

REVISED 2013



REGION ONE PROTOCOL EFFORT

REGION

THESE PROTOCOLS REFLECT THE STANDARD OF CARE FOR ALL EMS PROVIDERS OF REGION ONE



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Region One Protocol Effort

Allow the following protocols to serve as a guide while treating patients in the Parishes of Jefferson, Orleans, Plaquemines, and St. Bernard (Region One); protocols should not overshadow sound clinical judgment of paramedics. Any EMT certified to provide pre-hospital care in the parishes of Region One MUST and will adhere to the following protocols. These protocols reflect the Standard of Care for all EMS pre-hospital providers of Region One. In accordance with State Law,¹ these revised 2011 protocols shall supersede all protocols that are currently in use within any EMS system, public or private, licensed to operate in Region One. The use of any other protocols specifically developed for an individual EMS system (public or private) is strictly prohibited. To evaluate the effectiveness of patient care and these protocols, random run reports will be reviewed as part of a Continuous Quality Improvement (CQI) program.

Standing orders are designed for paramedics to initiate advanced care without having to contact Medical Control. Standing orders are listed in green text boxes within each protocol. Treatments options found in gray shaded boxes containing red text are only to be performed with the approval of Medical Control. Listed below are several reasons for which Medical Control **MUST** be contacted:

- as clinically indicated and in accordance with the operating procedures of your employer
- as indicated in the On-Scene Physician policy
- at any point within these protocols as it may be indicated
- for patients suspected of having an ST elevation myocardial infarction (STEMI) and for patients suspected of having new focal neurologic deficits. Contacting Medical Control will facilitate notification of the receiving hospital's appropriate team.
- if a line of treatment is in question or becomes unclear
- prior to administration of medications which are not standing orders
- prior to performance of any advanced skill(s) as specifically stated in the appropriate protocol
- to confirm a patients' death (medical or traumatic) and for field termination of cardiac arrests

As a courtesy, when contacting Medical Control by radio or telephone, begin the report with the reason for which you are calling. Medical Control reports should then follow the format found in the appendix.

¹ Louisiana State Law RS 33:4791.1 and RS 40:1234

General Administrative Policy

1. EMTs will provide care under the direction of the highest skilled level EMT and Medical Control.
2. The following protocols reflect the standard of care for all pre-hospital providers within Region One.
3. Patients in need of transport to a hospital will be transported in an ambulance or an approved vehicle that meets the requirements of the regulatory agencies of Region One and the State of Louisiana.

Medical Control Policy

1. In the event primary Medical Control cannot be reached, Medical Control will become the responsibility of the receiving facility or the EMS Medical Director.
2. The Medical Control Physician is expected to be familiar with these protocols and use them as a guide for patient care in the pre-hospital setting.
3. The physicians who serve in the capacity of Medical Control shall notify the appropriate Region One Medical Society in writing or E-mail with protocol revisions they feel are needed to meet the standard of care.
4. The Medical Control Physician shall notify the EMS service director in writing or by E-mail whenever care has been rendered which they believe does not comply with the established protocols.
5. Medical Control should be contacted for orders as it is indicated within the protocols or when medical direction is desired by the EMT.

Selection of Hospital

1. When patient condition and EMS unit status allows, patients or the authorized guardian of such, will be allowed to select the hospital Emergency Department of choice within the EMS service area. Hospital selection by patients or guardians will not be honored in cases of major trauma or critically ill patients.
2. If, in the opinion of Medical Control or the highest skilled level EMT, the patient's condition is unstable the patient will be transported to the closest appropriate hospital Emergency Department.
3. Patients who have sustained rabid animal bites, venomous snake bites or any other poisonous bites / stings should be transported to an ED that has antivenin and rabies treatment. Contact Medical Control for the appropriate receiving Emergency Department.

Minimal Requirements

In addition to state requirements, Region One mandates all EMS services and systems licensed to operate in the Parishes of Region One to carry the following equipment:

- 12-lead EKG
- AED (Automatic External Defibrillator); biphasic (for BLS units)
- All medications listed within these protocols
- Biphasic defibrillation
- Quantitative End Tidal CO₂ (ETCO₂) Capnography
- Glucometer
- Intraosseous vascular access (adult and pediatric)
- SpO₂
- Transcutaneous pacing
- Continuous Positive Airway Pressure (CPAP)

Operating without the above equipment violates certain parish ordinances and could jeopardize licensure. In order to provide the patients of Region One with the highest level of pre-hospital care, the use of continuous ETCO₂ monitoring and Continuous Positive Airway Pressure (CPAP) are required.

EMT – Basic / Intermediate Medication Administration

In the event of a basic level ambulance response to an emergency within Region One (prohibited in Orleans Parish, excluding MCI), EMT-Basics and Intermediates are permitted administer the following medications as specified within this document, with Medical Control orders:

- Albuterol, nebulized (pre-mixed)
- Aspirin
- Epinephrine auto inject pens
- Nerve agent antidotes (pre-mixed auto-injector)
- Oral Glucose

EMT-Basics and Intermediates may **assist** in administration of the patient's prescribed nitroglycerin, rescue inhalers and epinephrine auto-inject pens.

The above medications can only be given under direct Medical Control authorization with the exception of the Epinephrine auto inject pen. EMT – Basics and Intermediates can administer the standard adult dose (5mg) of premixed nebulized Albuterol. EMTs must be trained on the use of Abuterol and nebulizers prior to administering the medication. The training is the responsibility of each department's education division.

As of January 1, 2007 the State of Louisiana has approved the use of glucometers and supraglottic airway devices for EMT-Basics. Basic EMT's must be successfully trained on the use of the devices and their indications for use. Once these devices have been used, Medical Control should be contacted. Oxygen administration is still a basic level skill and its use does not need authorization from Medical Control.

Multi Agency Response

Region One Lead EMS Agencies (primary 911 providers) by parish:

Jefferson:

East and West Jefferson EMS; respectively.

Westwego EMS and Gretna EMS within their incorporated boundaries.

Orleans:

New Orleans EMS

Plaquemines:

Plaquemines Parish EMS

St. Bernard:

Acadian Ambulance Service of New Orleans

Listed above are the lead agencies for each parish within Region One. In the event of a **non-**lead EMS agency on scene, they will relinquish control of that scene to a representative of equal or higher skill level of the lead EMS agency in the parish which the incident is occurring. The non-lead EMS agency will assist the lead agency as needed. It is the responsibility of the highest skilled medic of the lead agency to request additional resources as needed.

Mass Casualty Incident (MCI)

Upon arrival on an MCI within Region One, the primary 911 provider for the parish in which the incident is taking place assumes and maintains control of the scene. The National Incident Management System will be utilized for all MCI's. Assistance from other Region One EMS agencies and mutual-aid services will be delegated by the Incident Commander. The START Triage guide is depicted below, this should guide triaging in the event of an MCI.

START Triage – *Assess, Treat*
Find color, STOP, TAG, MOVE ON

M I N O R	D E C E A S E D	I M M E D I A T E	D E L A Y E D	<i>Move Walking Wounded</i>
				No Resp after head tilt
				Breathing but Unconscious
				Resp <10 or > 30
				Perfusion Cap refill > 2 sec or No Radial Pulse <i>Control bleeding</i>
				Mental Status – Can't follow simple commands
				Otherwise
		Remember Resp <30 Perfusion < 2 Mental status = Can do		

*See the Region One MCI Plan

Call Disposition Policy

Purpose:

In an effort to deliver the highest level of pre-hospital care to our patients, all 911 calls received will be given one of the following dispositions:

1. Patient transported to an appropriate ED.

2. Patient Refusal

- this is reserved for a low acuity call in which neither the patient/guardian nor the medic feels that the patient's condition warrants transport via an ambulance. A patient refusal on a patient care report will be signed by the patient/guardian and witnessed by another party on the scene and/or the medic's partner if no unbiased third party is present (fire department, law enforcement agency, etc).

3. Patient Refusal AMA

- this is reserved for a more acute call in which the medic feels the patient needs EMS treatment and transport and the patient/guardian is declining EMS treatment and transport
- This requires consultation with online Medical Control or the Medical Director of the responding agency.

4. Cancelled prior to arrival on scene

- this is done by the Communications Center (Dispatch)
- A name of the canceling party must be documented on a recorded line and relayed to the EMS crew for proper documentation on their Daily Trip Sheet or Cancellation Form.

5. Cancelled on scene

- this is reserved for when an EMS unit arrives on the scene of a 911 call and finds **no patient, no injuries or medical complaints, and a request for medical assistance no longer exists**. This is most likely to occur on MVA's, but may occur in other circumstances. A unit cannot be on scene for an extended period of time and must give the name of the canceling party (whether it is law enforcement, fire department or the people involved in the incident). Should the medic render ANY type of assessment or treatment, this disposition cannot be utilized. Upon arriving on scene of an MVA with significant mechanism of injury (MOI), it is in the best interest of the medics to obtain refusals / AMA's.

6. Patient Deceased on Scene

- this may be from medical or traumatic causes and warrants notification of law enforcement and the Parish Coroner's Office
- Medical Control must be contacted for a DNR order and/or time of death.

7. Patient "gone on arrival" (GOA)

- this is reserved for an instance when an EMS crew arrives on a scene and the patient has left the scene. Every effort should be made to obtain information regarding how and when the patient left and the party relaying that the patient is gone should be documented over the radio.

8. Unfounded

- this is reserved for instances when an EMS crew or first responding agency arrives at a location and is unable to locate a patient. Every attempt will be made by the responding crew to locate the patient.

Hospital Diversion Policy

The dispatch centers of all Region One EMS providers will monitor EMS systems. Region One EMS crews will make every attempt to honor diversions and acknowledge off-load times of hospitals. Each provider should attempt to honor limited diversion notices and extended off-load time notices of each facility listed on the website. However, patient preference and informed decisions by patients may be honored.

Each provider will access the website and update on-duty crews periodically throughout the shift. Posting current and updated information will be the hospital's responsibility. Facility diversion information will be passed on to the EMS crews.

Hospital's approximate off-load times correspond to the colors listed on the website.

- Green** → **off-load times less than 15 minutes;**
- Yellow** ⇒ **off-load times of 15 – 30 minutes;**
- Red** → **off-load times of 30 – 60 minutes;**
- Black** → **off-load times of greater than 60 minutes,**
- Purple** → **off load times greater than 120 minutes.**

Limited Diversion Status – This notice is issued by hospitals to inform Region One EMS providers that an area(s) (department) of the hospital is without further available resources. In the diversion status/notice, a list of certain departments on diversion will be provided. This may include “**Emergency Department Saturation.**” EMS providers should make every effort possible to avoid transporting to hospitals on ED saturation. This Limited Diversion Status does not apply to patients who are critically ill requiring immediate stabilization.

Full Hospital Diversion is only honored in cases of level three closures (per Metro Hospital Council) within the hospital's infrastructure; these diversions will be honored without exceptions. Hospitals requesting full diversion status **for reasons other than level three closures**, must notify the primary 911 providers of Region One via EMS systems. It will be the director, or highest ranking authority of each primary provider to decide whether or not a hospital's request for full diversion will be honored.

Physician on Scene

A. Physician is first to arrive at the scene of emergency:

1. The Good Samaritan Statute applies in this situation. The Physician on-scene can choose to treat the patient with all the protection from liability as stated in the law.
2. Upon arrival of the EMT, the physician has three options:
 - a. to allow the EMT to assume full authority for directing the care of the patient – the physician will not have any risks of liability for abandonment in this situation.
 - b. to assist the EMT in the care of the patient without assuming authority for directing patient care.
 - c. can express his/her desire to assume full authority for directing patient care – the physician must agree to follow the criteria in section B

B. Protocol for Physicians Assuming Care of Patient at the Scene of a Medical Emergency

Indications: When a physician is at the scene of a medical emergency and wishes to assume authority for directing patient care.

Policy: Patient care is established by parish protocol and on-line Medical Control physicians. It is not however meant to interfere with an established physician-patient relationship. By law, the EMT's are providing pre-hospital care under the license of a medical director and/or according to the protocols approved by a parish medical society. They may additionally receive direction via on-line Medical Control from an Emergency Department physician. If responsibility for patient care is transferred to a physician at the scene, that physician becomes responsible for any care given and must accompany the patient to the hospital. Furthermore, the physician accepting these responsibilities must sign an agreement to assume care for the patient and the patient's pre-hospital medical record.

Procedure:

1. EMT's shall treat all on-scene physicians with respect and shall endeavor to work in cooperation with an on-scene physician for the patient's best interest.
2. If a physician desires to help assist the EMT in the care of the patient without assuming authority over patient care, the EMT should explain to the physician that their assistance is appreciated, but the State Law requires EMS personnel to comply with local protocol and/or established Medical Control with the base hospital physician.
3. If on-scene physician wishes to assume responsibility for the direction of patient care, the EMT should ask the physician to show his/her Louisiana State Board of Medical Examiners license as verification of his/her identity as a physician.
4. The EMT should establish contact with Medical Control. After advising the Medical Control Physician (MCP) of useful patient information, the EMT should inform the MCP that a physician is present and identify the physician. The EMT will then place the physician in contact with the on-line MCP and the two physicians will discuss patient treatment and who will have authority over patient care.

5. On-scene physicians who accept Medical Control and the responsibility for the direction of patient care must:
 - a. agree to full medical - legal responsibility
 - b. accompany the patient to the hospital, and
 - c. sign the EMS run sheet indicating that they have accepted responsibility for patient care and any medical orders given
6. EMS personnel shall only accept orders from the on-line MCP, unless informed by the MCP that Medical Control is being transferred to the on-scene physician. The EMT's should make their services, equipment, supplies and ambulance available to the on-scene physician for patient care. If Medical Control is transferred to the on-scene physician, EMT's may follow only those orders that are within their scope or practice.
7. If at any time the on-scene physician's orders become questionable, or are contrary to established Region One protocols, or if interference with patient care occurs, the EMT should immediately re-establish contact with the on-line MCP for guidance before any further action is taken. In any case of conflict, the MCP's orders shall prevail.
8. A patient who is lucid and understands the medical risks and consequences of their decisions (or in the case of a minor, their guardian/parent), has the legal right to refuse care by the EMS and/or on-scene physician after such risks and consequences have been explained to him/her.
9. In the event that the patient refused the care of the on-scene physician even when MCP is willing to transfer care to the on-scene physician, but accepts the care of the EMT, the MCP will be responsible for directing the EMT's care of the patient.
10. In the event that the patient wishes the on-scene physician to assume their care, but the MCP does not feel that transfer of patient care to the on-scene physician may be in the patient's best interest, the EMS team should attempt to have the patient sign a refusal of service form, as is standard practice, before leaving the scene. The on-scene physician is then responsible for further patient care and for arranging transport of the patient to an appropriate hospital or facility.

Taser / ECD Policy

- A. Law enforcement agencies may utilize an electronic control device (ECD) as a non-lethal method to incapacitate individuals. Under certain circumstances EMS should be summoned to evaluate and treat the victim. Typically, it is not an "ECD" itself that leads to the need for transport to a hospital; it is rather the events that have lead up to the officer deploying the ECD on an individual, such as in cases of "Excited Delirium."
- B. **Excited Delirium** - a condition in which a person is in a psychotic state and/or extremely agitated state. Mentally, the subject is unable to focus his/her attention on any one thing and is often distracted by his surroundings. The subjects' inability to process rational thought precludes normal de-escalation procedures alone. Physically, the organs within the subject are responding to the inciting factor, be it a drug stimulant or the exacerbation of an underlying psychiatric condition. These two factors occurring at the same time cause a person to act erratically enough that they become a danger to themselves and to the public. This is typically where law enforcement comes into contact with the person.

Possible causes of excited delirium, may include, but are not limited to:

- Overdose on stimulants (cocaine or methamphetamine) or hallucinogenic drugs (PCP). NOTE: this is the cause in the majority of cases where an ECD is deployed
- brain tumor
- dementia
- drug withdrawal
- head trauma
- hyperthyroidism "thyroid storm"
- hypoxia
- low blood sugar
- psychiatric pt off meds
- psychosis

Signs of excited delirium include:

- bizarre & aggressive behavior
- dilated pupils
- fear and panic
- high body temperature *
- incoherent speech
- inconsistent breathing patterns
- insensitive to pain
- nakedness
- paranoia
- profuse sweating; **absent** in extreme hyperthermia
- shivering
- superhuman strength
- violence directed at objects

** **High body temperature** is a key finding in predicting a high risk of sudden death. Another key symptom to the onset of death while experiencing excited delirium is "instant tranquility." This is when the suspect had been very violent and vocal and suddenly becomes quiet and docile while in the car or sitting at the scene.*

- C. Monitoring of the subject must take place regardless of whether EMS was called or not until the subject is released to a receiving facility. Care must be taken to avoid **positional and / or compression asphyxia**. No person should be restrained and left in any position that may restrict the airway for an extended period of time.

D. Procedure

Under certain circumstances EMS should be summoned to evaluate and treat the victim. Police officers must provide EMS personnel with as much information as possible (i.e. history of the original incident, behavior observed, symptoms, etc.)

These instances include but are not limited to:

1. probe embedded above the clavicles (especially eyeball, mouth or neck)
2. probe embedded in the groin
3. unconscious, even for short period
4. visible seizure when ECD is NOT being discharged
5. if the patient displays signs consistent with excited delirium
6. obvious significant injury from fall or take-down
7. person volunteers that they are having chest pain or trouble breathing
8. persistent confusion or altered mental status for more than one minute after application of ECD
9. victim of ECD used by a member of the public (i.e. non-police use)
10. if the victim requests EMS
11. if an officer has any doubt as to the health of the person based on:
 - a. the officer's training
 - b. the officer's previous use of an ECD
 - c. the subject exhibits any of the conditions and/or symptoms above
 - d. the subject exhibits any unusual behavior

↳ Armed law enforcement officers must accompany patients in custody or handcuffed patients to the hospital in the transporting unit.

E. Probe Removal

The State of Louisiana's Commission of EMS, which is the governing authority of all EMTs certified in Louisiana, **PROHIBITS** the removal of "barbs and/or probes" from ECD (TASER) devices. The EMS Commission views these barbs/probes as impaled objects. The removal of such is NOT within our scope of practice **UNLESS** they interfere with the airway or the ability to perform CPR. If law enforcement summons EMS to a scene for probe/barb removal the medics should advise law enforcement why they **cannot** remove these impaled objects. Law enforcement then must sign a guardian refusal or the patient **MUST** be transported to an appropriate ED for barb removal. If the barbs/probes are removed prior to arrival documentation must reflect such and EMS can provide wound care (ie. cleaning and bandaging the area).

Adult Protocol Preambles

To have a guideline or protocol to follow for every possible pre-hospital scenario is **unrealistic**. Therefore, when presented with a clinical situation not specifically addressed in a protocol paramedics should refer back to the basics of patient care and sound clinical judgment. The entire existence of Medical Control is to facilitate treatment in the pre-hospital setting. Medical Control should be used as a resource whenever needed.

Listed below are generalized guidelines to be followed while operating within Region One. These guidelines are additional references that are to coincide with each protocol.

- All patients must have their vital signs assessed upon patient contact or as soon as reasonably possible. Region One recognizes vital signs as:
 - blood pressure
 - capillary refill in pediatrics
 - GCS
 - heart rate
 - pain scale
 - respiratory rate
 - SpO₂
 - temperature (where indicated)
- As scene safety and scene conditions allow, all routine medical care and initial treatment should be completed **prior to moving the patient to the ambulance**.
- Upon administration of any medication, patients will ideally have O₂, IV access, EKG and pulse oximetry monitored.
- All medications given IV / IO to a pulseless patient will be followed by a 20 ml bolus, elevation of extremity & effective chest compressions.
- When a fluid bolus is not required or anticipated, saline locks may be used at the paramedic's discretion.
- Orthostatic vital signs should be considered when dehydration is suspected or for age appropriate patients complaining of weakness / syncope with unknown etiology.
- Endotracheal tube medication administration is prohibited.
- All **MEDICAL** patients in cardiac arrest must be treated on scene where found for no less than 30 minutes. **Patient care including adequate, aggressive CPR / BLS** is the focus in cardiac arrest, not patient packaging and transport. If a scene becomes unsafe where patient care cannot be delivered properly, law enforcement must be requested. The patient must then be transported to the closest ED.
- For trauma calls 10 minutes on scene is an industry standard however, you should never stay on scene for 10 minutes because you are allotted the time. Documentation must be provided on the pre-hospital run report when on scene times exceed ten minutes.
- A copy of the pre-hospital patient care report, **paper or electronic**, MUST be made available to the Emergency Department.

Notations and References

Cardiac Risk Factors

Major risk factors

1. Diabetes Mellitus (type I or II)
2. Use of tobacco products (packs per day / years)
3. Hypertension
4. High cholesterol
5. Family history ¹ of myocardial infarction before the age of 45 or any significant cardiovascular event ²

Minor cardiac risk factors (not limited to)

1. Obesity
2. Sedentary lifestyle
3. Cocaine use
4. ≥ 50 years of age

SAMPLE History

S	signs and symptoms including pain
A	allergies
M	medications prescribed and medications taken prior to arrival
P	past medical history
L	last intake and output
E	events leading to injury or illness {Mechanism of Injury, (MOI)}

Pain Assessment (OPQRST)

O	Onset	when did the pain first start
P	Provocation	what causes the pain; what makes it better or worse
Q	Quality	description of pain (sharp, dull, stabbing, pressure, etc)
R	Radiation	is the pain localized in one area or does it spread
S	Severity	1 – 10 scale
T	Time	pain constant or intermittent; has the pain occurred before

Wong-Baker FACES Pain Rating Scale³



¹ Mother, father, brother, sister ONLY

² Examples: coronary artery grafting (CABG); previous MI; stenting procedures

³ Hockenberry MJ, Wilson D, Winkelstein ML. *Wong's Essentials of Pediatric Nursing*, (7th ed), St. Louis, 2005, p. 1259. Used with permission. Copyright, Mosby.

Glasgow Coma Scale (GCS)

GCS is a component of vital signs. GCS should be repeated 5 minutes after the first score is obtained.

	Adult	Score
Eye Opening	Spontaneous	4
	To Speech	3
	To pain only	2
	No response	1
Best Verbal Response	Oriented appropriate	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best Motor Response	Follows commands	6
	Localizes pain	5
	Withdraws in response to pain	4
	Flexion in response to pain	3
	Extension in response to pain	2
	No response	1

Miami Emergency Neurological Deficit (MEND) Exam⁴

The emerging standard of care in the recognition and treatment of strokes includes the MEND exam. The initial assessment tool of the MEND exam involves the Cincinnati Pre-hospital Stroke Scale assessment, which should be done while on scene. Any one abnormal finding in the patient's level of consciousness, speech, ability to symmetrically move the face and/or inability to successfully complete the arm drift test calls for a complete MEND exam (time permitting), as the EMS unit is enroute to an ED. Hospital notification is also a priority treatment when focal neurological symptoms are noted within a 4 ½ hour window.

Cincinnati Stroke Scale⁵

If any one of these 3 signs is abnormal the probability of a stroke is 72 %. Time permitting a complete MEND exam should be completed in transit to the ED.

- Speech- (have patients say "you can't teach an old dog new tricks")
- *Normal:* patient uses correct words with no slurring
 - *Abnormal:* patient slurs words, uses the wrong words, or is unable to speak

- Facial Droop- (have patients show their teeth or smile)
- *Normal:* both sides of face move equally
 - *Abnormal:* one side of the face does not move at all

- Arm Drift- (have patients close their eyes and hold both arms out straight for 10 sec)
- *Normal:* both arms move equally or both do not move at all
 - *Abnormal:* one arm does not move or one arm drifts down compared with the other

⁴ Gordon D, Gordon M, Issenberg S. *Advanced Stroke Life Support Hospital & Prehospital 9th ed.* 2005.

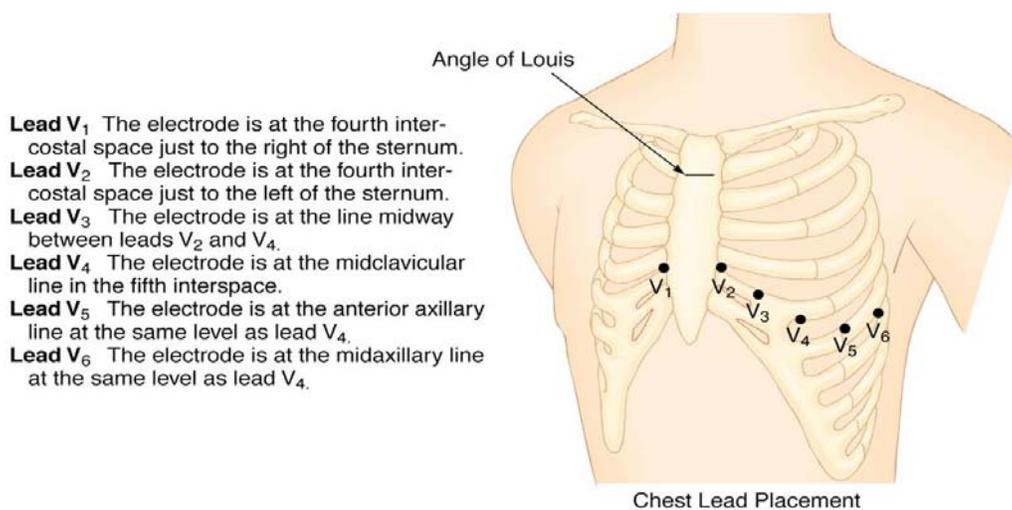
⁵ American Heart Association *Handbook of Emergency Cardiovascular Care for Healthcare Providers*, 2004; 33-34

12-Lead EKG Anatomy

- * ST elevation measured from the "J point."
- * ST elevation indicates injury (cardiac muscle death); ≥ 1 -2 mm in a pattern consistent with an acute infarct.
- * ST or T wave depression indicates ischemia (inadequate oxygenation of cardiac muscle and/or old injury).

12-lead EKG's are now a standard of care. They should be done on a multitude of patients with varying medical complaints well beyond the classic chest pain complaint. Specific protocols call for 12-lead EKG testing; in addition clinical presentation and/or assessment findings may warrant 12-lead EKG testing as a diagnostic tool.

Wall affected	Leads	Artery(s) involved	Reciprocal changes
Anterior	V ₂ -V ₄	Left coronary artery, Left Anterior descending (LAD)	II, III, aV _F
Anterolateral	I, aV _L , V ₃ -V ₆	LAD and diagonal branches, circumflex and marginal branches	II, III, aV _F
Anteroseptal	V ₁ -V ₄	LAD	
Inferior	II, III, aV _F	right coronary artery (RCA)	I, aV _L
Lateral	I, aV _L , V ₅ , V ₆	Circumflex branch or left coronary artery	II, III, aV _F
Posterior	V ₈ , V ₉	RCA or circumflex artery	V ₁ -V ₄ (R greater than S in V ₁ & V ₂ , ST-segment depression, elevated T wave)
Right ventricular	V _{4R} -V _{6R}	RCA	



Advanced Airway & Capnography

- ETT verification (*documentation should also include the following*)
 - a. bilateral lung sounds
 - b. condensation in tube (not always accurate)
 - c. equal chest rise
 - d. absence of epigastric sounds
 - e. visualization of ETT passing through vocal cords
 - f. qualitative CO₂ detectors (optional)
 - g. quantitative ETCO₂ device(s) – Capnography
- An attempt at endotracheal intubation is made once the tip of the ETT passes the teeth.
- **Capnography:**
 1. Quantitative capnography – Exhaled CO₂ continuous measuring device facilitates continuous documentation of endotracheal tube placement and allows for continuous end-tidal CO₂ monitoring. The continuous ETCO₂ monitoring provides documentation of ETT placement throughout treatment and transport. This modality can be used as a diagnostic tool allowing paramedics to deliver ventilations more effectively. The continuous capnography can also be used when treating COPD patients exhibiting with signs and symptoms of moderate to severe shortness of breath.
 - a. ETCO₂ monitors may give low readings for the first few minutes in a cardiac arrest, but as CPR increases circulation & cellular perfusion ETCO₂ values should increase in a patient with a viable downtime. The presence of any ETCO₂ value and/or waveform gives evidence of airway confirmation. NOTE: ETCO₂ also often gives the first indicator of ROSC, as evidenced by an abrupt & sustained rise in ETCO₂.
 2. Qualitative (colorimetric) – Exhaled CO₂ detecting device, useful diagnostic tool used to determine proper ETT placement (TubeCheck™, ETCO₂ detector). *Disadvantage:* cannot monitor effective ventilation.

Difficult Airway Adjuncts

- An ETT introducer should be considered for use in difficult airways.
- Supraglottic Airway Device (Combitube®, LMA, King LT)

Insertion of a Supraglottic Airway Device is a skill EMT – basics and intermediates can now perform. All EMT's must be trained and prove competency on the insertion of supraglottic airway devices. Continuous ETCO₂ monitoring is required with the use of supraglottic airway devices.

Pulseless Rhythms (2010 AHA's ACLS updates)

- In light of AHA's 2010 Guidelines, an increased focus is to be placed on immediate, effective, continuous, & minimally interrupted chest compressions in both the adult & pediatric patients. Compressions are to be started immediately as there is virtually no set-up time. Even basic airway equipment requires some set-up time for sizing & deployment. Therefore, the first cycle of chest compressions should be initiated without delay, while allowing time (approx. 18 sec. for first cycle) for basic airway equipment set-up/sizing. This simple logic effectively changes our focus from Airway, Breathing, & Circulation (ABC's) to Circulation/Compression, Airway, & Breathing/Ventilation (CAB's).

- Upon arriving on scene of a cardiac arrest with a down time > 5 minutes or not witnessed by EMS, 5 cycles (2 minutes) of BLS CPR must be completed before ANY advanced life support (ALS) treatments are preformed. During this time an OPA is inserted to facilitate ventilation. After the initial 2 minutes of BLS CPR, ALS treatments can begin starting with the application of defibrillation pads, provided the quality of chest compressions is not compromised.

- If the arrest is witnessed by EMS or no more than 5 minutes has elapsed from the time the patient collapsed, ALS measures can begin in conjunction with chest compressions (CPR).

