changes.
- Insecticides: May include S/S of organophosphate poisoning.
- Solvents: N/V, cough, AMS.
- Stimulants: Increased HR, BP, temperature, dilated pupils, seizures, and possible violence.
- TCA: Decreased mental status, dysrhythmias, seizures, hypotension, coma, death.

Poison Control - (800) 222-1222 OR (775) 982-4129

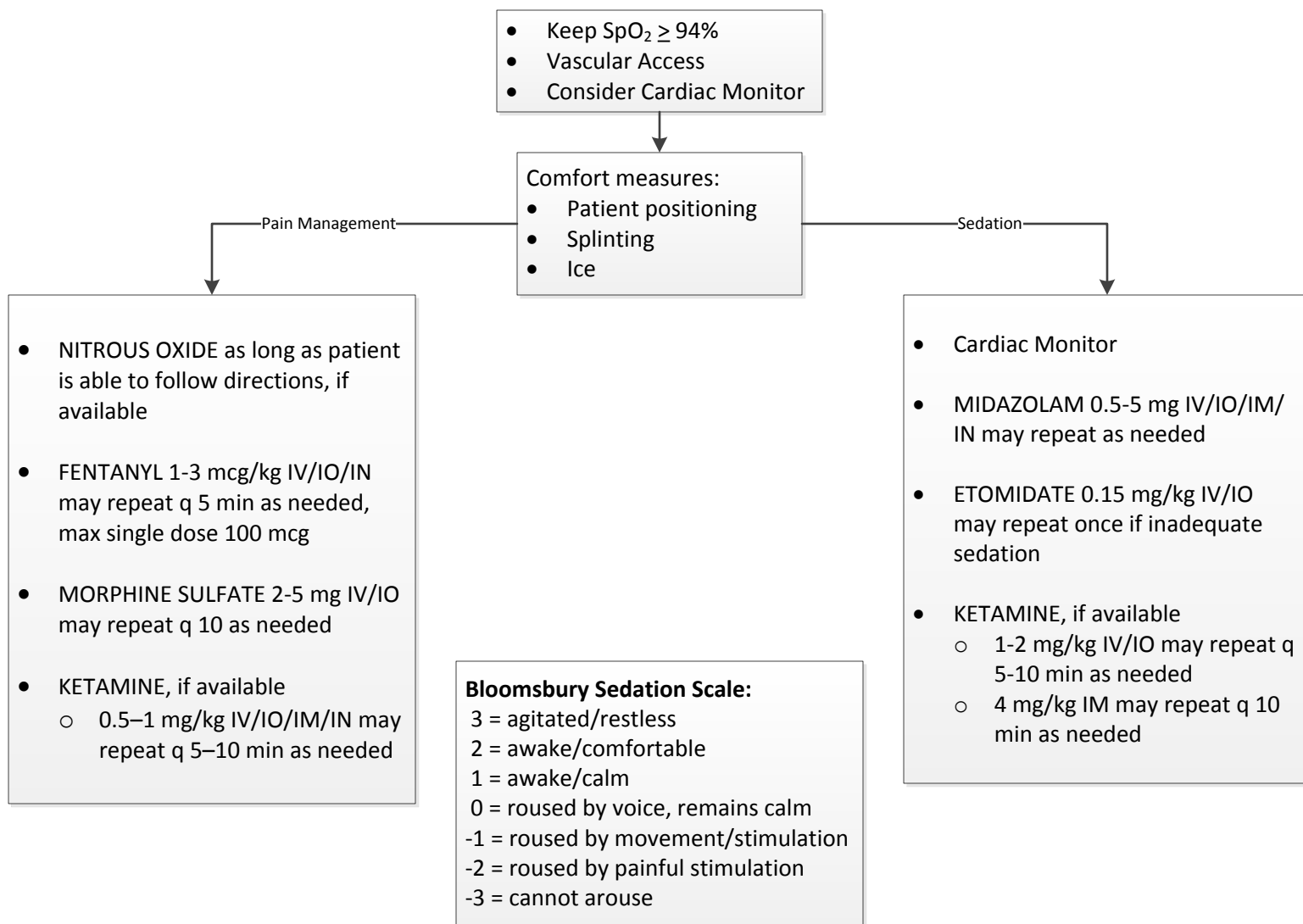
## Cyanide Exposure

For known cyanide poisoning in the absence of exposure to smoke, refer to the cyanide antidote parameters contained within the *Smoke Inhalation* protocol

### Pearls:

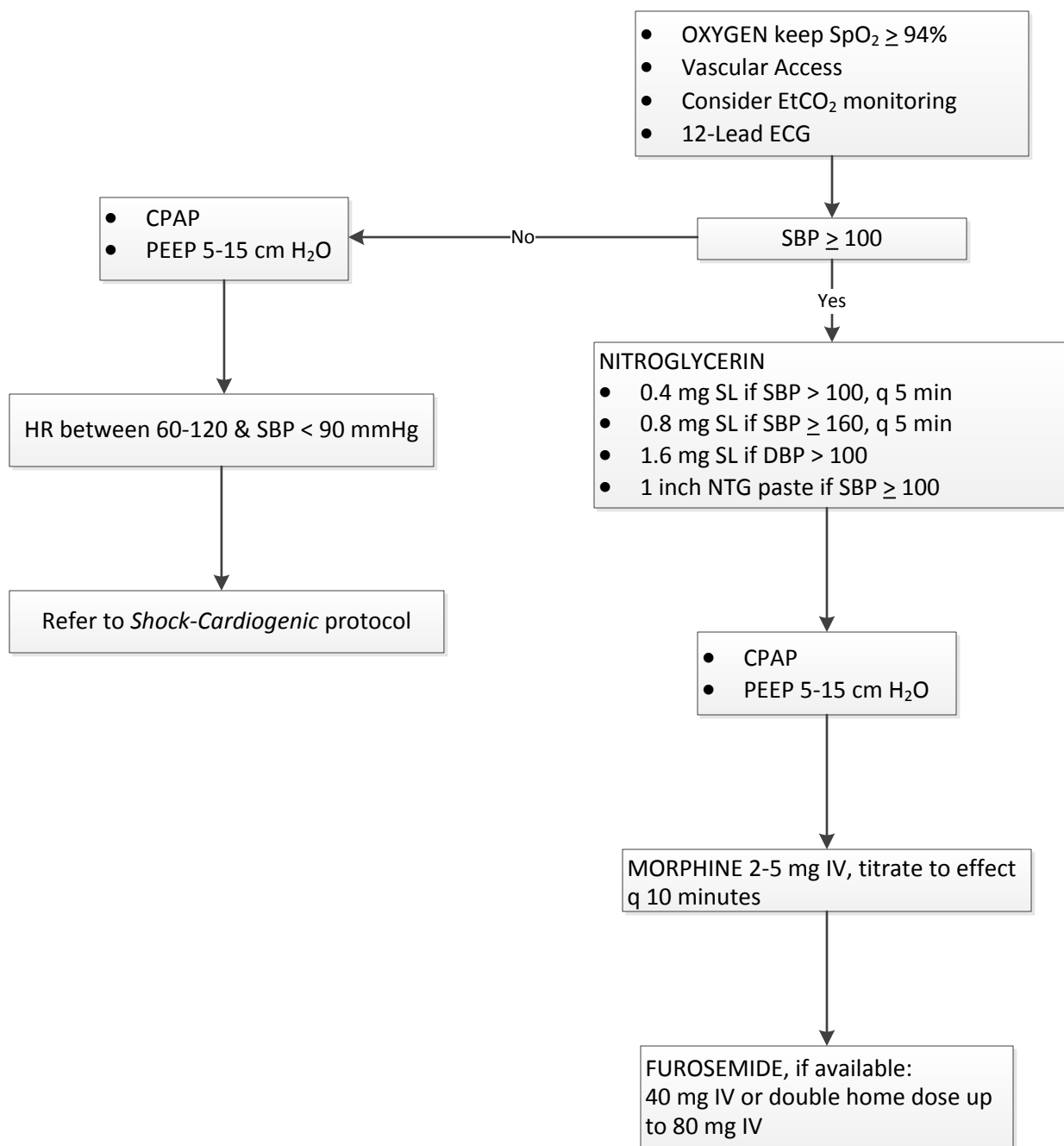
- Powdered HYDROXOCOBALAMIN will be reconstituted with 200 cc 0.9% NS or lactated ringers. Repeatedly invert for 60 seconds PRIOR TO administration. Do Not Shake.
- CALCIUM CHLORIDE is contraindicated in patients with suspected digitalis toxicity.
- If patient is suspected to have narcotic overdose/hypoglycemia, administer NARCAN/GLUCOSE prior to BIAD device/intubation.
- Consider a second line if possible for administration and avoidance of possible medication incompatibilities.
- For suspected ingestion, consider NG tube placement.
- Cyanide toxicity should be suspected for any patient being treated for Carbon Monoxide toxicity from smoke inhalation. Conscious patients with symptoms will require **Medical Control** contact prior to administration.
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated. Do not hesitate to contact **Medical Control** if needed.
- In the case of cyanide poisoning, altered mental status may be profound. Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.

Assess and document patient's condition and vital signs before and after treatment (at minimum every 15 minutes). Pain should be assessed using a combination of physiologic indicators, including but not limited to, 1-10 pain scale and Bloomsbury Sedation Scale.



### Pearls:

- Ophthalmic anesthetics may be used for ocular injuries, 1-2 drops, as needed.
- Consider prophylactic ONDANSETRON use when administering pain medication.
- Pain severity (1-10) is a vital sign to be recorded before and after medication administration and patient hand off.
- Monitor BP and respirations closely as sedative and pain control agents may cause hypotension and/or respiratory depression.
- Consider patient's age, weight, clinical condition, use of drugs/alcohol, exposure to opiates, when determining initial opiate dosing. Weight based dosing may provide a standard means of dosing calculation, but does not predict response.
- Exercise care when administering opiates and benzodiazepines; this combination results in deeper sedation with significant risk of respiratory compromise.
- Burn patients may require more aggressive dosing.



**Pearls:**

- Avoid administering NITROGLYCERIN to any patient who is currently using phosphodiesterase inhibitors.
- Consider NITROGLYCERIN PASTE for subsequent doses after placing CPAP mask (i.e. do not remove mask to administer SL doses).
- Allow patient to dangle legs, if possible.



- Cardiac monitor
- Consider 12-lead ECG
- SpO<sub>2</sub> and EtCO<sub>2</sub> monitoring

Asthma/reactive airway disease

- ALBUTEROL 2.5 mg in 3.0 mL HHN; repeat until improvement
- DUONEB 2<sup>nd</sup> & 3<sup>rd</sup> HHN  
\*\*additional HHNs use ALBUTEROL
- Consider CPAP

Chronic lung disease with deterioration

- ALBUTEROL 2.5 mg in 3.0 mL HHN; repeat until improvement
- DUONEB 2<sup>nd</sup> & 3<sup>rd</sup> HHN  
\*\*additional HHNs use ALBUTEROL
- Consider CPAP

Impending Respiratory Failure:

If patient > 45 years or previous cardiac history, consider contacting **Medical Control** prior to:

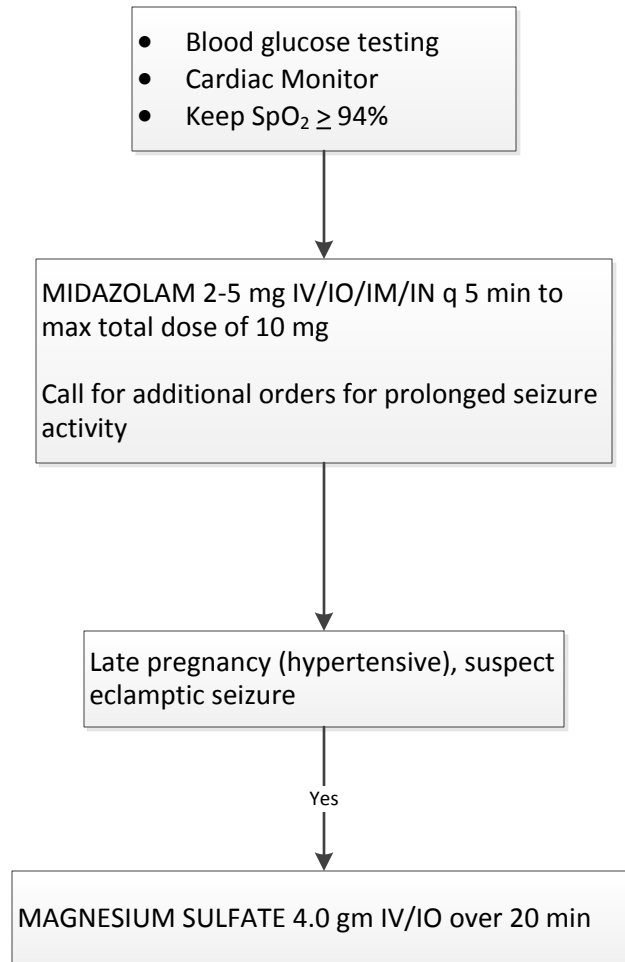
EPINEPHRINE

- 0.3 – 0.5 mg (0.3 – 0.5 mL) IM 1:1,000
- 0.1 mg IV 1:10,000 repeat as needed, max 0.3 mg

MAGNESIUM SULFATE 2 gm IV over 20 min

## Pearls:

- Duoneb equivalent can be achieved by combining 0.5 mg IPRATROPIUM in 2.5 mg ALBUTEROL.
- Signs of impending respiratory failure include: altered mental status, inability to maintain respiratory effort, cyanosis.



### Pearls:

- **Eclamptic seizure/ob patients** showing signs of Magnesium Sulfate toxicity (respiratory depression, hypotension or bradycardia):
  - Consider administering 5 mL 10% Calcium Chloride slow IV/IO push over 5 minutes.
- Benzodiazepines are effective in terminating seizures; do not delay IM/IN administration while initiating an IV.
- Status epilepticus is defined as two or more seizures successively without an intervening lucid period, or a seizure lasting over five minutes.
- Consider EtCO<sub>2</sub> monitoring.

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

Severe Sepsis if one of the following in addition to the above:

- Acute Hypoglycemia or Hyperglycemia
- Systolic BP < 90 mmHg or Mean Arterial Pressure (MAP) < 65 mmHg
- EtCO<sub>2</sub> < 25 mmHg



- Keep SpO<sub>2</sub> ≥ 94%
- Vascular access-Large bore IV preferred, obtain two if possible
- Cardiac Monitor
- Consider EtCO<sub>2</sub> monitoring
- Obtain Blood Glucose Level
- Follow Advanced Airway Management as indicated by patient's condition
- Place patient supine and elevate legs if possible
- Assess lung sounds
  - If clear, administer 30 cc/kg fluid bolus to max of 3000 mL; patient must receive 3000 mL before EPINEPHRINE infusion
  - Reassess lung sounds after each 500 mL given



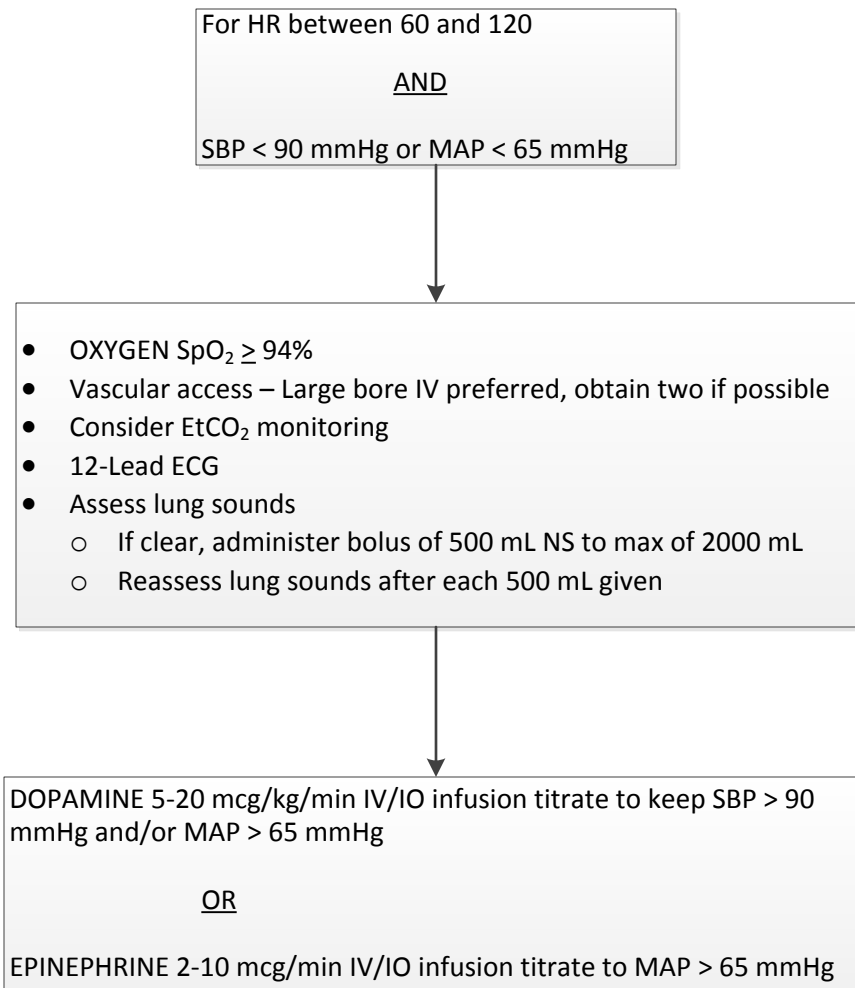
If unable to maintain SBP > 90 mmHg or MAP > 65 mmHg, following fluid administration:

EPINEPHRINE Infusion 2-10 mcg/min IV/IO infusion; titrate to keep SBP > 90 mmHg

- Blood pressure assessed every 5 min while titrating EPINEPHRINE infusion to maintain MAP > 65 mmHg or systolic blood pressure of > 90 mmHg
- Monitor ECG continuously

### Pearls:

- Hypotension can be defined as a SBP of < 90 mmHg or MAP < 65 mmHg. This is not always reliable and should be interpreted in context and patient's typical BP, if known.
- Shock may be present with a normal BP initially.
- Mean Arterial Pressure (MAP):  $MAP = ((DBP \times 2) + SBP) / 3$ .



