



**ALABAMA EMS  
PATIENT CARE PROTOCOLS**  
**10<sup>th</sup> Edition**  
**April 29, 2022**





**Scott Harris, M.D., M.P.H.**  
STATE HEALTH OFFICER

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April 29, 2022

Dear Colleague:

On behalf of the Alabama Department of Public Health Office of Emergency Medical Services, I would like to express our sincere appreciation to the individuals who were tasked with the responsibility of redesigning the Alabama EMS Patient Care Protocols. As you may know, creating this type of document is not an easy accomplishment; however, it is very important to ensure the advancement of EMS in Alabama, and it is a milestone to which we can all be proud.

I hope that you will agree that collective efforts yielded a great outcome for EMS in Alabama and for the EMS industry. This was only possible through dedication and commitment of time and effort, which is especially notable given the regular responsibilities of our providers and the current situation in our country. Again, thank you for your continued commitment to the values and mission of the Office of Emergency Medical Services, as we look forward to continuing the progression of EMS in Alabama.

Sincerely,

A handwritten signature in blue ink, appearing to read "Jamie Gray", is written over a faint, light blue circular watermark that contains the Alabama Department of Public Health logo.

Jamie Gray, B.S., NRP, Director  
Office of Emergency Medical Services

# PATIENT CARE PROTOCOLS

## TABLE OF CONTENTS

### Preface

### Scope of Practice

Emergency Medical Technician (EMT)	09
Advanced EMT (AEMT)	10
Intermediate EMT (EMT-I)	11
Paramedic	12
Community Paramedicine	13

### Acute Health Systems

Trauma System	14
Stroke System	17

### Treatment Protocols

General Patient Care	19
Abdominal Pain	20
Adrenal Insufficiency	22
Allergic Reaction	24
Altered Mental Status	26
Asthma / COPD	28
Bites and Envenomations	30
Cardiac Arrest - Adult	32
Cardiac Arrest - Pediatric	34
Cardiac Dysrhythmias - Adult	36
Cardiac Dysrhythmias - Pediatric	39
Chest Pain or Acute Coronary Syndrome (ACS)	41
Childbirth	43
Congestive Heart Failure	45
Croup or Upper Airway Obstruction	47
Decompression Sickness	49
Electromuscular Incapacitation Devices (Taser®)	51
Hemodialysis Emergency Disconnect	52
Hypertensive Emergencies	54
Hyperthermia	56
Hypoglycemia	58
Hypothermia	60
Influenza/Respiratory Illness	62
Nausea and Vomiting	64
Near Drowning	66
Newborn	68
Pain Management	70

Poisons and Overdoses	72
Post Intubation	74
Preeclampsia/Eclampsia	76
Seizure	78
Sepsis	80
Shock	82
Stroke	84
Syncope	87
Vaginal Bleeding	89
General Trauma	91

## Medications

Acetaminophen	97
Adenosine	97
Albuterol and Ipratropium	97
Amiodarone	98
Aspirin	98
Atropine Sulfate	98
Calcium Gluconate	99
Calcium Chloride	99
Cardene	99
Cefazolin	100
Ceftriaxone	100
Cleviprex	101
Dextrose 10%	101
Dextrose 25%	101
Dextrose 50%	102
Diltiazem	102
Diphenhydramine	102
Dobutamine	103
Dopamine	103
Epinephrine	103
Etomidate	104
Fentanyl	104
Furosemide	104
Glucagon	105
Haloperidol	105
Heparin	105
Hydralazine	106
Ketamine	106
Keppra	107
Labetalol	107
Lactated Ringers	107
Lidocaine	108

Lorazepam	108
Magnesium Sulfate	108
Mannitol	109
Methylprednisolone	109
Metoprolol	109
Midazolam	110
Morphine	110
Naloxone	110
Nitroglycerin	111
Nitroprusside	111
Norepinephrine	112
Ondansetron	112
Pavulon	112
Pepcid	113
Phenylephrine	113
Pitocin	113
Promethazine	114
Propofol	114
Racemic Epinephrine	114
Reglan	115
Rocuronium	115
3% Saline	115
Sodium Bicarbonate	116
Sodium Chloride	116
Succinylcholine	116
Terbutaline	117
Thiamine	117
Toradol	117
Tranexamic Acid (TXA)	118
Vecuronium Bromide	118
Vitamin K1	118

## References

Critical Care Guidelines	119
Rule of Nines	129
APGAR Scoring	130
Glasgow Coma Scale	130
Oxygen Percentages	131
Lidocaine Clock	131
Dopamine Table	132
Search and Rescue Marking System	133
Triage of Mass Casualties	134
Ideal Body Weight	141
Blood Transfusion Procedure	142

**Forms**

Request to be Transported to a Hospital on Diversion_____	<u>136</u>
Thrombolytic Checklist (STEMI)_____	<u>137</u>
Thrombolytic Checklist (Stroke)_____	<u>138</u>

**Tactical Paramedic**

Surgical Cricothyroidotomy_____	<u>139</u>
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## Preface

These protocols are intended to guide emergency medical services personnel (EMSP) in the response and management of emergency situations and the care and treatment of patients. A request for changes to these protocols should be made in writing to the State Emergency Medical Control Committee:

**Dr. William Crawford, State EMS Medical Director**  
Alabama State Emergency Medical Control Committee  
Alabama Department of Public Health (ADPH)  
Office of EMS  
P.O. Box 303017  
Montgomery, AL 36130-3017  
Or [William.Crawford@adph.state.al.us](mailto:William.Crawford@adph.state.al.us)

This manual contains ALL of the medications and procedures allowed for EMSP in Alabama. EMSP are responsible for their actions within the respective scope of practice of the license that they hold. Online Medical Direction (OLMD) can only order procedures and medication administration within the EMSP scope of practice. EMSP should respectfully decline any orders which would cause them to violate their scope of practice.

The medication section of this manual is provided for informational purposes only. EMSP may administer medications only as listed in the protocol unless OLMD orders a deviation.

This manual also serves as a reference for physicians providing OLMD to EMSP. Treatment direction which is more appropriate to the patient's condition than the protocol should be provided by the physician as long as the EMSP scope of practice is not exceeded. Treatment direction includes basic care, advanced procedures, and medication administration. OLMD can expect an EMSP to respectfully decline any orders which would cause them to violate their scope of practice.

Patient preference of hospital destination supersedes the Acute Health Care System as long as the patient is deemed competent by EMSP and OLMD.

**Pediatric information is differentiated by label and font characteristics. Anything pertaining to pediatric patients will be presented in Green Font. Unless otherwise noted in a protocol, a pediatric patient is defined as someone 15 years old or younger. For any concerns regarding pediatric protocols or procedures, please contact:**

**Dr. Shea Duerring, Assistant State EMS Medical Director for Pediatrics**  
Alabama State Emergency Medical Control Committee  
Alabama Department of Public Health (ADPH)  
Office of EMS  
P.O. Box 303017  
Montgomery, AL 36130-3017  
Or [Shea.Duerring@adph.state.al.us](mailto:Shea.Duerring@adph.state.al.us)

## **Scope of Practice**

Licensed EMSP are authorized to perform procedures and administer medications as defined by these protocols. Each level of EMSP, as defined by the Office of EMS Rules, has a specific list of authorized procedures and medications as defined by that level's scope of practice. Each scope of practice is in addition to that of any preceding lower levels.

EMSP are prohibited from performing any procedure or utilizing any medication not approved by the State Board of Health even though they may have been taught these medications and procedures in their EMSP curriculum.

Lower level EMSP can assist higher level EMSP with patient care activities as long as the lower level EMSP does not exceed his or her scope of practice regarding administration of medications or performance of procedures. Ultimately, the higher level EMSP is responsible for patient care and documentation.



## **Emergency Medical Technician (EMT)**

An EMT is authorized to perform patient care procedures and administer medications as follows:

1. Patient assessment including taking and recording vital signs and appropriate history.
2. Administration of supplemental oxygen via cannula or mask.
3. Administration of aspirin for suspected cardiac chest pain.
4. Use of oropharyngeal and nasopharyngeal airways.
5. Placement of Blind Insertion Airway Device (BIAD).
6. Use of bag-valve mask.
7. Use of mouth to mask device with or without supplemental oxygen.
8. Use of pulse oximetry devices.
9. Opening and maintaining a patent airway using simple airway maneuvers.
10. Use of suction equipment.
11. Cardiopulmonary resuscitation.
12. Simple management of a cardiac emergency including the use of an AED.
13. Acquiring and transmitting 12-lead ECG (if AED is capable).
14. Control of bleeding and shock through positioning, direct pressure, and tourniquet.
15. Use of hemostatic agents.
16. Bandaging.
17. Spinal Motion Restriction and Spinal Precautions.
18. Splinting including traction splint.
19. Joint dislocation immobilization.
20. Application of pneumatic anti-shock garment.
21. Assistance with emergency childbirth, NOT including any surgical procedures.
22. Capillary puncture for the purpose of blood glucose monitoring.
23. Use of automated glucometer.
24. Properly lifting and moving a patient.
25. Patient extrication.
26. Mass casualty incident triage including triage tags.
27. Scene management, such as directing traffic, but only when such activities do not interfere with patient care duties and law enforcement personnel are not at the scene.
28. Continuous Positive Airway Pressure (CPAP) or Bilevel Positive Airway Pressure (BiPAP).
29. Use of Capnography.

Medications (for use as specified in treatment protocols):

1. Administration of medications as listed on the EMT Medication Formulary in the EMS setting.
2. Assist in the administration of nitroglycerin; auto-inhalers; auto-injection epinephrine; and auto-injection, sublingual, or intranasal naloxone prescribed to the patient.
3. Site maintenance of heparin locks and saline locks.

## **Advanced Emergency Medical Technician (AEMT)**

An AEMT is authorized to perform all patient care procedures and administer all medications as defined in the EMT Scope of Practice AND the additional procedures and medications as follows:

Procedures:

1. Peripheral venipuncture (IV).
2. Adult and pediatric intraosseous cannulation (IO).
  - Adult Sites – Proximal Humerous, Sternal (with appropriate device), Proximal Tibia.
  - Pediatric Sites - Proximal Humerous, Proximal Tibia, Distal Femur (<2 years old).

Medications (for use as specified in treatment protocols):

1. Administration of medications as listed on the AEMT Medication Formulary in the EMS setting. Medications may be administered via the intravenous, intraosseous, intranasal, subcutaneous, intramuscular, oral, sublingual, and through inhalers if approved for such administration by the State Board of Health.
2. Maintenance of I.V. fluids within the scope of practice of an Advanced EMT for inter-facility transfer patients.

## **Intermediate Emergency Medical Technician (EMT-I)**

An EMT-I is authorized to perform all patient care procedures and administer all medications as defined in the EMT and the AEMT scope of practice AND the additional procedures as follows:

Procedures:

1. Placement of oral and nasal endotracheal tubes.
2. Use of cardiac monitoring equipment, including placement of electrical leads and obtaining 12-Lead ECG.
3. Delivery of electrical therapy to patients including manual defibrillation and synchronized cardioversion.

## Paramedic

A Paramedic is authorized to perform all patient care procedures and administer all medications as defined in the EMT, AEMT, and EMT-I scope of practice AND the additional procedures and medications as follows:

Procedures:

1. External Cardiac Pacing.
2. Nasogastric or Orogastric tube placement.
3. Needle Decompression at the second or third intercostal space on the anterior chest at the midclavicular line or along the anterior axillary line at the 4th intercostal space on the same side as the tension pneumothorax.

Medications:

1. Administration of medications on the list approved by the State Board of Health for such use in the EMS setting as stated on the Paramedic Medication Formulary. Medications may be administered via the intravenous, intraosseous, intranasal, subcutaneous, intramuscular, oral, sublingual, and rectal routes; and, through inhalers and endotracheal tubes if approved for such administration by the State Board of Health; and,
2. Within the constraints specified in the Office of EMS rules, administration of medications and maintenance of I.V. fluids for inter-hospital transfer patients.

## **Community Paramedicine**

**PURPOSE:** To provide guidance to EMSP engaged in scheduled patient visits for the purpose of preventing future medical emergencies.

### **KEY POINTS:**

- At this time, no EMSP shall engage in any patient care activities other than BLS interventions during scheduled patient encounters for the sake of EMS prevention.
- When a patient is assessed, the EMSP shall document the encounter and outcome at the conclusion (i.e., Refusal of Transport).
- If at any time during the scheduled visit, the patient or the provider identifies the need for emergency treatment, the EMSP shall perform the necessary interventions within his or her scope of practice and arrange for emergency transport.
- All EMS prevention activities should be approved by the agency's medical director prior to implementation.

## Acute Health Systems

This section provides patient entry criteria and guidance for Acute Health Systems procedures.

### Trauma System

#### ENTRY CRITERIA

##### Physiological Criteria:

1. A systolic BP <90 mm/Hg in an adult **or child 6 years or older <80 mm/Hg in a child 5 or younger.**  
This includes any trauma related cardiac arrest that will be treated or transported to the hospital.
2. Respiratory distress - rate < 10 or >29 in adults, **or <20 or >60 in a newborn. <20 or >40 in a child 3 years or younger. <12 or >29 in a child 4 years or older.**
3. Head trauma with Glasgow Coma Scale score of 13 or less **or head trauma with any neurologic changes in a child 5 years or younger.**

##### Anatomical Criteria:

1. The patient has a flail chest.
2. The patient has two or more obvious proximal long bone fractures (humerus, femur).
3. The patient has penetrating trauma to the head, neck, torso, or extremities proximal to the elbow or knee.
4. The patient has in the same body area a combination of trauma and burns (partial and full thickness) of 15 percent or greater.
5. See Trauma Protocol for criteria to enter a burned patient into the trauma system.
6. The patient has an amputation proximal to the wrist or ankle.
7. The patient has one or more limbs which are paralyzed.
8. The patient has a pelvic fracture, as evidenced by a positive "pelvic movement" exam.
9. The patient has a crushed, degloved, mangled, or pulseless extremity.
10. The patient has an open or depressed skull fracture.

##### Mechanism of the patient injury:

1. A patient with the same method of restraint and in the same seating area as a deceased victim.
2. Ejection of the patient from an enclosed vehicle.

3. Motorcycle/bicycle/ATV crash with the patient being thrown at least 10 feet from the motorcycle/bicycle.
4. Auto versus pedestrian with significant impact with the patient thrown, or run over by a vehicle.
5. An unbroken fall of 20 feet or more onto a hard surface. **Unbroken fall of 10 feet or 3 times the height of the child onto a hard surface.**

#### **EMSP Discretion:**

1. If the EMSP is convinced that the patient could have a severe injury which is not yet obvious, the patient should be entered into the Alabama Trauma System.
2. The EMSP's suspicion of severity of trauma/injury may be raised by the following factors:
  - a. Age >55
  - b. **Age <5**
  - c. Environment (hot/cold)
  - d. Patient's previous medical history
  - e. Insulin dependent diabetes or other metabolic disorder
  - f. Bleeding disorder or currently taking anticoagulant medication (e.g. coumadin, heparin)
  - g. COPD/Emphysema
  - h. Renal failure on dialysis
  - i. Pregnancy
  - j. **Child with congenital disorder**
  - k. Extrication time >20 minutes with heavy tools utilized
  - l. Motorcycle crash
  - m. Head trauma with history of more than momentary loss of consciousness.

#### **Entering a Patient into the Alabama Trauma System**

**An EMSP should call the Alabama Trauma Communication Center (ATCC) to determine patient destination.**

ATCC contact number: 1-800-359-0123

The initial unit on-scene should enter the patient into the Alabama Trauma System, but if they have not done so, it becomes the responsibility of the transporting service (ground or air) before the receiving facility is selected.

For helicopter EMS (HEMS) it is preferable to request a preliminary receiving facility from ATCC prior to arrival on the scene and then later enter the patient into the ATCC as soon as is logistically possible. After assessing a trauma situation and making the determination that the patient should be entered into the Alabama Trauma System, the EMSP licensed at the highest level should contact the ATCC at the earliest practical time before the receiving facility is selected and provide the following information; the highest level EMSP on the scene may delegate the call to ATCC to a lower level EMSP if patient care duties require the higher level EMSP's attention:

- 1) EMSP service
- 2) Location of Trauma Scene

- 3) Age and Sex of the patient(s)
- 4) Reason for Entry and Mechanism of Injury
- 5) Patient assessment
  - a) Airway Status
  - b) Vital signs and GCS
  - c) Areas of Injury
  - d) Environmental issues or co-morbid factors
- 6) Transportation type
- 7) Transportation timing

ATCC will provide a unique identification number that must be entered into the e-PCR.

Notify the ATCC of any change in the patient's condition. The receiving trauma center or ATCC should be updated by the transporting unit 5-10 minutes out. This update should only consist of any patient changes and the patient's current condition. A repeat of information used to enter the patient into the Alabama Trauma System is not necessary since this information will be relayed by the ATCC to the receiving trauma center.

After the patient is delivered to the trauma center, the transporting provider should call the ATCC with the patient care report times.

#### TRAUMA SYSTEM DIVERT TO CLOSEST FACILITY

Criteria for diverting to the closest hospital includes:

- Loss of airway.
- Hemodynamic instability (with no vascular access).
- Uncontrolled bleeding (external).
- Notifying ATCC of intent to divert to closest facility for listed criteria.



## Stroke System

The stroke system is for patients who have signs and symptoms of stroke, also defined as an acute episode of neurological deficit without any evidence of trauma. If the patient has altered mental status, other causes such as hypoxia, hypoperfusion, hypoglycemia, trauma, or overdose should be considered. Any patient treated by EMS using this protocol should be entered into the stroke system.

Perform the Emergency Medical Stroke Assessment (EMSA) stroke scale:

1. **Eye:**       **Horizontal Gaze:** Ask patients to keep their head still and follow your finger left to right with their eyes. In aphasic patients, call the patient's name on one side and then on the other.  
**Abnormal:** Patient is unable to follow as well in one direction compared to the other.
2. **Motor:**
  - a. **Facial Weakness:** ask patients to show their teeth or smile. In aphasic patients, look for asymmetric grimace to pain.  
**Abnormal:** One side of the face does not move as well as the other.
  - b. **Arm weakness:** Ask the patient to hold out both arms, palms up, for 10 seconds with eyes closed. In aphasic patients, hold the patient's arms up and let go.  
**Abnormal:** One arm does not move or drifts down compared to the other.
  - c. **Leg weakness:** Ask a patient to lift one leg and then the other for 5 seconds. In aphasic patients, hold one leg and let go, then repeat on the other side.  
**Abnormal:** One leg does not move or drifts down compared to the other.
3. **Speech/Aphasia:**
  - a. **Naming:** Ask a patient to name your watch or pen.  
**Abnormal:** Patient slurs words, says the wrong words, or is unable to speak.
  - b. **Repetition:** Ask the patient to repeat "They heard him speak on the radio last night." **Abnormal:** Patient slurs words, says the wrong words, or is unable to speak.

If any component of the EMSA stroke scale is abnormal, the patient is very likely to be suffering from an acute stroke. Greater than 3 points is a concern for a LVO Stroke (Large Vessel Occlusion)

### **EMSP Discretion**

1. If the EMSP is convinced that the patient is likely to have a stroke which is not yet obvious, then the patient may be entered into the stroke system.
2. EMSP suspicion of stroke may be raised by the following factors (but these situations alone do not constitute reason for stroke system entry):  
Symptoms of stroke occurred and disappeared within a few minutes, even if the patient is presently normal.  
Patient is awake with spontaneous inability to remember or understand what is said or to express himself (expressive or receptive aphasia).

3. EMSP are to immediately inform the ATCC when a decision is made to enter a patient into the stroke system using discretion and inform the ATCC of the reason for that decision.
4. It is to be specifically noted in the run report that EMSP discretion is being used to enter a patient into the stroke system and the reason or basis for that decision is to be written on the prehospital e-PCR.

## General Patient Care

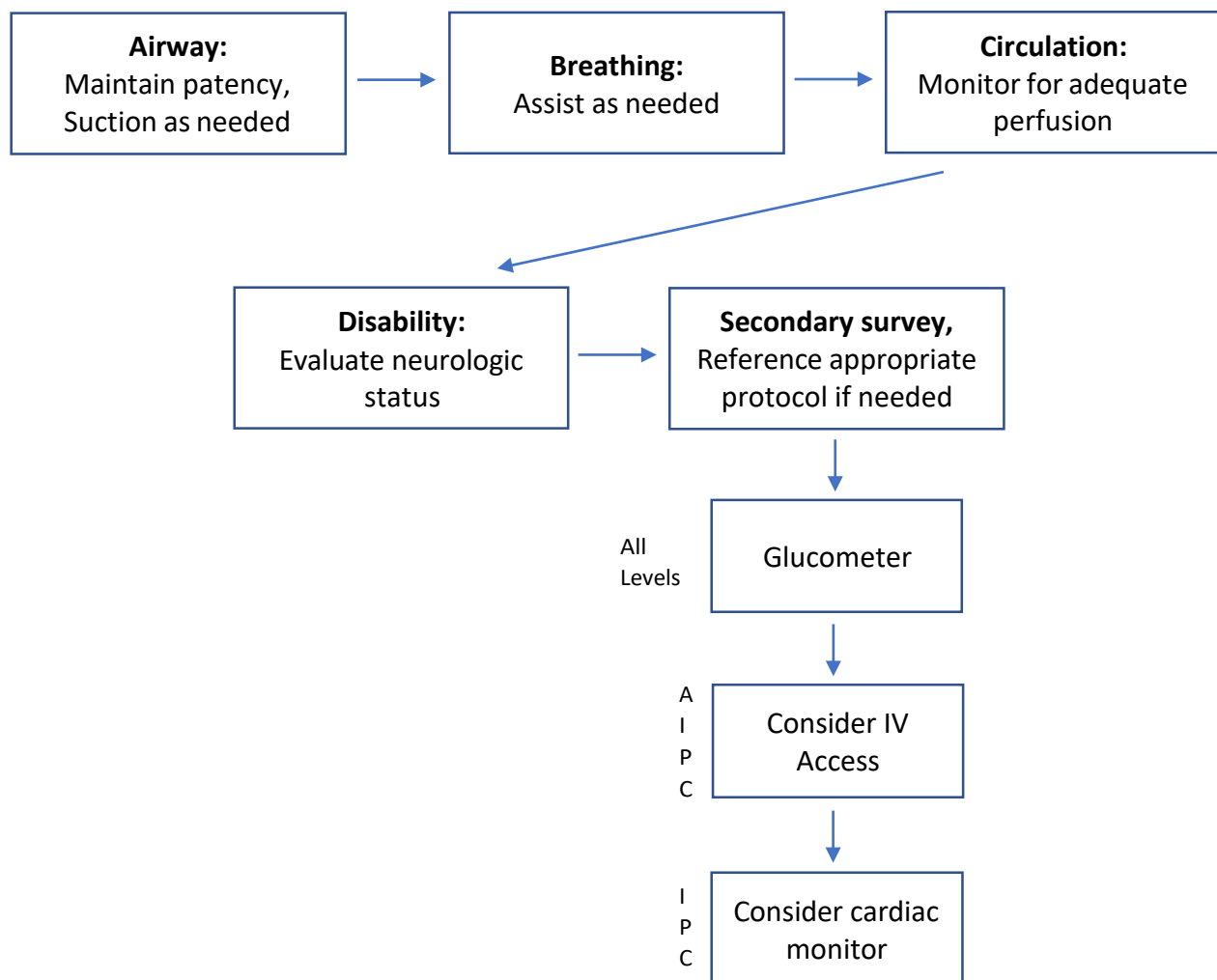
### History and Physical Exam

- Primary
- History (ie. medical history, medication history, surgical history, etc.)
- Vital signs
- Secondary survey

### Key Points

- This protocol is the starting point for assessment of every patient. All patients should have an appropriate assessment of “ABCDs” (airway patency, breathing adequacy, circulation, and disability).
- This protocol can be used for documentation purposes when no other specific protocol is used.

### Treatment



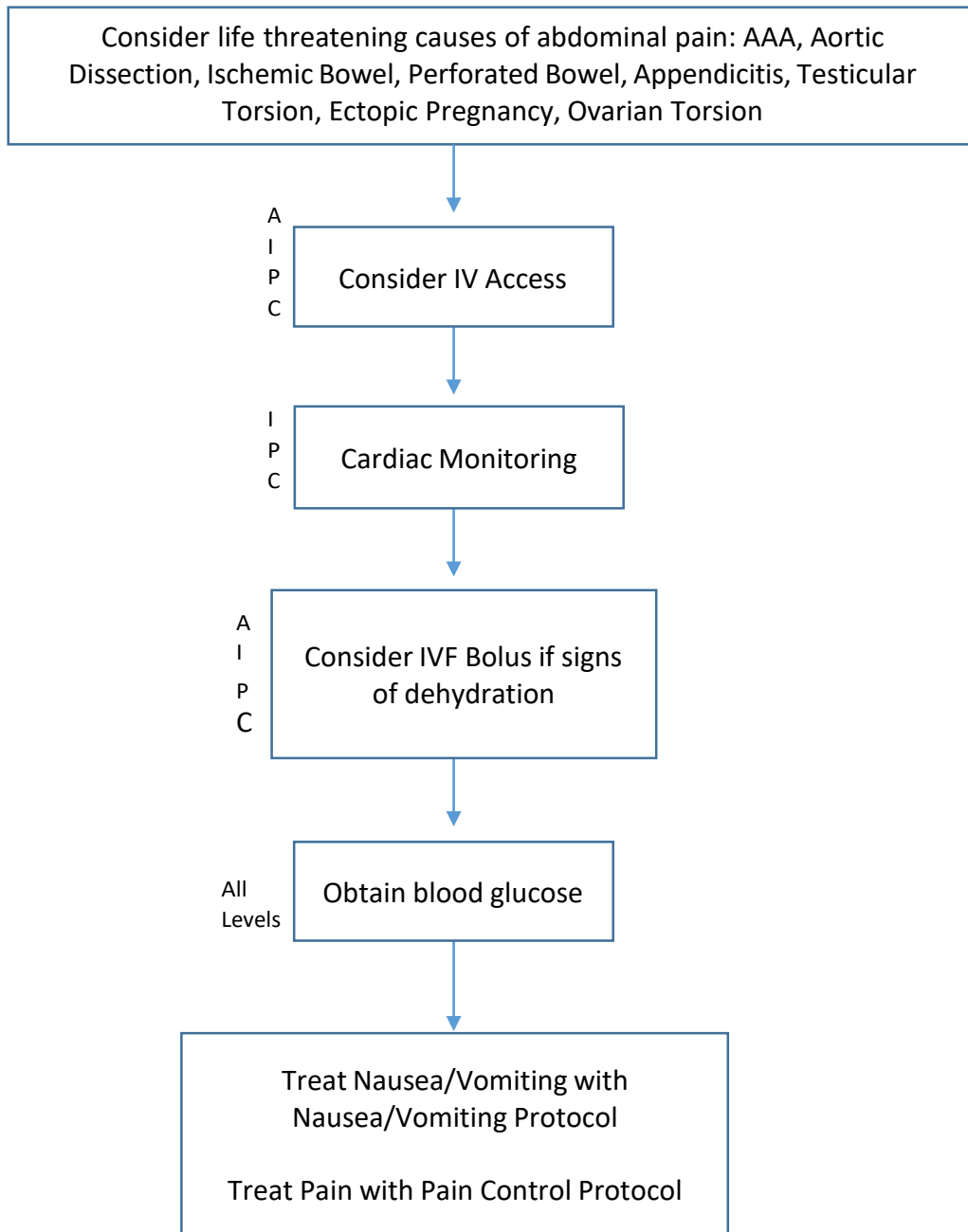
## Abdominal Pain

### History and Physical Exam

- PQRST: Place, Quality, Radiation, Severity, Time of onset.
- Related Symptoms: Nausea, vomiting (coffee-ground or bright red blood), diarrhea, constipation, melena, rectal bleeding, urinary difficulties, fever.
- Previous History: previous trauma, recent medications, surgical history, menstrual history, the possibility of pregnancy.
- Exam: Tenderness, guarding, rigidity, bowel sounds, distention, pulsating mass, evidence of rectal bleeding.

### Key Points

- **Emergent Causes of Abdominal Pain:** AAA, Aortic Dissection, Ischemic bowel, perforated bowel, Appendicitis, Testicular torsion, Ectopic pregnancy, Ovarian torsion.
- Abdominal pain may be the first warning sign of serious internal bleeding leading to hemorrhagic shock. Maintain a high index of suspicion and monitor for early signs of shock.
- Use caution in fluid administration in patients with a suspected ruptured abdominal aortic aneurysm. Do not try to raise blood pressure higher than a systolic of 90 in suspected AAA.
- Nitrous Oxide is contraindicated in abdominal pain due to the risk of abdominal bowel distention.
- Monitor for signs of shock and treat accordingly based on Shock Protocol.
- Give nothing by mouth.
- Re-assess frequently.
- Consider pain control based on Pain Control Protocol.



For Thoracic Aortic Dissection/Aortic Aneurysm and critical care provider - see Critical Care Guidelines.

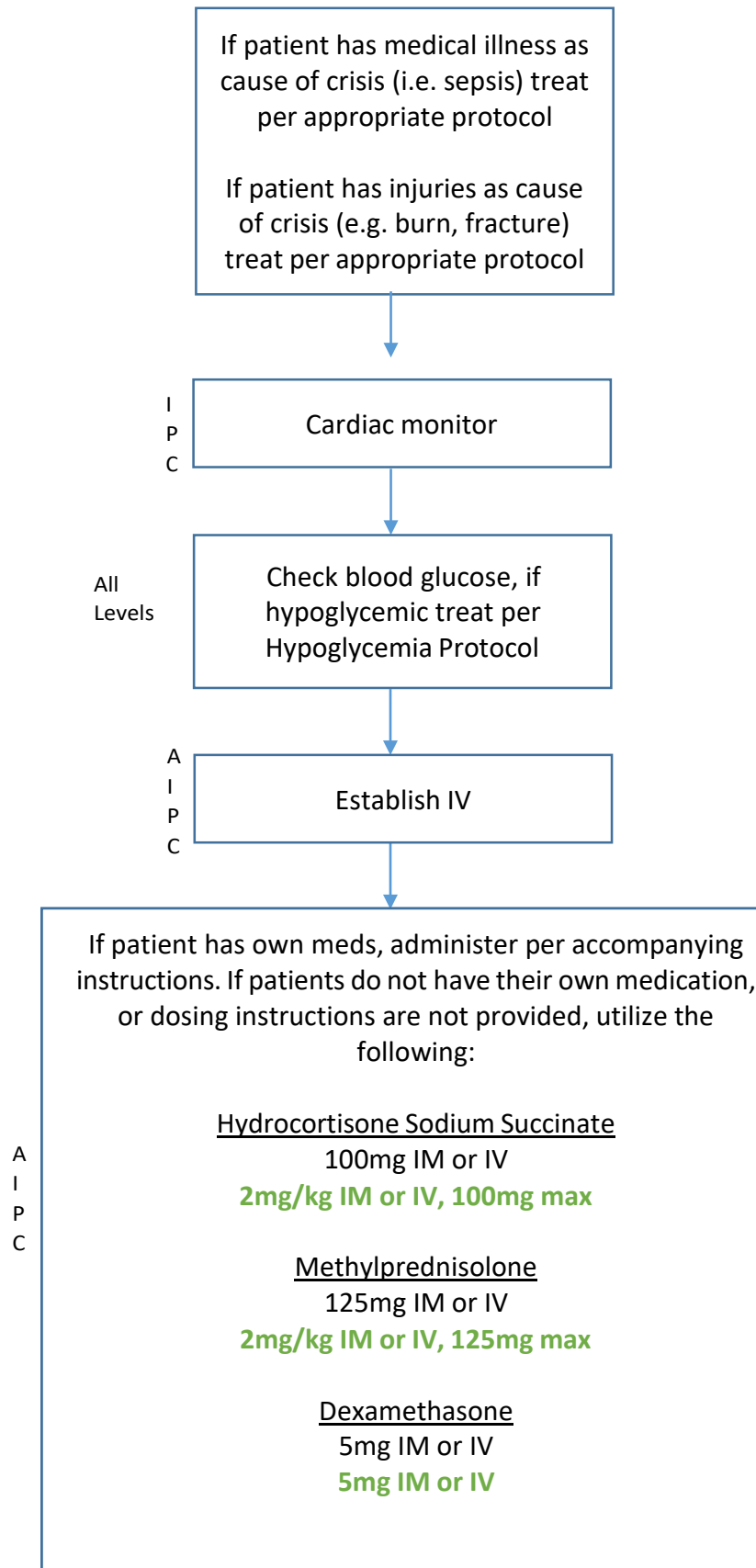
## Adrenal Insufficiency

### History and Physical Exam

- History of diagnosed Adrenal Insufficiency.
- Many diseases can cause Adrenal Insufficiency, including Primary Adrenal Insufficiency, Congenital Adrenal Hyperplasia (CAH), long-term administration of steroids, pituitary gland problems, auto-immune disease, cancers, and certain infections.
- Early signs of adrenal crisis: pallor, dizziness, headaches, weakness, abdominal pain, nausea, and vomiting.
- Late signs of adrenal crisis: lethargy, hypotension, shock, cardiorespiratory failure, and death.

### Key Points

- Adrenal glands make the steroids cortisol and aldosterone, which are both necessary for the body's response to physiologic stress such as acute illness or injury.
- Patients with Adrenal Insufficiency are unable to respond to physiologic stressors and may develop hypoglycemia, shock, or cardiovascular collapse that is refractory to treatment until adrenal corticosteroid replacement is given.
- This protocol is only for patients with diagnosed Adrenal Insufficiency and is intended to guide EMSPs in assisting these patients with Adrenal Insufficiency in administration of steroid medication in the setting of acute illness or injury. This is commonly referred to as adrenal crisis.
- All patients receiving steroids using this protocol must be transported to the hospital for further evaluation and treatment.
- Many of these patients will present with infection and shock consistent with sepsis. Providers should refer to the Sepsis Protocol for the remainder of their treatment.



