East Baton Rouge Parish

Department of

Emergency Medical Services

Standing Order Clinical Guidelines

Revised 09/23/2019

EMSGuidelinesCommittee@brla.gov

MEDICAL SOCIETY ACCEPTANCE LETTER

CapitalAMS
Capital Area Medical Society

February 11, 2019

Dan Godbee, MD
Medical Director
Department of Emergency Medical Services
City of Baton Rouge
3801 Harding Blvd.
Baton Rouge, LA 70807

Dear Dr. Godbee,

On behalf of the Capital Area Medical Society Board of Directors I am notifying you that the 2019 East Baton Rouge Parish Department of Emergency Medical Services Standing Order Guidline changes submitted for our review and revised accordingly were approved.

We appreciate the time that went into the development of these Protocols, and your efforts to insure that the emergency medical professionals of East Baton Rouge Parish are prepared.

Sincerely,

Amberly Nunez, MD

Amberly Nunez, MD
President, Capital Area Medical Society

MEDICAL DIRECTOR APPROVAL AUTHORIZATION

Department of Emergency Medical Services

City of Baton Rouge
Parish of East Baton Rouge

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Baton Rouge, Louisiana
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Chad J. Guillot
Director

Medical Director Approval Authorization

Due to the nature of Emergency Medical Services and the ever changing landscape of Emergency Medicine, the East Baton Rouge Parish Emergency Medical Services Medical Director shall have authorization for emergent changes to these Standing Order Guidelines approved by the Capital Area Medical Society.

In the event that a medication or procedure that is approved within these guidelines becomes unavailable due to national shortages, or compelling evidence emerges that proves that the current standard of care could be harmful or futile, the EMS Medical Director shall have authority to immediately address the required changes so that patient care is not compromised. The EMS Medical Director will immediately forward any emergent change of the clinical guidelines to the Capital Area Medical Society for further review.

10 August 2017

Will Freeman, MD — Date
President,
Capital Area Medical Society
Baton Rouge, LA

10 Aug 17

Dan Godbee, MD — Date
Medical Director,
East Baton Rouge Parish Emergency Medical Services
Baton Rouge, LA

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PREFACE

The following pages are to serve as a guideline to all EMS clinicians (EMTs, advanced EMTs and Paramedics), for the treatment of patients in the out-of-hospital setting, within the boundaries of East Baton Rouge Parish. As a guide, this manual will serve as a common point of reference between an EMS clinician and a physician acting as medical control. The EMS clinician is expected to possess and practice sound clinical judgment, excellent critical thinking skills, an ethical and a professional demeanor, at all times.

These guidelines are to be used by all levels of certification. However, at no time do these guidelines give any healthcare practitioner permission to perform skills or administer medications outside the scope of practice for their designated provider level. East Baton Rouge Parish EMS has adopted the Louisiana Scope of Practice for licensed EMS practitioners. The Louisiana EMS Scope of Practice Matrix is provided in the Reference section of this Guideline.

The medical treatments contained in this document are based on current evidenced based medicine including the current National EMS Education Standards. Materials utilized to supplement the Education Standards include but are not limited to the American Heart Association, Emergency Cardiac Care Guidelines, the National Association of EMT's (NAEMT) Advanced Prehospital Trauma Life Support, the current national pediatric curriculum, and the NAEMT Advanced Medical Life Support.

The patient care guidelines in this manual have been approved by the Capital Area Medical Society. It is possible and often occurs where a patient will present in such a manner as to require treatment under one or more guideline(s) simultaneously. The EMS clinician will therefore utilize all standing orders, in their entirety, as long as the patient's condition meets the criteria under which those orders were indicated. The EMS clinician will also contact medical control after completing the standing orders, as long as the condition still exists. Certain medications (i.e., pain medications) should be titrated to the patient's response as different patients have different thresholds to certain medications. Treatment for critical patients should be initiated on scene unless there is a situation that proves hazardous to the patient or EMS clinician.

If the presenting condition is alleviated by the clinician's care, the clinician may at his/her discretion discontinue the standing order guideline. The clinician should document this fact clearly on the department EHR. The clinician will follow any order directed by a medical control physician, as long as the order is within the lawful scope of practice for the clinician and whether or not the order is delineated as a technique in this manual. These deviations will be recorded on the Clinical Guidelines Deviation Report and routed to the Medical Director for review. The clinician should not routinely contact a medical control physician to request any alterations to the treatments and techniques outlined in this manual. However, if a situation arises that is not covered by a guideline in this manual, the clinician should contact medical control for advice, if needed, and offer suggestions based on the tools available to them; and/or document the situation thoroughly on the EHR. Novel treatments or techniques should be presented to the Clinical Guidelines Committee chairperson for consideration in future updates.

The official Guidelines are only available on ESO, the EMS homepage (intranet), the BRLA.gov website, the PPP app, and on Handtevy. These locations will have the most current version available. Any copies that are printed or saved are not official copies.

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INITIAL PATIENT ASSESSMENT

I. Scene Size-up
- A. Review dispatch information
- B. Assess need for BSI
- C. Assess scene safety
- D. Determine mechanism of injury/illness
- E. Determine number and location of patients
- F. Determine need for additional resources

II. Initial Assessment
- A. General impression of patient
- B. Assess AVPU
- C. Assess C-circulation (pulse, major bleeding, skin color, capillary refill)
- D. Assess A-airway
- E. Assess B-breathing (mechanical "ventilation" and gaseous "respiration")
- F. Assess D-disability (Stroke/Neurological assessment as needed)
- G. Expose/Examine/Exposures (Rapid assessment of head, neck, chest/back, abdomen, pelvis, extremities & prevent hypothermia as needed)
- H. Identify priority patients (rapid scene time and transport)

III. Initial Management
- A. Adult Medical Care
- B. Adult Trauma Care
  1. Trauma Score
  2. GCS
- C. Pediatric Medical Care
- D. Pediatric Trauma Care
  1. Trauma Score
  2. GCS

IV. Secondary Assessment
- A. Medical Assessment
  1. Detailed Exam - when chief complaint or presenting problem cant be established
  2. Focused Exam - when chief complaint or presenting problem can be established
- B. Trauma Assessment
  1. Detailed Exam - when chief complaint or presenting problem cant be established
  2. Focused Exam - when chief complaint or presenting problem can be established
- C. Assess vital signs
  1. Respirations
  2. Pulse
  3. Blood pressure
  4. Capillary refill time
  5. Skin condition (color, temperature, moisture)
  6. Lung sounds

D. Obtain medical history (SAMPLE)
   1. S-symptoms (OPQRST)
      a. O-onset
      b. P-provocation/palliation
      c. Q-quality
      d. R-radiation, referred
      e. S-severity
      f. T-time
   2. A-allergies
   3. M-medications
   4. P-past medical history (pertinent)
   5. L-last oral intake
   6. E-events leading to illness or injury

V. Other assessment techniques

A. ECG monitoring (ZOLL)
B. Continuous 12-lead monitoring and analysis (ZOLL)
C. SpO2 monitoring (ZOLL)
D. Capillary Blood Glucose
E. Temperature monitoring (ZOLL)
F. $EtCO_2$ (ZOLL)
G. SpCO monitoring (ZOLL)
H. Non-Invasive Blood Pressure monitoring (ZOLL)
I. CPR monitoring (ZOLL)
J. Respiration monitoring (ZOLL)

ADULT ROUTINE MEDICAL CARE

1. Complete "Initial Patient Assessment"
2. Universal Patient Care/Initial patient contact guideline
3. Obtain and document vital signs (at least 2 on all patient encounters in which the patient receives treatment) to include: BP, pulse, respirations, SpO_2, $EtCO_2$, capillary refill time, skin condition, pain scale, CBG, Temperature and GCS/Trauma scores (when appropriate).
4. Other assessment techniques "Initial Patient Assessment"
5. EKG as indicated, 12-Lead on all suspected AMI and any patient >35 y/o with CAD risk factors
6. Vascular access:
    a. By standing order
    b. At the discretion of the EMS clinician
    c. A saline lock or an infusion
    d. IO in place of IV per "EZIO™ Procedure"
    e. Infusions are recommended in cardiac arrests or any situation that could potentially require a fluid resuscitation (i.e. trauma, shock, OB)
7. Medications are administered by the most appropriate route, but can be administered by any route listed "for that medication, "in the formulary as the patient's situation may dictate. The use of an alternate route is by standing order
    a. All patients receiving medications shall be monitored with an ECG, NIBP and SpO_2
    b. Medication will be administered by the clinician preparing the dosage to be given
    c. The clinician will verify that the patient is receiving the right medication, at the right time, via the right route and in the correct dose
8. While treating under a standing order guideline, if the prevailing condition resolves, it is not necessary to contact medical control to discontinue treatments as long as cessation of the condition is well documented.
9. While treating under a standing order guideline, if the prevailing condition does not resolve after all "standing orders" have been accomplished, contact medical control for advice or additional orders
10. All patients are to be transported to the hospital of their choice unless their condition warrants the nearest and/or more appropriate medical facility. LERN shall be contacted on all Trauma and Stroke patients that meet LERN entry criteria.
11. An EHR will be completed at the conclusion of each patient encounter when a medical evaluation for any illness or injury was performed.
12. Consider abuse/neglect in any case of unexplained or suspicious trauma.
13. It is the clinician's legal responsibility to report suspected abuse or neglect to a protective service.
14. All policies and procedures outlined in the Operations Policy and Procedure Manual apply to all Clinical Guidelines.

PEDIATRIC ROUTINE MEDICAL CARE

1. Complete "Initial Patient Assessment"
2. Pediatric guidelines will be applied to all patients less than 12 years of age, or less than 100 lbs. However, signs of puberty and the size and weight of the patient must be taken into consideration when determining whether to use "adult" or "pediatric" treatment schemes
3. A length based resuscitation tape or pediatric resuscitation system will be utilized to determine equipment size, medication doses, and weight estimates on pediatric patients (Broselow, Handtevy).
4. Universal Patient Care/Initial patient contact guideline
5. ECG as indicated
6. Obtain and document vital signs (at least 2 on all patient encounters in which the patient receives treatment) to include: BP, pulse, respirations, SpO_2, $EtCO_2$, capillary refill time, skin condition, pain scale, CBG, Temperature and GCS/Trauma scores (when appropriate).
7. Vascular access:
    a. By standing order
    b. At the discretion of the EMS clinician
    c. A saline lock or an infusion
    d. Fluid boluses are 10 ml/kg for 0-1 months, and 20 ml/kg for 1 month and older
    e. IO in place of IV per "EZIO™ Procedure"
    f. Infusions are recommended in cardiac arrests or any situation that could potentially require a fluid resuscitation (i.e. trauma, shock)
8. Medications are administered by the most appropriate route, but can be administered by any route listed "for that medication, "in the formulary as the patient's situation may dictate. The use of an alternate route is by standing order
    a. All patients receiving medications shall be monitored with an ECG, NIBP and SpO_2
    b. Medication will be administered by the clinician preparing the dosage to be given
    c. The clinician will verify that the patient is receiving the right medication, at the right time, via the right route and in the correct dose
9. While treating under a standing order guideline, if the prevailing condition resolves, it is not necessary to contact medical control to discontinue treatments as long as cessation of the condition is well documented.
10. While treating under a standing order guideline, if the prevailing condition does not resolve after all "standing orders" have been accomplished, contact medical control for advice or additional orders
11. All patients are to be transported to the hospital of their choice unless their condition warrants the nearest and/or more appropriate medical facility. LERN shall be contacted on all Trauma and Stroke patients that meet LERN entry criteria.
12. An EHR will be completed at the conclusion of each patient encounter when a medical evaluation for any illness or injury was performed.
13. Consider abuse/neglect in any case of unexplained or suspicious trauma.
14. It is the clinician's legal responsibility to report suspected abuse or neglect to a protective service.
15. All policies and procedures outlined in the Operations Policy and Procedure Manual apply to all Clinical Guidelines.

UNIVERSAL PATIENT CARE/INITIAL PATIENT CONTACT

This guideline is intended for ANY patient encounter where an assessment is performed. This guideline serves as a definitive approach encompassing various assessment tools and observations the medical clinician may use to provide treatment. Assessment tools are grouped into two Tiers. Tier one is a baseline, mandatory acquisition on all patient encounters. Tier two is an expanded group of assessment tools the clinician may use as clinically indicated dependent upon patient presentation, condition, or procedures/treatments rendered. These two tier groups define a patient's "vital sign". A Minimum (2) sets of Tier One Vital Signs are to be obtained on every patient encounter*

* Extenuating circumstance where (2) sets of V.S. are unable to be obtained may include: patient walk-off/refusal of care, MCI, and/or certain safety situations.

GOALS

- Scene size-up and determine need for additional resources
- Initial Patient Assessment to identify any compromise to airway, breathing, circulation
- Ongoing Patient Assessment to identify overall provider impression

Universal Assessment:

Scene size up: Evaluate for Hazards/precautions, Mass Casualty, Additional resources, Equipment required/ needed.
Primary assessment: Evaluate General impression, Airway, Breathing, Circulation, Disability, Exposure and address threats to life
Secondary Medical assessment: History of present illness, Chief Complaint, Focused Exam versus Detailed Exam
Secondary Trauma assessment: Mechanism of Injury, Chief complaint, Focused Exam versus Detailed Exam

TIER ONE Assessment Tools:

AVPU scale
Blood Pressure
Heart Rate/Pulse Rate
Respiratory Rate & Quality
Pain Scale

TIER TWO Assessment Tools:

GCS indications: Any patient presenting with altered mental status, neurological insult, high index trauma requiring trauma center activation.
SPO2 indications: Patients presenting with hypoxia and/or hypercapnia in any form, patients suspected of presenting with hypoxia and/or hypercapnia in any form, any patient receiving respiratory drive altering medications, any patient receiving advanced airway interventions and/or requiring ventilation, and high index trauma requiring trauma center activation.
$EtCO_2$ indications: The same indications as SPO2 and/or, patients with acid/base disruptions, patients with circulation and/or metabolic disruptions.
CBG indications: Any patient that presents (or did present) with altered mental status, suspected stroke, shock, dizziness, syncope, near syncope, seizure, weakness leading up to 911 activation, or who is unresponsive. Known diabetic patients with a "diabetic complication complaint".
Temperature indications: Any patient exposed to environmental excessive heat/cold, R.O.S.C. achieved with targeted temperature management, burn patients, multi-systems trauma patients, suspicion of infection, excited delirium presentation, overdose patients, patients receiving paralysis/sedation induction agents, altered mental status, seizure.
CO indications: Patient with CO poisoning presentation/suspicion.
EKG 3 lead indications: Patients with a respiratory and/or possible cardiac complaint/presentation; typical, atypical, or contributing factors. Patients receiving medications that may have cardiovascular effects. Electrical insults (lightning strikes, electricity contact)
EKG 12 lead indications: Patients with a respiratory and/or possible cardiac complaint/presentation; typical, atypical, or contributing factors. Patient receiving medications known to cause cardiovascular effects. EVERY PATIENT THAT ACHIEVES R.O.S.C.
Revised Trauma Score indication: Any ADULT patient with high indexed trauma, requiring trauma center activation.
Pediatric Trauma Score indication: Any PEDIATRIC patient high indexed trauma, requiring trauma center activation.
Orthostatic BP/HR indication: Any patient suspicious of dehydration/hypovolemia.

VASCULAR ACCESS

A procedure to establish a portal of entry into the patient's vascular space. Vascular access indications include medication administration, volume replacement, or the anticipation that any of the before mentioned may become indicated. Vascular access sites may be initiated at the discretion of the clinician for any patient via Standing Order. Vascular access sites may be accompanied by either a Saline Lock or an infusion-maintained at a "KVO" rate. Acceptable vascular sites include extremity/peripheral, intraosseous, and external jugular.

Access Site Guidelines

Extremity
- Any patient where vascular access is indicated.

Intraosseous
- Recommended for use on adult and pediatric patients any time vascular access is difficult to obtain in emergent, urgent or medically necessary situations
- Lidocaine should be given as an anesthetic in patients as needed. Follow EZ-IO guideline recommendations

External Jugular
- Critically ill patients who require rapid vascular access for fluid resuscitation or medication administration into central circulation or in whom an extremity site is unavailable, or site is non-suitable for correct bore size.
- Any life threatening events where no obvious and/or adequate peripheral access site is available.