## Pearls:

- Hypotension can be defined as a SBP of < 90 mmHg or MAP < 65 mmHg. This is not always reliable and should be interpreted in context and patient's typical BP, if known.
- Shock may present with a normal BP initially.
- Mean Arterial Pressure (MAP):  $MAP = ((DBP \times 2) + SBP) / 3$ .

Individuals may present with soot around nose and mouth after exposure to smoke from a structure fire or other sources (vehicle fire, industrial gases, confined spaces, etc.)

- Keep SpO<sub>2</sub> ≥ 94%
- Ventilation management
- Cardiac monitor

- Vascular Access
- NS bolus 500 mL up to max 2000 mL for hypoperfusion

Other treatment protocols as indicated

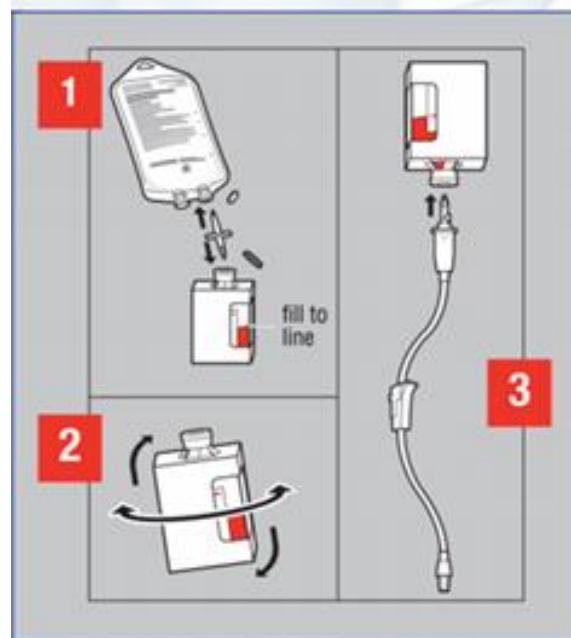
If the patient presents with cardiac arrest, hypotension, altered mental status or other signs and symptoms consistent with Cyanide (CN) poisoning, administer:

HYDROXOCOBALAMIN 5.0 g IV over 15 min

\* Depending on the severity of the poisoning and the patient's response, a second dose of 5.0 g may be administered by IV infusion up to a total dose of 10.0 g. The rate of infusion for a second dose may range from 15 min (for patients in extremis) to 2 hours, as clinically indicated.

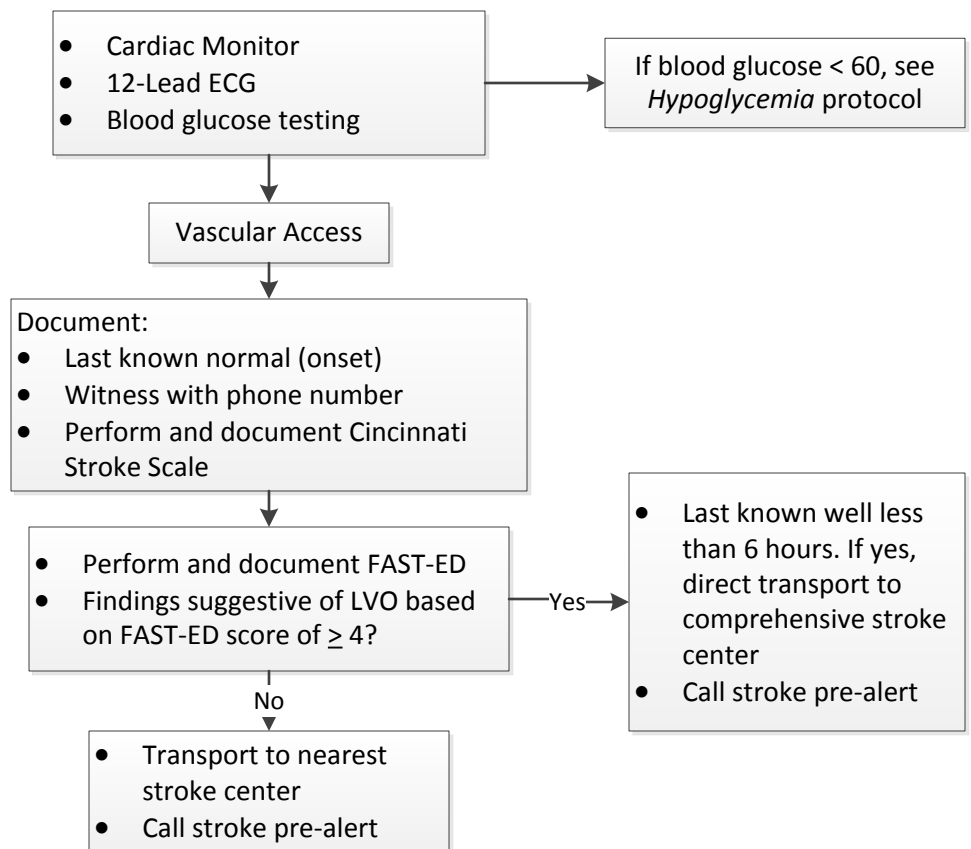
## Complete Starting Dose: 5 g

- 1 Reconstitute:** Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride injection\* to the vial using the transfer spike. **Fill to the line.**  
\*0.9% Sodium Chloride injection is the recommended diluent (diluent not included in the kit). Lactated Ringers injection and 5% Dextrose injection have also been found to be compatible with hydroxocobalamin and may be used if 0.9% Sodium Chloride is not readily available
- 2 Mix:** The vial should be repeatedly inverted or rocked, not shaken, for at least **60 seconds** prior to infusion.
  - CYANOKIT solutions should be visually inspected for particulate matter and color prior to administration
  - Discard solution if particulate matter is present or solution is not dark red
- 3 Infuse Vial:** Use vented intravenous tubing, hang and infuse over **15 minutes.**



### Pearls:

- Signs and symptoms consistent with Cyanide (CN) poisoning include:
  - Weakness, dizziness, headache, stupor, dilated pupils, dyspnea
  - Tachypnea, tachycardia, nausea, vomiting, tightness in the chest
  - Altered LOC, cardiovascular collapse, combativeness, confusion
  - Plasma Lactate concentration ≥ 8 mmol/L
  - Late signs: Cardiac arrest, apnea, bradypnea, hypotension, seizures
- Low EtCO<sub>2</sub> can be indicative of an elevated serum lactate level (less than 25).
- If the medication is not available on scene do not delay transport waiting for it.
- Decide early on if you want to intubate as burned airways swell, making intubation difficult.



**FAST-ED Stroke Score**

Item	FAST-ED Score	NIHSS Score Equivalence
<b>Facial Palsy</b>		
Normal or minor paralysis	0	0-1
Partial or complete paralysis	1	2-3
<b>Arm Weakness</b>		
No drift	0	0
Drift or some effort against gravity	1	1-2
No effort against gravity or no movement	2	3-4
<b>Speech Changes</b>		
Absent	0	0
Mild to moderate	1	1
Severe, global aphasia, or mute	2	2-3
<b>Eye Deviation</b>		
Absent	0	0
Partial	1	1
Forced deviation	2	2
<b>Denial/Neglect</b>		
Absent	0	0
Extinction to bilateral simultaneous stimulation in only 1 sensory modality	1	1
Does not recognize own hand or orients only to one side of the body	2	2

**Stroke Pre-Alert Criteria**

	Indication		Contraindication
<input checked="" type="checkbox"/>	Positive FAST-ED	<input checked="" type="checkbox"/>	Stroke or head trauma in last 3 months
<input checked="" type="checkbox"/>	≥ 18 Years Old	<input checked="" type="checkbox"/>	Recent intracranial or intraspinal surgery in last 3 months
<input checked="" type="checkbox"/>	Within last 6 hours onset of "last seen well"	<input checked="" type="checkbox"/>	Major surgery in past 2 weeks
		<input checked="" type="checkbox"/>	Active bleeding

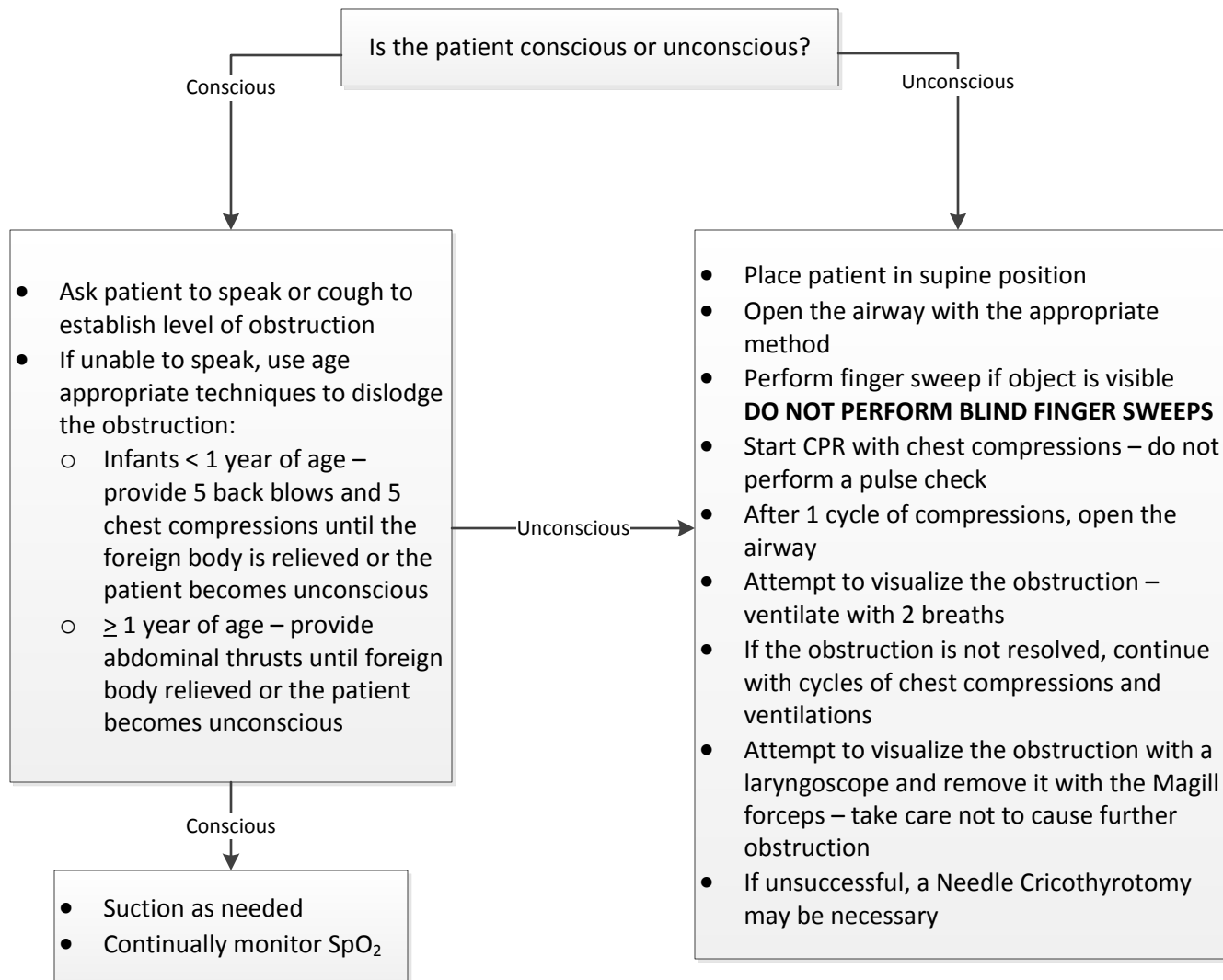
**Pearls:**

- Transporting agency should draw for destination hospital blood samples. The sequence should be blue, gold, green, lavender, filled completely. Label appropriately.

**PEDIATRIC  
TREATMENT  
PROTOCOLS**

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**Pearls:**

- If the patient presents with trismus and noisy respirations, insert a NPA and attempt to assist ventilations with a BVM.
- Avoid hyperventilation.
- Maintain EtCO<sub>2</sub> at 35-45.

Anaphylaxis is defined as an acute onset of an illness (over minutes to several hours) involving the skin, mucosal tissue, or both (e.g., generalized hives, pruritus or flushing, swollen lips-tongue-uvula) and respiratory compromise (e.g., dyspnea, wheeze-bronchospasm, stridor, reduced peak expiratory flow, hypoxemia) and/or reduced blood pressure (BP) or associated symptoms of end-organ dysfunction (e.g., hypotonia [collapse] syncope, incontinence).

- Consider Vascular Access
- Ventilation Management
- Consider Cardiac Monitor

**MILD** – Generalized hives, swelling, itching:

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

**MODERATE** - Mild symptoms with wheezing and difficulty swallowing:

- DIPHENHYDRAMINE 1.0 mg/kg IV (max 25 mg)
- ALBUTEROL unit dose 2.5 mg in 3.0 mL by nebulizer as needed
- EPINEPHRINE 0.01 mg/kg 1:1,000 IM (0.3 mg max) (in anterior thigh)

**SEVERE** - Impending respiratory failure and hypotension:

- EPINEPHRINE 0.01 mg/kg 1:1,000 IM (0.3 mg max)
- DIPHENHYDRAMINE 1.0 mg/kg IV (max 25 mg)
- EPINEPHRINE 0.01 mg/kg of 1:10,000 IV, followed by 20 mL/kg fluid bolus (0.3 mg max), may repeat PRN

Treat signs and symptoms of shock as necessary

Patient restraint – when patient is a threat to themselves, bystanders or EMS personnel

- Patients may be restrained with soft restraints
- Restraining opposing muscle groups (swimmers position) is most effective; never restrain in prone/hog-tied position
- Assess distal CMS after restraint, every 10 minutes
- Maintain and monitor the oxygen saturation
- Obtain vascular access as needed
- Apply cardiac monitor as needed – **Required with chemical restraint**
- Document reasons for restraint
- Incarcerated person may be restrained at the discretion of Law Enforcement
  - For handcuffed patients, request Law Enforcement accompaniment



Consider *Pediatric Pain Management/*  
*Sedation* protocol

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

## **Chemical Burns/Hazmat Contamination**

- Protect rescuer from contamination
- Remove all clothing and solid chemical which might provide continuing contamination
- Decontaminate patient using running water for 15 minutes if patient is stable
- Assess and treat associated injuries and evaluate for systemic symptoms
- Wrap burned area in clean dry cloth
- Keep patient warm after decontamination
- Contact hospital as soon as possible with type of chemical contamination for consideration of additional decontamination prior to entry into ED

Consider *Pediatric Pain Management/Sedation* protocol

## **Electrical Burn/Lightning**

- Protect rescuers from live electric wires
- Separate victim from electrical source when safe for rescuers
- Initiate CPR as needed
  - For victims in cardiac arrest, treatment should be early, aggressive, and persistent
  - Victims with respiratory arrest may require only ventilation and oxygenation to avoid secondary hypoxic cardiac arrest
  - Resuscitation attempts may have high success rates and efforts may be effective even when the interval before the resuscitation attempt is prolonged
- Place patient on cardiac monitor
- Obtain vascular access
- Treat any thermal burns as outlined above
- Assess for other injuries

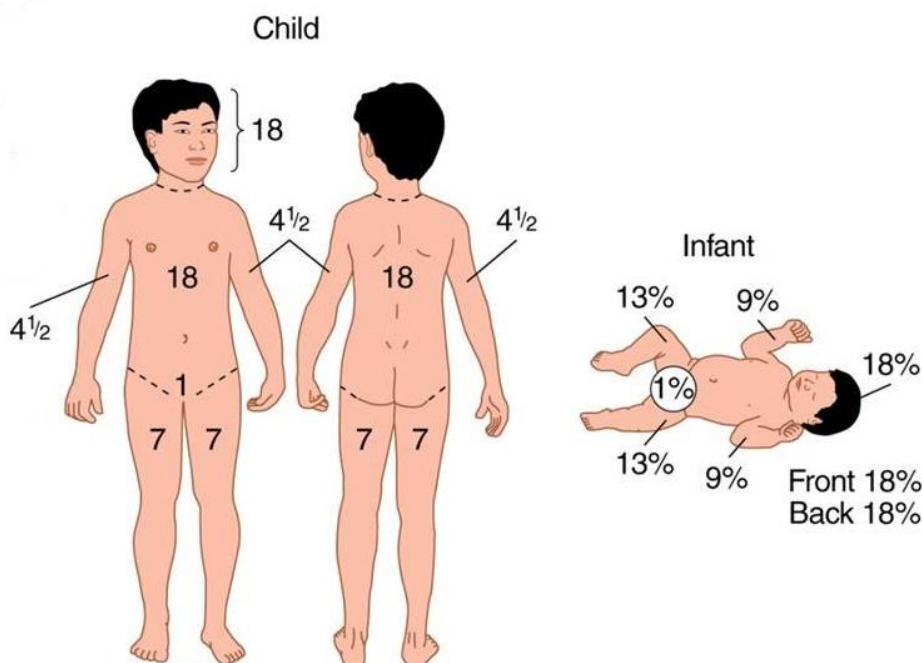
- Consider *Pediatric Pain Management/Sedation* protocol
- Treat dysrhythmias per protocol

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

## Thermal Burns

- Remove clothing which is smoldering and non-adherent to the patient
- Assess oxygenation and administer OXYGEN as needed
- Assess and treat associated trauma
- Remove rings, bracelets and other constricting objects
- Determine burn body surface area (BSA)
  - If  $\leq 10\%$  body surface area burned, use moist saline dressing for patient comfort
  - If burn is moderate to severe ( $> 10\%$  BSA), cover with clean, dry dressings
- Obtain vascular access
- Administer IV fluids as follows:
  - $\leq 5$  years old – 125 mL per hour
  - 6-12 years old – 250 mL per hour

Consider *Pediatric Pain Management/Sedation* protocol



### **Pearls:**

- Parkland Burn Formula – 4 mL NS x BSA (%) x body weight (kg) = total fluids
  - Administer 50% of total fluids in first 8 hours from time of injury
  - Administer 50% of total fluids over next 16 hours
- BSA is calculated for partial thickness and full thickness burns.