## Allergic Reaction

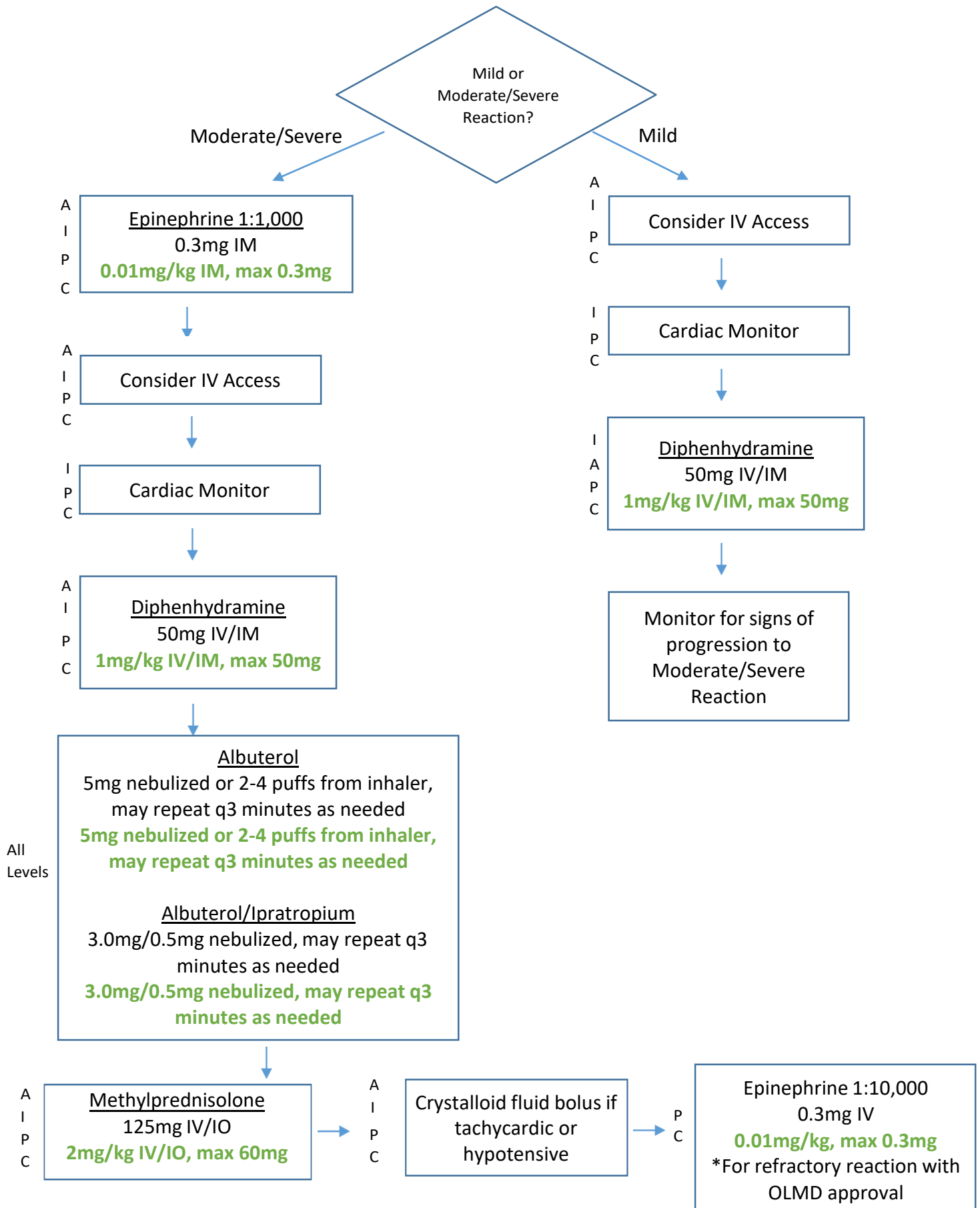
### History and Physical Exam

- Possible allergen exposure and route of exposure.
- History and type of any prior allergic reactions.
- Symptoms: itching, dyspnea, sensation of airway closure, generalized weakness.
- Airway: Swelling of the lips or tongue, drooling.
- Pulmonary: Wheezing, stridor, hoarseness, ability to speak.
- Skin: Hives, swelling, or erythema.
- Cardiovascular: Tachycardia, hypotension.

### Key Points

- Epinephrine administration is associated with many adverse reactions including hypertension, tachycardia, arrhythmias, tremor, anxiety, vomiting, and chest pain.
- Epinephrine should be used with caution in the elderly, in patient with known heart disease, and in patients with uncontrolled hypertension except in life-threatening allergic reactions.
- The two forms of Epinephrine must not be confused or over-dosage may occur. The 1:1,000 dilution is appropriate for IM injection and is the preferred route of administration in anaphylaxis. The 1:10,000 dilution is for IV administration which should only be used in refractory reaction and requires OLMD approval. The 1:1,000 dilution should **NEVER** be given IV.
- An Epi-pen Auto Injector is approved for administration of 1:1,000 Epinephrine IM.
- If the patient has his or her own Epinephrine Auto Injector (Epi-pen, AuviQ, etc.) the EMSP may administer or assist with administration.
- Patients with moderate/severe allergic reaction should be transported without delay due to potential for rapid deterioration, airway compromise, and/or biphasic reaction.
- Minor reactions are limited to skin rashes with no sign of airway, respiratory, or hemodynamic compromise.
- Moderate/Severe Reactions involve skin rashes with the presence of other symptoms such as respiratory symptoms, facial swelling, vomiting, and can include severe respiratory distress including airway compromise and shock.





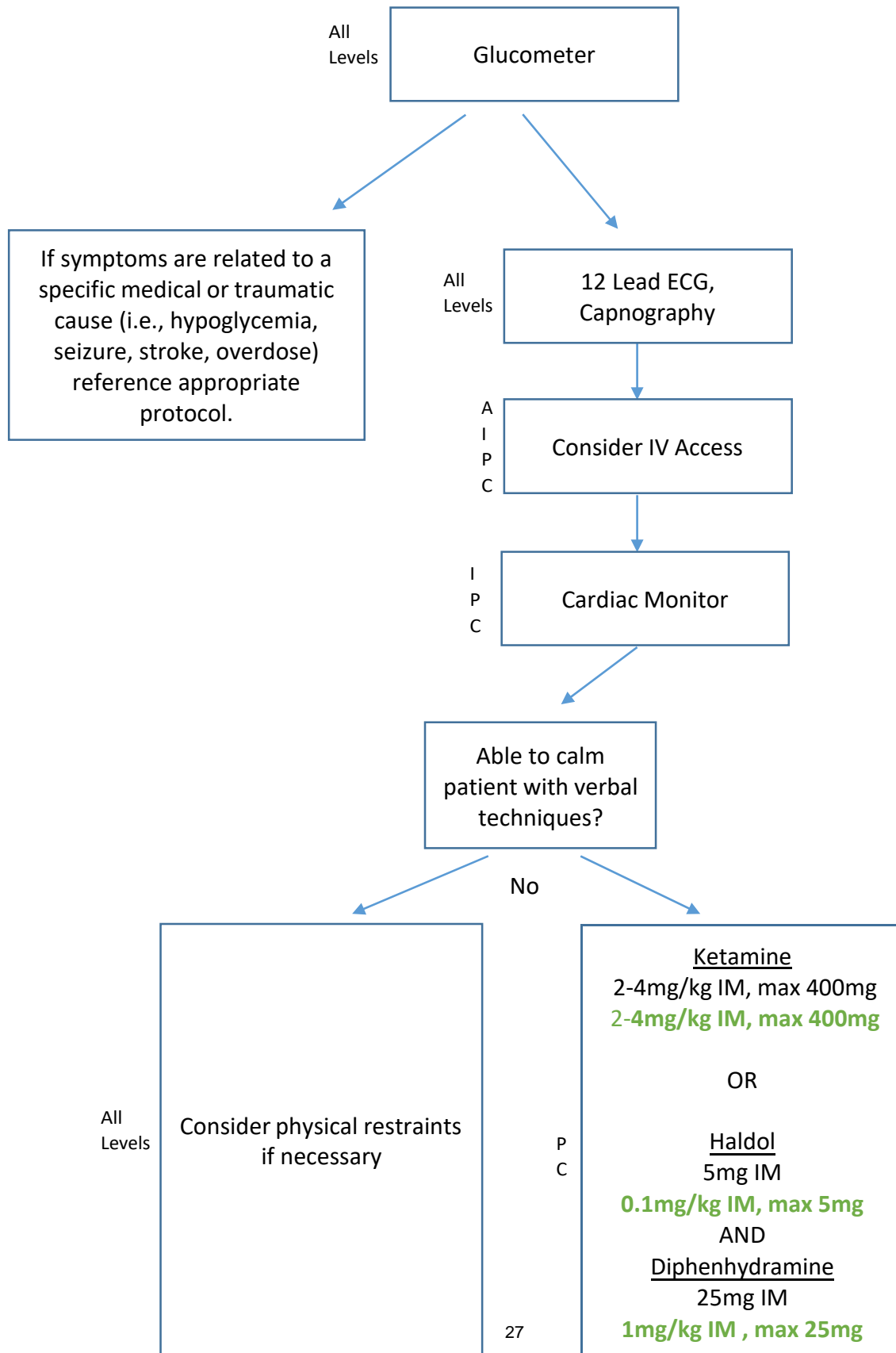
## Altered Mental Status

### History and Physical Exam

- Last time seen conscious or normal, progression of symptoms; recent symptoms such as headache, seizure, confusion, or trauma, possible toxin exposure.
- History of psychiatric illness, history of recent crisis, bizarre or abrupt changes in behavior, suicidal ideation, alcohol or drug intoxication, psychotropic drug use.
- Medical problems and medication history, toxin exposure, history of seizure or stroke.
- Surroundings: Note any pill bottles, syringes, etc., found with patient, as well as any peculiar odors in environment.
- Pupils: Size, symmetry, and reactivity.
- Mental Status: Note level of consciousness, neurologic status (including any focal deficits), and any irrational activity (verbal attacks, spitting, combativeness). Document GCS if applicable.
- Look for signs of trauma and evidence of drug use (ie. needle tracks).
- Note any characteristic odor on the patient's breath.

### Key Points

- In cases of a dangerous environment, safety of personnel on scene is paramount.
- Be particularly attentive to airway management. Aspiration of secretions, vomiting, and inadequate ventilations may be present in patients with severely altered mental status.
- Hypoglycemia may present with a focal neurologic deficit or altered mental status, particularly in elderly patients. Follow the Hypoglycemia Protocol if indicated.
- All patients treated using this protocol should have a medical evaluation and not be considered or referred to as a psychiatric patient, unless under a bona fide mental health hold by a physician, mental health professional, or law enforcement officer. Medical causes of altered mental status should be considered first before psychiatric causes of altered mental status.
- CAUTION: Do not leave suicidal patients alone. Suicidal patients and patients with hallucinations or delusions may potentially exhibit violent behavior. Search patients for and remove dangerous objects (i.e., knives, guns, pills).
- NOTE: Ketamine dosing is based on ideal body weight (based on height).



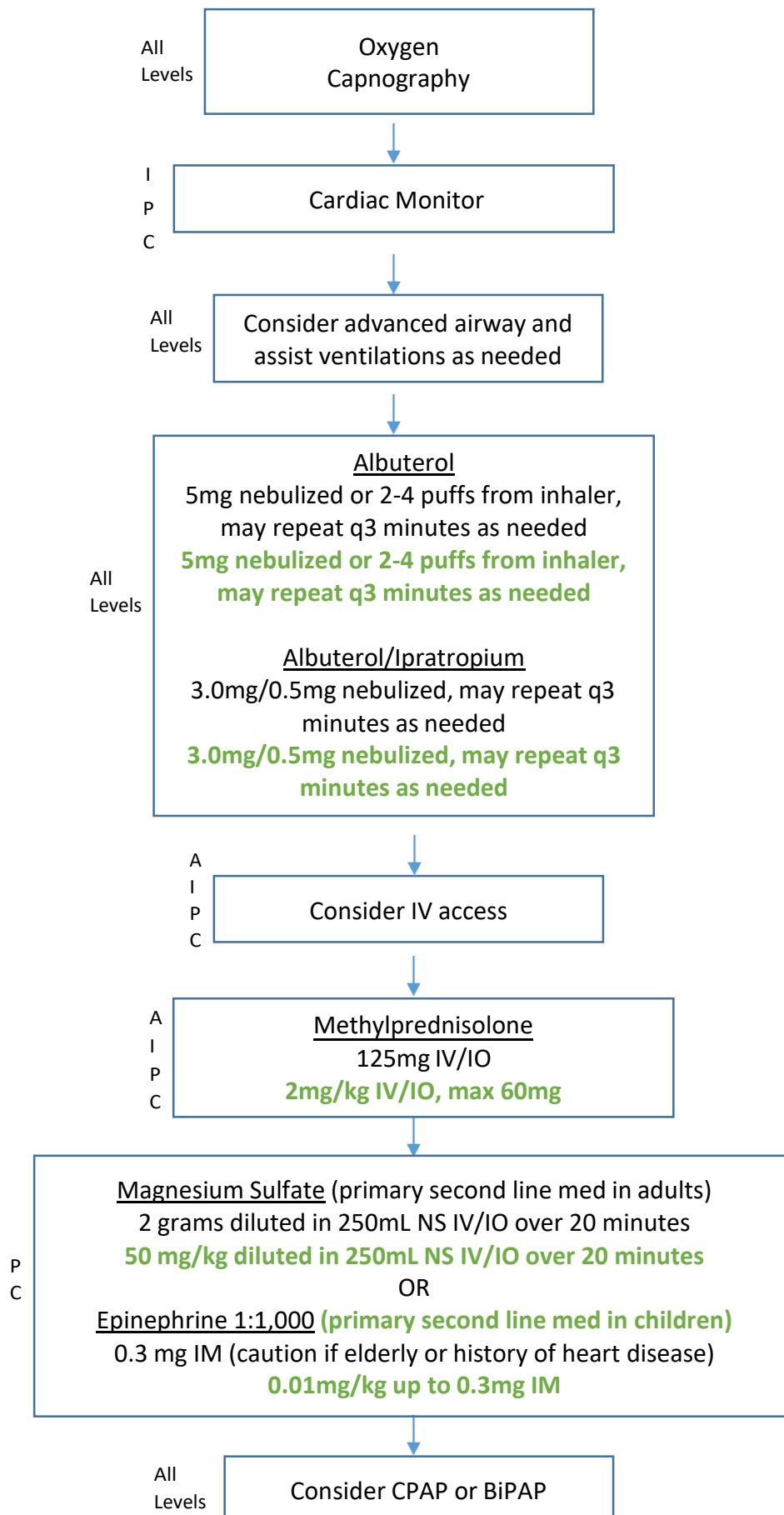
## Asthma/COPD

### History and Physical Exam

- Onset and timing of symptoms.
- History of respiratory problems such as asthma, COPD CHF, allergic reactions.
- Associated symptoms such as chest pain, palpitations, peripheral edema, fever, production cough.
- Home oxygen usage.
- Evidence of respiratory failure: inability to speak, weakened respiratory effort, increased work of breathing, cyanosis, hypoxia.
- Abnormal lung sounds to suggest lower airway obstruction such as silent chest or wheezing.
- Evidence of allergic reaction which could also cause lower airway obstruction.

### Key Points

- Pulse oximetry and capnography should be utilized in all patients with respiratory distress to assess oxygenation and ventilation.
- Patients with lower airway obstruction as in asthma and COPD will usually have wheezing associated with exacerbations; however, severe exacerbations can result in “silent chest” due to poor air movement.
- Waveform capnography will frequently have a “shark tooth” pattern in patients with obstruction processes such as asthma or COPD.
- Equipment for airways support and ventilation including intubation equipment, supraglottic airways, and a bag-valve-mask should be readily available in all patients with respiratory distress.
- If patient has unresponsive wheezing then epinephrine is the preferred second-line agent in children while magnesium is the preferred second line agent in adults.
- If epinephrine is administered in adults then caution should be used if the patient is elderly or has a history of hypertension or coronary artery disease.
- CPAP can be a useful adjunct in some patients with significant airway obstruction which is unresponsive to other therapies.



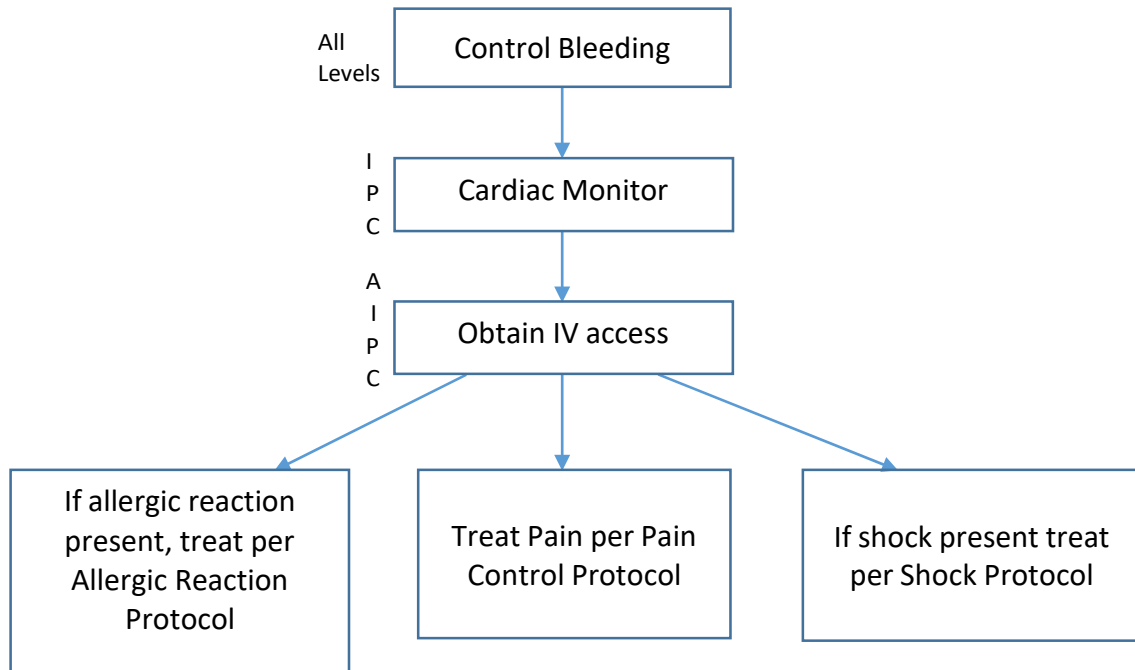
## Bites and Envenomation

### History and Physical Exam

- Type of bite/sting and description of creature, rabies status of creature.
- Timing, location, size of bite/sting.
- Previous reaction to bite/sting.
- Rash, wound, soft tissue swelling, redness, amount of pain.
- Evidence of allergic reactions such as itching, hives, difficulty breathing, wheezing, hypotension or shock.

### Key Points

- Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- Cat bites may progress to infection rapidly due to specific bacteria in their mouths.
- Carnivore bites (such as dogs) have the potential for progression to infection and risk of rabies exposure.
- Venomous snakes in this area are generally of the pit viper family: rattlesnake, copperhead, cottonmouth water moccasin. Coral snake bites are rare. The amount of envenomation is variable. It is no longer recommended to use tourniquets or venom extractors to treat snakebites.
- Black widow spider bites tend to be minimally painful at first, but over a few hours, patients develop severe muscular pain and abdominal rigidity.
- Brown recluse spider bites are minimally painful, but progress to tissue necrosis over the course of a few days.
- Jellyfish stings can be very painful. Treat by flushing the skin with salty ocean water and carefully removing any visible tentacles with tweezers. Do not use fresh water to flush the skin as this will cause undischarged nematocysts to rupture and release their toxins.
- Stingray spine punctures can be extremely painful. Impaled barbs should be left in place for transport. The wound can be immersed in non-scalding hot water to tolerance for 30 minutes which attenuates the heat-labile venom of the stingray.
- While identification of the creature is important, remember that the safety of the EMSP is more important than killing and/or identifying the creature. Consider taking a photo of the creature to show to the receiving physician, if a camera is available.



## Cardiac Arrest - Adult

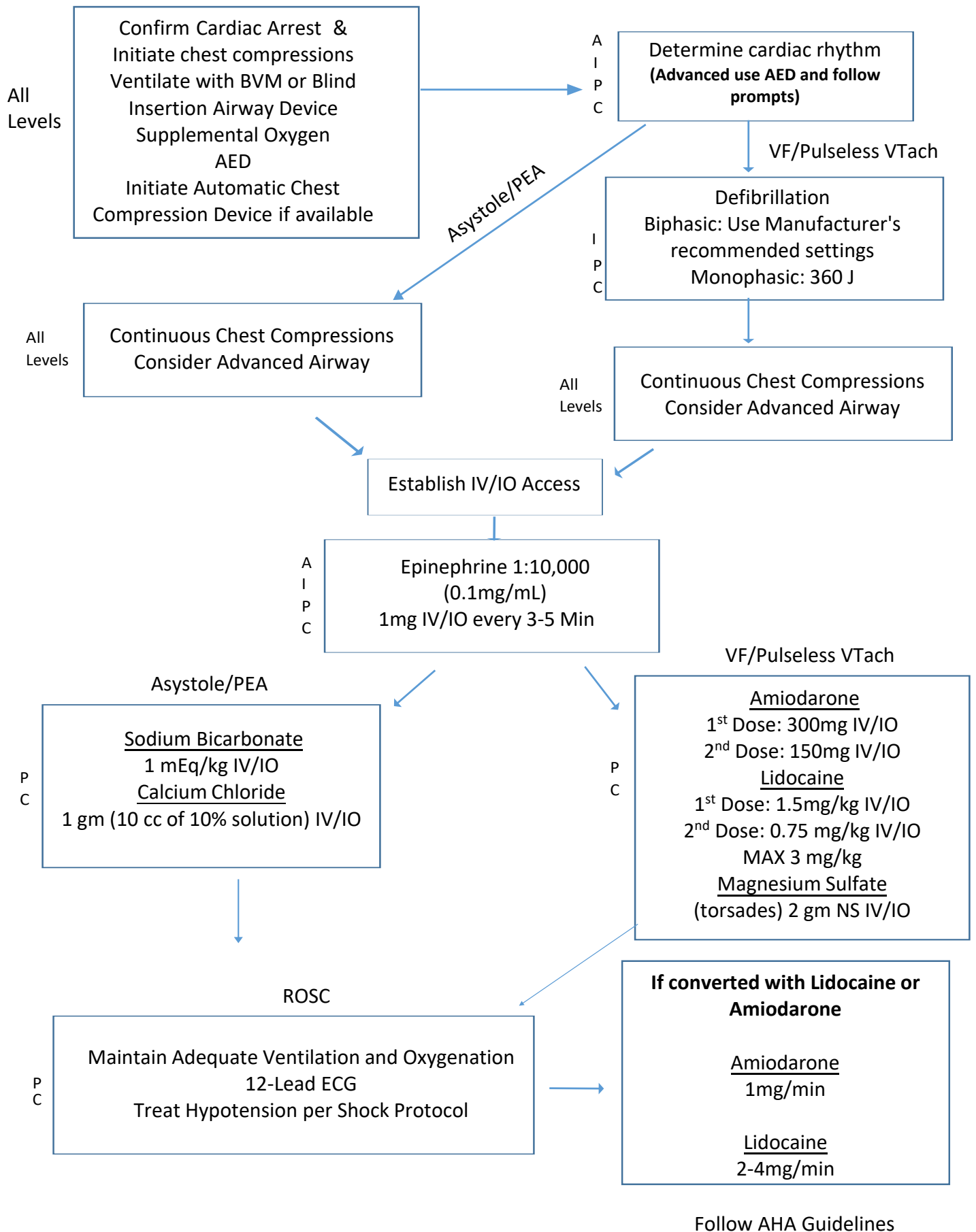
### History and Physical Exam

- What were the downtime and circumstances? Was the arrest witnessed? Was bystander CPR performed? Were there any preceding symptoms?
- Determine past medical history, allergies, and current medications.
- Rapidly determine the level of consciousness, respiratory effort, and presence of pulses.
- Cardiac Rhythm Analysis.
- Always think about reversible causes of cardiac arrest: Hypovolemia, Hypoxia, Acidosis, Hyperkalemia, Hypothermia, Tension Pneumothorax, Cardiac Tamponade, Toxins, Pulmonary Thromboembolism, Acute MI.

### Key Points

- **Performance of high-quality chest compressions at a rate of 100-120 compressions/minute and 2 inches depth allowing for full chest recoil combined with early defibrillation are the most critical elements of the resuscitation.** Consider the use of a metronome to ensure proper chest compression rate.
- Once resuscitative efforts are begun, they should be continued until arrival at the receiving hospital or until a joint decision has been made with OLMD that resuscitation should cease.
- Remember to treat the patient and not the monitor. Treatment decisions must be made considering the patient's condition, not just the rhythm on the monitor.
- Patients with penetrating torso injury and cardiac arrest can sometimes survive. The priority for these patients, as opposed to patients with other etiologies of cardiac arrest, is rapid transport and NOT chest compressions. Chest compressions may still be performed but should not delay transport. These patients should receive IV fluids according to the Shock Protocol.
- If quantitative waveform capnography <10 mm Hg, attempt to improve CPR quality.
- If the patient in cardiac arrest has a venous port or other central venous access devices, the EMSP may use it.





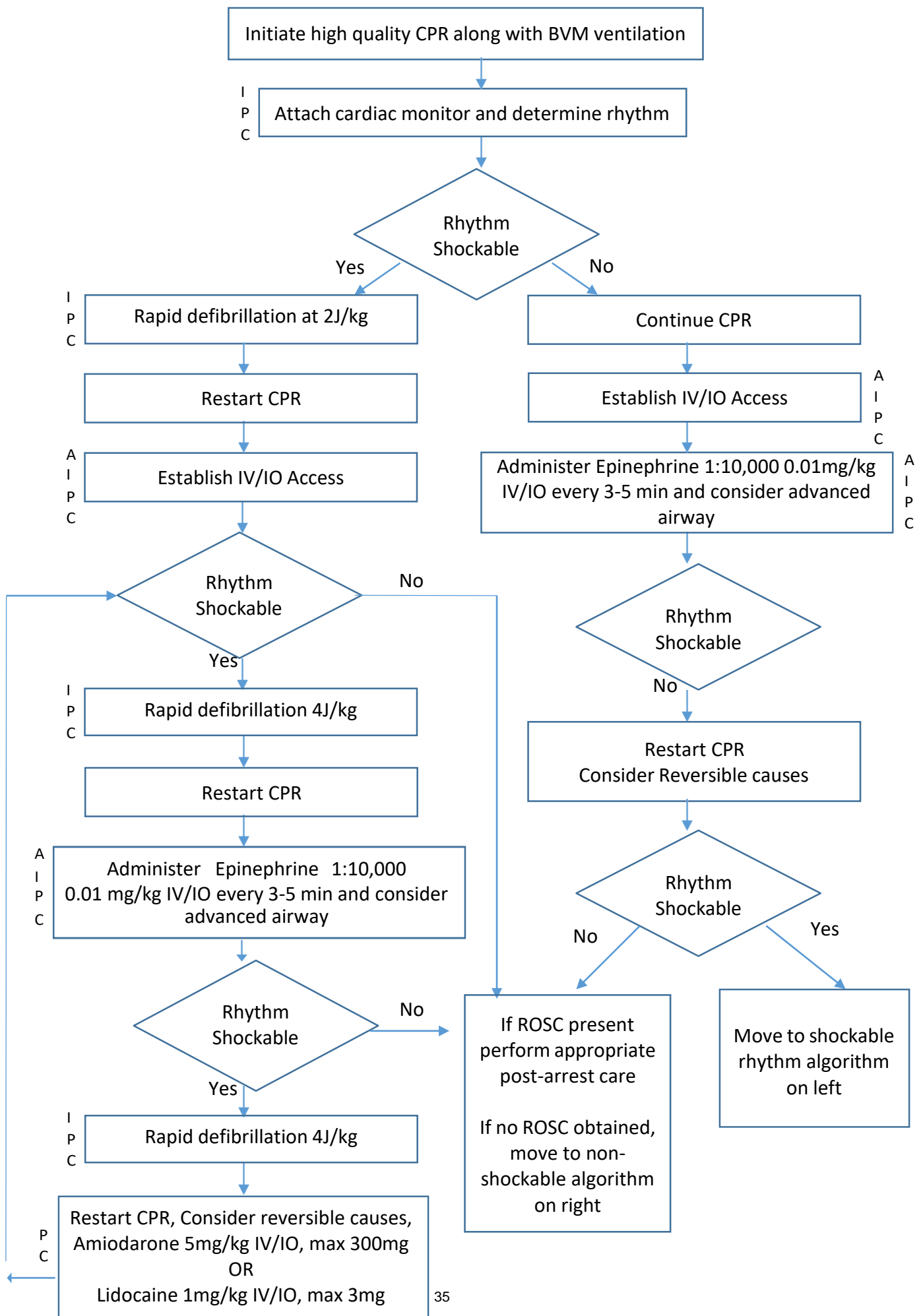
**Cardiac Arrest - Pediatric**

## History and Physical Exam

- Downtime and circumstances: Was arrest witnessed? Was bystander CPR performed? What lead up to the arrest?
- Patient's past medical history, medications, allergies.
- Quick determination of presence of pulse.
- Cardiac rhythm analysis.
- Consider reversible causes: airway obstruction, hypovolemia, hypoxia, acidosis, hypokalemia, hyperkalemia, hypothermia, tension pneumothorax, cardiac tamponade, toxins.

## Key Points

- Rapid initiation of high quality chest compressions after lack of pulse is determined.
- Chest compressions should be performed at a rate of 100-120 compressions per minute to a depth of 1/3 of the diameter of the chest and allowing for full chest recoil between compressions. Consider the use of a metronome to ensure proper rate.
- A quick determination of rhythm should be made and, if shockable, early defibrillation provided as soon as possible.
- Endotracheal intubation of pediatric patients in cardiac arrest is discouraged and use of supraglottic airways such as the iGel or BLS airways with good bag-valve-mask ventilation is encouraged.
- All patients who have an advanced airway placed (ETT or SGA) should have quantitative waveform capnography utilized.
- Vascular access should be obtained quickly either by IV access or IO access to facilitate timely administration of epinephrine and other medications.
- If the patient in cardiac arrest has a venous port or other central venous access device, the EMSP may utilize it.
- Treatment decisions must be made considering the patient's condition and not just the rhythm on the monitor.
- Even in pediatric patients traumatic out of hospital cardiac arrest is rarely survivable, however, patients with penetrating torso injury can sometime be saved and rapid transport to an appropriate facility is encouraged.
- Consider treatment for opiate overdose per Poisons and Overdoses Protocol if opiate overdose is suspected in the cardiac arrest patient.



## Cardiac Dysrhythmias - Adult

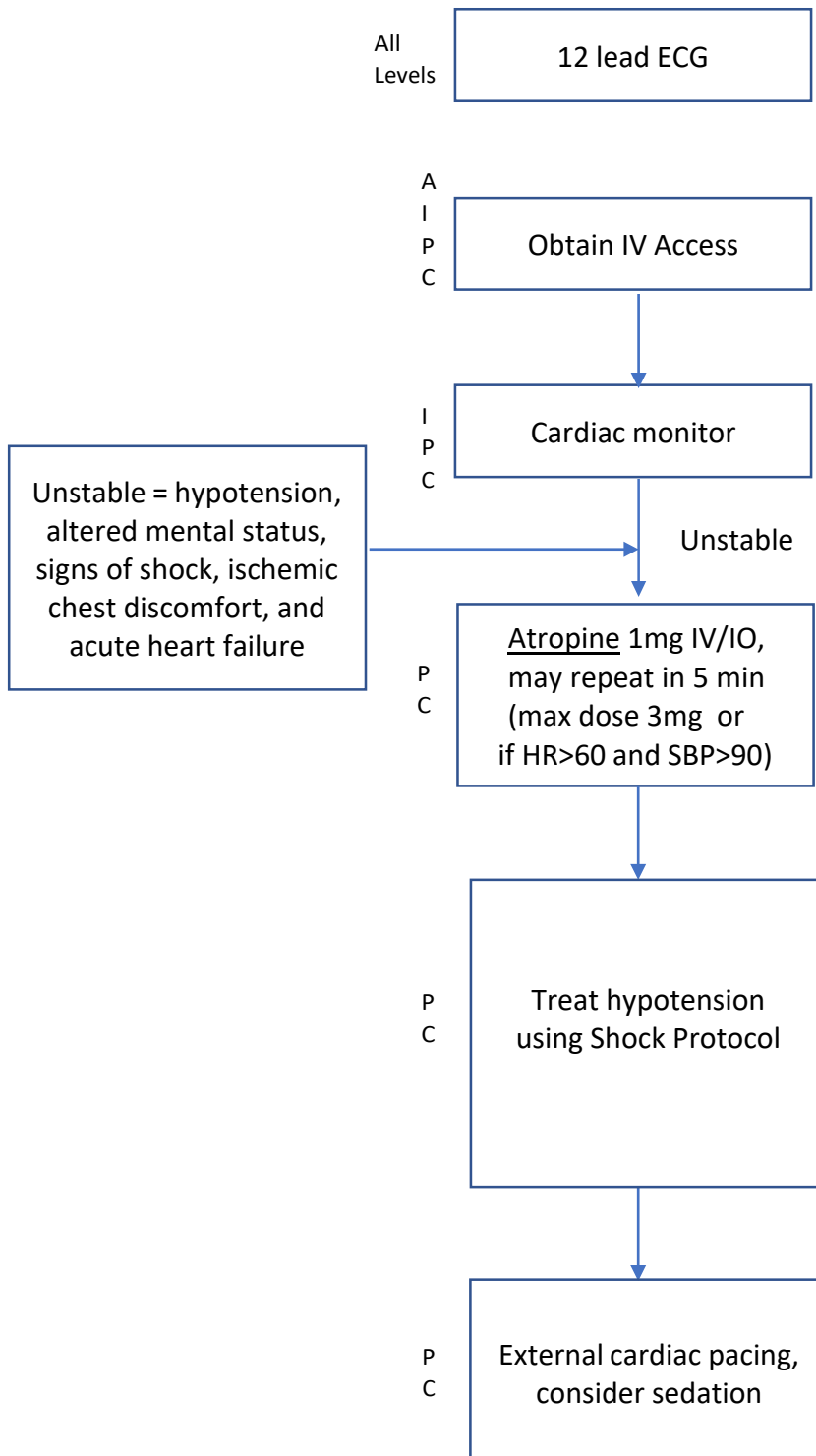
### History and Physical Exam

- Chief complaint, onset (sudden or gradual).
- Associated symptoms: palpitations, dizziness, chest pain, syncope, dyspnea.
- Past medical history and medication history.
- Look for evidence of low cardiac output such as altered level of consciousness, presence of shock syndrome, and signs of congestive heart failure.