- Cardiac Arrest Management (compressions, vascular access & adv. airway)
 1. Chest compressions must be initiated as soon as is possible, and compressions shall be continuous and as uninterrupted as is possible to account for the highest and best chest compression fraction (CCF) possible. Chest compression fraction is the amount of time during a cardiac arrest that there are chest compressions occurring, and the goal is $\geq 80\%$ compressions. After 2 minutes, briefly pause (<10 seconds) to check the rhythm and pulse. The goal for compressions is 100-120 compressions per minute. Push hard and fast allowing for complete chest recoil. When shocks are indicated compressions are to be resumed while charging the defibrillator.
 2. During the second round of CPR, vascular access, IV or IO, should be attempted.
 3. Placement of an advanced airway may take place once vascular access has been established. Compressions remain continuous with brief pauses every 2 minutes to check pulse / rhythm and also to swap persons performing compressions. Compressions are not paused to ventilate. The ventilation rate is 8 – 10 per minute. It is imperative that patients not be hyperventilated as it could lead to a negative patient outcome. Ventilating with excessive tidal volume increases intrathoracic pressure and reduces venous return, which

reduces cardiac output, and can also cause barotrauma. Excessive minute volume or ventilatory rate will also decrease cerebral blood flow and coronary perfusion, thereby working against resuscitative efforts. Proper ventilation with controlled peak inspiratory pressure will also keep GI distension to a minimum, which will also reduce the risk of aspiration.

**** For every interruption in CPR (even one second), it takes at least 30 seconds to regain adequate coronary & cerebral perfusion ****

- Defibrillation and Medication updates

1. Initial defibrillation x 1 @ 200 or 360 Joules (J) biphasic (MAX Joules for the monitor). Immediately after defibrillations do NOT check for a pulse; CPR must be resumed.
2. Additional defibrillations x 1 @ 200J or 360J (monitor specific MAX) should be delivered as soon as possible after the 2 minute pauses in CPR. The "drug shock...drug shock" method is no longer used, although, it is recommended for antiarrhythmics to be given as close as possible after the defibrillation.
3. Ideally, only one antiarrhythmic should be used in V-Fibrillation / pulseless V-Tachycardia. Amiodarone is the antiarrhythmic of choice for rhythms with or without a pulse. Lidocaine should not be used if Amiodarone is available. Recent studies show higher ROSC rates with the use of Amiodarone when compared to Lidocaine. Lidocaine will no longer be considered for V-Fib refractory to Amiodarone.
4. Transcutaneous Pacing (TCP), Procainamide & Magnesium Sulfate (except for torsades) are no longer used in pulseless rhythms.

- Special Resuscitation Guidelines

1. Electric Shock and Lightning Strikes

Once the scene is declared safe and smoldering clothing has been removed early aggressive CPR, defibrillation, and airway control is the focus of treatment. Because of the increased risk of tracheal edema, endotracheal intubation should be considered early even if spontaneous breathing has resumed. Defibrillation should be performed without delay. If there is any doubt in distinguishing asystole vs. "fine V-Fib" the paramedic should consider defibrillation.

An attempt at resuscitation will be made unless an extended downtime can be validated and/or injuries incompatible with life are present.

2. Hypothermic Cardiac Arrests

New ACLS guidelines recommend resuscitative efforts on all pulseless and apneic hypothermic patients. In the pre-hospital setting it is difficult to determine core body temperature. Therefore, we should consider patients who are hypothermic to be classified as "severely hypothermic," with a core body temp of less than 30°C (86°F).

ACLS recommends taking 30 – 45 seconds when evaluating for a pulse and respiratory effort in hypothermic patients. If unable to determine the adequacy of respiratory and cardiac function, CPR should be started. Endotracheal intubation is important in hypothermic patients as it provides a route for warm humidified oxygen to enter the central circulation.

The hypothermic patient who presents in V-Fib or pulseless V-Tach should be defibrillated according to the new 2005 guidelines. If there is no change in the rhythm after the first defibrillation all further defibrillations should be withheld pending determination of a core body temperature above 30°C (86°F). Hypothermic patients who do not respond to initial pharmacological therapy typically do not benefit from subsequent pharmacological therapy. This is due to a decrease in drug metabolism within the body. Repeated administrations of medications to a hypothermic patient could accumulate to toxic levels in the peripheral circulation decreasing their chance of survival.

3. Cardiac Arrest of the Pregnant Patient

An attempt at resuscitation should be made on all pregnant patients in cardiac arrest for the sake of the mother and fetus. In situations where the medic can verify a prolonged down time or injuries incompatible with life, the medic should follow the DNAR protocol. Cardiac arrest management is altered in these patients due to the physiological changes associated with pregnancy. Standard ACLS algorithms apply to pregnant women. However, some modifications in ABC's are needed.

In the case of cardiac arrest of a pregnant patient with a gestational age estimated to be >20 wks. immediately establish early compressions, defibrillation, and airway management. Transport promptly to the closest emergency department (preferably one with OB/GYN services but not required) for evaluation of a perimortem cesarean section. Do not resuscitate on scene for 30 min.

Airway – should be secured early with ETT to decrease the risk of aspiration (for late second and third trimester pregnant patients only). This risk is increased because of an insufficient lower esophageal sphincter. Therefore, continuous cricoid pressure should be used before and after intubation attempt(s). The size of the ETT is commonly decreased by 0.5 – 1.0 mm compared to a non-pregnant female.

Breathing - Because of the diaphragm's position, the patient's functional lung capacity has decreased while the body's demand for oxygen has increased. This is the reason for the rapid onset of hypoxia in pregnant patients. Techniques used to confirm ETT placement do not change. However, late in the third trimester ETCO₂ qualitative detectors may indicate improper placement when the ETT is really in the trachea. Ventilation volumes should also be reduced.

Circulation – Medications given IV / IO in the lower extremities may not reach the maternal heart unless, or until the fetus is delivered. Therefore, venous (including intraosseous) access in the lower extremities is strongly discouraged. Alternative sites such as the humeral head for the IO are recommended.

- Support (sprint) Vehicle Response to Cardiac Arrests

When supervisor units or any other single paramedic response vehicle arrives on the scene of a cardiac arrest, their single responsibility is **BLS CPR** (as described above). This course of treatment shall continue until knowledgeable bystanders are able and willing to help or additional paramedics / EMT's arrive. Once additional help arrives and 2 minutes of BLS CPR is complete, ALS measures can begin.

Medication Drips

Infusion Rates / Fluid Bolus

Medication	Infusion Rate	Concentration
Amiodarone	1 mg/min	1:1 (250 mg into 250 ml D5W)
Dopamine*	5 – 20mcg	<ul style="list-style-type: none"> 400mg/250 ml of D5W 800mg/250 ml of D5W (half the drip rate of the 400mg/250 concentration)
Epinephrine or Norepinehrine	2 – 10 mcg 1 – 10 mcg	4:1 mcg/ml (1 mg/250 ml of D5W)

Dopamine Drip Chart

Dopamine Drip Rates												
Patient weight in kg												
μ /kg/min	3	5	10	20	30	40	50	60	70	80	90	100
2 μ g	*	*	*	1.5	2	3	4	5	5	6	7	8
5 μ g	*	1	2	4	6	8	9	11	13	15	17	19
10 μ g	1	2	4	8	11	15	19	23	26	30	34	38
15 μ g	1.4	3	6	11	17	23	28	34	39	45	51	56
20 μ g	2	4	8	15	23	30	38	45	53	60	68	75
Microdrops per minute (or ml/hr) for 400mg/250ml												

Alternative Dopamine Calculation

(The following example will only work using the 400mg/250ml concentration of dopamine)

Take the first two numbers of the patient's weight in pounds and subtract it by 2

Example: pt weighs 182 lbs. $18 - 2 = 16$

The answer of 16 gives you drops per minute for a 5 mcg/kg/min dopamine infusion

Example: 16 gtts = 5 mcg/kg/min

If your order is 10 mcg/kg/min, simply double the drips per minute

Example: $16.0 \times 2 = 32$

Epinephrine & Norepinephrine (Levophed) Drip Chart

Epinephrine & Norepinephrine Drip Rates										
$\mu\text{g}/\text{min}$	1	2	3	4	5	6	7	8	9	10
μDrops	15	30	45	60	75	90	105	120	135	150
Microdrops per minute (or ml/hr) for 1mg/250ml										

Amiodarone

When Amiodarone is given IVP to patients **with a pulse**, it MUST be given over ten minutes; to do so use one of two methods. Administer 150mg Amiodarone directly into the IV / IO site over 10 minutes, 15mg/min. This may be accomplished by drawing up Amiodarone 150mg (3ml) in a 10ml syringe. Then add 7ml of D5W and administer 15mg/minute (1 ml) followed by a 20ml flush between each ml. For the alternative method, 10 gtts IV setup, mix 150 mg of Amiodarone into a 100 ml bag of D5W and run the bolus at 105 gtts/minute or ≈ 2 gtts/second. The bolus can be repeated in 10 – 15 minutes if needed one time, max of 2.2 grams / day.

Conversion of ectopy following an Amiodarone bolus, electrical therapy and/or a restoration of a pulse, an Amiodarone infusion must be initiated. To do so, mix 250 mg in 250 ml of D5W for a 1:1 concentration (5ml using 150mg/3ml solution). ACLS' recommended dose is 1mg/min over 6 hours, essentially giving a dose of 360 mg over 6 hours. Using a 60 gtts IV setup, the infusion would run at 60 gtts/min or 1 gtts/ every second.

Fluid Bolus

A fluid bolus (fluid challenge) is given at a rate of "wide open," typically through the largest IV catheter possible (14 – 18 gauge). Patients should be reassessed after each 250 – 500ml of fluid; particularly their lung sounds. This is especially the case when treating persons with cardiovascular disease and the elderly. When a fluid bolus is not going to be needed or anticipated, saline locks may be used.

Communications Center / Dispatch

Communication Centers play a vital role in the EMS system; they can begin treating patients first. Communication's *call takers* begin care with triaging, whether triaging one patient or triaging for an MCI; from there they determine what resources are needed. Another key role of Communication Centers is to facilitate street crews in whatever means realistically possible. As the EMS system evolves, Communication Centers will soon be accommodating the needs of the streets crew in several different ways.

Dispatchers and *call takers* will now be able to treat patients pharmacologically with aspirin. Through minimal training EMS *dispatchers* and *call takers* should recognize the symptoms of an *Acute Coronary Syndrome* (ACS). ACS includes unstable and stable angina and acute myocardial infarction. Patients with a chief complaint of chest pain who are NOT allergic to aspirin and do not have active or recent gastrointestinal (GI) bleeding should be instructed to chew an aspirin (160 to 325 mg). Patients who are already on a daily aspirin regimen and have taken an aspirin within the past 24 hours should not be instructed to take an aspirin.

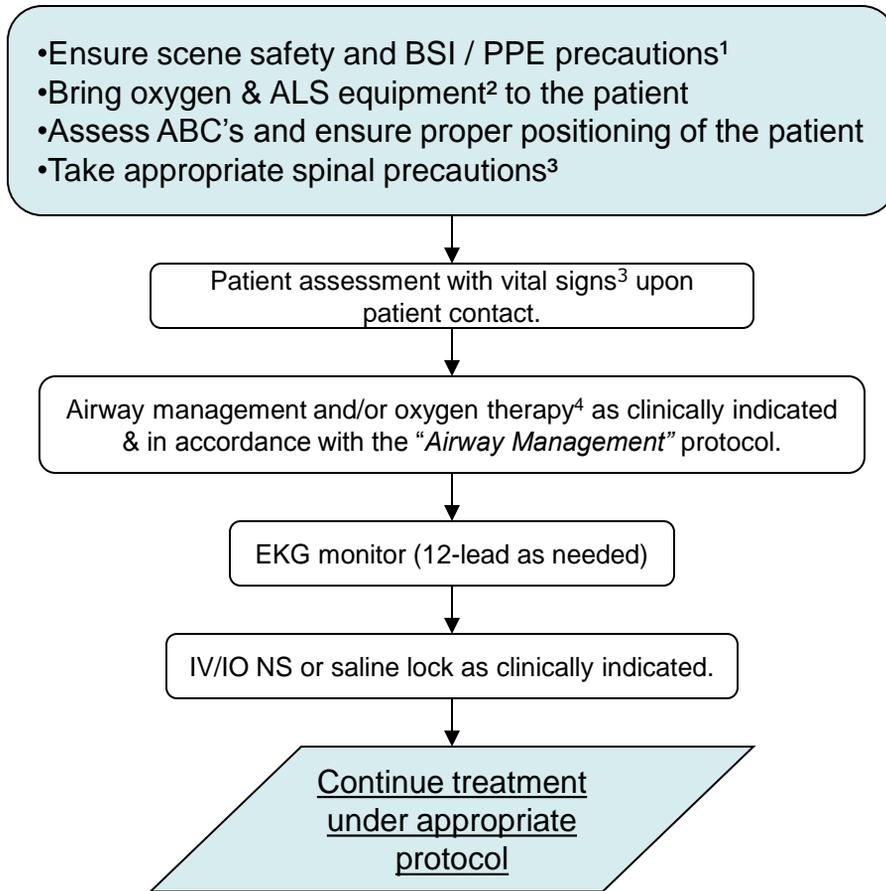
When EMS dispatchers are aware of a "significant traumatic incident" (when scene time is critical) they should transmit a solid tone for no less than 3 -5 seconds when 8 minutes has elapsed, if available. The transmission of this tone will stand as a reminder to the crew(s) on scene that they are approaching a 10 minute scene time. After the tone is transmitted a verbal notification will be broadcasted. "Unit #" or "All units on Main St. this is your 8 minute notification," (repeat once) end the broadcast with "no notification response is needed."

Using the same concepts as previously listed; if available, the Communication Center should transmit a solid tone once scene times have reached 30 minutes on all cardiac arrests. When units arrive on scene of calls that need notification, they will advise communications "patient contact" along with "8 minute (or 30 minute) notification needed." As an example "unit 1 patient contact, 8 minute notification please."

For calls involving poisonings and/or overdoses where the substance can be verified, communication centers will contact the Poison Control Center at (800) 222-1222. The information from poison control will then be relayed to the responding crews. Hospital Emergency Departments also call the Poison Control Center for poisoning; they are the recognized authority. All calls to and from the Poison Control Center are recorded and they often will tell the pre-hospital providers patients do not need to be transported. These procedures will take place as the communication center has the manpower. Dispatching units and answering the emergency lines will always take priority.

Routine Medical Care

The following procedures will be utilized on all medical emergencies requiring Advanced Life Support (ALS).



¹ Body Substance Isolation i.e. eye protection, face mask, gloves etc.

² Advanced airway equipment, suction, EKG monitor, and departmental issued ALS gear.

³ According to *Selective Spinal Immobilization* protocol.

³ Vital signs include: blood pressure, heart rate, respiratory rate, pain scale, SpO₂, temperature & GCS.

⁴ Oxygen flow rates:

- low flow 2 l/m NC

- supplemental 4 l/m NC

- high flow 15 l/m NRB or BVM

Airway Management

(Pt can self) Ventilate and is able to Oxygenate

☆ Proper Ventilation / Oxygenation is defined as an $SpO_2 \geq 94\%$ ☆

Administer oxygen as appropriate and clinically indicated via NRB or NC to maintain an SpO_2 of $\geq 94\%$

Is patient maintaining oxygenation?

Yes

No

Return to Routine Medical Care

Go to "Ventilate but cannot Oxygenate"

(Pt can self) Ventilate but not Oxygenate

(examples: asthma, CHF, COPD, generalized hypoxia, or pulmonary embolus)

Assist patient's respirations via BVM (PPV as tolerated) to maintain an $SpO_2 \geq 94\%$.
Insert NPA or OPA if tolerated

Yes

Is patient being oxygenated? Respiratory distress decreasing?

Maintain current oxygenation techniques & return to Routine Medical Care

No

If patient is unconscious → go to *Can't Ventilate Can Intubate Protocol*

- **Consider Nasal Intubation (Valium 2-5 mg IV or Versed 2.5 mg IV to reduce anxiety prior to intubation, if needed)**
- Continue to assist ventilations (pre-oxygenate)
- Insert NPA if not already in place (right nare is typically larger)
- Attach BAAM® to ETT, prepare capnography
- Briefly explain the procedure to the patient including the importance of a deep inspiration
- Advance lubricated ETT through nasopharynx into the oropharynx.
- Upon deep inspiration listen for the BAAM's® change in pitch & advance the ETT in place.

• Confirm tube placement using traditional methods (lung & epigastric auscultation), qualitative & quantitative → maintain oxygenation.

• Initiate $ETCO_2$ monitoring for all intubations.

• **Post intubation sedation:** consider **Versed 5 mg IV/IO/IN**, **Ativan 2-4mg IV/IO/IM**, or **Valium 2-5 mg IV/IO/IM** under standing order (**NOT** for drug facilitated intubation)

Maintain current oxygenation techniques & return to Routine Medical Care

Airway Management

Can't Ventilate / Can Intubate

Open airway; suction as needed

Insert OPA or NPA pre-oxygenate for 2 min & prepare for ET intubation¹.

Intubate the trachea within 30 sec:

- Visualize ETT passing through the vocal cords
- Auscultation of lungs with = chest rise
- No epigastric sounds present

Further confirm ETT placement using

- ETCO₂ detector (qualitative) and/or
- ETCO₂ capnography (quantitative)

Successful Intubation?

Yes

No

- Secure tube w/ commercial tube restraint device
- Reconfirm ETT placement using continuous ETCO₂ capnography

Maintain Advanced Airway techniques

Post Intubation Sedation (if needed):

- **Versed** 5mg IV/IO/IN q 2min. prn to max of 20mg
- **Ativan** 2-4mg IV/IM q 2min. prn to max of 10mg
- **Valium** 5mg IV/IM q 2min. prn to max of 10mg

Return to Routine Medical/Trauma Care

- Reinsert OPA & pre-oxygenate³ patient for 1-2 mins.
- Intubate the trachea within 30 sec; consider use of airway adjuncts such as ETT Introducer.
- Max of 2 intubations attempts² (one attempt on scene for trauma patients)

After 2nd unsuccessful attempt:

- Reinsert OPA & pre-oxygenate pt for 2-3 minutes
- Proceed to Supraglottic Airway Device

Insert Supraglottic Airway device & secure according to the manufactures guidelines, & confirm placement with continuous ETCO₂ monitoring.

Return to Routine Medical/Trauma Care

¹ Ensure the following tools are available prior to ET intubation: syringe, ETT balloon, stilet, ETCO₂ detector, ETT introducer, stethoscope, commercial tube restraint, ETCO₂ capnography

² An ET intubation attempt has been made once the end of the ETT passes the teeth.

³ Pre-oxygenation is achieved with one ventilation every 3 – 4 seconds or SpO₂ near 100%.

- Initiate continuous ETCO₂ monitoring for intubations.

Airway Management

Can't Intubate / Can't Ventilate

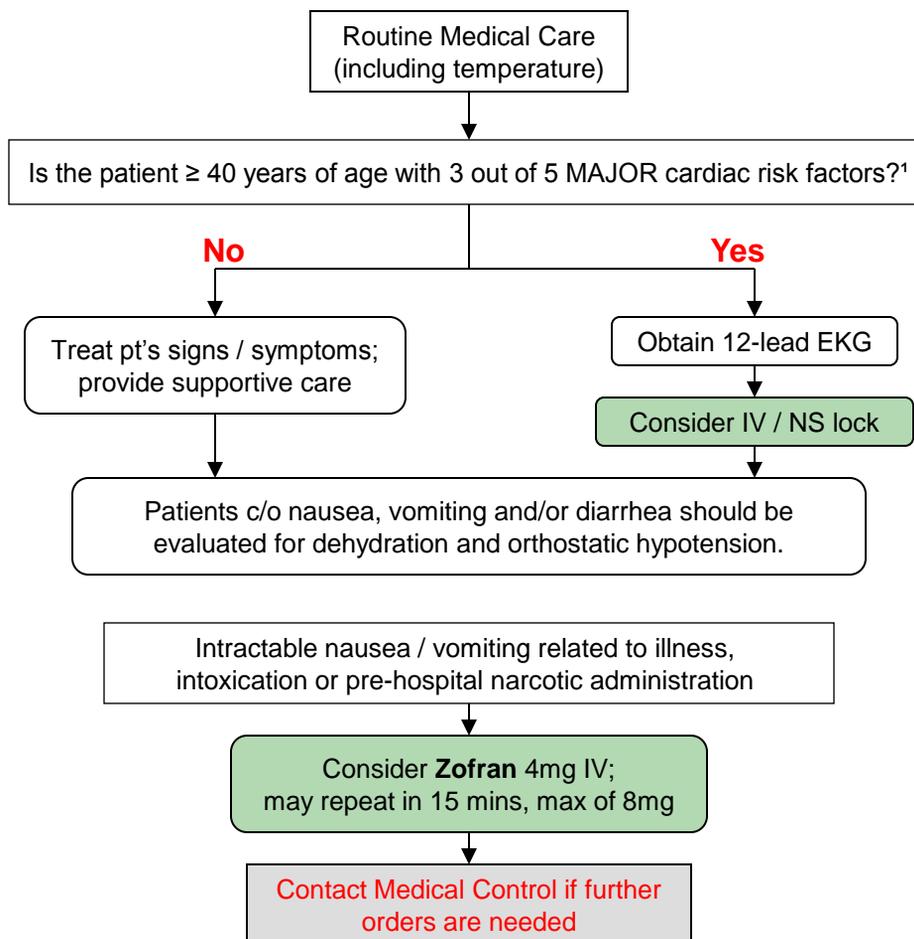
Reinsert OPA → attempt to oxygenate to $SpO_2 \geq 90-94\%$, and, if unable
Prepare for Needle Cricothyrotomy

Needle Cricothyrotomy:

- Locate the cricothyroid membrane & clean with alcohol preps or betadine if available
- Attach a 14ga. Jelco to a 10ml syringe
- Insert needle through cricothyroid membrane 45° in a caudal direction (toward the feet) aspirating during insertion.
- Once air is freely aspirated (usually following a "pop" of penetrating the cricothyroid membrane) advance the catheter into place & secure manually
- Attach a 3.0mm ETT adaptor into the catheter hub
- Oxygenate with either BVM or 100% O2 jet insufflator

Transport rapidly to nearest Emergency Department for definitive airway management

Acute Abdominal Pain & Nausea/Vomiting



¹ Major and minor cardiac risk factors are defined in the *Protocol Preambles*.

- Patients < 40 years of age c/o abdominal pain who:
 - have a soft and non-tender abdomen
 - are without fever
 - have stable vital signs
 - are not complaining of nausea, vomiting, and/or diarrhea

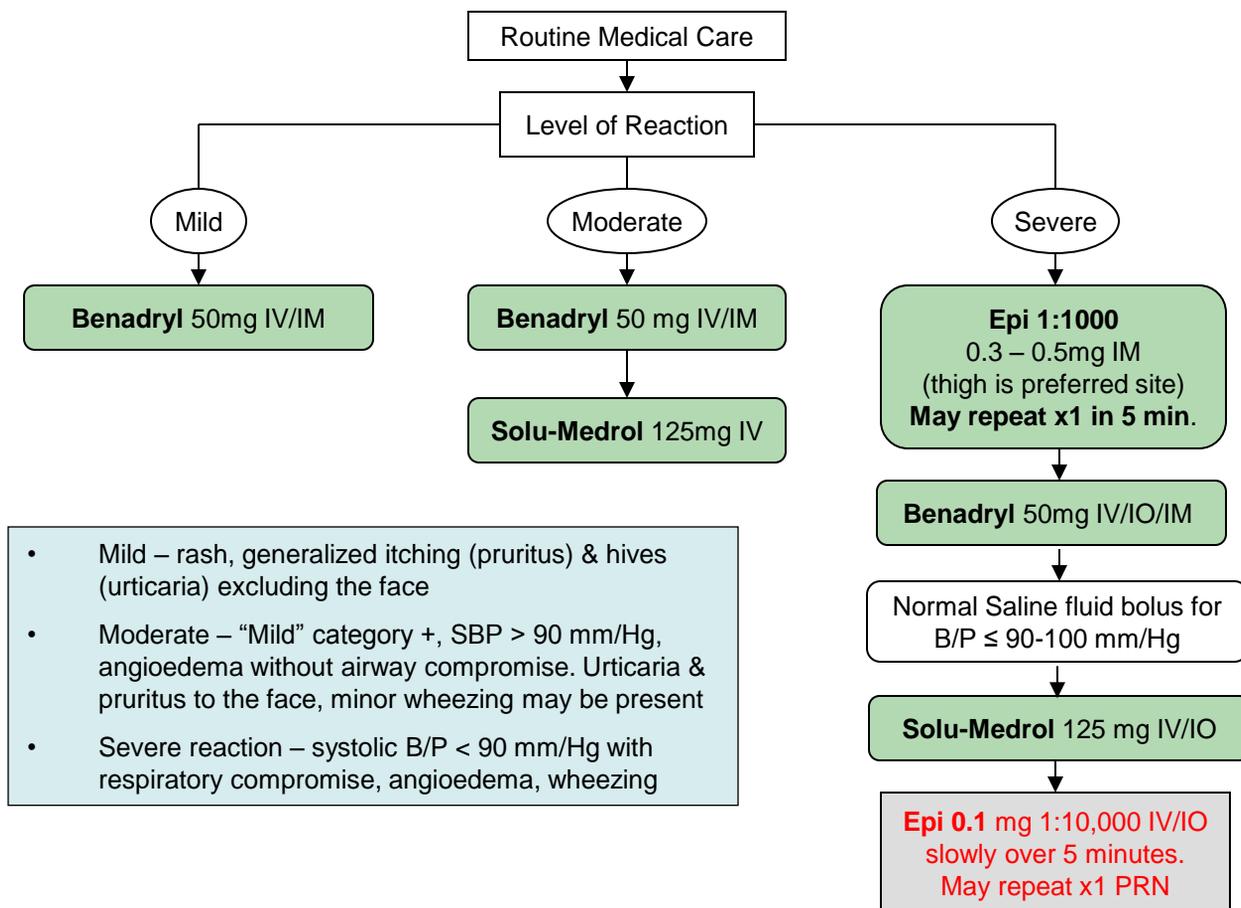
GENERALLY will not require advanced treatment.

- Elderly patients with hypotension and/or with major cardiac risk factors should be evaluated for possible Abdominal Aortic Aneurysm (AAA) with dissection and STEMI.
- Pregnancy (including ectopic) should be considered in females of childbearing age.
- As Routine Medical Care, a detailed OPQRST / SAMPLE (defined in the *Protocol Preambles*) history should be obtained. Examples of specific questions to include: last BM, blood in stool, frequency of urination, pain on urination, hernia etc.

* **Pain medications should NOT be administered to anyone complaining of *Abdominal Pain* unless ordered by Medical Control.**

Allergic Reaction / Anaphylaxis

Consider anaphylaxis when responses from 2 or more body systems (cutaneous, respiratory, cardiovascular, neurologic or GI) are noted. Cardiovascular & respiratory systems may not always be involved in anaphylaxis.¹



👉 Rule of thumb 👈

- Anyone c/o of difficulty swallowing and/or SOB should receive Solu-Medrol
- Anyone presenting with wheezing / stridor should receive Epi 1:1000 IM

• Consider immediate drug therapy prior to IV/IO access in critically ill patients. Administration to the thigh is the fastest IM site. Use either the vastus lateralis or the rectus femoris.

• Caution must be used in administering epinephrine to patients over the age of 50 and/or to patients with known cardiovascular disease, renal failure and/or COPD. If Epi 1:1000 must be used, give 0.1 - 0.3 mg IM.

• Treat any wheezing or “chest tightness” as indicated in *Reactive Airway Disease* protocol.

• Patients who take β -blockers have an increased risk in the severity of reaction; it is possible for these patients to have a paradoxical response to Epi. The use of Atrovent is recommended for these patients.

• A dystonic reaction (to Phenothiazines) is an adverse reaction **NOT** an allergic reaction. Patients should receive **IV (NEVER IM)** Benadryl 50mg.

• Treat hypotension with fluid in the absence of pulmonary edema.