- Unconscious and unresponsive
- Pulseless
- Does not meet *Resuscitation/Prehospital Death Determination* protocol

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

VF, pVT, TdP

- Defibrillate at 2 J/kg
  - Obtain vascular access
- EPINEPHINE 0.01 mg/kg  
1:10,000 IV/IO or 0.1 mg/kg  
1:1,000 ETT every 3- 5  
minutes
- Consider BIAD or ETT

Shockable rhythm

Yes

- Defibrillate at 4 J/kg
  - AMIODARONE 5 mg/kg IV/IO; may repeat x 2 if refractory VF/VT (max 15 mg/kg)
- OR
- LIDOCAINE 1.0 mg/kg IV/IO (max 3 mg/kg)
  - If no IV/IO access LIDOCAINE 2.5 mg/kg ETT, may repeat x 1. If IV/IO access is established after ETT dose, may repeat at 1 mg/kg IV/IO
  - If the patient converts to a perfusing rhythm after administration of LIDOCAINE start LIDOCAINE infusion at 20-50 mcg/kg/min

- Check pulse if organized rhythm
- Use Asystole/PEA as indicated
- Consider consultation of **Medical Control** for termination of efforts
  - Minimum of 3 rounds of medication are required prior to contact

Asystole/PEA

Obtain vascular access

- EPINEPHINE 0.01 mg/kg 1:10,000 IV/IO or 0.1 mg/kg 1:1,000 ETT every 3- 5 minutes
- Consider BIAD or ETT

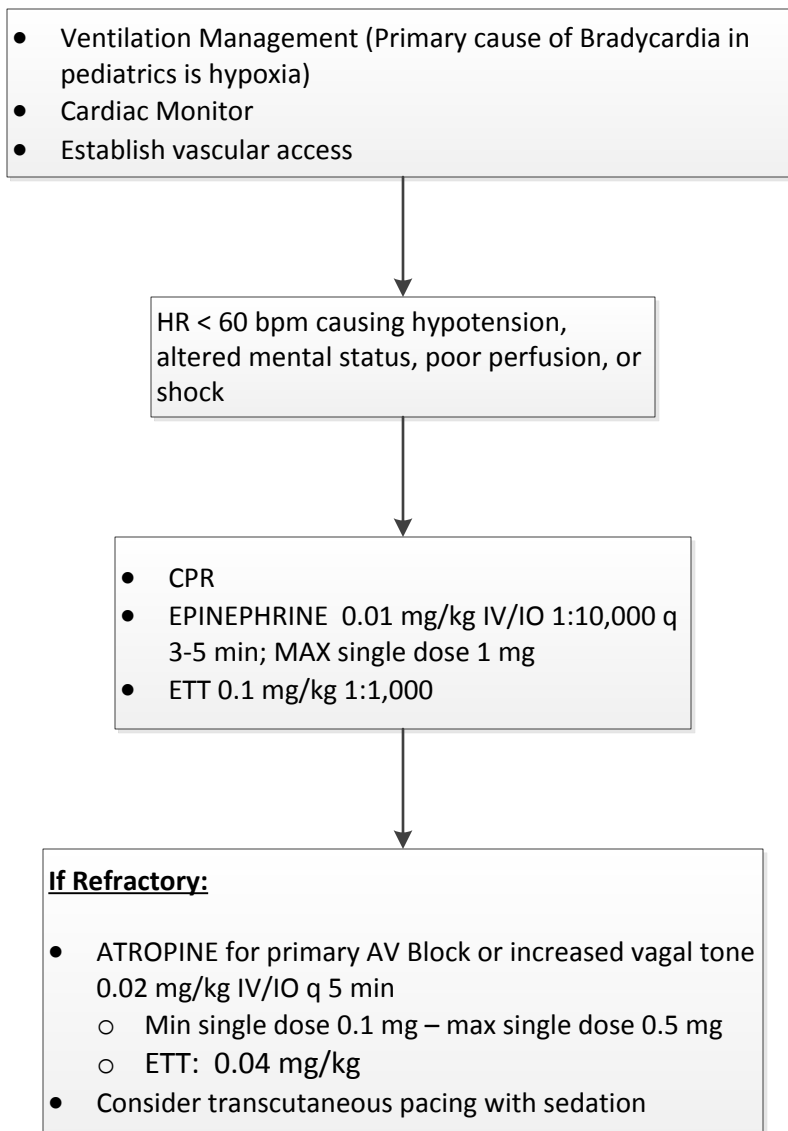
Shockable rhythm

Yes

Use VF, pVT, TdP as indicated

### Pearls:

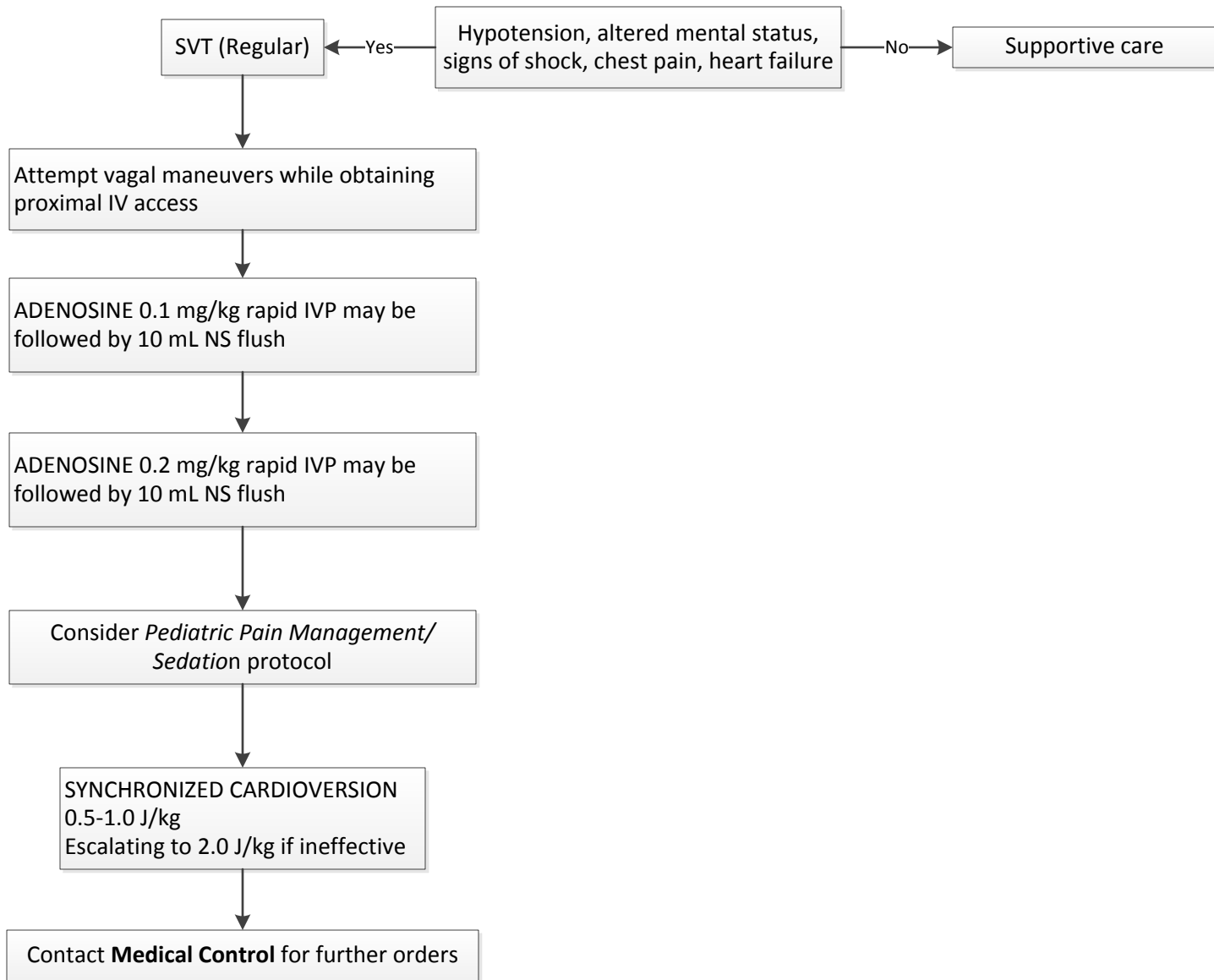
- Hypoxia is the leading cause of cardiac arrest in pediatric patients.
- Use caution when administering two or more ventricular antidysrhythmics, as it may have a proarrhythmic effect.
- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.
- DO NOT HYPERVENTILATE.
- Reassess and document ETT placement using auscultation and EtCO<sub>2</sub> capnography.
- Adult paddles/pads may be used on children weighing greater than 15 kg.



## Pearls:

- Emergency TCP is indicated in bradycardia due to complete heart block or sinus node dysfunction unresponsive to ventilation, oxygenation, chest compressions, and medications, especially if it is associated with congenital or acquired heart disease.

- Infant Rate  $\geq 220$  Child Rate  $\geq 180$
- Vascular Access
- Consider 12-Lead ECG



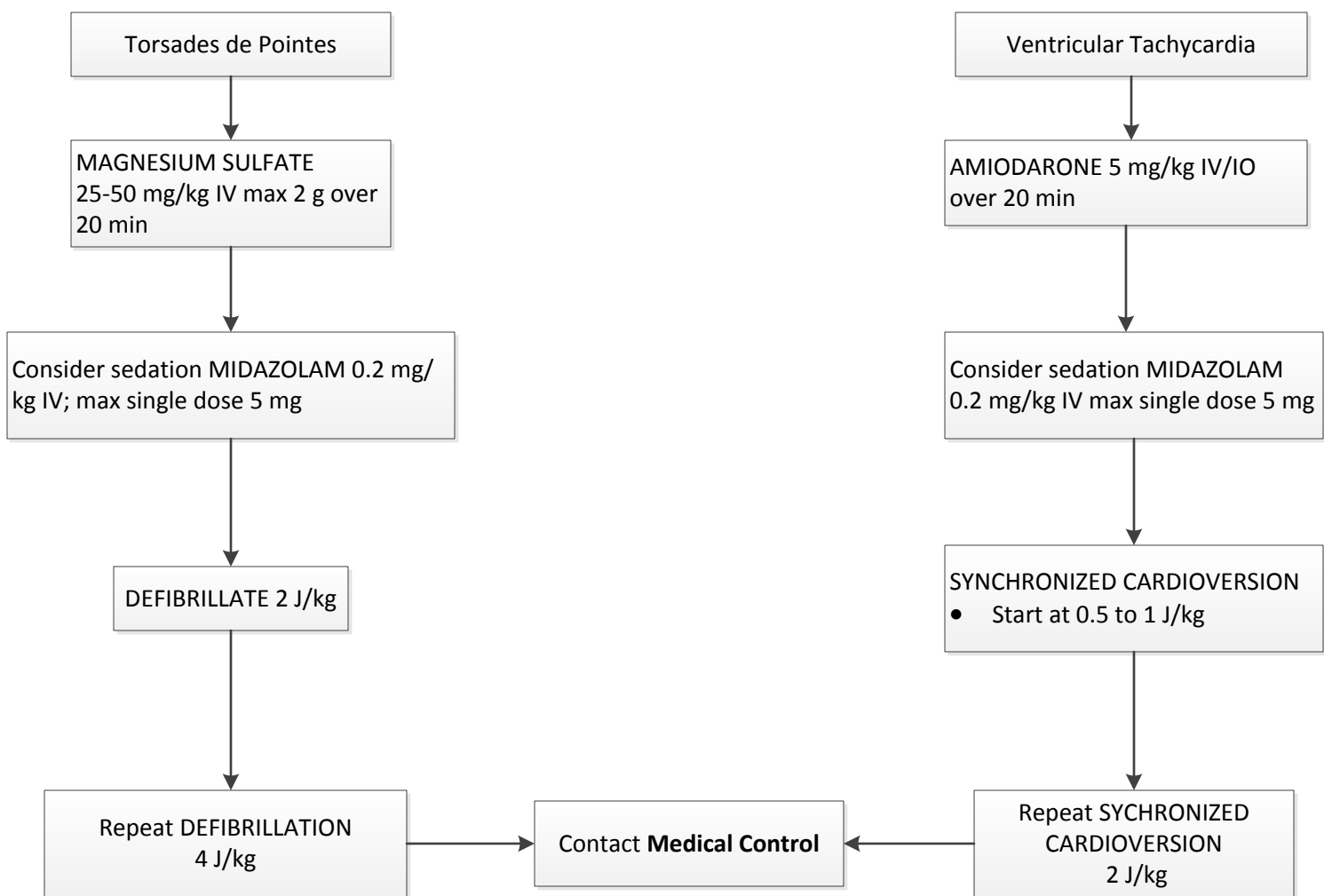
**Pearls:**

- QRS width  $> 90$  ms is considered wide and possibly SVT with aberrancy and rarely VT.
- May go directly to 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.



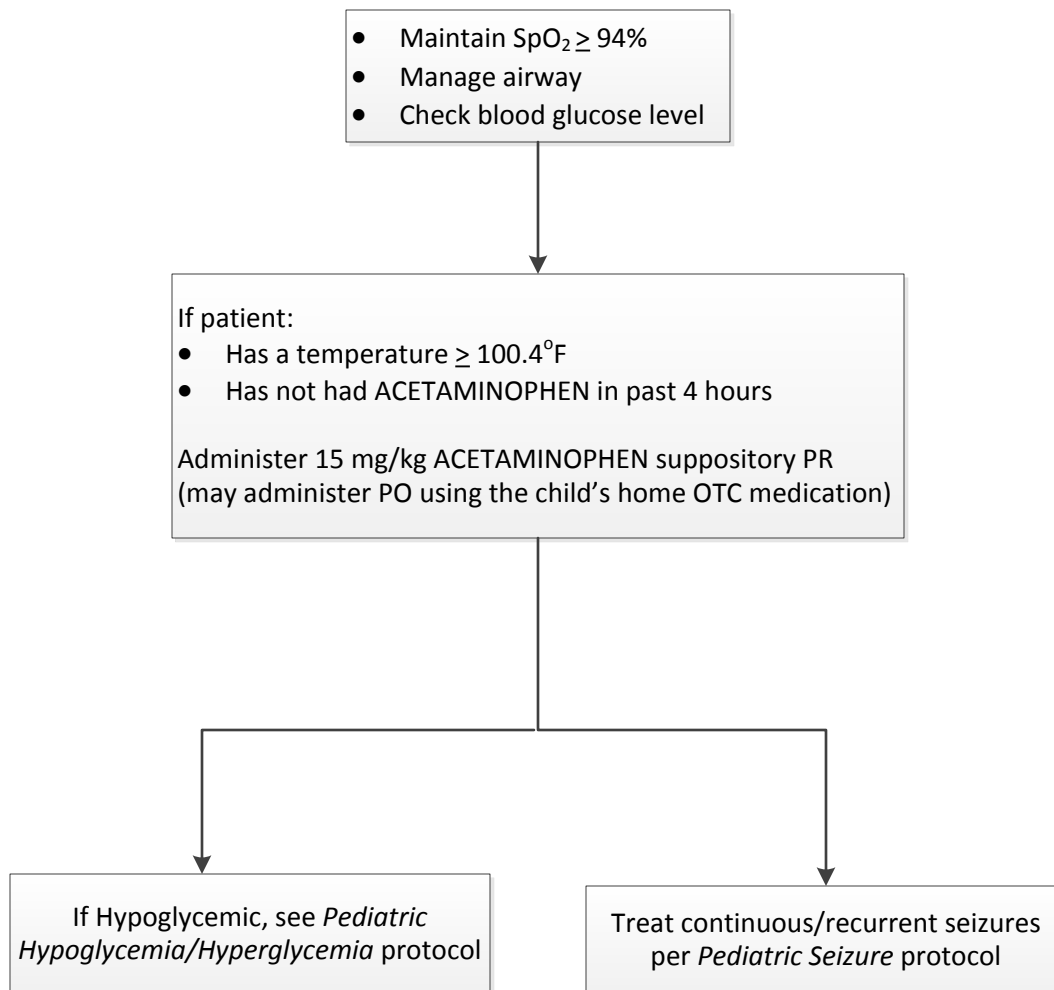
- Cardiac monitor
- Consider 12-lead ECG
- Vascular access
- QRS > 90 ms

Hypotension, altered mental status, signs of shock, chest pain, heart failure; go directly to electrical therapy.



**Pearls:**

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



## Pearls:

- Do not utilize cooling measures in a pediatric patient < 28 days of age.
- Excessive fluid boluses provided to febrile children may lead to complications – administration of IV fluid boluses should be undertaken with extreme caution.
- Consider a pediatric patient to have meningitis or sepsis until proven otherwise.
- Cocaine, amphetamines and salicylates may elevate body temperatures.
- Sweating generally disappears as body temperatures rise over 104°F.
- Intense shivering may occur as patient is cooled.
- Remove clothing and begin passive cooling. Do not use cold packs or ice to cool the patient.
- Dropping the temperature of a patient too quickly may cause seizures.