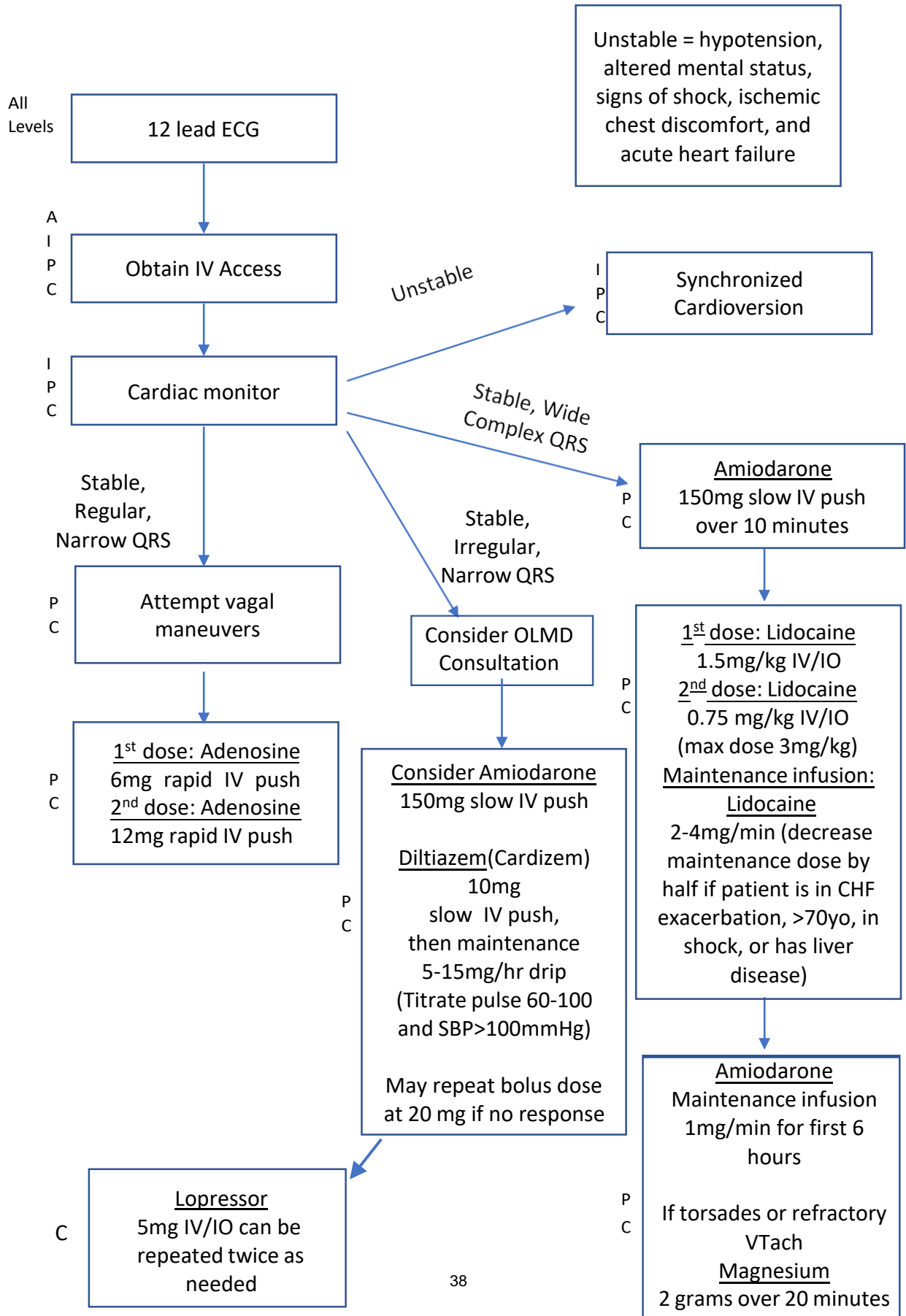
### Key Points

- Cardiac dysrhythmias with signs of impaired perfusion require immediate treatment in the field. However, if the patient has no signs of impaired perfusion, he or she may not require immediate treatment.

**Adult Bradycardia**



**Adult Tachycardia with a Pulse Treatment**



**Cardiac Dysrhythmia - Pediatric**

## History and Physical Exam

- Chief complaint, onset (sudden or gradual).
- Preceding signs or symptoms of illness.
- Related symptoms such as palpitations, dizziness, chest pain, syncope, dyspnea.
- Past medical history and medications.
- Look for evidence of low cardiac output such as altered level of consciousness, presence of shock, signs of heart failure.

## Key Points

- Treatment of dysrhythmias in the field is only indicated for pediatric patients who are symptomatic.
- Chest compressions should be initiated for a heart rate less than 60 in small children with signs of poor perfusion (altered mental status, hypoxia, hypotension, weak pulse, delayed capillary refill, cyanosis) and treatment should be guided by the Cardiac Arrest (Pediatric) protocol.
- In pediatrics bradycardia is frequently due to an underlying cause (usually hypoxia or hypoglycemia) and should be treated accordingly.
- If underlying causes for bradycardia have been treated and the patient remains bradycardic with symptoms of hemodynamic instability, then treatment with epinephrine is indicated.
- Children with tachyarrhythmias can frequently tolerate them quite well and if stable, EMSPs should consider deferring treatment to the hospital.

A  
I  
P  
C

Cardiac monitor  
IV access

Tachycardia  
or  
Bradycardia

Tachycardia

Bradycardia

Stable or  
Unstable

Stable or  
Unstable

Unstable

Unstable

Stable

P  
C

Synchronized  
Cardioversion

P  
C

Transcutaneous  
Pacing

Treat potential  
underlying causes  
of bradycardia

Narrow or  
Wide Complex

Narrow

Wide

P  
C

Vagal Maneuvers

Wide complex  
arrhythmias are rare in  
children and OLMC  
should be consulted

P  
C

Push Dose Epinephrine  
(1:100,000) 1mcg/kg  
(0.1mL/kg) up to 10mcg  
(1mL) IV/IO to maintain  
heart rate and MAP greater  
than 65mmHg

P  
C

Adenosine 0.1mg/kg  
up to 6mg IV/IO

If regular and  
monomorphic, consider  
SVT with aberrant  
conduction and  
treatment with adenosine

P  
C

Atropine  
0.02mg/kg IV up to 0.5mg  
IV/IO (minimum 0.1mg)

P  
C

Adenosine 0.2mg/kg up  
to 12mg IV/IO

P  
C

Consider Amiodarone  
5mg/kg up to 150mg  
IV/IO



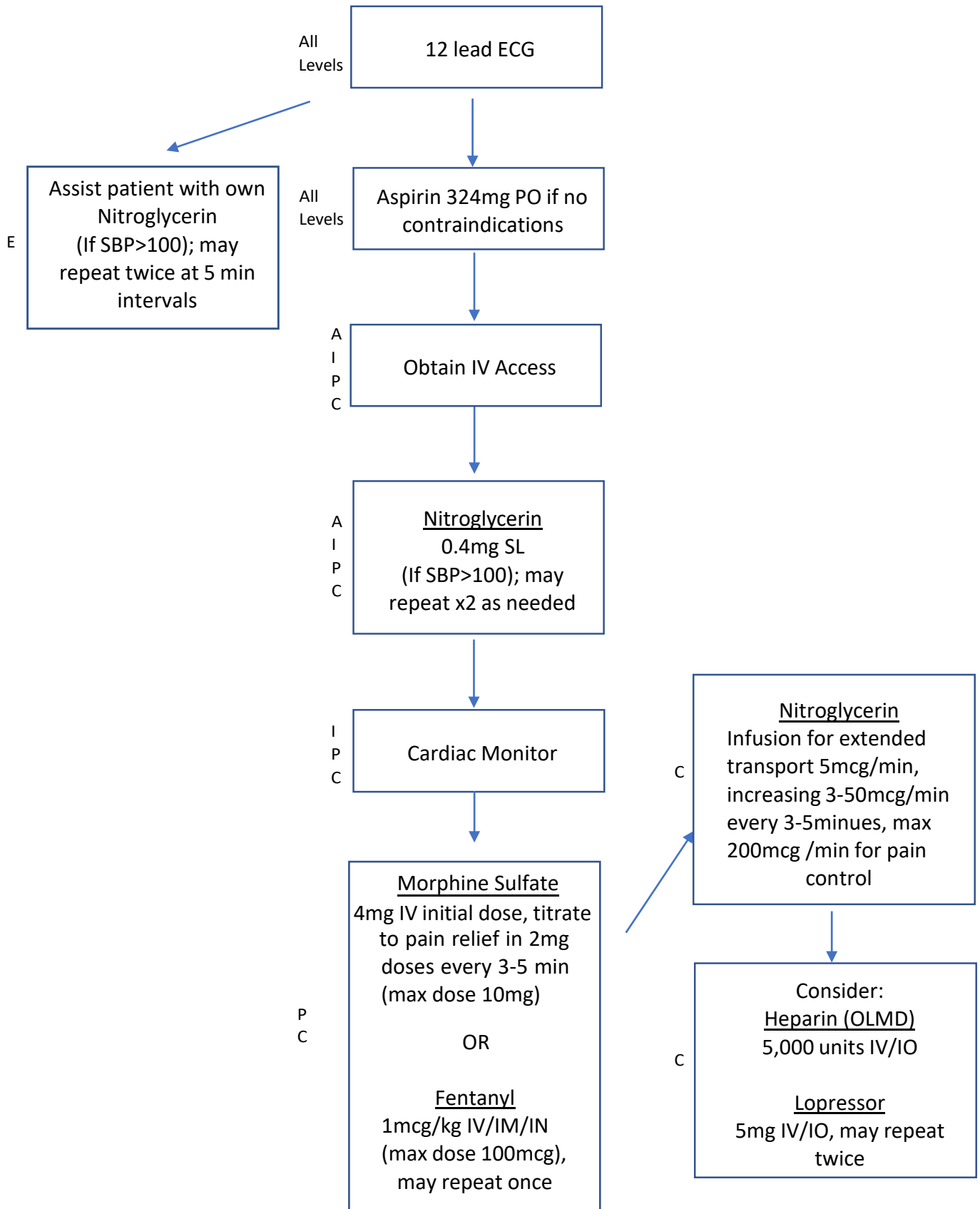
## Chest Pain or Suspected Acute Coronary Syndrome (ACS)

### History and Physical Exam

- Access pain: onset, location, quality, radiation, severity, time began.
- Associated symptoms: nausea, vomiting, diaphoresis, shortness of breath.
- History: cardiac or pulmonary events, medications, syncope.
- Risk factors: family history, smoking, obesity, diabetes, hypertension, high cholesterol.
- Repeat vital signs often (every 10 minutes and after each medication administration).
- Check symmetry of pulses and listen to breath sounds.
- Look for signs of congestive heart failure, including neck vein distension, peripheral edema, or pulmonary edema.

### Key Points

- **This protocol is for adults. Contact OLMD for chest pain in pediatric patients.**
- Have a high suspicion for cardiac disease in women, diabetics, and all patients >50 years old who have symptoms that might be attributed to ACS (chest pain, shortness of breath, radiation to neck/jaw/arm, diaphoresis, syncope, and nausea/vomiting).
- Obtain a 12 lead ECG on all patients with chest pain, epigastric discomfort, or suspected ACS prior to leaving the scene as ST segment elevation MI (STEMI) can be accurately diagnosed by 12 lead ECG.
- In patients with STEMI, time to reperfusion is critical. Transmitting an ECG to the receiving hospital can significantly shorten the time to reperfusion treatment. Minimize scene times and consider transporting patients with STEMI to hospitals with an available catheterization lab for percutaneous coronary intervention. If unsure of appropriate destination hospital, contact OLMD.
- Chest wall tenderness does not rule out cardiac ischemia.
- Do not give Aspirin to patients who cannot swallow, have an allergy to Aspirin, have current GI bleeding, or have already taken 324mg Aspirin in the last 24 hours.



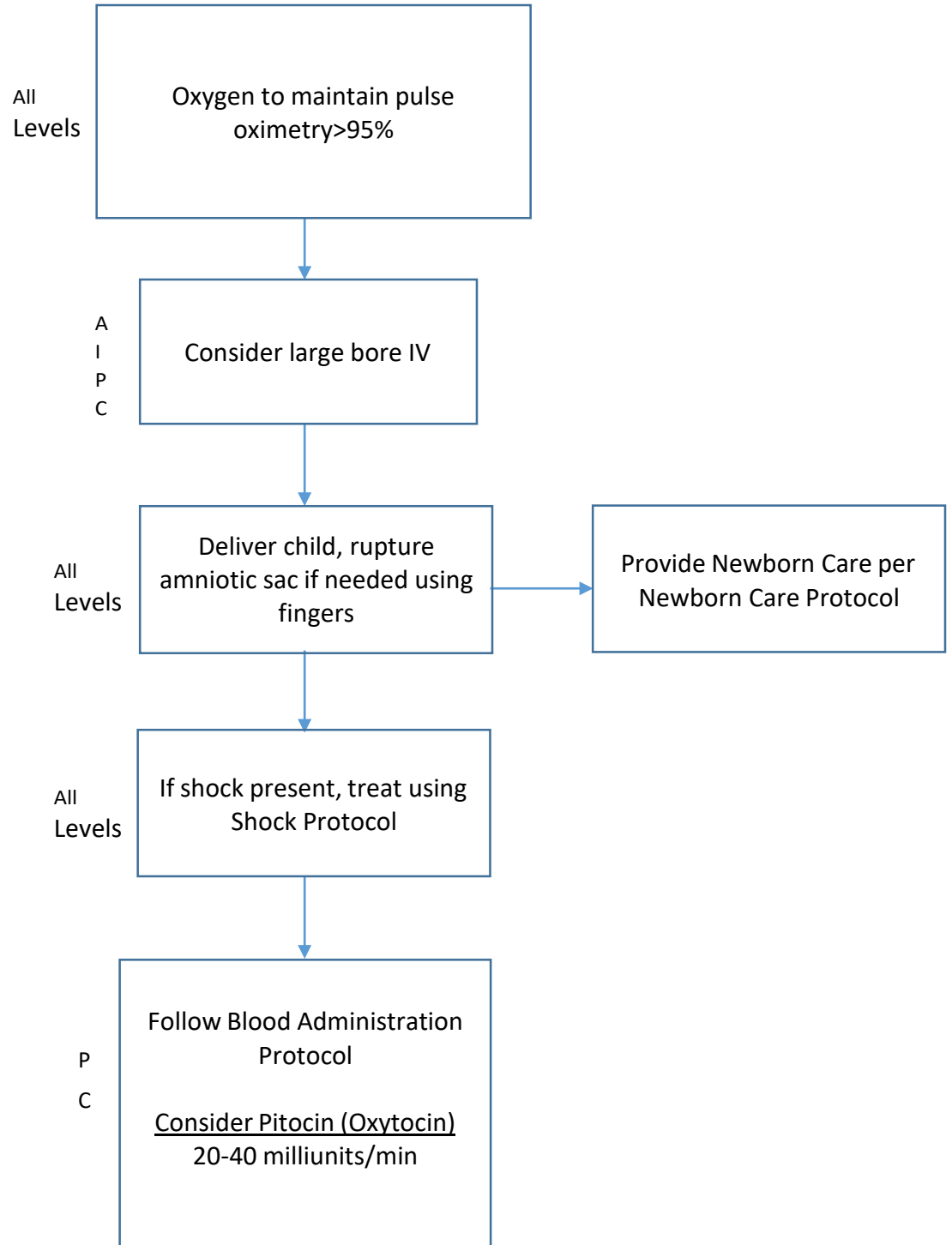
## Childbirth

### History and Physical Exam

- History of pregnancy: Due date, last menstrual period, is known multiple gestations?
- Does the patient feel that she is in labor or about to deliver (e.g. rectal or vaginal pressure)?
- Recent symptoms such as pain or contractions? Timing and regularity? Vaginal bleeding, ruptured membranes, urge to push?
- Medical history: medications, medical problems, age, number of prior pregnancies.
- Vital signs and fetal heart rate if possible.
- Contractions and relaxation of the uterus.
- Where privacy is possible, inspect perineum for vaginal bleeding or fluid (note color and presence of meconium), crowning (check during contraction), abnormal presentation (foot, arm, cord, or breech).

### Key Points

- Do not delay transport particularly for patients with previous cesarean section, known imminent multiple births, abnormal presenting parts, excessive bleeding, and premature labor.
- In case of the prolapsed umbilical cord, place the mother in Trendelenburg or knee-chest position. The elevated presenting body part relieves pressure on the cord and keeps the cord moist with saline gauze if it is exposed. Do not delay transport.
- If a non-viable premature fetus is delivered and the fetus is available, place the fetus in a clean container and transport it to the hospital with the mother. Remember to treat the fetus with the same respect as the EMSP would treat any deceased patient.
- Do not delay transport to hospital for delivery of placenta, if placenta is delivered in the field then it needs to be transported to the hospital with the patient.



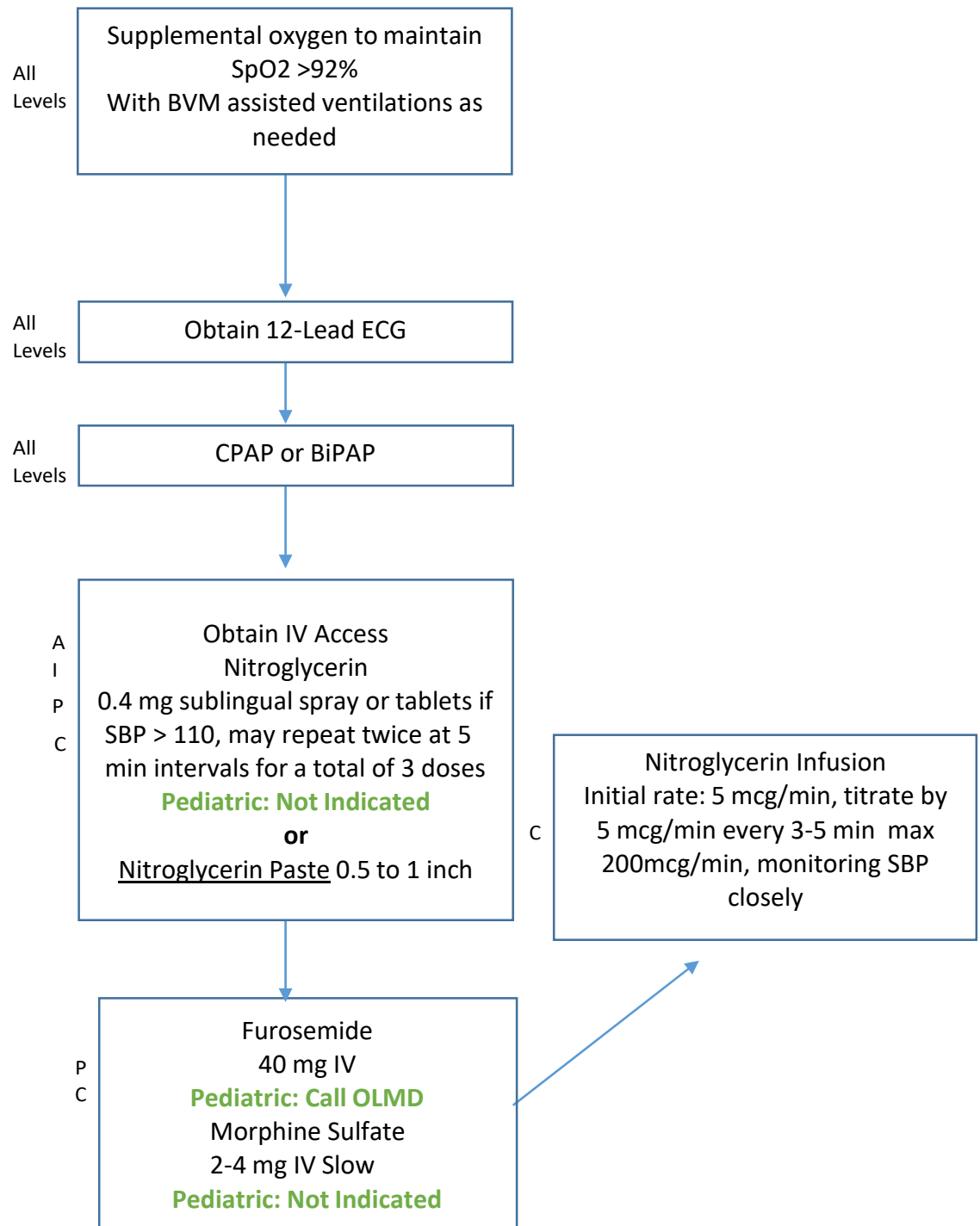
## Congestive Heart Failure

### History and Physical Exam

- The acuity of onset of symptoms? Obtain careful history of fever, chills, and purulent sputum products.
- History: Chronic lung or heart problems? Medications or home oxygen?
- Associated symptoms: Chest pain.
- Vital signs including pulse oximetry. If the patient is usually on supplemental oxygen, note his or her pulse oximetry on his or her usual amount of oxygen.
- Level of Consciousness.
- Cyanosis.
- Signs of Congestive Heart Failure: distended neck veins, pulmonary edema, cardiac wheezing, frothy sputum, peripheral edema.

### Key Points

- An accurate assessment of breath sounds is crucial.
- **Early use of CPAP/BIPAP and nitroglycerin is key to the management.**
- Oxygen as needed to maintain SpO<sub>2</sub> levels greater than 92%.
- Upright positioning.
- Cardiac monitor and 12-lead ECG.



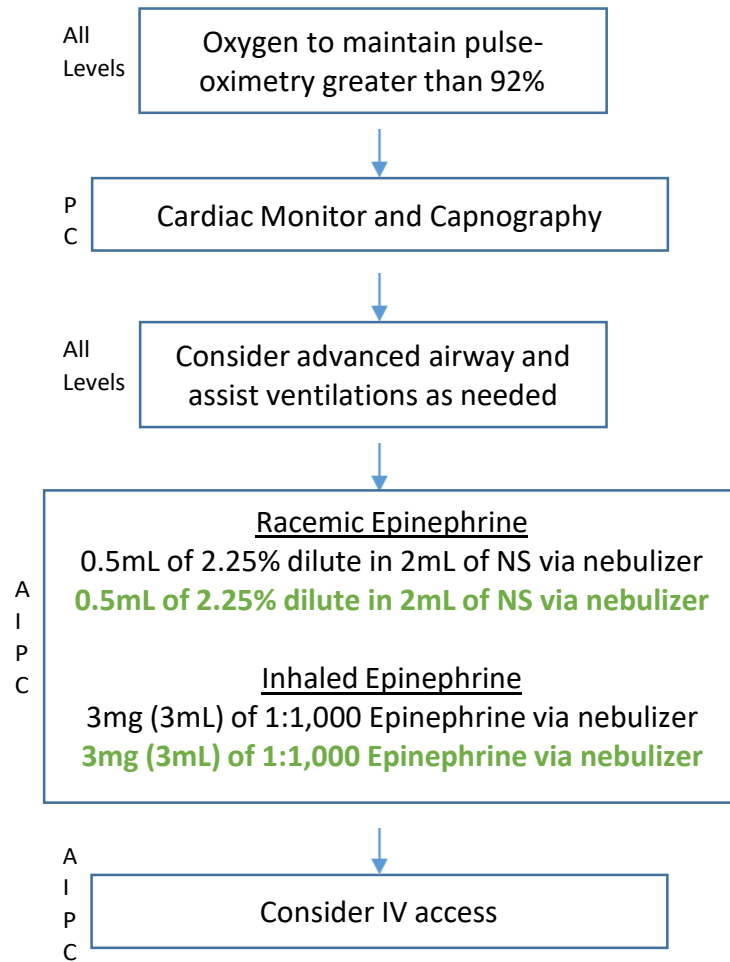
## Croup/Upper Airway Obstruction

### History and Physical Exam

- Onset and timing of symptoms.
- History of respiratory problems such as asthma, COPD CHF, allergic reactions.
- Croup and upper airway obstruction is usually associated with stridor, a high pitched expiratory noise best heard over the neck and frequently can be heard without a stethoscope.
- Recent history of symptoms associated with croup and upper airways swelling such as congestion, runny nose, barky cough.
- Associated symptoms such as chest pain, palpitations, peripheral edema, fever, production cough.
- Home oxygen usage.
- Evidence of airway obstruction: stridor, drooling, voice changes, coughing.
- Evidence of respiratory failure: inability to speak, weakened respiratory effort, increased work of breathing, cyanosis, hypoxia.
- Evidence of allergic reaction such as hives, airway edema, vomiting, or known exposure which can also be associated with upper airway obstruction.

### Key Points

- Pulse oximetry and capnography should be utilized in all patients with respiratory distress to assess oxygenation and ventilation.
- Equipment for airways support and ventilation including intubation equipment, supraglottic airways, and a bag-valve-mask should be readily available in all patients with respiratory distress.
- Upper airway obstruction is caused by swelling in the upper airway which is treated using racemic epinephrine or inhaled epinephrine.
- Upper airway obstruction may also be caused by foreign bodies.





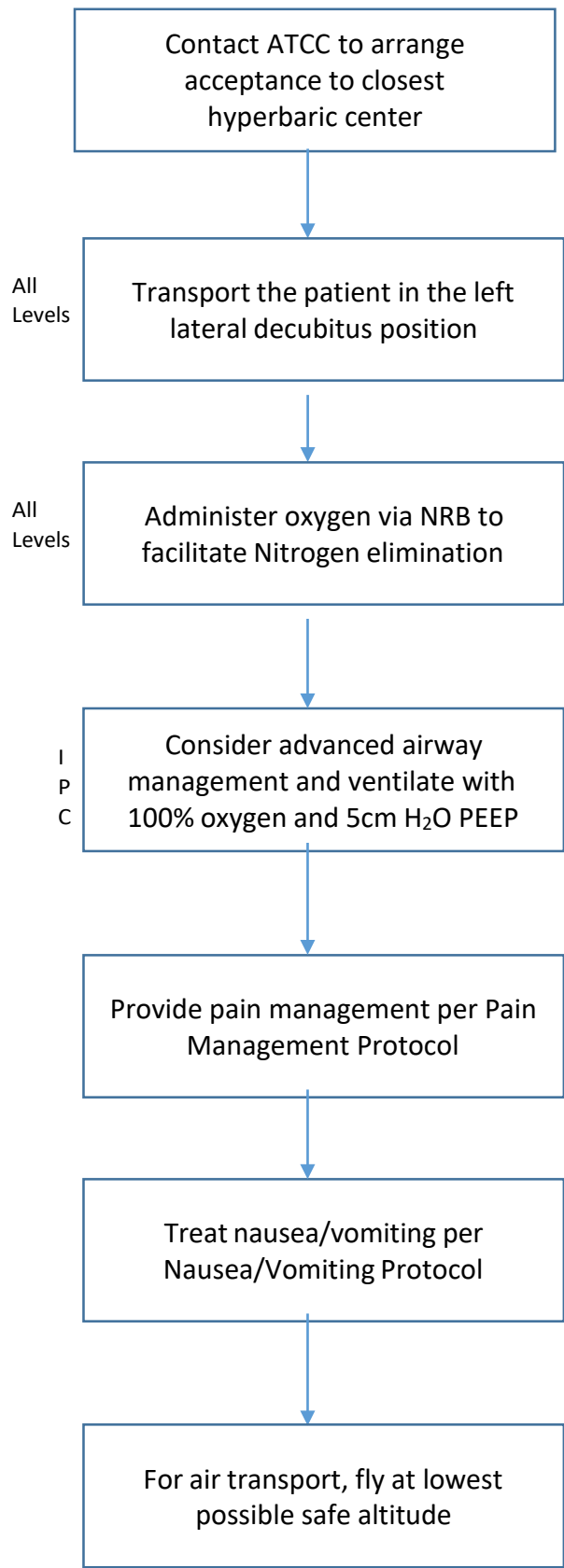
## Decompression Sickness

### History and Physical Exam

- Obtain appropriate history related to the incident (length of exposure, temperature of liquid medium, type of liquid medium, potential for injury, depth and duration of dive, onset of complications).
- Obtain past medical history and current medications.
- Obtain drug allergies.
- Any history of substance abuse?

### Key Points

- Patients should be treated in the left lateral decubitus position.
- Oxygen saturations should be monitored carefully.



## Electromuscular Incapacitation Device (Taser)

### History and Physical Exam

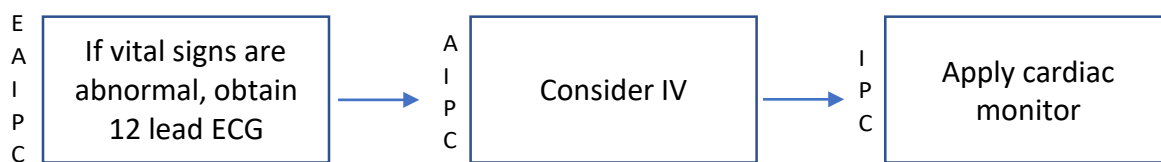
- What was the patient doing that required use of the device?
- Past history: Illicit drug use (types and frequency), medical problems and medication use, psychotropic or behavioral drug use, previous psychiatric disorders.
- If the device uses barbs, is a barb still penetrating the skin?
- Are the barbs in a sensitive area (eye, eyelid, ear, nose, neck, breast, or genitalia)?
- Do not touch or step on the barbs or wires until the wires have been unattached.
- Perform general patient assessment.

### Key Points

- Law enforcement may request EMSP to evaluate a patient who was the target of an electromuscular incapacitation device. The important issue is not removal of barbs, but rather what caused the patient to be combative requiring the use of the electromuscular incapacitation device. Deaths have been recorded after use of these devices; however, it has always been due to an underlying cause of combative behavior (ie., psychosis, drugs, hypoglycemia, intracranial abnormality, etc.).
- Patients with normal vital signs who have returned to a normal mental status do not require transportation to a hospital unless physician assistance is needed for barb removal, or some other reason is present mandating hospital transport. If there is any doubt whether transport is required, contact OLMD.
- If the patient is under arrest, law enforcement should accompany the patient to the hospital.
- If the patient has altered mental status, reference the AMS Protocol.

### Removal of Barbs:

- Treat barbs as contaminated needles.
- Confirm that the Taser has been shut off and that the wires have been removed from the barbs.
- Remove one barb at a time.
- Grab barb firmly and pull straight out in a quick motion, using two fingers of the EMSP's free hand on either side of the barb as a brace.
- Clean the area with betadine or alcohol and apply a dressing.
- Dispose of the barb in a sharps container, or give to law enforcement personnel.
- Barbs in the eye, eyelid, ear, nose, neck, breast, or genitalia should be transported to the hospital for physician removal.



## Hemodialysis Emergency Disconnect

### History and Physical Exam

- Some patients are now doing UNATTENDED (i.e. solo) home hemodialysis. In the event an EMSP responds to a scene where such a patient is unable to disconnect themselves from the machine, and no else is available who knows how to do so, follow this procedure to disconnect the patient from the machine for transport.

### Key Points

- If time and patient condition permit, ALS backup should be called for BLS crews.
- If the EMSP are trained in using HD shunt clamps, and such clamps are available, it is acceptable to remove the HD needles from the patient's shunt and apply clamps. If not, this procedure should be followed, leaving the needles in situ as described above and below.
- The dialysis machine will be left at the home.
- If the EMSP can, note (or photograph) any clinically relevant values on the machine's readouts (such as liters removed).
- For a patient with an AV shunt, the result of this procedure is that the patient still has the dialysis needles in his or her AV fistula, ATTACHED to CLAMPED tubing, which is wrapped with gauze to keep the needles and tubing next to the patient's arm (unless HD shunt clamps are used).

### Procedure:

- Push the **STOP** button on the front of the machine and unplug the machine's power cord.

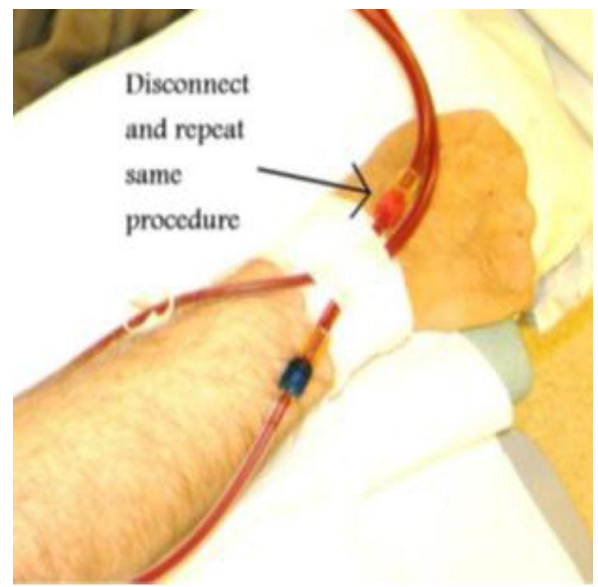
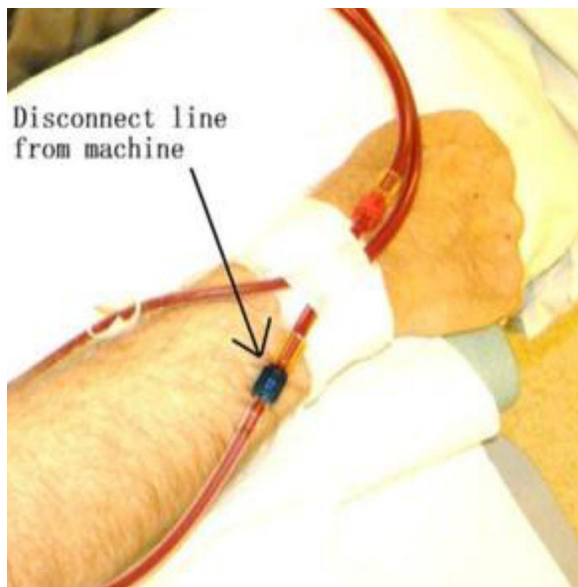


- Identify and close the four clamps on the tubing. If clamps are not on the tubing, use Kelly clamps or plastic clamps (which will usually be on or near the dialysis machine) to clamp off the two tubes both above and below the Luer lock disconnects.

The disconnects are in the center of the pictures below.



- If the EMSP is trained to do so, and has sterile caps or sterile syringes, or is on or near the dialysis machine, then swab each disconnect end-connector with alcohol and attach the cap or syringe.
- The EMSP will now have two needle-tubing pieces still inserted into the patient's fistula. GENTLY tape the tubing to the patient's arm, then LOOSELY wrap gauze around the arm. DO NOT apply a pressure dressing.



If the EMSP accidentally pulls a needle out of the fistula, he or she will have to apply firm manual pressure (again, NOT a pressure dressing) to that bleeding point for approximately 20 minutes. Be prepared to call for additional resources if needed.