Altered Mental Status

Routine Medical / Trauma Care

Assess Blood Glucose;
if poss, obtain baseline LOC

CBG < 60 or > 250mg/dL →
Diabetic Emergency Protocol

Restrain patient with soft restraints for the
safety of the patient and EMS crew as needed

Consider differential and treat accordingly

Hypoxia

RMC → *Airway Protocol*

Electrolyte/Metabolic Disturbances

- Hypercalcemia (calcium)
- Hypocalcemia
- Hyponatremia (sodium)
- Hypernatremia
- Hypomagnesemia (magnesium)
- Renal Failure (uremia)
- Hepatic failure (hepatic encephalopathy)
- Alcohol Withdrawal/Delirium Tremens

Infection

Remember BSI

- Meningitis
- S/S – ↑fever, ↓LOC, stiff neck, fatigue, photosensitivity
- RMC, determine onset (usually < 2 days), temp, supp care, place mask on patient.
- Encephalitis/Cerebritis (inflammation of brain)

Poisoning:

ABC's (RMC) → Contact Poison Control Center as needed (800-222-1222)

- Carbon Monoxide - SpO₂ will NOT reflect hypoxia.
- S/S - N/V, headache, papilledema, fatigue, cyanosis and/or ↓LOC
- Tx: **NRB 15L/m**; **NS IV**; titrate to hemodynamic stability
- SEE OVERDOSE PROTOCOL / CO Protocol**

Psychiatric

RMC / RTC →

- *Excited Delirium*
- *Drug Overdose in Suicide attempt*
- *Exacerbations of Bipolar Disorder (mania, profound depression); Schizophrenia*
- *Severe anxiety*

Thyrotoxicosis - (hyperthyroidism)

- S/S → hyperactivity, weight loss, tremors, diaphoresis, myopathy, N/V, polyuria, fatigue, palpitations and/or anxiousness
- Tx – RMC, **Benzodiazepine**

Trauma

RTC → *Trauma Center Criteria as needed*

- Head Injury / Bleed
- Hypotension-**IVF**; consider permissive hypotension in penetrating chest and abdominal trauma (90/P)
- Hypovolemia-**IVF**

Alcohol → *Drug Overdose*

Epilepsy → *Seizure*

Insulin → *Diabetic Emerg*

Overdose → *Drug Overdose*

Uremia

Trauma

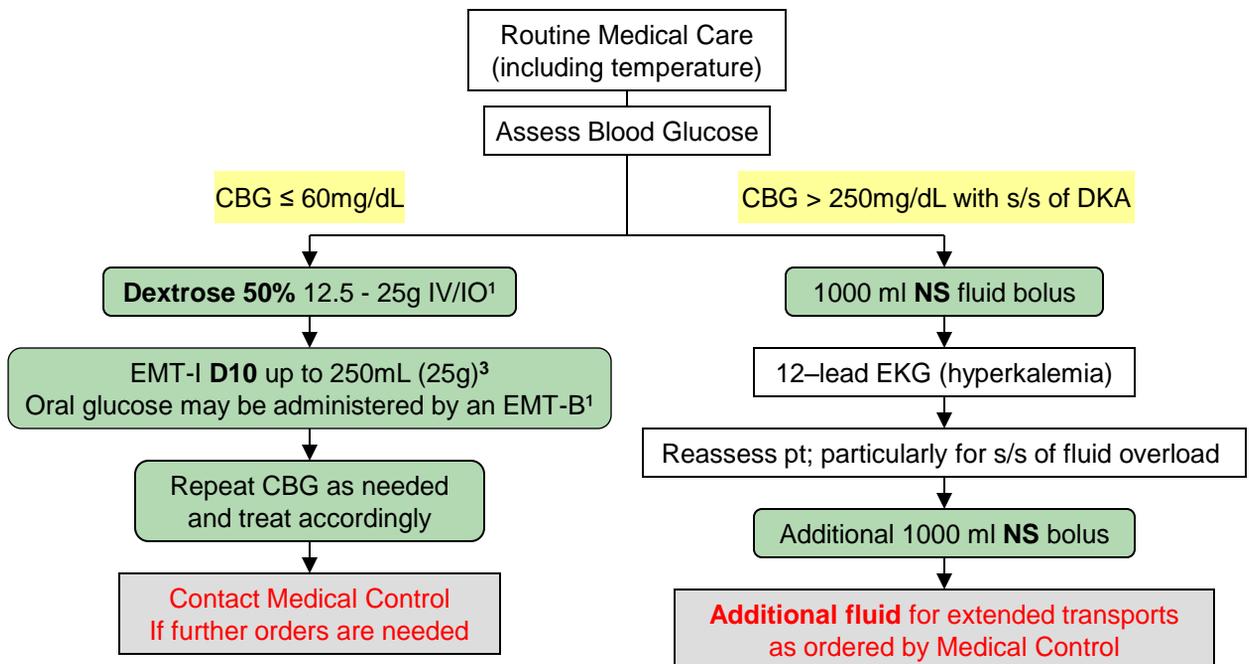
Infection

Psych → *Excited Delirium*

Stroke → *Stroke*

- SpO₂ < 94%, shallow respirations, unable to maintain own airway, respiratory rate ≤ 10/min and/or symptomatic hypotension SBP < 90mm/Hg.
- When trauma is known or suspected refer to the *Selective Spinal Immobilization* protocol. Patients with an altered mental status **cannot** be clinically cleared.
- Four point restraints may be used when necessary for the safety of the patient, EMS crew and by standers. Under Medical Control authorization, uncontrollable patients may be chemically sedated with the use of **Versed IV/IN** or **Valium IV/IM**.

Diabetic Emergency



Common S/S Associated with DKA:

- Abdominal pain or cramping
- Altered LOC
- **Blood Sugar > 250 mg/dL²**
- Complaints of being thirsty / polydipsia
- Deep rapid respirations (Kussmaul respirations) with or without an acetone odor
- Dyspnea
- Flushed/dry skin, dehydration (dry mucous membranes, skin tenting, infrequent urination)
- Frequent urination
- Headache or double vision
- ILL appearing
- Lethargy
- Muscle wasting or weight loss
- Nausea / Vomiting
- Rapid weak pulse

Common Causes of DKA:

- Acute infection
- Insufficient insulin intake
- Non compliance
- Undiagnosed type 1 diabetes

Alcoholic Ketoacidosis

- Chronic alcohol use results in no carbohydrate substrate
- Glucose may be low, normal and very occasionally slightly elevated
- Patients appear ill like DKA
- **Prehospital treatment is IV Fluid**

¹ Provided there is no risk of aspiration or airway compromise related to the patient's mental status, oral carbohydrates along with oral glucose products may be used in the place of IV Dextrose. This includes the use of products found in the patient's home. Capillary glucose levels < 60 mg/dL in patients presenting with an altered mental status and unable to maintain their own airway can receive IV Dextrose under standing orders. An EMT-B may administer oral glucose according to the above guidelines.

² A blood sugar > 250 mg/dL does not mean the patient is in DKA. A CBG of 250mg/dL alone is only indicative of hyperglycemia. Vomiting with hyperglycemia may be a relative indication of acidosis and likely significant dehydration.

³To make D10: dilute 50ml D50 in 200ml NS. Makes 250ml of D10.

Do Not Attempt to Resuscitate (DNAR)

Resuscitation should not be attempted in the following situations prior to contacting Medical Control:

- Lividity
- Rigor mortis
- Body decomposition, decapitation, hemi-corpectomy or incineration
- Any reason to believe CPR is not indicated or desired, especially with known terminal illness.
- Presence of legal documents ("Advance Directives," "Living Wills," or "DNR") stating resuscitative efforts be withheld.

EKG electrodes may be placed posteriorly or on limbs whenever necessary.
Every effort possible should be made to preserve a crime scene

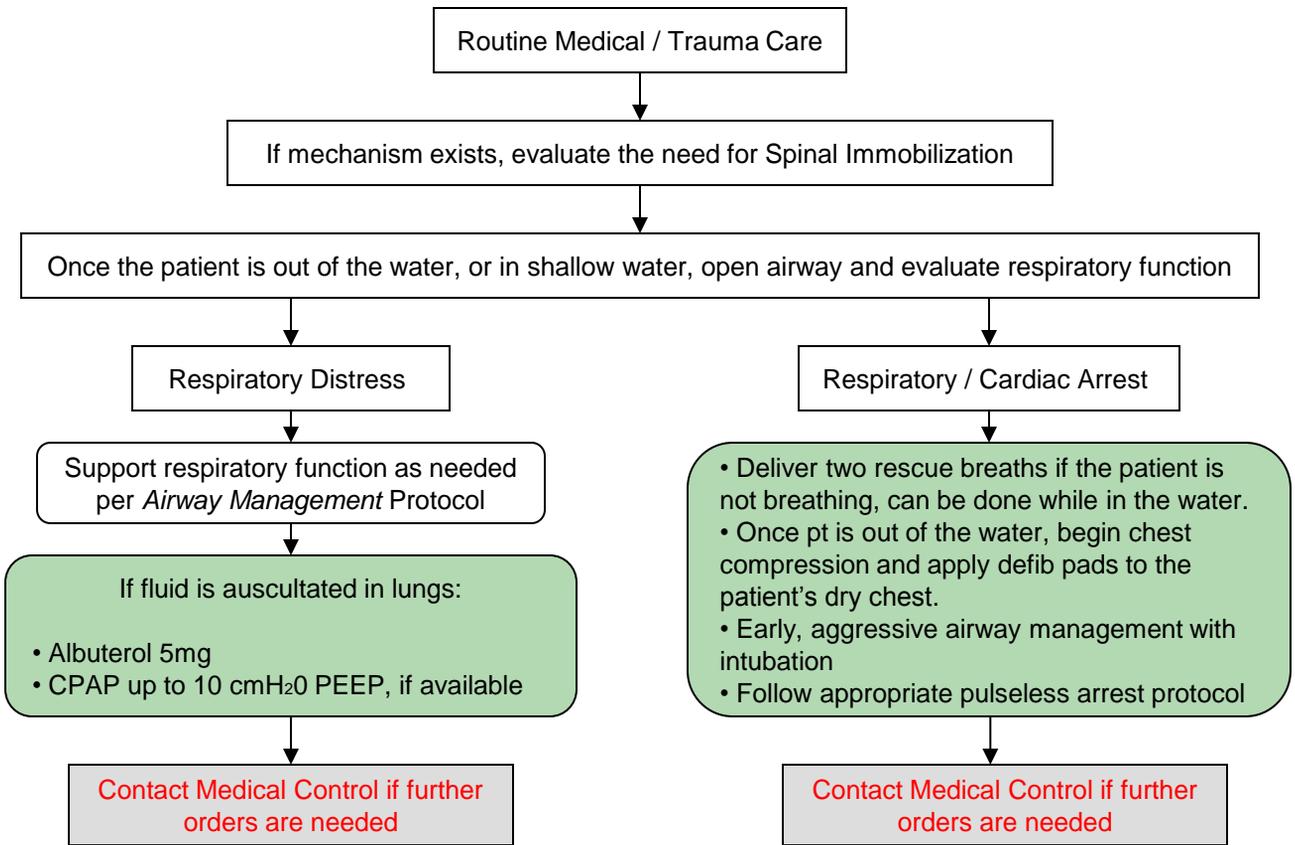
Asystole EKG strip in at least two leads should be included in the EMS Run Report along with proper documentation. Document the scene findings including: medications, medical history, last time pt was spoken to, position found, skin temp, pupils, any trauma or deformity etc...

Contact Medical Control for DNAR and/or time of death

- If EMS arrives to find CPR in progress on a patient who is clearly deceased or a patient who meets the criteria listed above in the blue box, CPR can be stopped with orders from Medical Control.
- For traumatic DNAR, see the *Adult Traumatic Prehospital Termination of Resuscitation Protocol*.

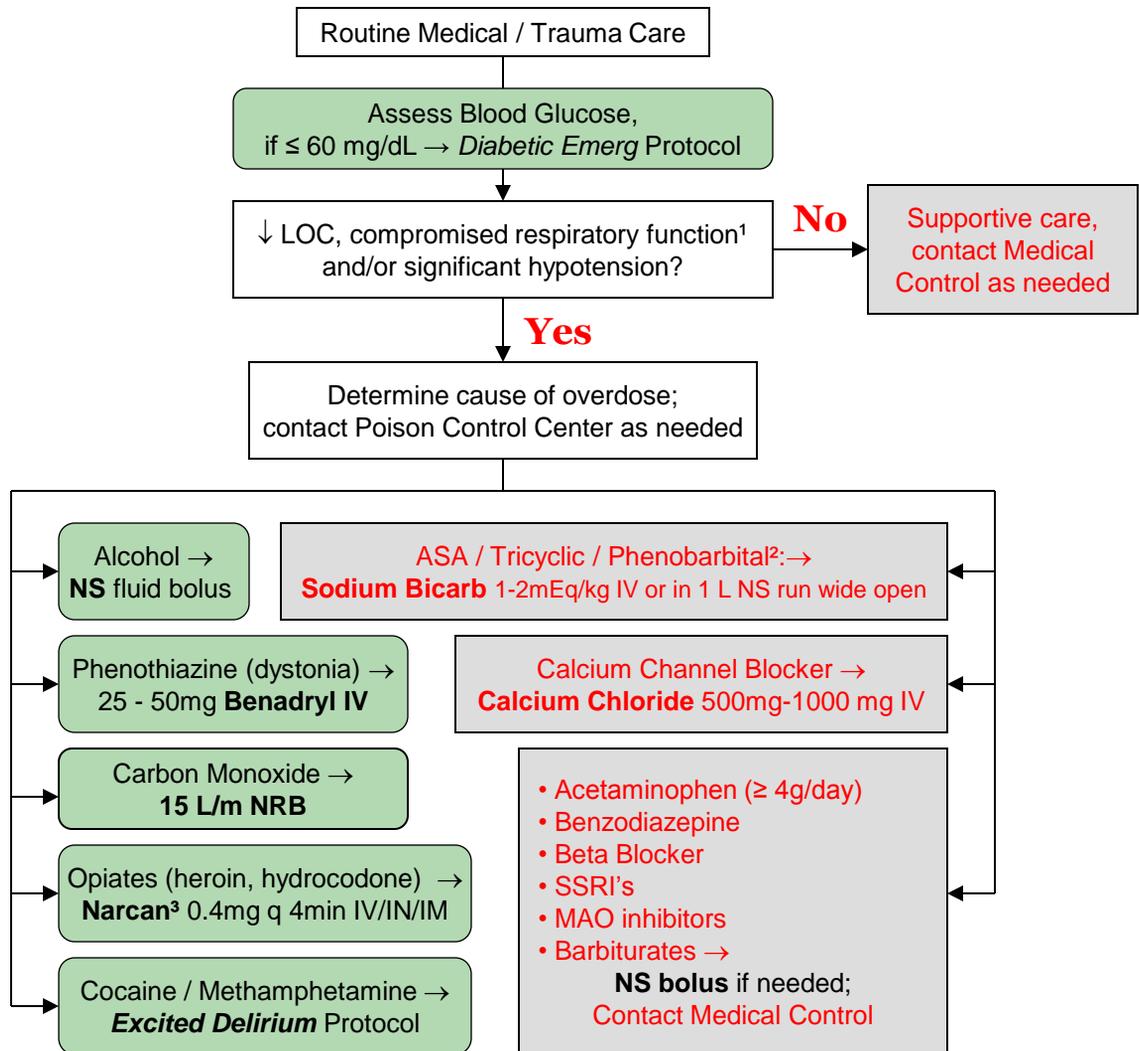
Drowning

When treating drowning victims, addressing submersion induced hypoxia remains an immediate focus in the American Heart Association's 2010 updates. Attention should be on oxygenation and ventilation; therefore, CPR for drowning victims should follow the traditional A-B-C approach to cardiac arrest care as opposed to the newer C-A-B approach.



- Initiate resuscitation in persons who have been submerged for **<60 minutes**. Paramedics should use sound clinical judgment when deciding if resuscitation efforts should be initiated, including but not limited to water temperature, length of submersion, and any associated trauma. If there is any doubt or if the events leading to the submersion are unclear, it is recommended that resuscitation be initiated and the victim be transported to an ED unless there is obvious death (eg, rigor mortis, decomposition, hemisection, decapitation, or lividity).
- Unnecessary cervical spine immobilization can impede adequate opening of the airway and delay delivery of rescue breaths. Routine stabilization of the cervical spine in the absence of circumstances that suggest a spinal injury is not recommended.

Drug Overdose



¹ SpO₂ < 94%, shallow respirations, unable to maintain own airway, respiratory rate ≤ 10/min and/or symptomatic hypotension SBP < 90mm/Hg.

² For known Tricyclic antidepressants, or Phenobarbital OD (S/S include resp. depression, wide QRS, focal seizures, AV blocks, ventricular arrhythmias), consider Sodium Bicarbonate 1mEq/kg IV/IO with Medical Control orders.

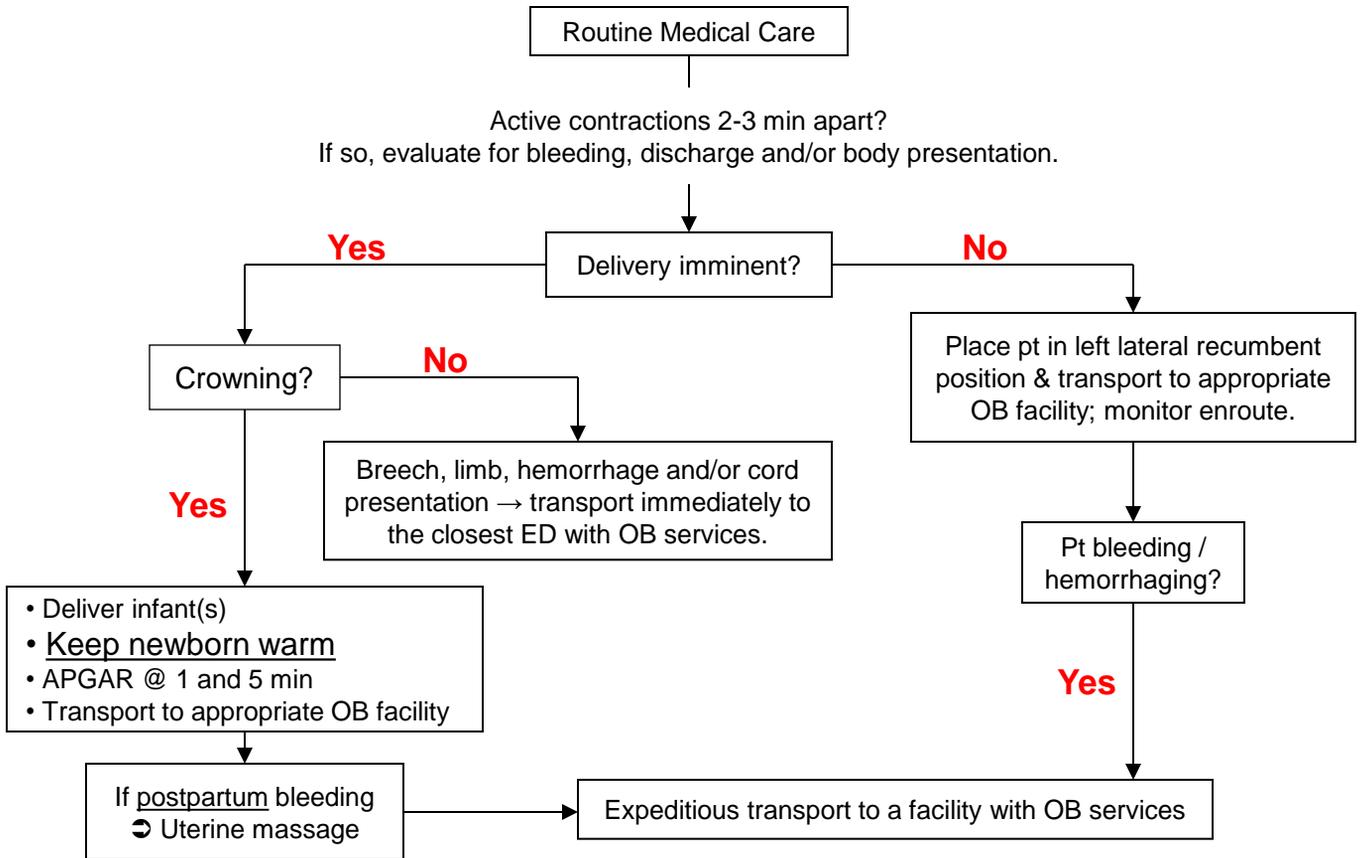
³ **Narcan** dose shall be administered in 0.4mg increments to a max of 2mg or until adequate ventilation/oxygenation is achieved as measured by pulse ox, adequate respirations, as well as patent airway (via NPA/OPA or adequate gag reflex). Doses administered in amounts larger than 0.4mg increase the risk of flash pulmonary edema. The likelihood of this incidence although rare, increases in proportion to the administered dose. For the safety of the patient, EMS crew and by standers, **Narcan** MUST only be given under the parameters which are denoted above or at the direction of Medical Control.

•When trauma is known or suspected refer to the *Selective Spinal Immobilization* protocol. Patients with an altered mental status cannot be clinically cleared.

•Four point restraints may be used when necessary for the safety of the patient, EMS crew and by standers.

•Uncontrollable patients may be chemically sedated with the use of **Versed, Valium, or Ativan** as indicated in the *Excited Delirium* Protocol.

Emergency Childbirth



- IV access may be obtained for any patient considered imminent for delivery or considered "**HIGH RISK**¹."
- Lactated Ringers (LR) is the fluid of choice

- **Do NOT** delay transport awaiting placental delivery
- All products of conception must accompany the pt to the ED.

Prolapsed cord

- Place patient in knee/chest position or in deep Trendelenburg
- Elevate presenting part or retract maternal tissue to allow/increase fetal blood flow until relieved by hospital staff.

¹ **HIGH RISK** includes but is not limited to :

- preterm labor
- Vaginal bleeding
- Multiple gestation pregnancy
- Placental abruption
- Placenta previa
- Pre-eclampsia
- Pt who states she is "high risk" (diabetic, HTN, etc)
- trauma

Excited Delirium

A condition in which a person is in a **psychotic state** or extremely agitated state. Mentally, the subject is unable to focus his/her attention on any one thing and is often distracted by his surroundings. The subjects' inability to process rational thought precludes normal de-escalation procedures alone. Physically, the organs within the subject are responding to the inciting factor be it a drug stimulant or the exacerbation of an underlying psychiatric condition. These two factors occurring at the same time cause a person to act erratically enough that they become a danger to themselves and to the public. This is typically where law enforcement comes into contact with the person.

Possible causes of Excited Delirium include:

- drug withdrawal
 - head trauma
 - illness
 - low blood sugar
 - overdose on stimulant or hallucinogenic drugs.
- NOTE: This is the cause in the majority of cases where an ECD is needed.
- psychiatric patient off their medication
 - psychosis

Symptoms of Excited Delirium include:

- bizarre and aggressive behavior
- dilated pupils
- fear and panic
- high body temperature*
- incoherent speech
- inconsistent breathing patterns
- nakedness
- profuse sweating
- shivering

* **High body temperature** is a key finding in predicting a high risk of sudden death. Another key symptom to the onset of death while experiencing excited delirium is "instant tranquility." This is when the suspect who had been very violent and vocal suddenly becomes quiet and docile while in the car or sitting at the scene.

Routine Trauma Care (Spinal Immobilization)

- High Flow O₂
- Assess CBG
- EKG
- Temperature

Sedation:

- **Versed** 5mg IM or IN, may repeat x 1, max of 10mg
- OR**
- **Versed** 5 mg IV q 5 min, max of 10mg
- OR**
- **Valium** 5 – 10 mg IV/IM
- OR**
- **Ativan** 2-4mg IV/IM

Contact Medical Control if
additional sedation is needed

-Use of benzodiazepines in excited delirium should **be titrated to relief of agitation and alleviation of physical symptoms** including, but not limited to:

- combativeness
- diaphoresis
- tachycardia (goal for a heart rate < 100 bpm)
- tachypnea

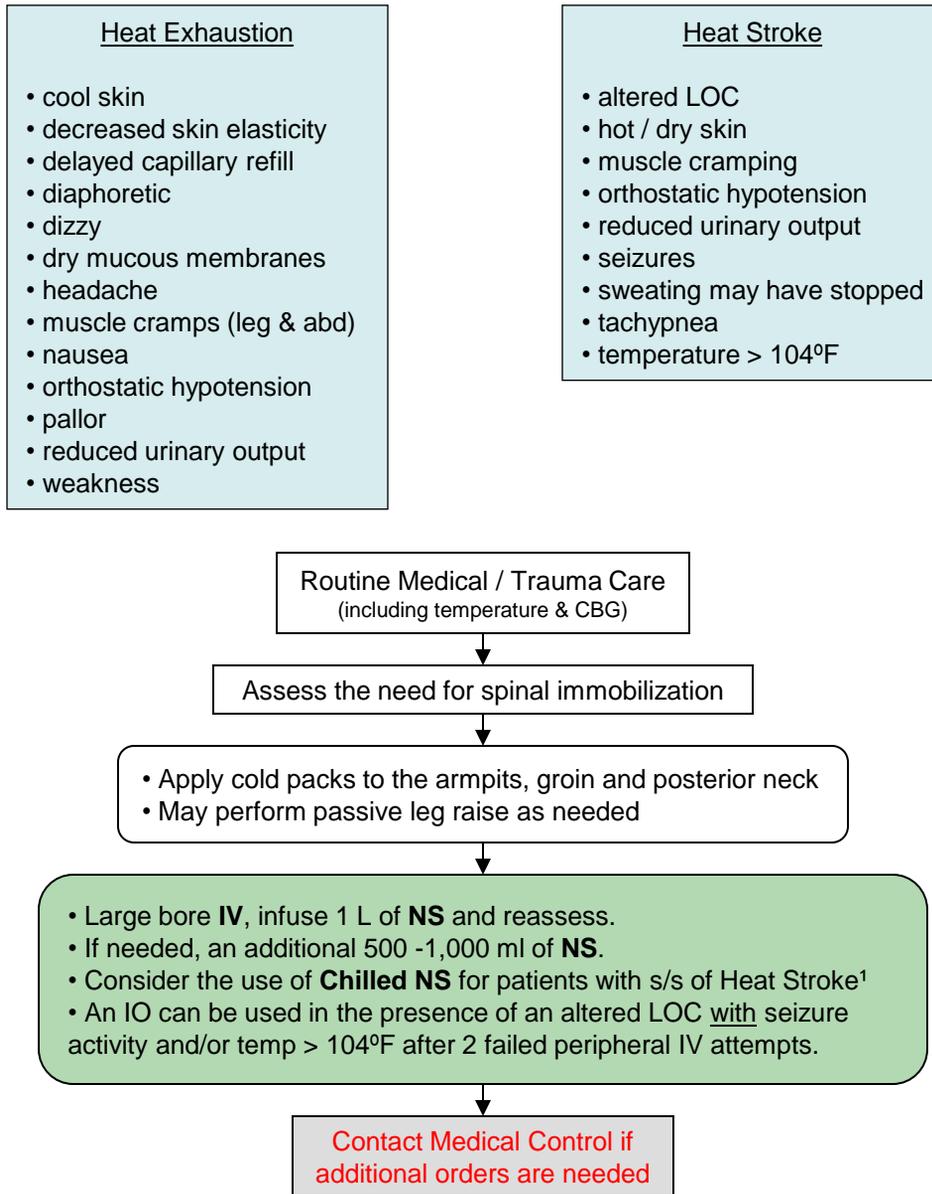
- Care should be given to post-sedation vital sign monitoring (with special attention to EKG rhythms), pulse oximetry and maintenance of airway.

- Patients should be transported to the closest appropriate hospital for evaluation and stabilization.

- Ensure proper positioning of the patient to avoid **positional and compression asphyxia**. No person should be restrained or compressed and left in any position that may restrict the airway for any extended period of time.
- The restraining of patients is for the protection of both the patient and EMS personnel.
- Law enforcement should accompany EMS to the hospital.

Heat Related Emergency / Dehydration

Heat Exhaustion vs Heat Stroke

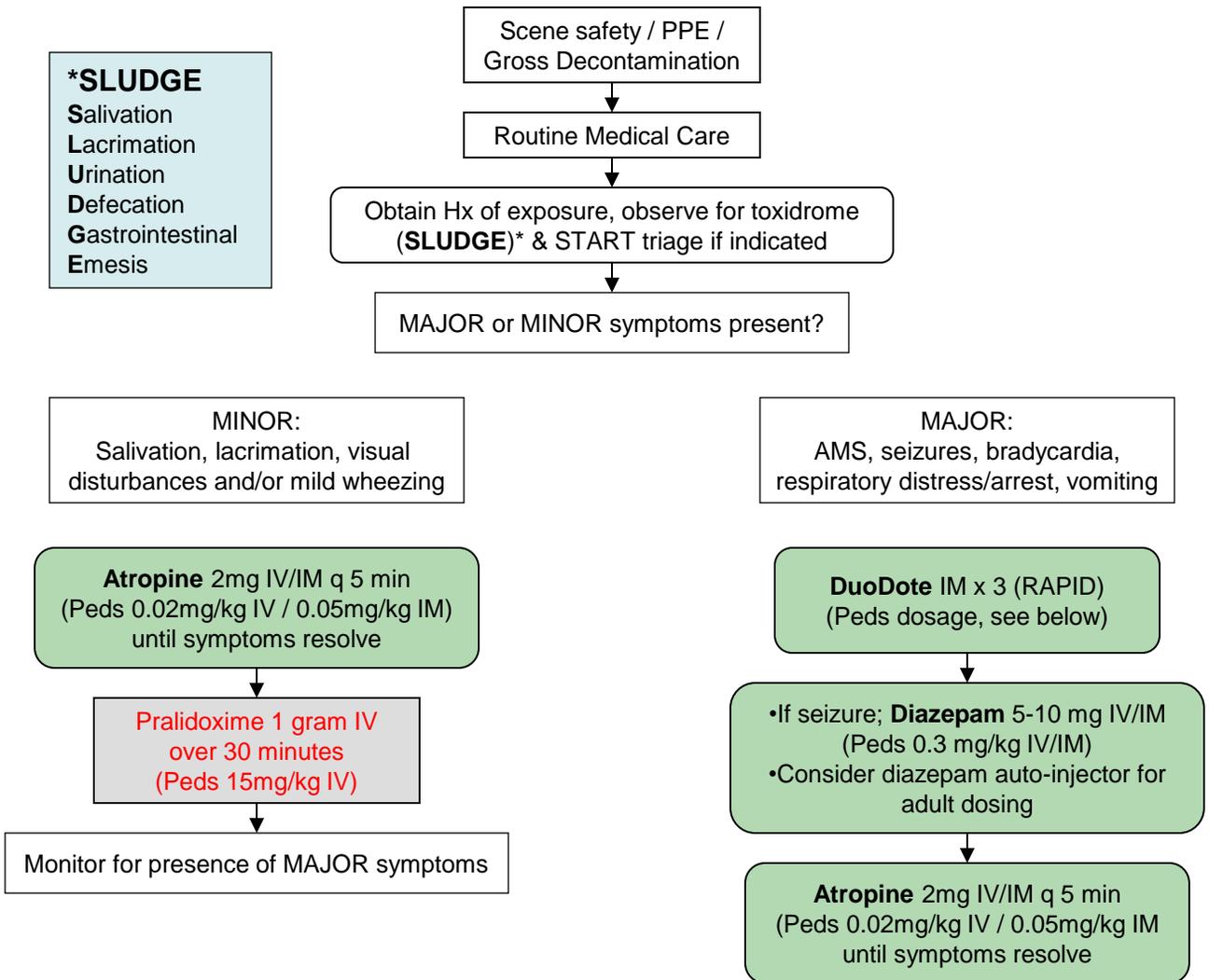


¹ Infuse chilled NS for Heat Stroke patients with AMS to a target temp of 101°F.

- History should include: length of exposure, any attempts at oral rehydration, last urination and alcohol or drug use in the past 24 hours.

- For tonic-clonic seizure activity, refer to the *Seizure* protocol.

Nerve Agent / Organophosphate Poisoning



- One **DuoDote** = One **Mark One Kit**
- If MAJOR incident, notify EMS supervisor or highest ranking EMS personnel for CHEMPACK deployment.
- If large scale MCI, begin with 1 **DuoDote** if pt < 7 y/o, 2 **DuoDotes** if pt is 8-14 y/o & 3 **DuoDotes** if pt ≥ 15 y/o.
- If out of **DuoDote**; use pediatric Atropens
 - Atropine** 0.5 mg if < 39 lbs
 - Atropine** 1 mg if 40 – 90 lbs
 - Atropine** 2 mg if > 90 lbs
- For pts with MAJOR symptoms, treat q 5 min with Atropine until symptoms resolve (mainly oral/respiratory secretions) → no max dose
- Notify receiving ED of possible organophosphate poisoning prior to ED arrival for proper ED HAZMAT precautions.
- Each DuoDote contains
 - Atropine 2.1 mg
 - Pralidoxime 600 mg

Pneumonia

Pneumonia is primarily caused by a bacterial infection. This can often be mistaken for pulmonary edema and/or COPD; therefore, it is imperative to understand the presentation of pneumonia. Patients who have a history of asthma and COPD are at a higher risk for developing pneumonia.