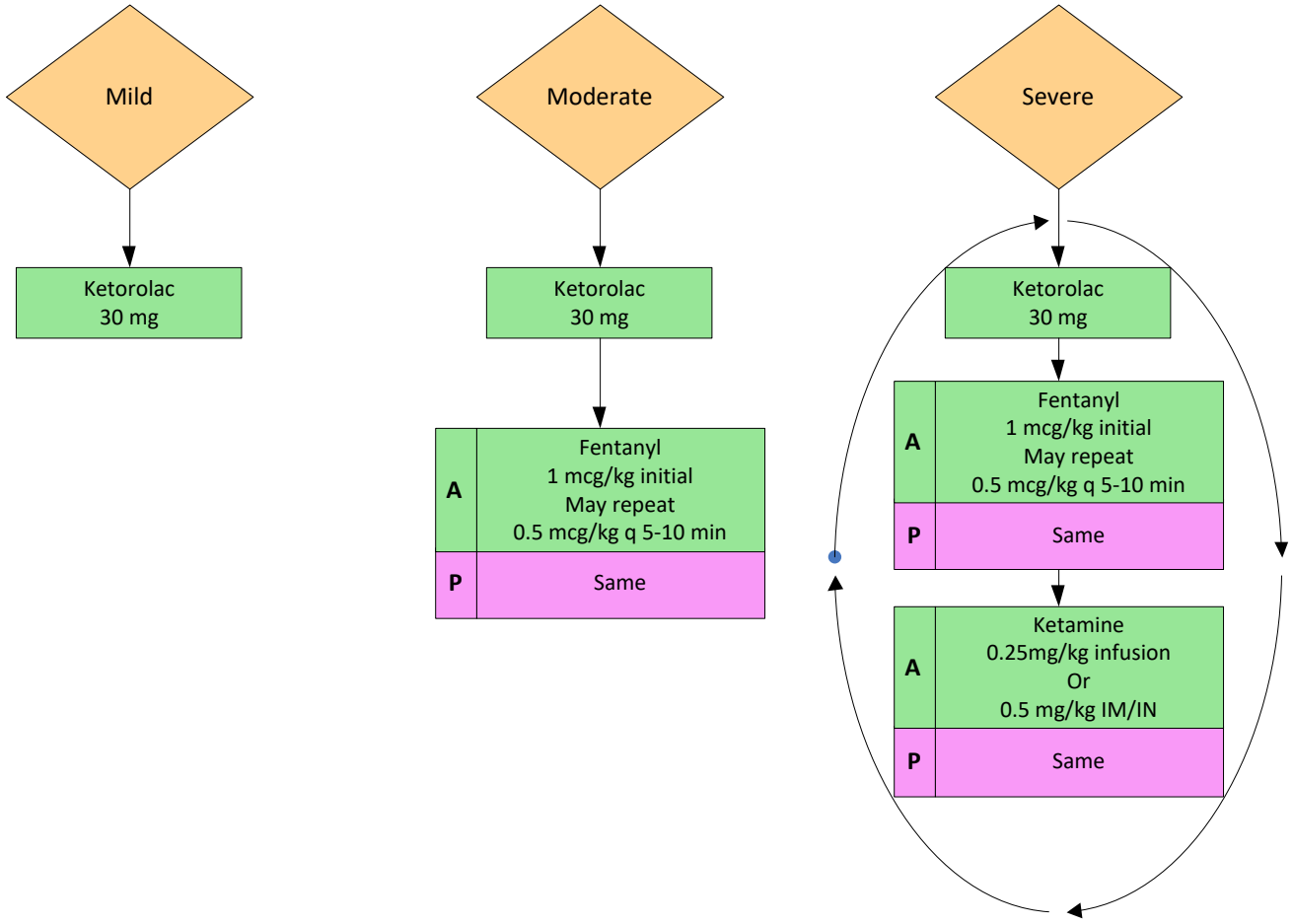
Pearls:
- The clinician must exhibit sound clinical judgment regarding access site with respect to patient pre-existing conditions. Some examples include but are not limited to: dialysis shunt, orthopedic surgeries, age of patient, cancers, etc.

PAIN MANAGEMENT

The process of medical care that alleviates or reduces all levels of pain

GOALS

- Reduction and Control of pain to an acceptable level
- Identify and address the pain source
- Treat non-invasively and invasively as MUCH as needed



Pearls:

PROVIDER MUST EXERCISE SOUND CLINICAL JUDGEMENT

- Ketorolac normally works best for "inflammatory" type pain
- Fentanyl is a great "dosing/titration" opioid for generalized complaints
- Ketamine is the drug of choice for major traumas (amputations, severe burns, impaling injuries).
- IN routes may be preferred route in children.
- Non-pharmacological methods of treating pain include: position of comfort, splinting, padding, ice, compression, elevation, distraction, etc.

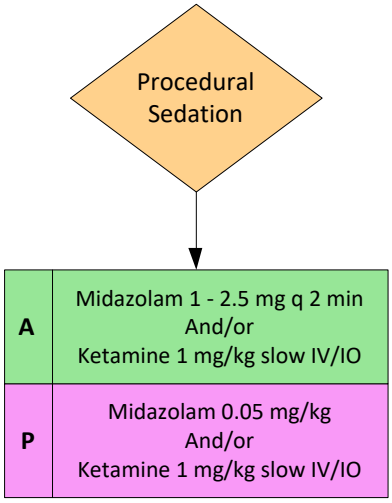
This guideline is a RELATIVE guideline allowing increase of provider response for patient care.

PROCEDURAL SEDATION

Procedural sedation may be necessary to reduce anxiety and discomfort during certain procedures such as Transcutaneous Pacing, Synchronized Cardioversion, Extrication, Splinting Fractures, etc.

GOALS

- Reduce/prevent procedure induced anxiety/discomfort.
- Appropriately sedate patient without compromising hemodynamic stability.
- Maintain independent ventilatory function and patent airway.



Pearls:

- Continuous assessment of patient's respiratory and perfusion status should be performed.
- If patients are hemodynamically compromised, exercise caution before administering medications that can suppress the central nervous system. Ketamine may be a better option.
- When using Midazolam, the patient should be arousable. Avoid deep sedation.

AIRWAY/OXYGENATION

This guideline is intended for ANY patient encounter whereas clinical signs and symptoms have supported the use of oxygen carrying applicators. Each oxygen applicator indication is based upon the type of hypoxia needing to be corrected (hypoxic, hypemic, histotoxic, stagnant) and/or hypercapnia. Furthermore, should the patient condition present and/or worsen, warranting airway stabilization, this guideline outlines various adjuncts available to support and/or maintain a patent airway. The airway adjuncts may be utilized by the trained clinician at his/her skill level based upon patient presentation, condition, or procedures/ treatment rendered via standing order.

Nasal Cannula Indication: Mild to moderate hypoxia correction applicator at flow rates of 2-6 lpm. Pre-intubation oxygenation using an apneic oxygenation technique at a flow rate of 15 lpm or higher; used in conjunction with another oxygen carrying applicator in the pre-oxygenation phase of elected intubations.
Nebulizer Indication: Mild to moderate hypercapnia correction applicator at flow rates of 6-8 lpm used to deliver bronchodilator and anti-cholinergic medications.
Non-Rebreather mask indication: Moderate to severe hypoxia correction applicator at flow rates of 10-15 lpm. Used in conjunction with a nasal cannula in the pre-oxygenation phase of elected intubations.
CPAP indication: Moderate to severe hypoxia correction applicator at rates of 5-10 cmH_2O. Enables airway splinting to correct hypercapnia at low rate pressures. At higher pressures, physiologic changes occur at the cellular and end organ level within the pulmonary/ cardiovascular system resulting in increased surface area tension of the lungs, decreased preload to the heart due to intrathoracic pressure increase, and improved diffusion through a liquid median. Can be used in conjunction with a nasal cannula
Bag valve mask indication: Severe hypoxia, Respiratory arrest/failure, device used for positive pressure ventilation and the pre-oxygenation phase prior to advanced airway placement, may be used in conjunction with a nasal cannula

Head Tilt Chin Lift: A manual and simple technique for opening an airway in the medical patient.
Modified Jaw Thrust: A manual and simple technique for opening an airway in the trauma patient. Can cause fatigue for the clinician during long durations of application.
Nasopharyngeal Airway: A basic life support adjunct introduced nasally to displace and prevent the tongue from resting on the back of oropharynx.
Oropharyngeal Airway: A basic life support adjunct introduced via mouth to displace the tongue up and away from tracheal opening.
Supraglottic Airway: An advanced airway that is blindly introduced through the oropharynx passageway resting in the supraglottic space allowing ventilation to the trachea.
Nasotracheal Intubation: An advanced airway that is introduced nasally into the trachea in instances where orotracheal intubation is not possible.
Orotracheal Intubation: An advanced airway introduced via oropharynx passageway into the trachea.
Surgical Cricothyroidotomy: An advanced airway introduced via cricothyroid membrane incision and placement of an endotracheal tube.

Pearls:
Hypoxic Hypoxia- Failure of oxygen molecules from the atmosphere to diffuse in the lungs from alveoli to arterial blood. Think: CHF.
Hypemic Hypoxia- The capacity of blood to carry oxygen is reduced. Think: anemia, blood loss and CO poisoning.
Histotoxic Hypoxia- A failure of oxygen cellular delivery and/or exchange. Think: cyanide poisoning.
Stagnant Hypoxia- A failure of adequate blood circulation. Think: various forms of shock and increasing intrathoracic pressure.

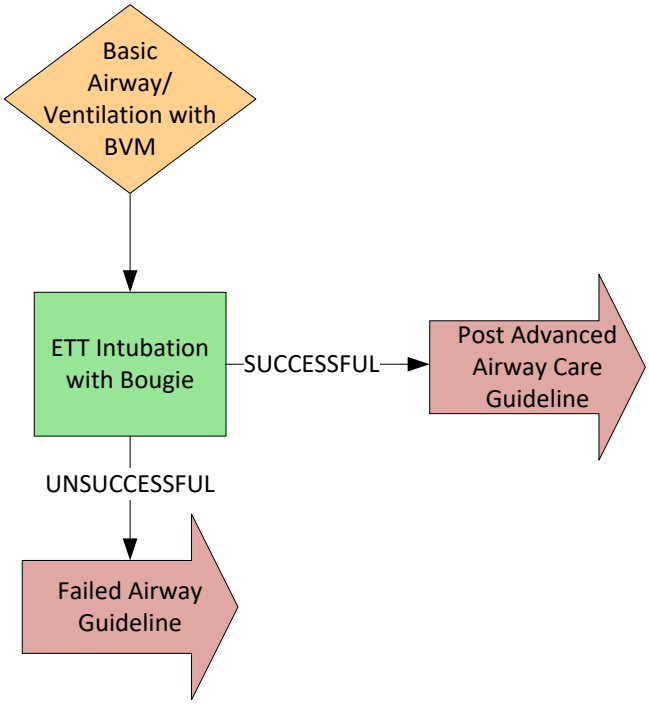
Oxygenation: Oxygen is considered a drug for medical use. Hyperoxia is debated regarding its effects. Oxygen is proven to increase blood pressure by increasing total peripheral vascular resistance due to systemic peripheral vasoconstriction. It is also reported to decrease intracranial pressure. This improves brain oxidative metabolism in severe head injury patients. However, because of the systemic immune response, ischemic changes may occur regarding reperfusion mechanisms. Thus, because of the disparity with oxygen clinical indications, delivery methods, and body system changes, clinicians should strive for a SPO2 of between 94-99% with exception to Stroke/TIA, ACS, and patients with a lung disease history.

CRASH AIRWAY

Unresponsive; Unreactive; Near-Death

GOALS

- Provide positive pressure ventilation.
- Secure and protect airway from aspiration.
- Ensure adequate oxygenation to maintain SpO2 above 90%.



Crash Airway Criteria:

- Inability to maintain airway patency.
- Inability to protect airway against aspiration.
- Failure to oxygenate/ventilate.

Pearls:

- If first attempt at endotracheal intubation is unsuccessful, proceed to Failed Airway Guideline.
- If patient is unable to be intubated due to airway reflexes, trismus, combativeness, etc., go to Medication Assisted Intubation Guideline.
- Maintain *apneic oxygenation* with high flow nasal cannula until airway/ventilation can be established.

DELAYED SEQUENCE INTUBATION

Delayed Sequence Intubation is the use of pharmacologic agents to facilitate endotracheal intubation in patients where intubation may be difficult or impossible. This includes patients that are combative, have intact airway reflexes or other unfavorable conditions.

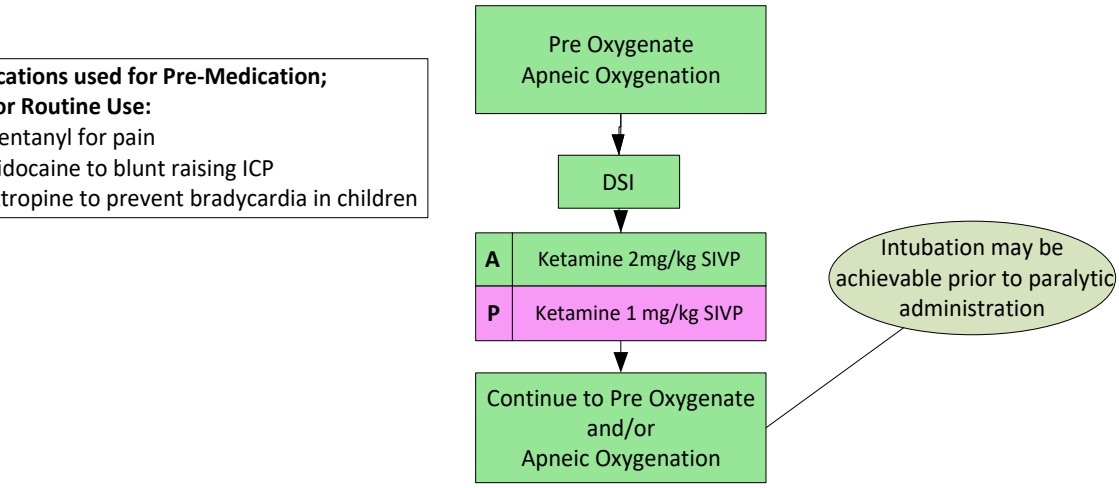
GOALS

- Preparation
- Placement with Proof
- Pre-Oxygenation
- Protection with positioning
- Paralysis with induction
- Post advanced airway management

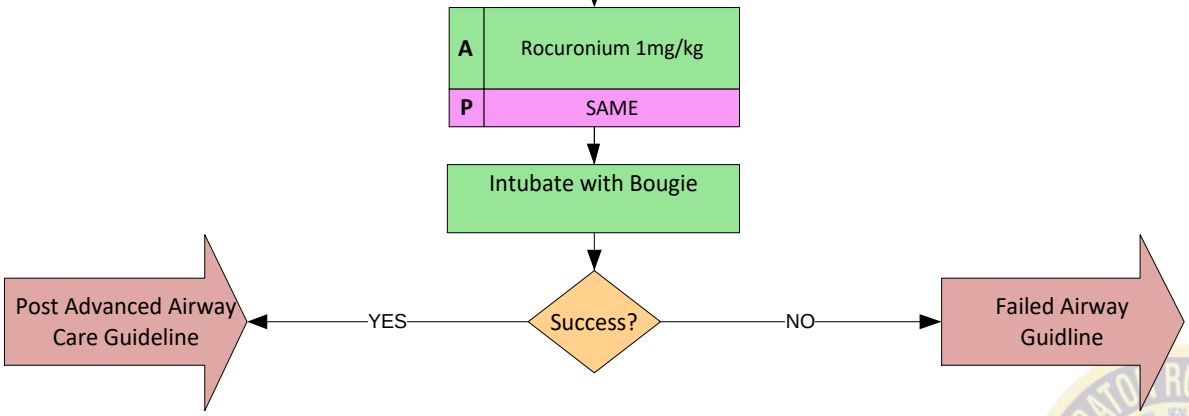
- Increase Safe Apnea Time
  - -Pre Oxygenate 5 min
  - -Apneic Oxygenation
- Premedicate PRN
- Fluid Resuscitation and Vasopressor PRN for Hemodynamic Instability

Medications used for Pre-Medication;
Not for Routine Use:

- Fentanyl for pain
- Lidocaine to blunt raising ICP
- Atropine to prevent bradycardia in children



!!! 2 Advanced Airway Clinicians must be present before using Neuromuscular Blockades !!!



Pearls:

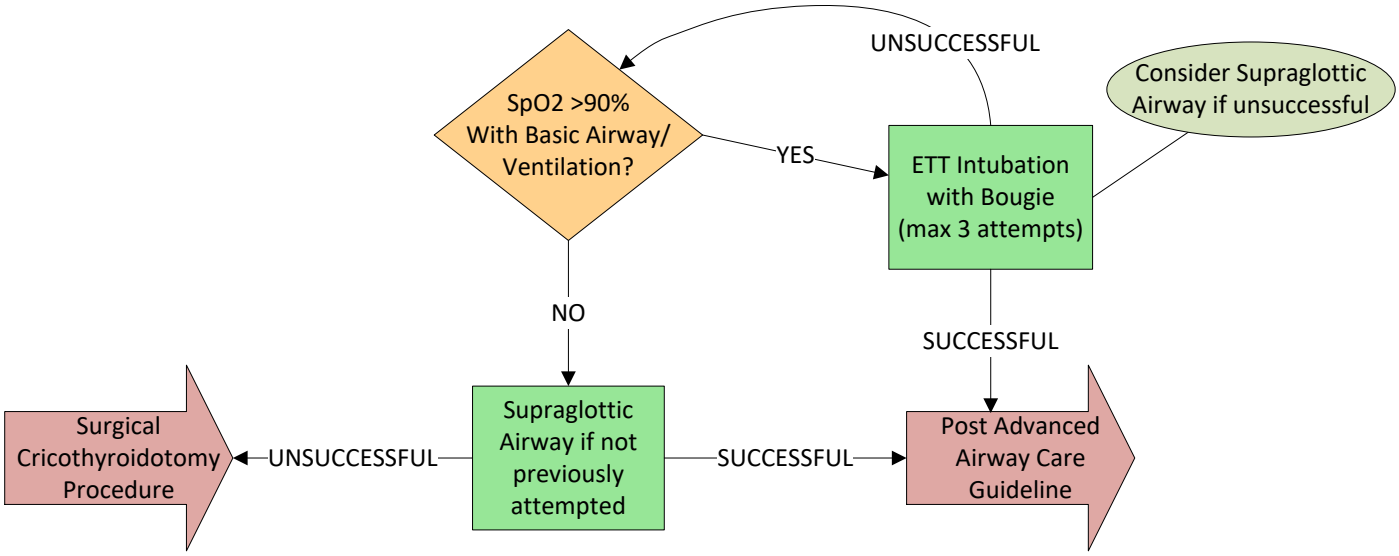
- **PROVIDER MUST EXERCISE SOUND CLINICAL JUDGEMENT**
- The use of neuromuscular blockers requires 2 advanced airway clinicians to be present before administration. Each clinician must be capable of performing endotracheal intubation, cricothyrotomy, and administration of IV medications.
- Not indicated for "crash" airway scenarios (unconscious, unreactive, near-death).
- Not all patients that have indications for this guideline are necessarily candidates.
- If the patient desaturates to <94% during the intubation attempt, stop and re oxygenate the patient to a Spo2 >97%. If the patient continues to desaturate, stop the attempt and proceed to failed airway guideline.

FAILED AIRWAY

Can't intubate. Can't oxygenate. Can't ventilate

GOALS

- Provide positive pressure ventilation.
- Secure and protect airway from aspiration.
- Ensure adequate oxygenation to maintain SpO2 above 90%.