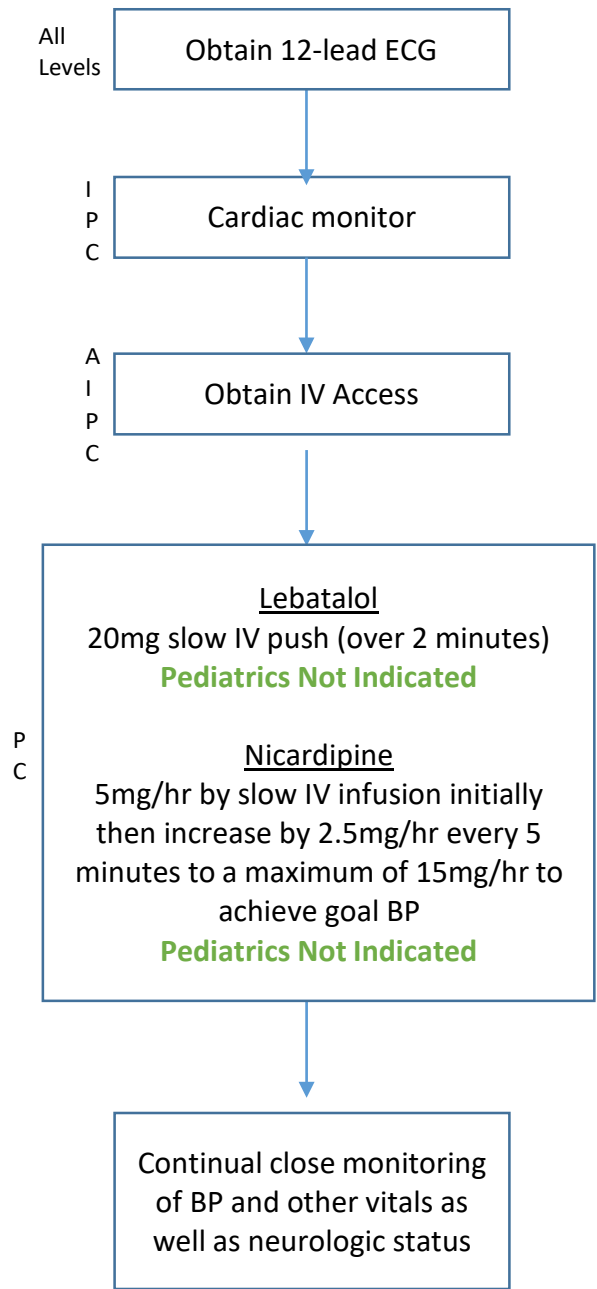
## Hypertensive Emergencies

### History and Physical Exam

- History of hypertension or other medical problems.
- Medication use or drug ingestion.
- Signs or symptoms of end organ damage such as headache, blurred vision, neurologic deficit, pain, congestive heart failure.
- Signs or symptoms of stroke (focal neurologic deficit, aphasia, etc.).

### Key Points

- Hypertensive emergency is only treated if signs and symptoms of end organ damage are present and Diastolic BP > 115.
- Patients who appear to be having a stroke usually do not have their BP treated in the prehospital setting.
- Use caution in patients who have a potential underlying shock with hypertension (e.g. sepsis).



## Hyperthermia

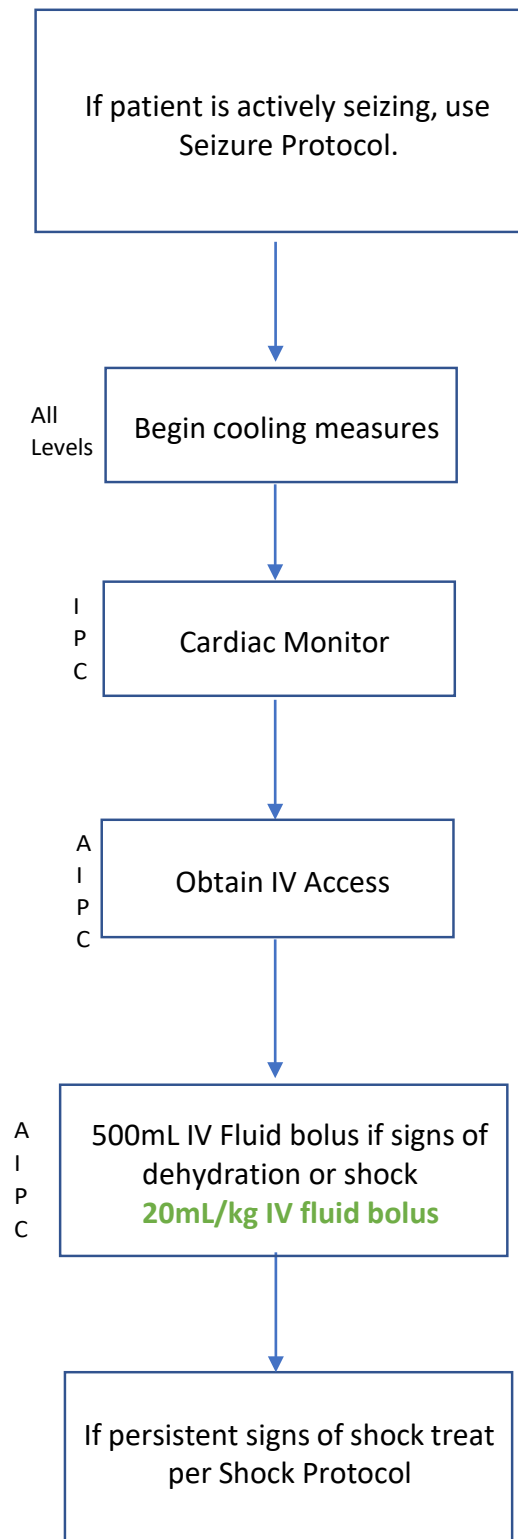
### History and Physical Exam

- Sudden collapse or gradual development?
- Exercise induced?
- Environmental conditions?
- Previous history of hyperthermia?
- Vital signs: Oral or rectal temperature (if available) greater than 104°F or 40°C usually consistent with heat stroke, but lower temperatures can be seen.
- Skin: temperature, presence or absence of sweat.

### Key Points

- There are three classic syndromes of hyperthermia – heat cramps, heat exhaustion, and heat stroke. Heat cramps occur secondary to inadequate intake of fluids and electrolytes resulting in muscle cramping. Heat cramps can progress to heat exhaustion resulting in dehydration, nausea and vomiting, and generalized weakness. Higher temperatures are usually seen with heat exhaustion (101-104°F or 38.3-40°C). Heat exhaustion can progress to heat stroke.
- Heat stroke is a medical emergency. It is defined as hyperthermia (usually >104°F or 40°C) with altered mental status.
- Suspect hyperthermia/heat stroke in patients with acute psychosis or seizure on a hot, humid day.
- If a physician with expertise in hyperthermia management is on scene, contact OLMD to relinquish control.
- Cool patient if possible while transporting. If ice water bath equipment or iced towels are immediately available, immerse the patient until his or her core temperature returns to normal. Wet sheets wrapped over a patient without good air flow may increase temperature and should be avoided.





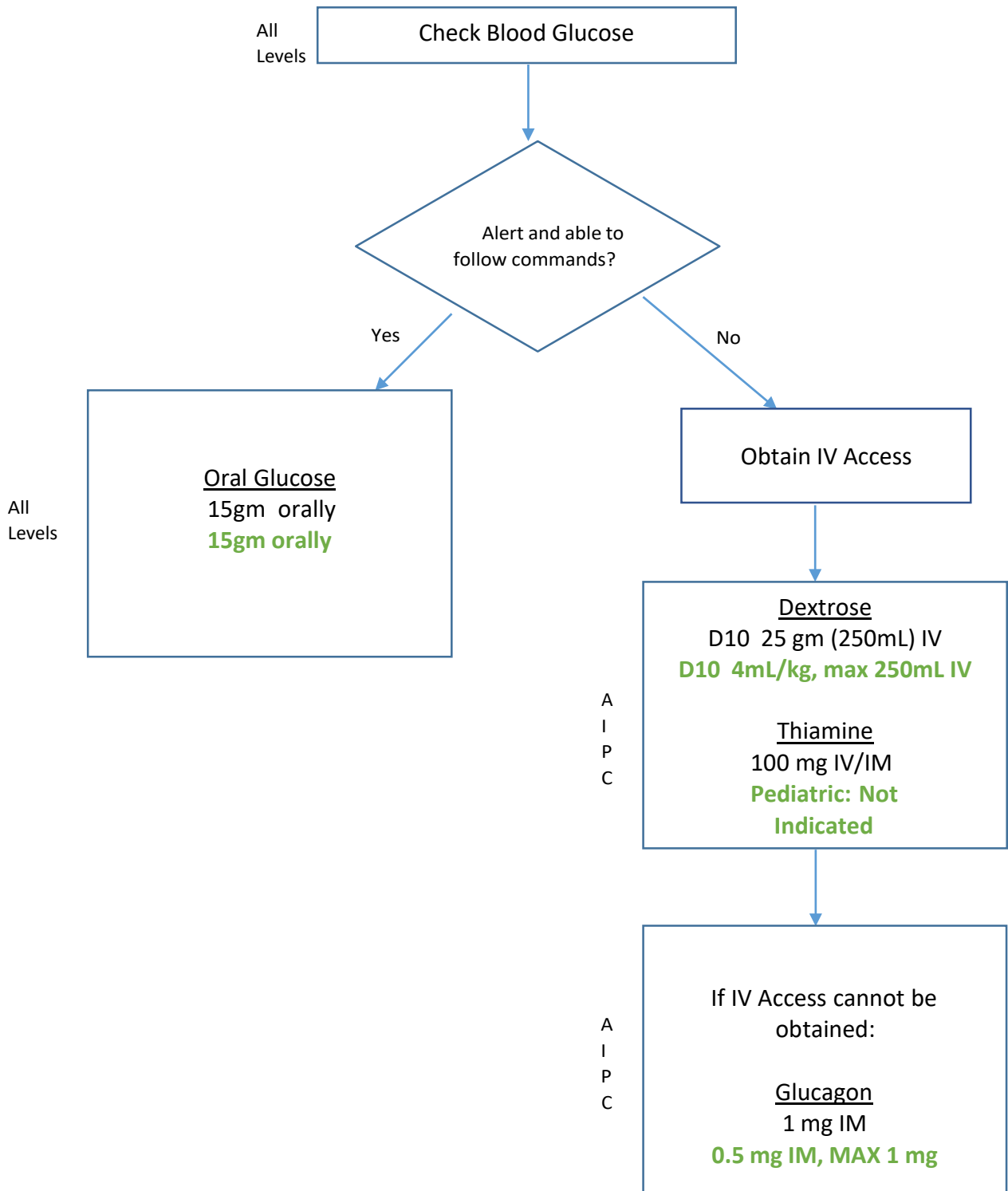
## Hypoglycemia

### History and Physical Exam

- Onset of symptoms sudden or gradual? When was patient last well?
- Recent stress either emotional or physical, last meal, or other oral intake.
- History of Diabetes Mellitus, medical alert tag.
- Medication history, including insulin (time/amount), and oral hypoglycemic agents.
- Rate and quality of respiration, odor on breath.
- Mental Status.
- Skin color, temperature, and hydration.
- Signs of adrenaline effect: diaphoresis, tachycardia, tremor, and/or seizures.

### Key Points

- The diabetic will frequently know what is needed - listen to the patient, but remember hypoglycemia is often associated with mental confusion.
- Hypoglycemia can present as seizures, coma, altered mental status, or stroke-like symptoms with focal neurologic deficits (particularly in elderly patients).
- Patients who are elderly, or who have been hypoglycemic for prolonged periods of time may be slower to awaken once hypoglycemia has been treated.
- Hypoglycemia is not an indication for use of IO access except in extreme circumstances. All such uses of IO will be reviewed by the Office of EMS.
- Treat Hypoglycemia with Dextrose. Give Oral Glucose Paste, juice, syrup, or other sugar containing food if patient is awake enough to follow commands
  - Adult Glucose <70
  - Pediatric Glucose <60
- If the patient is comatose and IV access cannot be obtained, give Glucagon IM.



## Hypothermia

### **Mild to Moderate Hypothermia (90-95°F)**

Patients may present with a history of exposure to cold, altered mental status, shivering, stiffening of muscles, stumbling or staggering gait, cool or cold skin, or mottled/pale skin.

### **Severe Hypothermia (<90°F)**

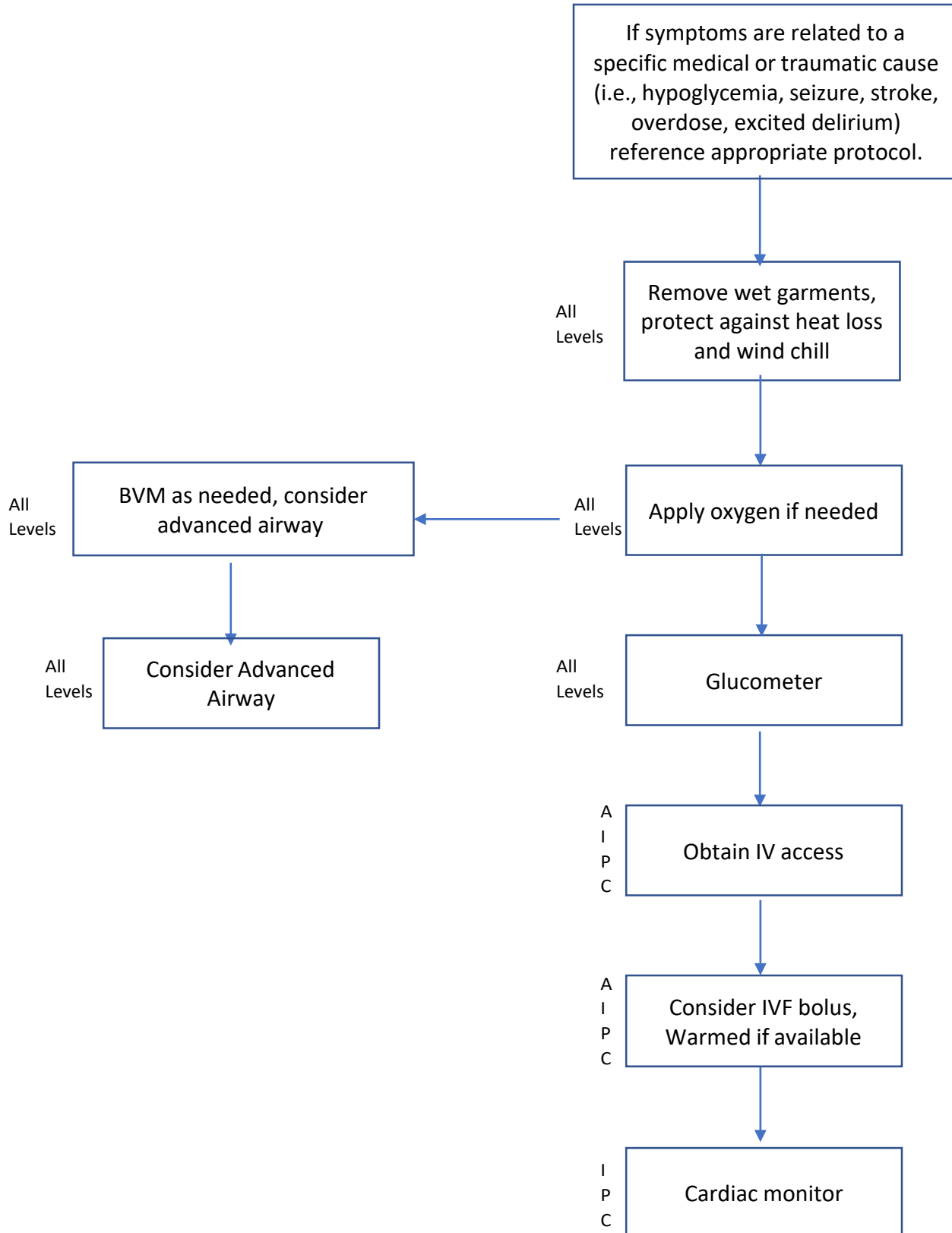
Patients may present with any of the symptoms listed above (except shivering), absent or diminished respiratory effort, or absent or diminished peripheral pulses. They may also present with respiratory and/or cardiac arrest.

#### History and Physical Exam

- Length of exposure.
- Environmental conditions.
- Observe for respiratory effort and check pulses.
- Assess cardiac rhythm.
- Determine level of consciousness by verbal and motor responsiveness.

#### Key Points

- If terrain is difficult, evacuate patients first and treat second.
- Do chest compressions only if the chest is compressible and the patient has a disorganized rhythm. Max of three shocks should be performed for VF/VT.
- In cases of severe hypothermia, there is some evidence that metabolism of antiarrhythmic drugs is slowed, which can lead to accumulation of drugs to toxic levels. Therefore, it is recommended that in these cases, OLMD be consulted for advice prior to administration of antiarrhythmic drugs.
- Medications should not be given below 86 Degrees.



## Influenza, Respiratory Illness

### History and Physical Exam

- Signs and symptoms of influenza like illnesses:
  - Rapid onset of symptoms.
  - Fever.
  - Pleuritic Chest Pain.
  - Nasal Congestion.
  - Body Aches.
  - Difficulty Breathing.
  - Cough.
  - Chills.
  - Sore Throat.
  - Runny nose.
  - Headache.

### Key Points

- All EMSP engaged in aerosol generating activities (e.g. endotracheal intubation, bag-mask ventilation, nebulizer treatment, CPAP, or BiPAP [use expiratory filter]) should wear the PPE as described in this treatment protocol.
- When transporting a patient with symptoms of acute febrile respiratory illness, notify the receiving healthcare facility so that appropriate infection control precautions may be taken prior to patient arrival.
- Any non-essential equipment that can be removed from the patient compartment of the ambulance before transport will hasten the time needed to disinfect and return to service.
- After the patient has been removed and prior to cleaning, the air within the vehicle may be exhausted by opening the doors and windows of the vehicle while the ventilation system is running. This should be done outdoors and away from pedestrian traffic.
- Routine cleaning methods should be employed throughout the vehicle and on non-disposable equipment. Routine cleaning with soap or detergent and water to remove soil and organic matter, followed by the proper use of disinfectants, are the basic components of effective environmental management of influenza. Reducing the number of influenza virus particles on a surface through these steps can reduce the chance of hand transfer of virus particles. Influenza viruses are susceptible to inactivation by a number of chemical disinfectants readily available from consumer and commercial sources.

### Treatment

- Treat using General Patient Care Protocol.
- Use appropriate standard infectious disease precautions.
- Appropriate PPE for suspected cases of influenza includes: disposable N-95 mask, eye protection, and disposable non-sterile gloves. Disposable non-sterile gown is optional depending on the situation (follow guidance of service medical director).
- If dispatch advises the EMSP of the potential for acute febrile respiratory illness symptoms on scene, don PPE for suspected cases of influenza prior to entering the scene.
- If the EMSP encounters individuals with symptoms of acute febrile respiratory illness prior to donning PPE, stay more than 6 feet away from individuals with symptoms and exercise appropriate routine respiratory droplet precautions. If a patient has signs or symptoms of influenza or acute febrile respiratory illness, don the PPE described above before coming into close contact with them.
- All patients with acute febrile respiratory illness should wear a surgical mask, if tolerated by the patient.
- Encourage good patient compartment vehicle airflow/ventilation (turn on exhaust fan) to reduce the concentration of aerosol accumulation when possible.

## Nausea and Vomiting

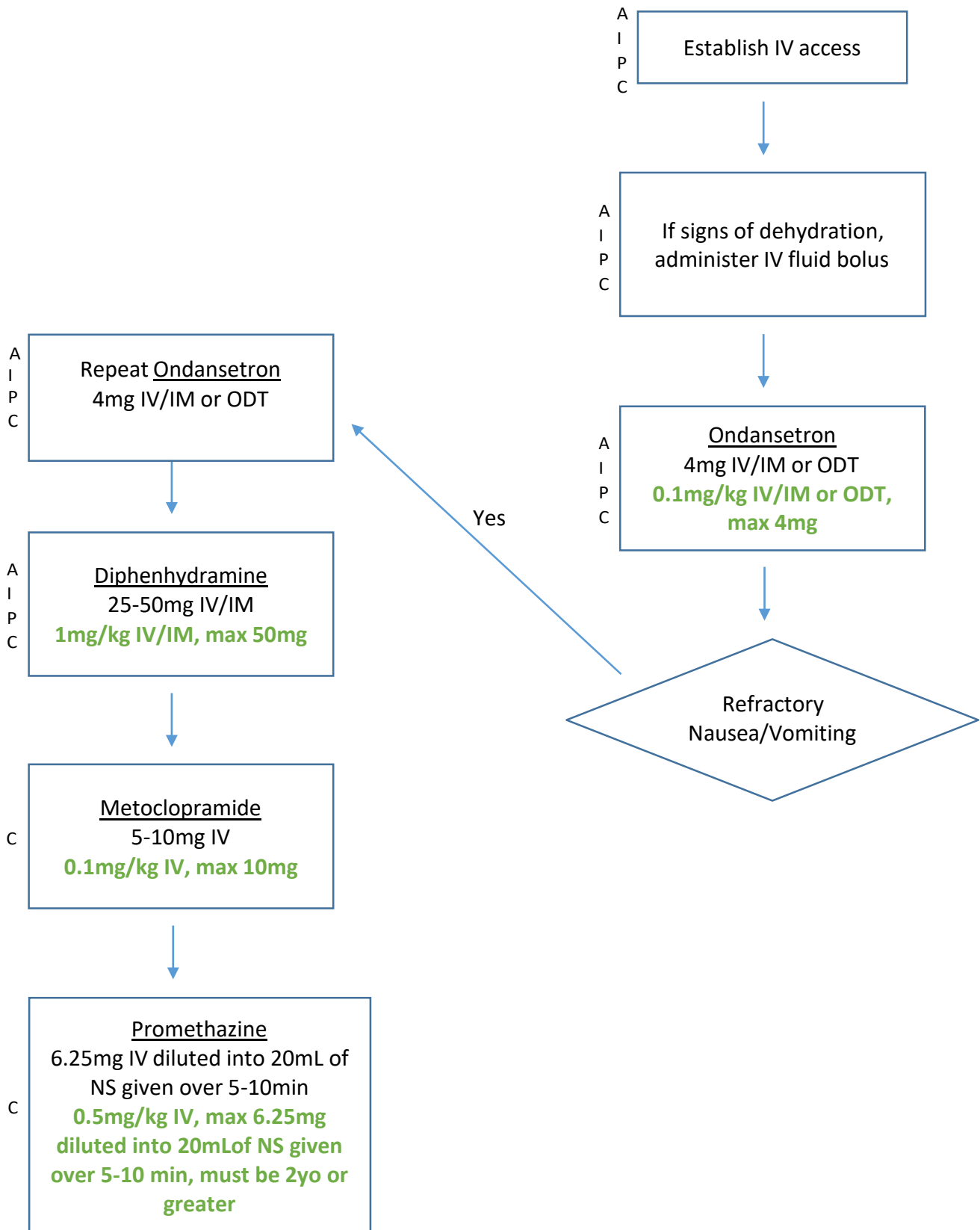
### History and Physical Exam

- Symptom onset.
- Associated symptoms such as abdominal pain, diarrhea, and headache.
- If vomiting, is there any blood or coffee-ground like material in the vomitus.
- History of ingestion of potential poison or spoiled food.
- If female of child-bearing age, inquire if the patient could be pregnant.
- History of recent head injury.
- Signs of dehydration (poor skin turgor, dry mucous membranes, sunken fontanelle in babies).
- Jaundice.
- Evidence of head trauma.
- Abdominal tenderness, rigidity, distention, guarding, and bowel sounds.
- Neurologic exam: level of consciousness, pupils, focal neurologic findings.

### Key Points

- Ondansetron may be used in cases of nausea to prevent vomiting.
- Ondansetron may be used to prevent nausea when administering narcotic medications, especially if there is a history of nausea after receiving narcotics.
- Diphenhydramine, Metoclopramide, and Promethazine are other medications which can be used for refractory nausea/vomiting.
- Care should be used in the administration of Metoclopramide and Promethazine as they can be associated with extrapyramidal effects.





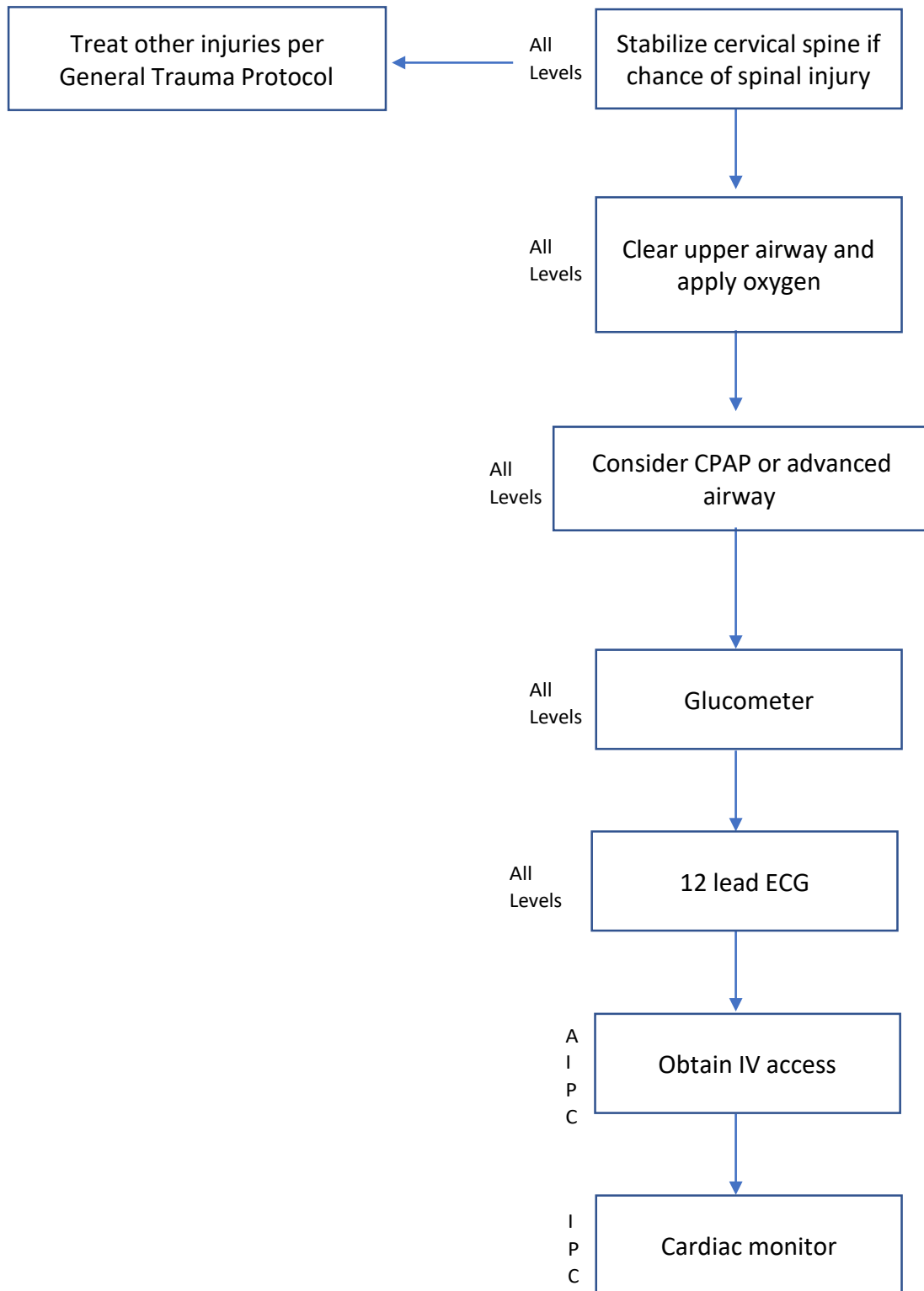
## Near Drowning

### History and Physical Exam

- Length of submersion.
- Approximate temperature of water.
- Any associated trauma.
- History of scuba diving.
- Resuscitation history (if applicable): time of arrest, bystander CPR, other interventions.
- Respiratory status.
- Neurologic status.

### Key Points

- If a patient is still in water, rescue by trained, equipped personnel only.
- Near drowning patients are likely to vomit. Use caution and protect the airway.
- All near drowning patients should be transported. Patients may appear well initially, but rapid deterioration can occur. Monitor closely for pulmonary edema.
- It is a common error to underestimate injuries (ie., from diving, jumping, MVC, etc.).
- If a scuba diving injury is possibly related to a decompression issue, refer to Decompression Sickness Protocol.
- Reference Trauma Protocol as needed.



## Newborn Care

### History and Physical

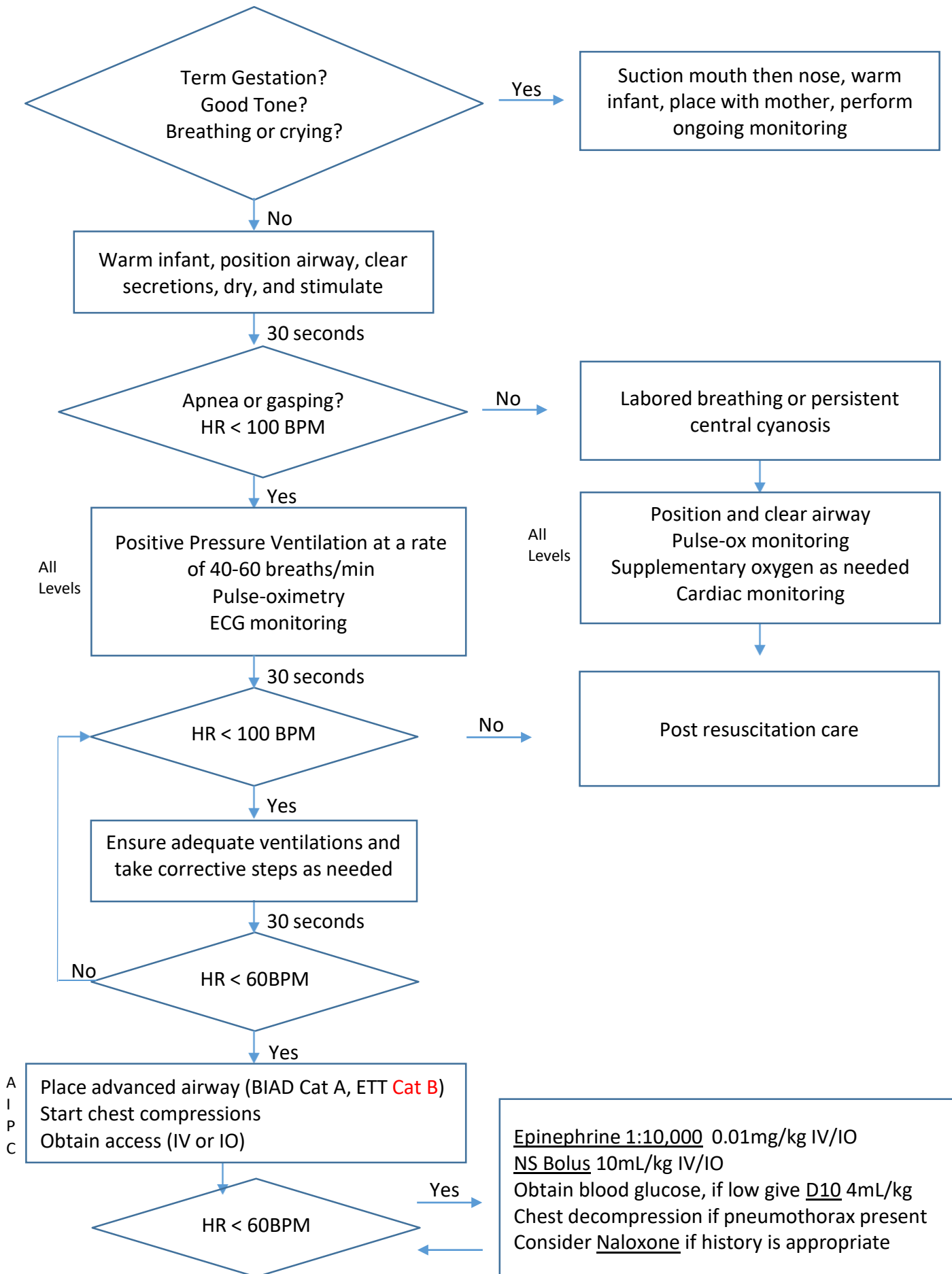
- How far along is the pregnancy?
- Have they received any prenatal care?
- Have there been any complications with the pregnancy?
- Are there any known issues with the baby or the pregnancy?
- Was there meconium at delivery?
- Is the baby active and crying?
- Does the baby have good tone?
- Is the baby gasping or apneic?
- What is the baby's heart rate?

### Key Points

- Once the baby is born, if it is full term, active and crying, and has good tone routine newborn care should be delivered and the baby given to mother and kept warm. Skin-to-skin contact with the mother is preferred.
- Newborn heart rate is best assessed by using a stethoscope or by palpating the base of the umbilical stump. The rate will be high and tapping out the rhythm can be helpful in assessing the rate quickly until a cardiac monitor can be applied.
- Inflation and ventilation of the lungs are the priority in newly born infants who need support after birth.
- A rise in heart rate is the most important indicator of effective ventilations and response to resuscitative interventions.
- Pulse oximetry is used to guide oxygen therapy and meet saturation goals. The pulse-ox probe should be applied to the right upper extremity to ensure the saturation is pre-ductal.
- Oxygen saturations are initially low and will normalize over time following birth.

Target Preductal SpO <sub>2</sub> after Birth	
1 min	60-65%
2 min	65-70%
3 min	70-75%
4 min	75-80%
5 min	80-85%
10 min	85-95%

- Use of a PEEP valve in BVM ventilations is important and PEEP should be set to 5cmH<sub>2</sub>O.
- Chest compressions are provided if there is a poor heart rate response to ventilations after appropriate ventilation corrective steps which preferably include placement of an advanced airway.
- If the response to chest compressions is poor, it is reasonable to provide epinephrine, preferably by the IV or IO route. The distal femur is the preferred IO site in small, newborn infants.
- Failure to respond to epinephrine should prompt further evaluation in treatment including possible IV fluid bolus for volume expansion, evaluation for hypoglycemia, and possible naloxone administration if there is a maternal history of drug usage.