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

- BGL < 60 mg/dl (< 40 mg/dl in Neonates)
- ORAL GLUCOSE if the patient is alert/able to protect their own airway
  - ≤ 28 days D10, 2 mL/kg IV/IO/UV
  - ≥ 28 days D25, 2 mL/kg IV/IO
- Max single dose 25 gm
- If no IV Access, GLUCAGON:
  - 0.5 mg IM (< 20 kg)
  - 1.0 mg IM (> 20 kg)
- Reassess BGL after each intervention as necessary; titrate to effect

If BGL > 250 mg/dl NS bolus 10-20 mL/kg over 1 hour

## Pearls:

- 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.

## Heat Exhaustion

- Body temperature up to 104°F/40°C
- Minor CNS changes, weakness, dizziness, fainting
- Nausea, headache, dilated pupils, no appetite
- Skin clammy, pale and moist
- Muscle cramps/pain
- NS bolus 20 mL/kg IV/IO; maintain age appropriate SBP  $\geq 70 + (2 \times \text{age})$ ; max 60 mL/kg

## Heat Stroke

- Body temperature 104°F/40°C or greater
- Altered mental status or loss of consciousness
- Convulsions, seizures
- Tachycardia, hypotension
- Skin (hot, red, dry)
- Severe vomiting or diarrhea
- NS bolus 20 mL/kg IV/IO; maintain age appropriate SBP  $\geq 70 + (2 \times \text{age})$ ; max 60 mL/kg

- Consider Cardiac Monitor and attempt to obtain body temperature
- Remove patient from hot environment and remove clothing
- Begin active cooling of patient

Treat seizures per the *Pediatric Seizure* protocol

## Pearls:

- **Heat exhaustion can rapidly progress to heat stroke if untreated.**
- Heat stroke requires very aggressive cooling.
- Active cooling includes application of cold packs (not directly on skin), fanning, air conditioner or air movement.
- 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  $\leq 28$  days fluid bolus 10 mL/kg IV/IO.

- 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 warming measures
- Vascular access
- Cardiac Monitor
- Consider warm NS bolus 20 mL/kg IV/IO; maintain age appropriate SBP  $\geq 70 + (2 \times \text{age})$ , max 60 mL/kg

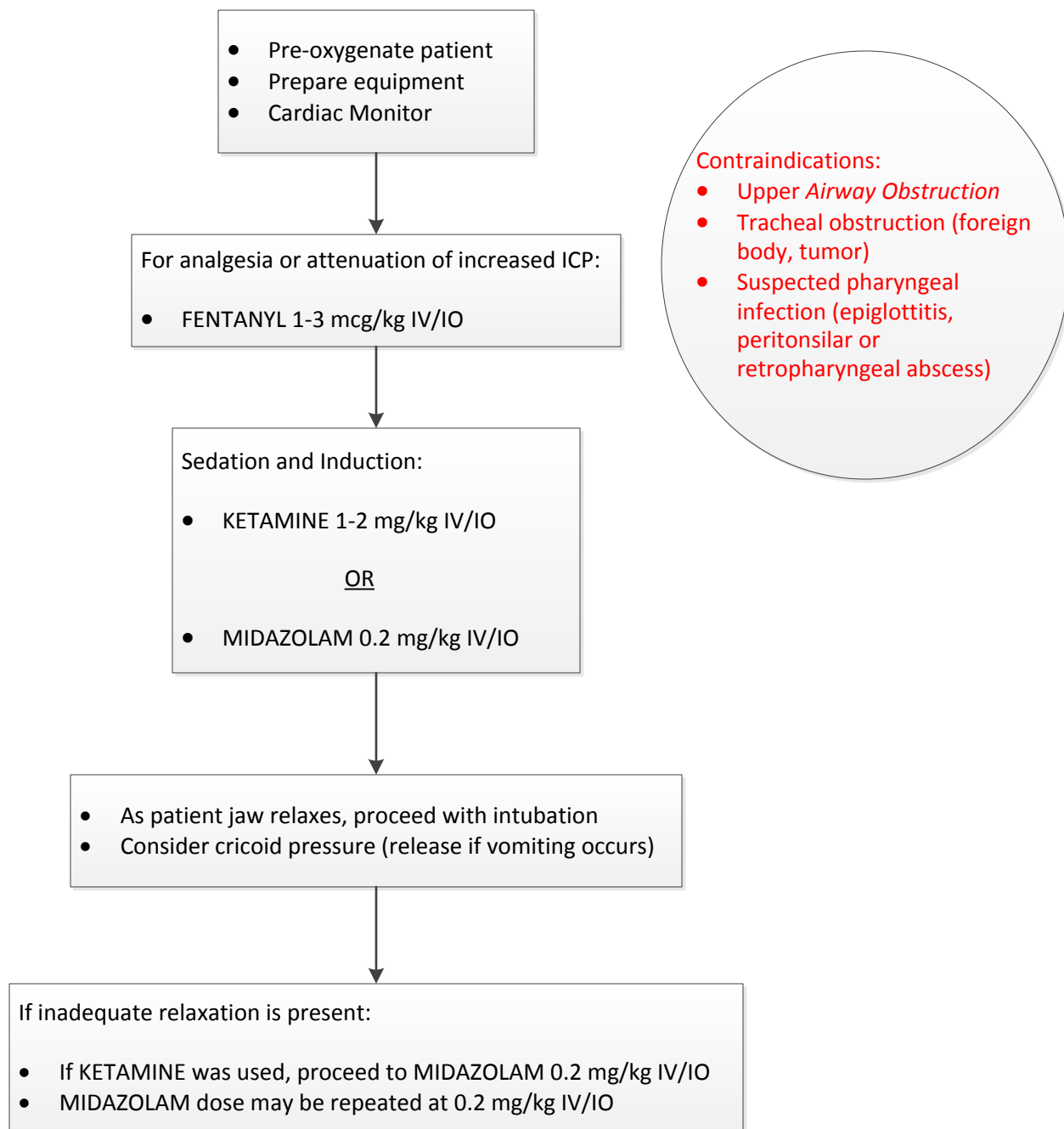
Transport all severely hypothermic patients regardless of response to treatments. Follow appropriate protocols for other treatment/transport decisions.

Patient with pulse	
Core Temperature	Treatment
93.2°F – 96.8°F	Passive re-warming and active external re-warming
86°F – 93.2°F	Passive re-warming and active external re-warming to trunk areas only

Patient without a pulse	
Start CPR, defibrillate once if indicated	
Core 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, repeat defibrillation for VF/VT/Torsades, passive re-warming and active external re-warming to trunk areas only

### Pearls:

- Extremes of age are more prone to cold emergencies.
- If temperature is unknown, treat the patient based on suspected temperature.
- For the severely hypothermic patient, perform procedures gently and monitor cardiac rhythm closely.
- Active warming includes hot packs that can be used on the armpit and groin; care should be taken not to place the packs directly on the skin.
- If available, core temperature is preferred.



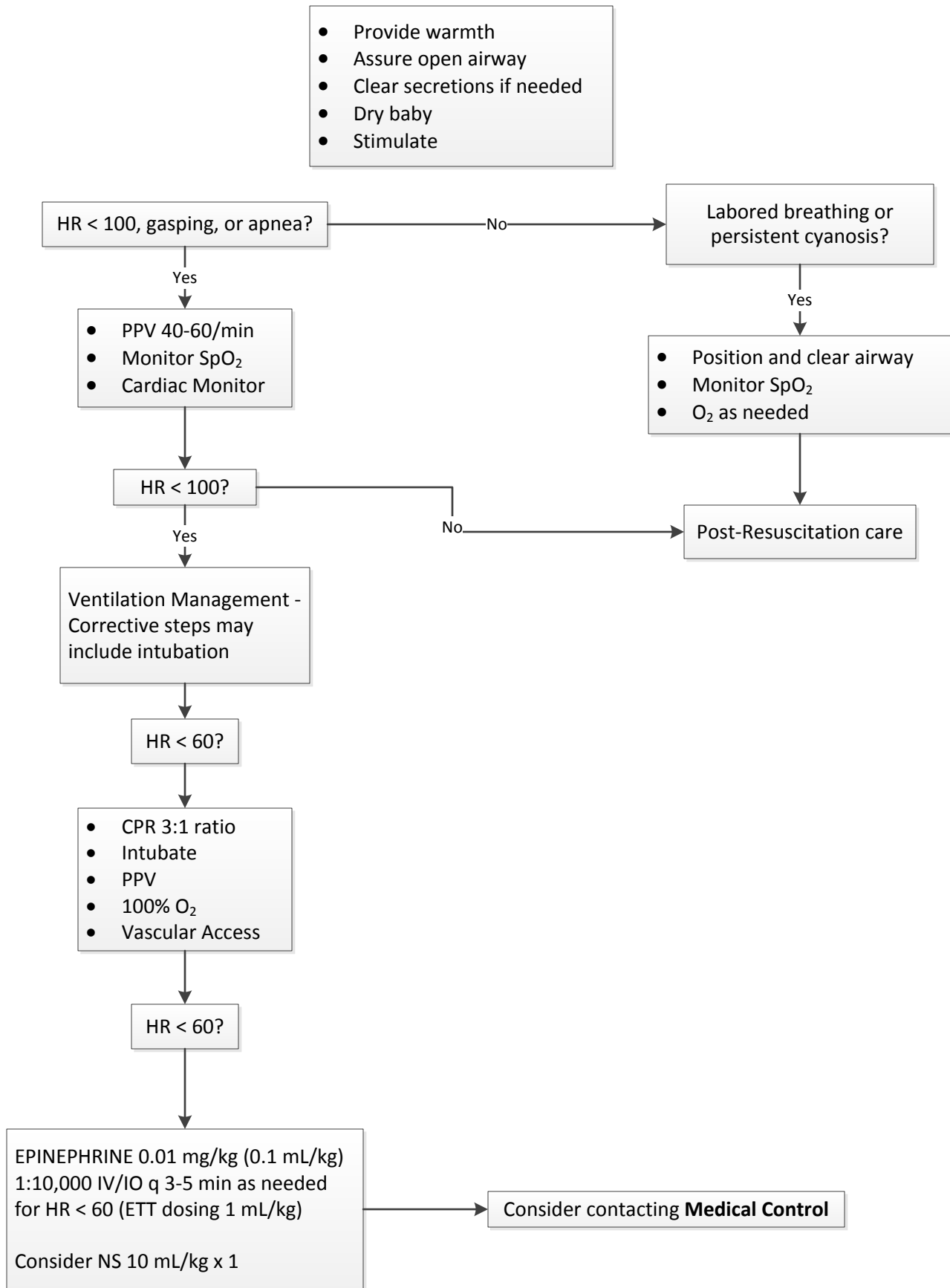
## Pearls:

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

- Consider Vascular Access
- NS 20 mL/kg IV; may repeat up to 60 mL/kg as needed
- Consider Cardiac Monitor



**ONDANSETRON**  
0.15 mg/kg IV/IO/IM up to max dose 4.0 mg; may repeat x 1 in 20 minutes





<b>APGAR</b>	<b>Score=0</b>	<b>Score=1</b>	<b>Score=2</b>
• <b><u>Activity/Muscle Tone</u></b>	Absent	Arms/legs flexed	Active Movement
• <b><u>Pulse</u></b>	Absent	Below 100	Above 100
• <b><u>Grimace/Reflex Irritability</u></b>	No response	Grimace	Sneeze, cough, pulls away
• <b><u>Appearance/Skin Color</u></b>	Blue-Grey, pale all over	Normal, except extremities	Normal over entire body
• <b><u>Respiration</u></b>	Absent	Slow, irregular	Good, crying

### Targeted pre-ductal SpO<sub>2</sub> after birth

1 minute	60% - 65%
2 minute	65% - 70%
3 minute	70% - 75%
4 minute	75% - 80%
5 minute	80% - 85%
10 minute	85% - 95%

### Pearls:

- Neonate considerations for infants  $\leq$  28 days (4 weeks).
- 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 (BG < 40).
- Document all times (delivery, contraction, duration, frequency).
- Record APGAR at one and five minutes after birth.
- Ideal placement of pulse oximetry is on the right hand for pre-ductal SpO<sub>2</sub>. See attached chart for target ranges.
- Pre-term newborns are susceptible to oxygen toxicity.
- Transport mother and infant together whenever possible.
- Maintaining temperature of newborn is essential.

Poison Control - (800) 222-1222 OR (775) 982-4129

- Determine cause of poisoning/overdose, treat as appropriate
- Cardiac Monitor

## Carbon monoxide (CO)

- Place patient on CO monitor, do not rely on pulse oximeter readings
- If patient's SpCO is:
  - 0 – 5 % - Considered normal for non-smokers. When > 3% with symptoms, consider high flow oxygen and recommend transport. If asymptomatic, no further medical evaluation necessary of SpCO. Counsel patients on signs and symptoms to watch, offer transport to ED, if refused complete AMA.
  - 5 – 10 % - Considered normal for smokers, abnormal for non-smokers. If symptoms are present, consider high flow oxygen and recommend transport to ED.
  - 10 – 15 % - Abnormal in any patient. Assess for symptoms, consider high flow oxygen and recommend transport to ED.
  - > 15 % - Significantly abnormal in any patient. Administer high flow oxygen and recommend transport to ED.
  - > 30 % - Consider transport/referral to hyperbaric facility (consider referral to hyperbaric facility if > 25% for patients with ALOC or pregnant).
- If patient has altered LOC, neurological impairment, or > 25% SpCO, treat with 100% O<sub>2</sub> and transport to nearest appropriate facility
- Continue supportive therapies as needed

## Opiates

NALOXONE 0.1 mg/kg IV/IO/IM/IN, max single dose 0.5 mg; may repeat to a max dose of 10 mg

## Tricyclic Anti-Depressants

- For patients with any of the following:
  - Dysrhythmias, or QRS of  $\geq$  120 ms
  - Hypotension
  - Seizure
  - Cardiac Arrest
- Administer SODIUM BICARBONATE 1.0 mEq/kg IV
- If patient is intubated, ventilate patient to maintain EtCO<sub>2</sub> level of 28-30 mmHg

## Organophosphate Poisoning (Insecticide)

ATROPINE 0.02 mg/kg IV/IO q 3-5 minutes as needed to decrease secretions and ventilator resistance; min single dose 0.1 mg

## Agents:

- Acetaminophen: Initially normal or N/V. Tachypnea and AMS may occur later. Renal dysfunction, liver failure and/or cerebral edema may manifest.
- Depressants: Decreased HR, BP, temp and RR.
- Anticholinergic: Increased HR, increased temperature, dilated pupils and AMS changes.
- Insecticides: May include S/S of organophosphate poisoning.
- Solvents: N/V, cough, AMS.
- Stimulants: Increased HR, BP, temperature, dilated pupils, seizures, and possible violence.
- TCA: Decreased mental status, dysrhythmias, seizures, hypotension, coma, death.
- **Beta Blocker Overdose:** call for possible administration of GLUCAGON.
- **Calcium channel blocker:** call for possible administration of CALCIUM CHLORIDE and/or GLUCAGON.

Poison Control - (800) 222-1222 OR (775) 982-4129

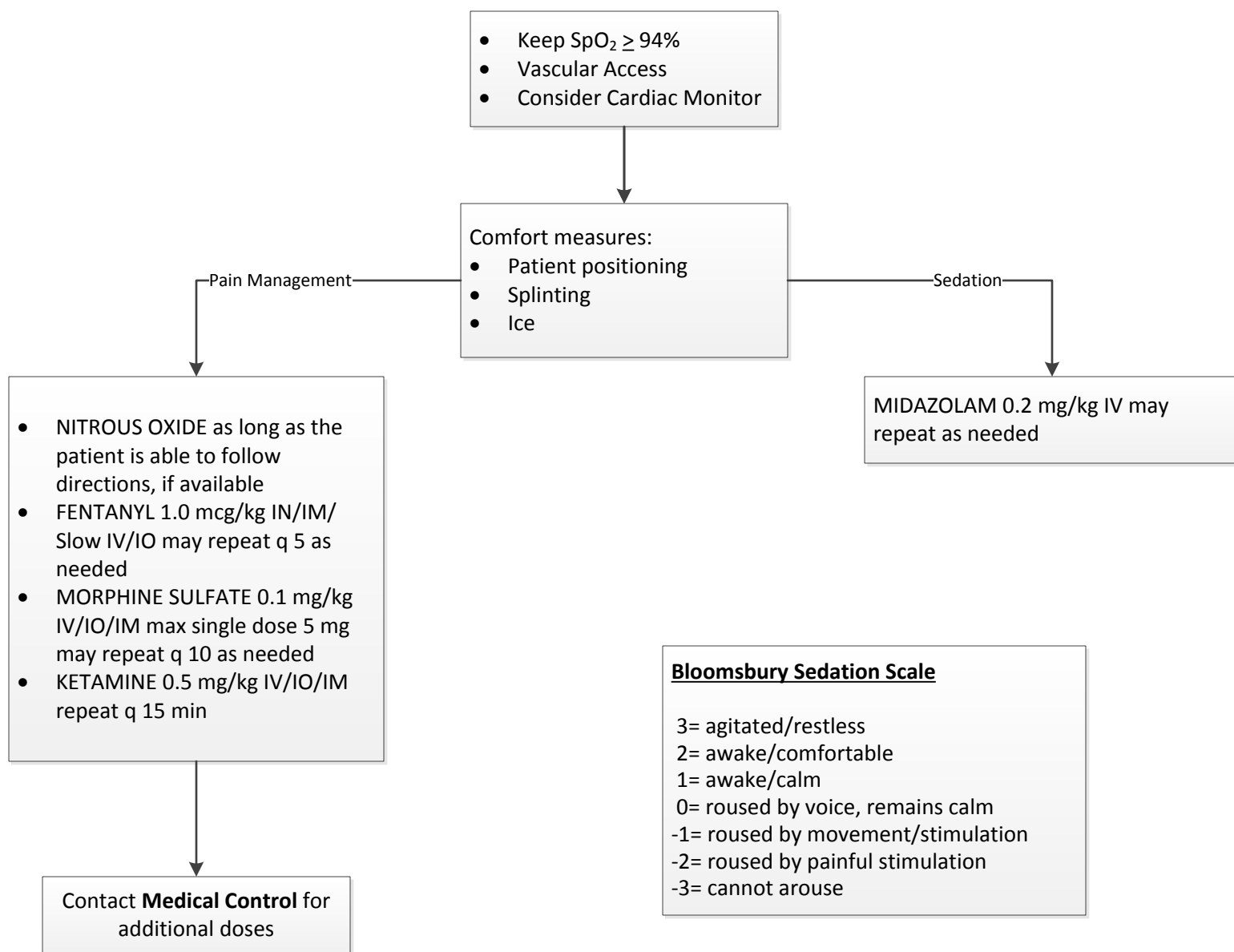
## Cyanide Exposure

For known cyanide poisoning in the absence of exposure to smoke, refer to the cyanide antidote parameters contained within the *Pediatric Smoke Inhalation* protocol

### **Pearls:**

- Powdered HYDROXOCOBALAMIN will be reconstituted with 200 cc 0.9% normal saline or lactated ringers. Then repeatedly invert for 60 seconds PRIOR TO administration. DO NOT SHAKE.
- If patient is suspected to have narcotic overdose/hypoglycemia, administer NARCAN/GLUCOSE prior to BIAD device/intubation.
- CALCIUM CHLORIDE is contraindicated in patients with suspected digitalis toxicity.
- Cyanide toxicity should be suspected for any patient being treated for Carbon Monoxide toxicity from smoke inhalation. Conscious patients with symptoms will require **Medical Control** prior to administration.
- Consider a second line if possible for administration and avoidance of possible medication incompatibilities.
- For suspected ingestion, consider NG tube placement.
- Overdose or toxin patients with significant ingestion/exposure should be closely monitored and aggressively treated. Do not hesitate to contact **Medical Control** if needed.
- In the case of cyanide poisoning, altered mental status may be profound. Profound altered mental status can be defined as a deficit that includes disorientation, bewilderment and difficulty following commands.