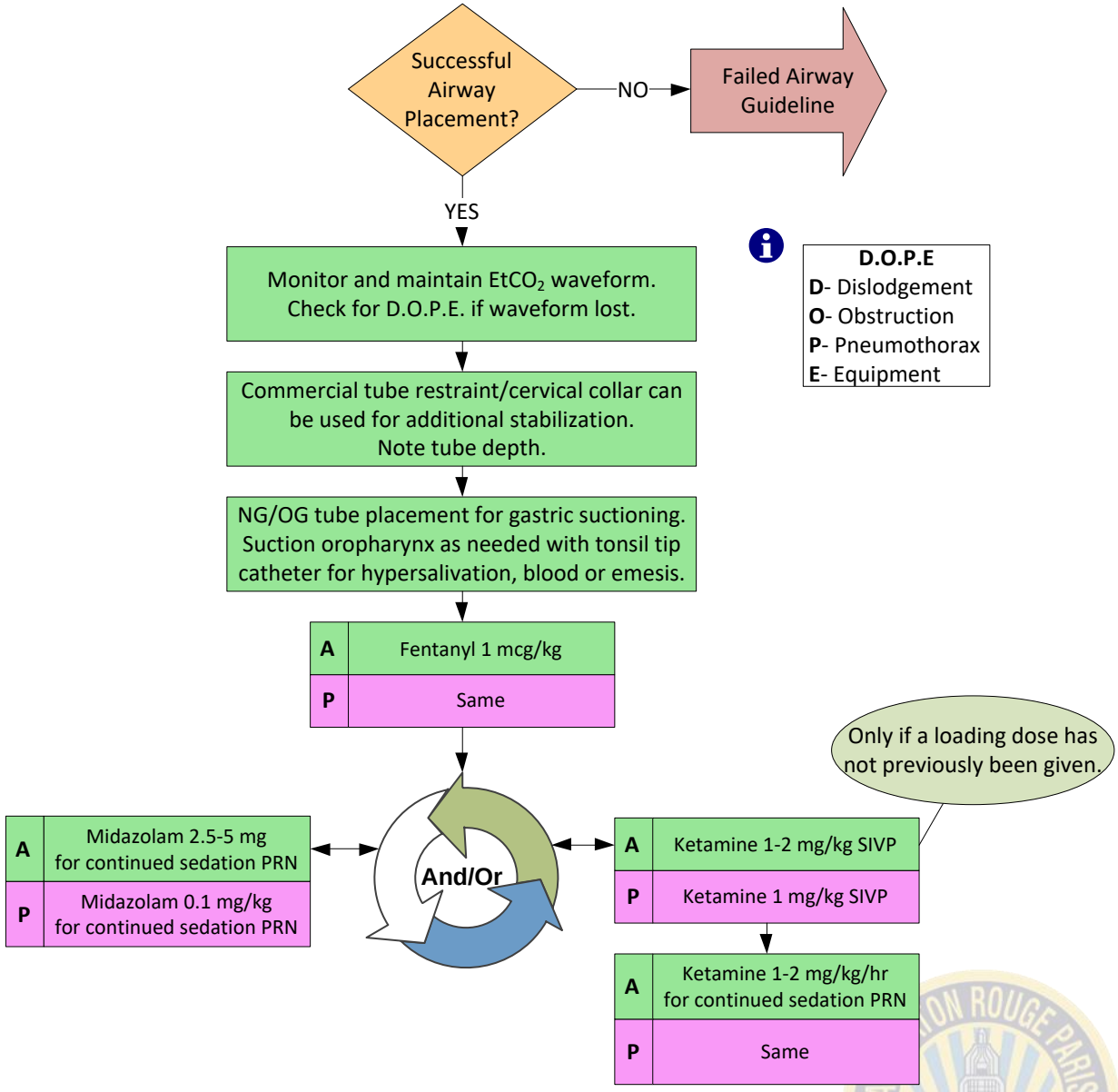
Pearls:

- In some situations, the provider may elect to bypass certain airways when clinical presentation excludes their use. The provider may elect to go straight to a surgical cricothyroidotomy when clinical presentation dictates and when endotracheal intubation and supraglottic airway placement would most likely prove ineffective.
- It is also acceptable to maintain oxygenation/ventilation with basic airway equipment and bag valve mask if deemed effective.
- It is also acceptable to pause the algorithm if the patient's SpO2 is improving and restart it as needed.
- Maintain apneic oxygenation with high-flow nasal cannula until airway can be established.

POST ADVANCED AIRWAY CARE

Patients with advanced airway placement requiring maintenance to ensure and maintain proper placement.

GOALS
- Confirmation and continuous monitoring of airway placement.
- Provide comfortability and tolerability to the patient requiring airway placement.



Pearls:
- Airway must be reassessed each time the patient is moved and frequently during patient care.
- It is imperative to use waveform capnography and capnometry when an advanced airway is placed to continuously monitor patency and appropriate placement.
- $EtCO_2$ monitoring will not identify endobronchial intubation.
- Unresponsive patients still have a physiological response to pain even though they cannot communicate painful stimulus. Pain management should be considered.
- NG/OG tube placement can reduce intrathoracic pressure which will lead to improved circulation.

DO NOT RESUSCITATE

This guideline is to be used in the determination to withhold resuscitation in a patient with obvious signs of death or possible qualifying criteria.

GOALS

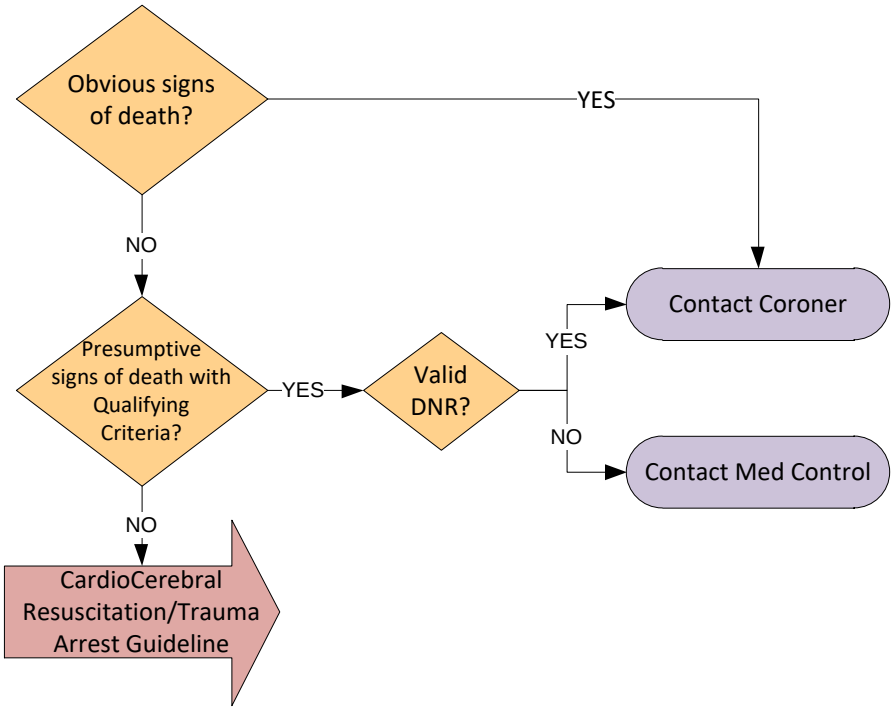
- Prevention of futile attempts at resuscitation when patients present clinically deceased.

Presumptive Signs of Death:

- Unresponsive
- Pulseless
- Apneic
- Fixed/Dilated Pupils

Obvious Signs of Death:

- Tissue Decomposition
- Lividity
- Rigor Mortis
- Injuries Incompatible with life including, but not limited to:
  - Decapitation
  - Catastrophic brain injury
  - Hemicorporectomy
  - Grossly obvious mortal wounds
  - Injuries that do not permit effective administration of CPR



Qualifying Criteria:

- DNR/Advanced Directives/Living Will/LaPOST
- End-Stage terminal illness
- Hospice
- Newborn w/confirmed gestation of <23 weeks
- When sound judgment indicates that resuscitation is unwarranted or futile

Pearls:

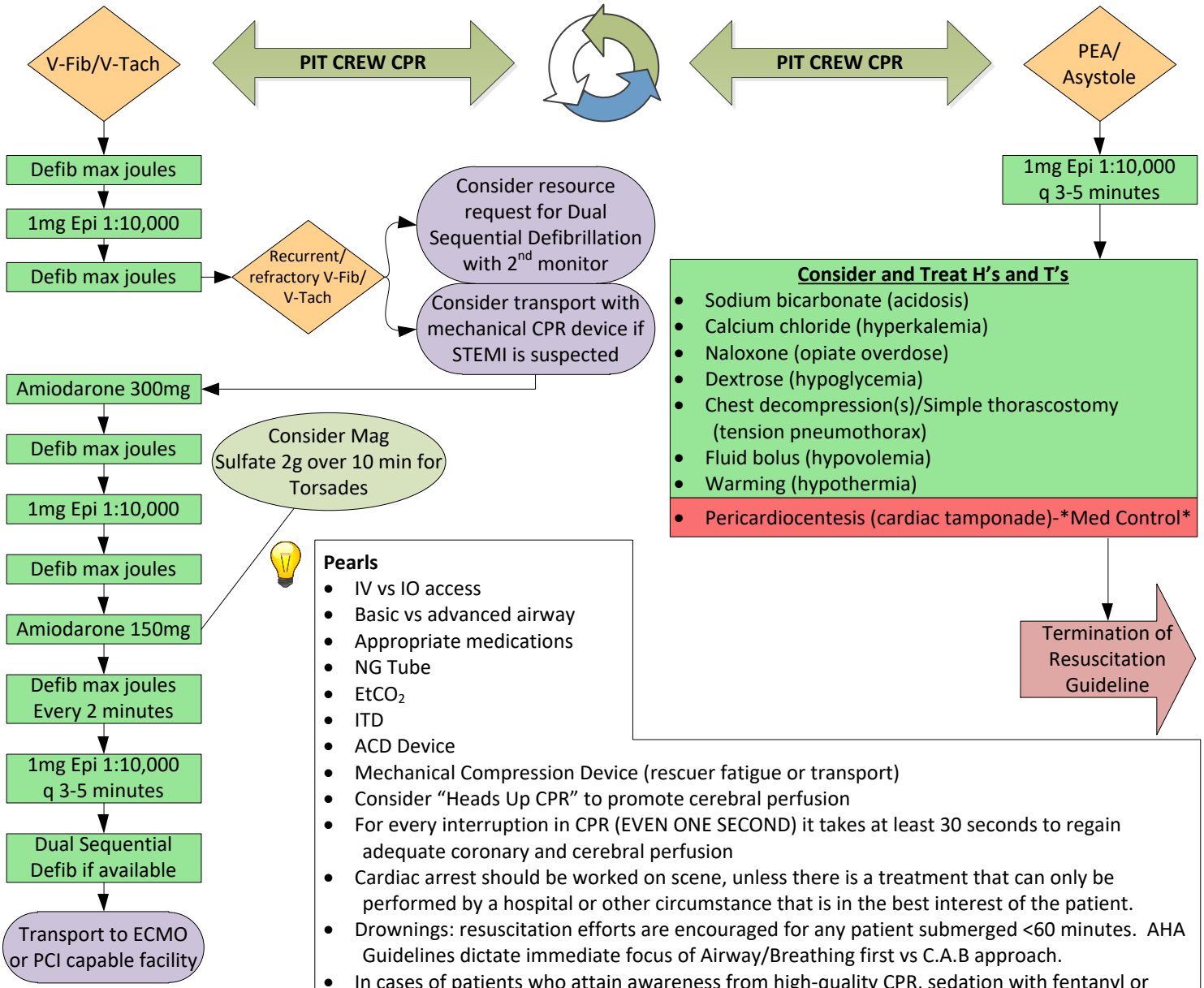
- If possible and appropriate, resuscitation should be initiated when obvious signs of death are not present until Medical Control advises to terminate resuscitation or an obvious sign of death is found after initiating resuscitation.
- If an obvious sign of death is found, the clinician can terminate the resuscitation. The clinician should then contact Medical Control to advise them of what was done.
- If the family's wishes are in conflict with the patient's DNR or living will, Medical Control should be consulted.
- In situations where resuscitation attempts are typically not warranted, clinicians can initiate/continue resuscitation and transport if they feel as if they are in danger. Medical Control can then be contacted for further orders to include continuing ALS care, performing only BLS care, or terminating care (if considered futile) during transport.
- CPR should be withheld if it places the rescuer at risk of physical injury or death.
- Exercise caution before deciding to not attempt resuscitation when in view of the public.
- Resuscitation may be considered if cardiac arrest is not related to DNR orders (trauma, anaphylaxis, choking, etc.). Contact Medical Control.

CARDIO-CEREBRAL RESUSCITATION (ADULT)

Patients that present pulseless and apneic in V-Fib/Pulseless V-Tach and Asystole/PEA.

GOALS

- BLS OWNS THE CODE! High quality chest compressions with early/frequent defibrillations take priority over all ALS treatment.
- Immediate chest compressions, limiting interruptions to 10 seconds or less.
- Compression rate of 100-120/minute
- 2 minute cycles with rhythm analysis and compressor change.
- Rapid identification of shockable rhythm.
- Charge defibrillator 15 seconds before end of cycle or utilize analysis mode with Zoll monitor.
- Peri-shock pause interval (10 seconds or less). Defibrillate or Dump Charge or follow Zoll monitor prompts.
- Limit ventilations to chest rise only at 10 bpm for reduction of intrathoracic pressure.



Pearls

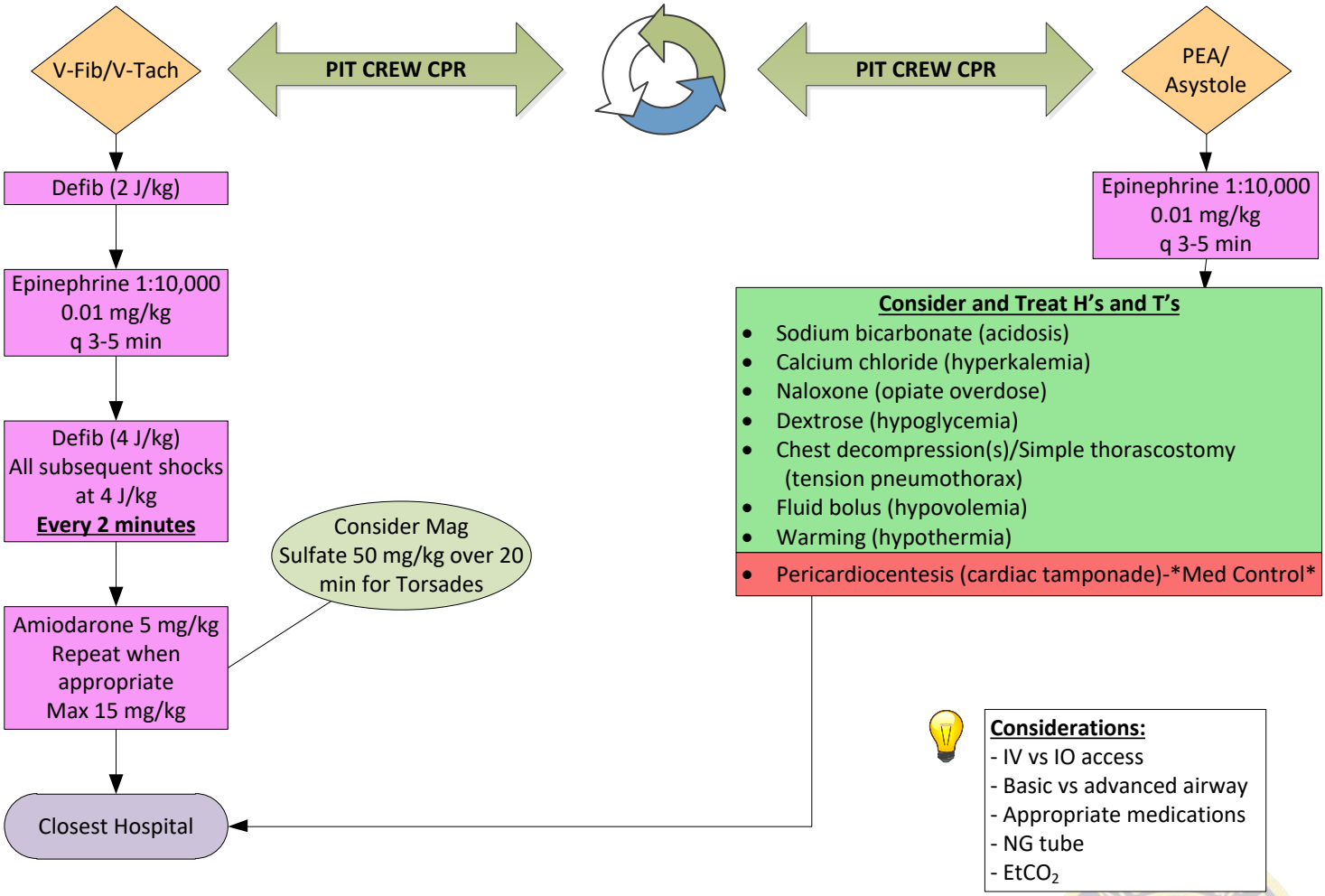
- IV vs IO access
- Basic vs advanced airway
- Appropriate medications
- NG Tube
- $EtCO_2$
- ITD
- ACD Device
- Mechanical Compression Device (rescuer fatigue or transport)
- Consider "Heads Up CPR" to promote cerebral perfusion
- For every interruption in CPR (EVEN ONE SECOND) it takes at least 30 seconds to regain adequate coronary and cerebral perfusion
- Cardiac arrest should be worked on scene, unless there is a treatment that can only be performed by a hospital or other circumstance that is in the best interest of the patient.
- Drownings: resuscitation efforts are encouraged for any patient submerged <60 minutes. AHA Guidelines dictate immediate focus of Airway/Breathing first vs C.A.B approach.
- In cases of patients who attain awareness from high-quality CPR, sedation with fentanyl or ketamine may be warranted.
- Peri-shock pause is defined as the specific interruption in chest compressions prior to and following defibrillatory shock.

CARDIO-CEREBRAL RESUSCITATION (PEDIATRIC)

Patients that present pulseless and apneic in V-Fib/Pulseless V-Tach and Asystole/PEA. Because cardiac arrest often interchanges between shockable and non-shockable rhythms, this guideline focuses on the interchangeability dependent upon rhythm.