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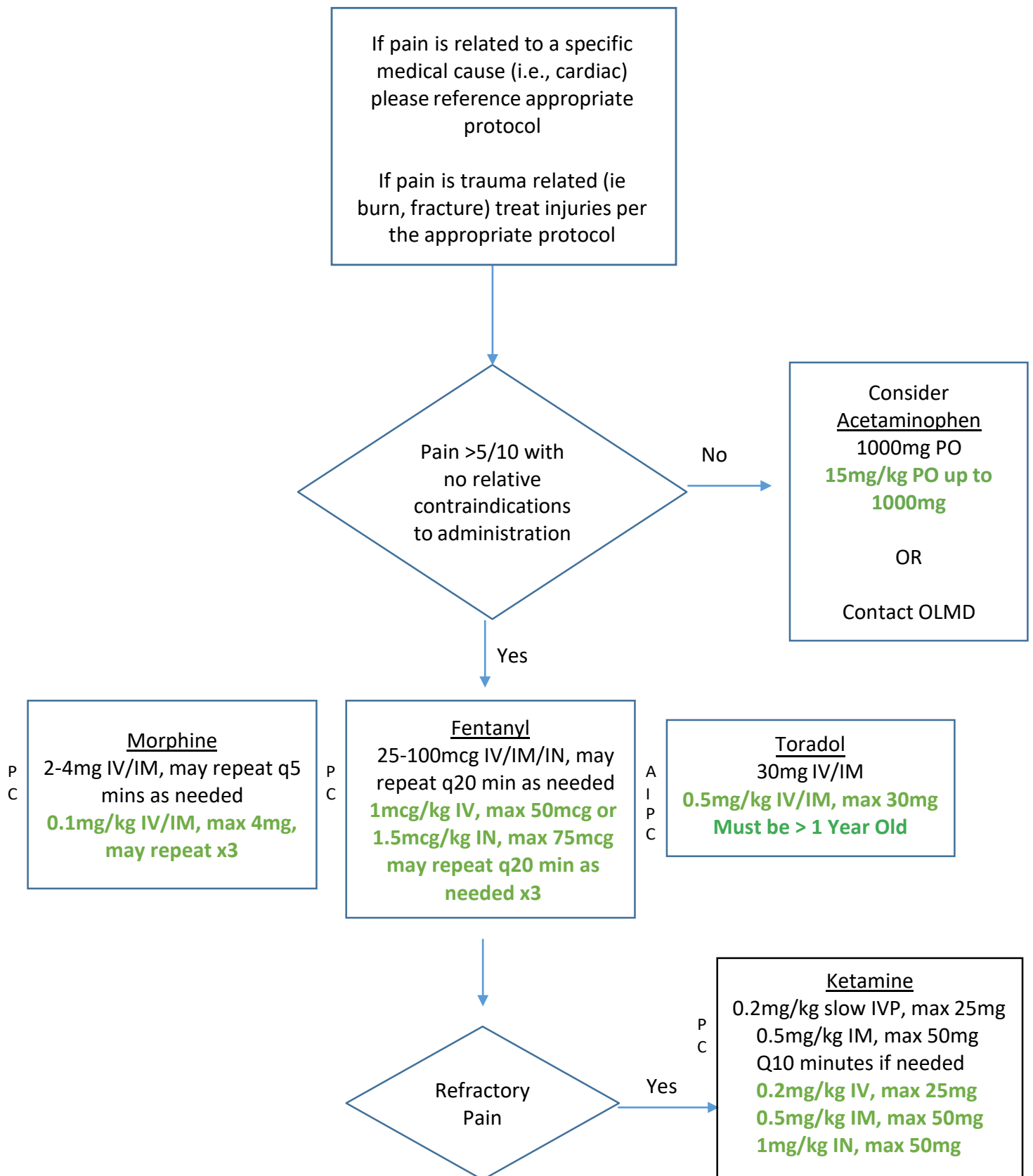
## Pain Management

### History and Physical Exam

- When did the pain start?
- What was happening when the pain started?
- What is the quality and severity of the pain?
- Is there any radiation of the pain?
- Has the patient ever experienced pain like this before?
- Does the patient have any underlying medical conditions which could relate to the pain?
- Has the patient experienced any recent injuries?
- Uncomfortable appearance?
- Tenderness.
- Location of injuries.

### Key Points

- Morphine or Fentanyl should be used as primary analgesics.
- Fentanyl can be given intranasally for children to avoid IV sticks.
- Ketamine can be used for refractory pain or if other medications are in shortage.
- Toradol is an NSAID medication which can be used for pain control as well, but should not be used in patients with known renal history or who have already taken NSAIDs for pain.
- Mild pain can be treated with oral acetaminophen (Tylenol). Tylenol should not be given to any patient with a history of liver disorders or any patient who has already taken Tylenol in the last 8 hours.
- If pain is **cardiac in nature**, refer to Adult Chest Pain Protocol.
- All **injuries** should be treated per the appropriate protocol.
- Consider co-administration of Ondansetron, especially in patients with known nausea/vomiting related to pain medication (see Nausea and Vomiting protocol).
- Analgesic pain medication should be used with caution in children less than 1 and elderly patients.
- Relative contraindications to narcotic pain medication include: altered mental status and hypotension and online medical control should be utilized prior to administration of pain medication to these patients.
- Ketamine should be dosed on ideal body weight.
- Consider monitoring EtCO<sub>2</sub> and watch for respiratory depression if multiple doses are given.



## Poisons and Overdoses

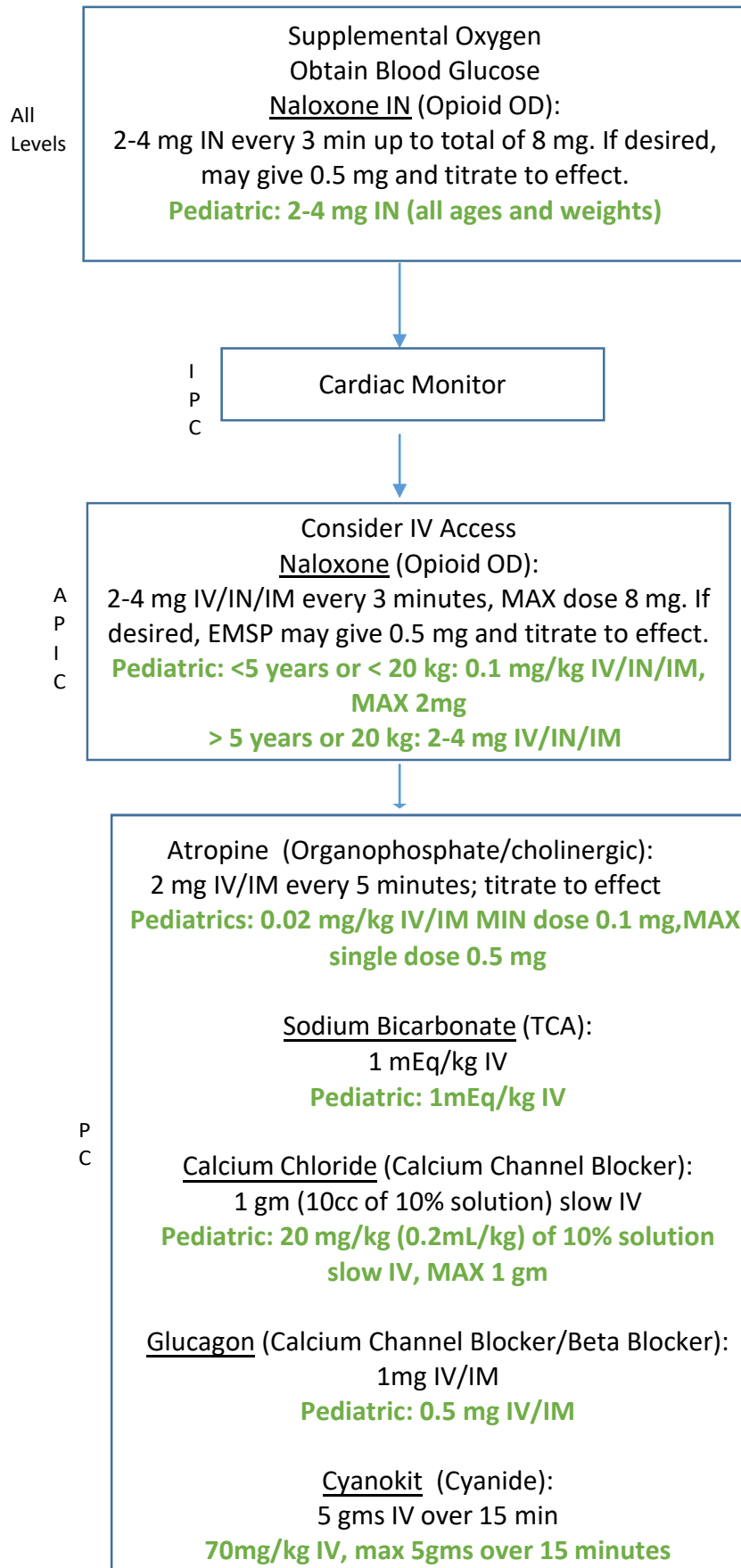
### History and Physical Exam

- Scene safety: Do not enter an area that is possibly contaminated with a hazardous material unless properly protected. Do not enter the scene if physical danger is present. Wait for the police and/or hazardous materials units to clear or secure a dangerous scene.
- Type of ingestion: What, when, and how much was ingested? Bring the poison, the container, and everything questionable in the area with the patient to the ED. Look for multiple patients with the same signs and symptoms.
- Reason for ingestion: Screen for child neglect, and/or suicidal ideation.
- History: Medications, diseases, psychiatric history, and/or drug abuse.
- Action taken by bystanders: Induced emesis, “antidote” given.
- Level of Consciousness.
- Breath odor.
- Neurologic status, pupillary findings.
- Vomitus.
- Needle marks or track marks.
- SLUDGES (Salivation, Lacrimation, Urination, Defecation, Gastric Emesis, and Sweating) These symptoms are consistent with cholinergic toxicity.

### Key Points

- Inhalation poisoning is particularly dangerous to rescuers. Recognize an environment with continuing contamination and extricate rapidly by properly trained and equipped personnel.
- Do not induce vomiting.
- Do not try to neutralize acids with strong alkalis. Do not try to neutralize alkalis with acids.
- OLMD is encouraged to involve Poison Control Center when needed, 1-800-222-1222.
- Calcium Chloride can be interchanged for Calcium Gluconate.
- Follow local Hazardous Material Plan.
- Protect medical personnel.
- Remove the patient from the contaminated area and/or remove the contaminant from the patient.
- Flush contaminated skin and eyes with copious amounts of water unless Lyme.
- If **cholinergic or organophosphate poisoning**, administer atropine.
- If **depressed respirations or altered mental status**, consider naloxone.
- Treat hypoglycemia using Hypoglycemia Protocol.
- If **Tricyclic Antidepressant overdose**, administer Sodium Bicarbonate, especially if QRS > 100 msec or the patient has altered mental status. Do not delay transport, rapid deterioration may occur. Monitor for seizure activity.
- If **Beta Blocker Overdose**, administer Glucagon.
- If **Calcium Channel Overdose**, administer Calcium Chloride, Glucagon. NOTE: flush the line between giving calcium and glucagon to prevent precipitation.
- If **Cyanide** - May be from cyanide exposure or from smoke inhalation. In a patient who shows signs of shock or cardiac collapse in the setting of a closed space smoke exposure, consider Cyanokit.





## Post Intubation Sedation

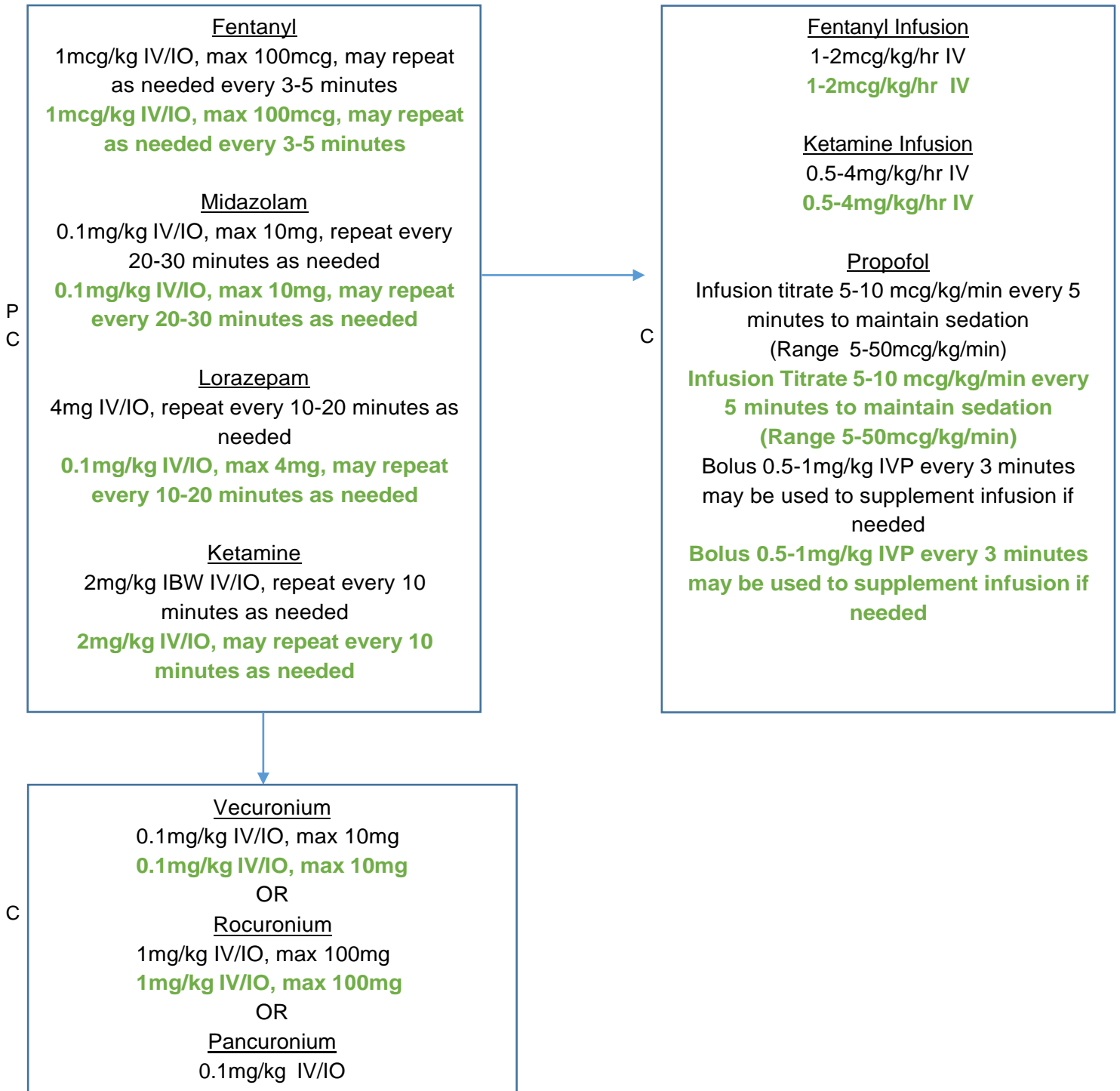
### Usage:

- Protocol to be used for patient comfort and sedation after intubation on scene or to during interfacility transfer.

### Key Points

Select dose based on assessment and clinical considerations

- Practice Ventilator Pneumonia Prevention - Closed circuit suction, head up 30-45 degrees, suction and ET cuff pressure to 20 - 30.
- Consider OG.
- Initially use repeat bolus administration until the pain and sedation goal.
- Anticipate pain and agitation during transport and treat accordingly.
- Sedation goal for this guideline is a RASS -1 to -5.
- Use the lower part of the dose range or reduce the normal dose of all sedatives by the patient is hemodynamically unstable.
- A sedative should be added if opioids fully control pain, but sedation goals cannot be met. Choose only one sedative to use.
- A long acting paralytic should only be utilized if appropriate analgesia and effective.
- Have the receiving physician verify tube placement and chart.
- It is required that the airway be monitored continuously throughout transport capnography and pulse oximetry.
- Reassess airway placement frequently and with every patient.
- Benzodiazepines should be used along with opiates for both sedation and pain control.
- Ketamine can be used as a single pain/agitation treatment or used in conjunction with opiates.



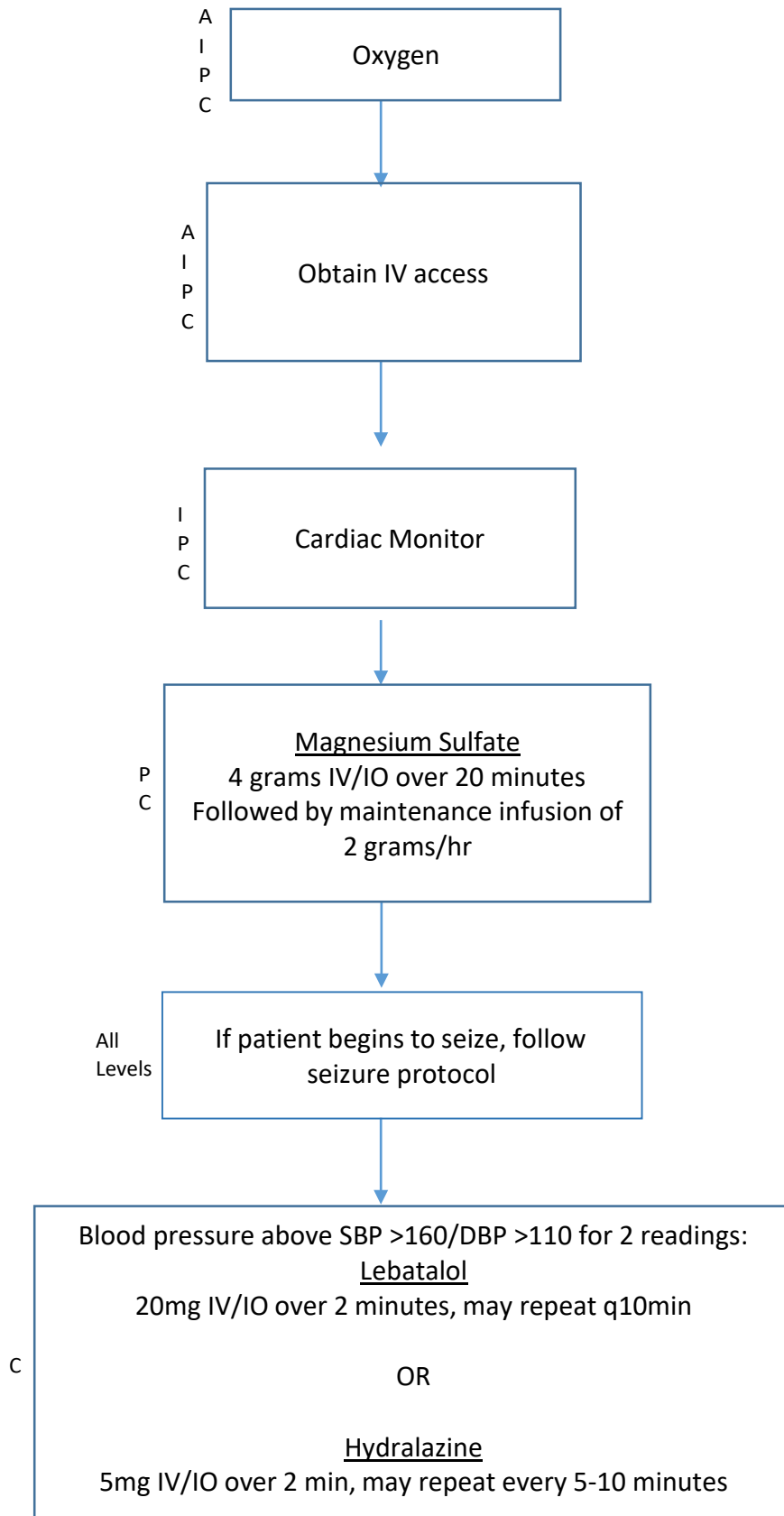
## Preeclampsia/Eclampsia

### History and Physical Exam

- Prenatal care.
- History of seizure disorder (seizure with no prior history is more likely to be eclampsia).
- History of headache, vision changes, right upper quadrant pain, peripheral edema.
- Vital Signs:
  - Blood pressure normally decreases during pregnancy.
  - In the setting of pregnancy, hypertension is defined as BP >140/90 or a relative increase of 30 mm hg SBP or 20 mm hg DBP from the patient's pre-pregnancy blood pressure.
- Seizure activity.

### Key Points

- The disease of unknown origin.
- Field diagnosis of preeclampsia based on findings of pregnancy, hypertension, and edema.
- Usually occurs after the 20th week of gestation. May occur up to 6 weeks postpartum.
- Eclampsia occurs with the signs/symptoms of preeclampsia with seizures or coma.
- Magnesium can cause respiratory depression and hypotension.



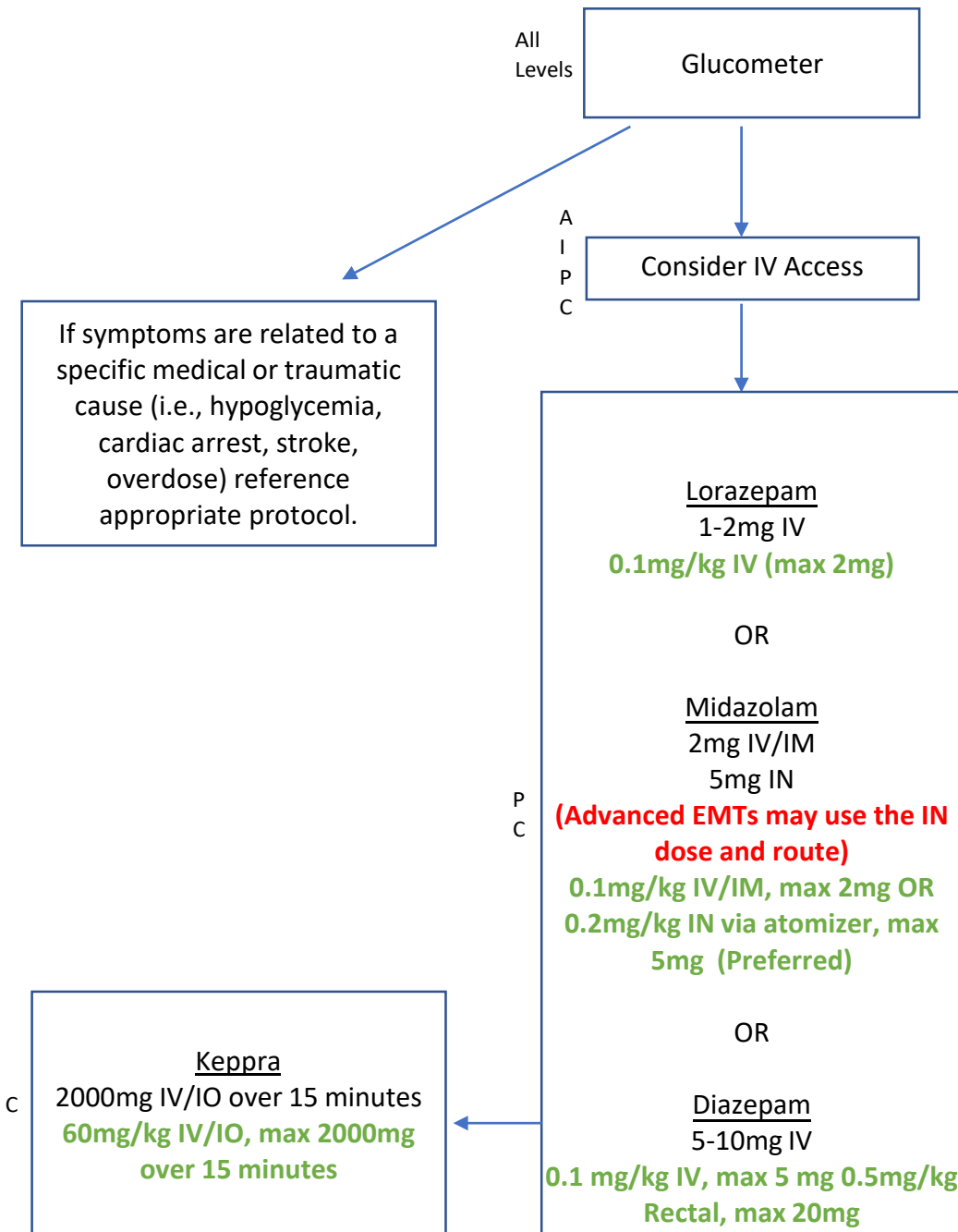
## Seizure

### History and Physical Exam

- Onset and duration.
- History and description of seizures.
- Medications and compliance.
- History or evidence of trauma, particularly head trauma.
- History of diabetes, headache, recreational drug or alcohol use, or pregnancy.
- Level of consciousness, ongoing seizure activity, incontinence, focal neurologic signs.

### Key Points

- Don't force items into the seizing patient's mouth.
- Note: Seizures may be caused by arrhythmias, particularly in patients over 50 years old. Seizure activity may also be caused by cerebral hypoxia from cardiac arrest. Always check a pulse. Follow appropriate protocol if arrhythmia or cardiac arrest is found.
- Seizures in pediatric patients are commonly febrile seizures and are usually benign and short lived.
- Seizures in a pregnant woman may be due to eclampsia. Use the appropriate protocol.



## Sepsis

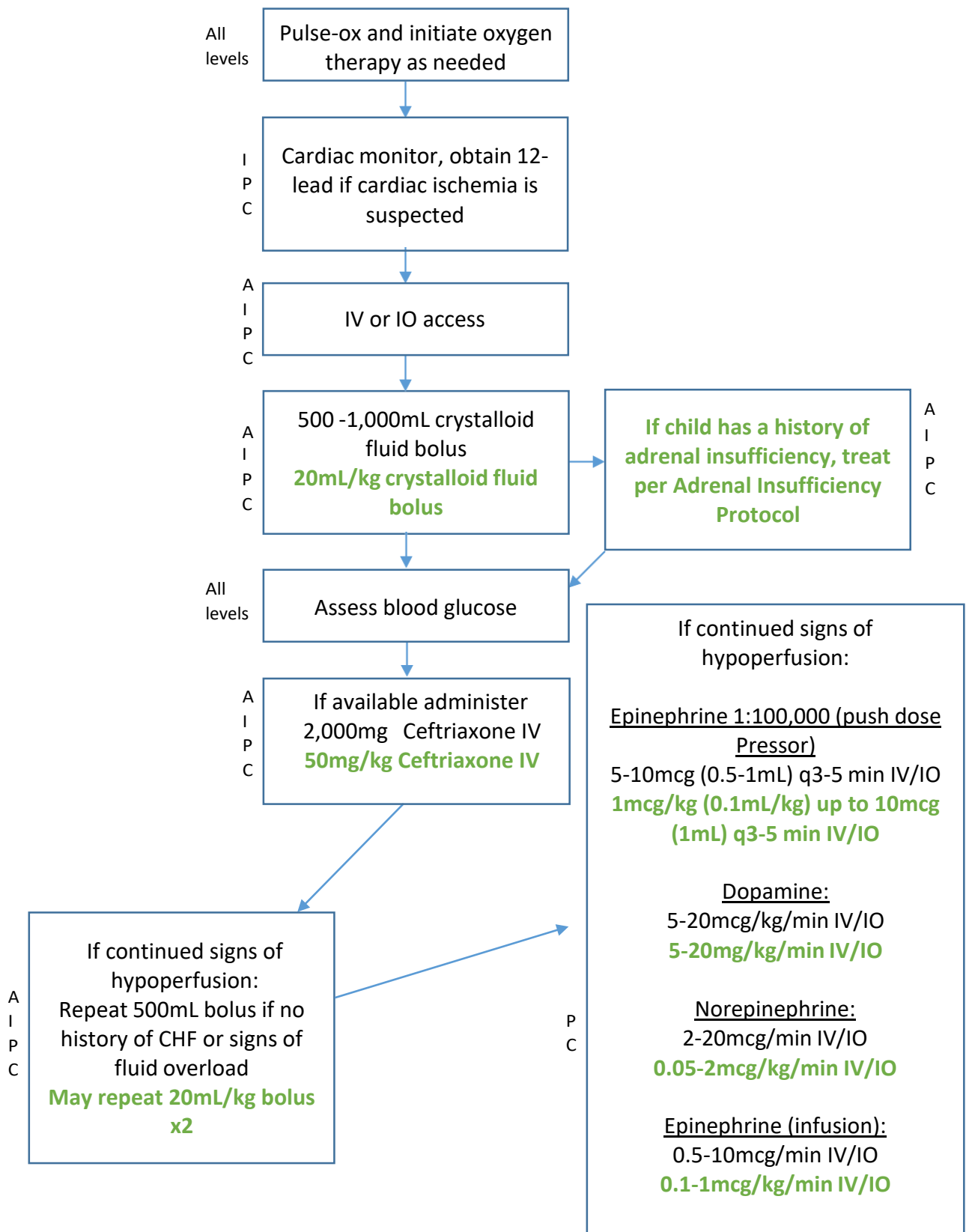
### History and Physical Exam

- Onset of illness.
- Changes in mental status.
- Urine output.
- Any underlying medical conditions which make the patient susceptible to infection.
- Presence of fever.
- Heart rate and blood pressure.
- Capillary refill.
- Shock index >1.0.

### Key Points

- Sepsis is a life-threatening condition and requires aggressive management.
- Early identification and rapid intervention is key to survival of sepsis.
- Early effective fluid resuscitation is the first step in management and crucial for the stabilization of sepsis-induced tissue hypoperfusion or septic shock.
- Given the urgent nature of this medical emergency, initial fluid resuscitation should begin immediately upon recognizing a patient with sepsis and/or hypotension.
- Fluid amounts should be reduced in patients with heart failure or signs of fluid overload.
- Prehospital antibiotics have been shown to reduce mortality in patients with septic shock and, if available, should be rapidly administered after initiation of fluid resuscitation.
- **Blood cultures should be obtained prior to initiation of antibiotics if available, however, this should not delay the initiation of antibiotic therapy.**
- Vasopressor therapy should be utilized to maintain a goal MAP >65mmHg in adults and **normal BP for age in children.**
- Receiving facilities should be alerted that the patient is septic.





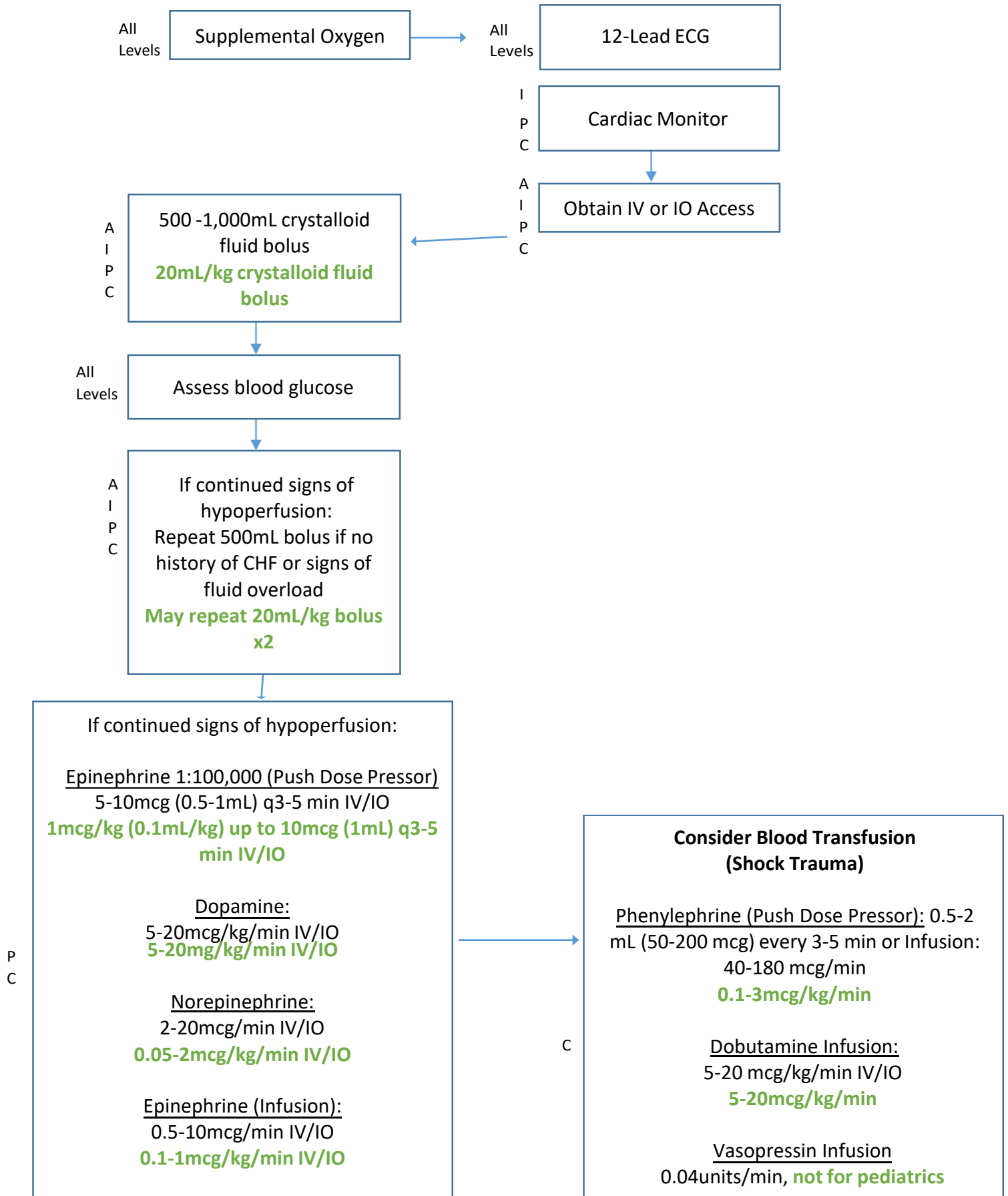
## Shock

### History and Physical Exam

- Evidence of inadequate organ perfusion: tachycardia, hypotension, delayed capillary refill, skin cold and clammy, altered mental status.

### Key Points

- Types of Shock:
  - **Hypovolemic:** Loss of circulating blood volume. This may be due to hemorrhage or through loss of fluids such as vomiting, diarrhea, poor intake, or burns.
  - **Cardiogenic:** Pump failure (I.e., Heart Failure, Massive MI, myocarditis).
  - **Distributive:** Decreased vascular tone. Includes anaphylaxis, sepsis, and neurogenic shock.
  - **Obstructive:** mechanical obstruction to blood flow to, or from the heart. Includes cardiac tamponade, tension pneumothorax, aortic dissection, and pulmonary embolism.



## Stroke

### History and Physical Exam

- Last time patient was seen normal.
- Existing previous neurological deficit.
- Stroke risk factors (Hypertension, diabetes, heart disease, smoking, dysrhythmias, blood thinner use, or previous stroke).
- Has the patient had any recent similar events?
- Level of Consciousness: Alert, Responds to Voice, Responds to Pain, Unconscious.