Routine Medical Care
(including temperature)

Oxygenate pt as clinically indicated
to an SpO₂ ≥ 94%.
Assist pt with deep breathing¹

Consider **CPAP** 5-10cm H₂O
for respiratory distress

Using the adjacent box, focus is
on recent & past medical history.

Evaluate the need for bronchodilators:
level of distress, wheezing, crackles.

Administer **Albuterol** 5mg with
Atrovent 500mcg via nebulizer

Infuse 500-1000 ml NS bolus if
dehydration is suspected:
•skin tenting (tested at the clavicles)
•dry mucous membranes
•orthostatic hypotension

Signs and Symptoms Associated with Pneumonia:

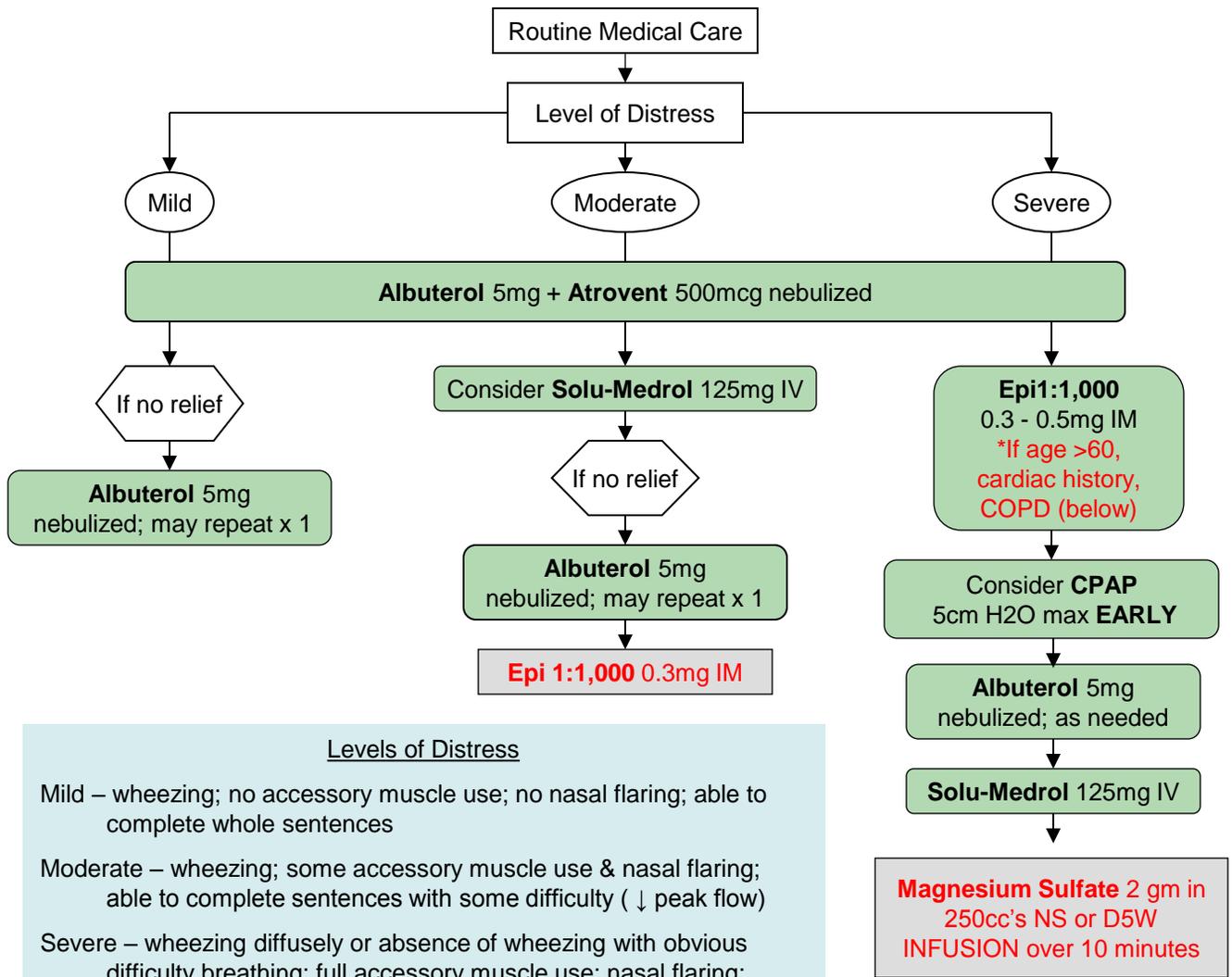
- Hypoxia
- Productive cough (mucus could be green or yellow & even contain blood)
- Fluid in pleural cavity which could cause reproducible chest wall pain especially on inspiration and commonly mistaken for rales related to pulmonary edema
- Dehydration (administer NS fluid bolus)
- Tachycardia
- Fever (not always solid indicator in aging adults)
- Tachypnea
- Chills
- Bed bound patients
- Aspiration risk
- Institutionalized² (currently or recent)
- Hemoptysis³ (coughing or spitting up blood)
- Adventitious lung sounds such as crackles

¹ IF TOLERATED Deep breathing increases the surface area within the alveoli of the lungs. An increase in surface area increases the gas exchange which will increase oxygenation. This also stimulates movement or activity in the bases of the lungs which is most often the site of the bacteria causing the pneumonia.

² Institutionalized: any of the following is considered an institution: hospital, nursing home, penitentiary, etc. This increases the risk for pneumonia due to their sedentary lifestyle.

³ P.P.E. masks should be used on anyone presenting with hemoptysis. Hemoptysis is considered T.B. until proven otherwise.

Reactive Airway Disease



Levels of Distress

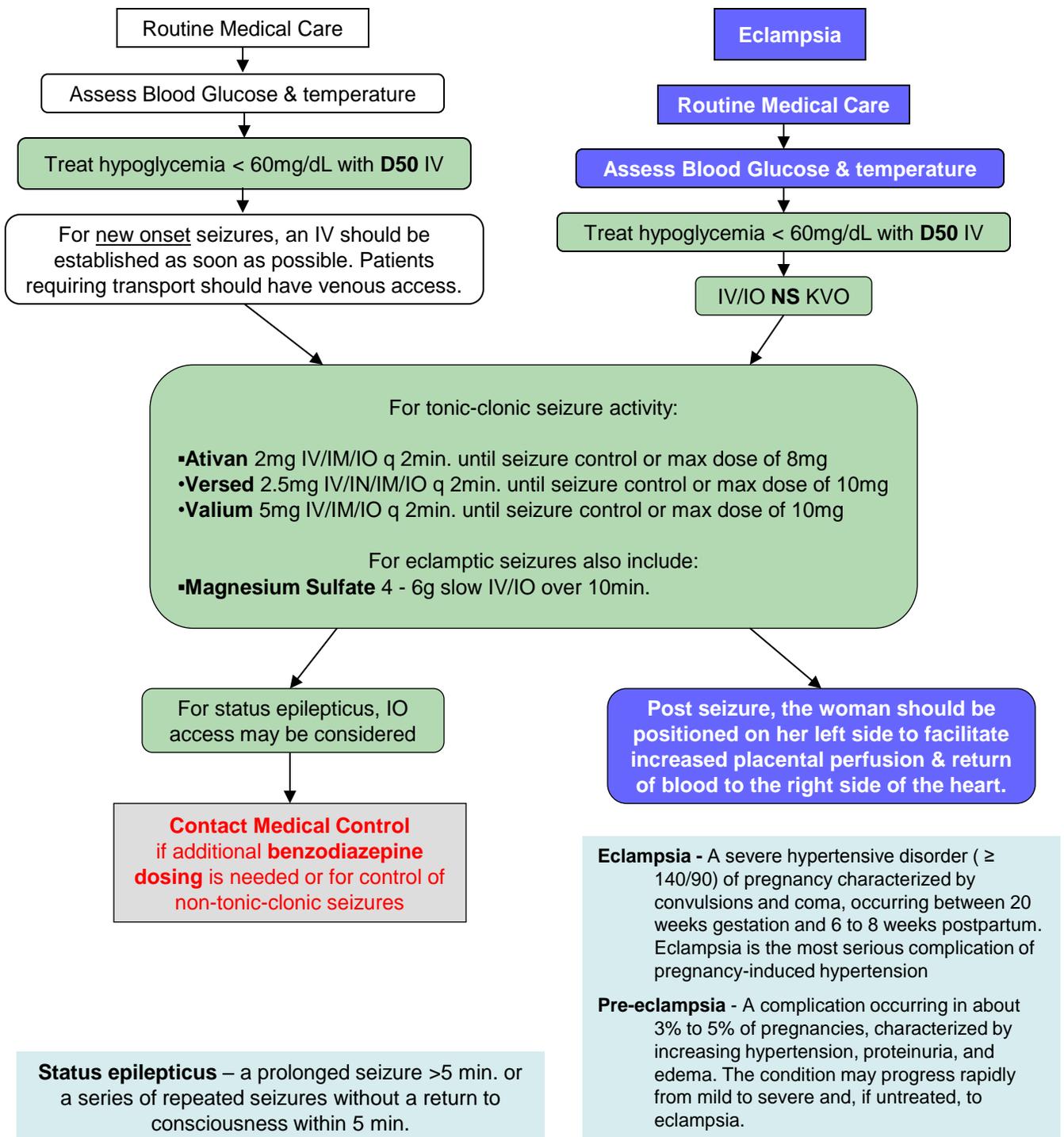
Mild – wheezing; no accessory muscle use; no nasal flaring; able to complete whole sentences

Moderate – wheezing; some accessory muscle use & nasal flaring; able to complete sentences with some difficulty (↓ peak flow)

Severe – wheezing diffusely or absence of wheezing with obvious difficulty breathing; full accessory muscle use; nasal flaring; unable to complete whole sentences; (↓ peak flow)

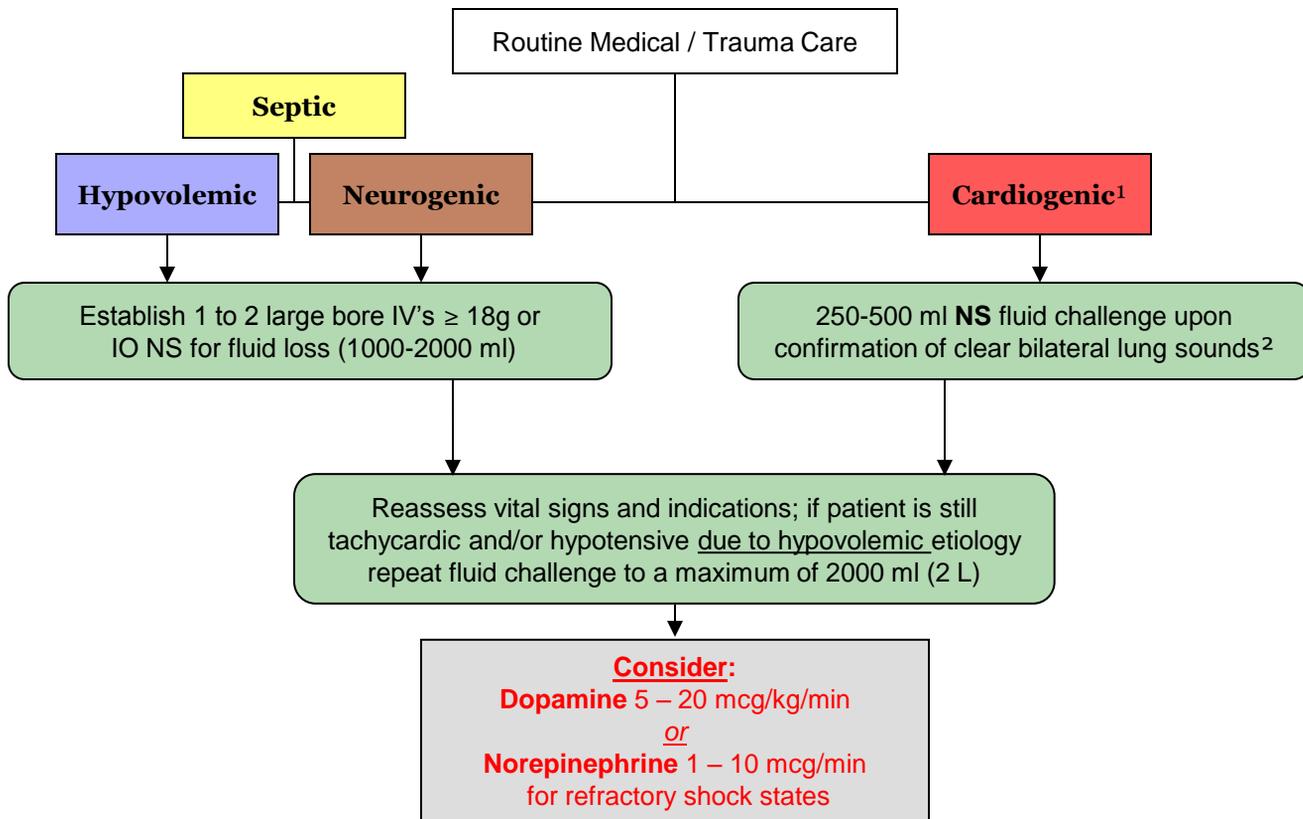
- The current dose for **Albuterol** is 5mg nebulized for patients ≥ 30kg. For patients < 30kg, administer 2.5mg nebulized.
- Determine if pt has been intubated, if so treat aggressively
- Patients ≥ ≈ 60 years of age with a cardiac history, COPD, and/or renal failure shall not be given **Magnesium Sulfate** or **Epinephrine** without consultation from Medical Control.
- The onset of action for **Atrovent** is ≈ 20 min with peak action between 60-90 minutes; therefore should be given with the first **Albuterol** treatment and with every 4th treatment thereafter.
- Corticosteroids (**Solu-Medrol**) or oral Prednisone is the only proven treatment for the inflammatory response in asthma. Early administration of these medications is vital as they aid in reducing the possibility of hospital admission. It usually takes six hours once the medication is given before it's effects are seen.
- Consider the use of qualitative ETCO₂ as a diagnostic tool by assessing for bronchospastic or "shark fin" waveform.

Seizure



- All seizures of new onset need transport to an ED with a functional CT scanner. If seizure is secondary to trauma, transport to trauma center.
- For active tonic-clonic seizure activity, Intranasal (IN) Versed may be given only if an IV is unobtainable. Valium CANNOT be given intranasally, oil based medications cannot be atomized.
- If IN Versed is used to control seizure activity, peripheral intravenous access is still needed.

Shock



S/S of hypovolemic shock:

- altered mental status
- capillary refill > 2 seconds
- chest pain
- diaphoresis
- increased level of anxiety
- muscle cramping
- N/V/D
- pallor
- possible hx of recent trauma
- SBP < 90-100mm/Hg
- SOB
- tachycardia > 120 bpm

Septic Shock

- fever typically present
- hypotensive
- skin appears flushed
- warm extremities

Neurogenic Shock

- hypotensive
- not always tachycardic
- usually associated with a traumatic event

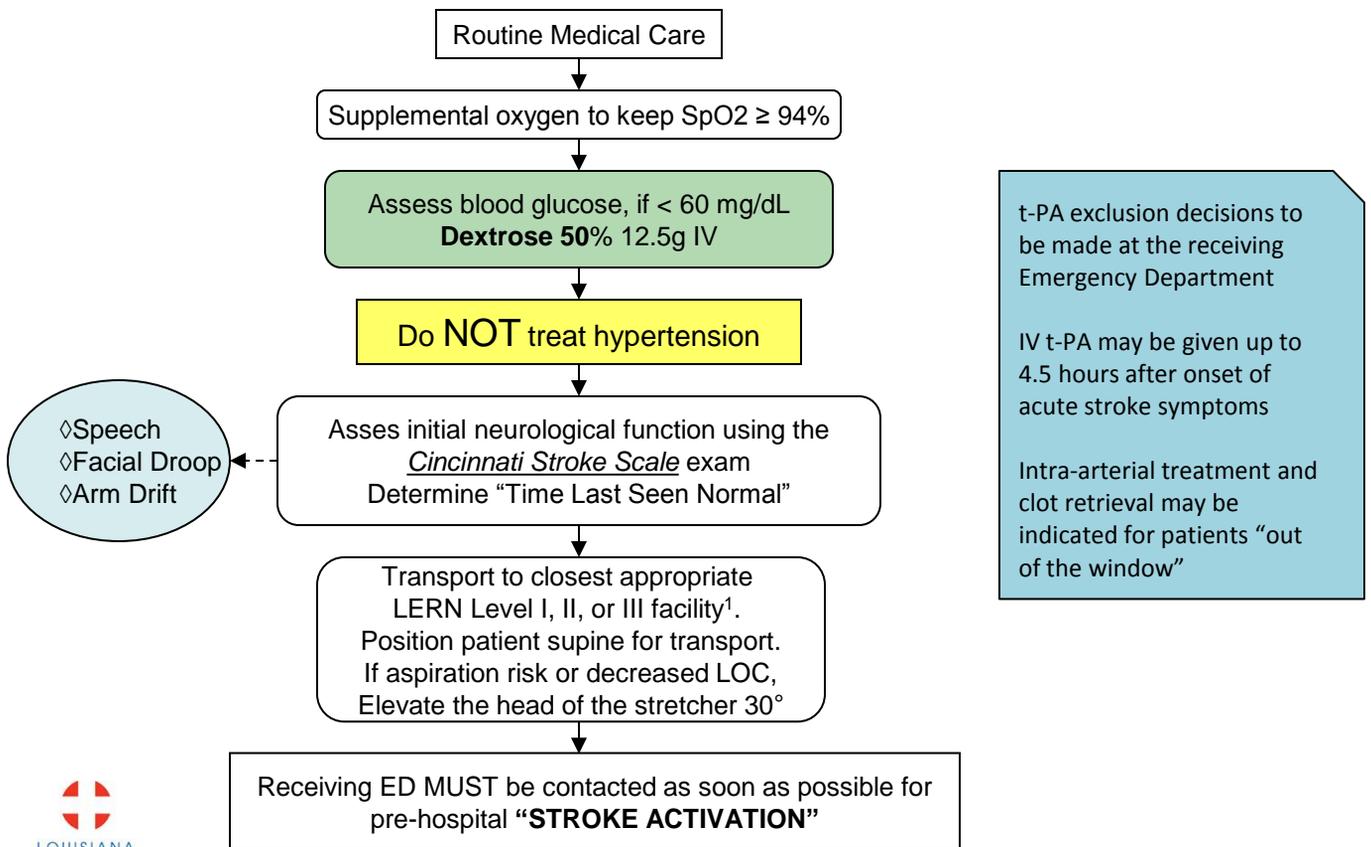
¹ Only in cardiogenic shock, associated with CHF / pulmonary edema, can a dopamine infusion be initiated before contacting Medical Control.

² Lung sounds should be assessed for every 250-500 ml of fluid for the presence of pulmonary edema. If pulmonary edema develops **Contact Medical Control**, as **Dopamine** or **Norepinephrine** may be indicated.

Stroke

Determine Onset of Focal Neurological Symptoms “Time Last Seen Normal”

As pre-hospital providers our hands on care for stroke victims is limited. Therefore, our next crucial role in caring for stroke victims is geared toward recognition. The *Cincinnati Stroke Scale* shall be used as a quick stroke screening tool. The detailed testing of neurological function should be completed enroute to the ED. If present, transport a family member or anyone who has pertinent medical information to the ED.



- ¹ Prior to concluding the Medical Control radio report, identify who will be notifying the receiving ED (EMS or Medical Control).
 - ² Transport to a hospital that has neurological services and a functional CT scanner. A neurosurgeon is not required for an ED to accept an active stroke.
- Patients who awaken from sleep with neurological deficits must still be transported to a hospital with neurological services and a functional CT scanner as a stroke activation.
 - Treat hypotension as per protocol to improve perfusion.
 - To assist in t-PA screening, ask “Have you been admitted to the hospital within the past 3 months?”
 - Treat generalized seizure activity aggressively per protocol

*Jauch EC, Saver JL, Adams HP Jr., Bruno A, Connors JJ, Demaerschalk BM, et al., American Heart Association Stroke Council, Council on Cardiovascular Nursing, Council on Peripheral Vascular Disease, and Council on Clinical Cardiology. Guidelines for the early management of patients with acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013;44:870–947.

Termination of Resuscitation (non-traumatic)

All of the following **MUST** be met to consider “**Termination of Resuscitation.**”

- Pulseless and apneic prior to EMS arrival
- **18 years of age or older**
- > 30 min resuscitation (by EMS) following appropriate pulseless protocol
- > 30 min of chest compressions with interruptions only for rhythm checks
- ETT or supraglottic airway with proper documentation of qualitative and/or quantitative¹ capnography
- Patent IV / IO line
- When system configuration allows, it is preferable to have two on-duty paramedics, one of which is at a supervisory level and/or an on-line medical director, on scene verifying proper basic and advanced treatments.
- Patient could not have been in a perfusing rhythm at anytime
- Persistent asystole or agonal rhythm, rate < 40 bpm, (not VF/VT) with no identifiable reversible causes after a minimum of 30 minutes of resuscitation
- Patient’s immediate family members must have been fully informed of situation, if on scene
- A safe environment for EMS / first responders
- Law Enforcement / Coroner on scene or already notified

If all the above are met, contact Medical Control

If ANY one of the above is not met you still **MUST** stay on scene for 30 min² prior to any movement or packaging of the patient. You may begin packaging the patient after 30 minutes and transport to the closest appropriate ED.

Contact Medical Control for Termination of Resuscitation

Yes

Termination granted?

No

Post Termination Procedures:

This patient/body becomes property of the Coroner’s office once pronounced.

1. Advanced airway must remain in place.
2. IV / IO’s cannot be taken out.
3. ECG electrodes & Defib pads remain.
4. Do not remove decompression needles (if applicable).

Advise Medical Control you will remain on scene & continue to work the non-perfusing rhythm for another 10 min then call back for termination.

Contact Medical Control for Termination³

¹ Quantitative and qualitative capnography is defined in the *Protocol Preambles*.

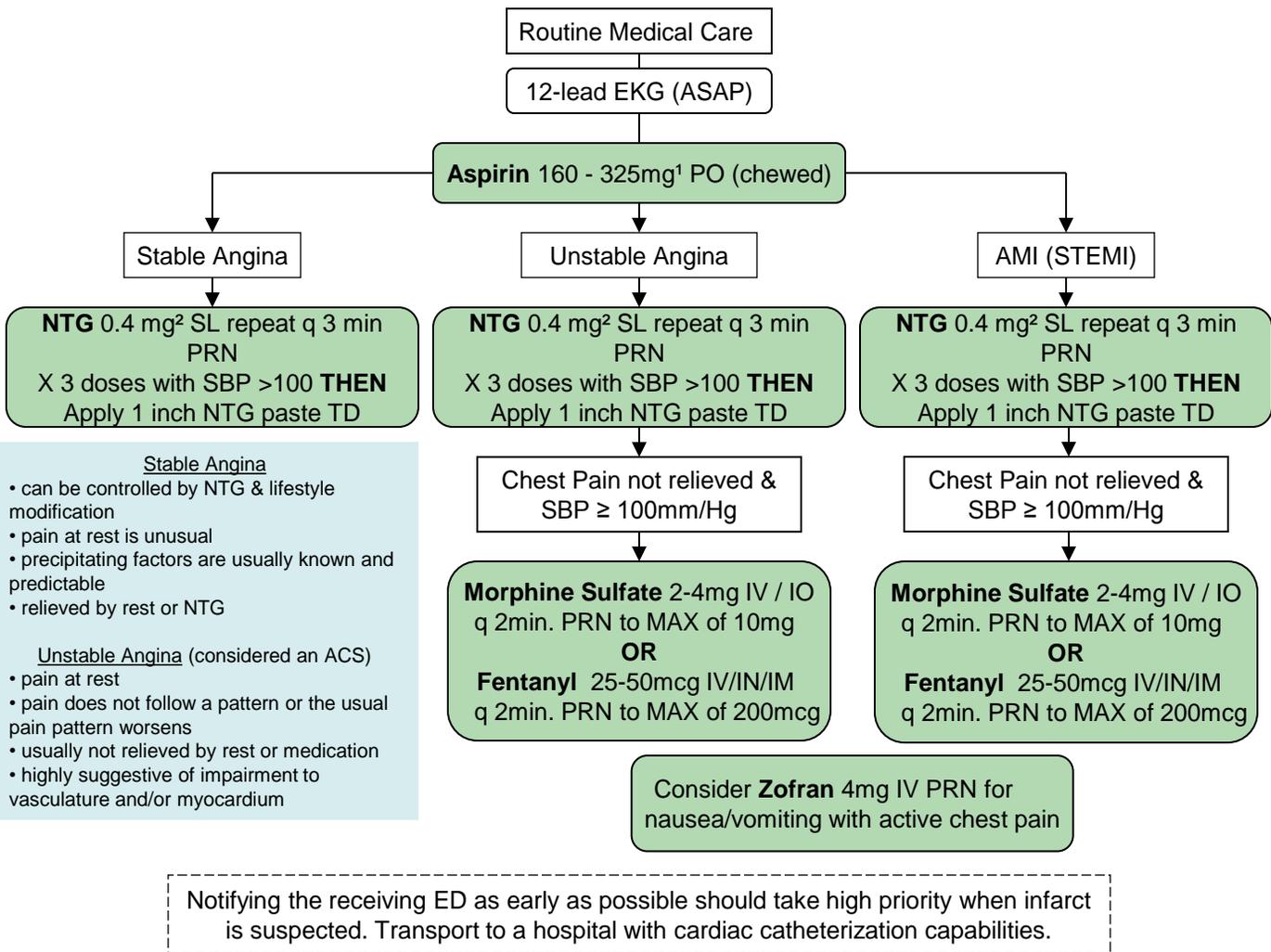
² Deterioration of a safe scene in which the EMT’s are in danger takes priority over scene time on cardiac arrests. If the scene has become too dangerous to provide patient care, law enforcement must be dispatched with documentation reflecting such on the run report.

³ If Medical Control does not grant “Termination” after 2 requests, transport to the closest appropriate ED.

- Termination of Resuscitation does not apply in public venues / public view or at any time the medics feel their safety is compromised.
- This protocol is not applicable to EMT-Basics and EMT-Intermediates.

Acute Coronary Syndrome (ACS)

Acute Coronary Syndromes include unstable angina and ST elevated myocardial infarction (STEMI)



¹ Aspirin (ASA) is contraindicated in pts with current or recent GI bleeding & patient's who have taken ASA within the past 24 hours. ASA is relatively contraindicated in patients with history of asthma and Medical Control is to be contacted prior to administration.

² Nitroglycerin (NTG) is contraindicated in patients who have taken Viagra or Levitra within the past 24 hours (Cialis in the past 48 hours). NTG SL tablets and NTG SL spray may be used interchangeably.

- Age and cardiac risk factors (defined in the *Protocol Preambles*) are a key evaluation tool in this protocol. Major risk factors should be documented on the EMS Run Report.

- If the administration of one NTG results in a substantial decrease in blood pressure, discontinue further NTG use; this response may be indicative of an MI involving the right ventricle. This hypotension usually responds well to a fluid bolus (NS). A common finding associated with a right sided inferior MI is ST elevation in V4R with bradycardia.

- Treat life-threatening arrhythmias per the appropriate protocol before initiating this ACS protocol.

- Consider a right sided 12-lead EKG (V4R) for suspected Inferior STEMI (leads II, III, AvF).

- Ventricular ectopy typically does not require treatment unless the ectopic beats are greater than the number of regular (non ectopic) beats and / or a patient is hemodynamically unstable.

- Paramedics treating patients within this protocol should minimize on scene time to 15 minutes for STEMI.

Asystole / P.E.A.

American Heart Association's *Advanced Cardiopulmonary Life Support (ACLS)* 2010 updates places special attention on the value of chest compressions. New guidelines denote specific times when pausing chest compressions is permissible. Five (5) cycles of CPR is now required before pausing chest compressions to attach EKG/Defib and/or any advanced airway attempt.

Effective CPR performed PTA?
AED used PTA?
EMS witnessed arrest?

Pt apneic and pulseless with down time > 4 - 5 mins,
begin **BLS¹** CPR for 2 mins prior to rhythm check

Attach EKG, confirm Asystole / PEA

Continuous CPR²

- Establish IV/IO access
- Epinephrine** 1mg IV/IO repeat q 3 – 5 min
- Insert advanced airway³
- Initiate continuous ETCO₂ monitoring

Search & treat for possible contributing factors⁴

≈ 10 sec pause in CPR q 2 min for rhythm / pulse check

If acidosis is suspected
(i.e. prolonged down time),
Sodium Bicarbonate 1mEq/kg

Effective chest compressions and controlled ventilations at 8 – 10 /min takes priority over
ANY OTHER TREATMENT.

Perform continuous chest compressions without stopping for ventilations.

Only pause for ≈ 10 sec every 2 min to verify EKG.

¹ B.V.M. with OPA / NPA only. If effective CPR is in progress upon arrival, A.L.S / ACLS may be initiated after the first 2 minute cycle is complete.