Assess and document patient's condition and vital signs before and after treatment (at minimum every 15 minutes). Pain should be assessed using a combination of physiologic indicators, including but not limited to, 1-10 pain scale, and Bloomsbury Sedation Scale.



## Pearls:

- Ophthalmic anesthetics may be used for ocular injuries, 1-2 drops, as needed.
- Consider prophylactic ONDANSETRON use when administering pain medication.
- Give pain management cautiously to patients who are bradycardic.
- Pain severity (1-10) is a vital sign to be recorded before and after medication administration and patient hand off.
- Monitor BP and respirations closely as sedative and pain control agents may cause hypotension and/or respiratory depression.
- Consider patient's age, weight, clinical condition, use of drugs/alcohol, exposure to opiates, when determining initial opiate dosing. Weight based dosing may provide a standard means of dosing calculation, but does not predict response.
- Exercise caution when administering opiates and benzodiazepines; this combination results in deeper sedation with significant risk of respiratory compromise.

- Cardiac monitor
- SpO<sub>2</sub> and EtCO<sub>2</sub> monitoring

## **Bronchospasm/Asthma/Reactive Airway Disease**

ALBUTEROL 2.5 mg in 3.0 mL via HHN until symptoms improve

Duoneb 2<sup>nd</sup> & 3<sup>rd</sup> HHN \*\* additional HHNs use ALBUTEROL

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

EPINEPHRINE 0.01 mg/kg 1:1,000 IM anterior thigh q 15 mins; MAX 0.3 mg

### **Impending Respiratory Failure:**

EPINEPHRINE 0.01 mg/kg of 1:10,000 q 3-5 mins IV/IO; MAX 1 mg

- ETT: 0.1 mg/kg 1:1,000 EPINEPHRINE q 3-5 mins

### **Status Asthmaticus**

MAGNESIUM SULFATE 25-50 mg/kg mixed in 100 mL NS IV infusion over 20 mins MAX 2 gm

## **Suspected Croup**

< 6 months 0.25 mL 2.25% RACEMIC EPINEPHRINE in 3 cc NS via HHN

OR

< 6 months 0.25 mg of EPINEPHRINE in 3 cc NS via HHN (may repeat x 1 in 20 minutes)

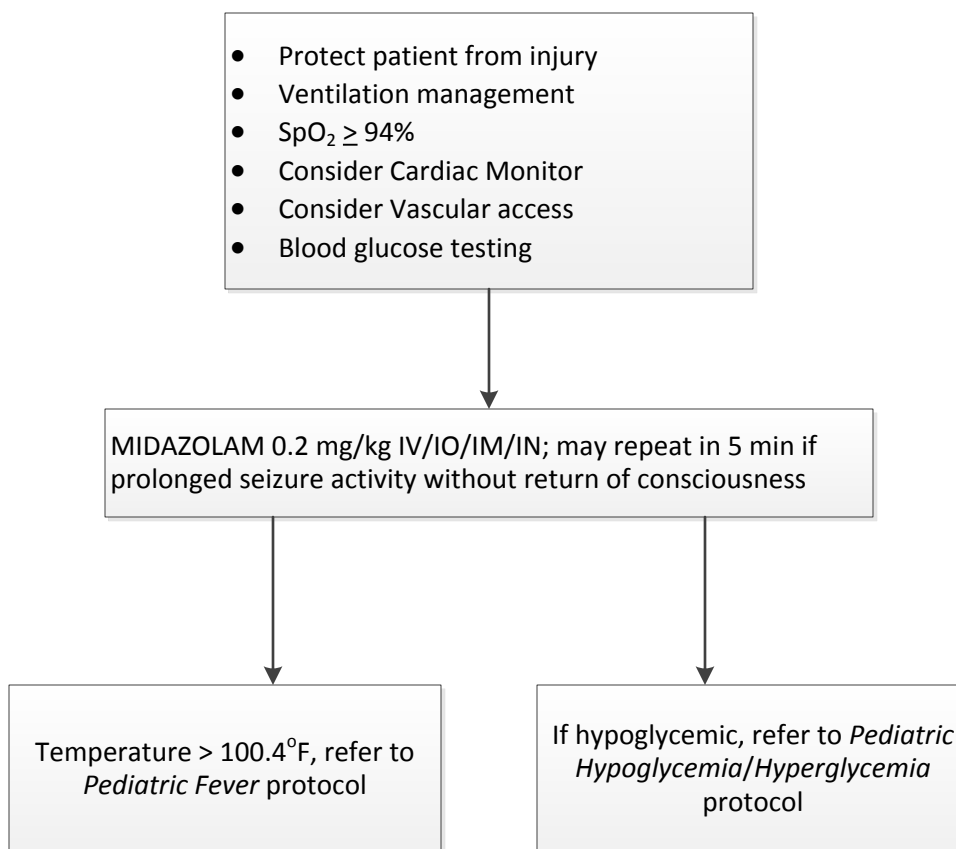
> 6 months 0.5 mL 2.25% RACEMIC EPINEPHRINE in 3 cc via HHN

OR

> 6 months 0.5 mg of EPINEPHRINE in 3 cc via HHN (may repeat x 1 in 20 minutes)

### **Pearls:**

- Duoneb equivalent can be achieved by combining 0.5 mg IPRATROPIUM in 2.5 mg ALBUTEROL.
- Be prepared to assist ventilations as needed.
- Pulse oximetry and end tidal continuous waveform capnography must be monitored.
- Allow the patient to assume a position of comfort.
- Respiratory distress secondary to drowning may require PEEP and/or nebulizer treatment.
- Croup may respond positively to cold environment and nebulized saline.



## Pearls:

- Benzodiazepines are well tolerated in pediatrics; do not delay IM/IN administration while initiating an IV.
- Status epilepticus is defined as two or more seizures successively without an intervening lucid period, or a seizure lasting over five minutes.
- Grand mal seizures (generalized) are associated with loss of consciousness, incontinence and 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.

Individuals may present with soot around nose and mouth after exposure to smoke from a structure fire or other sources (vehicle fire, industrial gases, confined spaces, etc.)

- Keep SpO<sub>2</sub> ≥ 94%
- Ventilation management
- Cardiac Monitor

- Vascular Access
- NS bolus 20 mL/kg up to 60 mL/kg for hypoperfusion

Other treatment protocols as indicated

If the patient presents with cardiac arrest, hypotension, altered mental status or other signs and symptoms consistent with Cyanide (CN) poisoning, administer:

HYDROXOCOBALAMIN 70 mg/kg IV over 15 minutes

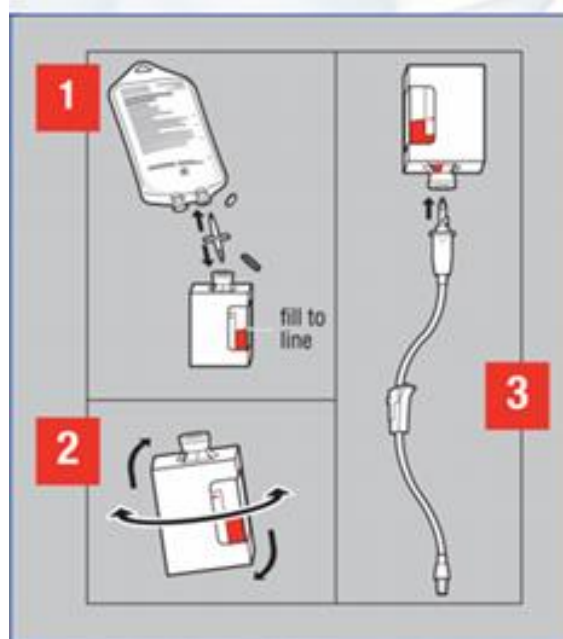
## Complete Starting Dose: 5 g

- 1 Reconstitute:** Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride injection\* to the vial using the transfer spike. **Fill to the line.**

\*0.9% Sodium Chloride injection is the recommended diluent (diluent not included in the kit). Lactated Ringers injection and 5% Dextrose injection have also been found to be compatible with hydroxocobalamin and may be used if 0.9% Sodium Chloride is not readily available

- 2 Mix:** The vial should be repeatedly inverted or rocked, not shaken, for at least **60 seconds** prior to infusion.
  - CYANOKIT solutions should be visually inspected for particulate matter and color prior to administration
    - Discard solution if particulate matter is present or solution is not dark red

- 3 Infuse Vial:** Use vented intravenous tubing, hang and infuse over **15 minutes.**



### Pearls:

- Signs and symptoms consistent with Cyanide (CN) poisoning include:
  - Weakness, dizziness, headache, stupor, dilated pupils, dyspnea
  - Tachypnea, tachycardia, nausea, vomiting, tightness in the chest
  - Altered LOC, cardiovascular collapse, combativeness, confusion
  - Plasma Lactate concentration ≥ 8 mmol/L
  - Late signs: Cardiac arrest, apnea, bradypnea, hypotension, seizures
- Low EtCO<sub>2</sub> can be indicative of an elevated serum lactate level (less than 25).
- If the medication is not available on scene do not delay transport waiting for it.
- Decide early on if you want to intubate as burned airways swell, making intubation difficult.

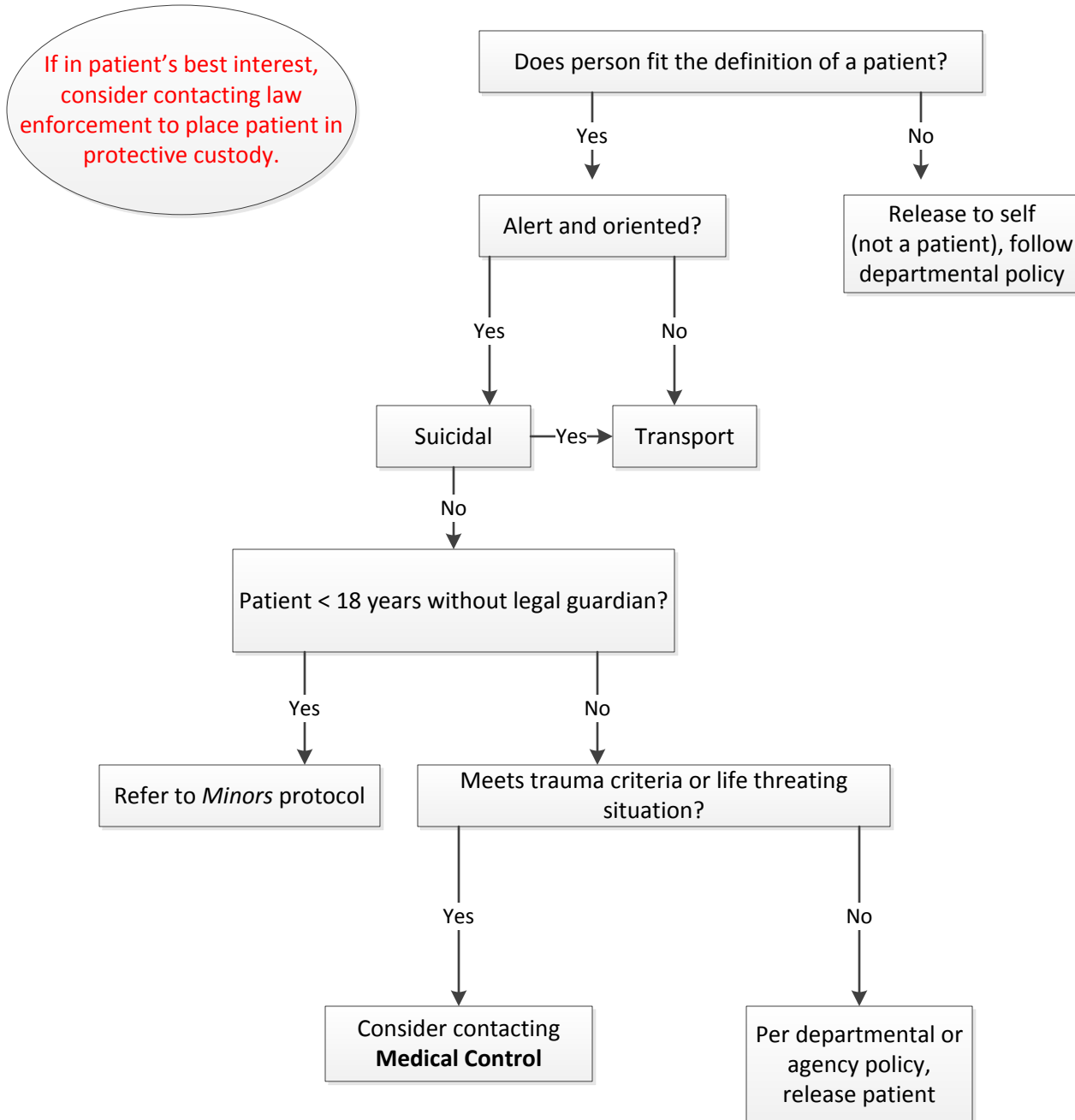
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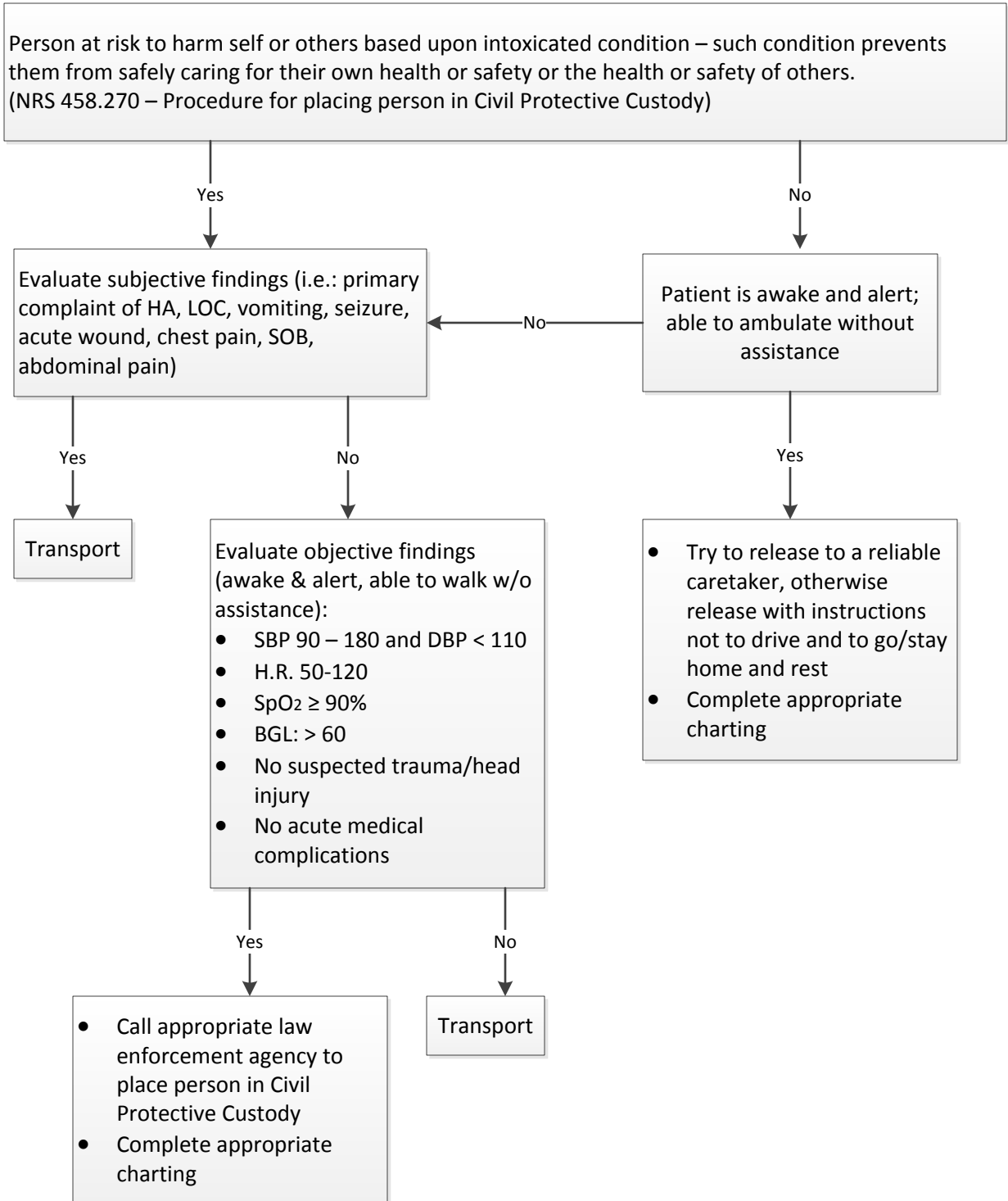


# **OPERATIONAL PROTOCOLS**

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This applies only to the patient who has capacity and is competent: Patient is stable and able to understand and reiterate to you the problem, risks, and consequences of refusal of care.