### Perform EMSA stroke scale (Eye, Motor, Speech, Aphasia):

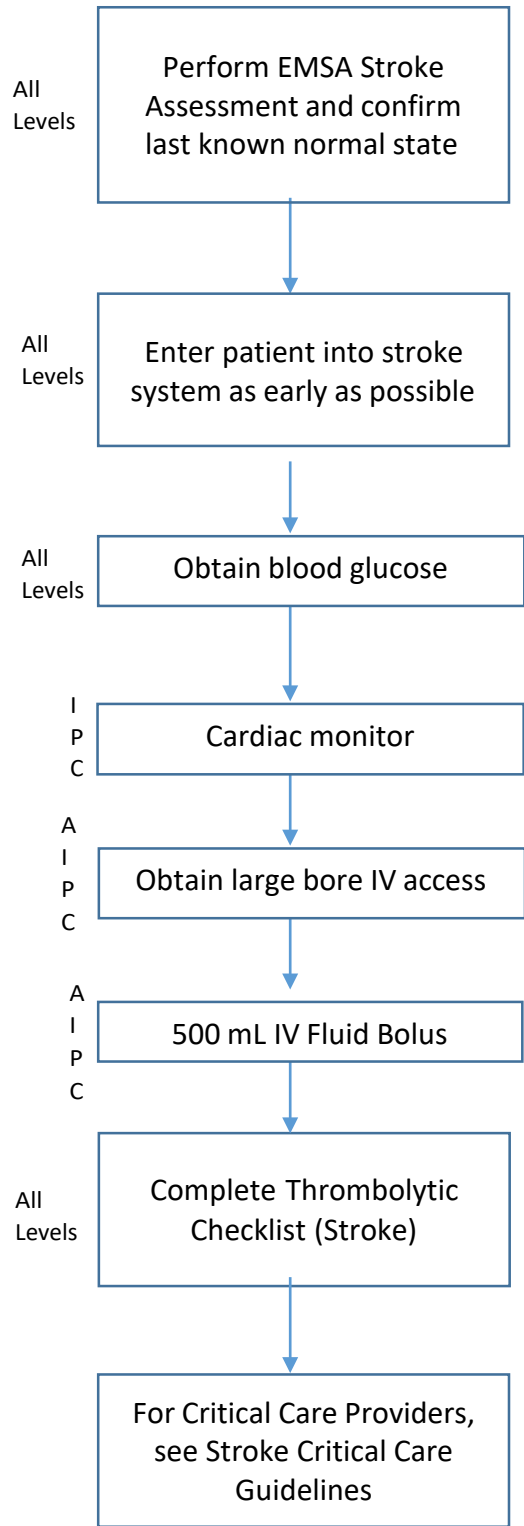
1. **Eye:**
  - a. **Horizontal Gaze:** Ask patients to keep their head still and follow your finger left to right with their eyes. In aphasic patients, call the patient's name on one side and then on the other.  
**Abnormal:** Patient is unable to follow as well in one direction compared to the other.
2. **Motor:**
  - a. **Facial Weakness:** ask patients to show their teeth or smile. In aphasic patients, look for asymmetric grimace to pain.  
**Abnormal:** One side of the face does not move as well as the other.
  - b. **Arm weakness:** Ask the patient to hold out both arms, palms up, for 10 seconds with eyes closed. In Aphasic patients, hold the patient's arms up and let go.  
**Abnormal:** One arm does not move or drifts down compared to the other.
  - c. **Leg weakness:** Ask a patient to lift one leg and then the other for 5 seconds. In aphasic patients, hold one leg and let go, then repeat on the other side.  
**Abnormal:** One leg does not move or drifts down compared to the other.
3. **Speech/Aphasia:**
  - a. **Naming:** Ask a patient to name your watch or pen.  
**Abnormal:** Patient slurs words, says the wrong words, or is unable to speak.
  - b. **Repetition:** Ask the patient to repeat "They heard him speak on the radio last night." After you.  
**Abnormal:** Patient slurs words, says the wrong words, or is unable to speak.

If any component of the EMSA stroke scale is abnormal, the patient is very likely to be suffering from an acute stroke. Greater than 3 points is a concern for a LVO Stroke (Large Vessel Occlusion).

### Key Points

- This protocol is for patients who have an acute episode of neurologic deficit without any evidence of trauma. If the patient has altered mental status, treat using the Altered Mental Status Protocol.

- Determining the exact time of symptom onset is critical since administration of thrombolytic drugs for the treatment of stroke is time-dependent.
- High blood pressure during an acute stroke may be compensatory, do not attempt to lower it without consulting OLMD.
- If in a region with a stroke system, notify the ATCC and transport the patient to the appropriate stroke-ready center.
- When possible, bring a knowledgeable friend or family member with the patient to assist with providing the patient's history at the hospital. If it is not possible for that person to accompany the patient, attempt to obtain a cell phone number for someone who can provide the receiving hospital with patient history and details of the event.
- Give nothing by mouth.
- A blood glucose should be obtained on all suspected stroke patients.
- If a patient has no signs of congestive heart failure or volume overload give Normal Saline.
- If patient can tolerate, place in supine position.
- Monitor neurological function frequently.
- Complete the "Thrombolytic Checklist (Stroke)".



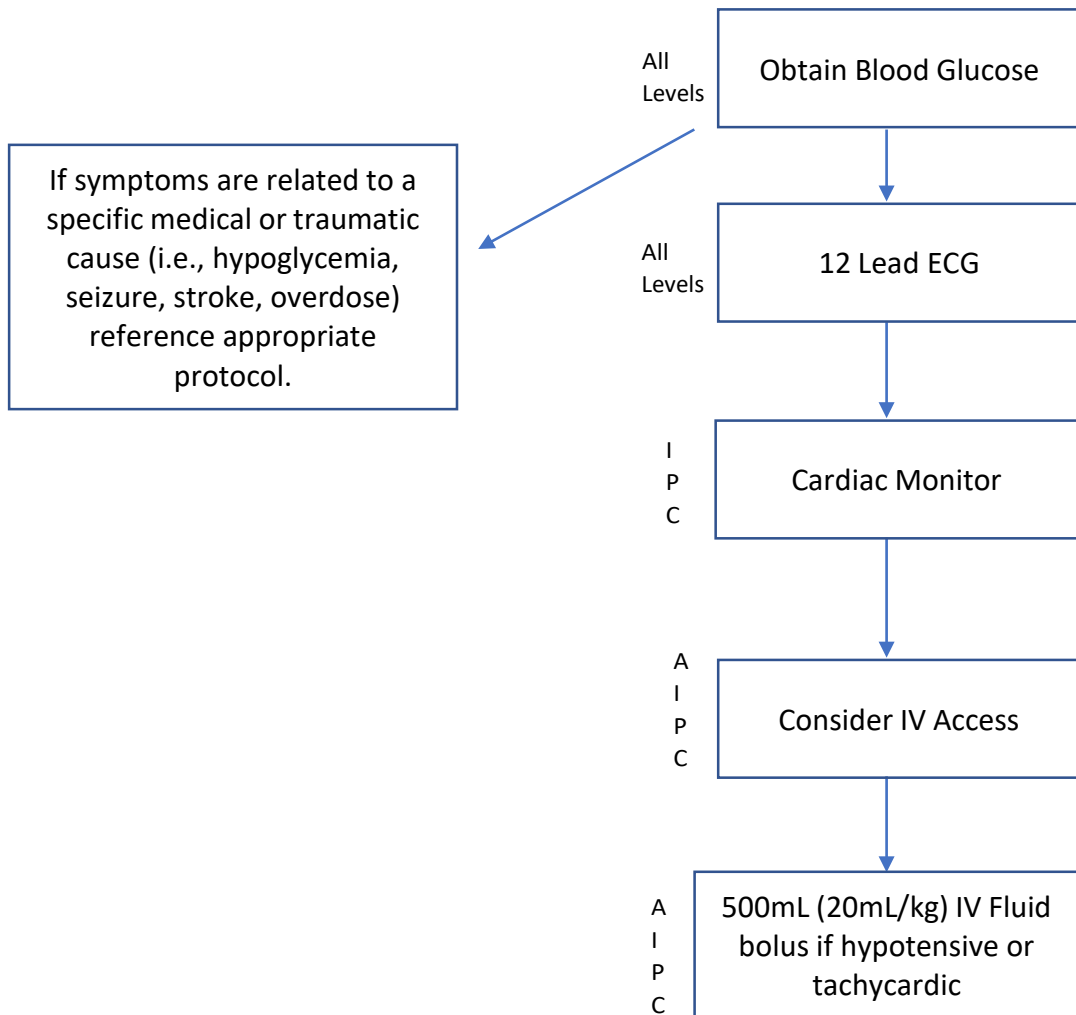
## Syncope

### History and Physical Exam

- Description of event: Onset, duration, seizure activity, precipitating factors, activity when syncope occurred.
- Other symptoms: vertigo, nausea, chest pain, abdominal pain.
- Pregnancy status.
- Medications, past medical history, history of syncope.
- Neurologic exam.
- Evidence of head trauma.

### Key Points

- Syncope is a transient state of unconsciousness from which the patient has recovered. If the patient is still unconscious, treat using the Altered Mental Status or Shock protocols as indicated.
- Most syncope is vasovagal. Placing the patient in the recumbent position should be sufficient to restore vital signs and level of consciousness to normal. However, other causes may be cardiac dysrhythmias, hypotension, aortic dissection, GI bleed, hypoglycemia, seizure, stroke, and transient ischemic attack.
- Syncope while in the recumbent position or in middle aged or elderly patient is concerning for a cardiac etiology.





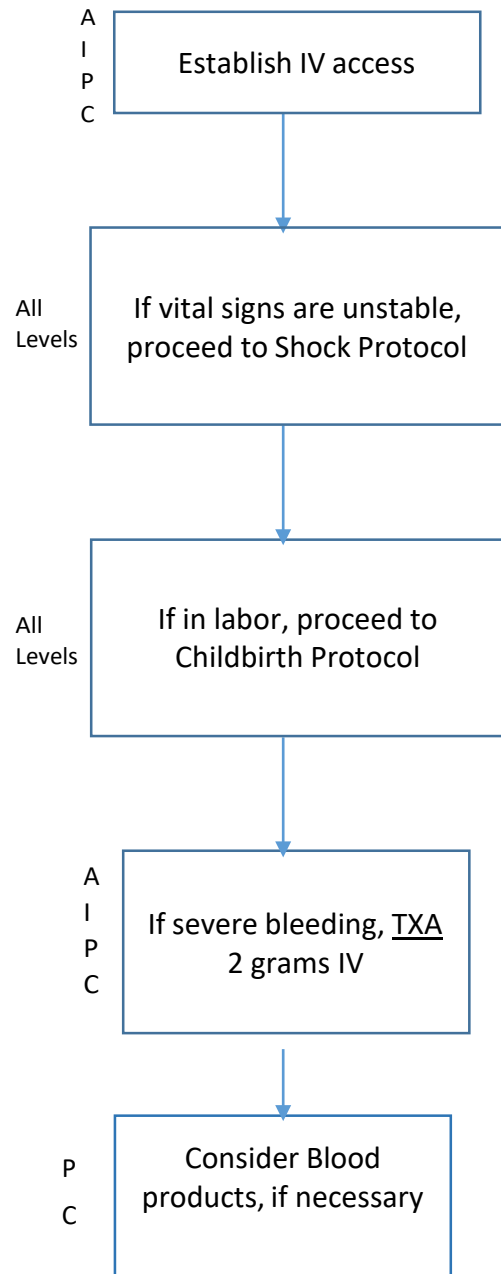
## Vaginal Bleeding

### History and Physical Exam

- Onset and duration of bleeding, amount, passage of clots or tissue, number of menstrual pads used.
- Last menstrual period, pregnancy status, birth control method.
- Pregnant patients: Due date, estimated gestation age.
- Postpartum patients: Time and place of delivery, history of complications.
- Bleeding disorders or anticoagulant medications.
- Evidence of blood loss, clots or tissue fragments.
- Fever.
- Signs of hypovolemic shock.

### Key Points

- Amount of vaginal bleeding is difficult to estimate. Try to get an estimate of the number of saturated pads in the previous 6 hours. Discreet inspection of the perineum may be useful to determine if clots or tissue are being passed.
- Patients in shock from vaginal bleeding should be treated using the Shock Protocol.
- Always consider pregnancy or ectopic pregnancy as the cause of the bleeding.
- If a non-viable premature fetus is delivered and the fetus is available, place the fetus in a clean container or sheet and transport to the hospital with the mother.



## General Trauma

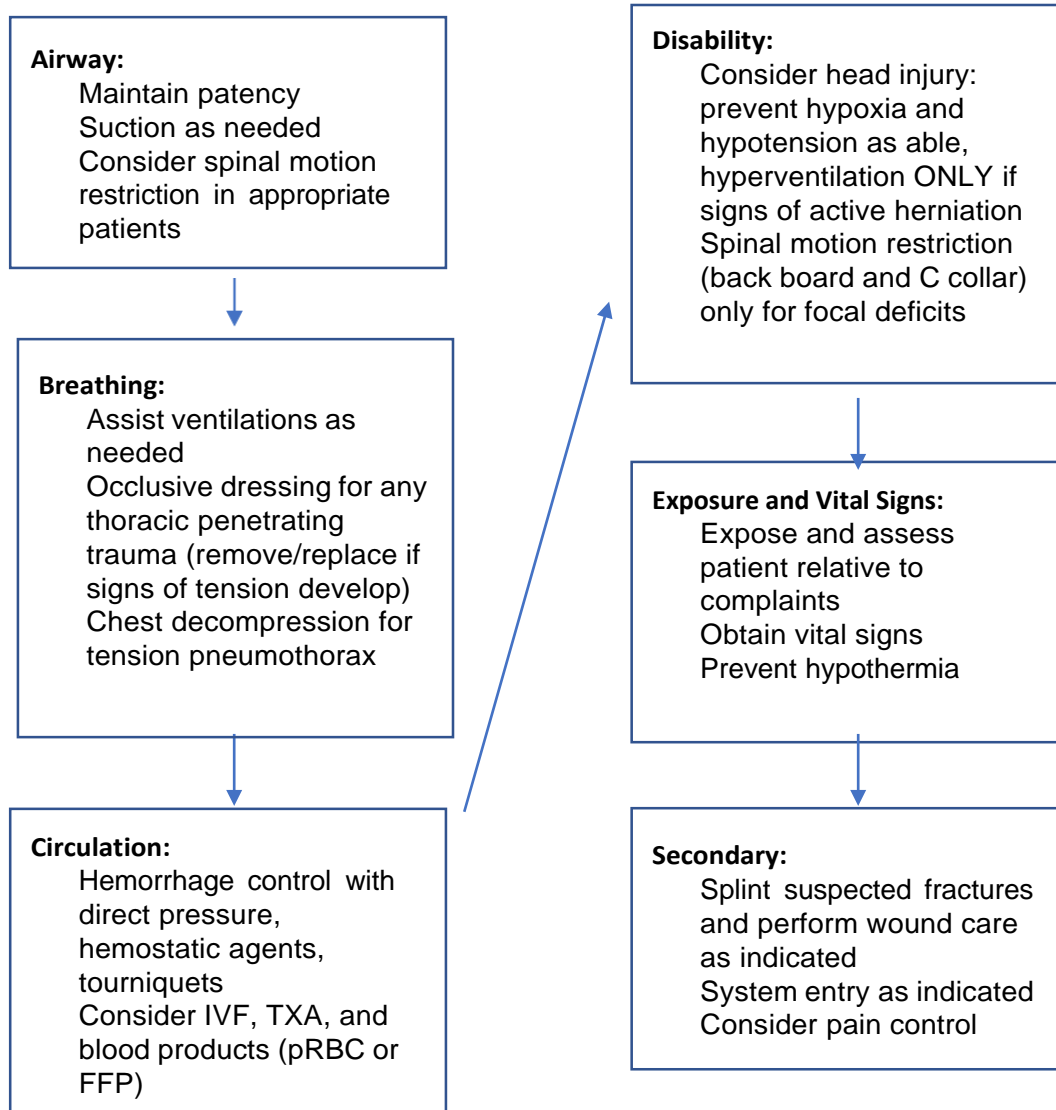
### History and Physical Exam

- General impression of patient.
- Primary assessment and obtain vital signs.
- Determine level of consciousness (AVPU).
- Secondary survey.

### Key Points

- Consult OLMD as needed.
- Scene safety and PPE.
- If injuries meet Trauma Criteria, declare Trauma Alert to receiving facility.
- Transport the patient to a trauma facility unless the patient is unstable and requires immediate stabilization or intervention.

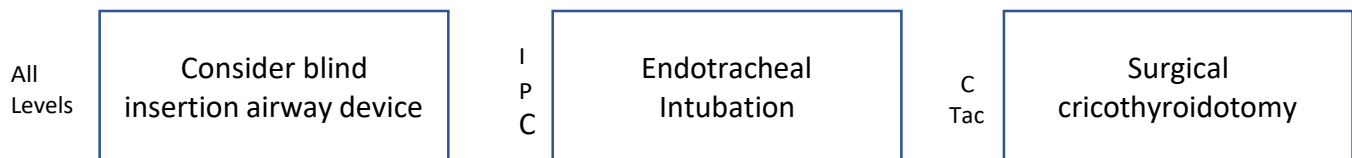
### Treatment



## Trauma Specific Considerations

### Airway Management:

- Ensure open airway by positioning, adjuncts, or invasive interventions:
  - Head tilt chin lift or jaw thrust (in suspected spinal injury).
  - NPA (caution with suspected closed head injury) or OPA (caution with intact gag reflex).
  - Suction to clear the airway as needed.
  - Administer oxygen to maintain O<sub>2</sub> saturation >94%.
  - Utilize capnography monitoring for all multi-system trauma patients and all invasive airway interventions.

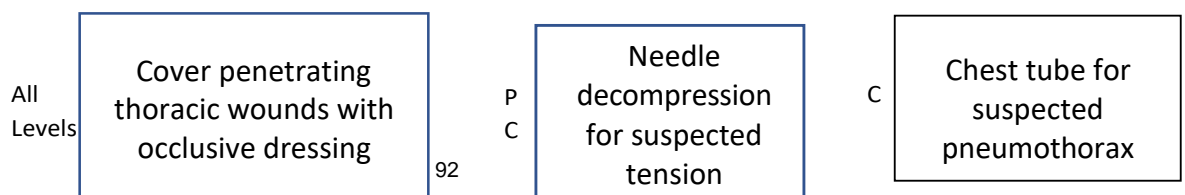


### Mental Status Assessment:

- Determine GCS and frequently reevaluate.
- Establish patient's level of consciousness:
  - A = Alert
  - V = Responsive to verbal stimulus
  - P = Responsive to painful stimulus
  - U = Unresponsive to all stimulus

### Respirations:

- Assess respiratory rate.
- Consider occlusive dressings (vented preferred) on penetrating chest and/or abdominal wounds (neck to umbilicus).
- Evaluate for pneumothorax (mechanism of injury + one of the following is concerning for pneumothorax).
  - Progressive respiratory distress
  - Diminished or absent breath sounds
  - Tachypnea/SpO<sub>2</sub> <90%
- Needle decompression for tension pneumothorax (14G or 10G needle) or for flail chest and the use of Positive pressure ventilation. Tension pneumothorax is defined as clinical signs consistent with pneumothorax and evidence of tension which is cardiovascular compromise, ie... Cardiac arrest or AMS plus signs of significant cardiovascular compromise.
  - Lateral = 4<sup>th</sup>-5<sup>th</sup> intercostal space anterior axillary line
  - Anterior = 2<sup>nd</sup>-3<sup>rd</sup> intercostal space mid clavicular line
  - Repeat PRN



**Massive Hemorrhage:**

- Note time of tourniquet application to inform receiving facility.
- **Do not place hemostatic pressure dressings into the chest or abdomen**

All Levels	Apply direct pressure to any major site of bleeding	All Levels	Apply tourniquet for extremity hemorrhage if direct pressure fails	All Levels	*Consider applying pressure dressing*
All Levels	Consider pelvic immobilization if fracture suspected	A I P C	Consider 20cc/kg IVF bolus to maintain SBP>90 or MAP>65	A I P C	Consider TXA 2g over 20minutes (max 100mg/min)
		P C	Consider blood product administration per procedure		

**Head Injury**

- History: Mechanism of injury, level of consciousness changes, protective device use (helmet), past medical history.
- Physical Exam: Document GCS (Eyes, Verbal, and Motor), pupillary exam, external evidence of head trauma (bleeding from ears, CSF draining from ears/nose/mouth, scalp laceration).
- Always consider cervical spine injury in patients with head trauma.
- Hyperventilation can cause cerebral edema. Maintain a rate of 8 breaths per minute or capnography reading of 35-45. Hyperventilation may be used, if there are signs of cerebral herniation (extensor posturing, dilated or nonreactive pupils, decrease in GCS of >2 or if initial GCS >9).
- Eye injuries: Perform gross visual acuity exam. Place a rigid eye shield.
- Treatment: Sit patient up or elevate head of stretcher if able.

P C	<u>TXA</u> 2g IV over 20 minutes (max 100mg/min) Not for Pediatrics	P C	<u>3% Saline</u> 250mL IV/IO 5mL/kg IV/IO, max 250mL	C	<u>Mannitol</u> 1g/kg IV over 10 min 1gm/kg IV/IO over 10 min
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**Spinal Injury:**

- History: Mechanism of injury (Axial loading, blunt trauma to head or neck, MVC, Fall >3 feet, any violent mechanism with high energy transfer), history of arthritis of spine
- Assessment for spinal injury can only be utilized if the patient is alert, calm, cooperative, and not intoxicated. Any painful injury might distract the patient from the pain of a spine injury. If the patient's spine or neurologic exam cannot be appropriately assessed, the spine cannot be cleared clinically.

- **Physical Exam:** Palpate the entire spine. Perform both gross motor and sensory exam.
- **Treatment:** Spinal precautions and spinal motion restriction (SMR).
  - Spinal precautions include the use of a cervical collar and securing the patient firmly to the stretcher maintaining the spine in neutral alignment. Spinal precautions may be appropriate for patients found ambulatory at the scene, patients who must be transported for a prolonged amount of time, or patients for whom a backboard is not otherwise indicated.
  - Spinal motion restriction (SMR) includes the use of a cervical collar, head immobilizer device, spinal motion restriction, padding, and adequate straps so that the patient remains securely in place, even when rolling to clear the airway. Full SMR is not always in the patient's best interest, as complications can develop quickly. Other appropriate devices may be needed, depending on the patient's situation. Follow the manufacturer's guidelines when utilizing any SMR device. Only patients with evidence of paralysis after blunt trauma should receive full SMR.
  - If any motion restriction technique causes an increase in pain or neurologic deficit, the patient should be stabilized in the position found or position of greatest comfort.

**Neurogenic Shock:**

- Mild-moderate: Hypotension (may have widened pulse pressure), bradycardia, warm/flushed skin, or priapism.
- Severe: Above plus shortness of breath, chest pain, weakness, cyanosis, faint pulse, or hypothermia.
- See Shock Protocol.

**Pain:**

- See Pain Protocol.

**Fractures and Dislocations:**

- **History:** History of trauma and mechanism of injury.
- **Physical Exam:** Localized tenderness, instability, or crepitus; evaluate pulses, motor function, and sensation; evaluate for obvious deformity, angulation, deep lacerations, and exposed bone fragments.
- Extremity injuries benefit from appropriate care but are of low priority with multiple injuries. Be aware that fractures do not necessarily lead to deformity or loss of function.
- Splinting:
  - Check PMS before and after splinting.
  - Immobilize the joint above and below the suspected fracture.
  - Consider traction splint for suspected femur fractures.
  - If a limb is angulated or has no pulse, one attempt may be made to place the limb in position of function to restore distal pulse.
- See Pain Protocol for treatment of pain.
- Open fractures, give antibiotics.

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Cefazolin or Cetriaxone  
2gm IV/IM  
50mg/kg IV/IM up to 2gm

**Amputation:**

- History: Timing and mechanism of amputation, history bleeding disorder (including blood thinner medication use).
- Physical Exam: Approximate amount of blood loss, note structural attachments in partial amputations.
- **Amputated part**: Wrap the amputated part in a sterile dressing moistened with sterile saline and place in a plastic bag. Then place the bag in ice water. Transport the part with the patient if possible. Don't immerse the amputated part in liquid or dry ice.
- **Partial amputation**: Control the bleeding. Saturate the wound with sterile saline and cover with a dry sterile dressing. Splint in anatomical position.
- Timing is of the greatest importance to assure viability. If the extrication time will be prolonged, consider sending the amputated part ahead to be surgically prepared for reimplantation.
- If bleeding cannot be controlled by direct pressure and elevation, a tourniquet should be applied. The tourniquet should not be covered. Note the time of tourniquet placement.
- See Massive Hemorrhage section above or Shock Protocol for uncontrolled bleeding.
- See Pain Protocol for treatment of pain.

**Hypothermia:**

- Remove wet clothing, utilize blankets, provide warm environment in ambulance.
- Consider warmed fluids (if possible).
- See Hypothermia Protocol.

**Trauma Considerations in Pregnant Patients:**

- Treat life threats initially with protocol above. Contact OLMD to discuss medication administration.
  - All pregnant patients should be transported for further evaluation. See appropriate OB/GYN Protocols as needed.
  - All pregnant patients should be transported in the left lateral decubitus position.
  - All pregnant patients should receive high flow O<sub>2</sub>.

**Burns:**

- History: Environmental hazards (smoke, toxic chemicals or fumes, potential for explosion, electrical sources), type of exposure, duration of exposure, associated trauma or blast injury, history of loss of consciousness, past medical history (especially cardiac and pulmonary disorders).
- Scene hazards: electrical wires, chemical fumes, carbon monoxide, and fire. Do not attempt rescue in a hazardous environment unless trained in this area.

- **Physical Exam:** Identify severity of burns and extent of burns (rule of nines), evaluate for associated trauma.
  - Superficial: reddened only, Partial thickness: blistered areas, Full thickness: scarred or leathery areas.
- Inhalation exposure can cause airway compromise. Note presence of stridor, facial swelling, carbonaceous sputum, and singed nasal hair or drooling. Be prepared to support the patient's ventilations, or secure the airway if necessary.
- Smoke or chemical exposure can cause bronchospasm. Note the presence of wheezing.
- Carbon monoxide poisoning can cause dyspnea. In carbon monoxide poisoning the pulse oximeter can give a false high reading. Carbon monoxide can also cause cerebral anoxia. Check for headache, confusion, or decreased level of consciousness.
- Large burns cause severe fluid loss. Note tachycardia, signs of volume depletion, and hypotension.
- If the patient is unconscious, consider the possibility of head or cervical spine injury.
- Consider the possibility of abuse when certain burns are encountered. These include cigarette burns, iron burns, grill burns, and any burns in the elderly or children where the described mechanism of injury appears unlikely.
- Consider possible myocardial injury, ischemia, or arrhythmia in patients with electrical burns or inhalation injury.
- **Treatment:**
  - Stop the burning process by removing burning clothing and cooling with adequate sterile water. Brush off dry chemicals present on skin before flushing with large amounts of water.
  - Liquid chemical should be flushed with copious amounts of normal saline.
  - Eyes may be irrigated with normal saline.
  - Cover affected areas with a dry burn sheet.
  - Place patients with electrical injury or inhalational injury on a cardiac monitor.
  - Start a large bore IV on patients with electrical burns, significant chemical exposures, inhalational injuries, any loss of consciousness, or other significant related trauma or burns.
  - Consider IVF in patients with >20% TBSA burns if hospital arrival time will be >20 minutes. Do not delay transport in seriously burned patients to administer IVF as fluid loss occurs over the course of hours.
  - For suspected or known cyanide exposure; suspected or known inhalational injury; evidence of closed space smoke exposure; or if the patient is comatose, in shock, or in cardiac arrest, consider Hydroxycobalamin.
  - If shock is present, refer to the Shock Protocol.
  - For pain control, see the Pain Protocol.

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Consider Albuterol if wheezing is present

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Consider IV accessA  
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C

Consider isotonic IVF bolus for burns &gt;20% TBSA

I  
P  
C

Cardiac monitor

P  
C

Consider Hydroxycobalamin 5 gm IV over 15 min

P  
C

Consider pain control



**Medication Formulary**  
**(For Dosing, See Appropriate Protocol)**

**Acetaminophen**  
(Tylenol)

**Indications**

Fever, Pain

**Contraindications**

Avoid in patients with severe liver disease

**Side Effects**

Nausea, vomiting

**Adenosine**  
(Adenocard)

**Indications**

PSVT, SVT

**Contraindications**

Second- or third-degree AV block

**Side Effects**

Short-lasting, 2nd or 3rd AV block, transient asystole, various arrhythmias lasting only a few seconds

**Albuterol and Ipratropium**  
(Ventolin, Proventil, DuoNeb)

**Indications**

Acute Bronchospasm  
Cardiac arrest associated with asthma  
Hyperkalemia

**Side Effects**

Tremor, dizziness, nervousness, headache, nausea, tachycardia, bronchospasm

**Amiodarone**  
(Cordarone)

**Indications**

Shock resistant V-Fib or Pulseless V-Tach  
Ventricular Tachycardia  
Refractory A-fib/Flutter

**Contraindications**

Cardiogenic shock  
Marked Sinus Bradycardia  
2<sup>nd</sup> or 3<sup>rd</sup> degree AV Block

**Side Effects**

Hypotension, bradycardia, AV

**Aspirin**

**Indications**

Adult patients with acute coronary syndrome

**Contraindications**

Aspirin allergy or aspirin induced asthma  
Active GI bleeding  
If patient has taken 324 mg within the last 24 hours

**Side Effects**

May cause GI discomfort and nausea  
May cause wheezing

**Atropine**

**Indications**

Anticholinergic drug used in bradycardias  
Organophosphate poisoning (to block the parasympathetic response)  
Refractory Bradycardia in pediatric patients

**Contraindications**

Tachycardia, glaucoma, A-Fib/Flutter w/RVR

**Side Effects**

Tachycardia, dry mouth, thirst, flushing of skin, blurred vision, headache, pupillary dilation, urinary retention

**Calcium Gluconate 10%**  
(Kalcinate)

**Indications**

Calcium Channel Blocker overdose Magnesium Sulfate drip toxicity  
Hypocalcemia / Hyperkalemia

**Contraindications**

Use with extreme caution in patients taking digitalis

**Side Effects**

Hypotension, bradycardia, arrhythmia, cardiac arrest, chalky or metallic taste

**Calcium Chloride 10%**

**Indications**

Calcium Channel Blocker overdose Magnesium Sulfate drip toxicity  
Hypocalcemia / Hyperkalemia

**Contraindications**

Use with extreme caution in patients taking digitalis

**Side Effects**

Hypotension, bradycardia, arrhythmia, cardiac arrest, chalky or metallic taste

**Cardene**

(Nicardipine)

**Indications**

Systolic BP > 180 mmHg, OR diastolic BP > 110 mmHg

**Contraindications**

Patients who have aortic valve stenosis

**Side Effects**

Hypotension

**Cefazolin**  
(Ancef)

**Indications**

Sepsis/Open Fracture

**Contraindications**

Hypersensitivity or known allergy

**Side Effects**

Nausea, vomiting, diarrhea, pain at injection site

**Ceftriaxone**  
(Rocephin)

**Indications**

Sepsis/Open Fracture

**Contraindications**

Hypersensitivity or known allergy

**Side Effects**

Nausea, vomiting, diarrhea, pain at injection site

**Cleviprex**  
(Clevidipine)

**Indications**

Systolic BP > 180 mmHg, OR diastolic BP > 110 mmHg

**Contraindications**

Patients who have aortic valve stenosis allergies to soy or egg products  
Defective lipid metabolism

**Side Effects**

Hypotension  
Reflex Tachycardia

**Dextrose 10%**  
(D10)

**Indications**

Suspected hypoglycemia

**Contraindications**

Intracranial hemorrhage  
Known CVA

**Side Effects**

Local irritation, may precipitate severe neurologic symptoms in alcoholics

**Dextrose 25%**  
(D25)

**Indications**

Suspected hypoglycemia

**Contraindications**

Intracranial hemorrhage  
Known CVA

**Side Effects**

Local irritation, may precipitate severe neurologic symptoms in alcoholics

**Dextrose 50%**  
(D50, Dextrose)

**Indications**

Suspected hypoglycemia

**Contraindications**

Intracranial hemorrhage  
Known CVA

**Side Effects**

Local irritation, may precipitate severe neurologic symptoms in alcoholics, causes local tissue necrosis if IV infiltrates

**Diltiazem**  
(Cardizem)

**Indications**

Rate control in refractory atrial fibrillation and SVT

**Contraindications**

Concurrent or recent use of Beta Blockers

**Side Effects**

Hypotension, heart block

**Diphenhydramine**  
(Benadryl)

**Indications**

Anaphylaxis  
Allergic reactions

**Contraindications**

Urticaria, extrapyramidal reaction, asthma, COPD, pregnancy, nursing mothers, acute glaucoma

**Side Effects**

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

**Dobutamine**  
(Dobutrex)

**Indications**

Cardiogenic shock associated with hypotension

**Contraindications**

Hypersensitivity to drug

**Side Effects**

Tachydysrhythmias, ectopy, headache, angina, nausea/vomiting, hypotension, hypertension

**Dopamine**  
(Intropin)

**Indications**

Cardiogenic shock associated with hypotension

**Contraindications**

Hypovolemic shock where complete fluid resuscitation has not occurred  
Uncorrected tachydysrhythmias or V-fib

**Side Effects**

Tachydysrhythmias, ectopy, headache, angina, nausea/vomiting

**Epinephrine**  
(Adrenalin)

**Indications**

V-Fib / Pulseless V-Tach  
Asystole / PEA  
Anaphylaxis  
Bronchospasm  
Hypotension

**Contraindications**

Hypertension

**Side Effects**

Palpitations, hypertension, dysrhythmias, anxiety, tremors

**Etomidate**  
(Amidate)

**Indications**

For use in RSI Protocol – for induction

**Contraindications**

Adrenal Insufficiency, Sepsis

**Side Effects**

Respiratory depression, venous pain, skeletal muscle movement

**Fentanyl**  
(Sublimaze)

**Indications**

Pain control

**Contraindications**

Bronchial asthma, concomitant MAO inhibitors, myasthenia gravis, Parkinson's Disease

**Side Effects**

Muscle rigidity, respiratory depression, bradycardia, myoclonic movements, tachycardia, vein irritation, dermatitis

**Furosemide**  
(Lasix)

**Indications**

Acute Pulmonary Edema such as CHF

**Contraindications**

Hypersensitivity

**Side Effects**

Hypovolemia, hypotension, hyponatremia, hypokalemia



**Glucagon**  
(GlucaGen)

**Indications**

Hypoglycemia

**Contraindications**

Insulinoma, Pheochromocytoma

**Side Effects**

Nausea/vomiting, urticarial

**Haloperidol**  
(Haldol)

**Indications**

Altered Mental Status when patient is combative and a potential for harm to his or her self and/or any personnel present

**Contraindications**

Patients with known reversible cause of altered mental status  
QT prolongation or history of torsades de pointes

**Side Effects**

Give with diphenhydramine to prevent extrapyramidal symptoms

Use caution when treating elderly patients who may require smaller doses to achieve therapeutic effect

Haloperidol has been associated with cardiac arrest in patients with prolonged QT intervals

Patients who receive haloperidol should be closely monitored for cardiac arrhythmia, particularly when the medication is given IV