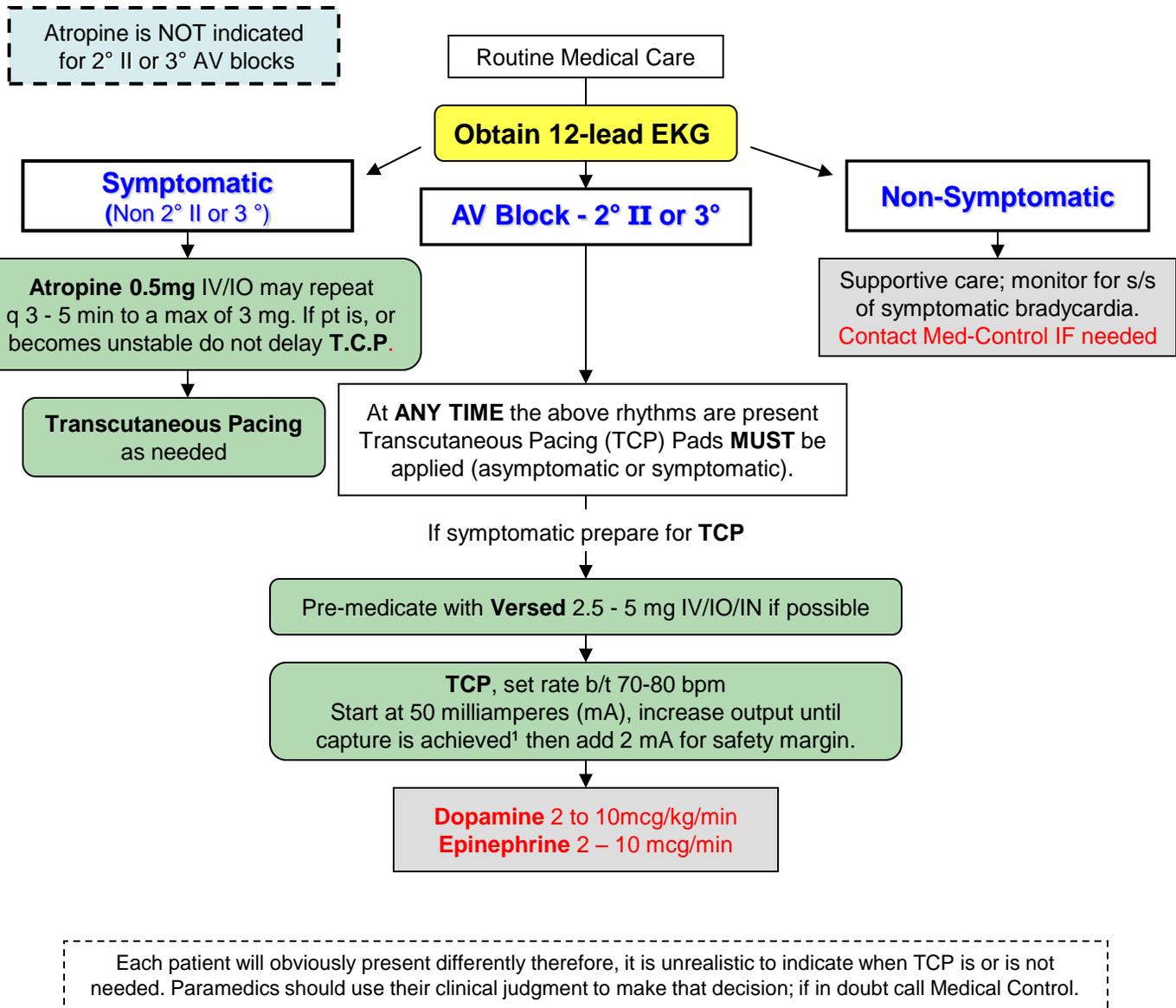
² Guidelines for CPR can be found in the *Protocol Preambles*.

³ Airway management per *Advanced Airway Protocol*. **Avoid prolonged (>10sec) pauses in compressions for airway management.**

⁴**Contributing Factors:**

- Hypoglycemia – treat with **Dextrose 50%**
- Hyperkalemia – **Calcium Chloride** 8mg/kg for known hyperkalemia or end-stage renal disease / dialysis
- OD - of tricyclic antidepressants **Sodium Bicarb** 1 – 2mEq/kg and/or **Narcan** 2mg for narcotic OD
- Tension pneumothorax - **Needle Decompression**
- Hypothermia – avoid rigorous movement of patient; especially if patient regains pulse. Excessive movement could cause V-Fib or V-Tach. This is rare but when it occurs the VF/VT is almost always refractory.
- Hypovolemia – **Fluid bolus**

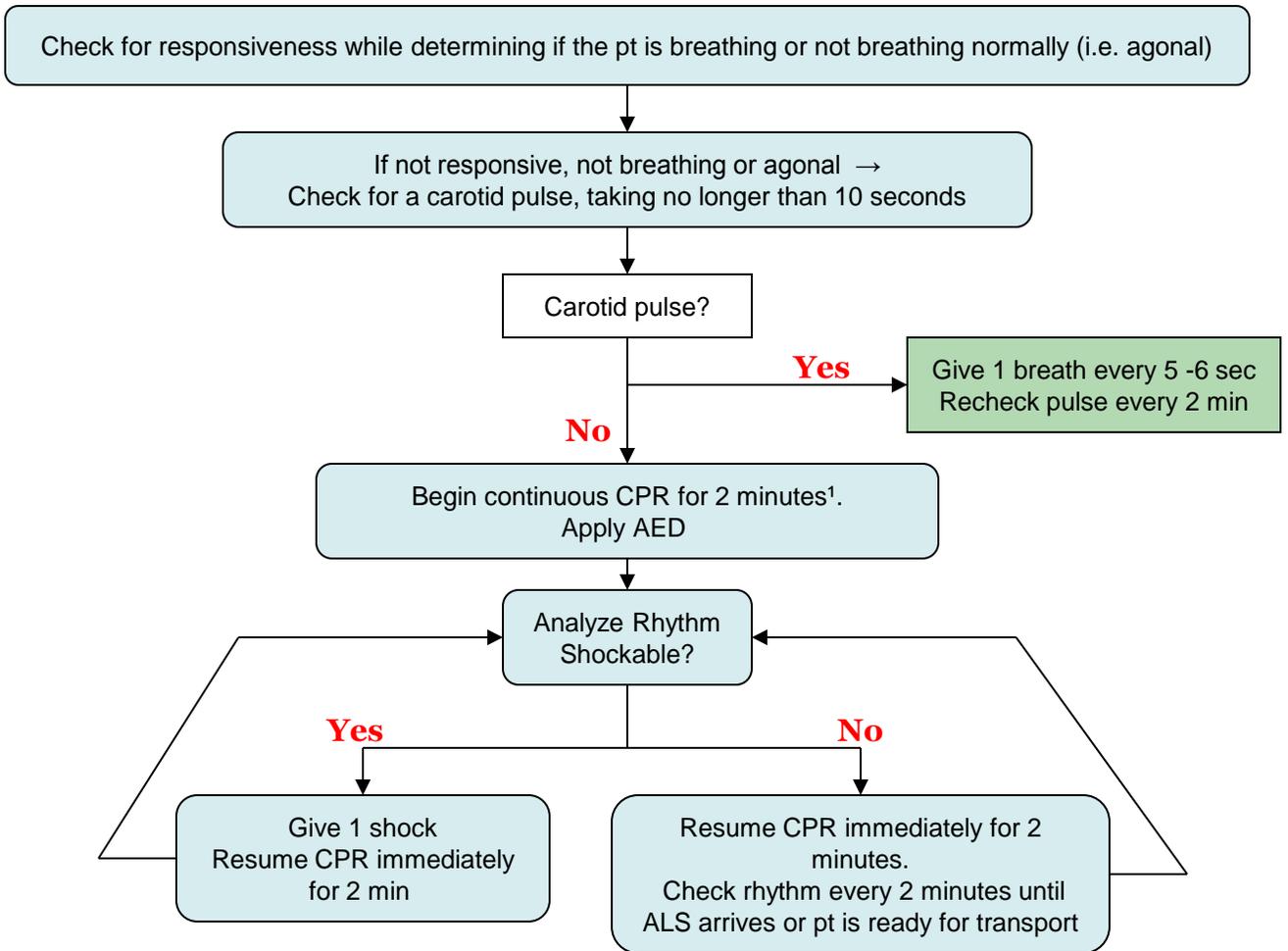
Bradycardia (Symptomatic)



¹ Widening of QRS and a broad T wave after each spike.

- **Symptomatic bradycardia** is defined as pulse < 60 beats per minute (bpm) with a SBP <100mm/Hg, SOB, altered mental status, and/or other signs of hypoperfusion.
- Patients presenting with possible cardiac related chest pain and/or STEMI should NOT receive atropine, unless hemodynamically unstable, prior to consulting with **Medical Control**.
- Transplanted hearts will not respond to **Atropine**; **TCP** is the treatment of choice
- **TCP** is the treatment of choice for 2nd degree type II and 3rd degree AV heart blocks with serious S/S. Contact Medical Control if no serious S/S exist. Atropine is NOT indicated for AV blocks at this level.
- NEVER use Lidocaine to treat premature ventricular beats (PVC's) when patients are bradycardic. The mere presence of PVC's should lead to a more detailed history. Refer to *Wide Complex Tachycardia* Protocol for treatment of ventricular ectopy.

B.L.S. / A.E.D.



Emphasis on High-Quality CPR

- Rate at least 100/min
- Compression depth at least 1 ½ - 2 inches
- Allow complete recoil after each compression
- Minimize interruptions in compressions
- Avoid excessive ventilation

Following the initial rhythm check or defib:

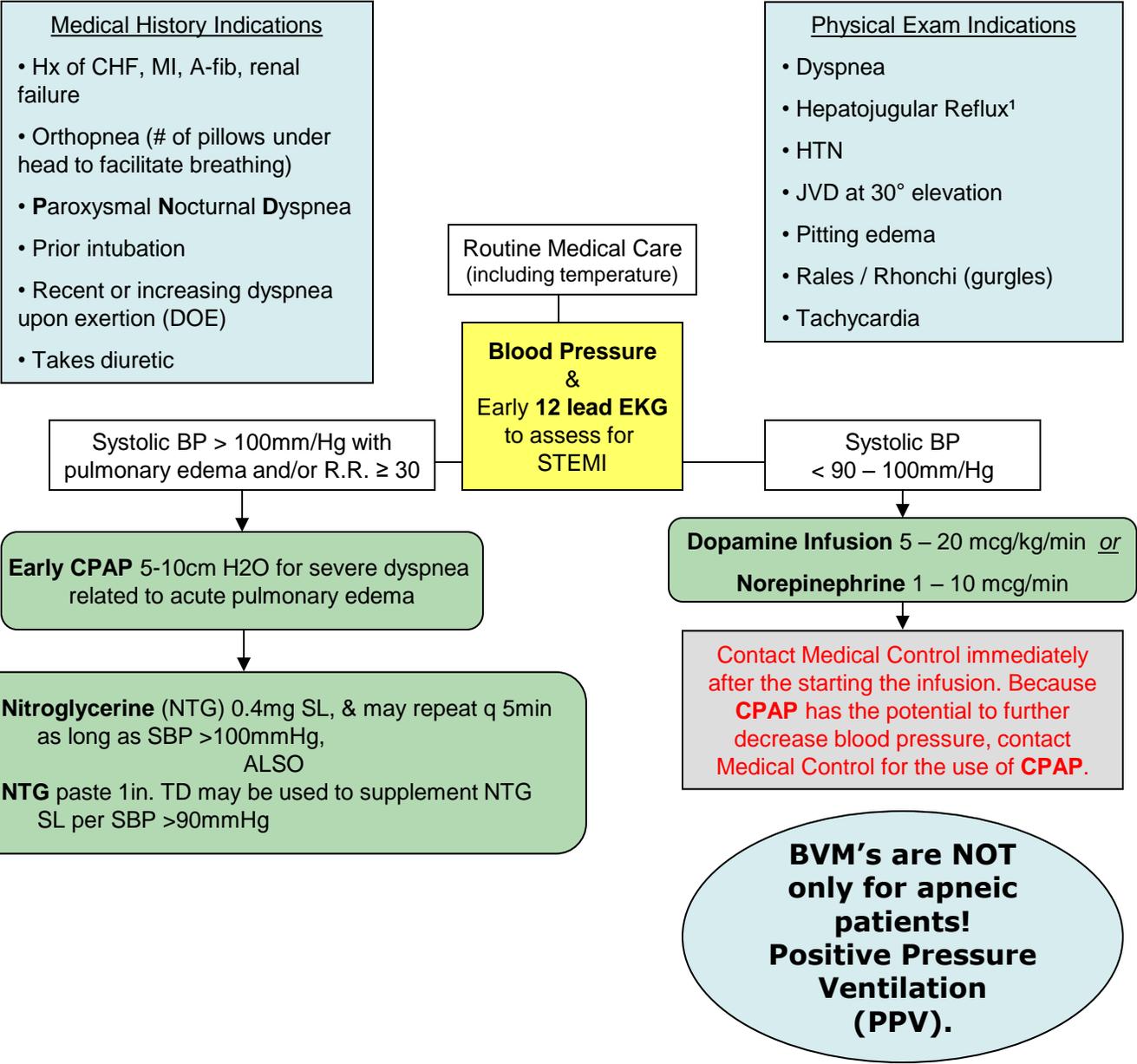
- Consider the use of a mechanical compression device, if available, per its protocol
- Consider the use of a Supraglottic Airway

¹ Do not delay compressions while preparing a BVM / oral airway or applying the AED.

- Allow for early consideration of ALS backup or intercept.
- Patients must be worked on scene for a minimum of 30 minutes

CHF / Pulmonary Edema

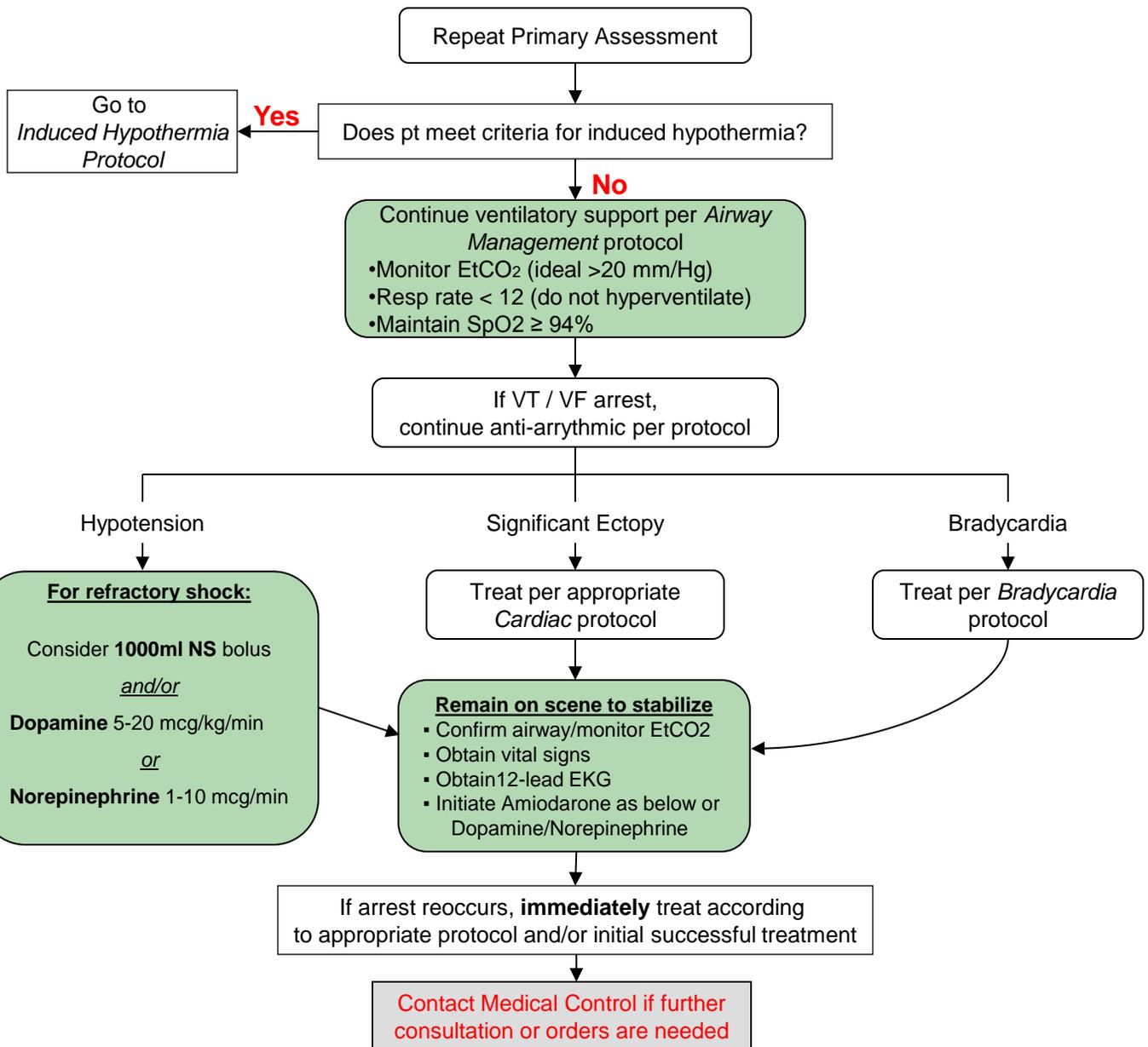
Recognition is Key



¹ Hepatojugular reflux indicates right sided heart failure. With the patient sitting at a 30° angle, palpate the abdomen over the liver lightly, if the jugular veins rise ≈ 4 cm = positive reflux.

- Consider **myocardial infarction** as a cause of pulmonary edema—transport to facility with cardiac catheterization lab.
- In the elderly and recently institutionalized patients consider pneumonia.
- Avoid NTG in patients that have taken Viagra or Levitra in the past 24 hours, or Cialis in the past 48 hours
- Consider the use of quantitative ETCO₂ as a diagnostic tool.

Post Resuscitation



- If upon successful electrical conversion of VF / VT prior to having administered an anti-arrhythmic, give 150mg **Amiodarone** over 10 minutes. Then infuse 1 mg/min (refer to *Protocol Preambles* for further information on Amiodarone infusions).
- Titrate **Dopamine 5-20mcg/kg/min** or **Norepinephrine 1-10mcg/min** to MAP > 80 / SBP > 90 mm/Hg
- The condition of the post-resuscitation patients fluctuates rapidly, they require close monitoring and post ROSC care may be planned with online Medical Control
- Hyperventilation is a significant cause of hypotension by decreasing venous return to the heart in post-arrest patients; this must be avoided at all costs.

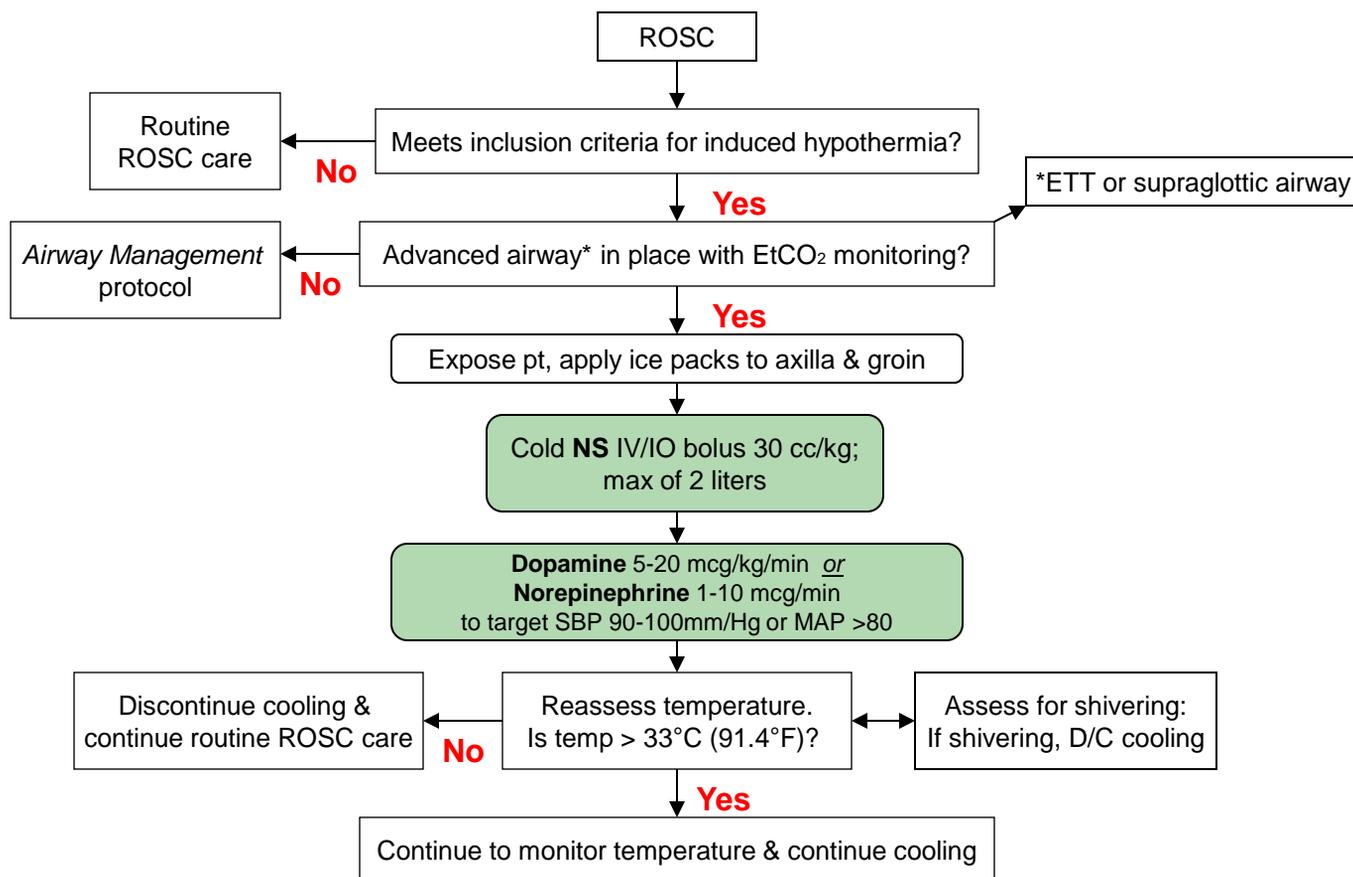
Prehospital Induced Hypothermia (ROSC)

Inclusion Criteria

- 18 years of age & older
- ROSC not related to blunt/penetrating trauma
- Temperature after ROSC > 34°C (93.2°F)
- GCS ≤ 8
- Advanced airway in place with confirmation of placement
- SBP > 90mm/Hg with vasopressor support

Exclusion Criteria

- Neurologically intact after successful resuscitation
- Pregnancy
- Refractory ventricular arrhythmias (VT/VF/Torsades)
- End stage terminal illness
- Pre-existing hypothermia < 34° C
- Obvious recent major surgery



EMS physicians only

If temp is > 33°C (91.4°F) & SHIVERING

EMS physicians only

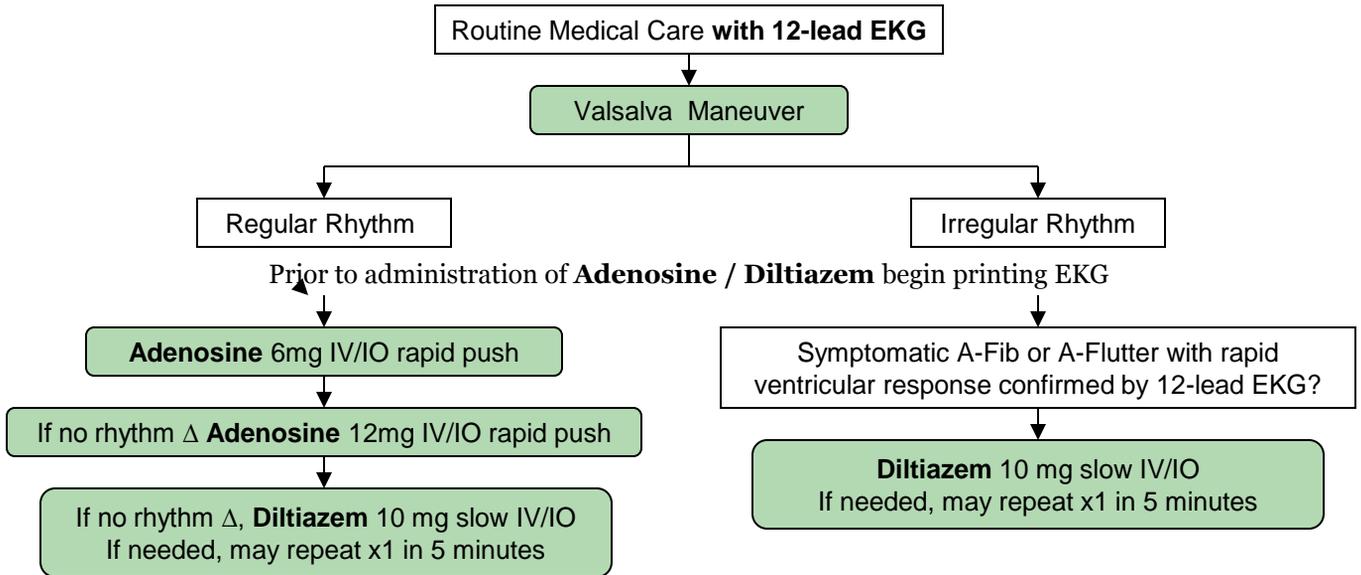
Etomidate 20mg IV/IO & continue cooling

Consider **Vecuronium** 0.15 mg/kg to max 10 mg

- Monitor airway closely between patient movements
- Do not hyperventilate; EtCO₂ > 20 post ROSC
- Once cooling is initiated and pt arrests again, cooling should cease unless ROSC is reestablished
- Patients who are being cooled should be brought to an ED that will continue the treatment, even if it EMS must bypass an ED that will not continue to cool post ROSC patients.

Tachycardia (Narrow Complex)

Stable Narrow Complex >150 bpm (SVT)

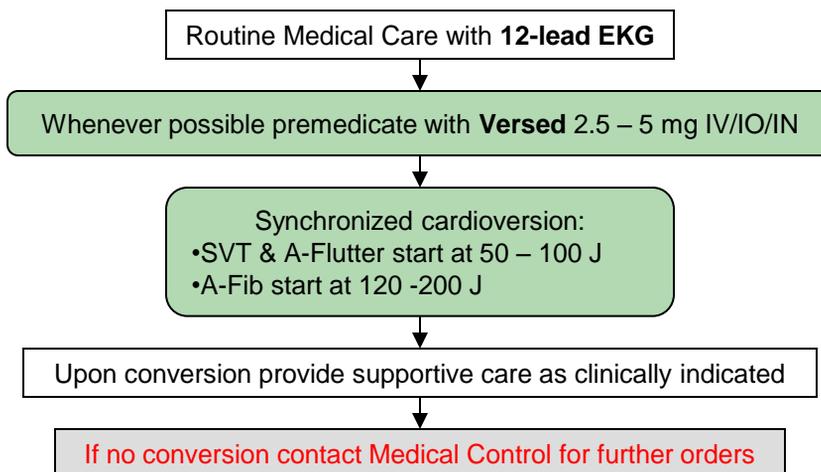


- Despite 12-lead analysis, if still unable to determine whether the rhythm is regular or irregular and the QRS is $\leq .12$ sec, give **Adenosine** 6mg IV as a diagnostic tool to slow the rate.
- Monitor for hypotension with Diltiazem administration.
- Use Adenosine with caution in patients with asthma.

Unstable Narrow Complex > 150 bpm (SVT, A-Flutter / Fib)

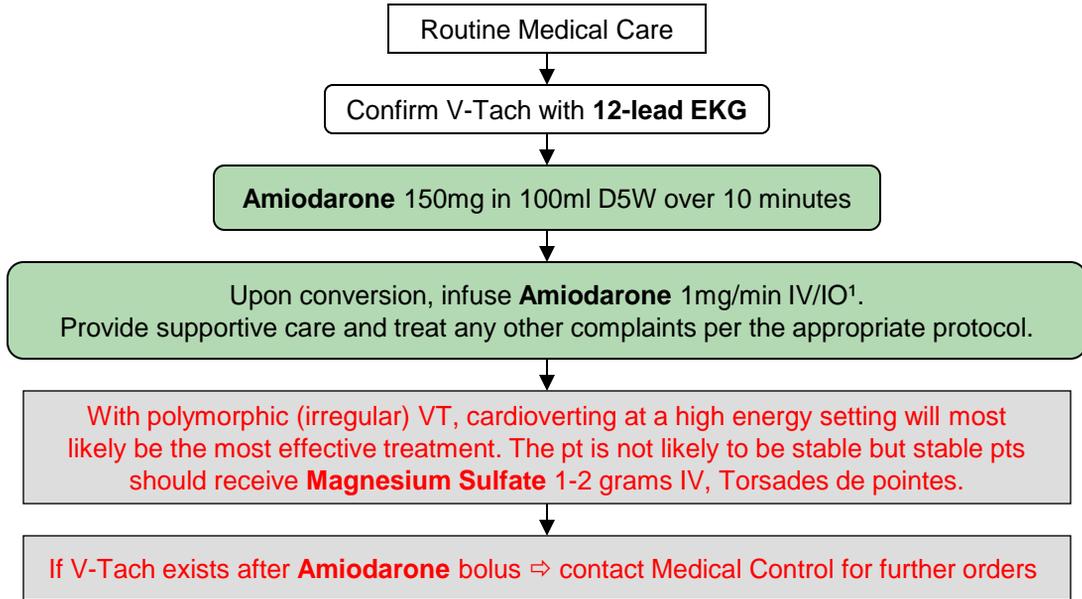
Unstable is recognized as altered mental status, severe hypotension and/or hypoxia

Cardioversion is rarely indicated for rates < 150 bpm



Tachycardia (Wide Complex)

Stable Wide Complex (V-Tach) >150 bpm

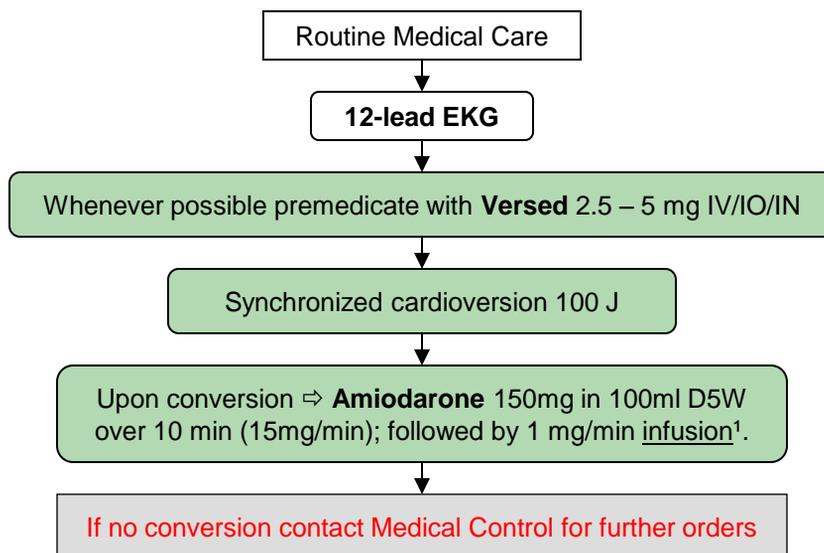


Provided the pt has no hx of WPW, with Medical Control orders, **Adenosine** 6mg may be given to slow the stable wide monomorphic (regular) tachycardia. This should only be done if unable to differentiate SVT vs. VT. This treatment is NOT for unstable, irregular and/or polymorphic wide complex tachycardias as it may lead to VF.