## **Contact Medical Control When:**

- EMS judgment suggests consultation with Medical Control Physician necessary
- EMS provider needs assistance in termination of resuscitation or requesting deviation from protocols
- Protocol requires base physicians contact for medication administration or other procedures
- Patient condition not addressed in protocols

## **Communication Failure:**

- Protocol becomes standing order if:
  - Medical Control cannot be contacted (radio/phone failure)
  - Medical Control physician does not answer after reasonable time
- In the event Medical Control cannot be contacted, care will be delivered in the best interest of the patient.
- Medical crew will follow agency specific guidelines for reporting and review

## **Document:**

- Report in accordance with agency policy
- Treatment requests/approved physician orders
- Time of contact and Medical Control physician's name

The final destination hospital has profound clinical, personal and financial implications for our patients. Hospitals in the Reno/Sparks area offer different specialty services and patients may be better served at specific facilities.

### Base Hospitals

- **Renown Regional Medical Center (RRMC)**
- **Saint Mary's Regional Medical Center (SMRMC)**
- **Northern Nevada Medical Center (NNMC)**
- **Renown South Meadows Medical Center (RSMMC)**
- **Reno Veteran's Administration (VA)** hospital is not a base hospital, but is an acceptable destination for patients who request it and are accepted prior to transport. Provide the RVA with patient's initials and last four ss#. Hospital will provide notification of acceptance or diversion.
- **Incline Village Community Hospital (IVCH)** is not a base hospital, but is an acceptable destination for patients who request it and are accepted prior to transport.
- Other out-of-area hospitals are acceptable destinations with certain restrictions (i.e. closest hospital to the scene, other appropriate facilities are not bypassed or the patient does not meet trauma criteria).

### Catchment Zone

Patients who do not have a hospital preference and originate in one of the defined catchment zones will be transported to the appropriate hospital within that zone. Exceptions include clinical findings, hospital diverts and MCIs. The catchment destinations apply to both ground and air units.

PATIENT DESTINATION TABLE								
	RRMC	SMRMC	NNMC	RSMMC	TFH	CTH	IVCH	BMH
Acute Coronary Syndrome (Non STEMI)	X	X	X	X	X	X		
STEMI	X	X	X			X		
Possible Stroke	X	X	X					
Pediatric Airway	X							
Obstetric Emergency	X	X			X	X		X
Neonate	X	X						
State Trauma Criteria	X							
Sexual Assault	X	X	X	X	X	X	X	X

## BURN CENTER

- Second and/or third degree burns > 20% body surface area (BSA).
- Second and/or third 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 injury.
- Chemical burns.
- Circumferential burns.
- Inhalation injury.

**If the patient meets the criteria AND the burns are not complicated by major trauma, initiate air ambulance response.**

## TRANSPORT REQUIREMENTS

### **NAC 450B.774 Procedure when patient refuses transportation to center for treatment of trauma.**

1. If a patient at the scene of an injury refuses to be transported to a center for the treatment of trauma after a determination has been made that the patient's physical condition meets the triage criteria requiring transport to the center, the person providing emergency medical care shall evaluate the mental condition of the patient. If the person determines that the patient is competent, the patient must be advised of the risks of not receiving further treatment at the center.
2. If the patient continues to refuse to be transported to the center for the treatment of trauma, the person providing emergency medical care shall request the patient to sign a statement indicating that the patient has been advised of the risks of not receiving further treatment at the center and continues to refuse to be transported to the center.
3. The person providing emergency medical care shall inform a physician at the location to which the person intends to transport the patient of the patient's refusal to be transported before the person leaves the scene of the injury.

**Hospital Diversion** – Occasionally, facilities may declare divert status for select patients. (Any facility accredited to care for STEMI or Stroke patients, cannot divert those patients, except in the case of an internal disaster.) Document the reason for the diversion and take the patient to the patient's second choice or the closest base hospital. Diversion decisions are typically made without medical control contact.

- **Closed** – The hospital has not capacity/resources to accept any ambulance patient.
- **Critical Care** – The hospital has not capacity/resources to accept ambulance patients who have a high probability of requiring ICU admission; ambulance patients who present in the field as high risk for potential or actual life-threatening health problems. Typically, this refers to patients who demonstrate signs and symptoms of Hemodynamic instability; acute respiratory failure; acute MI or severe CP; complete loss of consciousness or other presentations indicative of the need for critical care nursing or ICU admission. Paramedics/RNs are encouraged to contact the ED Base Station physician directly to clarify questions about any potential transport.
- **ED Capacity** – The ED is over-capacity with long treatment delays in triage that could potentially jeopardize the appropriate placement of incoming ambulance patients. Treat the same as a closed divert.
- **Transport Bypass** – The ED is unable to accept ambulance patients in a timely manner. Treat the same as a closed divert.
- **Internal Hospital Disaster** – The hospital has an in-house emergency such as a fire, electrical outage, hazmat or a major malfunction of critical equipment that may preclude the provision of save effective care in the emergency department.

**Patient/Family Choice** – Patient/family choice should dictate hospital destination unless the patient is excluded due to clinical conditions defined below, or hospital choice is on divert status.

**Trauma (Special Resources)** – Patients who meet State Trauma Criteria shall be transported to the closest Level 1 or 2 trauma center. In most cases, this is RPMC. If the patient (who is deemed competent) meets trauma criteria, but requests another hospital, the provider should appropriately explain the rationale for transport to the trauma center. If the patient still requests another destination, contact medical control at the closest trauma center and obtain physician approval for diversion. By air, patients less than 14 years of age who meet trauma criteria will be transported, when appropriate, to RPMC or U.C. Davis (whichever is closest).

**Nearest facility** – If a patient and/or family has no hospital preference, the transport shall be to the designated hospital in the catchment area. If outside the catchment zone, the closest hospital by time.

**OB (Special Resources)** – Within Washoe County, only RPMC and SMPMC have obstetrical services. Obstetrical patients greater than 20 weeks gestation with complaints related to their pregnancy should not be transported to NNMC or RSMPC.

**Neurological Disease/Possible Stroke (Special Resources)** – Patients with stroke symptoms, with duration of symptoms less than eight hours will be transported to a Primary Stroke Center. With the exception of divert status for an internal hospital disaster; patients that meet stroke criteria cannot be diverted. Outside the Reno/Sparks area, the patient will be transported to the closest hospital. If the patient, family, or patient's physician request another hospital, the patient will be taken to the requested hospital.

**Pediatrics (Special Resources)** – Pediatric patients 12 years of age or younger are to be taken to Renown Regional Medical Center if they present with a need for intubation, assisted ventilation, or critical care. (Respiratory arrest goes to closest emergency department).

**Neonatal (Special Resources)** – Any patient 28 days of age or younger that presents with a need for intubation or bag-valve-mask ventilation will be taken to a hospital with a neonatal intensive care unit. Any patient born in the field will be taken to a hospital with a labor and delivery department. In both cases, these facilities are RPMC or SMPMC.

**Other** – Other acceptable reasons for destination selection are physician/facility request during an inter-facility transfer, transporting with/for another agency, such as fixed wing transfers, etc.

**Sexual Assault** – Victims of sexual assault who do not meet trauma triage guidelines will be transported to the closest hospital or the hospital of their choice if a medical assessment for injuries is requested. The police will be notified by the hospital for subsequent transport to the SART center upon completion of the medical evaluation and treatment.

**Exceptions (Nearest facility)** – Patients in cardiac arrest or who are in impending arrest, have an airway obstruction, uncontrolled hemorrhage, imminent delivery, or any condition that may be jeopardized by a longer transport are to be taken to the closest emergency department.

**Acute Coronary Syndrome (Special Resources)** – Any patient who meets the following criteria is taken to a hospital with interventional cardiology capabilities (RPMC, SMPMC, NNMC):

- 12 lead ECG shows evidence of an active STEMI AND/OR
- History of angioplasty, stent placement, or coronary artery bypass graft AND symptoms suggesting acute coronary syndrome. With the exception of divert status for an internal hospital disaster; patients that meet STEMI criteria cannot be diverted.
- Patients with chest pain and non-STEMI symptoms of acute coronary syndrome may be transported to any facility.

**MCI** – All hospital destinations during a declared MCI are coordinated and assigned by Medical Dispatch Facility.



**Notes:**

- Divert status (except for internal hospital disaster) does not apply in cases of airway obstruction, severe shock, cardiac arrest, uncontrolled hemorrhage, imminent delivery or any patient that may be jeopardized by the diversion.
- It also does not apply to patients meeting pediatric and trauma criteria or in the case of an MCI.
- If patient is en route to a facility and the facility goes on divert, make an appropriate attempt to reroute the patient to the closest ED that is not experiencing diversion. Should that not be possible, due to the patient's condition or other circumstance, the patient in transport will not be rerouted and will proceed to the specific ED that was originally identified.
- If a patient demands transport to a hospital on diversion, or if the patient is refusing transport if they will not be taken to their hospital of choice because of the diversion, the patient will be taken to their hospital of choice. Make every effort to inform the patient of the need to go to a hospital not on divert and document the conversation.

**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

Do not resuscitate

**Pearls:**

- DNR/POLST is **INVALID** if patient indicates they wish to receive life-resuscitating 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 a DNR/POLST form 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**.

A Patient Care Record (PCR) will be completed for each incident/patient encounter, in accordance with current agency Policy.

**Per the Nevada Administrative Code 450B.180 "Patient" means:**

Any person who is sick, injured, wounded, or otherwise incapacitated or helpless and who is carried in an ambulance or air ambulance or is cared for by an emergency medical dispatcher, emergency medical responder, emergency medical technician, advanced emergency medical technician, paramedic or registered nurse.

When providing patient care activities prior to the arrival of the transporting agency, upon the transporting agencies arrival and when prepared to transfer patient care, EMS providers shall provide a verbal report. The verbal report should reflect the patient's status, the treatments that have been accomplished and the potential treatment plan, if necessary. This transfer of care shall be documented in the Patient Care Report (PCR).

**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 of older person; voluntary and mandatory reports; investigation; penalty.

### **Child Report (under 18)**

- Contact appropriate Law Enforcement agency if immediate patient protection is needed
- Washoe County Child Protective Services: 775-785-8600
- Complete appropriate agency reporting form

### **Elder Report (over 59)**

- Contact appropriate Law Enforcement agency if immediate patient protection is needed
- Nevada Health and Human Services Aging and Disability Services: (888) 729-0571
- Complete appropriate agency reporting form

For persons over the age of 17 whose present socioeconomic conditions could benefit from additional resources, but do not require mandatory reporting, refer to regional resources guide.

### **Pearl:**

- If there is a high index of suspicion, report to the appropriate agency and allow them to do the investigation.

- Ambulance attendants should be aware that whenever a patient is to be transferred from one medical facility to another by EMS, the transferring physician is responsible for notifying, in advance, the receiving physician of the following:
  - Reason for transfer
  - Patient condition
  - Estimated time of arrival
- Attendant should expect that the transferring physician will provide to them the name of the receiving facility and receiving physician, a copy of any available diagnostic tests, x-rays and patient medical records prior to releasing the patient.
- Ambulance attendants should only transfer a patient whose therapy required during the transfer lies within the ambulance attendant's scope, or that the appropriate personnel (registered nurse, respiratory therapist, etc.) accompanies the patient.
- Ambulance attendants are authorized to administer or monitor all medications listed on the approved medication list as appropriate for their level of licensure and as per protocol.
- ILS and ALS ambulance attendants are authorized to administer or monitor any crystalloid IV solution during the transport.
- Arterial lines should be discontinued prior to transport unless appropriate personnel from the initiating facility accompany the patient.
- Heparin lock/implantable catheters with/without reservoirs may be closed off and left in place. If they are to be used during transport, then an IV infusion should be established.
- Orogastric or nasogastric tubes may be left in place and should either be closed off or left to suction per order of transferring physician.
- Orthopedic devices may be left in place at the ambulance attendant's discretion as to ability to properly transport the patient with existing devices(s) in place.
- Trained personnel authorized operate the apparatus should accompany any patient requiring mechanical ventilation during transport. If the patient will require manual ventilatory assistance, at least two persons shall be available to attend to the patient.
- Transport of patient with IV antibiotic:
  - Obtain and document name of antibiotic
  - Obtain and document dose and rate of administration
  - If unfamiliar with antibiotic, ask about any specific side effects
  - Monitor medication to ensure proper administration rate during transport
  - Monitor patient for signs and symptoms of any side effect and/or allergic reactions such as nausea/vomiting, diarrhea, changes in LOC, rashes, swelling, SOB, or changes in BP. If any changes noticed; discontinue IV, initiate appropriate treatment, document changes, and inform staff at receiving facility.

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 an 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 is a resident of the county (NRS 129.080) that petitioned the juvenile court of that county 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-emancipated 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 the patient be taken into temporary custody in order that treatment or transport can be instituted
- Contact base hospital and apprise them of the situation

Once a physician has identified him/herself as such on scene, than 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 for care 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 physician's 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 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 case of the patient, use agency specific procedures for reporting.

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# **MEDICATIONS**

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# Adult Medications

The following are the authorized medications used by EMS providers in Washoe County. Licensed EMS providers working under the agency permit are authorized, within their level of certification and training, to administer medications as directed by the written treatment protocols.

It is important to note that some dosages and processes vary on an agency basis. It is imperative that each EMS provider is aware of their agency's internal procedures.

Medication	Indication/Protocol	Dose/Route
<b>Adenosine</b>	A) Cardiac - Narrow Complex Tachycardia	A) 6 mg rapid IVP followed by 20 mL flush, repeat 12 mg x 2 PRN
<b>Albuterol</b>	A) Respiratory Distress /Asthma/COPD/Reactive Airway Disease B) Allergic Reaction/Anaphylaxis C) Hyperkalemia	A) 2.5 mg/3 cc Nebulized repeat PRN B) 2.5 mg/3 cc Nebulized repeat PRN C) 2.5 mg/3 cc Nebulized repeat PRN
<b>Amiodarone</b>	A) Cardiac – Arrest (pVT, VF) B) Cardiac - Wide Complex Tachycardia	A) 300 mg IV/IO, may repeat 150 mg for sustained VT/VF in 3-5 min B) 150 mg IV/IO over 10 min
<b>Aspirin</b>	A) Acute Coronary Syndrome (Suspected)	A) 324 mg PO
<b>Atropine Sulfate</b>	A) Cardiac - Bradycardia B) Overdose/Poisoning (Organophosphate Poisoning)	A) 0.5 mg IVP, may repeat q 3-5 min to max 3 mg B) 1-2 mg q 3-5 mins until secretions cease
<b>Calcium Chloride</b>	A) Hyperkalemia B) Overdose/Poisoning (Calcium Channel Blocker OD **Call for order**)	A) 5-10 mL 10% slow IV/IO over 5 min B) 250-500 mg slow IV/IO
<b>Dextrose</b>	A) Hypoglycemia	A) 12.5-25 gm D50% IV/IO, reassess/repeat PRN AND/OR 100 mL D10% IV/IO, reassess/repeat PRN
<b>Diltiazem</b>	A) Cardiac - Narrow Complex Tachycardia **Call for order**	A) 15-20 mg IV/IO over 5 min; after 15 min, if not resolved, 20-25 mg over 5 min Maintenance infusion 5-15 mg/hr titrated to heart rate
<b>Diphenhydramine</b>	A) Allergic Reaction/ Anaphylaxis/Dystonia	A) 25-50 mg IV/IM
<b>Dopamine Hydrochloride</b>	A) Shock - Cardiogenic B) Cardiac - Bradycardia C) Cardiac - Post Arrest Care	A) 5-20 mcg/kg/min IV/IO infusion B) 2-10 mcg/kg/min IV C) 5-10 mcg/kg/min IV, max dose 20 mcg/kg/min
<b>Duoneb</b>	A) Respiratory Distress	A) 0.5 mg IPRATROPIUM in 2.5 mg ALBUTEROL 2 <sup>nd</sup> and 3 <sup>rd</sup> HHN