GOALS

- BLS OWNS THE CODE! High quality chest compressions with early/frequent defibrillations take priority over all ALS treatment.
- Immediate chest compressions, limiting interruptions to 10 seconds or less.
- Compression rate of 100-120/minute
- 2 minute cycles with rhythm analysis and compressor change.
- Rapid identification of shockable rhythm.
- Charge defibrillator 15 seconds before end of cycle or utilize analysis mode with Zoll monitor.
- Peri-shock pause interval (10 seconds or less). Defibrillate or Dump Charge or follow Zoll monitor prompts.
- Limit ventilations to chest rise only at 10 bpm for reduction of intrathoracic pressure.



Considerations:

- IV vs IO access
- Basic vs advanced airway
- Appropriate medications
- NG tube
- $EtCO_2$

Pearls:

- Respiratory arrest is the leading cause of cardiac arrest in children
- For every interruption in CPR (EVEN ONE SECOND) it takes at least 30 seconds to regain adequate coronary and cerebral perfusion.
- Cardiac arrest should be worked on-scene, unless there is a treatment that can only be performed by a hospital or other circumstance that is in the best interest of the patient.
- Drowning's: resuscitation efforts are encouraged for any patient submerged <60 minutes
- Simple airways are often acceptable for ventilating pediatric patients.

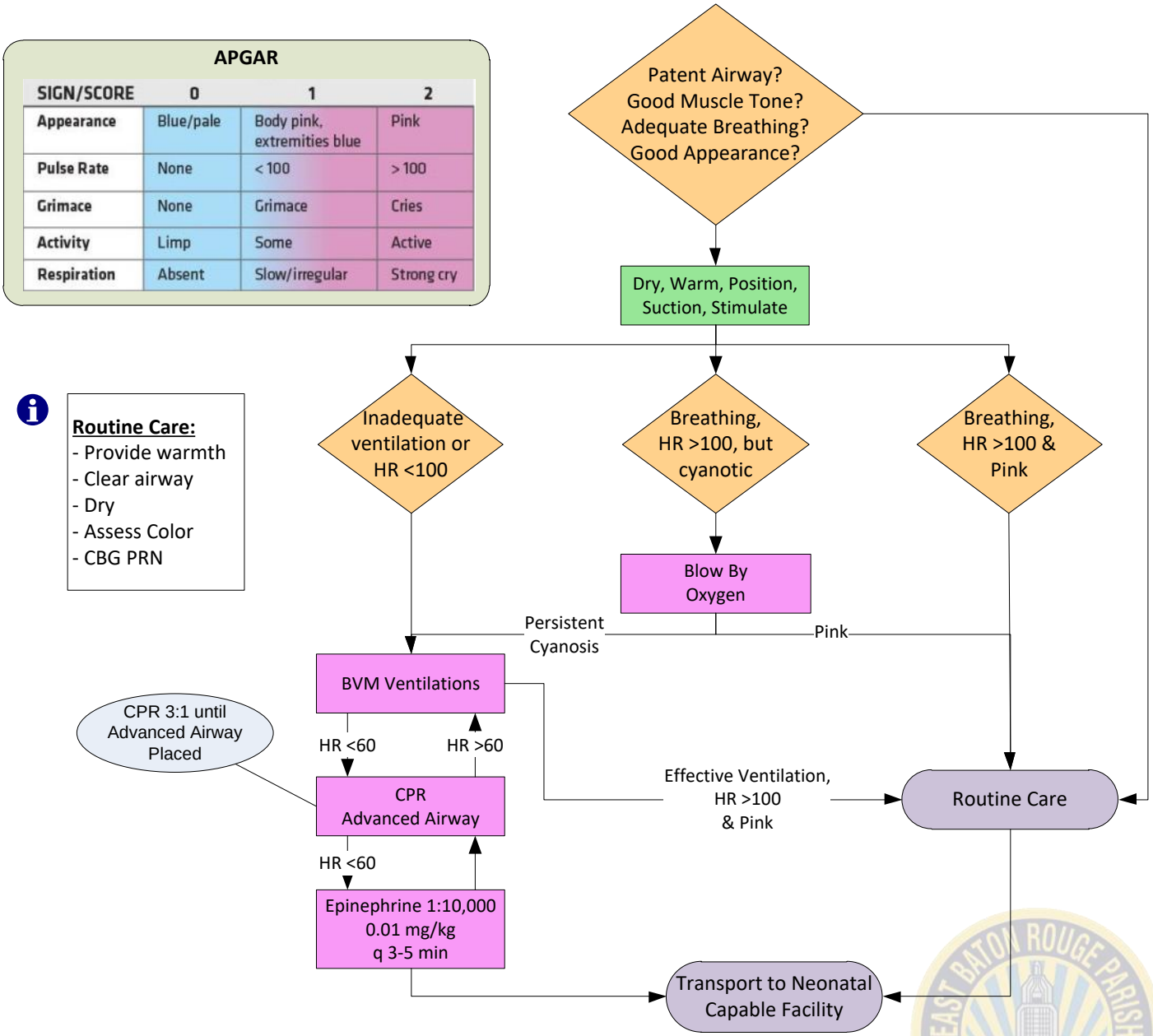
NEONATAL RESUSCITATION

Complications of the newborn child

GOALS
- Maintain/restore oxygenation/ventilation/perfusion of a newborn child.
- Assess APGAR at 1 and 5 minute intervals.

APGAR

SIGN/SCORE	0	1	2
Appearance	Blue/pale	Body pink, extremities blue	Pink
Pulse Rate	None	< 100	> 100
Grimace	None	Grimace	Cries
Activity	Limp	Some	Active
Respiration	Absent	Slow/irregular	Strong cry



Routine Care:
- Provide warmth
- Clear airway
- Dry
- Assess Color
- CBG PRN

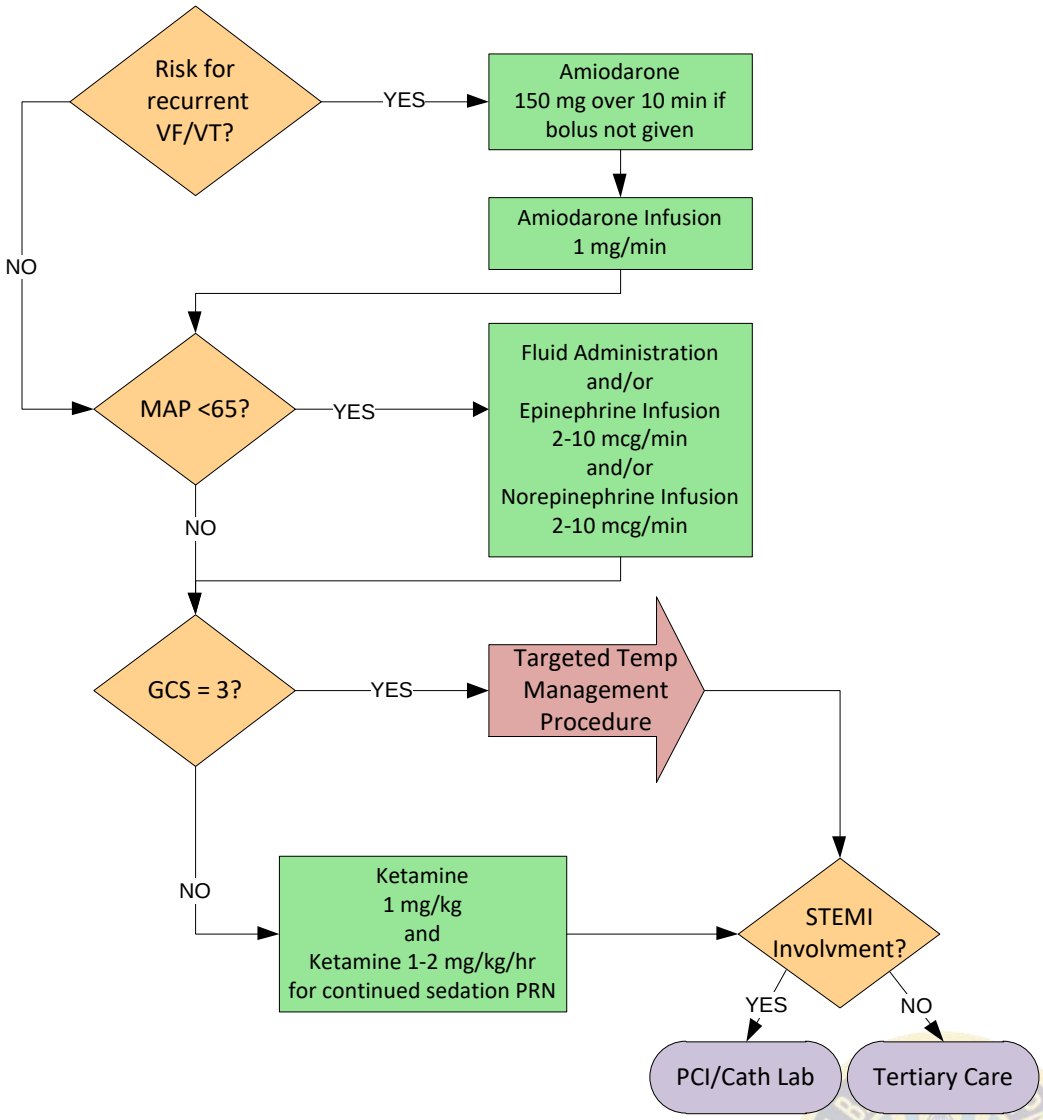
Pearls:
- Heat packs should not be placed directly against the skin
- Each intervention should be trialed for approximately 30 seconds
- Infants who require significant resuscitation should be monitored and treated to maintain glucose >40 mg/dl
- A majority of newborns respond to simple measures
- Cyanosis is determined by examining the face, trunk and mucous membranes
- Treat hypoglycemia for CBG of <40 mg/dl with $D_{10}W$ per Diabetic Guideline

POST RESUSCITATION CARE

Patients that achieve return of spontaneous circulation (ROSC).

GOALS

- REMAIN CALM!
- Maintain ventilation, cardiac and circulatory support
- Rapid identification of STEMI with early hospital notification
- Increase ventricular ectopy threshold
- Reduction of secondary brain injury risk



Pearls:

- Any GCS >3 suggests brain activity. Withhold hypothermia.
- Remove Impedance Threshold Device if it was placed.
- DO NOT HYPERVENTILATE! Maintain ventilations at 10 bpm. Maintain SpO2 between 95-99% to prevent oxygen toxicity. Maintain $EtCO_2$ between 35-45 mmHg.
- A post-resuscitation patient's clinical presentation may change rapidly and frequently.
- Closely monitor patient trends (every 2-5 mins).
- Consider application of a cervical collar to prevent flexion/extension of neck (think distal tube placement).
- PEDIATRICS: Optimize oxygenation and ventilation. Fluids as needed. Contact Med Control PRN.

TERMINATION OF RESUSCITATION

Rules that apply for termination of resuscitation in non-traumatic cardiopulmonary arrest.

GOALS

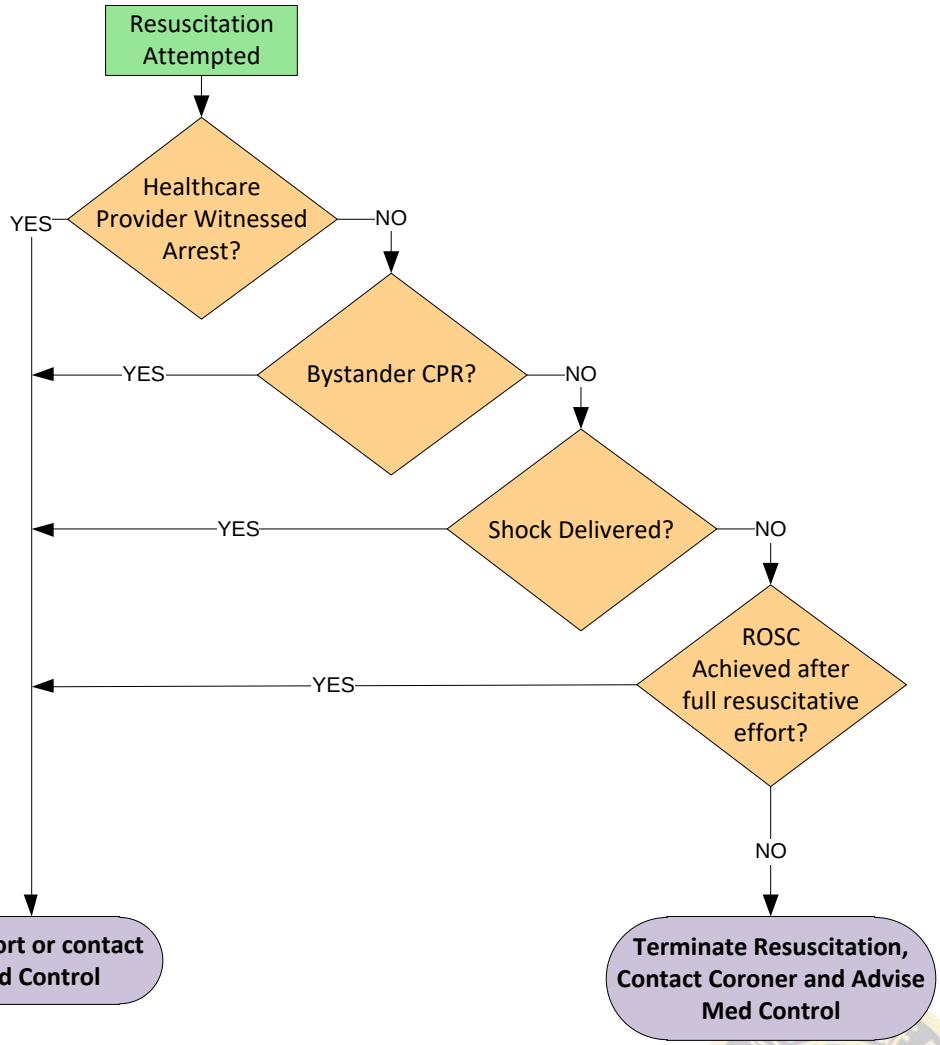
- Reduce the number of unnecessary ambulance transports of patients with no survival benefit
- Ensure appropriate management of the deceased patient
- Provide adequate support to patient's family

TOR Guideline should not be attempted in the following circumstances:

- Trauma
- Pediatrics
- Pregnancy
- Hypothermia
- Lightning Strikes
- Conditions unsafe for EMS Providers

Full Resuscitative Effort:

- Definitive airway
- Vascular Access
- Defibrillation as needed
- 20-30 minutes of treatment following ACLS Guidelines and/or CardioCerebral Resuscitation Guideline



Pearls:

- Patients who present with unwitnessed cardiac arrest, no bystander CPR, an un-shockable rhythm and no ROSC after prehospital care have greater than a 99% predictability of a very poor outcome.
- When TOR rules are implemented, we must ensure appropriate management of the deceased patient in the field and that we provide adequate support services for the patient's family.
- It may not be appropriate to terminate resuscitation when in view of the general public.
- TOR Guidelines should not be applied in situations involving an overdose or toxic exposure when there may be a reversal agent or other treatments available at a hospital not available to EMS.

ACS/STEMI/NSTEMI/ANGINA

ACS refers to a group of conditions due to decreased blood flow in the coronary arteries such that part of the heart muscle is unable to function properly or dies. ACS usually occurs as a result of one of three problems: STEMI, NSTEMI or unstable angina.

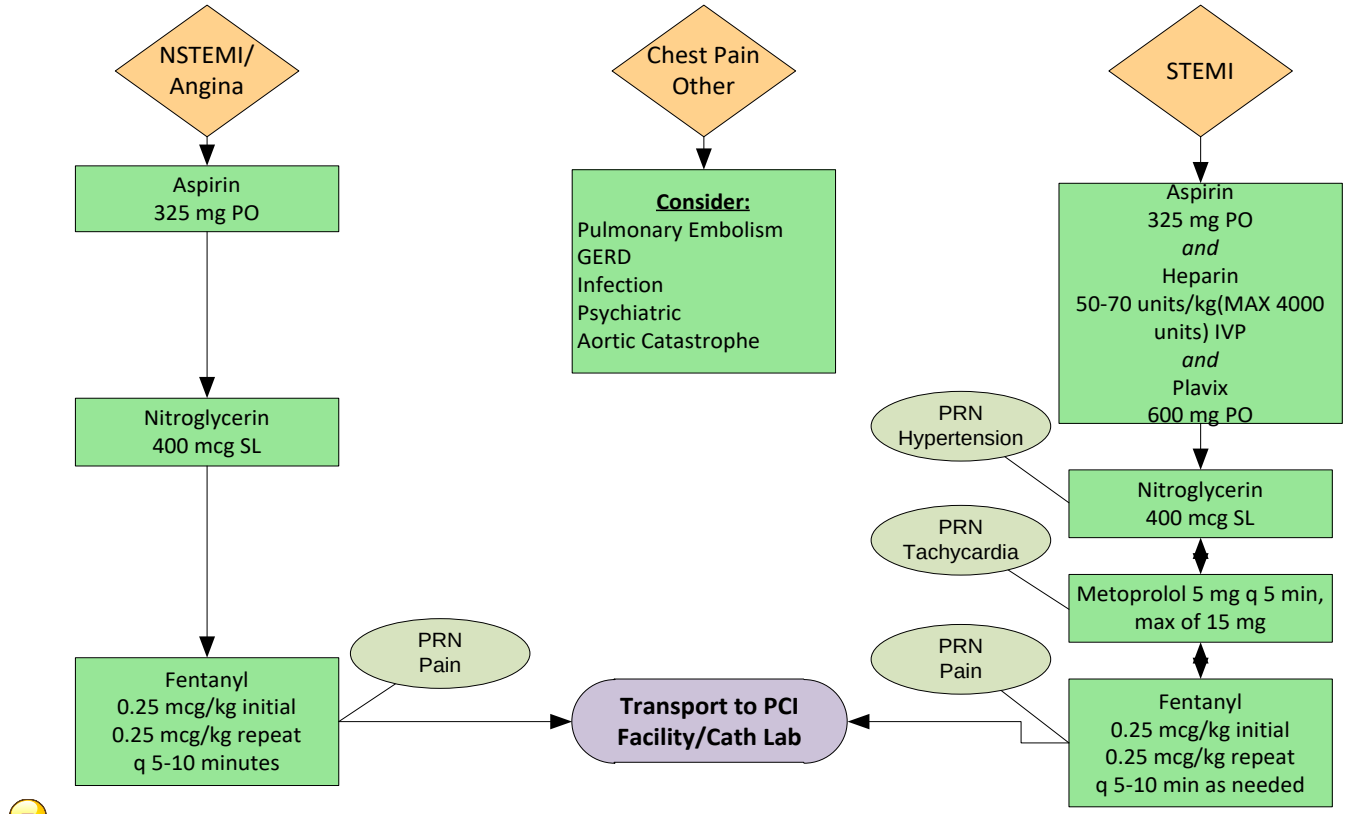
Based on pathology, the two main types of acute myocardial infarctions are:

STEMI: Transmural AMI is associated with a major coronary artery. It can be subclassified into anterior, posterior, inferior, lateral or septal. Transmural infarcts extend through the whole thickness of the heart muscle and are usually a result of complete occlusion of the area's blood supply. In addition, ST elevation and Q waves are seen on the ECG.