Unstable Wide Complex (V-Tach) > 150 bpm

Unstable is recognized as altered mental status, severe hypotension and/or hypoxia

Cardioversion is RARELY indicated for rates < 150 bpm



¹ Refer to the Adult *Protocol Preambles* for infusion information.

Ventricular Fibrillation / Tachycardia (pulseless)

American Heart Association's *Advanced Cardiopulmonary Life Support (ACLS)* 2010 updates places special attention on the value of chest compressions. New guidelines denote specific times when pausing chest compressions is permissible. Five (5) cycles of CPR is now required before pausing chest compressions to attach EKG/Defib and/or any advanced airway attempt.

Pt apneic and pulseless with down time > 4 - 5 mins,
begin **BLS** CPR for 2 mins prior to rhythm check

Attach defib pads confirm V-Fib / V-Tach

Shock @MAX Joules (*per monitor)

Effective CPR performed PTA?
AED used PTA?
EMS witnessed arrest?

CPR 2 min
•Establish IV/IO access

Shockable rhythm?

No

Highest quality CPR takes
priority over any other
treatment

Yes Shock @MAX Joules

CPR 2 min
•**Epinephrine 1:10,000** 1mg IV/IO q 3-5 min
•Insert advanced airway
•Initiate continuous ETCO₂ monitoring, if available

Shockable rhythm?

No

◆ if a pulse present begin
postresuscitation care.
◆ if asystole go to protocol
◆ electrical activity check
pulse & go to PEA protocol

Yes

CPR 2 min
•**Amiodarone** 300mg IV/IO; after 4-6 min second
dose is 150mg
•Treat reversible causes

Continue 2 min cycles of CPR with rhythm checks

Focus on:

- **Continuous** compressions
- Minimize interruptions (CCF)
- Controlled ventilations
- Compress while charging
- Compress while intubating
- Compress during IV/IO
- Allow proper chest recoil
- Proper compression depth

•First line medications should be given prior to placement of any advanced airway. No longer deliver "cycles" of CPR. Give continuous chest compressions without stopping for ventilations. Pause for ≈ 10 sec q 2 min to verify ECG. Ventilate q 6-8 seconds ≈ 6 - 10 times / min. CPR guidelines are listed in the *Preambles*. The focus is high-quality compressions with a high (>80%) Chest Compression Fraction (CCF). Chest Compression Fraction* is simply a measurement of time spent delivering compressions versus time without compressions occurring. **Higher CCF = higher ROSC**

•Cardiac arrests must be worked on scene for no less than 30 minutes.

•If effective CPR is in progress upon arrival, ALS may be initiated after the first 2 minute cycle of CPR is complete.

•If acidosis is suspected (prolonged down time) **Sodium Bicarbonate** 1mEq/kg IV/IO

•If conversion occurs post **Amiodarone** administration ⇒ Infuse 1 mg / min (refer to the *Protocol Preambles* for further infusion information).

•If upon successful electrical conversion of VF / VT prior to having administered an anti-arrhythmic, give 150mg **Amiodarone** over 10 minutes. Then infuse 1 mg/min (refer to *Protocol Preambles* for further information on Amiodarone infusions).

•**Magnesium Sulfate** 1 – 2 gm only for torsades de pointes.

Routine Trauma Care

- Ensure scene safety & BSI precautions
- Assess the MOI
- Assess ABC's and take appropriate spinal precautions¹
- Airway management, ventilatory assistance as needed & oxygen therapy per *Airway Management* protocol²
- Assess for and begin treating **LIFE THREATENING** injuries
- Determine if pt meets **Trauma Center** criteria

Is the Trauma Center indicated?

Yes

Transport to Trauma Center

Vital signs³ q 5 min

- Establish 2 large bore IV's. If peripheral IV access is unobtainable or for unstable pts, IO access can replace one large bore IV.⁴
- Monitor EKG
- Assess for and treat non-life threatening injuries

Alert Medical Control

No

Perform focused history & physical exam

Stabilize and treat patient as needed

Transport to appropriate facility

¹ According to *Selective Spinal Immobilization* protocol

² Only one intubation attempt is allowed on scene.

³ Vital signs include: blood pressure, heart rate, respiratory rate, pain scale, SpO₂, temperature & GCS.

⁴ Tailor all resuscitation with fluid to clinical setting & suspected etiology of hypovolemic shock

- **Uncontrolled/Internal hemorrhage** should be managed by "balanced resuscitation" (ATLS) ensuring that vital organs are perfused while not over fluid resuscitating the patient interfering with internal hemorrhage control. It is therefore recommended that a systolic BP of < **80mmHg**, a **change in mental status**, or **lost radial pulses** be treated with **250ml** incremental IV boluses enroute to a trauma center.

- **Controlled hemorrhage** should be resuscitated with a crystalloid replacement until normal vital signs are obtained; should hypotension recur, consider additional internal hemorrhage may exist

- Helmets and shoulder pads are **ONLY** to be removed IF they interfere with securing an airway or the ability to perform chest compressions.

- If the pt is or becomes pulseless, proceed to the appropriate pulseless protocol.

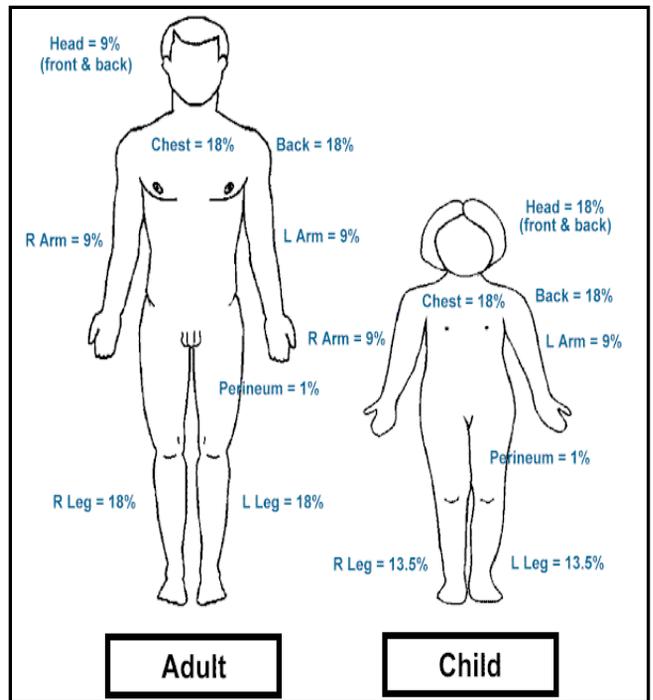
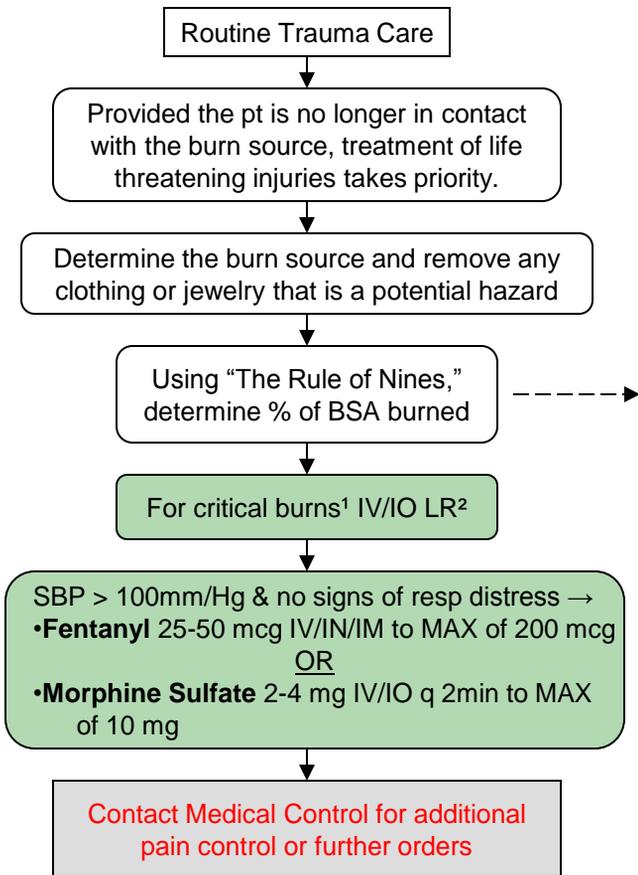
- Communication Center will transmit a solid tone for 3-5 seconds once scene times reach 8 minutes on appropriate calls.

- Standard of Care is an on scene time NOT > 10 min. Make every effort possible to not take the entire 10 minutes.

- **Tension Pneumothorax** – air escapes into pleural spaces and cannot reenter the lung which is the reason affected structures shift away from the affected lung. The shift displaces the trachea, heart, aorta, inferior and superior vena cava decreasing venous return which causes PEA. A simple pneumothorax is accompanied with decreased or absent breath sounds and is not an indication for chest decompression. **Medical Control consultation on Needle Decompression may be considered, but is not required, especially when the patient is in cardiac arrest with penetrating trauma.** The following are common signs and symptoms of Tension Pneumothorax: deviation of trachea, tachycardia, tachypneic, JVD, absent breath sounds on the affected side, progressively increasing respiratory distress (harder to ventilate patient) and hypotension. Should clinical presentation dictate a tension pneumothorax and MedControl is unable to be reached, proceed with the treatment.

- If a **field amputation** is needed **contact the Trauma Center** as early as is possible to allow for resource mobilization.

Burns



- For minor soft tissue burns involving < 20% BSA, apply moist sterile dressing. All moist or wet dressings must be covered with at least a burn sheet.
- For thermal burns > 10% BSA use dry sterile dressings.

Chemical burns are uncommon but do still occur especially in the industrial settings of our region.

- If safety permits, remove any clothing & brush off any residue that may still be present. REGARDLESS OF THE EXTENT OF INJURY flush the patient with copious amounts of water for no less than 20 minutes. This will make certain the burning has stopped and aid in decontaminating the patient. Flushing should not be done in the ambulance.
- If patient care can be SAFELY DELIVERED, it may be done so during this time. The SAFETY OF THE EMT'S AND HOSPITAL STAFF TAKE PRIORITY. Serious injury or death to the EMS crew could result from transporting improperly decontaminated patients in the confines of their ambulance. Furthermore, ED staff could become exposed if pts are not decontaminated prior to transport.

¹ Critical Burns > 20% Body Surface Area (BSA) having any 2° and/or 3° burns; any burns to the perineum, face and/or circumferential burns.

² Fluid given in burns is done according to Parkland Formula: 4 x patient's weight (kg) X % BSA burned. 50% of that answer should be infused in the first 8 hours.

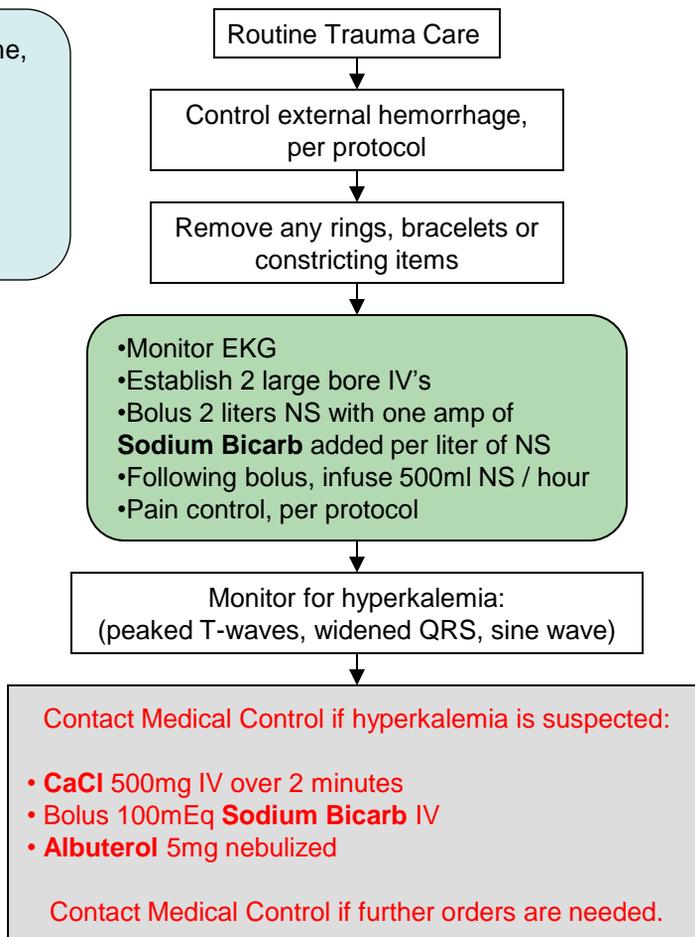
- When both arms are burned and IV access is needed, use the veins of the feet or one external jugular.
- If the incident occurs at an industrial site obtain an MSDS sheet when possible.

Crush Injury / Syndrome (>2 hours)

- Crush Injury – compression of extremities or other major muscle groups causing muscle swelling and/or neurological impairment
- Crush Syndrome – systemic manifestations of crush injury due to traumatic rhabdomyolysis & the release of potentially toxic cell components & electrolytes . This may lead to lethal dysrhythmias, hyperkalemia, hypocalcemia, renal failure, local tissue injury or death. More likely with multiple crushed limbs. Crush syndrome may also lead to AMS and hypotension.

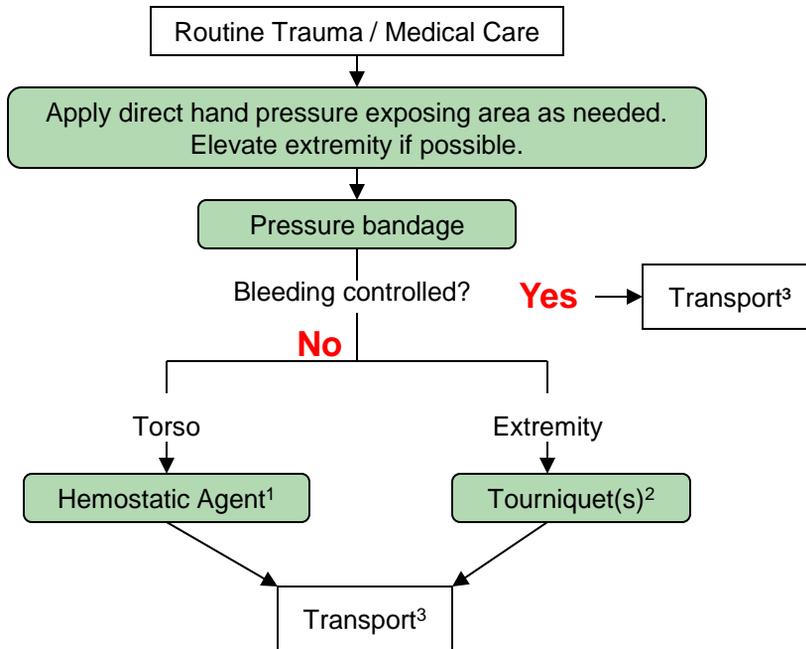
Compartment Syndrome, signs & symptoms:

- pain
- parasthesias
- pallor
- paralysis
- pulselessness



- Monitor the air quality for confined space rescue
- Monitor the patient closely during extrication
- Large volume fluid resuscitation is required to avoid renal failure and death.
- Do not overlook other potential injuries

Hemorrhage Control

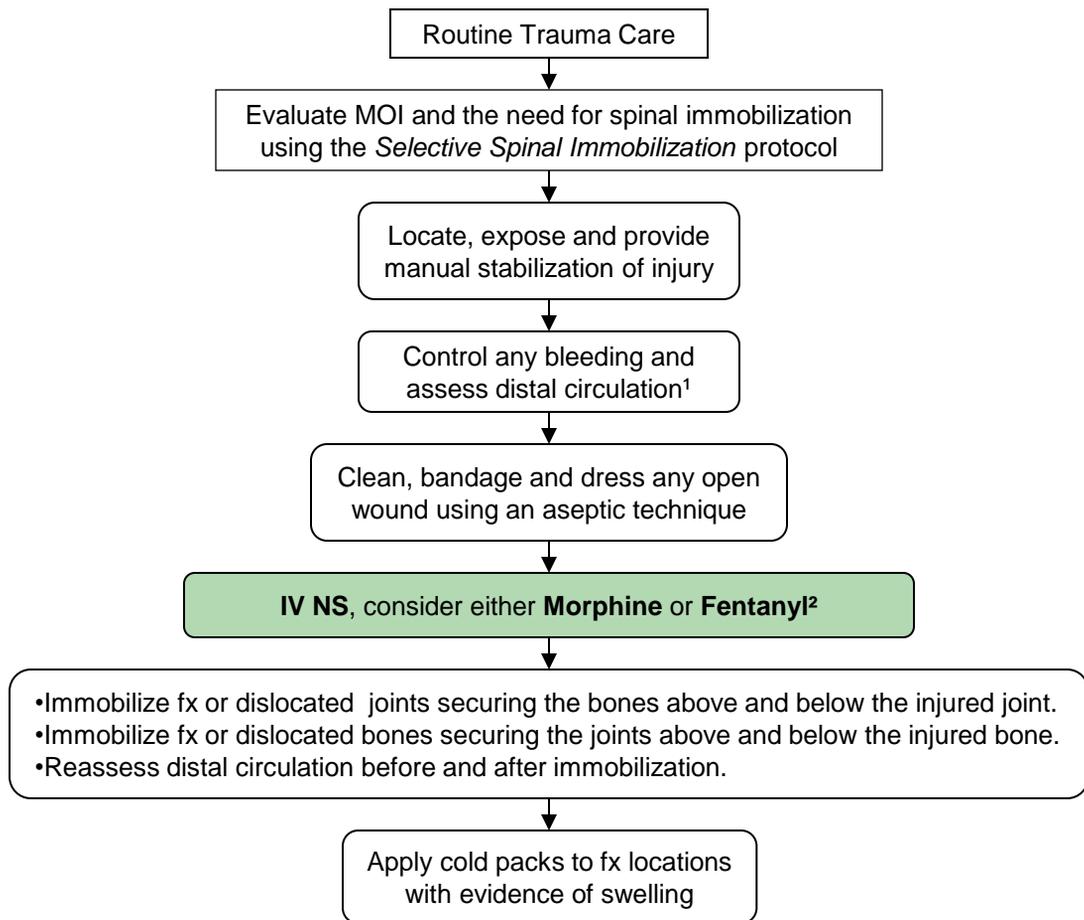


¹ Use Hemostatic agent per manufacturer's protocol.

² Tourniquets should be used only in potentially life threatening hemorrhage when direct pressure fails to control bleeding. Apply proximal to wound as per manufacturer's protocol. Cut away clothing prior to application so that tourniquet is visible. Mark "TK" and time of application on a piece of tape, then secure to the tourniquet. Notify receiving ED staff of tourniquet placement upon ED arrival. If hemorrhage is **not controlled** with one tourniquet, **apply a second tourniquet** just proximal to the first one.

³ If amputation, gently wash severed part with sterile saline to remove debris. Wrap severed part in sterile gauze moistened in sterile saline and place in transport container. Place transport container on ice (if available) for transport to receiving ED (amputated part should not come in direct contact with ice).

Open Wound / Fracture / Dislocation Protocol



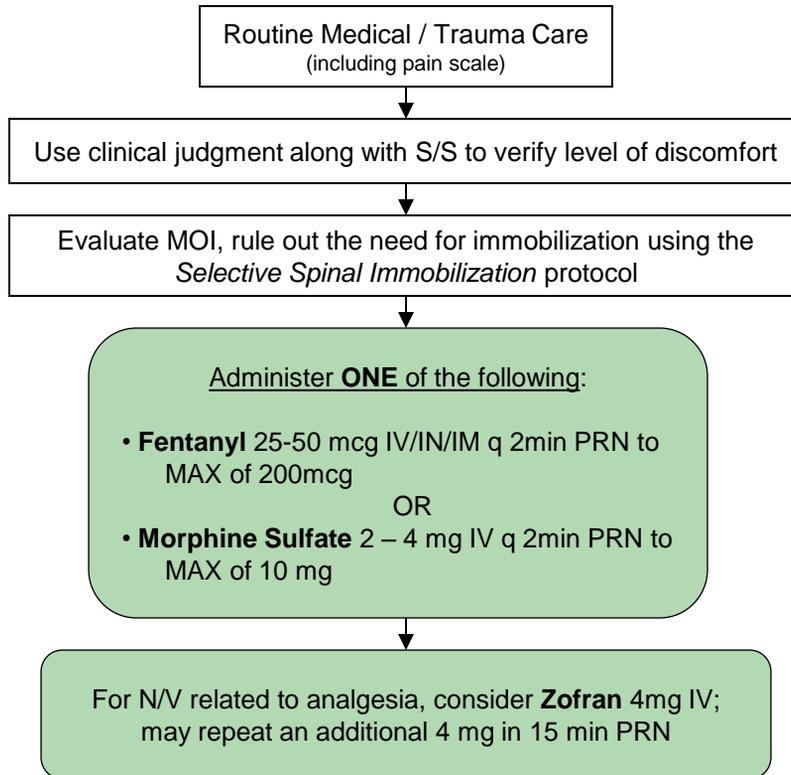
¹ If **NO** distal circulation is present (no distal pulse, no capillary refill, cyanosis) make **ONE** attempt to reposition the fx or dislocation in hopes of restoring distal circulation.

² **Morphine and Fentanyl** should be administered as indicated in the *Pain Management* Protocol.

- This protocol is developed for use on stable patients with complaints of an isolated fracture or dislocation.
- Patients suspected of pelvis & femur fractures should be monitored closely for signs and symptoms related to shock.
- Never reintroduce an exposed bone (open fx) back into the skin unless vascular compromise is present.
- For suspected hip fractures / dislocations, immobilize in the position found. Consider using the sheet papoose method of immobilization.

Pain Management (non-cardiac)

PAIN rated > level 5 is considered a distracting condition → prudent cervical spinal immobilization should be considered.



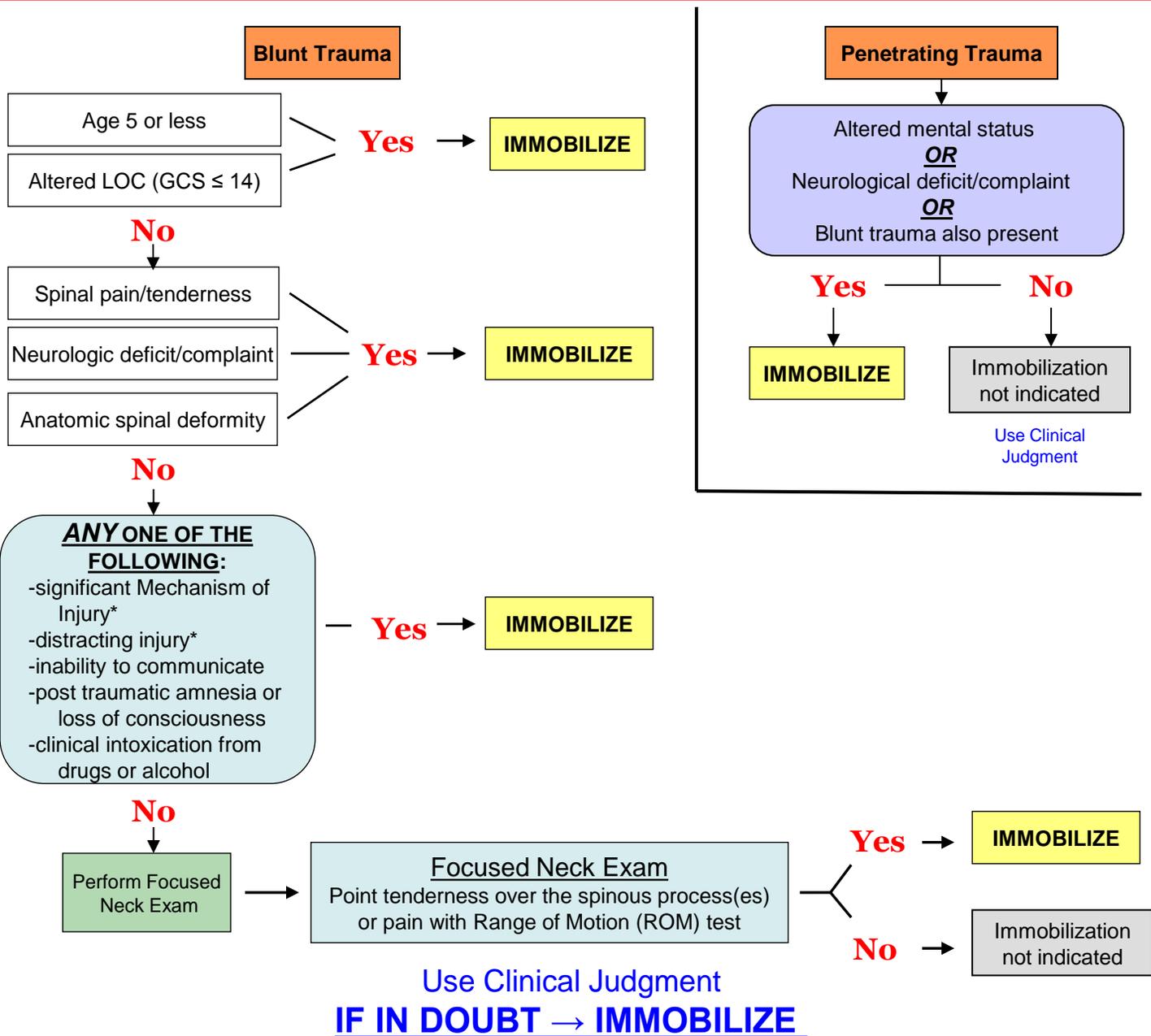
Obviously, these patients must be transported to the ED.

This standing order is to address pain in the following situations:

- isolated extremity fracture with deformity
- burns *** see *Burn* protocol
- obvious dislocations with severe pain
- cancer patients and patients with other co-morbid illnesses who manage pain at home

- **Pain control cannot be given for complaints of head or abdominal pain unless ordered by Medical Control.**

Selective Spinal Immobilization



* **distracting injury** – any painful injury that might distract the patient from the pain of a c-spine injury; pain > 5 is a distraction.

* **significant MOI** – is determined by sound clinical judgment.

• Rule of thumb – if you spend any length of time thinking whether or not you should immobilize a patient → then you probably should.

• Long spine boards (LSB's) have both risks & benefits, and have not been shown to improve outcomes. The best use of LSB's may be for extricating an unconscious patient or providing a firm surface for chest compressions. Utilization of the LSB should follow consideration of the individual patient's risk vs. benefit, including patients with blunt trauma & distracting injury, intoxication/altered mental status, or neurologic complaint, and non-ambulatory blunt trauma patients with spinal pain, tenderness, or spinal deformity.

• **Ambulatory patients with blunt trauma but no major injuries or co-morbidities may not need to be immobilized—perform focused neck exam, assessment, and use good clinical judgment. If they do not require LSB immobilization they may have a cervical collar placed and have spinal precautions taken to include ensuring minimal patient movement and being tightly secured to the stretcher, and/or manual in-line stabilization.**

Trauma Center Protocol

The recognition of major trauma and the decision to be rendered by Medical Control to transport the patient to designated trauma facility will supersede patient choice without consideration of patient finances.

Anatomic Criteria

- Penetrating injuries to the head, neck, torso or extremities proximal to the elbow and knee.
- Flail chest
- Two or more proximal long bone fractures
- Crush, degloved, or mangled extremity
- Pelvic fracture
- Open or depressed skull fracture
- Limb paralysis
- Amputation proximal to the wrist or ankle
- Combination of mechanism of trauma associated with burns

Physiologic criteria

Assess V/S & LOC

- Glasgow Coma Scale <14
- SBP <90 mm/Hg (<60 in peds)
- Respiratory rate <10 or > 29/min or
- Revised Trauma Score <11
- Pediatric Trauma Score <9

Trauma Center Medical Control must be called for every trauma activation and anytime it becomes unclear whether or not a patient is a candidate for the trauma center.

If the patient meets trauma criteria but has one of the below or online Medical Control feels it is in the patient's best interest to stop at a closer facility, Medical Control may direct patient transport to the closest ED for appropriate stabilization followed by expeditious transfer to the trauma center.

- non-patent airway (can this be corrected by OPA, BVM and O₂?)
- tension pneumothorax
- transport time > 50 minutes to trauma center

The patient in traumatic cardiopulmonary arrest not meeting adult traumatic termination criteria will be transported to the closest appropriate Emergency Department for evaluation and treatment.

Adult Traumatic Prehospital Termination of Resuscitation

Adult Traumatic Prehospital Termination of Resuscitation

The patient must meet all of the following criteria and the Trauma Center Medical Control must be contacted.

- Age ≥ 18
- Victim of blunt or penetrating trauma
- Apneic and pulseless with EKG that shows asystole or PEA < 40

Pediatric Preambles

The American Heart Association's recommended age group classifications will be adopted for use within these protocols.

- an infant is less than one year of age
- a child is one year of age to an adolescent (known by secondary sex characteristics; ≈12-14 years of age)
- adolescent is considered an adult for the purpose of treatment

Most pediatric emergencies are a result of respiratory collapse, congenital heart disease or shock. Early recognition and aggressive treatment is priority in the treatment of pediatrics. The most common cause of cardiac arrest is most often from respiratory failure or shock, known as asphyxial arrest.

PALS divides shock into 3 separate categories: compensated, inadequate end organ perfusion, and decompensated.

Compensated:

- cool extremities
- normal BP
- prolonged capillary refill
- tachycardia
- weak peripheral pulses still having central pulses

Inadequate end organ perfusion (all of the above plus...)

- decreased urine output
- depressed mental status
- metabolic acidosis
- tachypnea
- weak central pulses

Decompensated (late sign; near organ failure) both the above stages plus...

- hypotension

Vital Signs

In assessing vital signs, capillary refill, combined with another assessment tool is an adequate indicator of perfusion. The formula used to approximate blood pressure remains the same, $70 + (2 \times \text{age in years})$, and should be used for treating hypotension or shock. When fluid is needed, 20 ml/kg can be administered. This can be repeated two more times for a total of 60 ml/kg; isotonic fluids only. When treating patients for shock, a fluid bolus of 20 ml/kg (10 ml/kg for neonate) should be given even if the patient has a normal blood pressure.