May cause neuroleptic malignant syndrome

**Heparin**

*\*Authorized Services Only\**

**Indications**

Anticoagulant therapy

**Contraindications**

Severe thrombocytopenia, Uncontrolled active bleeding

**Side Effects**

No immediate side effects

Late side effects include hemorrhage

**Hydralazine**  
(Apresoline)

**Indications**

Severe hypertension

**Contraindications**

Hypotension, coronary artery disease, hypovolemia, Lupus

**Side Effects**

Hypotension, Tachycardia

**Ketamine**

(Ketalar)

**Indications**

Induction agent for RSI, Pain Management, Sedation

**Contraindications**

<3mos age, Known schizophrenia, Severe HTN

**Side Effects**

Hallucinations, respiratory depression, elevated BP

<b>PT WEIGHT IN LBS.</b>	<b>PT WEIGHT IN KG</b>	<b>0.5mg/kg/hr ml/hr</b>	<b>1 mg /kg /hr ml/hr</b>
110	50	25	50
121	55	27	55
132	60	30	60
143	65	32	65
154	70	35	70
165	75	37	75
176	80	40	80
187	85	42	85
198	90	45	90
209	95	47	95
220	100	50	100
231	105	52	105
242	110	55	110
253	115	57	115
264	120	60	120
275	125	62	125
286	130	65	130
297	135	67	135
308	140	70	140

**Keppra**  
(Levetiracetam)

**Indications**

Continued seizures after administration of a Benzodiazepine

**Contraindications**

Use with caution in pregnancy and renal impairment

**Side Effects**

Angioedema

**Labetalol**

**Indications**

Hypertension

**Contraindications**

Bronchial asthma, overt cardiac failure, cardiogenic shock, bradycardia, hypotension

**Side Effects**

Dizziness, lightheaded, headache, nausea/vomiting, chest pain, shortness of breath, fatigue

**Lactated Ringers**  
(LR)

**Indications**

Hypovolemic shock Dehydration

Burns

Obstetrical emergencies

**Contraindications**

Severe metabolic acidosis or alkalosis

**Side Effects**

Volume overload, agitation

**Lidocaine**  
(Xylocaine)

**Indications**

Pain Management for IO insertion  
Cardiac Arrest

**Contraindications**

Known sensitivity

**Side Effects**

Hypotension, decreased LOC, irritability, muscle twitching, eventually seizures

**Lorazepam**  
(Ativan)

**Indications**

Seizures and status  
Epilepticus  
Conscious sedation  
Skeletal muscle relaxant  
Acute anxiety states  
Combative patients

**Contraindications**

Respiratory depression

**Side Effects**

Respiratory/cardiac arrest, decreased LOC, hypotension

**Magnesium Sulfate**

**Indications**

Torsades de Pointe  
Digitalis induced ventricular arrhythmias  
Anticonvulsant in eclampsia  
Suspected hypomagnesium

**Contraindications**

Hypermagnesium, Hypocalcemia, Anuria, Heart block, Active labor

**Side Effects**

Bradycardia, hypotension, hyporeflexia, diaphoresis and drowsiness, decreased respiratory rate, flaccid paralysis

## **Mannitol**

### **Indications**

Signs and symptoms of increased intracranial pressure associated with cerebral edema

### **Contraindications**

Known hypersensitivity  
Renal Disease  
Active Intracranial Bleeding  
Severe Pulmonary Edema/CHF

### **Side Effects**

Dizziness, fever, headache, seizures, angina, edema, hypotension, tachycardia, blurred vision, dehydration, urticarial, chills, thrombophlebitis, fluid and electrolyte imbalance, CHF, GI distress

## **Methylprednisolone**

(Solu-Medrol)

### **Indications**

Steroid used in respiratory distress to reverse inflammatory and allergic reactions

### **Contraindications**

TB, Hyperglycemia, Fungal Infection

### **Side Effects**

Arrhythmias, bradycardia, headache, depression

## **Metoprolol**

(Lopressor)

### **Indications**

Acute Coronary Syndromes  
Hypertension  
Tachydysrhythmias

### **Contraindications**

Bradycardia  
Heart Block  
Cardiogenic Shock/Heart Failure

### **Side Effects**

Hypotension, bradycardia, headache, GI discomfort, shortness of breath

**Midazolam**  
(Versed)

**Indications**

Seizures and status epilepticus  
Conscious sedation  
Skeletal muscle relaxant  
Acute anxiety states  
Combative patients

**Contraindications**

Glaucoma, shock, ETOH, pregnancy, renal failure, coma

**Side Effects**

Apnea, cardiac arrhythmias, hypotension

**Morphine**

**Indications**

Pain Management  
Pulmonary Edema

**Contraindications**

Avoid use with hypotension  
Avoid in the presence of RV/Inferior wall MI

**Side Effects**

Hypotension, AMS, nausea/vomiting

**Naloxone**  
(Narcan)

**Indications**

Narcotic overdose

**Contraindications**

Palpitations, hypertension, dysrhythmias, anxiety, tremors

**Side Effects**

Vomiting with rapid administration, ventricular dysrhythmias, acute narcotic withdrawal, seizures, hypertension

**Nitroglycerin**  
(Nitro, Nitrostat, Nitro-Bid)

**Indications**

Chest pain  
Pulmonary edema

**Contraindications**

Increased ICP  
Hypotension / Shock  
Glaucoma  
Use of Viagra, Levitra (within 24 hours) or Cialis (within 36 hours)

**Side Effects**

Headache, dizziness, hypotension

**Nitroglycerin Infusion Chart**

Dose in mcg/min	50 mg/250 mL D5W 100 mg/500 mL D5W	25 mg/250 mL D5W 50 mg/500 mL D5W
10	3 mL/hr	6
15	4.5	9
20	6	12
25	7.5	15
30	9	18
35	10.5	21
40	12	24
45	13.5	27
50	15	30

**Nitroprusside**  
(Nipride)

**Indications**

Hypertension

**Contraindications**

Hypersensitivity, Compensatory hypertension secondary to AV shunt or aortic insufficiency

**Side Effects**

Headache, dizziness, hypotension, coma, dilated pupils, diaphoresis, GI distress, acidosis (cyanogens toxicity), tachycardia

**Norepinephrine**  
(Levophed)

**Indications**

Hypotension

**Contraindications**

Hypotension from blood volume deficits, mesenteric or peripheral vascular thrombosis

**Side Effects**

Tissue hypoxia, bradycardia, anxiety, headache, respiratory difficulty, extravasation necrosis

**Mix 4 mg of Norepinephrine in 250 ml of D5W = 16 mcg/ml concentration**

<b>Dose (mcg/min)</b>	2	3	4	5	6	7	8	9	10	11	12
<b>Rate (ml/hr)</b>	7.6	11.2	15	18.8	22.6	26.2	30	33.8	37.6	41.2	45

<b>Dose (mcg/min)</b>	13	14	15	16	18	20	22	24	26	28	30
<b>Rate (ml/hr)</b>	48.8	52.6	56.4	60	67.6	75	82.6	90	97	105	112.6

**Ondansetron**  
(Zofran)

**Indications**

Nausea/vomiting

**Contraindications**

Patients with prolonged QT syndrome

**Side Effects**

None

**Pavulon**  
(Pancuronium)

**Indications**

Facilitates endotracheal intubation by paralysis of skeletal muscle to increase pulmonary compliance during mechanical ventilation

**Contraindications**

Myasthenia Gravis, Acidosis

**Side Effects**

Tachycardia, Hypertension, Apnea



**Pepcid**  
(Famotidine)

**Indications**

H-2 blocker used for allergic reactions

**Contraindications**

Advanced Kidney Disease

**Side Effects**

Fever, fatigue, arrhythmia, urticaria, depression, anxiety, tinnitus

**Phenylephrine**  
(Neo-Synephrine)

**Indications**

Hypotension, Cardiogenic Shock, Neurogenic and Spinal Shock

**Contraindications**

Hypovolemia

**Side Effects**

Hypertension, Bradycardia, Headache, Dizziness, Dysrhythmias

**Pitocin**  
(Oxytocin)

**Indications**

Post-partum hemorrhage

**Contraindications**

Uterine rupture  
Incomplete delivery  
Hypertension

**Side Effects** Hypotension

Dysrhythmias  
Tachycardia

**Promethazine**  
(Phenergan)

**Indications**

Nausea/vomiting

**Contraindications**

Lactating females, MAOI use, COPD, HTN, Pregnancy

**Side Effects**

Dizziness, Drowsiness

**Propofol**  
(Diprivan)

**Indications**

Sedation of mechanically ventilated patients

**Contraindications**

Hypotension, hypersensitivity

**Side Effects**

Hypotension

**Racemic Epinephrine**  
(Vaponephrine)

**Indications**

Bronchospasm in bronchiolitis  
Stridor at rest in croup  
Suspected epiglottitis

**Contraindications**

Hypersensitivity

**Side Effects**

Tachycardia  
Palpitations

**Reglan**  
(Metoclopramide)

**Indications**

Nausea/Vomiting

**Contraindications**

Hypersensitivity, pheochromocytoma, seizures, GI bleeding, GI obstruction

**Side Effects**

Dystonic reaction, seizures, hallucinations, CHF, hypertension, SVT, dizziness, hypotension, diarrhea, rash, laryngospasm, hepatic toxicity

**Rocuronium**  
(Zemuron)

**Indications**

Facilitates endotracheal intubation by paralysis of skeletal muscle to increase pulmonary compliance during mechanical ventilation

**Contraindications**

Severe Acidosis or Alkalosis

**Side Effects**

Hypotension, hypertension, increased pulmonary vascular resistance

**3% Saline**  
(Hypertonic Saline)

**Indications**

Increased intracranial pressure with suspected herniation

**Contraindications**

Patients without suspected cerebral edema

**Side Effects**

Dehydration

## **Sodium Bicarbonate**

(NaHCO<sub>3</sub>)

### **Indications**

Severe metabolic acidosis  
Cardiac arrest  
Hyperkalemia

### **Contraindications**

Hypokalemia

### **Side Effects**

Metabolic alkalosis, increased vascular volume, pulmonary edema, dysrhythmias through serum potassium depletion, transient raises the arterial PCO<sub>2</sub>

## **Sodium Chloride**

(Normal Saline)

### **Indications**

Heat exhaustion  
Diabetic disorders  
Freshwater drowning  
Head injury  
Hypovolemia

### **Contraindications**

Congestive Heart Failure

### **Side Effects**

Volume overload, congestive heart failure, diuresis, thirst

## **Succinylcholine**

(Anectine)

### **Indications**

Skeletal muscle relaxation, Facilitate management of patients undergoing mechanical ventilation

### **Contraindications**

Malignant hyperthermia, Skeletal muscle myopathies, Penetrating eye injury

### **Side Effects**

Cardiac arrhythmias, increased intraocular pressure, muscle fasciculation

**Terbutaline**  
(Brethine)

**Indications**

Premature labor

**Contraindications**

Hypersensitivity

**Side Effects**

Tremors, anxiety, tachycardia, palpitations, drowsiness, nausea/vomiting, diaphoresis, muscle cramps

**Thiamine**  
(Vitamin B1)

**Indications**

Vitamin B1 Deficiency, Wernicke-Korsakoff Syndrome, Chronic Alcohol Abuse

**Contraindications**

Hypersensitivity

**Side Effects**

Weakness, restlessness

**Toradol**  
(Ketoralac)

**Indications**

Pain Management in isolated hip or extremity trauma, burns, renal colic, musculoskeletal pain, possible kidney stones

**Contraindications**

Renal complications, excessive age, hypersensitivity, NSAID/Ibuprofen use in 24 hrs, CVA/TBI in last 24 hrs, anticoagulation therapy, active bleeding, GI bleeding

**Side Effects**

Bleeding, GI discomfort

**Tranexamic Acid (TXA)**  
(Cyklokapron)

**Indications**

Patient > 15 years old

Signs and symptoms of severe hemorrhage (internal or external)

Hemodynamic Instability: SBP < 90, Pulse rate > 110 bpm, Respiratory rate > 24 breaths per minute, evidence of peripheral vasoconstriction

Duration from initial injury is less than 180 min

**Contraindications**

Patient <15 years old, time of initial traumatic injury > 180 min, patients who have contraindications to antifibrinolytic therapy agents, and medical control discretion

**Side Effects**

Nausea, Vomiting, GI issues

**Vecuronium Bromide**  
(Norcuron)

**Indications**

Facilitates endotracheal intubation by paralysis of skeletal muscle to increase pulmonary compliance during mechanical ventilation

**Contraindications**

Myasthenia Gravis

**Side Effects**

Hypotension, hypertension, increased pulmonary vascular resistance

**Vitamin K1**  
(Phytonadione)

**Indications**

Reversal of Warfarin (Coumadin) overdose, Major bleeding with elevated INR, Intracranial hemorrhage with elevated INR

**Contraindications**

Hypersensitivity

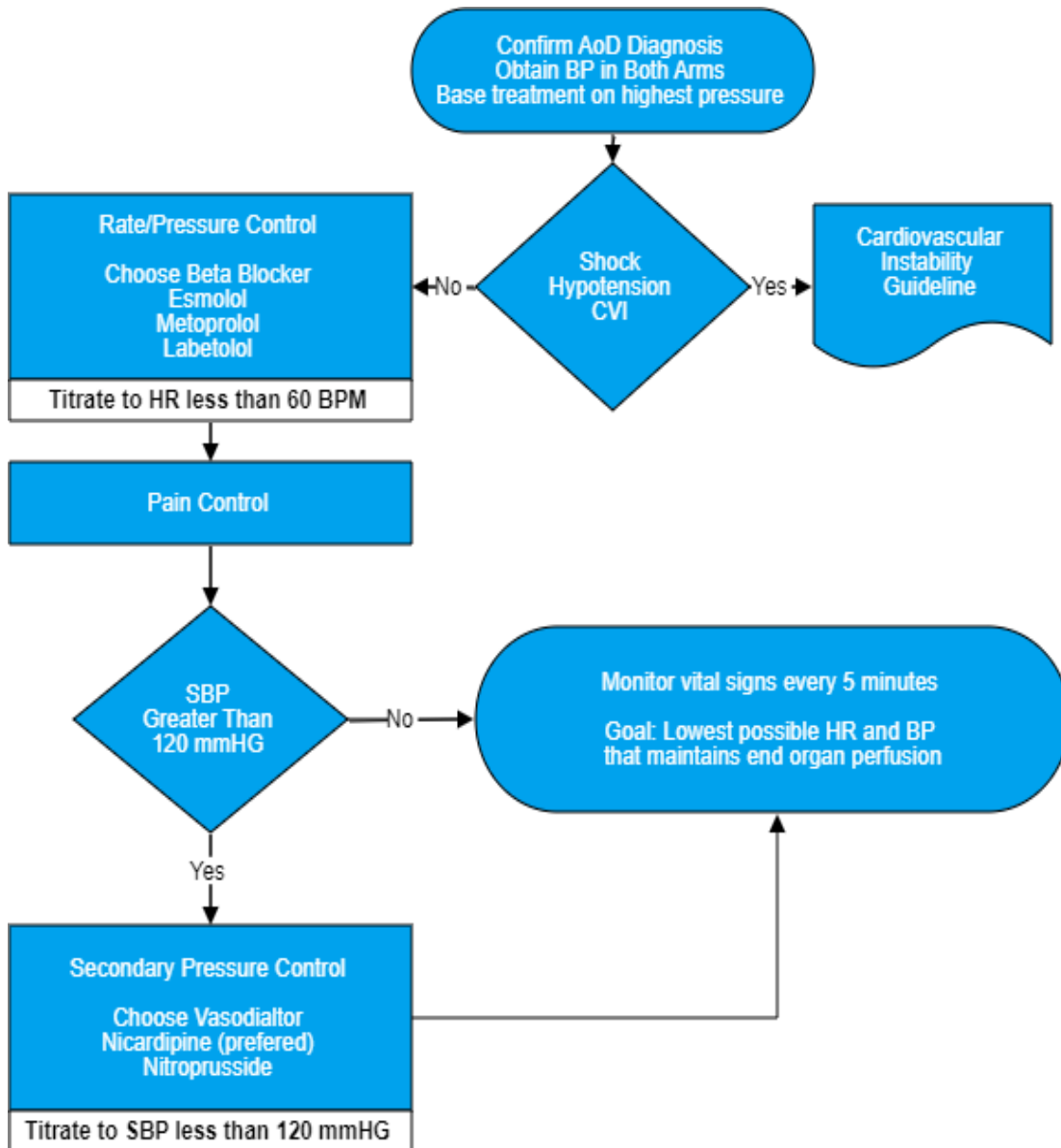
**Side Effects**

Tachycardia, dizziness, sweating, Prolonged Warfarin (Coumadin) reversal

## Critical Care Guidelines

### Thoracic Aortic Dissection/Aortic Aneurysm

- Monitor non-invasive blood pressure every 5 minutes or continuously if an arterial line is available



## Critical Care Medications

### Esmolol

500 mcg/kg over 1 min, then begin infusion at 50mcg/kg/min. Titrate by 50mcg/kg/min every 5-15 min, max 300 mcg/kg/min

### Labetalol

10-20mg slow IV/IO push (over 2 minutes)

Repeat every 10 minutes with additional doses doubled. Max 300 mg.

### Metoprolol

5mg IV/IO every 5 min x 3 doses

### Cardene (Nicardipine)

2.5 mg/hr IV/IO Infusion. Titrate 2.5mg/hr every 5-15 min to max dose of 15mg/hr. Once target is reached, titrate down to by 2.5mg/hr to 3mg/hr

### Nitroprusside (Nipride)

0.5-10mcg/kg/min IV/IO titrated to goal Bp

## Stroke

- For inter-facility transfers with known intracranial hemorrhage, maintain a goal BP of < 160 Systolic, while maintaining a MAP >90. Individual cases should be discussed with the sending and/or receiving physician or OLMD.
- For inter-facility transfers where tPA was initiated, continue therapy and complete the NIH paperwork as indicated. Maintain a goal BP of <180 Systolic, or as directed by the receiving neurologist. Follow the Hypertensive Critical Care Protocol.
- For patients who receive thrombolytic treatment, the blood pressure should be maintained at or below 180/105 mmHg for at least 24 hours after treatment.

## Brain Herniation (Cerebral Edema) Syndrome:

- Brain herniation can occur with expanding mass lesions due to intracranial hemorrhage, stroke, abscess, tumors, and hydrocephalus. If practicable, medical crews should manage herniation syndrome collaboratively with treating providers or program medical directors.

## Signs:

- Neurogenic breathing patterns (Cheyne-Stokes, Hyperventilation, ataxic).
- Abnormal pupils and pupil response (asymmetrical dilation, fixed).



- Abnormal motor response.
- Cushing reflex (bradycardia, respiratory depression, and hypertension).

Treatment:

**Hypertonic Saline 3%**  
 250 IV/IO over 5-15 min  
 1-2 ml/kg over 5-15 min

**Mannitol**  
 0.5-1gm/kg over 30-60 min

## **Pulmonary Embolism**

Assessment:

- Pulmonary emboli to the lung can result in syndromes ranging from mild pleuritis, to an acute asthmatic attack, to a sudden onset supraventricular tachycardia, to a cardiopulmonary arrest.
- For interfacility transfers, evaluate lab results to include D-dimer.

### **Heparin**

For confirmed pulmonary embolism on inter-facility transfers, consider a Heparin bolus of 80 units/kg (max of 4,000 to 7,500 units), followed by an infusion of 18 units/kg/hr (max of 1,300-1,800 units/hr).

### **Lovenox**

For interfacility transfers, discuss Lovenox 1mg/kg SQ with the sending physician.

## **Disseminated Intravascular Coagulation**

Assessment/Indications:

- Abnormal clotting profiles.
- Prolong PT and/or aPTT.
- Suppressed clotting factors.
- Positive D-dimer.
- Underlying or associative causes for DIC include shock states (sepsis, anaphylactic, circulatory), blood transfusions reactions, neoplasms, vascular and hematopoietic disorders, obstetric complications (retained fetus, eclampsia, septic abortion, and abruptio placentae), crush and tissue injury, or necrosis and liver disease.

#### Treatments:

- Continue infusion of blood products if already initiated such as: PRBCs, platelets, FFP (to correct clotting factors consumption), cryoprecipitate (factor VIII) to correct hypofibrinogenemia; utilize CBC, INR and ABG if available.
- Fluid resuscitation will be needed to maintain cardiac output, urine output, and blood pressure.
- Invasive hemodynamic monitoring if available, reduce temp with 325mg Tylenol (Acetaminophen) or if unable to administer Tylenol, Toradol (Ketorolac) 30 mg IV.
- Consider mechanical ventilation w/sedation, analgesia, and NMBA as needed.

#### Airway Management

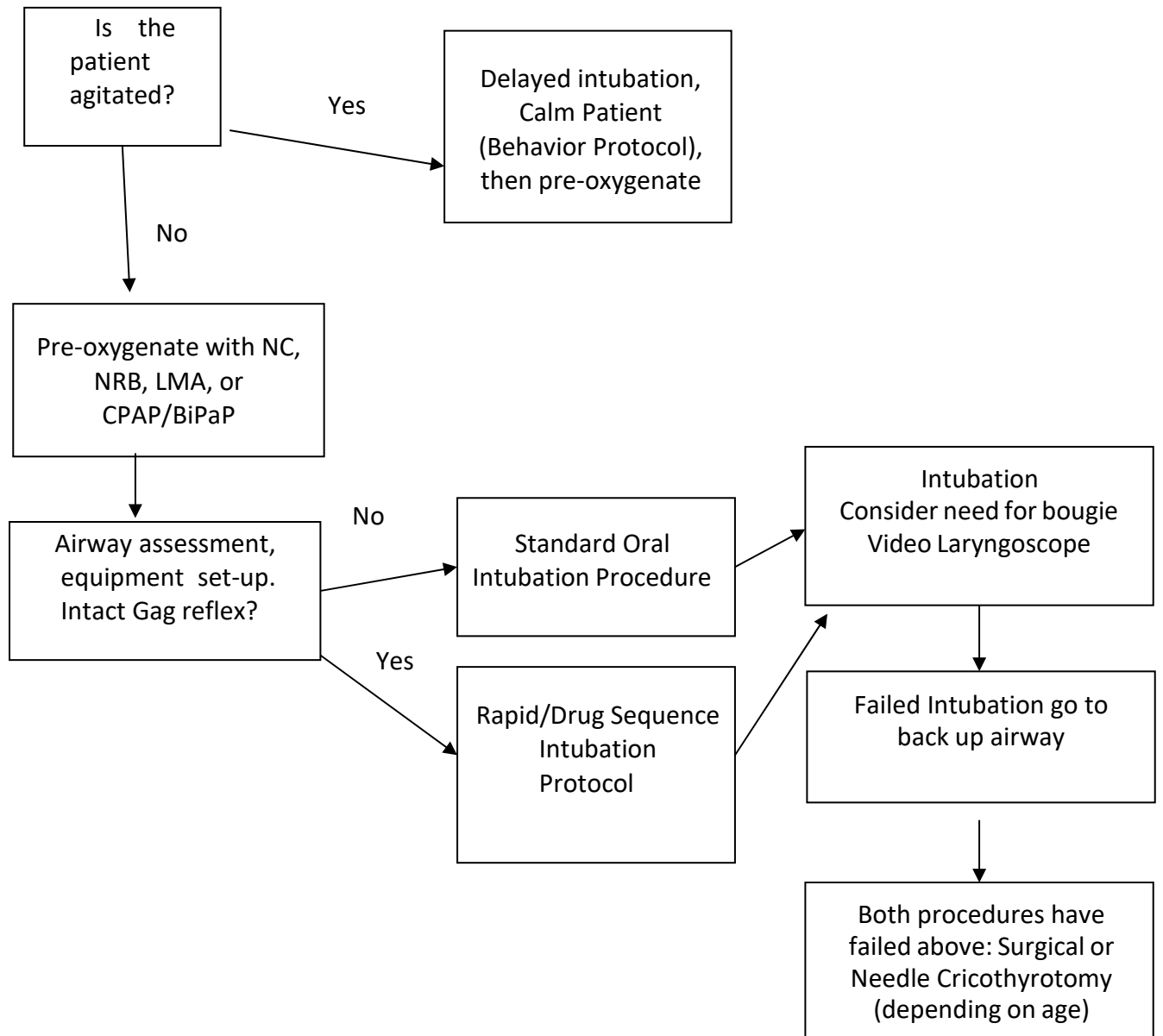
##### Assessment:

1. Assess for airway, breathing, circulation, disability, and neurological function.
2. Assess for adequate effort and rate of breathing. If adequate, administer oxygen to maintain oxygen saturations between 94% – 99%.

##### Decision Making:

1. Any of the following should have an adequate airway placed:
  - Failure to maintain or protect the airway.
  - Failure of ventilation or oxygenation.
  - The anticipated clinical course will likely lead to deterioration.
2. Airway assessment should be performed for difficult intubation.
  - Airway assessment for difficult intubation (e.g. LEMONS, RODS, MOANS, SMART).
  - Intubation, RSI medications, and positive pressure ventilation can cause or worsen hypotension, hypoxia, and acidosis resulting in critical cardiovascular instability.
  - Airway difficulties must be identified and mitigated to ensure the best possible airway management outcomes.
  - The failure to evaluate the airway and identify difficult airway situations is the single most important factor leading to peri-intubation complications.
3. Metabolic acidosis
  - When intubating the patient with metabolic acidosis, whatever the cause, consideration must be made of the patient's minute ventilation and every attempt must be made to match that minute ventilation, pre, peri and post intubation.

**Airway Algorithm (TO FINISH)**



## Rapid Sequence Intubation

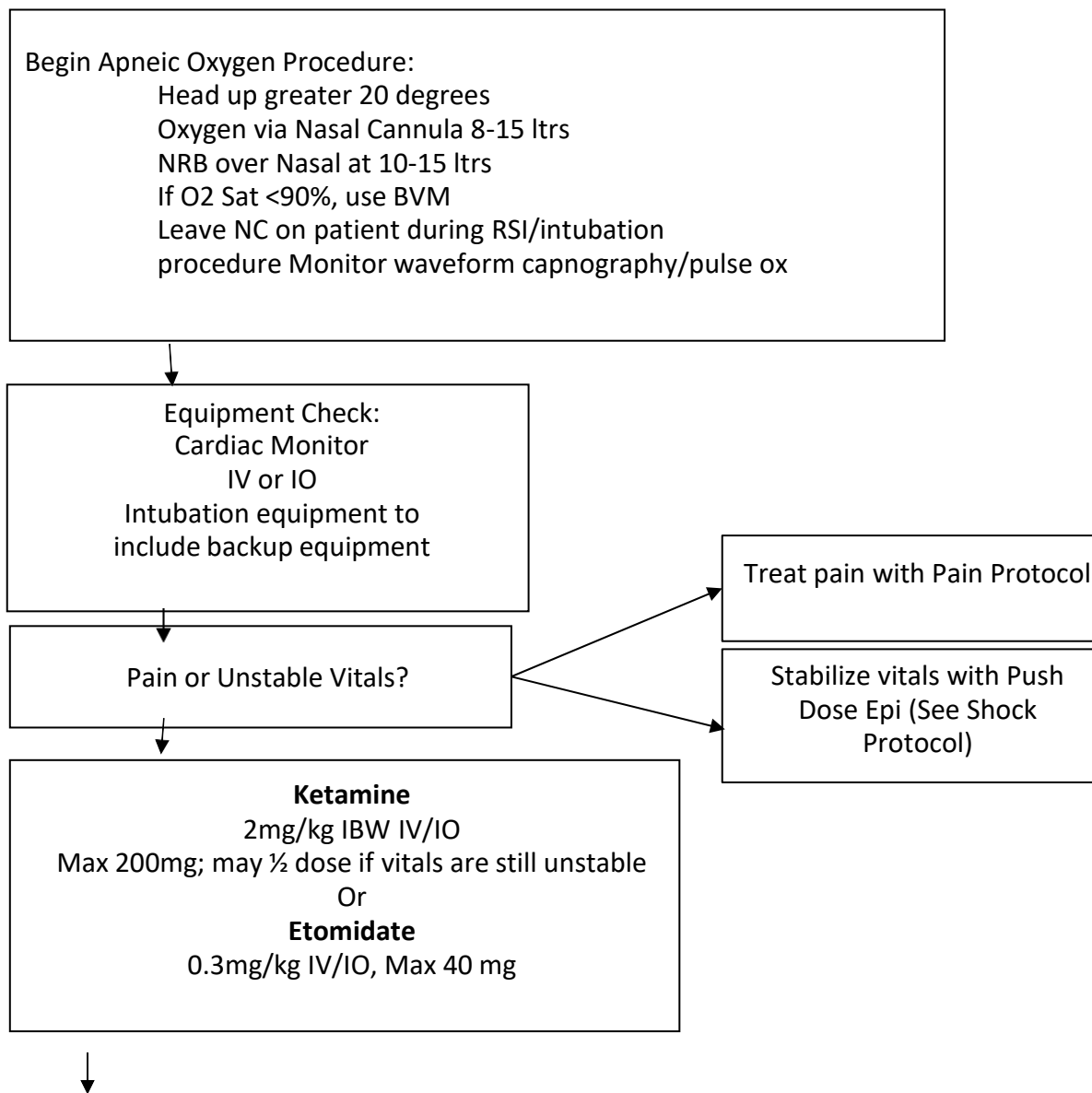
### Clinical Indications:

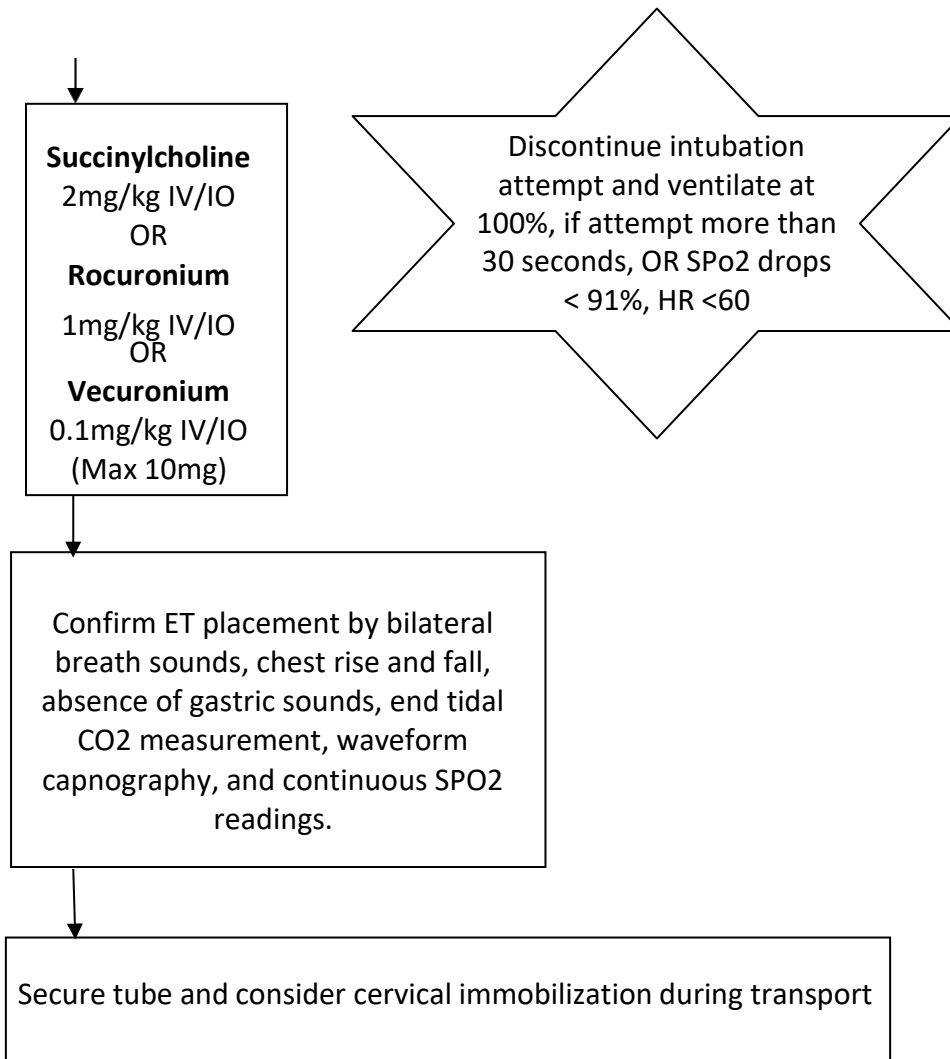
- A patient with the inability to maintain a patent airway.

### Contraindications:

- Ketamine should not be used as an induction agent for infants < 3 months old, patients with a known history of schizophrenia, or in patients with severe uncontrolled hypertension.
- Etomidate should not be used in patients with known sepsis.

### Procedure:





## Post Intubation Protocol

Consider NG/OG Tube

Practice Ventilator

Pneumonia Prevention

Closed circuit suction

Head up to 30-45n degrees

Inline suction

Maintain ET cuff pressure 20 to 30

## Decision Making:

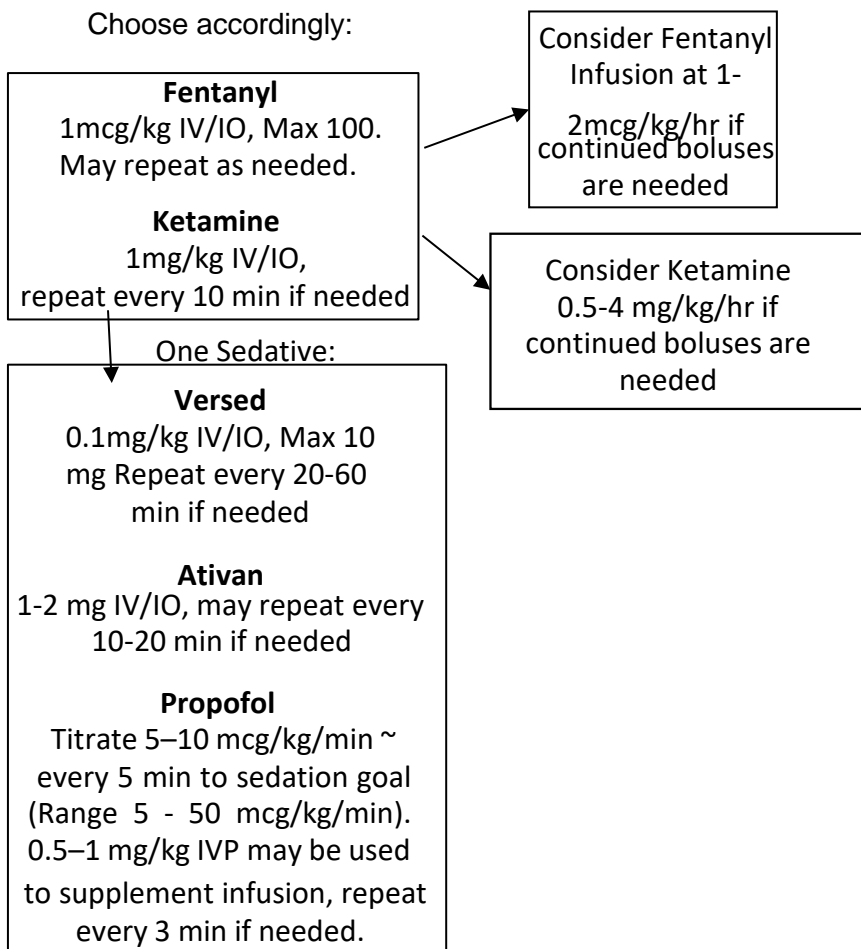
Select dose based on assessment and clinical considerations

- Initially use repeat bolus administration until the pain and sedation goal is attained.
- After initial goal is attained use scheduled bolus or infusion to maintain goal.
- Anticipate pain and agitation during transport and treat preemptively by bolus.
- Sedation goal for this guideline is a RASS -1 to -5.
- Use the lower part of the dose range or reduce the normal dose of all sedatives by 1/2 to 1/4 if the patient is hemodynamically unstable.
- A Sedative should be added if opioids fully control pain but sedation goals cannot be met. Choose only one sedative to use.
- A long acting paralytic should only be utilized if appropriate analgesia and sedation are not effective.
- Have the receiving physician verify tube placement and chart findings. It is required that the airway be monitored continuously throughout transport via waveform capnography and pulse oximetry. Reassess airway placement frequently and with every patient move.