NSTEMI: Subendocardial AMI involves a small area in the subendocardial wall of the left ventricle, ventricular septum, or papillary muscles. The subendocardial area is particularly susceptible to ischemia. In addition, ST depression and possibly T wave changes may be seen on the ECG.

GOALS

- Reduction of platelet aggregation, cardiac workload, and cardiac oxygen demand. Control pain, blood pressure and heart rate
- Promote the body's natural clot lysis mechanisms to work normally.
- Rapid identification for STEMI to include continuous 12-lead monitoring and early notification to the receiving facility
- Reperfusion of occluded artery at a Primary PCI facility within 90 minutes of first EMS contact



Pearls:

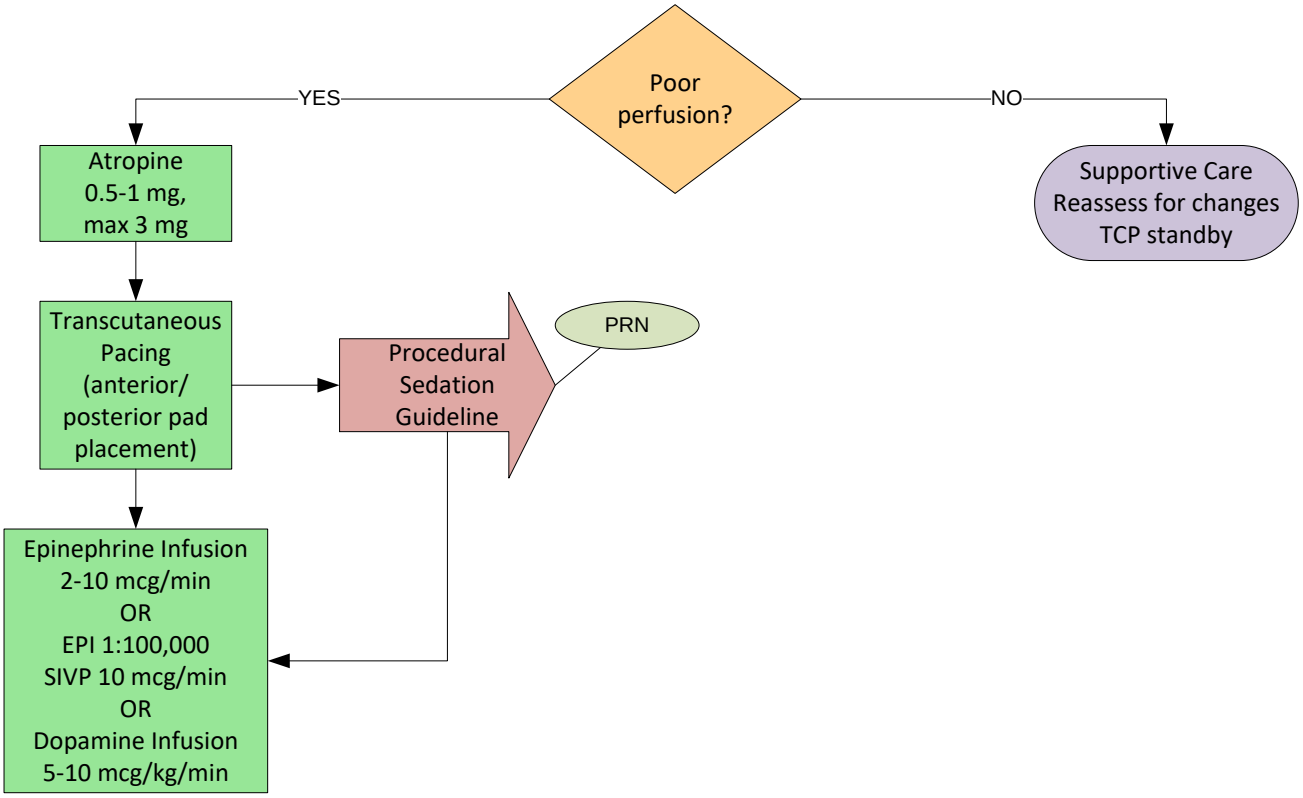
- Early hospital notification; destination determination/capability.
- Limit scene time to 15 minutes or less.
- Be prepared for sudden ventricular fibrillation or pulseless ventricular tachycardia; defibrillate **(Attach Defib Pads)**.
- Patients that present with hypotension or relative hypotension should not receive preload reducing medications and may need to be treated under the cardiogenic shock guideline
- Patients treated for ACS and initial EKG is negative for STEMI require continuous 12-Lead monitoring and/or serial 12-Lead EKG's at 5 minute intervals.
- Heparin should be considered for pt's who have ST elevation presumed to be caused by ACS involving a blockage of a coronary artery. Situations where Heparin is not indicated include ST elevation presumed to be caused by infection, inflammation, drug use, systemic hypoxia or other STEMI imposters.
- Heparin should be withheld in pt's with active bleeding and/or stroke-like symptoms.
- Oxygen is not recommended for SPo2 ≥92% room air.
- HTN is defined as a systolic and diastolic >140/90 mmHg

BRADYCARDIA (ADULT)

Patients that present with a heart rate less than 60 bpm that is inadequate for clinical condition.

GOALS

- Increase cardiac output
- Increase intrinisic rate
- Improve organ perfusion



Pearls:

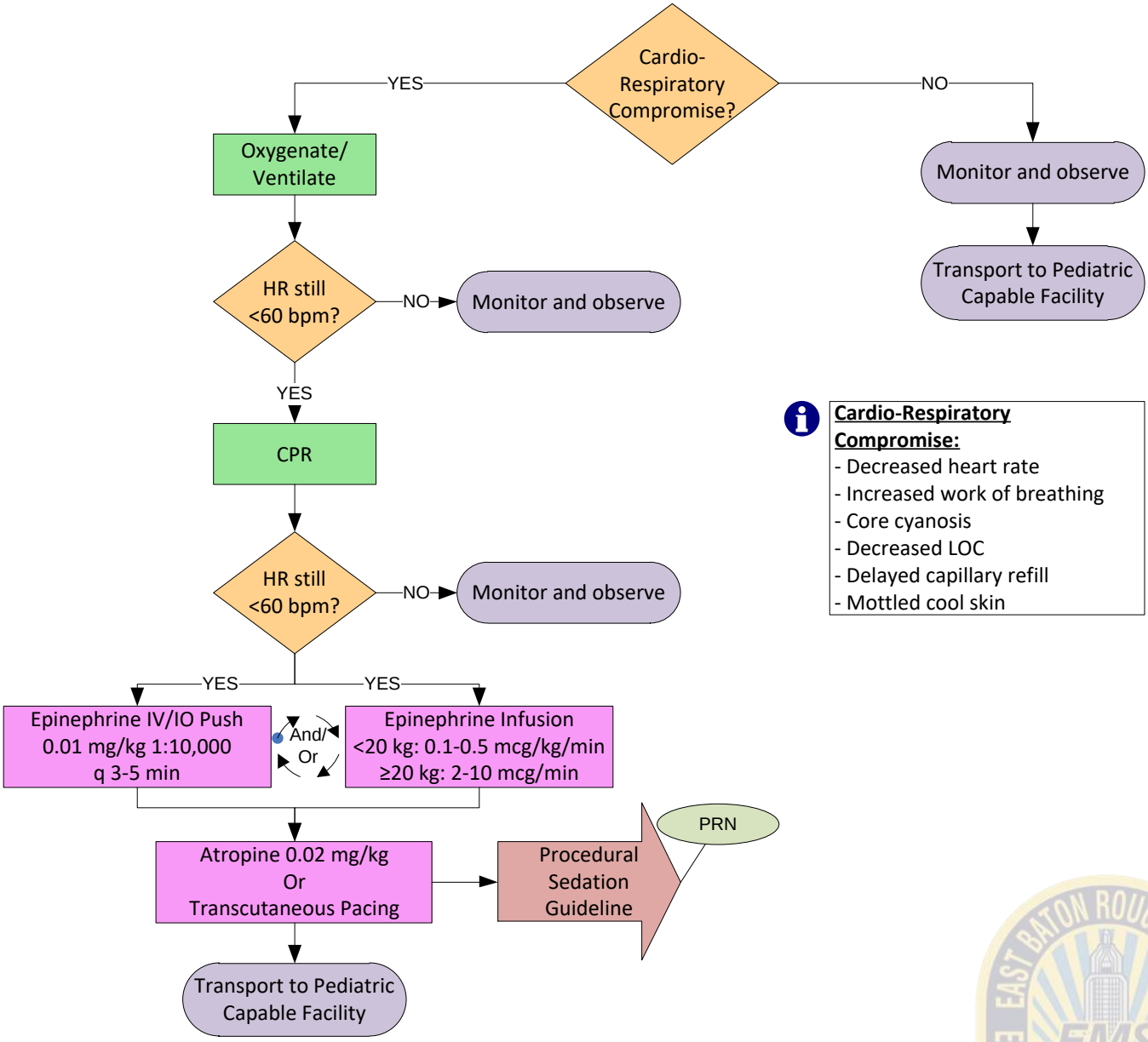
- Denervated transplanted hearts will not respond to atropine; TCP is the treatment of choice.
- TCP is the treatment of choice for high degree AV blocks (type II AV block and new Third Degree block with wide QRS complexes).
- DO NOT DELAY TCP for IV access if the patient is hemodynamically unstable.
- Use atropine with caution in patients with possible MI and/or ST segment changes.
- TCP STANDBY = Attach pacing pads anterior/posterior and observe for deterioration.

BRADYCARDIA (PEDIATRIC)

Patients that present with a heart rate less than 60 bpm that is inadequate for clinical condition.

GOALS

- Increase cardiac output
- Increase intrinisic rate
- Improve organ perfusion



Cardio-Respiratory Compromise:

- Decreased heart rate
- Increased work of breathing
- Core cyanosis
- Decreased LOC
- Delayed capillary refill
- Mottled cool skin

Pearls:

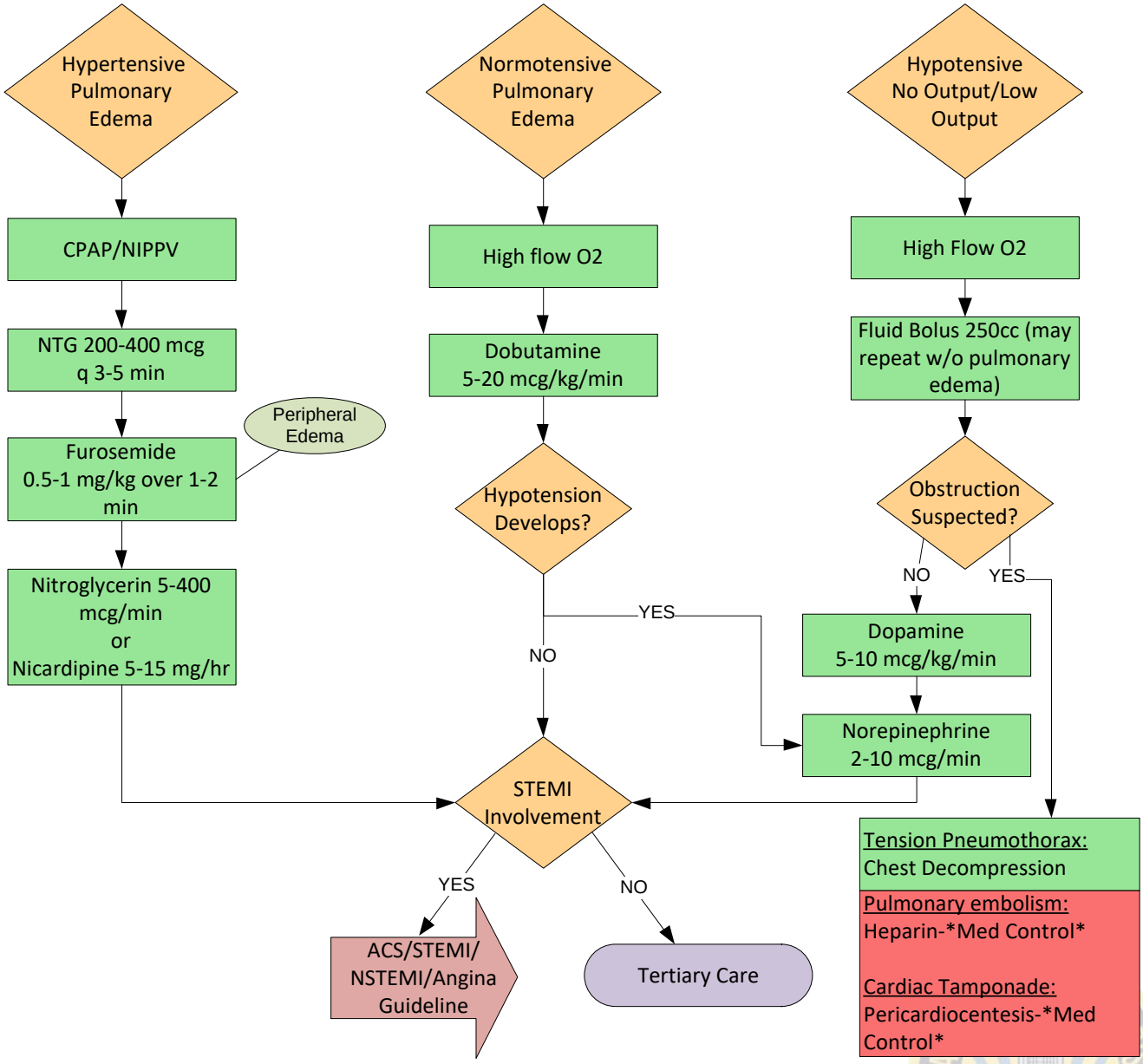
- Hypoxia due to respiratory complications is the most common reason for bradycardia and cardiac arrest in children
- Hypoglycemia, narcotic ingestion and severe dehydration may be the cause of bradycardia

CHF/Cardiogenic Shock

Patients that present with disruptive circulation caused by the heart or obstruction of the heart, resulting in respiratory failure and/or shock.

GOALS

- Improve cardiac contractility
- Correct hypoxia and ensure proper ventilation management
- Control blood pressure, pre-load and after-load



Pearls:

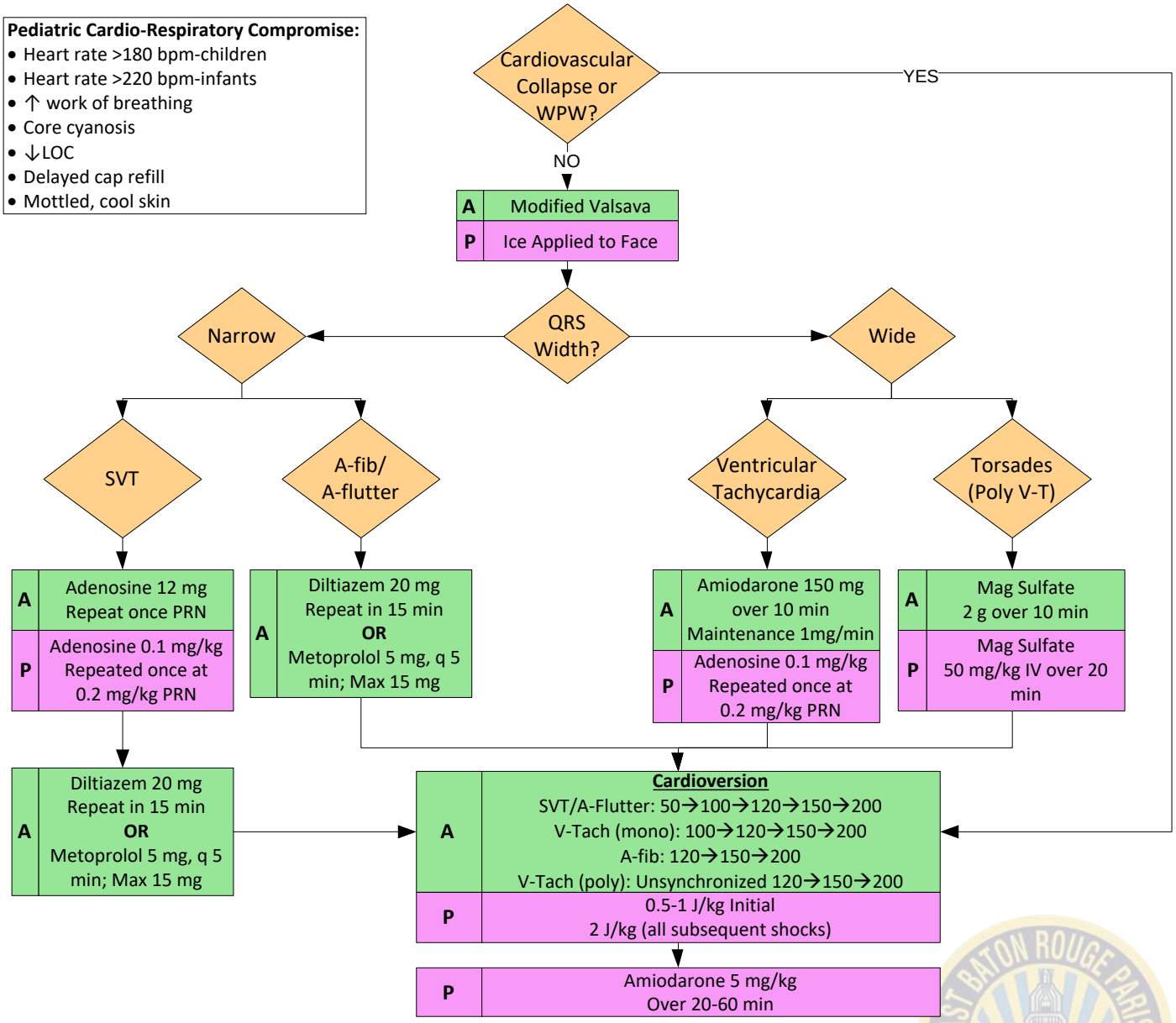
- Avoid interruptions in CPAP when possible (IV NTG vs SL NTG).
- Normotensive patients with pulmonary edema can deteriorate into cardiogenic shock rapidly
- Consider myocardial infarction in all of these patients. Aspirin 325 mg PO may be appropriate, if tolerable
- All efforts at verbal coaching should be utilized prior to Anxiolytic administration
- Patients that fail to respond to oxygen and/or NIPPV may require advanced airway management and ventilatory support.
- If the decision is made to initiate an IV infusion of NTG or nicardipine, you should discontinue SL and/or IV bolus doses

TACHYCARDIA

Tachycardias causing hemodynamic instability.