Airway / Ventilation

When selecting oral airways make certain the correct size is being used. Oral airways that are too small will not keep the tongue from occluding the airway; if they are too large it can obstruct the airway. Studies show out-of-hospital use of BVM's can be as effective as, and safer than, ventilating via an ETT for short transports. As a general rule apneic patients should still be intubated. In cardiac arrest, patients tend to be over ventilated which can have paradoxical effects. Ventilating with excessive tidal volume increases intrathoracic pressure and reduces venous return, which reduces cardiac output, and can also cause barotrauma. Excessive minute volume or ventilatory rate will also decrease cerebral blood flow and coronary perfusion, thereby working against resuscitative efforts. Proper ventilation with controlled peak inspiratory pressure will also keep GI distension to a minimum, which will also reduce the risk of aspiration. Pediatric assessment tape is recommended to assist with proper tidal volumes & ventilatory rates.

ET intubation is our standard of care, especially in a cardiac arrest situation. As a general rule of thumb, patients between the ages of 1 and 10 should be intubated with an uncuffed ETT. The size of the ETT is determined by the patient's age in years / 4 + 4 = ETT (uncuffed) size in mm. It is very important that the uncuffed ETT is properly sized to ensure minimal air leaking and maximal airway protection; therefore, if the tube is too small you should consider using a larger one provided it is a prudent choice to do so using sound clinical judgment. Cuffed ETT are recommended for use in the ages above 10 years.

Confirmation of ETT placement is accomplished using the same methods in adult ETT confirmation. Capnography (electronic ETCO₂ monitoring) is the "gold standard" of airway placement confirmation, monitoring, & documentation. ETCO₂ monitors may give low readings for the first few minutes in a cardiac arrest, but as CPR increases circulation & cellular perfusion ETCO₂ values should increase in a patient with a viable downtime. The presence of any ETCO₂ value and/or waveform gives evidence of airway confirmation. **NOTE: ETCO₂ also often gives the first indicator of ROSC, as evidenced by an abrupt & sustained rise in ETCO₂.**

Suctioning is a necessary skill in airway protection, but keep in mind that it works against oxygenation efforts & can cause damage if the catheter comes in contact with tissue. Therefore, if suctioning is needed, the duration of suction efforts should be limited, and a max suction force should be between 80 and 100 mm/Hg.

Listed below are the common signs and symptoms associated with respiratory distress, failure, and arrest. This list was taken from the National Association of Emergency Medical Services Physicians. These can be referenced when assessing the respiratory status in pediatrics¹.

Respiratory distress:

- able to maintain sitting position (children older than four months)
- alert, irritable, anxious
- audible wheezing
- central cyanosis that resolves with oxygen administration
- intercostals retractions
- mild tachycardia
- nasal flaring
- neck muscle use
- respiratory rate > than normal for age
- stridor

Respiratory failure: involves the above findings with any of the following:

- central cyanosis
- decreased muscle tone
- increased respiratory effort at sternal notch
- marked tachycardia
- marked use of accessory muscles
- poor peripheral perfusion
- retractions, head bobbling, grunting
- sleepy, intermittently combative, or agitated

Respiratory arrest: involves the above findings with any of the following:

- absent breath sounds
- absent or shallow chest wall motion
- bradycardia or asystole
- limp muscle tone
- respiratory rate slower than 10 breaths per minute
- unable to maintain sitting position (> 4 yrs of age)
- unresponsive to voice or touch
- weak to absent pulses

¹ Brown K. Model Pediatric Protocols 2003 *National Association of EMS Physicians* 2003.

Chest Compressions

In light of AHA's 2010 Guidelines, an increased focus is to be placed on immediate, effective, continuous, & minimally interrupted chest compressions in both the adult & pediatric patients. Despite the likelihood of an asphyxial origin of arrest in the pediatric patient, compressions are to be started immediately as there is virtually no set-up time. Even basic airway equipment requires some set-up time for sizing & deployment. Therefore, the first cycle of chest compressions should be initiated without delay, while allowing time (approx. 18 sec. for first cycle) for basic airway equipment set-up/sizing. This simple logic effectively changes our focus from Airway, Breathing, & Circulation (ABC's) to Circulation/Compression, Airway, & Breathing/Ventilation (CAB's).

Chest compressions should be performed at a rate of at least 100 per minute. To achieve effective chest compressions, compress at least one third of the anteriorposterior diameter of the chest. This corresponds to approximately 1½ inches (about 4 cm) in most infants and about 2 inches (5 cm) in most children. Before the next compression is delivered the chest must fully recoil from the previous compression.

Continue chest compressions while the defibrillator is charging. Pause compressions just before the shock is delivered to ensure the best chance of conversion. **NOTE: The chest compression/ventilation ratio for the neonate is 3:1 to increase focus on ventilation rate, unless there is evidence of a cardiac origin where the ratio reverts back to 15:2.**

In symptomatic bradycardia, chest compressions should start when the heart rate is less than 60 beats per minute.

Vascular Access

Intraosseous access is just as effective as IV access in pediatrics. IO access should be obtained early for unstable and/or symptomatic children. Therefore, it is unacceptable to take multiple IV attempts in a critical pediatric patient. In cardiac arrests, the intraosseous (IO) access is preferred. With IO access only isotonic fluids should be used.

Medications

Adenosine	0.1 mg/kg (max 6mg) IV/IO	repeat 0.2 mg/kg (max 12mg)
Amiodarone	5 mg/kg IV/IO	repeat 15 mg/kg max 300 mg
Atropine	0.02 mg/kg IV/IO	repeat x 1 minimum dose 0.1mg Max single dose Child 0.5mg Max single dose Adolescent 1 mg
Ca Chloride	20 mg/kg IV/IO	slow IVP (not proven helpful in cardiac arrest).
Epinephrine	0.01 mg/kg (1:10,000) IV/IO	repeat q 3 – 5 minutes
Glucose	0.5-1 g/kg IV/IO	D25W : 2-4mL/kg D50W: 1-2mL/kg
Magnesium	25-50 mg/kg IV/IO over 10-20 min; faster in torsades	Max dose 2 g
Narcan	0.1 mg/kg IV/IO (cardiac arrest 1 - 2mg IV/IO)	
Sodium Bicarb	1 mEq/kg of 8.4 % solution IV/IO	
Zofran	0.1 mg/kg	for N/V

Defibrillator / Cardioversion Settings

Defibrillator pad placement – white pad just left of the sternum, the other (red) pad on the upper back just below the scapula.

Adult defib pads are generally used on all pediatric patients > 10 kg. However, refer to your device's guidelines.

Energy Settings

Biphasic and monophasic settings are the same.

- In V-Fib / Pulseless V-Tach (no stacked shocks) the first defib is 2 J/kg; with the second and each shock thereafter at 4 J/kg.
- After the 2nd shock, Epi 1:10,000 0.01mg/kg q 3-5 min
- For refractory VF/VT, give Amiodarone 5 mg/kg again but give it before the next shock in sequence.
- Cardioversion energy settings for monophasic and biphasic are the same.

Notations and Reference

Glasgow Coma Scale

	Child	Infant	Score
Eye Opening	Spontaneous	Spontaneous	4
	To Speech	To speech	3
	To pain only	To pain only	2
	No response	No response	1
Best Verbal Response	Oriented appropriate	Coos & babbles	5
	Confused	Irritable cries	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
	No response	No response	1
Best Motor Response	Obeys commands	Moves spontaneously & purposefully	6
	Localizes commands	Withdraws to touch	5
	Withdraws in response to pain	Withdraws in response to pain	4
	Flexion in response to pain	Abnormal flexion posture to pain	3
	Extension in response to pain	Abnormal extension posture to pain	2
	No response	No response	1

APGAR

An APGAR score is required at 1 and 5 minutes postpartum.

Clinical Sign	0 (zero)	1 point	2 points
Appearance	Blue or pale	Pink body with blue extremities	Completely pink
Pulse	Absent	Below 100	Over 100
Grimace	No response	Grimaces	cries
Activity	Limp	Some flexion	Active motion
Respiratory	Absent	Slow; irregular	Good, strong cry

A score of 7 – 10 is associated with coughing and crying within seconds of delivery. Newborns with this score typically do not require any further resuscitation.

A score of 4 – 6 are moderately depressed. They will typically appear pale or cyanotic and have respiratory complications and flaccid muscle tone. These newborns will require some type of resuscitation efforts.

Term Newborn Vital Signs

Heart rate 120 – 160

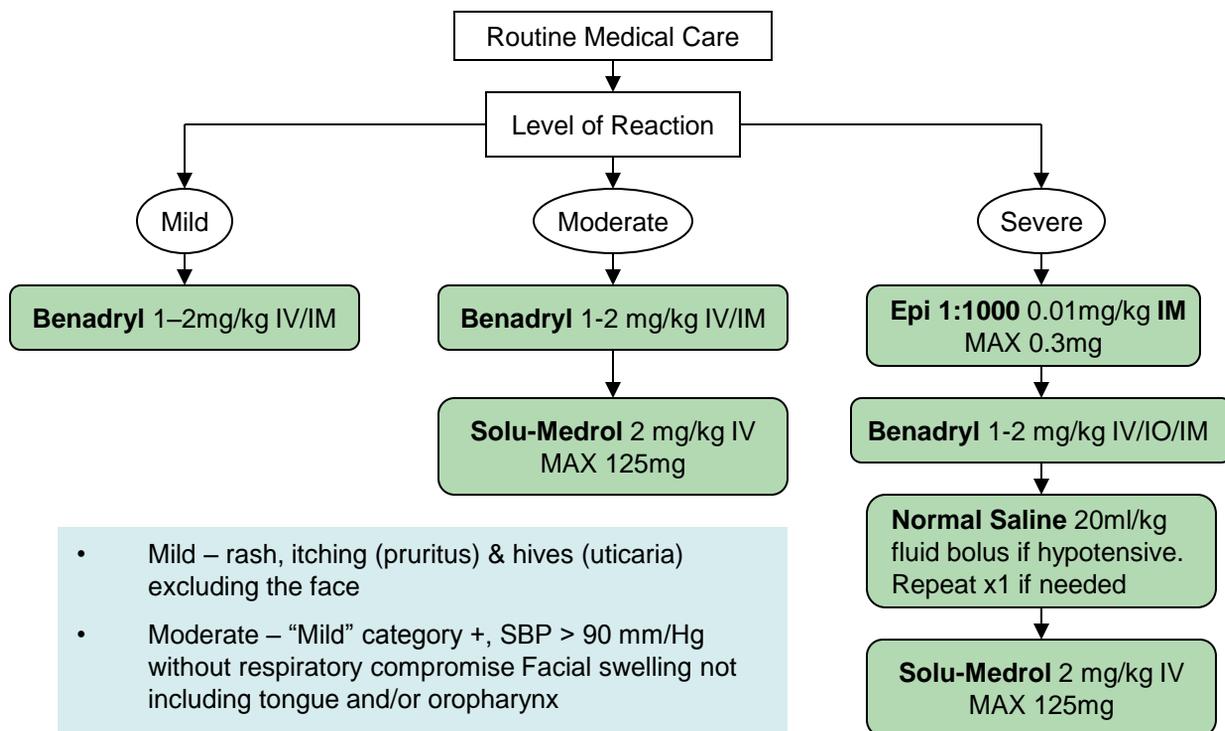
Respiratory rate 30 – 60

SBP 56 – 90 mm/Hg

DBP 26 – 56 mm/Hg

Pediatric Allergic Reaction / Anaphylaxis

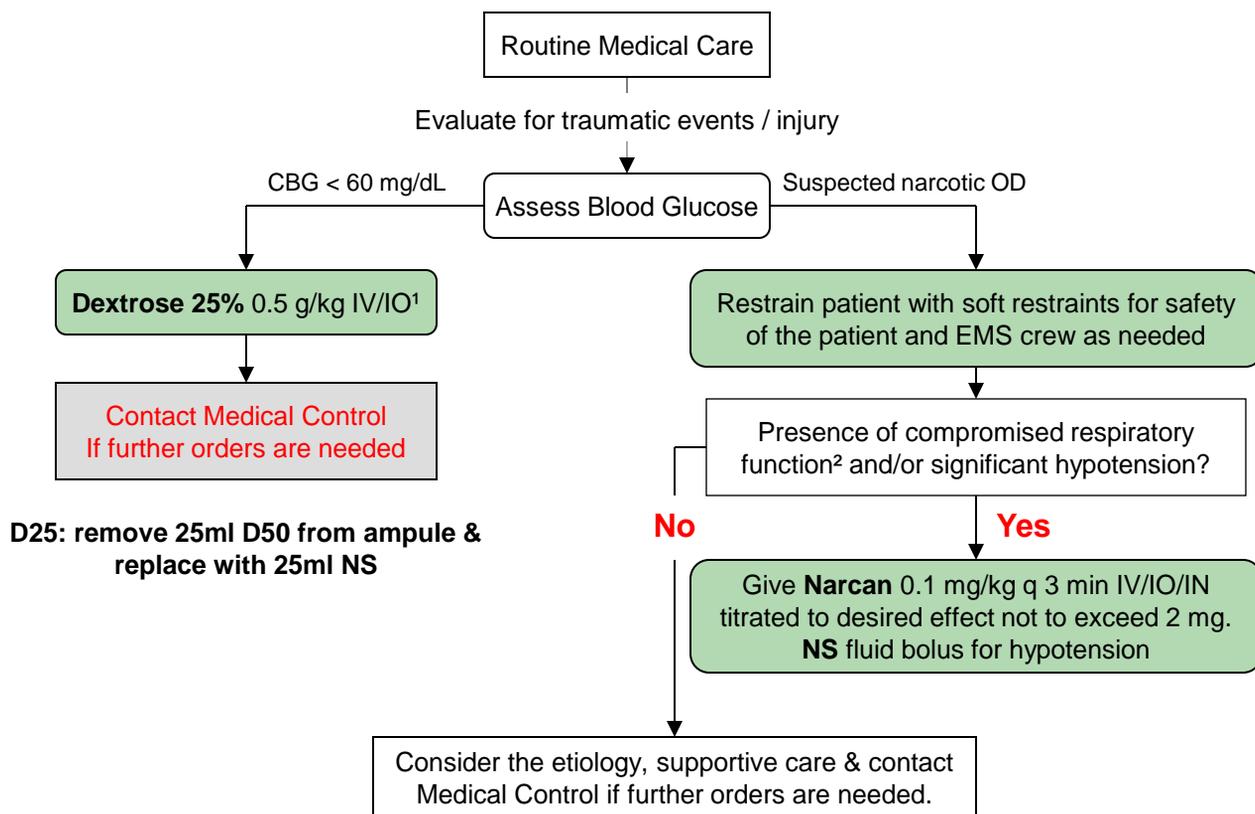
Consider anaphylaxis when responses from 2 or more body systems (cutaneous, respiratory, cardiovascular, neurological, or GI) are noted. Cardiovascular and respiratory systems may not always be involved in anaphylaxis.



- Mild – rash, itching (pruritus) & hives (urticaria) excluding the face
- Moderate – “Mild” category +, SBP > 90 mm/Hg without respiratory compromise Facial swelling not including tongue and/or oropharynx
- Severe – systolic B/P < 90 mm/Hg with respiratory compromise, angioedema, wheezing

- Consider immediate drug therapy prior to IV/IO access in critically ill patients.
- Treat any wheezing or “chest tightness” as indicated in *Reactive Airway Disease* protocol.
- **Epi 1:1000 IM should be the 1st line treatment in severe reactions / anaphylaxis**

Pediatric Altered Mental Status



◆ Patients with traumatic injuries whose mental status remains altered following this outlined treatment should be transported to a hospital that has neurology services and a *functional CT scanner*.

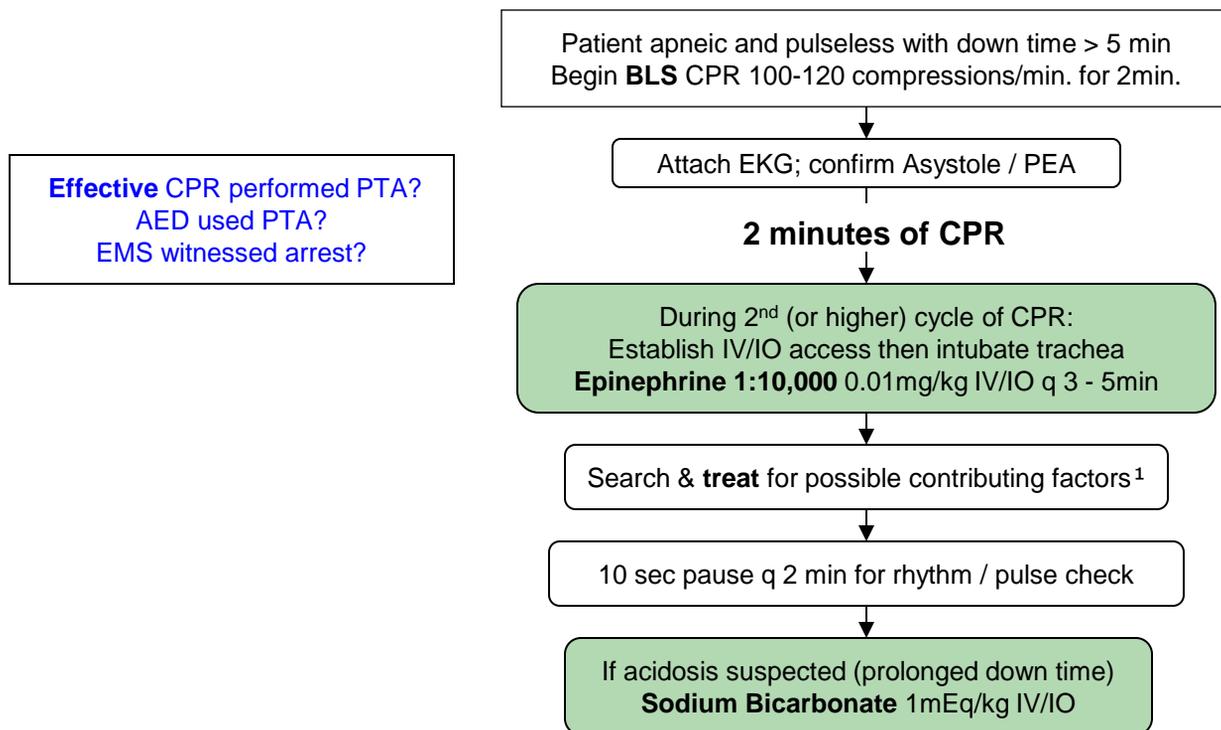
¹ Providing there is no risk of aspiration or airway compromise related to the patient's mental status, oral carbohydrates along with oral glucose may be used in the place of IV/IO Dextrose. This includes the use of products found in the patient's home. Patient's with capillary glucose levels < 60 mg/dL who present with an altered mental status, or are unable to maintain their own airway, can receive IV **Dextrose** under standing order.

² SpO₂ < 94 %, shallow respiration, unable to maintain own airway, respiratory rate ≤ 10 / min and/or age appropriate symptomatic hypotension.

• For known Tricyclic antidepressants (ie amitriptyline, elavil) or Phenobarbital OD (s/s include resp depression, wide QRS, focal seizures, AV blocks, vent arrhythmias), consider **Sodium Bicarbonate** 1mEq/kg IV/IO with Medical Control orders.

Pediatric Asystole / P.E.A.

American Heart Association's *Pediatric Advanced Life Support (PALS)* 2010 updates place special attention on the value of chest compressions. New guidelines denote specific times when pausing chest compressions is permissible. Two (2) minutes of CPR is now required before pausing chest compressions to attach ECG/Defib and/or any advanced care.



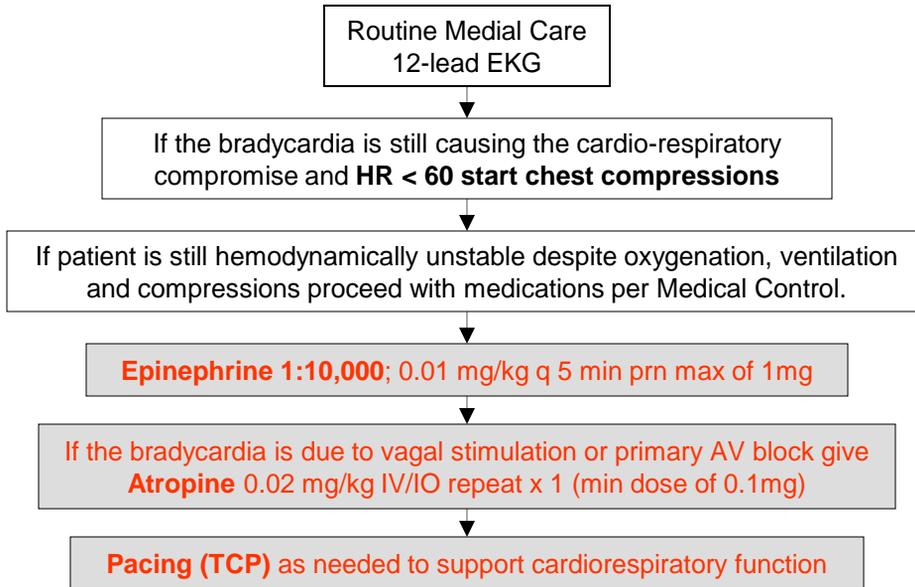
¹ Contributing Factors:

- Hypoglycemia – treat with **Dextrose 25 or 50%** (according to patient's age)
- Hyperkalemia – **Calcium Chloride 20mg/kg IV/IO** for known hyperkalemia
- OD - of tricyclic antidepressants **Sodium Bicarb 1 mEq/kg IV/IO** and/or **Narcan 0.1mg/kg IV** for narcotic OD
- Tension pneumothorax - **Needle Decompression**
- Hypothermia – avoid rigorous movement of patient; especially if pt regains pulse. Excessive movement could cause V-Fib or V-Tach (rare).
- Hypovolemia – **Fluid bolus** (20ml/kg repeat prn); max 60ml/kg (10ml/kg neonate)
- After advanced airway is placed (per protocol), no longer deliver “cycles” of CPR.
- Before the pt is intubated, do not ventilate during chest compressions. Ventilation rate is ≈ 14-18 times/min (q 8-10 sec)
- Upon arrival 2 minutes of CPR (BVM with OPA) must be completed before ANY ALS begins
- If upon arrival effective chest compressions are being performed (100/min that allow time for recoil for at least 2 min) ALS can be initiated; assuming CPR does not stop. CPR guidelines are listed in the Preambles.

Pediatric Bradycardia

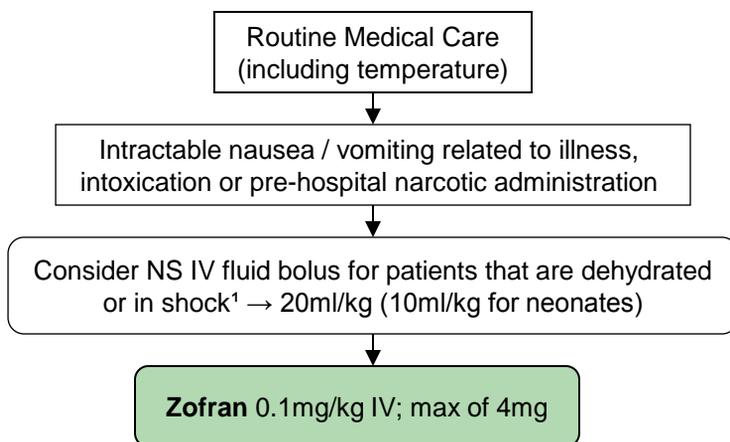
Patients with cardio-respiratory compromise related to bradycardia should be treated in this protocol. The primary determining factor guiding patient care is hemodynamic stability. Bradycardic patients who are perfusing well, and are in no respiratory compromise, usually do not require emergency treatment.

Address Hypoxia



Significant bradycardia is defined in *PALS* as, a heart rate less than 60 bpm with poor systemic perfusion. This requires aggressive treatment as bradycardia is the most common rhythm just before cardiac arrest. Treatment needs to be geared to reversing the hypoxia and hypotension. Use caution when intubating and suctioning these patients - excessive vagal stimulation can cause further bradycardia.

Pediatric Nausea / Vomiting & Dehydration



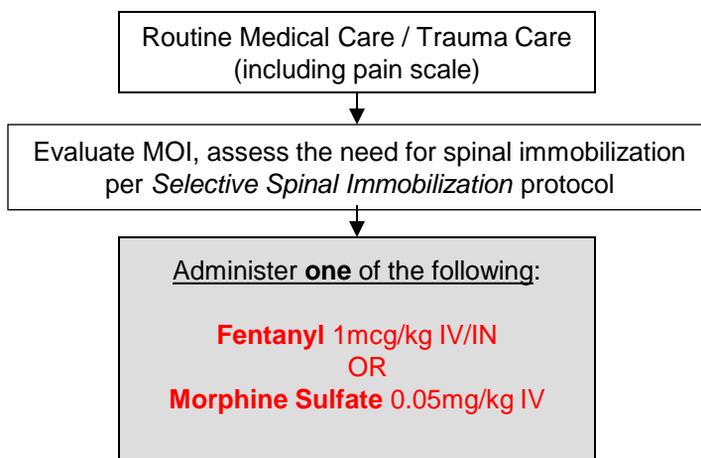
¹ Assess for signs and symptoms of dehydration: tachycardia, weak peripheral pulses, capillary refill > 2 seconds, sunken fontanel, skin turgor < 2 seconds, cool extremities, or lethargy. See *Pediatric Preambles* for further information.

- Approximate blood pressure estimate: $70 + (2 \times \text{age in years})$

Revised July, 2013

Pediatric Pain Management (non-cardiac)

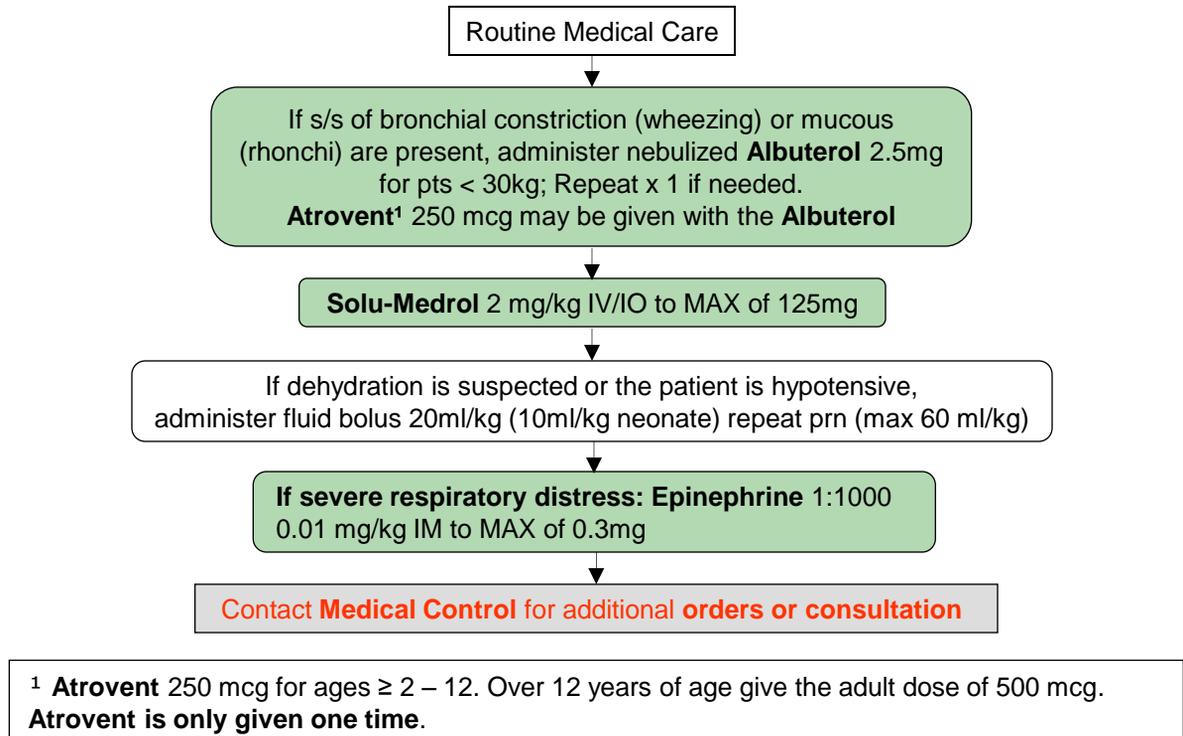
All pain medications given to pediatrics MUST be done so with orders from Medical Control!



- Have Narcan readily available to treat narcotic induced respiratory depression.
- Refer to Wong-Baker FACES of pain rating scale found in the *Adult Protocol Preambles*.

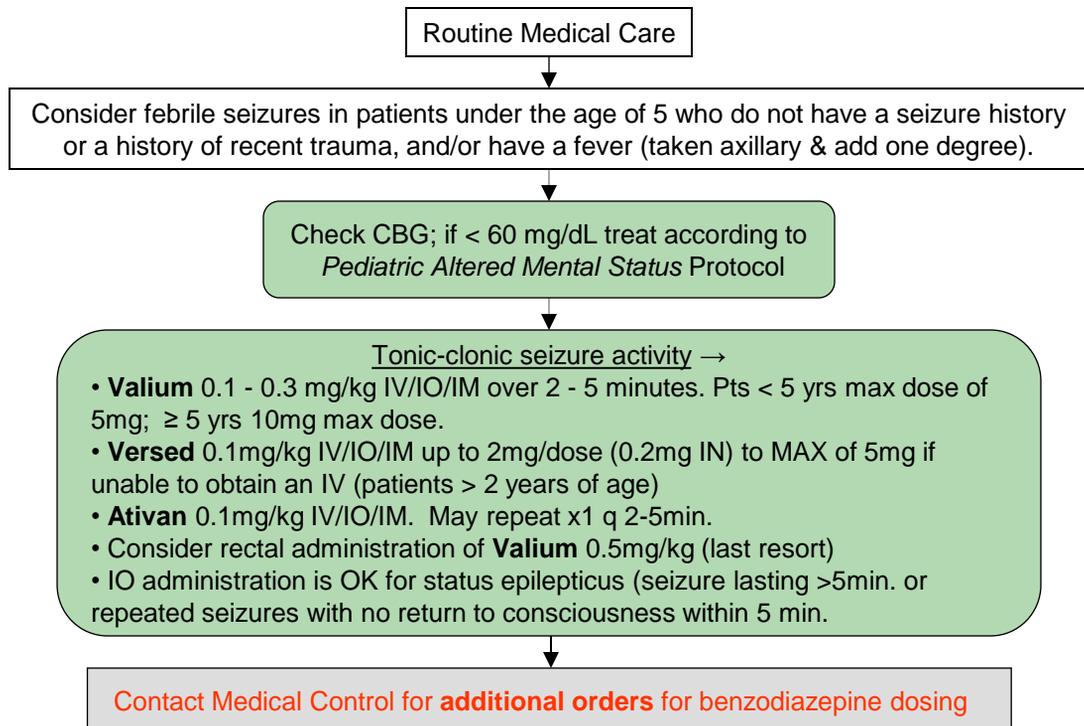
Revised July, 2013

Pediatric Reactive Airway Disease



Revised July, 2013

Pediatric Seizure

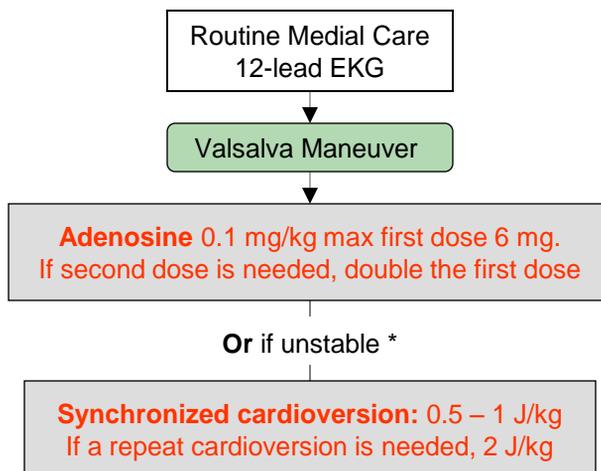


Febrile seizures – normally occur as result of a rapid increase in body temperature or fever. Febrile seizures occur in 2% - 3% of children between the ages of 3 months and 5 years of age. If pt has a hx of febrile seizures they often reoccur with subsequent spikes in fever.