Score	Classification	(RASS)
+4	Combative	Overtly combative or violent; immediate danger to staff
+3	Very agitated	Pulls on or removes tube(s) or catheter(s) or has aggressive behavior toward staff
+2	Agitated	Frequent non-purposeful movement or patient-ventilator dyssynchrony
+1	Restless	Anxious or apprehensive but movements not aggressive or vigorous
0	Alert and calm	Spontaneously pays attention to caregiver
-1	Drowsy	Not fully alert, but has sustained (more than 10 seconds) awakening, with eye contact, to voice
-2	Light sedation	Briefly (less than 10 seconds) awakens with eye contact to voice
-3	Moderate sedation	Any movement (but no eye contact) to voice
-4	Deep sedation	No response to voice, but any movement to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

### Pain and Agitation

Choose accordingly:



Long Term Paralytic

**Vecuronium (Norcuron)**

0.1 mg/kg IO/IV (max of 10 mg)

OR

**Rocuronium (Zemuron)**

1mg/kg IO/IV (max of 100 mg)

OR

**Pavulon (Pancuronium)**

0.1 mg/kg IV/IO.



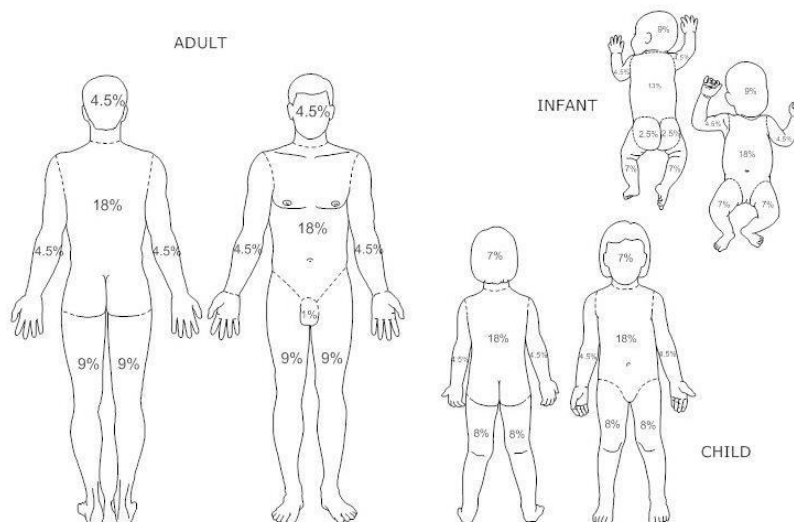
## RULE OF NINES

When it is necessary to estimate the percentage of Total Body Surface (TBS) burns, such as making the decision to transport directly to a burn center, the rule of nines is useful. **In children, relatively more area is taken up by the head and less by the lower extremities. Accordingly, the rule of nines is modified.** An accurate description of the burn, including location and severity, should be provided to the receiving facility. The rule of nines is not intended to replace such a description.

ADULT Body Part	Percentage of Total Body Surface (TBS)
Arm (shoulder to fingertips)	9 %
Head and neck	9 %
Leg (groin to toes)	18 %
Anterior trunk	18 %
Posterior trunk	18 %
Perineum	1%

CHILD Body Part	Percentage of Total Body Surface (TBS)
<b>Arm (shoulder to fingertips)</b>	<b>9 %</b>
<b>Head and neck</b>	<b>18 %</b>
<b>Leg (groin to toes)</b>	<b>14 %</b>
<b>Anterior trunk</b>	<b>18 %</b>
<b>Posterior trunk &amp; Buttocks</b>	<b>18 %</b>

INFANT Body Part	Percentage of Total Body Surface (TBS)
<b>Arm (shoulder to fingertips)</b>	<b>9 %</b>
<b>Head and neck</b>	<b>14 %</b>
<b>Leg (groin to toes)</b>	<b>16 %</b>
<b>Anterior trunk</b>	<b>18 %</b>
<b>Posterior trunk</b>	<b>18 %</b>



### APGAR SCORING

	0 POINTS	1 POINT	2 POINTS
<b>HEART RATE</b>	<b>ABSENT</b>	<b>&lt;100 BPM</b>	<b>&gt;100 BPM</b>
<b>RESPIRATORY EFFORT</b>	<b>ABSENT</b>	<b>WEAK CRY</b>	<b>STRONG CRY</b>
<b>MUSCLE TONE</b>	<b>FLACCID</b>	<b>SOME FLEXTION</b>	<b>ACTIVE MOTION</b>
<b>REFLEX IRRITABILITY</b>	<b>NO RESPONSE</b>	<b>GRIMACE</b>	<b>VIGOROUS CRY</b>
<b>COLOR</b>	<b>BLUE, PALE</b>	<b>BODY PINK, EXTREMITIES BLUE</b>	<b>BODY PINK, EXTREMITIES PINK</b>

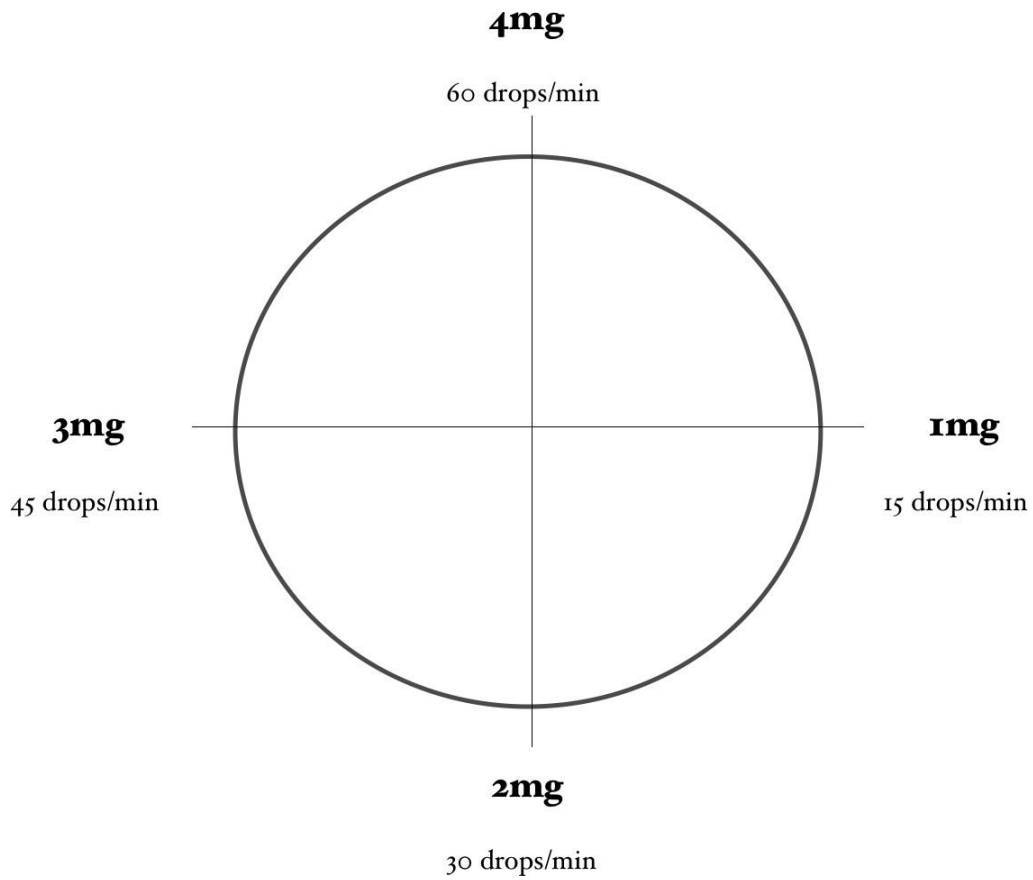
### Glasgow Coma Scale

	Eyes	Voice	Motor
1	No eye opening	No speech	No movement
2	Eyes to painful stimulus	Incoherent speech	Extending Decerebrate
3	Opens eyes to voice	Inappropriate words	Flexing Decorticate
4	Spontaneously opens eyes	Confused	Withdraws from painful stimulus
5		Oriented	Localizes to painful stimulus
6			Obeys commands

## Oxygen Percentages

Method	Flow Rate	O <sub>2</sub> % Inspired Air
Room Air		21%
Nasal Cannula (prongs)	1 L/min	24%
	2 L/min	28%
Face Mask	6 L/min	44%
Oxygen Reservoir (mask)	10-12 L/min	90%
Bag-Valve Mask with 100% valve and reservoir	High flow regulated to inflate reservoir at proper rate	90%+

## Lidocaine Clock



800 mg dopamine per 500 mL NS (400 mg dopamine per 250 mL) NS for a concentration of 1600 mcg dopamine per mL. The following table assumes using a 60 drops per mL (microdrop) infusion set.

### DOPAMINE TABLE


PT WEIGHT		DESIRED DOSE (drops/min)		
Lbs	Kg	5 mcg/kg/min	10 mcg/kg/min	20 mcg/kg/min
88	40	8	15	30
100	45	8	17	34
110	50	9	19	38
120	55	10	21	41
132	60	11	23	45
143	65	12	24	49
154	70	13	26	53
165	75	14	28	56
176	80	15	30	60
187	85	16	32	64
198	90	17	34	68
209	95	18	36	71
220	100	19	38	75
231	105	20	39	79
242	110	21	41	83
253	115	22	43	86
264	120	23	45	90
275	125	23	47	94
286	130	24	49	98
297	135	25	51	102
308	140	26	53	106


#### USING THE DOPAMINE TABLE:

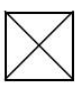
Find patient weight and then move across row to the column for the desired dose. Set dial-a-flow to the corresponding flow rate.


## STRUCTURE MARKING SYSTEM

Begin by using orange spray paint or lumber crayon to draw a 2-foot box. Then use the box to alert subsequent rescuers to building conditions or earlier findings.


 Damage is minor with little danger of further collapse. Structure is safe for search and rescue operations.

 Damage is significant. Shoring, bracing or removal of hazards is necessary.

 Structure is not safe for search and rescue operations. Remote search operations may proceed at significant risk. Safe havens and evacuation routes should be established.


 Direction to safely enter building.


**HM** Hazardous material is present. Type of hazard may also be noted.

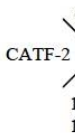
 9/1/95 0800  
HM-CHLORINE  
CATF-2

Write date, time, hazardous materials present and team identification on the right-hand side of the box. For example, this building was searched Sept. 1, 1995, at 8a.m., chlorine was found, and the search was conducted by Los Angeles County CATF-2.

## SEARCH MARKING SYSTEM

 Search operations are currently in progress. (ORANGE)

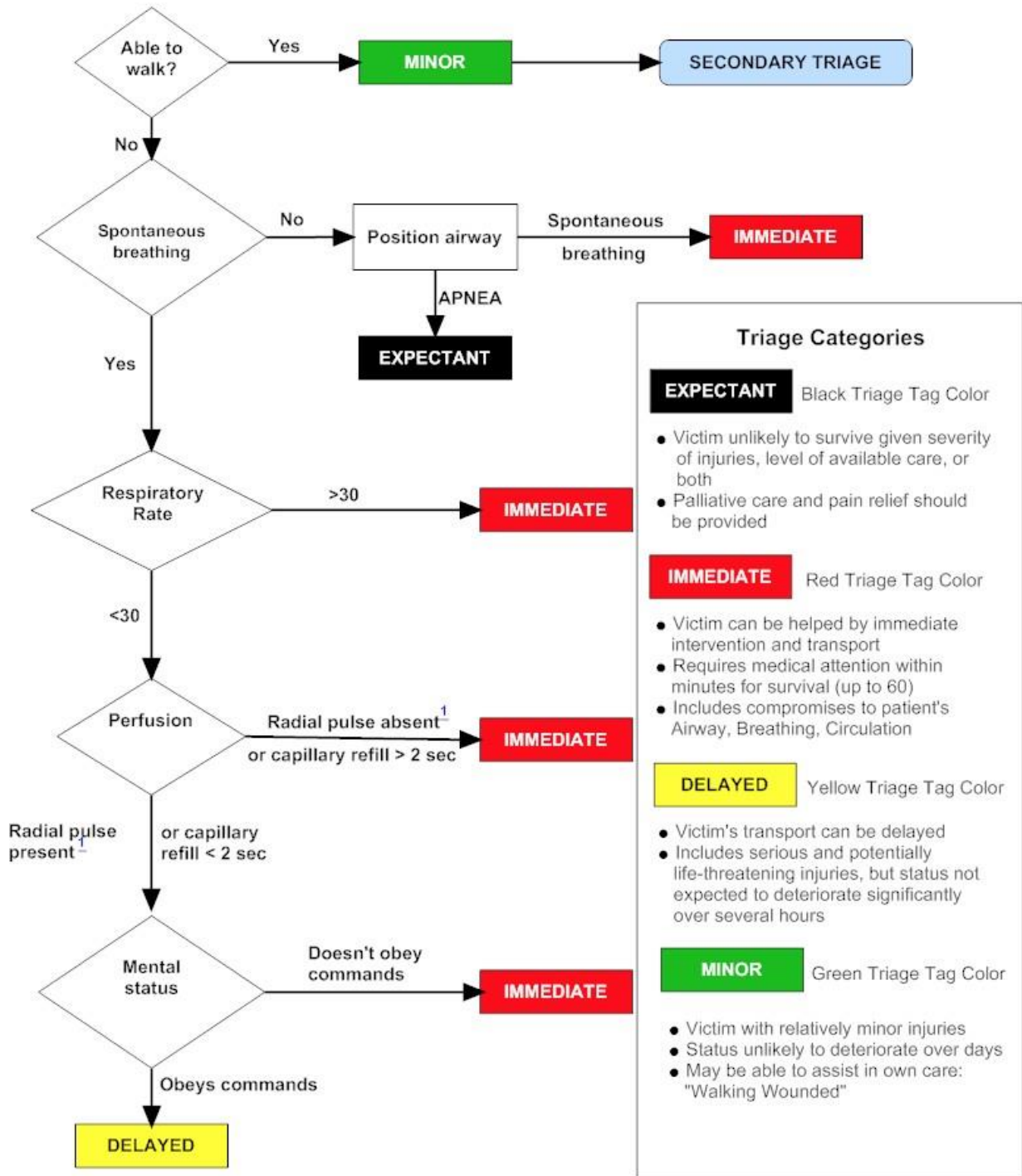
 Personnel have exited the structure. (ORANGE)

 9/1/95  
CATF-2 HM-  
CHLORINE  
1-LIVE  
1-DEAD

Left quadrant – Team identifier.  
Top quadrant – Time and date team left the structure.  
Right quadrant – Hazards found.  
Bottom Quadrant - Number of live and dead victims still inside the structure. *Written in Black Marker or lumber crayon/chalk*

Source: Federal Emergency Management Agency Urban Search and Rescue Task Force System.

START Adult Triage



**Triage Categories**

**EXPECTANT** Black Triage Tag Color

- Victim unlikely to survive given severity of injuries, level of available care, or both
- Palliative care and pain relief should be provided

**IMMEDIATE** Red Triage Tag Color

- Victim can be helped by immediate intervention and transport
- Requires medical attention within minutes for survival (up to 60)
- Includes compromises to patient's Airway, Breathing, Circulation

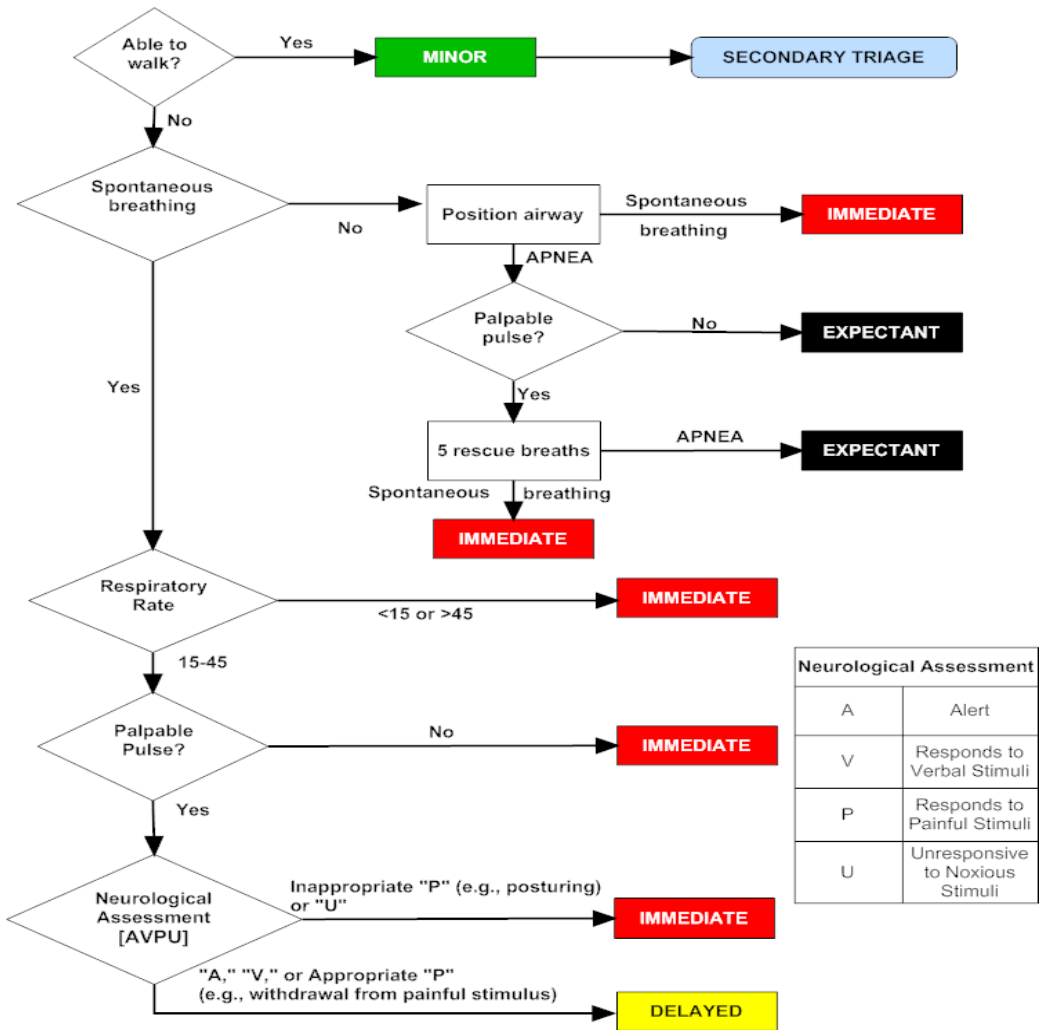
**DELAYED** Yellow Triage Tag Color

- Victim's transport can be delayed
- Includes serious and potentially life-threatening injuries, but status not expected to deteriorate significantly over several hours

**MINOR** Green Triage Tag Color

- Victim with relatively minor injuries
- Status unlikely to deteriorate over days
- May be able to assist in own care: "Walking Wounded"

## JumpSTART Pediatric Multiple Casualty Incident Triage



Use JumpSTART if the Patient appears to be a child.

Use an adult system, such as START, if the patient appears to be a young adult.

### Triage Categories

<div style="background-color: black; color: white; padding: 2px; text-align: center; margin-bottom: 5px;"><b>EXPECTANT</b></div> <p style="margin: 0;">Black Triage Tag Color</p> <ul style="list-style-type: none"> <li>Victim unlikely to survive given severity of injuries, level of available care, or both</li> <li>Palliative care and pain relief should be provided</li> </ul>	<div style="background-color: yellow; padding: 2px; text-align: center; margin-bottom: 5px;"><b>DELAYED</b></div> <p style="margin: 0;">Yellow Triage Tag Color</p> <ul style="list-style-type: none"> <li>Victim's transport can be delayed</li> <li>Includes serious and potentially life-threatening injuries, but status not expected to deteriorate significantly over several hours</li> </ul>
<div style="background-color: red; color: white; padding: 2px; text-align: center; margin-bottom: 5px;"><b>IMMEDIATE</b></div> <p style="margin: 0;">Red Triage Tag Color</p> <ul style="list-style-type: none"> <li>Victim can be helped by immediate intervention and transport</li> <li>Requires medical attention within minutes for survival (up to 60)</li> <li>Includes compromises to patient's Airway, Breathing, Circulation</li> </ul>	<div style="background-color: green; color: white; padding: 2px; text-align: center; margin-bottom: 5px;"><b>MINOR</b></div> <p style="margin: 0;">Green Triage Tag Color</p> <ul style="list-style-type: none"> <li>Victim with relatively minor injuries</li> <li>Status unlikely to deteriorate over days</li> <li>May be able to assist in own care: "Walking Wounded"</li> </ul>

## Request to be Transported to Hospital on Divert

Complete this form for a patient that chooses to be taken to a hospital on diversion

### PURPOSE

This form should be used when a patient requests transport to a hospital that is on diversion. The patient should be informed of the diversion and what the diversion means. If the patient is adamant that he/she be transported to the hospital on diversion, complete this form and have the patient sign the Statement of Understanding below.

### EMS TRANSPORT PROVIDER: MARK ALL THAT APPLY

- Patient transported to a hospital that was on “diversion.”
- Patient was informed and voiced understanding that an extended wait is possible.
- Patient was informed and voiced understanding that transfer to another hospital is possible.
- Patient was diverted to this hospital because \_\_\_\_\_ hospital is on Emergency Department, Critical Care, Med/Surg, Psych, CT, Labor & Delivery diversion. (Enter hospital name and circle appropriate reason for diversion).

### STATEMENT OF UNDERSTANDING

It has been explained to me that \_\_\_\_\_ hospital is on diversion, and that I may have an extended wait to see the doctor, get a bed, or may need to be transferred to another hospital. I still wish to be transported to this hospital.

Acknowledgment of Patient

\_\_\_\_\_ Date

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Signature



## Thrombolytic Checklist (STEMI)

Complete this checklist for any patient with a STEMI

EVENT INFORMATION					
Date:		ATCC Number:		Time:	
Destination:					
Patient Name:			Patient DOB:		

12-LEAD
Chief Complaint/Reason for 12-Lead: _____
12-Lead Acquired: Yes _____ No _____      12-Lead Transmitted: Yes _____ No _____
Number of Transmission Attempts: _____      Mode of Transmission: _____
EMSP Assessment of 12-Lead: _____

DOES PATIENT HAVE:	YES	NO
Chest pain or equivalent characteristic of myocardial ischemia, for at least 30 minutes. Pain has not lapsed and is not relieved by NTG or position changes		
ECG ST segment elevation of at least 1 mm in at least two contiguous leads reflecting a single myocardial region (Q waves are not a contraindication)		
Elapsed time from onset of ischemia to evaluation less than twelve hours		
EXCLUSION CRITERIA: POTENTIAL ABSOLUTE CONTRAINDICATIONS	YES	NO
Active internal bleeding		
Past of present bleeding disorder		
History of any stroke, intracranial neoplasm, arteriovenous malformations or aneurysm		
Intracranial or intraspinal surgery or trauma in the last 2 months		
Intracranial neoplasm, arteriovenous malformation, or aneurysm		
Uncontrolled hypertension - systolic > 180 mm Hg, diastolic > 110 mm Hg		
Pregnancy		
EXCLUSION CRITERIA: POTENTIAL RELATIVE CONTRAINDICATIONS	YES	NO
Diabetic hemorrhagic retinopathy or other hemorrhagic ophthalmic conditions		
Prolonged CPR (longer than 10 minutes)		
Major surgery at <u>non-compressible</u> site (eg. CABG) within 10 days		
Documented cerebrovascular disease		
Gastrointestinal or genitourinary bleeding within last 7 days		
Significant liver dysfunction		
PHYSICALLY advanced age (>75 years with multiple disease states beyond AMI).		
Patients currently receiving oral anticoagulants		
Previous thrombolytic therapy		
Trauma to the head in the last 2 weeks		
Any trauma in the last 2 weeks		
Surgery in the last 2 weeks		

## Thrombolytic Checklist (Stroke)

Complete this checklist when treating any patient with an acute stroke

EVENT INFORMATION					
Date:		ATCC Number:		Time:	
Destination:		Historian Cell Phone #:			
Patient Name:				Patient DOB:	

EMSA ASSESSMENT
<p>1. <b>Eyes:</b> <i>Horizontal Gaze</i></p> <ul style="list-style-type: none"> <li>Ask patient to keep their head still and follow your finger left to right with their eyes. In aphasic patients, call the patient's name on one side and then the other.</li> <li><b>Abnormal</b> – Patient is unable to follow as well in one direction compared to the other.</li> </ul> <p>2. <b>Motor:</b> <i>Facial Weakness</i></p> <ul style="list-style-type: none"> <li>Ask patient to show their teeth or smile. In aphasic patients, look for asymmetric grimace to pain.</li> <li><b>Abnormal</b> – One side of the face does not move as well as the other.</li> </ul> <p style="margin-left: 20px;"><i>Arm Weakness</i></p> <ul style="list-style-type: none"> <li>Ask patient to hold out both arms, palms up, for 10 seconds with eyes closed. In aphasic patients, hold the patients arms up and let go.</li> <li><b>Abnormal</b> – One arm does not move, or drifts down compared to the other.</li> </ul> <p style="margin-left: 20px;"><i>Leg Weakness</i></p> <ul style="list-style-type: none"> <li>Ask patient to lift one leg and then the other for 5 seconds. In aphasic patients, hold up one leg and let go, then repeat on the other side.</li> <li><b>Abnormal</b> – One leg does not move, or drifts down compared to the other.</li> </ul> <p>3. <b>Slurred Speech or Aphasia:</b></p> <p style="margin-left: 20px;"><i>Naming</i></p> <ul style="list-style-type: none"> <li>Ask patient to name your watch and pen.</li> <li>Abnormal – Patient slurs words, says the wrong words, or is unable to speak.</li> </ul> <p style="margin-left: 20px;"><i>Repetition</i></p> <ul style="list-style-type: none"> <li>Ask patient to repeat "They heard him speak on the radio last night" after you.</li> <li>Abnormal – Patient slurs words, says the wrong words, or is unable to speak.</li> </ul> <p style="margin-top: 20px;">_____ : Time last known well _____ &lt; 4.5hrs    _____ &lt; 6 hrs. _____ &lt; 24 hrs. _____ &gt; 24 hrs.</p> <p>Level of consciousness: Alert _____ Responds to Voice _____ Responds to Pain _____ Unresponsive _____</p> <p>GLUCOMETER READING: _____ mg/dL    Was bolus given? Yes _____ No _____ Unknown _____</p>

QUESTIONS	YES	NO
History of stroke, brain tumor, aneurysm, arteriovenous malformations		
Patient Pregnant		
Past or Present Bleeding disorders		
Surgery in last 2 weeks		
Anticoagulant medications taken Last Taken:		
Intracranial or intraspinal surgery or trauma in the last 2 months		
Gastrointestinal or genitourinary bleeding within last 7 days		

**Leave a copy with the patient**

Received by: \_\_\_\_\_ Date: \_\_\_\_\_

## **Surgical Cricothyroidotomy** **\*Tactical Paramedic Only\***

### **Description:**

Surgical cricothyroidotomy involves passing a tube through an incision in the cricothyroid membrane in order to provide an airway to oxygenate and ventilate a patient when less invasive airway management techniques cannot be accomplished or have failed.

### **Indications:**

This procedure is to be used only when standard airway management procedures cannot be accomplished or have failed.

### **Precautions:**

Caution should be used in patients with:

- Laryngeal injury.
- Tracheal rupture.
- Anterior neck swelling that obscures anatomical landmarks.
- Anatomic anomalies or distortion of the larynx and trachea.
- Bleeding disorders.

### **Procedure:**

#### **Adult**

- Have suction supplies available and ready.
- Locate the cricothyroid membrane utilizing anatomical landmarks.
- Use the non-dominant hand to secure the membrane.
- Prepare the site for incision. Quickly cleanse the site with antiseptic solution. Start from the membrane and wipe in widening circles until a broad margin around the site is cleansed.
- Make a vertical incision in the skin 1.5 to 2.5 cm in length over the cricothyroid membrane.
- Use blunt dissection to expose the cricothyroid membrane.
- Once the membrane is exposed, make a horizontal incision through the membrane.
- Insert the endotracheal tube until the cuff is in the trachea, inferior to the incision site. Consider the use of a Bougie as a guide into the trachea.
- Inflate the cuff.
- Secure the tube with a commercial tube holder if available or prepackaged tube securing tie.
- Confirm placement as you would an ETT.
- Note the depth on insertion.

#### **Pediatric**

Not Recommended.

# NIH PREDICTED BODY WEIGHT (PBW) / TIDAL VOLUME CHART

## MALES

## FEMALES

HEIGHT		PBW	MALES					FEMALES							
			4	5	6	7	8	HEIGHT	PBW	4	5	6	7	8	
Feet	Inches	Male	ml/kg	ml/kg	ml/kg	ml/kg	ml/kg	Female	Inches	Female	ml/kg	ml/kg	ml/kg	ml/kg	ml/kg
4' 10"	58	45.4	180	230	270	320	360	34	55	34	140	170	200	240	270
4' 11"	59	47.7	190	240	290	330	380	36.3	56	36.3	150	180	220	250	290
5' 0"	60	50	200	250	300	350	400	38.6	57	38.6	150	190	230	270	310
5' 1"	61	52.3	210	260	310	370	420	40.9	58	40.9	160	200	250	290	330
5' 2"	62	54.6	220	270	330	380	440	43.2	59	43.2	170	220	260	300	350
5' 3"	63	56.9	230	280	340	400	460	45.5	60	45.5	180	230	270	320	360
5' 4"	64	59.2	240	300	360	410	470	47.8	61	47.8	190	240	290	330	380
5' 5"	65	61.5	250	310	370	430	490	50.1	62	50.1	200	250	300	350	400
5' 6"	66	63.8	260	320	380	450	510	52.4	63	52.4	210	260	310	370	420
5' 7"	67	66.1	260	330	400	460	530	54.7	64	54.7	220	270	330	380	440
5' 8"	68	68.4	270	340	410	480	550	57	65	57	230	290	340	400	460
5' 9"	69	70.7	280	350	420	490	570	59.3	66	59.3	240	300	360	420	470
5' 10"	70	73	290	370	440	510	580	61.6	67	61.6	250	310	370	430	490
5' 11"	71	75.3	300	380	450	530	600	63.9	68	63.9	260	320	380	450	510
6' 0"	72	77.6	310	390	470	540	620	66.2	69	66.2	260	330	400	460	530
6' 1"	73	79.9	320	400	480	560	640	68.5	70	68.5	270	340	410	480	550
6' 2"	74	82.2	330	410	490	580	660	70.8	71	70.8	280	350	420	500	570
6' 3"	75	84.5	340	420	510	590	680	73.1	72	73.1	290	370	440	510	580
6' 4"	76	86.8	350	430	520	610	690	75.4	73	75.4	300	380	450	530	600
6' 5"	77	89.1	360	450	530	620	710	77.7	74	77.7	310	390	470	540	620
6' 6"	78	91.4	370	460	550	640	730	80	75	80	320	400	480	560	640

## Blood Transfusion Procedure

### Clinical Indications

- Hypotension is the setting of known traumatic injury
- Obvious massive bleeding
- Significant GI bleeding
- Vaginal bleeding

### Contraindications

- Known personal or religious objection to blood products
- Patient less than 3 yrs of age and/or less than 15kg

### Procedure:

- If patient has not already received crystalloid fluid administer 1-2 L NS or LR, **20-40mL/kg NR or LR**
- Obtain secondary access with large bore IV or IO for blood administration
- Ensure blood temperature has been appropriately maintained
- Gently agitate blood product bag and use only filtered blood tubing for administration
- Setup and prime line as required
- Utilize blood warmer for administration
- Administer 1 unit PRBCs with 1 unit FFP, **10mL/kg PRBCs with 10mL/kg FFP**
- Alternatively administer 1 unit whole blood, 10mL/kg whole blood
- Monitor closely for transfusion reaction, if transfusion reaction occurs immediately stop transfusion and see section below for treatment of transfusion reactions
- May repeat 2<sup>nd</sup> unit, **10mL/kg**, of PRBCs/FFP or whole blood if hypotension persists
- When blood is complete, remove blood tubing and flush line
- Any remaining blood should be left with patient at receiving facility

### Documentation Requirements

- Document that consent was obtained if possible
- Indication for blood product administration
- Blood administration start and stop time
- Blood product unit ID and type (eg O-)
- Type of product, rate, and total volume infused
- Vitals should be documented every 5-15 minutes at minimum
- Presence or absence of blood transfusion reaction
- Interventions performed if blood transfusion reaction occurs
- Patient response to blood administration
- Patient status at infusion completion
- Disposition of infused blood

### Blood Transfusion Reaction

- Signs/Symptoms
  - Localized erythema at infusion site
  - Hives or itching
  - Flushing
  - Fever
  - Chills
  - Chest pain or pressure
  - Tachycardia
  - Difficulty breathing
- Treatment
  - Stop blood immediately
  - Flush line and start crystalloid solution through line
  - Administer 50mg (**1mg/kg, max 50mg**) diphenhydramine IV
  - Administer 125mg (**2mg/kg, max 125mg**) methylprednisolone IV
  - For anaphylactic/significant reaction see Allergic Reaction Protocol

**End of Document**