GOALS
- Increase diastole interval allowing adequate heart refill.
- Slow conduction time and interrupt re-entry pathways through the AV node.
- Suppress activity of the SA and AV nodes and prolong their refractory periods.

Pediatric Cardio-Respiratory Compromise:
- Heart rate >180 bpm-children
- Heart rate >220 bpm-infants
- ↑ work of breathing
- Core cyanosis
- ↓LOC
- Delayed cap refill
- Mottled, cool skin



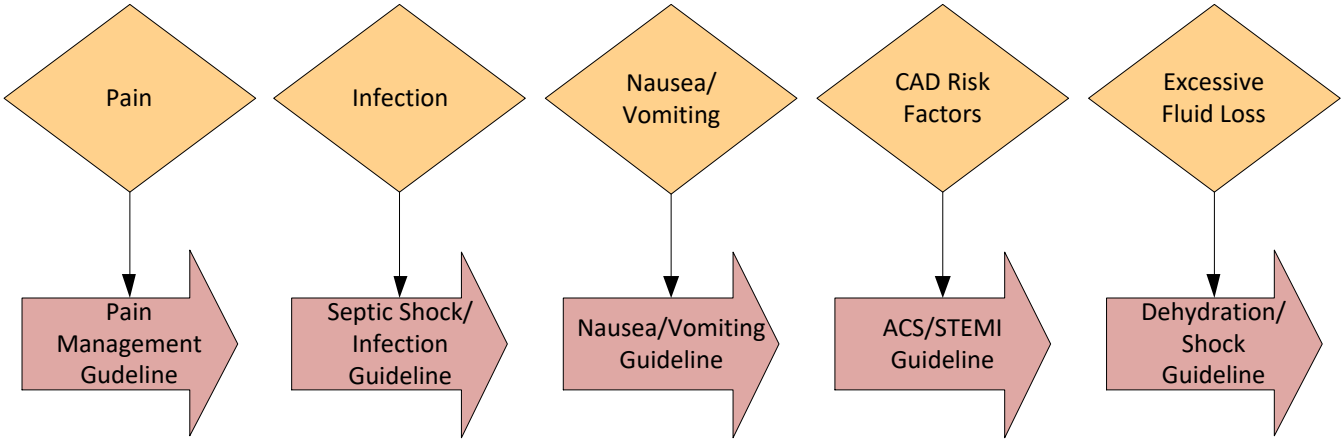
Pearls:
- Heart rates <150 bpm seldom cause cardiovascular compromise
- Sinus tachycardia suggests underlying medical condition. (Treat appropriately)
- Do not give calcium channel blockers (Diltiazem) to Wolff-Parkinson-White (WPW).
- If the pt has a history of WPW or a 12-lead showing WPW, withhold calcium channel blockers, beta blockers and adenosine. Treatment should only include Modified Valsalva, Cardioversion or Amiodarone.
- Use caution with adenosine in asthma patients.
- When rhythm regularity determination is not practical and the QRS is narrow, adenosine is acceptable to "slow the rate".
- Amiodarone may be used as an alternate treatment for tachyarrhythmias under medical control direction.

ABDOMINAL COMPLICATIONS

Abdominal cavity complications of a medical nature.

GOALS

- Manage pain/discomfort and nausea
- Manage fluid loss and or hemorrhage
- Complete OPQRST assessment



Pearls:

Abdominal Complications can include hemorrhage, infection, inflammation and obstruction to any of the various organs, vasculature and/or tissue. Pain is the most common complaint.

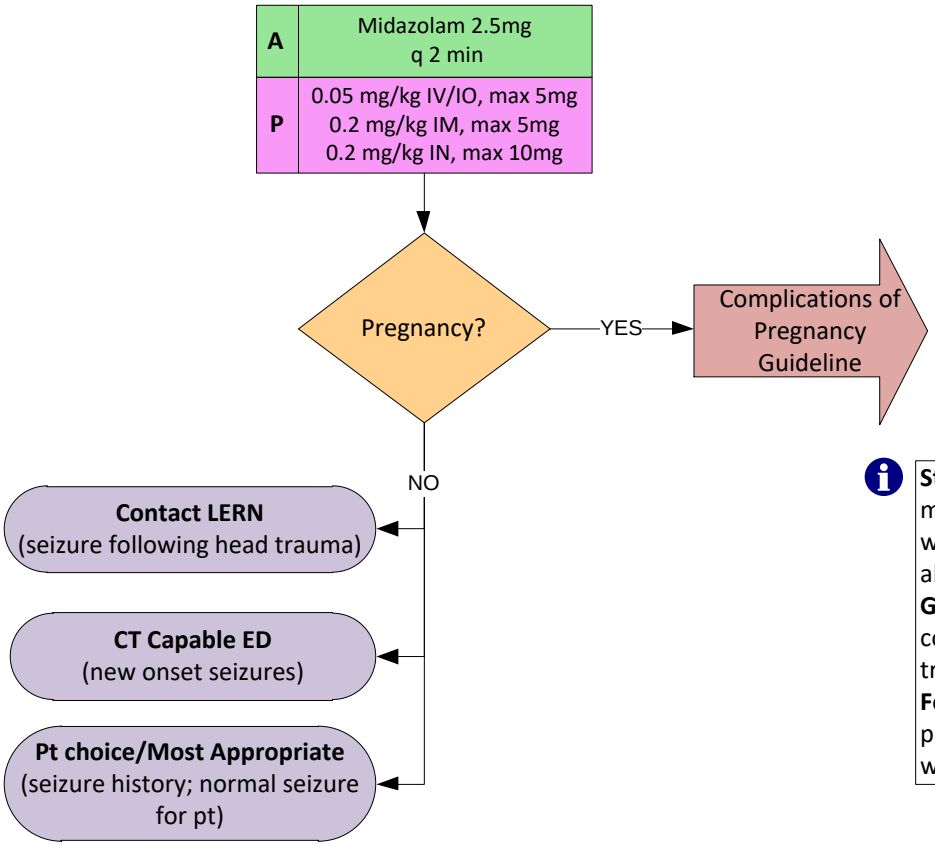
- Abdominal pain/discomfort may be the only symptom of a patient with Acute Myocardial Infarction
- Females of child bearing age should be suspected of ectopic pregnancy
- DKA can present with severe abdominal cramping due to hypovolemia
- Consider cardiac etiology inpatients >50 y/o, DM and/or female with increased abdominal complaints
- Consider Anaphylaxis in cases of abdominal cramps, vomiting and diarrhea in the presence of a possible trigger
- Consider Aortic Catastrophe in the elderly or over the age of 50 with CAD risk factors that present with hypotension/hypovolemia and abdominal pain

ACTIVE SEIZURE(S)

Varied observations of uncontrolled jerking movement (tonic/clonic seizure) to momentary loss of awareness (absent seizure), caused by the abnormal excessive or synchronous neuronal activity of the brain

GOALS

- Protect patient from further injury.
- Airway Maintenance.
- Reduce CNS response via benzodiazepine administration.



Eclampsia: A severe hypertensive disorder (>140/90) of pregnancy characterized by convulsions and coma, occurring between 20 weeks gestation and up to 6-8 weeks postpartum.

Status Epilepticus: A prolonged seizure (>5 minutes) or a series of repeated seizures without a return to consciousness within about 5 minutes.
Grand Mal Seizure: Associated with loss of consciousness, incontinence and tongue trauma.
Focal Seizure (Petit Mal): Affects only one part of the body and is not usually associated with loss of consciousness.

Pearls:

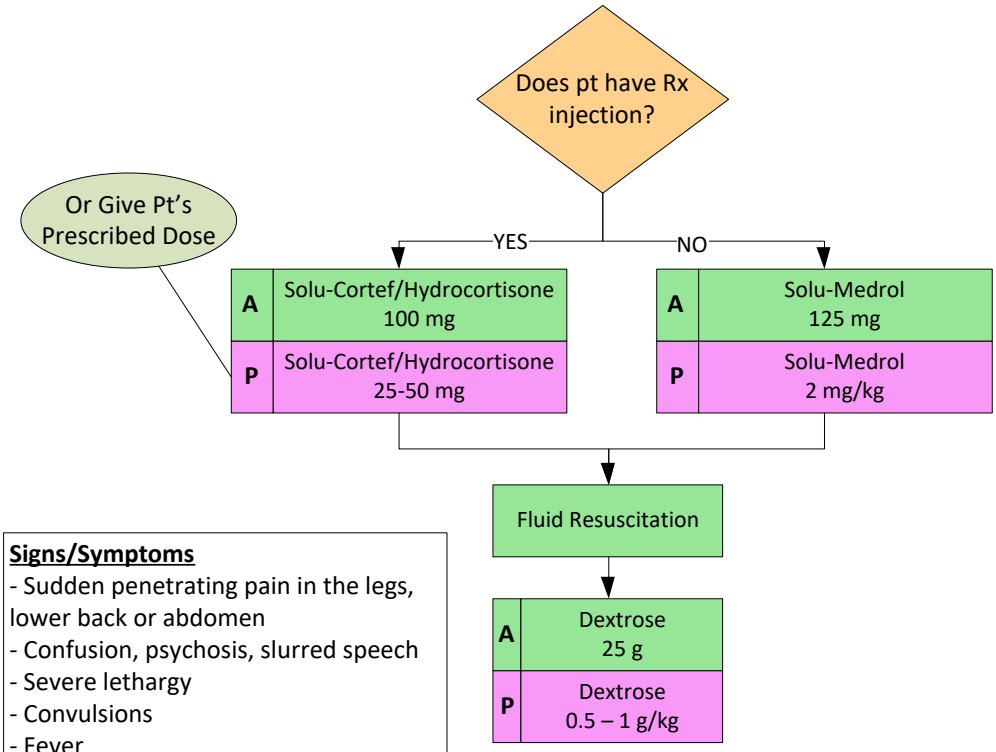
- Midazolam IM is usually effective in terminating seizures. Do not delay IM route for failed IV/ IO access. Consider double dose for IM.
- Anticipate airway problems and recurrent seizures.
- Treat hypoglycemia under diabetic guideline.

ADRENAL CRISIS

Acute adrenal insufficiency is a medical emergency and potentially life-threatening situation requiring immediate emergency treatment. It is a constellation of symptoms that indicate severe adrenal insufficiency caused by insufficient levels of the hormone cortisol.

GOALS

- Give injection of steroid, typically hydrocortisone.
- Treat hypoglycemia as needed.
- Fluid support



Signs/Symptoms

- Sudden penetrating pain in the legs, lower back or abdomen
- Confusion, psychosis, slurred speech
- Severe lethargy
- Convulsions
- Fever
- Hyperkalemia
- Hypercalcemia
- Hypoglycemia
- Hyponatremia
- Hypotension
- Hypothyroid
- Severe vomiting and diarrhea
- Syncope

Pearls:

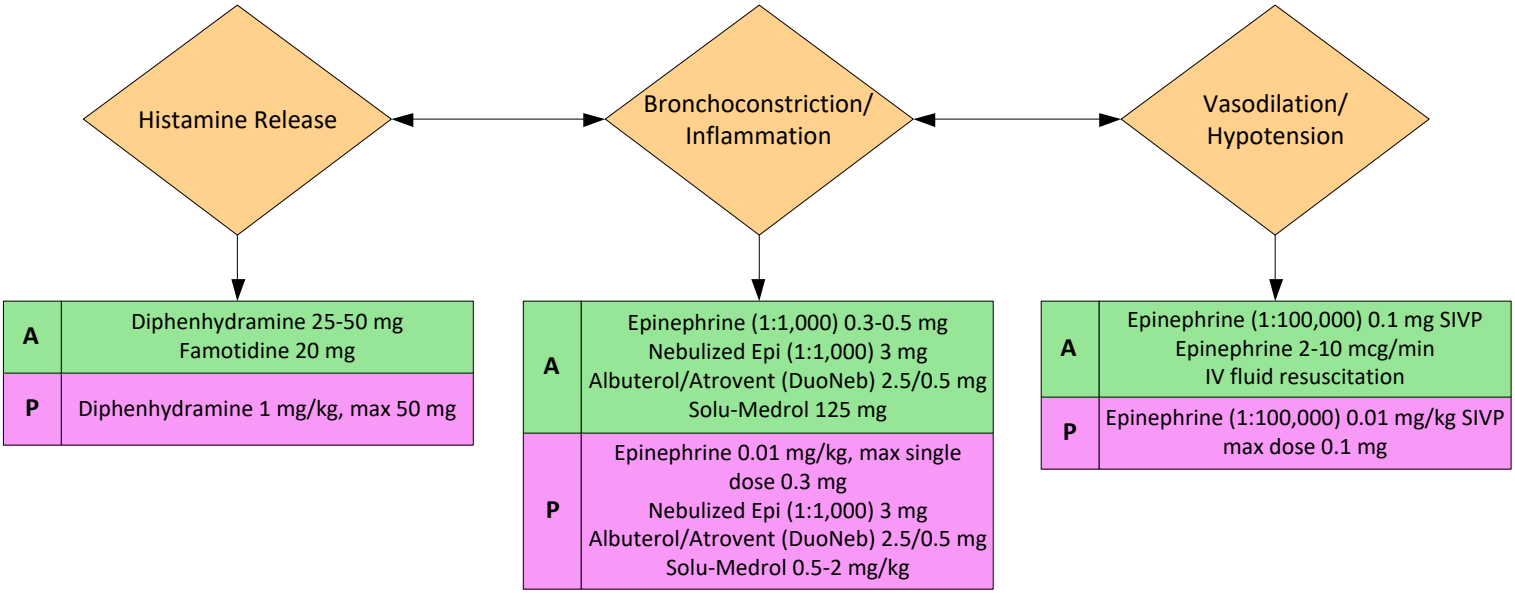
- EMS will not carry this Solu-Cortef/Hydrocortisone, but if it is available then the Paramedic may administer it.
- Patients that are prone to Adrenal Crisis may have a prescription on hand.

ALLERGIC REACTION/ANAPHYLACTIC SHOCK

Sensitivity to allergens that come into contact with skin, nose, eyes, respiratory tract and/or GI tract resulting in misguided reaction of the immune system. These reactions may manifest from a mild local reaction and/or a moderate generalized reaction into anaphylactic shock. The severity of the reaction shall determine the level of treatment.

GOALS

- Histamine blockade
- Inflammation control
- Bronchodilation
- Vasoconstriction for distributive shock



Reaction Severities

Mild: rash, pruritus, and urticaria; excluding the face

Moderate: "mild reaction" with "normal perfusion", angioedema without airway compromise. Urticaria and pruritus to the face, minor wheezing may be present. N/V and/or abdominal pain with associated GI symptoms.

Severe: Respiratory compromise, angioedema and wheezing.

Anaphylactic Shock: Hypotension with evidence of poor perfusion leading to cardiovascular collapse. Pruritus and uticaria may not be evident secondary to poor perfusion. Itching (pruritus) may not be experienced.