Medication	Indication/Protocol	Dose/Route
<b>Epinephrine</b>	<p>A) Cardiac - Arrest (VF, pVT, TdP, Asystole)</p> <p>B) Allergic Reaction/ Anaphylaxis</p> <p>C) Respiratory Distress</p>	<p>A) 1 mg 1:10,000 IV/IO q 3-5 mins; ETT 2.5 mg 1:1,000</p> <p>B) <b>Moderate Allergic Reaction:</b> 0.3 mg 1:1,000 IM <b>Severe Allergic Reaction:</b> 0.1 mg 1:10,000 IV repeat x 3 followed by 100 mL NS.</p> <p>C) 0.3-0.5 mg 1:1,000 IM; 0.1 mg IV 1:10,000 repeat as needed, max 0.3 mg</p>
<b>Epinephrine Infusion</b>	<p>A) Cardiac - Bradycardia</p> <p>B) Cardiac - Post Arrest Care</p> <p>C) Sepsis</p> <p>D) Shock - Cardiogenic</p>	<p>A) 2-10 mcg/min IV/IO infusion</p> <p>B) 2-10 mcg/min IV/IO infusion</p> <p>C) 2-10 mcg/min IV/IO infusion</p> <p>D) 2-10 mcg/min IV/IO infusion</p>
<b>Etomidate</b>	<p>A) Sedation</p> <p>B) Medication Assisted Intubation</p>	<p>A) 0.15 mg/kg IV/IO may repeat once if inadequate sedation</p> <p>B) 0.3 mg/kg IV/IO may repeat once if inadequate relaxation</p>
<b>Fentanyl</b>	<p>A) Pain Management</p> <p>B) Medication Assisted Intubation</p>	<p>A) 1-3 mcg/kg IV/IO/IN, may repeat q 5 min</p> <p>B) 1-3 mcg/kg IV/IO</p>
<b>Furosemide</b>	<p>A) Pulmonary Edema</p>	<p>A) 40 mg IV or double home dose up to 80 mg IV</p>
<b>Glucagon</b>	<p>A) Hypoglycemia</p> <p>B) Overdose/Poisoning (Beta Blocker Overdose **Call for order**)</p>	<p>A) 1 mg IM</p> <p>B) 3-5 mg IV/IO</p>
<b>Haloperidol</b>	<p>A) Behavioral Emergency</p>	<p>A) 5-10 mg IV/IM q 5-10 mins, max 15 mg</p>
<b>Hydrocortisone Sodium Succinate</b>	<p>A) Acute Adrenal Crisis</p>	<p>A) 100 mg IV/IO/IM</p>
<b>Hydroxocobalamin (Cyanokit)</b>	<p>A) Smoke Inhalation (Suspected Cyanide Poisoning)</p>	<p>A) 5 gm IV over 15 minutes</p>
<b>Ipratropium Bromide</b>	<p>A) Respiratory Distress</p>	<p>A) 0.5 mg/2.5 mL 2<sup>nd</sup> and 3<sup>rd</sup> HHN</p>
<b>Ketamine</b>	<p>A) Behavioral Emergency</p> <p>B) Sedation</p> <p>C) Pain Management</p> <p>D) Medication Assisted Intubation</p>	<p>A) 4 mg/kg IM or 1-2 mg/kg IV</p> <p>B) 1-2 mg/kg IV/IO may repeat q 5-10 min as needed 4 mg/kg IM may repeat q 10 min as needed</p> <p>C) 0.5-1 mg/kg IV/IO/IM/IN may repeat q 5-10 min as needed</p> <p>D) 1-2 mg/kg IV/IO</p>

Medication	Indication/Protocol	Dose/Route
Lidocaine	<p>A) Cardiac – Arrest (pVT, VF) <b>*Routine use of Lidocaine not recommended*</b></p> <p>B) Cardiac – Wide Complex Tachycardia</p>	<p>A) 1-1.5 mg/kg IV/IO, followed by 0.5-0.75 mg/kg IV/IO q 5 min to 3 mg/kg max If patient converts, Lidocaine Infusion 2-4 mg/min IV/IO; ETT 3 mg/kg, repeat once.</p> <p>B) 1-1.5 mg/kg IV/IO slow push; maintenance infusion 2-4 mg/min</p>
Magnesium Sulfate	<p>A) Cardiac - Torsades de Pointes</p> <p>B) Respiratory Distress</p> <p>C) Seizure (Suspected Eclamptic Seizure)</p>	<p>A) 2 gm IV/IO over 5 mins</p> <p>B) 2 gm IV over 20 mins</p> <p>C) 4 gm IV/IO over 20 mins</p>
Methylprednisolone	A) Acute Adrenal Crisis	A) 125 mg IV/IO/IM
Metoprolol	A) Acute Coronary Syndrome (STEMI patient with SBP > 140 & HR > 100 **Call for order**)	A) 5 mg slow IV push
Midazolam (Versed)	<p>A) Behavioral Emergency</p> <p>B) Sedation (Cardioversion, Pacing, Post-Intubation, Anxiety)</p> <p>C) Seizures</p> <p>D) Medication Assisted Intubation</p> <p>E) Hypothermia Post ROSC</p>	<p>A) 2-5 mg slow IV/IO/IM/IN q 5 minutes, titrated to effect, max dose 10 mg</p> <p>B) 0.5 mg-5 mg IV/IO/IM/IN</p> <p>C) 2-5 mg IV/IO/IM/IN q 5 min, max total dose 10 mg</p> <p>D) 2-5 mg IV/IO may repeat with 2-5mg IV/IO if inadequate relaxation</p> <p>E) 2-5 mg IV/IO; titrate to effect</p>
Morphine Sulfate	<p>A) Pain Management</p> <p>B) Pulmonary Edema</p>	<p>A) 2-5 mg IV/IO q 10 mins</p> <p>B) 2-5 mg IV q 10 minutes</p>
Naloxone (Narcan)	A) Poisoning/Overdose	A) 0.5 mg-2 mg IV/IO/IM/IN may repeat to max total dose of 10 mg
Nitroglycerin	<p>A) Acute Coronary Syndrome</p> <p>B) Pulmonary Edema</p>	<p>A) If SBP &gt; 100: 0.4 mg SL, may repeat q 5 min until pain free, consider 1 inch NTG paste if transport time &gt; 15 mins</p> <p>B) If systolic BP: &gt; 100, 0.4 mg SL q 5 min ≥ 160, 0.8 mg SL q 5 min If diastolic BP &gt; 100: 1.6 mg SL 1 inch NTG paste if SBP ≥ 100</p>
Ondansetron (Zofran)	A) Nausea/Vomiting	A) 4 mg IV/IO/IM, may repeat once
Oxytocin	A) Childbirth - Uncontrolled Postpartum Hemorrhage	A) 20 units in 1000 mL NS, give 10 units (500 mL) over 10-20 minutes, then 2.5 units (125 mL) per hour

Medication	Indication/Protocol	Dose/Route
<b>Promethazine (Phenergan)</b>	<b>A)</b> Nausea/Vomiting	<b>A)</b> 12.5 mg IV/deep IM, may repeat x 1 in 15 mins  Geriatrics: 6.25 mg IV/deep IM x 1, no repeat  Dilute IV doses in 10 mL NS
<b>Sodium Bicarbonate</b>	<b>A)</b> Crush Injury (Rhabdomyolysis Prevention) <b>B)</b> Hyperkalemia (Suspected) <b>C)</b> Overdose/Poisoning (Tricyclic Antidepressant Overdose)	<b>A)</b> 1 mEq/kg in 1000 mL NS wide open <b>B)</b> 1 mEq/kg infusion over 5 mins <b>C)</b> 1 mEq/kg slow IV push
<b>Tetracaine</b>	<b>A)</b> Ocular Injury	<b>A)</b> 1-2 drops per eye, repeat PRN
<b>Thiamine</b>	<b>A)</b> Hypoglycemia with chronic alcoholism/malnutrition	<b>A)</b> 100 mg slow IV/IM

# Pediatric Medications

The following are the authorized medications used for pediatric patients by EMS providers in Washoe County. Licensed EMS providers working under the agency permit are authorized, within their level of certification and training, to administer medications as directed by the written treatment protocols.

It is important to note that some dosages and processes vary on an agency basis. It is imperative that each EMS provider is aware of their agency's internal procedures.

Medication	Indication/Protocol	Dose/Route
<b>Acetaminophen</b>	A) Pediatric Fever	A) 15 mg/kg PR/PO
<b>Adenosine</b>	A) Cardiac - Narrow Complex Tachycardia	A) 0.1 mg/kg rapid IVP followed by 10 cc flush, repeat 0.2 mg/kg x 2 PRN
<b>Albuterol</b>	A) Allergy/Anaphylaxis B) Respiratory Distress/Asthma	A) 2.5 mg in 3 cc Nebulized repeat PRN B) 2.5 mg in 3 cc Nebulized repeat PRN
<b>Amiodarone</b>	A) Cardiac – Arrest (pVT, VF) B) Cardiac - Wide Complex Tachycardia	A) 5 mg/kg IV/IO, repeat twice for sustained VT/VF; max 15 mg/kg B) 5 mg/kg IV/IO over 20 mins
<b>Atropine Sulfate</b>	A) Cardiac - Bradycardia B) Overdose/Poisoning (Organophosphate Poisoning)	A) 0.02 mg/kg IV/IO q 5 mins, min single dose 0.1 mg, max single dose 0.5 mg, ETT 0.04 mg/kg B) 0.02 mg/kg IV/IO q 3-5 mins until cessation of secretions
<b>Calcium Chloride</b>	A) Overdose/Poisoning (Calcium Channel Blocker OD **Call for order**)	A) 20 mg/kg slow IV/IO
<b>Dextrose</b>	A) Hypoglycemia	A) < 28 days: D10 2 mL/kg IV/IO/UV ≥ 1 month: D25 2 mL/kg IV/IO Max single dose 25 gm
<b>Diphenhydramine</b>	A) Allergy/Anaphylaxis	A) 1 mg/kg IV/IO/IM max 25 mg
<b>Duoneb</b>	A) Respiratory Distress	A) 0.5 mg IPRATROPIUM in 2.5 mg ALBUTEROL 2 <sup>nd</sup> and 3 <sup>rd</sup> HHN

Medication	Indication/Protocol	Dose/Route
Epinephrine	<p>A) Cardiac - Bradycardia</p> <p>B) Cardiac - Arrest (VF, pVT, TdP, Asystole)</p> <p>C) Allergy/Anaphylaxis</p> <p>D) Respiratory Distress/Asthma</p> <p>E) Neonatal Resuscitation</p>	<p>A) 0.01 mg/kg IV/IO q 3-5 mins, max 1 mg ETT 1:1000 0.1 mg/kg</p> <p>B) 0.01 mg/kg IV/IO, 0.1mg/kg ETT q 3-5 mins</p> <p>C) <u>Moderate Allergic Reaction:</u> 0.01 mg/kg 1:1,000 IM, max 0.3 mg <u>Severe Allergic Reaction:</u> 0.01 mg/kg 1:10,000 IV/IO followed by 20 mL/kg NS, repeat PRN</p> <p>D) <u>Moderate:</u> 0.01 mg/kg 1:1,000 IM q 15 mins, max 0.3 mg <u>Impending Respiratory Failure:</u> 0.01 mg/kg 1:10,000 IV/IO, 1 mg max <u>Suspected Croup:</u> &lt; 6 months 0.25 mg in 3 cc NS via HHN &gt; 6 months 0.5 mg in 3 cc via HHN</p> <p>E) 0.01 mg/kg 1:10,000 IV/IO q 3-5 min as needed</p>
Fentanyl	<p>A) Pain Management</p> <p>B) Medication Assisted Intubation</p>	<p>A) 1 mcg/kg IV/IO/IM/IN, may repeat q 5-10 mins</p> <p>B) 1-3 mcg/kg IV/IO</p>
Glucagon	A) Hypoglycemia	<p>A) &lt; 20 kg: 0.5 mg IM &gt; 20 kg: 1 mg IM</p>
Hydrocortisone Sodium Succinate	A) Acute Adrenal Crisis	A) 1-2 mg/kg IV/IO
Hydroxocobalamin (Cyanokit)	A) Smoke Inhalation (Suspected Cyanide Poisoning)	A) 70 mg/kg IV over 15 mins
Ketamine	<p>A) Medication Assisted Intubation</p> <p>B) Pediatric Pain Management</p>	<p>A) 1-2 mg/kg IV/IO</p> <p>B) 0.5 mg/kg IV/IO/IM q 15 min</p>
Lidocaine	<p>A) Cardiac – Arrest (pVT, VF)</p> <p><b>*Routine use of Lidocaine not recommended*</b></p>	A) 1.0 mg/kg IV/IO (max 3 mg/kg); 2.5 mg/kg ETT, may repeat x 1. If patient converts after administration, infusion 20-50 mcg/kg/min
Magnesium Sulfate	<p>A) Cardiac – Wide Complex Tachycardia (Torsades de Pointes)</p> <p>B) Respiratory Distress</p>	<p>A) 25-50 mg/kg IV max 2 g over 20 minutes</p> <p>B) 25-50 mg/kg in 100 mL NS IV infusion over 20 minutes, max 2 gm</p>
Methylprednisolone	A) Acute Adrenal Crisis	A) 0.5-1 mg/kg IV/IO
Midazolam (Versed)	<p>A) Sedation</p> <p>B) Seizure</p> <p>C) Medication Assisted Intubation</p> <p>D) Cardiac - Wide Complex Tachycardia</p>	<p>A) 0.2 mg/kg IV, may repeat as needed</p> <p>B) 0.2 mg/kg IV/IO/IN/IM, may repeat in 5 mins</p> <p>C) 0.2 mg/kg IV/IO; may repeat if inadequate relaxation</p> <p>D) 0.2 mg/kg IV; max single dose 5 mg</p>



Medication	Indication/Protocol	Dose/Route
<b>Morphine Sulfate</b>	<b>A)</b> Pain Management	<b>A)</b> 0.1 mg/kg IV/IO/IM max single dose 5 mg, may repeat q 10 as needed
<b>Naloxone (Narcan)</b>	<b>A)</b> Poisoning/Overdose	<b>A)</b> 0.1 mg/kg IV/IO/IM/IN, max single dose 0.5 mg, may repeat to max dose of 10 mg
<b>Ondansetron (Zofran)</b>	<b>A)</b> Nausea/Vomiting	<b>A)</b> 0.15 mg/kg IV/IO/IM up to max dose 4 mg, may repeat x 1 in 20 mins
<b>Tetracaine</b>	<b>A)</b> Ocular Injury	<b>A)</b> 1-2 drops per eye, repeat PRN
<b>Racemic Epinephrine</b>	<b>A)</b> Respiratory Distress (Suspected Croup/Epiglottitis)	<b>A)</b> < 6 months 0.25 mL/3 mL NS HHN > 6 months 0.5 mL/3 mL NS HHN
<b>Sodium Bicarbonate</b>	<b>A)</b> Overdose/Poisoning (Tricyclic Antidepressant Overdose)	<b>A)</b> 1 mEq/kg IV

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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**

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

**Side Effects and Special Notes**

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

**ADENOSINE (ADENOCARD)****Pharmacology and Actions**

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

**Indications**

Stable Narrow Complex SVT

**Contraindications and Precautions**

1. Second or third degree heart block, poison or drug induced tachycardia.
2. Atrial fibrillation, atrial flutter, or Ventricular Tachycardia will not be converted by Adenosine.
3. Reduce initial dose to 3 mg if given through a central line.
4. 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

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

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. Adverse effects include tremor, nervousness, tachycardia, palpitations and occasionally hypertension.
2. Most patients will have a decrease in heart rate and blood pressure with relief of bronchospasm.
3. 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

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

### Contraindications

1. None in VF/Pulseless VT.
2. Endotracheal administration is contraindicated.

### Precautions

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

## ASPIRIN

### Pharmacology and Actions

Inhibits platelet aggregation and arterial constriction by blocking formation of thromboxane A<sub>2</sub>. This reduces overall ACS mortality, reinfarction, and CVA.

### Indications

1. Indicated in all patients with ACS.
2. Indicated in any person with symptoms suggestive of ischemic pain.

### Contraindications and Precautions

1. Relatively contraindicated in patients with active ulcer disease.
2. 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 node and increasing the heart rate.

### Indications

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

### Contraindications and Precautions

1. The action of atropine cause mydriasis (dilated pupils).
2. Use with caution in presence of myocardial ischemia.
3. Routine use during PEA or Asystole is unlikely to have therapeutic benefit.
4. 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

1. Known or suspected hyperkalemia.
2. Hypocalcemia.
3. As an antidote for toxic effects from calcium channel blocker and beta blocker overdose.
4. MgSO<sub>4</sub> overdose.

### Contraindications

1. Hyperkalemia due to digitalis toxicity.
2. 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

1. Indicated for the treatment of known hypoglycemia.

### Contraindications and Precautions

1. Contraindicated in intracranial or intraspinal hemorrhage.

### Side Effects and Special Notes

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

## DILTIAZEM (CARDIZEM®)

### Pharmacology and Actions

Diltiazem is a calcium channel blocking agent that inhibits the influx of calcium ions during membrane depolarization of cardiac and vascular smooth muscle. Its action is to slow AV nodal conduction and increase the AV nodal refractory period. Diltiazem slows the ventricular rate in patients with a rapid ventricular response during atrial fibrillation or atrial flutter, potentially converts SVT to normal sinus rhythm, and decreases total peripheral resistance in both systolic and diastolic blood pressure.

### Indications

1. Narrow complex atrial fib/flutter with rapid ventricular rate (>150 bpm)
2. SVT refractory to Adenosine. Use after Adenosine for refractory reentry SVT with narrow QRS and adequate blood pressure.

### Contraindications and Precautions

1. Patients with impaired left ventricular function or heart failure.
2. Complete heart block.
3. Recently (within past 1 hours) received IV  $\beta$ -blocker.
4. Patients with WPW and Afib.
5. Sick sinus syndrome.
6. Vtach, wide complex tachycardia, drug/poison induced tachycardia
7. Cautious use in patients with CHF, monitor for signs of pulmonary edema.
8. Cautious use in patients who are already taking antihypertensive medications, monitor for hypotension.