Revised July, 2013

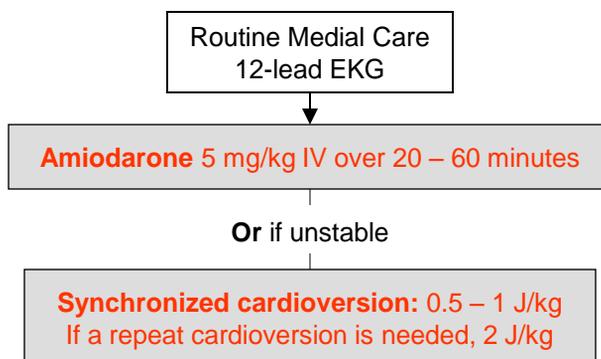
Pediatric Tachycardia

Narrow Complex Tachycardia (QRS \leq 0.08 seconds)



- In infants SVT is usually $> \approx$ 220 bpm and usually goes undetected until the patient is critical.
- In children SVT is usually $> \approx$ 180 bpm. Often complain of dizziness, chest discomfort, or become lightheaded.
- This age group will often say their heart feels as if it is racing.

Wide Complex Tachycardia (>180 bpm QRS $>$ 0.09 seconds)

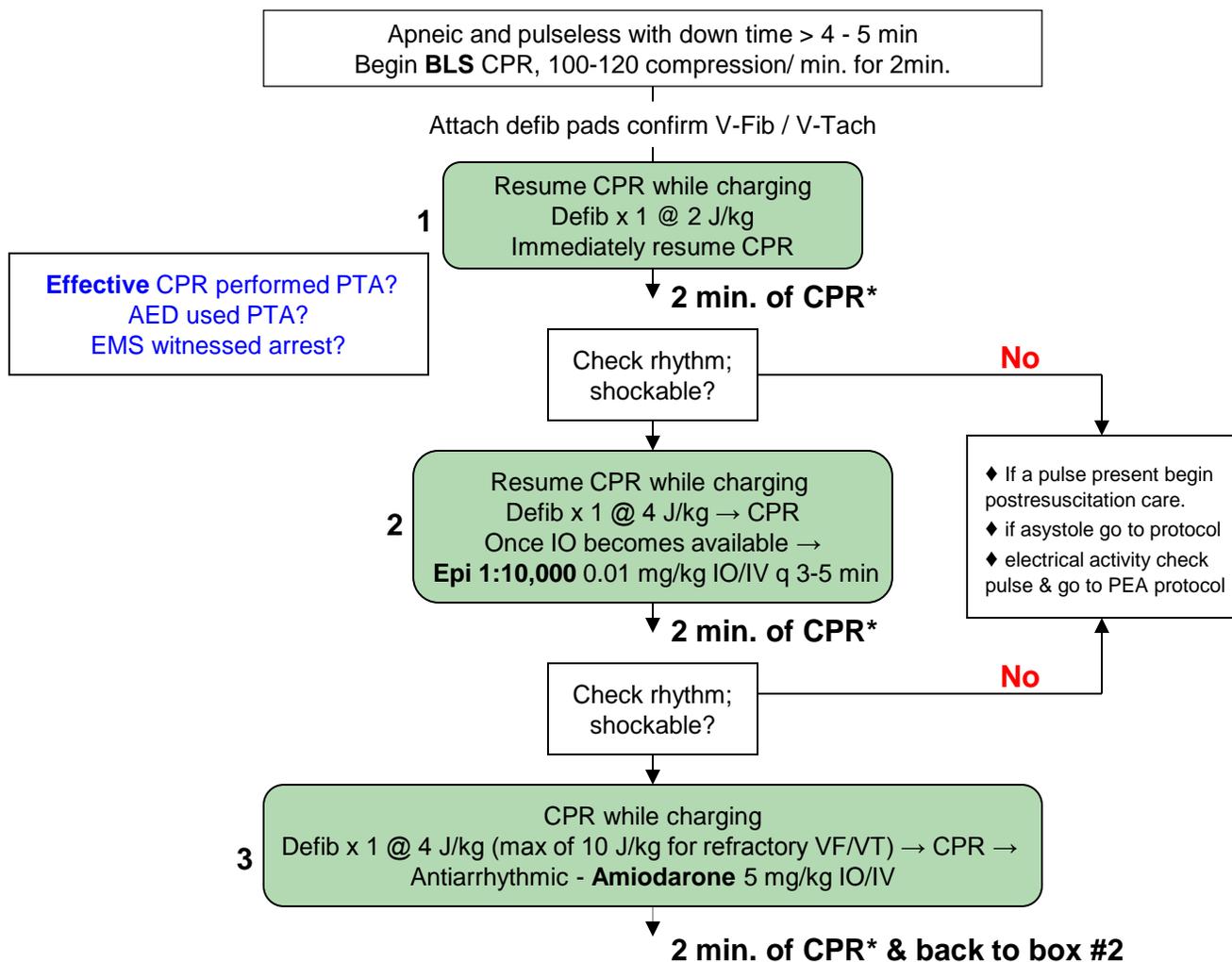


Provided the pt has no hx of WPW, with Medical Control orders, **Adenosine** may be given to slow the stable wide monomorphic (regular) tachycardia. This should only be done if unable to differentiate SVT vs. VT. This treatment is NOT for unstable, irregular and/or polymorphic wide complex tachycardias as it may lead to VF.

- Evaluate and treat for possible contributing factors: **hypoxia**, hypovolemia, acidosis, hypo or hyperkalemia, hypoglycemia, hypothermia, toxins, cardiac tamponade, tension pneumothorax, thrombosis, trauma.
- Unstable is defined as \downarrow BP, Δ mental status, \downarrow SpO₂, \uparrow capillary refill
- **For Torsades** (polymorphic VT) **contact Med Control for Mag Sulfate 50% 50 mg/kg IV/IO over 20min to MAX of 2gm**

Pediatric Ventricular Fibrillation / Tachycardia (pulseless)

American Heart Association's *Pediatric Advanced Life Support (PALS)* 2010 updates place special attention on the value of chest compressions. New guidelines denote specific times when pausing chest compressions is permissible. Two (2) minutes is now required before pausing chest compressions to attach ECG/Defib and/or any advanced care.



*Focus on providing **continuous chest compressions with minimal interruptions** regardless of the type of airway in place. Pause for ≈ 10 sec every 2 min to verify EKG. Ventilate ≈ 14-18 / min.

- Upon arrival 5 cycles (2 min) of CPR (BVM with OPA) must be completed before ANY ALS begins
- If upon arrival effective chest compressions are being performed (100/min that allow time for recoil for at least 2 min) ALS can be initiated; assuming CPR does not stop.
- If acidosis is suspected (prolonged down time), **Sodium Bicarbonate** 1mEq/kg IO/IV.
- Amiodarone is the antiarrhythmic of choice. Amiodarone should only be given once.
- CPR guidelines are listed in the *Pediatric Preambles*.
- **For Torsades** (polymorphic VT) **contact Med Control for Mag Sulfate 50% 50 mg/kg IV/IO over 20min to MAX of 2gm**

Trauma Center Protocol

The recognition of major trauma and the decision to be rendered by Medical Control to transport the patient to designated trauma facility will supersede patient choice without consideration of patient finances.

Anatomic Criteria

- Penetrating injuries to the head, neck, torso or extremities proximal to the elbow and knee.
- Flail chest
- Two or more proximal long bone fractures
- Crush, degloved, or mangled extremity
- Pelvic fracture
- Open or depressed skull fracture
- Limb paralysis
- Amputation proximal to the wrist or ankle
- Combination of mechanism of trauma associated with burns

Physiologic criteria

Assess V/S & LOC

- Glasgow Coma Scale <14
- SBP <60
- Respiratory rate <10 or > 29/min or
- Revised Trauma Score <11
- Pediatric Trauma Score <9

Trauma Center Medical Control must be called for every trauma activation and anytime it becomes unclear whether or not a patient is a candidate for the trauma center.

If the patient meets trauma criteria but has one of the below or online Medical Control feels it is in the patient's best interest to stop at a closer facility, Medical Control may direct patient transport to the closest ED for appropriate stabilization followed by expeditious transfer to the trauma center.

- non-patent airway (can this be corrected by OPA, BVM and O₂?)
- tension pneumothorax
- transport time > 50 minutes to trauma center

The patient in traumatic cardiopulmonary arrest not meeting adult traumatic termination criteria will be transported to the closest appropriate Emergency Department for evaluation and treatment.

Neonatal Resuscitation

Four Question Rapid Assessment

1. Was the baby born following a full-term gestation?
2. Is the amniotic fluid free of meconium or infection?
3. Baby breathing or crying?
4. Presence of good muscle tone ?

No

to one or more of the four questions

Keep the newborn warm. Position, clear airway, dry to stimulate breathing, oxygenate prn

Assess resp, heart rate, & color

If breathing is adequate & HR > 100; provide supportive care

For inadequate breathing and/or HR < 100, provide positive ventilation. Intubate as needed

Chest compressions and ventilatory support for HR < 60. Use a 3:1 ratio unless suspected cardiac etiology, then use a 15:2 ratio. After 2 minutes of chest compressions and ventilatory support without a spontaneous return of HR > 60 administer, **Epi 1:10,000** IV/IO 0.01 to 0.03 mg/kg

Yes

to all questions

No resuscitation is needed; dry the newborn and keep warm

position, suction, dry, warm and stimulate

oxygen

establish effective ventilation

- bag-valve mask
- ET intubation

chest compressions

meds

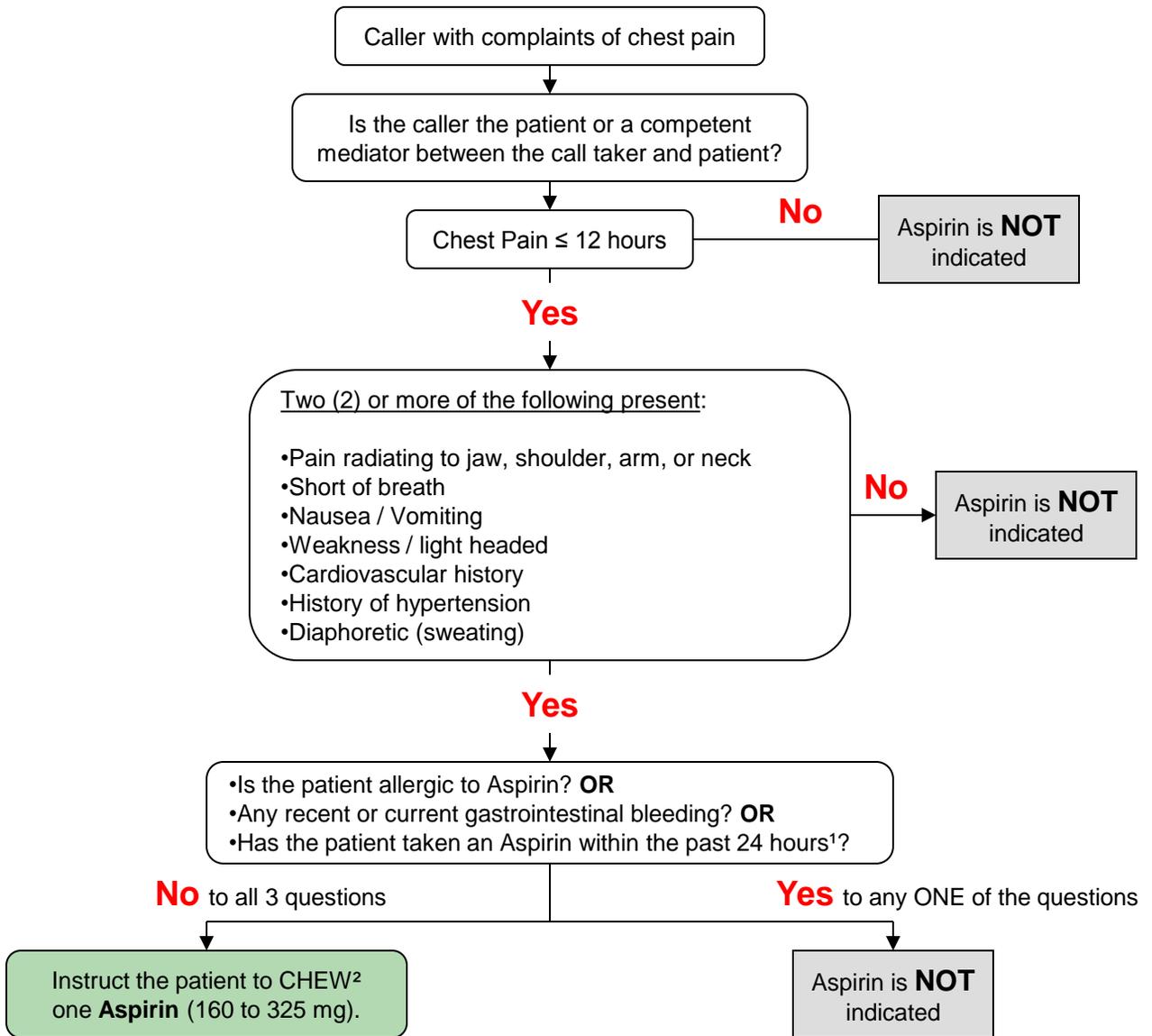
APGAR scores at 1 and 5 minutes postpartum



Appendix

Communication Center Aspirin Protocol

New American Heart Association 2010 updates in *Advance Cardiovascular Life Support*, have EMS dispatchers telling callers (patients) to take aspirin when an Acute Coronary Syndrome (ACS) is suspected. An ACS includes stable and unstable angina and acute myocardial infarctions (AMI).



¹ If unable to determine if an aspirin was taken in the past 24 hours, consider the answer to be NO.

² If the patient is unable to chew, they may use water. Once the patient chews the aspirin they may follow up with a few sips of water

* Guidelines based on- Stabilization of the Patient with Acute Coronary Syndromes *Circulation*. 2005. 8:89-91

Intranasal (IN) Medication Delivery

The intranasal (IN) route for medication delivery has several advantages but is not preferred over traditional IV routes. Not all medications can be given intranasally for various reasons. Naloxone (Narcan), Midazolam (Versed), and Fentanyl (Sublimaze) may be given IN. The intranasal route is also useful for topical anesthetics prior to nasal intubations.



The device is designed to “mist” the medication in the nasopharynx. The nasal cavity is quite vascular which allows an almost instant route for the medication to enter central circulation. Each mL, 10-50 microns of the medication, is expelled in the nasal cavity across mucus membrane where it is absorbed into the circulation. Studies have shown serum levels of IN delivered medications to be comparable to serum level of medications given IV. Those same studies also report small amounts of the medication being absorbed by the lungs.

Factors which could reduce the effectiveness of the IN delivery:

- decreased blood flow to nasal mucosa (trauma / surgery)
- dehydration (dry mucous membranes)
- epistaxis
- hypotension
- increased mucous production (common cold, cystic fibrosis)
- vasoconstrictors, topical (ie snorting cocaine)

Procedure:

(non-sterile)

- Load syringe with desired amount of medication (max 2mL)
- Apply atomizer adapter on the syringe
- Place the tip of the atomizer 1.5 cm within the nostril
- Quickly compress the syringe, administering only **1 mL per nostril**
- If needed, repeat the procedure in the other nostril

- IN medication delivery does not replace the need for IV access. This is simply another route for medication delivery when vascular access is unobtainable.
- Vascular access may be unobtainable for several reasons, including but not limited to:
 - poor peripheral access
 - combative / violent patients
 - less frightening (pediatrics)

Intraosseous Vascular Access

Indications for using the IO are listed in the appropriate protocol. The purpose of this protocol is proper insertion techniques. Our protocol will closely reflect the manufactures guidelines.

Adult vs. Pediatric

Adult - Any pt weighing ≥ 40 kg without the below contraindications.

Pediatric – Any pt weighing ≥ 3 kg but < 40 kg without the below contraindications.

An IO is NOT for prophylactic use!

Contraindications

- Fracture of the bone selected for IO infusion (*consider alternate sites*)
- Excessive tissue at insertion site with the absence of anatomical landmarks (*consider alternate sites*)
- Previous significant orthopedic procedures (*IO within 24 hours, prosthesis - consider alternate sites*)
- Infection at the site selected for insertion (*consider alternate sites*)

Indications

- IV fluids or meds are needed & peripheral IV cannot be established in 2 attempts or 90 seconds, **and** the pt exhibits one or more of the following:
 - a. Altered mental status
 - b. Resp compromise (SpO₂) 80% after appropriate oxygen therapy, resp rate < 10 or > 40 x min.
 - c. Hemodynamic instability (SBP < 90)
- Adult and Pediatric IO devices can be considered PRIOR to peripheral IV attempts in the following situations:
 - a. Cardiac arrest
 - b. Profound hypovolemia with alteration of mental status
 - c. Pt in extremis with immediate need for delivery of medication and/or fluids
 - d. Burns
 - e. Status epilepticus
 - f. Profound hypoglycemia
 - g. Narcotic OD without vascular access

Considerations

Flow rate: Due to the anatomy of the IO space you will note flow rates to be slower than those achieved with IV catheters.

• Ensure the administration of an appropriate rapid syringe bolus (flush) prior to infusion.

NO FLUSH = NO FLOW

-Rapid syringe bolus (flush) the adult IO with 10 ml (pediatric IO with 5 ml) of NS. Repeat prn.

• To improve continuous infusion flow rates always use a syringe, pressure bag or infusion pump

Pain: Insertion of the adult IO & pediatric IO in conscious patients has been noted to cause mild to moderate discomfort (usually no more painful than a large bore IV). However, IO Infusion for conscious patients has been noted to cause severe discomfort.

• Prior to IO syringe bolus (flush) or continuous infusion in alert patients, SLOWLY administer Lidocaine 2% (Preservative Free) through the IO hub.

Adult IO Slowly administer 20 – 40 mg Lidocaine 2% (Preservative Free), allow to sit in bone marrow space for 30 seconds.

- Pediatric IO Slowly administer **0.5 mg /kg** Lidocaine 2% (Preservative Free), allow to sit in bone marrow space for 30 seconds.

EZ-IO® Insertion Procedure

PROCEDURE: *If the patient is conscious, advise of EMERGENT NEED for this procedure and obtain informed consent*

1. Wear approved Body Substance Isolation Equipment (BSI)
2. Determine adult IO or pediatric IO indications
3. Rule out Contraindications
4. Locate appropriate insertion site (3 approved sites)
5. Prepare insertion site using aseptic technique
6. Prepare the IO driver and appropriate needle set
8. Stabilize site and insert appropriate needle set
9. Remove IO driver from needle set while stabilizing catheter hub
10. Remove stylet from catheter, place stylet in shuttle or approved sharps container
11. Confirm placement
12. Connect primed provided IO connector
13. Slowly administer appropriate dose of Lidocaine 2% (Preservative Free) IO to conscious patients
14. Syringe bolus (flush) the IO catheter with the appropriate amount of normal saline.
15. Utilize pressure (pressure bag or infusion pump) for continuous infusions where applicable
16. Begin infusion
17. Dress site, secure tubing and apply wristband as directed
18. Monitor IO site and patient condition

Prehospital Radio / Phone Report Format

- "This is" (EMS department / service name) _____
- Unit # _____
- Skill level treating the patient
- Parish or origin
- ETA
- Pt's age
- History of present illness (CC) & duration of illness
 - Relay major pertinent injuries
- Pt's LOC & GCS _____
- Vital signs
 - B/p
 - Pulse
 - Resp (lung sounds)
 - SpO2 (including O₂ device and rate)
- **Pertinent** medical history _____
- Treatment rendered & impact of treatment (response to treatment).

Trauma Radio Report

"This is" (Service Name) _____ (Unit #) _____ EMT-B/I/P _____ Parish _____

Age _____

Mechanism of Injury/ MOI) _____

Meets Trauma Center criteria (anatomic, physiologic) by _____

GCS _____

Vitals: Airway status / O₂ device _____ B/P _____ HR _____
Resp rate _____ SpO₂ _____

Treatment rendered & impact of treatment (*physical exam improvement*) _____

Scene Delays Due to Extrication, Traffic, Etc. _____ ETA _____

Physiological:

- (a) Glasgow Come Scale < 14
- (b) Systolic BP < 90 mm Hg
- (c) Respiratory Rate < 10 or > 29 min
- (d) Revised Trauma Score < 11
- (e) Pediatric Trauma Score < 9

Anatomic:

- (a) Penetrating injuries to head, neck, torso, or extremities proximal to elbow and knee
- (b) Flail chest
- (c) Combination of mechanism of trauma with associated burns
- (d) Two or more proximal long-bone fractures
- (e) Pelvic fractures
- (f) Limb paralysis
- (g) Amputation proximal to the wrist or ankle

Abbreviation List

*** Individual Service Policy May Prohibit Use**

AAA	Abdominal Aortic Aneurysm	J	Joule (electrical measurement)
ABC's	Airway, breathing, circulation	KVO	Keep vein open
ACLS	Advanced Cardiac Life Support	LOC	Level of Consciousness
ALS	Advanced Life Support	lpm	liters per minute
AMI	Acute Myocardial Infarction	mA	milliamperes
AMS	Altered Mental Status	max	Maximum
ASA	Aspirin	ml	milliliter
BAAM	Beck Airway-Airflow Monitor	µg	Microgram
BP	Blood pressure	min	Minute
B/p	Blood pressure	mm/Hg	Millimeters of mercury
bpm	beats per minute	mEq	milliequivalent
BSA	Body Surface Area	mg	Milligram
BVM	Bag Valve Mask	MgSO ₄	Magnesium Sulfate
CaCl	Calcium Chloride	MI	Myocardial Infarction
CBG	Capillary Blood Glucose	NPA	Nasopharyngeal Airway
cc	cubic centimeter	NPO	Nothing per mouth
C-spine	Cervical Spine	NTG	Nitroglycerine
CHF	Congestive Heart Failure	NS	Normal Saline
Cx	chest	MOI	Mechanism(s) of Injury
c/o	complaining (or complaints) of	O ₂	Oxygen
COPD	Chronic Obstructive Pulmonary Disease	OB	Obstetrical
cm	centimeter	OPA	Oropharyngeal Airway
CPR	Cardio-Pulmonary Resuscitation	OD	Overdose
CVA	Cerebrovascular Accident	PEA	Pulseless Electrical Activity
DAM	Difficult Airway Maneuvers	PHTLS	Prehospital Trauma Life Support
DKA	Diabetic Ketoacidosis	PO	by mouth
DNR	Do Not Resuscitate	PPV	Positive Pressure Ventilations
DNAR	Do Not Attempt to Resuscitate	prn	as needed
ED	Emergency Department	PTA	Prior to arrival
ECG	Electro-cardiogram	Pt	patient
Epi	Epinephrine	Pts	patients
ET	Endotracheal	q	every
ETT	Endotracheal tube	RMC	Routine Medical Care
ETCO ₂	End-tidal Carbon Dioxide	r/o	rule out
ETOH	Alcohol use or odor present on pt	SBP	Systolic Blood Pressure
Fx	fracture	SpO ₂	Oxygen Saturation via Pulse Oximetry
g	Gram	SL	Sublingual
GCS	Glasgow Coma Scale	SQ	Sub-cutaneous
HTN	Hypertension	SVT	Supraventricular Tachycardia
Hx / hx	history	TCA	Tricyclic Antidepressant
IO	Intraosseous	TD	Transdermal
IM	Intramuscular	TCP	Transcutaneous pacing
IV	Intravenous	V-Fib	Ventricular Fibrillation (VF)
kg	Kilogram	V-Tach	Ventricular Tachycardia (VT)
≥	Greater than or equal to	>	Greater than
≤	Less than or equal to	<	Less than
♂	Male	≈	Approximately
♀	Female	Δ	Change

Glossary

afebrile	without fever
anaphylactic shock	rapidly developing, systemic anaphylaxis that produces life-threatening vascular collapse and acute airway obstruction within minutes after exposure to an antigen
angioedema	condition marked by the development of edematous areas of skin, mucous membranes, or internal organs. It is frequently associated with urticaria (hives). It is benign when limited to the skin but can cause respiratory distress when present in the mouth, pharynx, or larynx.
anisocoria	A condition characterized by an unequal size of the pupils
ascites	the abnormal accumulation of fluid in the peritoneal cavity
ataxia	gait marked by staggering and unsteadiness
cardiogenic shock	failure of the heart to pump an adequate supply of blood and oxygen to body tissues. The most common cause is acute myocardial infarction (AMI). Treatment usually includes volume replacement, high flow oxygen, inotropic agents
chronotropic	effects are ones that change the heart rate (i.e. the time between p waves).
clonic	alternating contracting and relaxing the muscles
contralateral	referring to the opposite side
diplopia	double vision
dysarthria	imperfect articulation of speech due to disturbances of muscular control
dry mucous membranes	seen in fevers, chronic gastritis, some liver disturbances
dysphasia	difficulty swallowing
dystonic	Prolonged involuntary muscular contractions that may cause twisting of body parts, repetitive movements, and increased muscular tone. This is an adverse reaction NOT a allergic reaction. Treatment is IV Benadryl.
eclampsia	a severe hypertensive disorder ($\geq 140/90$) of pregnancy characterized by convulsions and coma, occurring between 20 weeks' gestation and the end of the sixth week postpartum.
epistaxis	hemorrhage from the nose (nosebleed).
etiology	the set of factors that contributes to the occurrence of a disease or injury

gait	manner of walking
gaze	movement of both eyes together
gaze, dysconjugate hepatojugular reflux	Failure of the eyes together with the patient at 30° angle press on the abdomen over the liver lightly. If the jugular veins rise ≈ 4 cm it is a positive reflux which is a sure sign of CHF
hyperglycemia	increase in blood sugar levels without major sign and symptoms
hypovolemic shock	shock occurring when there is an insufficient amount of fluid in the circulatory system. Usually, this is due to the bleeding, diarrhea, or vomiting.
infarction	the death of tissue due to a lack of blood flow. A myocardial infarction is death of part of the heart muscle caused by an obstruction of a coronary artery.
inotropic	influencing the force of muscular contraction (increasing the force)
ischemia	reduced (isch) blood (emia). A condition of inadequate blood flow to a tissue. Ischemia to the heart can cause angina, and if present long enough, infarction.
lividity	skin discoloration, as from bruising, or venous congestion
neurogenic shock	a form of distributive shock due to decreased peripheral vascular resistance. Damage to either the brain or the spinal cord inhibits transmission of neural stimuli to the arteries and arterioles, which reduces vasomotor tone. The decreased peripheral resistance results in vasodilatation and hypotension; cardiac output diminishes due to the altered distribution of blood volume.
nystagmus	constant, involuntary, cyclical movement of the eyeball in any direction
orthopnea	breathing difficulty which occurs when laying flat; symptom of heart failure. It is measured by the number of pillows needed to prop the patient up to enable breathing.
orthostatic hypotension	fall in blood pressure upon standing, which causes symptoms such as dizziness, lightheadedness, dimming or tunnelling of vision, and pain or discomfort in the back of the head and neck.
Paroxysmal- nocturnal	(PND) shortness of breath that usually occur when the patients are asleep laying flat. PND commonly occurs several hours after a person

dyspnea	with heart failure has fallen asleep. PND resolves quickly once a person awakens and sits upright. It takes longer to develop than orthopnea.
plegia	complete weakness (unable to move)
pruritus	severe itching
qualitative devices	(capnography) exhaled CO ₂ detecting device used to determine initial ETT placement. It is not used for continuous ventilation monitoring. (TubeCheck™, ETCO ₂ detector, BAAM®, etc).
quantitative capnography	exhaled CO ₂ continuous measuring/monitoring device used for initial ETT placement and allows for continuous end-tidal CO ₂ monitoring.
pallor	lack of color, paleness
rigor mortis	state of hardness and stiffness of muscles in a dead body
sepsis	a systemic inflammatory response to infection, in which there is fever or hypothermia, tachycardia, tachypnea, and evidence of inadequate blood flow to internal organs.
septic Shock	Hypotension and inadequate blood flow to organs, as the result of sepsis. S/S includes hypotension, fever, tachypnea, tachycardia, decreased urinary output. Temperature and hypoxia vary with the degree of sepsis.
supraglottic	located above the glottis
stridor	high-pitched, harsh sound occurring during inspiration, sign of an upper airway obstruction
tonic	tension or contraction especially muscular
urticaria	vascular reaction of the skin characterized by sudden eruption of pale papules/hives and itching.
Valsalva's Maneuver	an attempt to forcibly exhale with the glottis, nose, and mouth closed. This maneuver causes increased intrathoracic pressure, slowing of the pulse, decreased blood return to the heart, and increased venous pressure
vertigo	a sensation of spinning or feeling dizzy; it is a symptom not a disease.