Pearls:

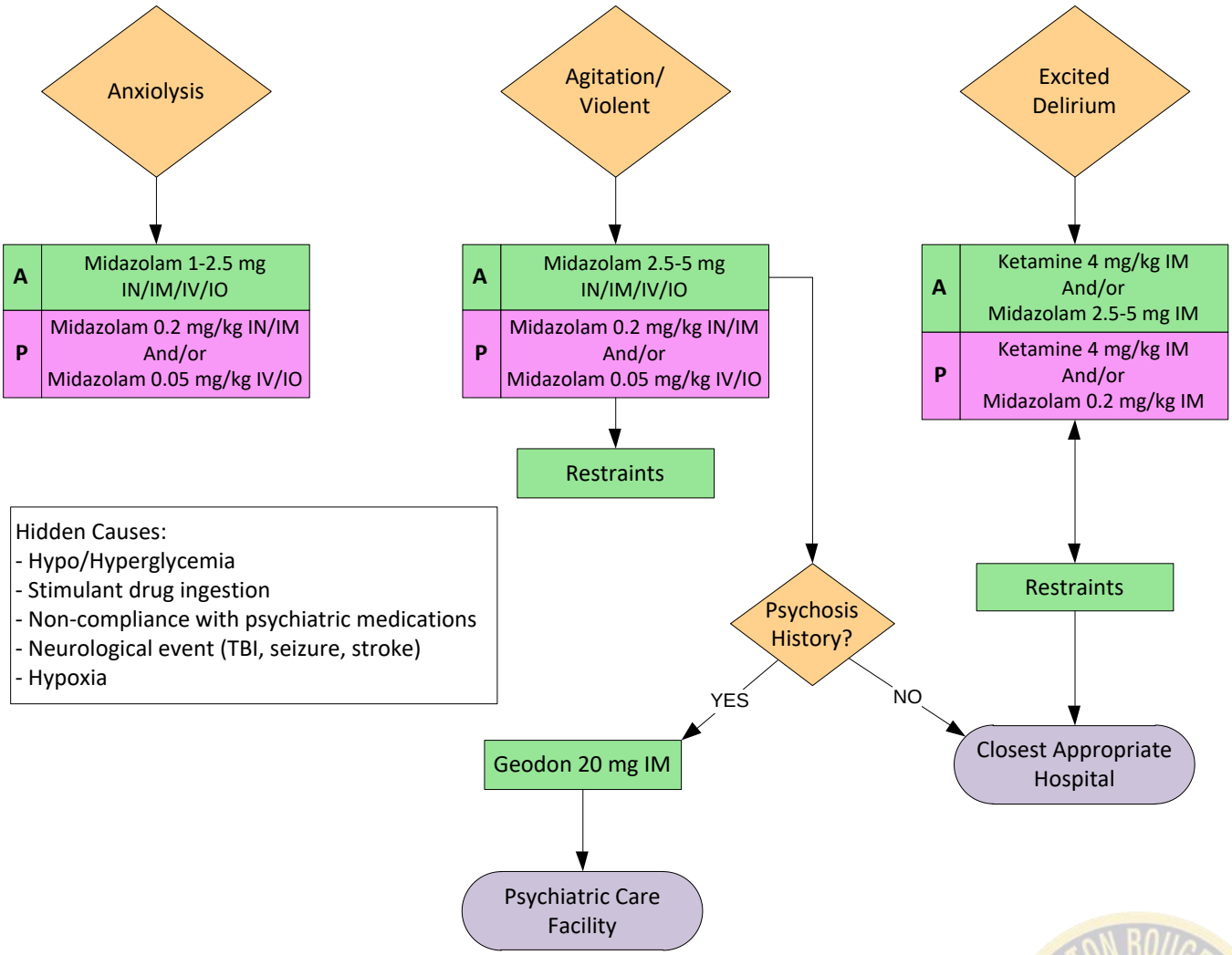
- Caution MUST be used in administering epinephrine to patients over the age of 50 and/or to patients with known cardiovascular disease, renal failure, and/or COPD. When treating these patients with epi, reduce the dose by half and monitor cardiac ischemia with continuous 12 Lead.
- Consider a severe reaction when responses from 2 or more body systems (cutaneous, respiratory, cardiovascular, neurologic or GI) are noted. Cardiovascular and respiratory systems may not always be involved in a severe reaction
- When 2 or more body systems are involved, Epinephrine should be administered.
- Isolated severe angioedema may be secondary to ACE Inhibitors and is NOT and allergic reaction.
- Cardiac arrest can occur as soon as 5 minutes after medication induced anaphylaxis; 15 minutes for insects and 30 minutes for food.

ANXIOUS/VIOLENT/AGITATED

A patient who exhibits violent and/or agitated behavior where crew, public and/or patient safety is compromised. Focused assessments and patient care are unable to be adequately performed.

GOALS

- Physical and chemical restraints to prevent injury to providers and/or patient.
- Gain control of certain patient's requiring medical assessment and/or treatment
- Calm, safe transport to the ED
- Rule out hidden, reversible causes
- Reduce patient anxiety during certain medical procedures



Hidden Causes:
- Hypo/Hyperglycemia
- Stimulant drug ingestion
- Non-compliance with psychiatric medications
- Neurological event (TBI, seizure, stroke)
- Hypoxia

Pearls:

- Never restrain patient face down!
- Excited delirium signs include agitation, delirium, anxiety, hallucinations, dilated pupils, violent bizarre behavior/ paranoia, increased strength, hyperthermia/nakedness, and incoherent speech or shouting.
- Geodon is reserved for psychosis related patients ONLY!

ASTHMA (ADULT)

A common inflammatory disease of the lungs characterized by airway obstruction secondary to narrowing of the bronchioles. The narrowing is caused by spasms of smooth muscle, edema of the small airways and presence of mucus in the airway resulting from an immunological reaction.

GOALS

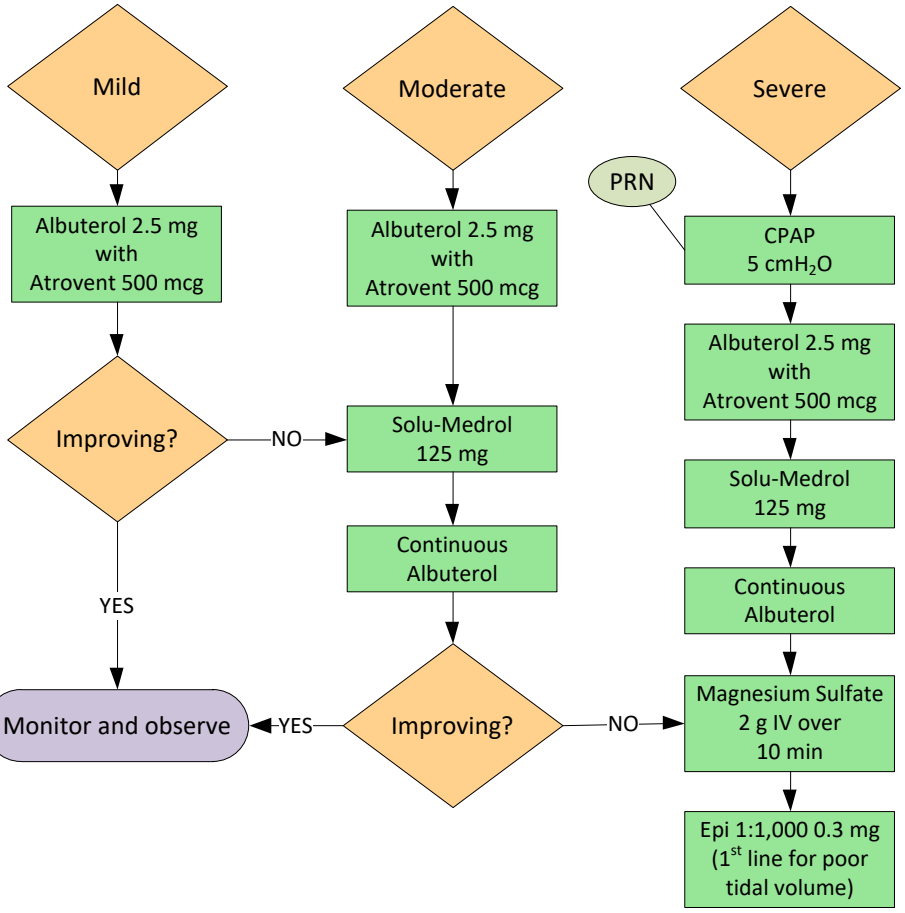
- Bronchodilation
- Reduce hypercapnia and intrinsic peep
- Reduction of airway swelling

Levels of Severity:

Mild-Wheezing, no accessory muscle use, no nasal flaring, able to complete whole sentences.

Moderate-Wheezing, minimal accessory muscle use and nasal flaring, difficulty completing sentences, decreased peak flow.

Severe-Diffuse wheezing, or absence thereof with obvious dyspnea, full accessory muscle use, nasal flaring and decreased peak flow.



Pearls:

- Patients >60 years of age with a cardiac history and/or renal failure should use extreme caution if giving magnesium sulfate or epinephrine.
- Atrovent onset is 20 minutes with peak action 60-90 minutes and is limited to 1 dose
- Corticosteroids are one of the only proven treatments for inflammatory response in asthma. (6 hour effect window; aids in reducing the possibility of hospital admission).
- CPAP can be used to help splint airways open to allow for adequate exhalation.
- $EtCO_2$ is a great tool for measuring patient response to treatment.
- Consider continuous albuterol for moderate/severe patients
- Consider Epi IM 1st line in cases of decreased tidal volume or decreased mental status.
- Beta-blocker medication should be withheld when β agonist medication is being administered. Patients with significant hypertension may need to be treated with Mag Sulfate.
- Wheezing can also be a sign of pulmonary edema in CHF. Wheezing does not always equate to asthma or other obstructive airway disorders.

COMPLICATIONS OF PREGNANCY

Complications that arise pre and post-partum.

GOALS

- Appropriately manage complications of pregnancy.
- Lower blood pressure in symptomatic pre-eclampsia and eclampsia to 140-150/90-100 mmHg.

Cardiac Arrest

- Rescuer dedicated to uterine displacement
- Suspect PE or STEMI
- Cardio-Cerebral Resuscitation Guideline

Hemorrhage

- -Fluid
  -Positioning
  -Rapid Transport
- TXA
  1 g IV over 10 min
  for postpartum
  hemorrhage

Pre-Eclampsia

- Mag Sulfate
  2 g IV over 10 min
- Labetalol 20 mg
  if BP >160/110
  (May repeat or
  double q 10 min)

Eclampsia

- Mag Sulfate
  4 g IV over 10 min
- Midazolam
  5mg
- Labetalol 20 mg
  if BP >160/110
  (May repeat or
  double q 10 min)

Pre-Eclampsia S/S
Hypertension with:
- Edema
- Headache
- Nausea/vomiting
- Vision changes
- Shortness of breath
- RUQ pain

Eclampsia – A severe hypertensive disorder of pregnancy characterized by convulsions and coma, occurring between 20 weeks gestation and 6 to 8 weeks post-partum.

Pearls:

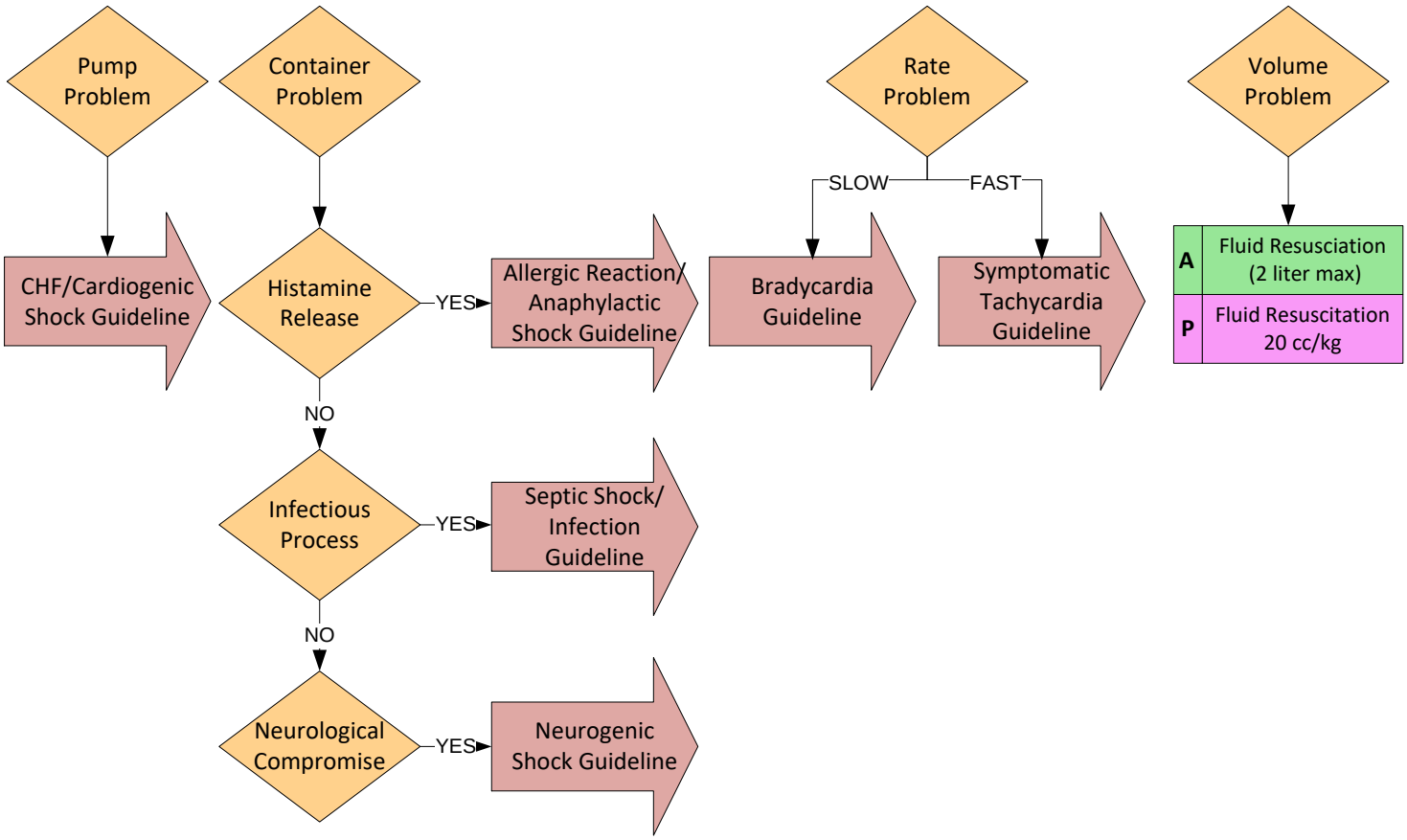
- Monitor blood pressure closely. Magnesium Sulfate also has anti-hypertensive properties. Ensure that blood pressure is not excessively lowered.
- Placenta Previa occurs in the last trimester or late mid-trimester and is characterized by painless bright red vaginal hemorrhage
- Abruptio Placentae occurs between 20 weeks of gestation and birth and is characterized by painful venous or arterial minor to heavy vaginal hemorrhage
- Ectopic pregnancy occurs in the early stages of pregnancy and are most commonly implanted in the fallopian tube. Characterized by painful hemorrhage of varying degrees
- Consider transporting the OB patient in the Left Lateral Recumbent position to prevent supine hypotension or if hypotension is present.
- A fundal height at the umbilicus is approximately 20-24 weeks gestation and at the xiphoid process is approximately 36 weeks gestation.

DEHYDRATION/SHOCK

A potentially life threatening condition secondary to a loss of blood products or free water which leads to end organ failure. Blood products include plasma, whole blood, and/or sodium.

GOALS

- Maximize oxygen delivery and ventilation
- Restore blood flow
- Fluid resuscitation



Pearls:

- Hypovolemic/Hemorrhagic (Non-traumatic) shock: is a VOLUME PROBLEM. Causes include excessive vomiting, diarrhea, polyuria, excessive sweating, burns, internal/external hemorrhage (non-traumatic), tachypnea and poor oral fluid intake. Patients may present with cold/clammy skin, increased shallow breathing, elevated heart rate, altered mental status, pale/cyanotic/dry mucous membranes.
- Blood pressure is a "late sign" of dehydration. Patient can be normotensive or even hypertensive (relatively) and be dehydrated, requiring fluid resuscitation.
- For DM Type 1 pediatric patients, fluid resuscitation is 10 cc/kg where evidence of dehydration exists.

DIABETIC

Patient who may or may not exhibit altered mental status and/or an unresponsive state in the presence of a low or elevated capillary blood glucose level.

GOALS

- Reverse hypoglycemia
- Manage dehydration associated with hyperglycemia
- Maintain/establish adequate ventilation

Symptomatic Hypoglycemia

A	Oral Glucose Or Carbohydrates
P	Same

A	Thiamine 100 mg PRN
P	NOT INDICATED

A	Dextrose 12.5 – 25 g Or Glucagon 1 mg
P	Dextrose 0.5 -1 G/kg <8 years old use $D_{10}W$ Or Glucagon 0.03 – 0.1 mg/kg

Symptomatic Hyperglycemia/ DKA/HHNK

→ Dehydration/ Shock Guideline

DKA/HHNK
Patient Presentation:

- Abdominal pain/cramping
- Altered LOC
- Polydipsia
- Kussmaul respirations
- Hypocapnia
- Polyuria
- Dyspnea
- Lethargy
- N/V
- H/A and/or diplopia

Pearls:

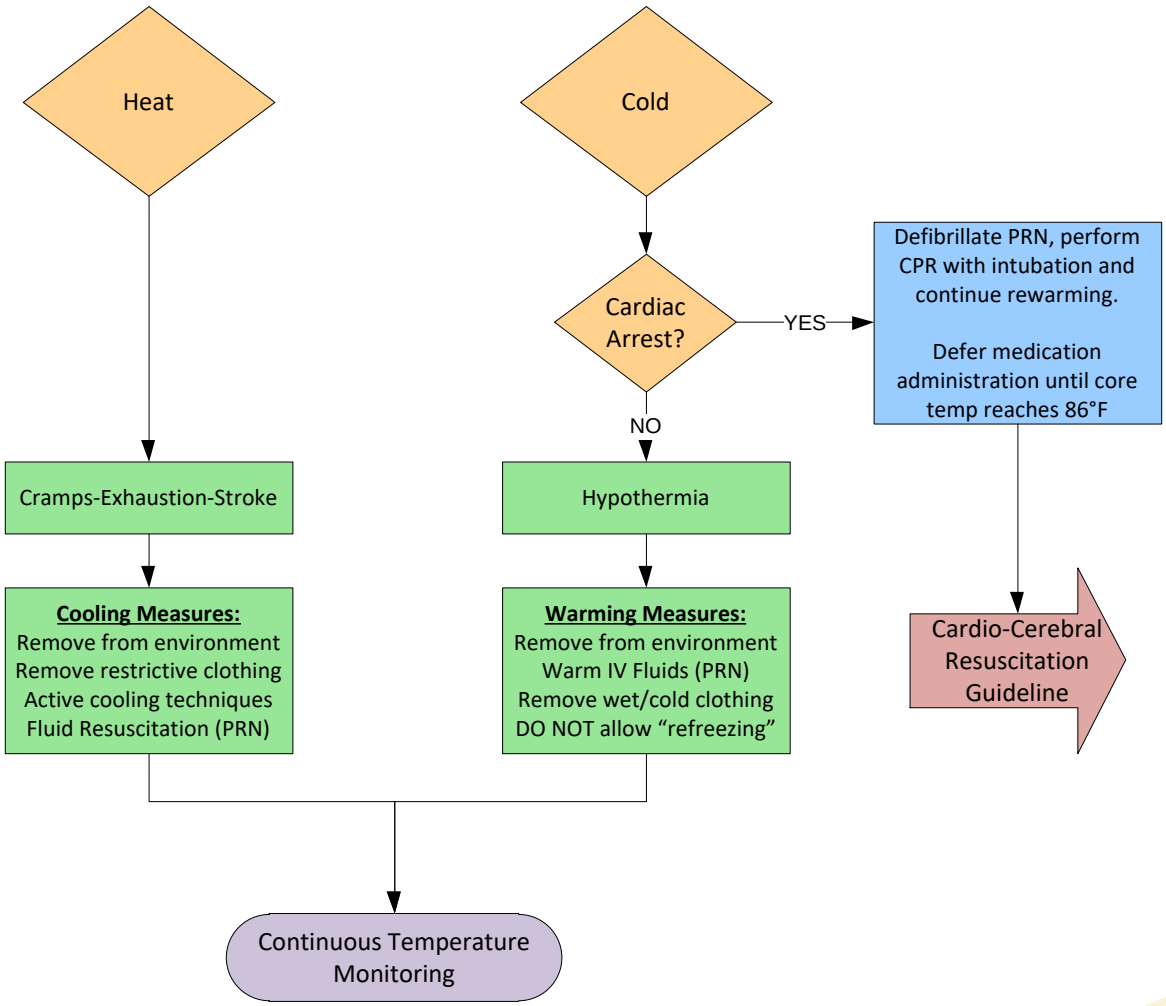
- CBG is RELATIVE!
- HHNK is predominately found with Type II Diabetics & DKA is predominately found with Type I Diabetics. These patients will often present with severe dehydration.
- DKA produces ketones; HHNK does not produce ketones.
- Use caution with hypoglycemic patients with a hx of chronic alcoholism, severe malnutrition or recent gastric bypass. These patients may require thiamine administration before glucose/dextrose (Wernicke's Encephalopathy).
- Closely monitor DKA/HHNK patients via continuous 12-Lead; hyperkalemia.
- Insulin pumps should be suspended in the presence of hypoglycemia.