### Side Effects and Special Notes

1. Hypotension
2. Bradycardia
3. Heart block

**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**

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

**Contraindications and Precautions**

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

**Side Effects and Special Notes**

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

**DOPAMINE HYDROCHLORIDE (INTROPIN)****Pharmacology and Actions**

Dopamine is the endogenous catecholamine precursor of norepinephrine. It releases norepinephrine and displays direct and indirect alpha and beta 1 effects. It increases cardiac output and usually elevates heart rate and systolic pressure-systemic vascular resistance is not increased except at higher dosages. It dilates renal and splenic vascular beds by activation of dopaminergic receptors. The alpha effects predominate at higher doses (usually greater than 10 mcg/kg per minute, marked individual variation exists and dose must be guided by clinical response).

**Indications**

1. Indicated for augmentation of cardiac performance and/or renal blood flow in shock and hypoperfusion syndromes due to septicemia, cardiac failure, cardiac surgery, renal failure, trauma and acute myocardial infarction.

**Contraindications and Precautions**

1. Contraindicated in patients with uncorrected tachyarrhythmias, ventricular/fibrillation or known hypersensitivity.
2. Should be used cautiously in patients with peripheral vascular disease.
3. Any underlying hypovolemia must be corrected, if possible, prior to use.

**Side Effects and Special Notes**

1. The principal adverse effects include headache, anxiety, tachycardia, chest pain, hypotension, nausea and vomiting.
2. Carefully monitor blood pressure, ECG and urine output throughout the infusion.
3. Extravasation requires discontinuation of the drug.



## DOPAMINE INFUSION CHART

Use this chart if you are using a Dopamine concentration of 1600 mcg/ml.  
Match the weight with the dose and set your dial a flow or pump.

Example: A patient who weighs 50 kg needs dopamine at 5 mcg/kg/min. You need to administer 9 ml/hr or 9 gtts/min using 60 gtts/ml set.

Weight (kg)	Dopamine dosage in mcg/kg/min					
	5	6	7	8	9	10
50	9	11	13	15	17	19
55	10	12	14	16	19	21
60	11	13	16	18	20	22
65	12	15	17	19	22	24
70	13	16	18	21	24	26
75	14	17	20	22	25	28
80	15	18	21	24	27	30
85	16	19	22	25	29	32
90	17	20	24	27	30	34
95	18	21	25	28	32	36
100	19	22	26	30	34	37
105	20	24	28	31	35	39
110	21	25	29	33	37	41
115	22	26	30	34	39	43
120	22	27	31	36	40	45
125	23	28	33	37	42	47
130	24	29	34	39	44	49

## 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

1. Indicated in cardiac arrest, post cardiac arrest, sepsis, bradycardia, distributive shock, bronchial asthma, croup, anaphylaxis and hypotension.

### Contraindications and Precautions

1. Age > 45, or previous cardiac history (in some settings, consult medical control).
2. 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

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

### EPINEPHRINE INFUSION CHART

Dose Ordered (mcg/min)	Amount to infuse ml/hr	
	1mg/100 mL or 10 mg/1000 mL (10 mcg/mL)	2 mg/250 mL or 4 mg/500 mL (8 mcg/mL)
2	12	15
3	18	23
4	24	30
5	30	38
6	36	45
7	42	53
8	48	60
9	54	68
10	60	75

**ETOMIDATE (AMIDATE)****Pharmacology and Actions**

Etomidate is an imidazole derivative that is primarily a hypnotic. It is the most hemodynamically stable of the currently available induction agents. At induction doses of 0.3 mg/kg, it has minimal respiratory or myocardial depression. Etomidate attenuates the rise in intracranial pressure that is associated with laryngoscopy and intubation. It does this by decreasing cerebral blood flow and cerebral metabolic oxygen demand without adversely affecting cerebral perfusion pressure. In healthy, hemodynamically stable patients, the recommended induction dose of 0.3 mg/kg should be used. The onset is 20-30 seconds with full recovery in 7-14 minutes.

**Indications**

1. Medication assisted intubation
2. Sedation

**Contraindications and Precautions**

1. Known hypersensitivity to the drug.

**Side Effects and Special Notes**

1. Etomidate does not release histamine, but it can cause nausea and vomiting, pain on injection, myoclonic movement, and hiccups.
2. A small number of patients will experience pain on injection of Etomidate. This is due to the diluent (propylene glycol) and can be lessened considerably if administered in a large vein, and in conjunction with a rapid intravenous fluid rate.
3. The myoclonic activity following Etomidate injections is secondary to brain stem stimulation and can be mistaken for grand mal seizures.
4. Hiccups are usually not a concern during RSI, but should be recognized as a side effect of Etomidate administration.
5. The best known and most concerning side effect of Etomidate is its reversible blockade of 11 beta-hydroxylase, which decreases both serum cortisol and aldosterone levels. This side effect is much more common with continuous infusions of Etomidate in the intensive care unit setting rather than with a single dose injection utilized for RSI.

## 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

1. Relief of severe acute and severe chronic pain.

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. For better analgesic effect, administer drug before patient has intense pain.
2. Monitor respiratory status carefully, drug may cause respiratory depression. Naloxone may be used to reverse Fentanyl.
3. 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

1. Furosemide is the indicated therapy in acute pulmonary edema.

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. 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

1. Hypoglycemia.
2. Beta blocker and calcium channel blocker overdose/poisoning.

### Contraindications and Precautions

1. Known hypersensitivity to the drug.

### Side Effects and Special Notes

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

## HALOPERIDOL (HALDOL)

### Pharmacology and Actions

The precise mechanism of action has not been clearly established. A butyrophenone that probably exerts its antipsychotic effects by blocking postsynaptic dopamine receptors in the brain.

### Indications

1. Management of psychotic disorders.

### Contraindications

1. Known hypersensitivity to medication.
2. Coma or CNS depression.

### Side Effects and Special Notes

1. Extrapyramidal reactions
2. Tardive dyskinesia
3. Sedation
4. Tachycardia
5. Hypotension
6. Dry mouth

## HEPARIN

### Pharmacology and Actions

Preventse conversion of fibrinogen to fibrin and prothrombin to thrombin by enhancing the inhibitory effects of antithrombin III.

### Indications

1. Deep vein thrombosis
2. Pulmonary emboli
3. Myocardial infarction
4. Open heart surgery
5. Disseminated intra vascular clotting syndrome (DIC)
6. Atrial fibrillation with embolization
7. Prevention of DVT/P.E.

### Contraindications

1. Hypersensitivity
2. Hemophilia
3. Leukemia with bleeding
4. Peptic ulcer disease
5. Severe hepatic disease
6. Severe HTN

### Side Effects and Special Notes

1. Monitor for bleeding gums, petechiae, ecchymosis, black tarry stools, hematuria, epistaxis and decrease in blood pressure. The antidote for heparin overdose is Protamine.
2. Heparin may increase the action of Diazepam.
3. Digitalis, tetracyclines and antihistamines decrease the action of Heparin.
4. Oral anticoagulants, salicylates, dextran, steroids and nonsteroidal anti-inflammatories increase the action of Heparin.

## HEPARIN WEIGHT ADJUSTED PROTOCOL

The following chart gives the Heparin infusion rate in both units/hr and mL/hr with a Heparin concentration of **50 units/mL** (i.e., 25,000 units in 500 mL).

Units/Hr	mL/Hr
600	12
700	14
800	16
900	18
1000	20
1100	22
1200	24
1300	26
1400	28
1500	30
1600	32
1700	34
1800	36
1900	38
2000	40
2100	42
2200	44
2300	46
2400	48
2500	50
2600	52
2700	54
2800	56
2900	58
3000	60

## HYDROCORTISONE SODIUM SUCCINATE (SOLU-CORTEF)

### Pharmacology and Actions

Is a systemic corticosteroid that inhibits multiple inflammatory processes. Solu-Cortef produces multiple glucocorticoid and mineralocorticoid effects. It has a half-life of 8-12 hours and is metabolized by the liver.

### Indications

1. Adrenal insufficiency (congenital adrenal hyperplasia)
2. Corticosteroid responsive conditions

### Contraindications and Precautions

1. Systemic fungal infections
2. Premature infants and neonates
3. Idiopathic thrombocytopenic purpura
4. Hyperglycemia
5. Hypersensitivity
6. Decreases immune function
7. Contains benzyl alcohol

### Side Effects and Special Notes

1. Sodium retention, CHF, edema
2. Hyperglycemia
3. Hypertension
4. Hyperkalemia
5. N/V
6. Headache
7. Anaphylaxis



**HYDROXOCOBALAMIN (CYANOKIT®)****Pharmacology and Actions**

Hydroxocobalamin, the active ingredient in CYANOKIT®, forms a strong bond with cyanide, forming nontoxic cyanocobalamin, and another form of vitamin B12, which is then safely excreted in the urine.

**Indications**

1. Exposure to fire or smoke in an enclosed area indicated by the presence of soot around the mouth, nose or oropharynx.
2. Suspected Cyanide poisoning.

**Contraindications and Precautions**

1. Cyanokit® has proven to be incompatible with other drugs; therefore, it should not be administered simultaneously in the same line as other medications, consider initiating two IV lines.
2. Possible allergic/anaphylactic reaction.
3. Substantial increases in blood pressure may occur following Cyanokit therapy.

**IPRATROPIUM BROMIDE (ATROVENT)****Pharmacology and Actions**

Anticholinergic bronchodilator

**Indications**

1. Relief of acute bronchospasm (reversible airway obstruction).

**Contraindications and Precautions**

1. Allergy or known hypersensitivity to Atrovent.
2. Hypersensitivity to Atropine (chemically related).
3. Those with a history of hypersensitivity to soya lecithin or related food products, such as soy beans and peanuts.
4. Use with caution in patients with heart disease, hypertension, glaucoma and the elderly.
5. 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**

1. More common: cough, dry mouth or unpleasant taste.
2. 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**

1. 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.
2. Indicated for sedation, behavioral emergencies, and medication assisted intubation.

**Side Effects and Special Notes**

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

**LIDOCAINE (XYLOCAINE)****Pharmacology and Actions**

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

**Indications**

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

**Contraindications and Precautions**

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

**Side Effects and Special Notes**

1. 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.
2. 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

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

### Contraindications and Precautions

1. Use cautiously in patients with renal failure.

### Special Notes and Side Effects

1. Monitor respiratory rate every 5 minutes. For respiratory depression, discontinue Magnesium infusion and maintain airway/ventilation as needed.
2. Monitor blood pressure every 15 minutes.
3. Monitor reflexes every 30 minutes. If absent or hyper-reactive, after standard regimen, call physician.
4. 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

1. Severe anaphylaxis, asthma, or COPD
2. Urticarial
3. Spinal cord injury

### Contraindications and Precautions

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

### Special Notes and Side Effects

1. Fluid retention
2. Congestive heart failure
3. Hypertension
4. Abdominal distention
5. Vertigo
6. Headache
7. Nausea
8. Malaise
9. Hiccups

## METOPROLOL

### Pharmacology and Actions

Selectively antagonizes beta 1-adrenergic receptors. Half-life is 3-7 hours.

### Indications

1. AMI

### Contraindications and Precautions

1. Hypersensitivity to drug/class/component
2. Sinus bradycardia
3. HR < 45 bpm (MI, acute)
4. AV block, 2<sup>nd</sup> or 3<sup>rd</sup> degree
5. AV block, PR interval > 0.24 sec (MI, acute)
6. Heart failure, uncompensated
7. Heart failure, mod-severe (MI, acute)
8. SBP < 100 mmHg (MI, acute)
9. Cardiogenic shock
10. Sick sinus syndrome w/o pacemaker

### Side Effects and Special Notes

1. CHF
2. Heart block
3. Bradycardia, severe
4. Raynaud's phenomenon
5. Bronchospasm
6. Hypersensitivity reaction
7. Hepatitis (rare)

## MIDAZOLAM (VERSED)

### Pharmacology and Actions

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

### Indications

1. Agent for short periods of sedation and to reduce agitation
2. Seizures

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. Constant monitoring of cardiopulmonary status of patient required.
2. 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

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

### Contraindications and Precautions

1. Use caution in the patient with RV infarction.

### Side Effects and Special Notes

1. The most common side effects are respiratory depression and orthostatic hypotension (which can be corrected with IV fluids).
2. Monitor for respiratory depressions, continuous pulse oximetry may aid in assessing respiratory depression.
3. 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

1. Known or suspected opioid induced respiratory depression.

### Contraindications and Precautions

1. May cause withdrawal symptoms in addicted individuals.

### Side Effects and Special Notes

1. Administer slowly in an amount sufficient to reverse respiratory depression only. Given rapidly, a patient may awaken suddenly and become extremely combative.
2. The duration of the narcotic may exceed that of Naloxone. Re-administration may be necessary.

## NITROGLYCERINE (NITROSTAT, TRIDIL)

### Pharmacology and Actions

Relaxation of vascular smooth muscle is the principal action of Nitroglycerin. Nitroglycerin produces, in a dose related manner, dilation of both the arterial and venous beds. Venous dilation promotes peripheral pooling of blood and decreases venous return to the heart, reducing left ventricular end-diastolic pressure (preload). Arteriolar relaxation reduces systemic vascular resistance and arterial pressure (afterload). Myocardial oxygen consumption is decreased. Elevated central nervous and pulmonary capillary wedge pressures, pulmonary vascular resistance and systemic vascular resistance are also reduced.

### Indications

1. Myocardial ischemia
2. Malignant hypertension
3. Congestive heart failure

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. Headache is the most frequent adverse reaction.
2. If severe hypotension and reflex tachycardia occurs, decrease Nitroglycerin or temporarily discontinue it and place the patient in a supine position with legs elevated.
3. 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.
4. Intravenous Nitroglycerin should be administered by an infusion pump.
5. Blood pressure should be taken and recorded every five minutes while titrating Nitroglycerin, then every 15 minutes while infusion continues. Monitor ECG continuously.

## NITROGLYCERINE DRIP CHART

Amount to infuse in ml/hr		
Dose Ordered (mcg/min)	50 mg/250 ml	100 mg/250 ml
	100 mg/500ml (200 mcg/ml)	200 mg/500 ml (400 mcg/ml)
10	3	1.5
20	6	3
30	9	4.5
40	12	6
50	15	7.5
60	18	9
70	21	10.5
80	24	12
90	27	13.5
100	30	15
110	33	16.5
120	36	18
130	39	19.5
140	42	21
150	45	22.5
160	48	24
170	51	25.5
180	54	27
190	57	28.5
200	60	30



## 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

1. Broad, first-line for rapid pain relief.

### Contraindications and Precautions

1. Euphoria
2. Disassociation

### Side Effects and Special notes

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

## 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

1. Prevention of nausea and vomiting.

### Contraindications and Precautions

1. Known hypersensitivity to the medication.

### Side Effects and Special Notes

1. Use cautiously in patients with liver failure.

## OXYMETAZOLINE HYDROCHLORIDE (AFRIN)

### Pharmacology and Actions

Thought to cause local vasoconstriction of dilated arterioles, reducing blood flow and nasal congestion.

### Indications

1. Nasal congestion, prior to nasal intubation to lessen the chance of causing and epistaxis.

### Contraindications and Precautions

1. Known hypersensitivity to the drug.
2. Use cautiously in patient with hyperthyroidism, cardiac disease, hypertension or diabetes mellitus.

### Side Effects and Special Notes

1. Bottle is single patient use only and needs to be replaced after each use.

## 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

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

### Contraindications and Precautions

1. Known hypersensitivity to the drug and with retained placenta.

### Side Effects and Special Notes

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

## PROMETHAZINE (PHENERGAN)

### Pharmacology and Actions

Promethazine is a phenothiazine and acts as an antiemetic.

### Indications

1. Prophylaxis and treatment of nausea and vomiting.

### Contraindications and Precautions

1. Contraindicated in patients with central nervous system depression.

### Side Effects and Special Notes

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

## POTASSIUM CHLORIDE

### Pharmacology and Actions

Potassium is a mineral that the human body requires for proper functioning of neuromuscular tissues.

### Indications

1. Used for the treatment of hypokalemia.

### Contraindications and Precautions

1. Severe renal impairment with oliguria and anuria.
2. Hyperkalemia

### Side Effects and Special Notes

1. Adverse reactions to Potassium Chloride administration include peripheral vascular collapse with hypotension, cardiac arrhythmias, heart block, possible cardiac arrest, EKG changes (prolonged P-R interval, wide QRS, ST segment depression, tall tinted T waves), nausea, vomiting, abdominal pain and pain at the infusion site.
2. Potassium Chloride should be administered via an infusion pump.
3. 1-3cc of 1% Lidocaine may be added directly to the Potassium Chloride solution to decrease pain at the infusion site.
4. Patients receiving Potassium Chloride at rates greater than 20 mEq per hour should have continuous ECG monitoring.
5. Treat hyperkalemia: 1 gm Calcium Chloride + 5 units regular insulin + 50 gm Glucose

## 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

1. Treatment of life-threatening airway obstruction in croup and epiglottitis.

### Contraindications and Precautions

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

### Side Effects and Special Notes

1. 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.
2. Racemic Epinephrine is heat and light sensitive. If the solution is discolored, it should be discarded.
3. 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.

## TETRACAINE

### Indications

1. Provides anesthesia prior to ophthalmic procedures, such as irrigation.

### Contraindications and Precautions

1. Known hypersensitivity

### Side Effects and Special Notes

1. Use cautiously in patients with cardiac disease and hyperthyroidism.
2. Not for long term use.
3. Warn patient not to rub or touch eye while it is anesthetized. This may cause corneal abrasion and greater pain when anesthesia wears off.
4. Do not use discolored solution.

## SODIUM BICARBONATE

### Pharmacology and Actions

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

### Indications

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

### Side Effects and Special Notes

1. 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

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

### Contraindications and Precautions

1. Known hypersensitivity to the drug.

### Side Effects and Special Notes

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