ENVIRONMENTAL EXPOSURE

Environmental exposure is defined by patients suffering from effects of extreme environmental temperatures.

GOALS

- Removal of patient from the environment
- Management/control of temperature



Pearls:

- Handle hypothermic patients carefully to reduce the risk of sudden V-Fib.
- Heat stroke presents with AMS and usually have high core temps above 104°F, sweating generally disappears. These patients must be aggressively and quickly cooled.
- Heat cramps may occur even with normal body temperature as a result of dehydration.
- Heat exhaustion may present with multiple signs & symptoms including: nausea/vomiting, weakness, dizziness, headache, tachycardia, hypotension and elevated temperature.
- Hyperthermia may be caused by illicit drug use or patients receiving general anesthesia for intubation

HYPERTENSIVE CRISIS

Systolic blood pressure >185 mmHg and/or diastolic blood pressure >110 mmHg and/or mean arterial pressure (MAP) >150 mmHg with a presence of symptoms suggesting organ dysfunction of the cardiac, renal, or central nervous systems.

GOALS

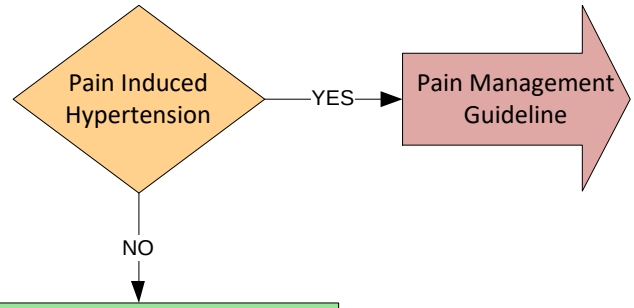
- Moderate reduction of MAP 10-20%
- Pain management
- Improve end organ dysfunction to the cardiac, renal, and/or central nervous systems

Signs and Symptoms:

- Systolic BP >185 mmHg
- Diastolic BP >110 mmHg

AND

- severe headache
- chest pain
- dyspnea
- A.M.S.
- seizure



Nicardipine 5-15 mg/hr
Or
Labetalol 20 mg
(May repeat or double q 10 min)
Or
IV Nitroglycerin Infusion
5-400 mcg/min

MAP Formula

$$\frac{(DBP \times 2) + SBP}{3}$$

OR

1/3 of (SBP-DBP) + DBP

Pearls:

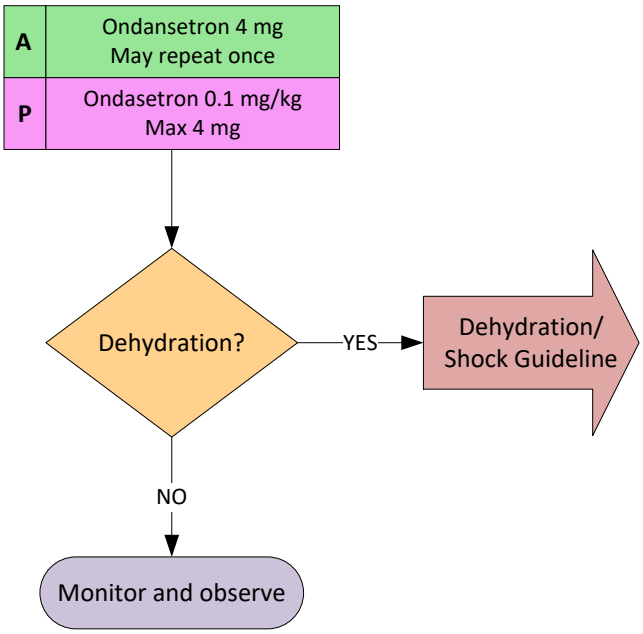
- Patients should be transported with their head elevated to 30 degrees.
- Ensure blood pressure cuff is sized appropriately.
- Utilize automated blood pressure trending.
- Use caution with Labetalol if cocaine use is suspected (runaway alpha response).
- Blood pressure determination based upon "trending" not initial/single BP reading.
- Hypertension is not uncommon in an emergency setting. HTN is usually transient and in response to stress and/or pain.
- When the patient is presenting with hypertension in the presence of severe pain, the patient's pain should be addressed with analgesics before attempting to lower blood pressure with an anti-hypertensive medication.

NAUSEA/VOMITING

Nausea is a non-specific symptom of an involuntary urge to vomit. Nausea may precede vomiting or present with out vomiting at all. Many possible causes of nausea/vomiting exist.

GOALS

- Prevention or reduction of the symptom(s)
- Reduction of fluid loss from severe vomiting
- Rehydration of patients



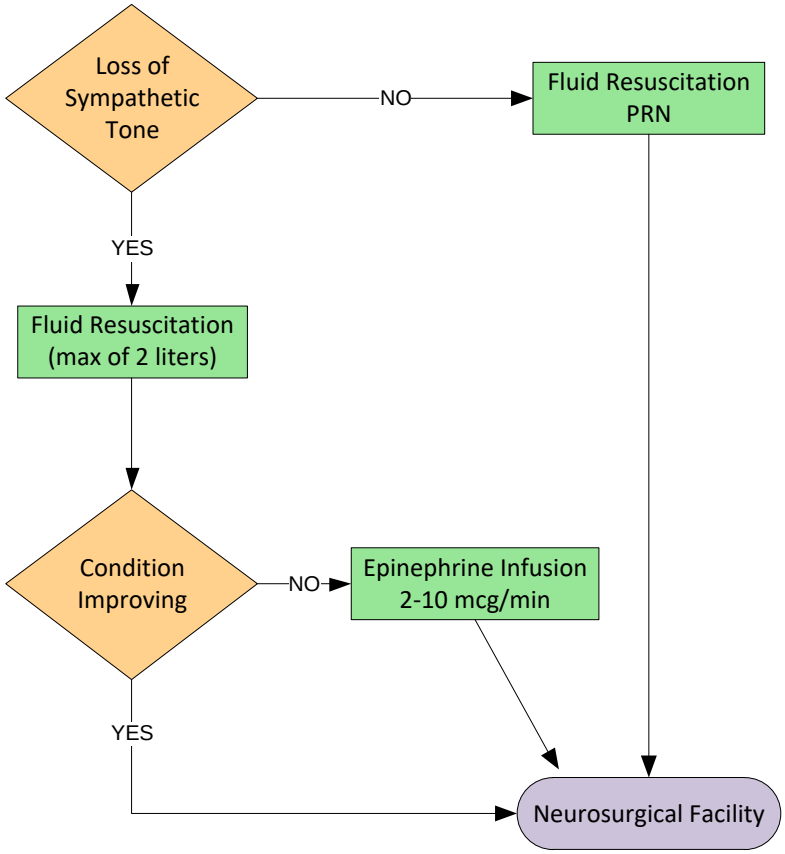
Pearls:

- Ondansetron may be given as a "pre-medication" for other nausea/vomiting causing medications/procedures.
- There are no studies to ascertain the safety in administration of ondansetron in the OB patient.
- Ondansetron can prolong QT intervals.
- Prolonged vomiting can result in hypocalcemia and other electrolyte imbalances.
- It may be appropriate to withhold ondansetron in patients who have ingested toxins where vomiting may be beneficial (alcohol).

NEUROGENIC SHOCK

Classified as distributive shock whereas a disruption is occurring of the autonomic pathways within the central nervous system resulting in hypotension and occasional bradycardia.

GOALS
- Stabilize blood pressure, heart rate and body temperature
- Prevent tissue damage



Neurogenic Shock S/S:
- Vasodilation
- Hypotension
- Warm, flushed skin
- Priapism
- Not tachycardic; possibly bradycardic

Pearls:
- Neurogenic shock can result from a brain injury or a high spinal cord injury above the level of T-6
- Fluid resuscitation to achieve a MAP ≥70 mmHg
- Assess and treat for hypothermia

OVERDOSE/TOXICITY

The exposure of a drug or other substance in quantities greater than recommended resulting in toxic or lethal states.

GOALS

- Airway/Ventiltion/Circulation management
- Antidote administration when applicable
- Poison Control Center Notification (800-222-1222)

Opiates

A	Naloxone 0.4 - 2 mg q 2 min
P	Naloxone 0.1 mg/kg q 2 min

Stimulants/ Synthetics

A	Midazolam 2.5 – 5 mg
P	Midazolam 0.05 mg/kg IV/IO or 0.2 mg/kg IM/IN

Organo-phosphates

A	Atropine 2-4 mg q 5-10 minutes until "sludge" resolves
P	Atropine 0.05 mg/kg q 3-5 min

ASA/Tricyclic

A	Sodium Bicarbonate 1 meq/kg; repeat 0.5 meq/kg q 5 min
P	Same

Beta Blockers

A	Glucagon 1 mg
P	Glucagon 0.03 – 0.1 mg/kg

Anxious/Violent/ Agitated Guideline — Consider

Calcium Channel Blockers

A	CaCl 500 mg – 1 g SIVP
P	CaCl 20 mg/kg SIVP, Max 1 g

Neuroleptics

A	Diphenhydramine 25-50 mg
P	Diphenhydramine 1 mg/kg

Tylenol

Maintain ABC's

Benzo-diazepines

Maintain ABC's

Carbon Monoxide

High Flow O_2

SpCO% Interpretation (carboxyhemoglobin):

- **0-5%:** Normal in non-smokers
- **5-10%:** Normal in smokers. For non-smokers, assess for s/s, treat with high flow O_2
- **>10%:** Assess for s/s, treat with high flow O_2

Pearls:

S/S of an overdose/toxic exposure can range from compromises of airway, ventilation or circulation to violence and agitation

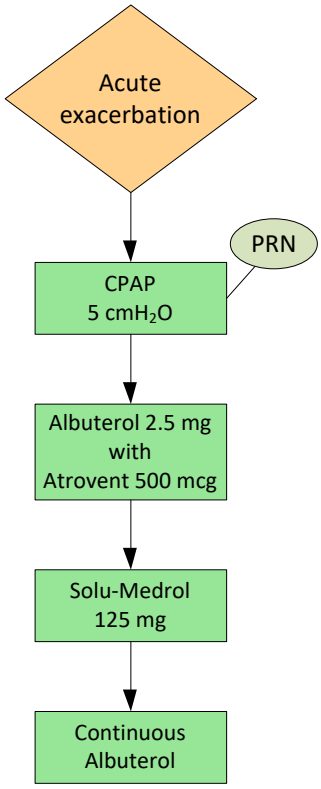
Opiates: heroin, fentanyl, morphine, hydrocodone, etc.
Stimulants/Synthetics: PCP, cocaine, amphetamines, MDMA, "mojo", "K-2", "spice"
Organophosphates: insecticides, herbicides and nerve agents
Tricyclics: elavil, amitriptyline
Calcium Channel Blockers: amlodipine, nifedipine, diltiazem, verapamil, benazepril
Neuroleptics: any "psychotropic" "behavior improving" medications like haldol, phenothiazines, phenergan
Benzodiazepines: midazolam/Versed, valium, alprazolam/Xanax, clonazepam/Klonopin, lorazepam/Ativan

RESPIRATORY DISTRESS/COPD (ADULT)

Chronic Obstructive Pulmonary Disease is a type of obstructive lung disease with long term poor airflow.

GOALS

- Treat acute exacerbations
- Bronchodilate airway
- Reduce mucous production
- Reduce swelling
- Address hypoxia and hypercapnia



Pearls:

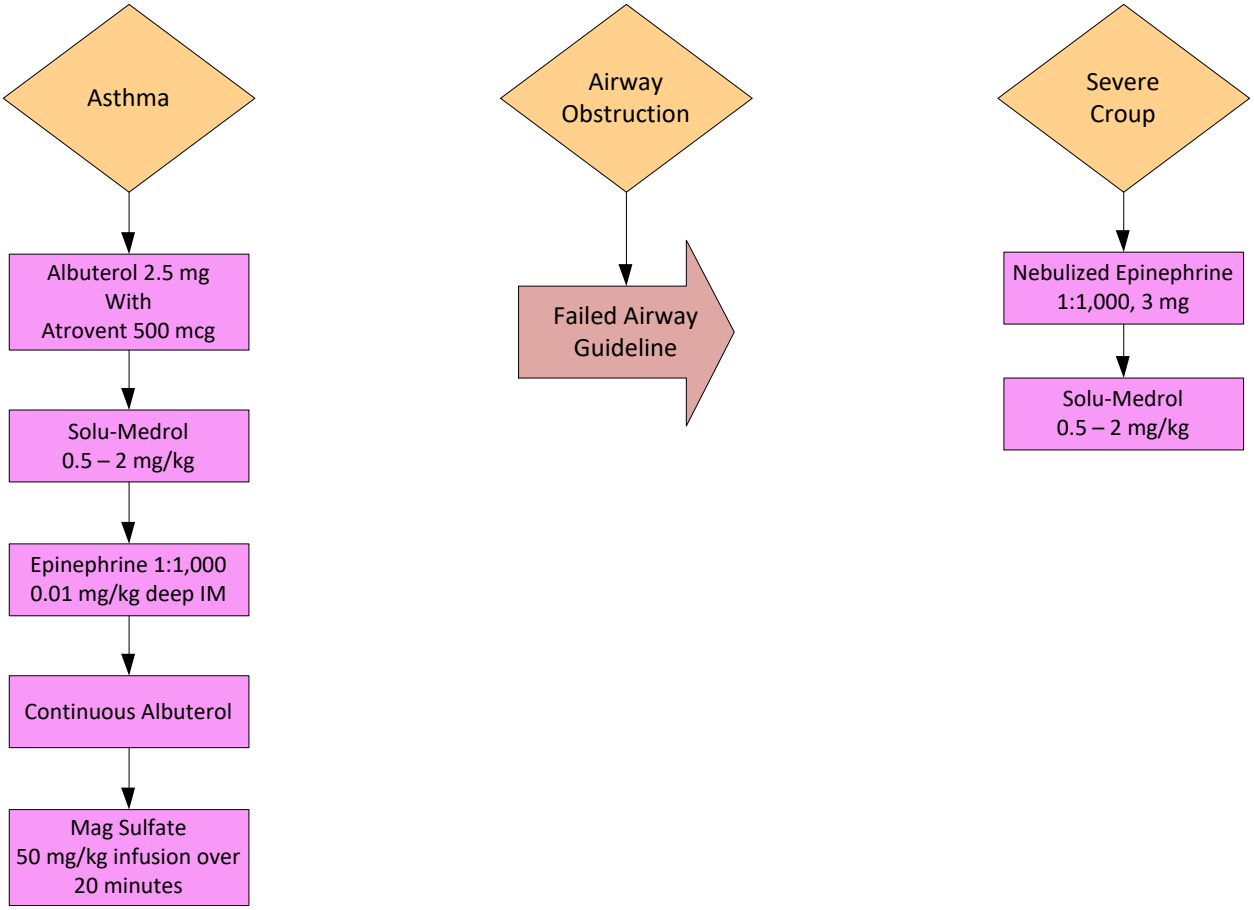
- PPV may be detrimental to continuity of care. **INTUBATION SHOULD BE A LAST RESORT.**
- Chronic findings (including wheezing, dyspnea upon exertion, "pink-puffer syndrome") are normal for these patients and should not be routinely treated in the emergency setting. Provider must exercise clinical judgment regarding the difference between a chronic finding and an exacerbation of symptoms complaint.
- These patients present with chronic hypercapnia.
- These patients respiratory drive is fueled by peripheral chemoreceptors not central chemoreceptors.
- Normal SpO2 values may range from 88-94%, depending on stage of disease.
- Chronic steroid use can lead to adrenal insufficiency
- CPAP can be used to help splint airways open to allow for adequate exhalation
- $EtCO_2$ is a great tool for measuring patient response to treatment
- β-blocker medication should be withheld when β_2 agonist medication is being administered. Patients with significant hypertension may need to be treated with nitroglycerin.
- Wheezing can also be a sign of pulmonary edema in CHF. Wheezing does not always equate to obstructive airway disorders.

RESPIRATORY DISTRESS (PEDIATRIC)

Common upper and lower respiratory disorders affecting the pediatric patient's respiratory system. Pediatric respiratory distress may lead to respiratory failure where inadequate gas exchange causes hypoxia, hypercapnia or both. This is the leading cause of cardiac arrest in children.

GOALS

- Bronchodilation
- Reduction of airway swelling
- Reverse and prevent hypoxia
- Reduce hypercapnia and intrinsic peep
- Obtain and maintain patent airway



Respiratory Distress:
- Nasal Flaring
- Retractions
- Stridor
- Wheezing
- Tachypnea
- "Cling to parent"

Respiratory Failure:
- Gurgling
- Head bobbing
- Altered mental status
- Decreased muscle tone
- Decreased respiratory rate
- "Help from anyone"

Pre Arrest:
- Bradypnea
- Agonal
- Poor palor
- Diffuse cyanosis
- Non-responsive muscle tone
- Unresponsive

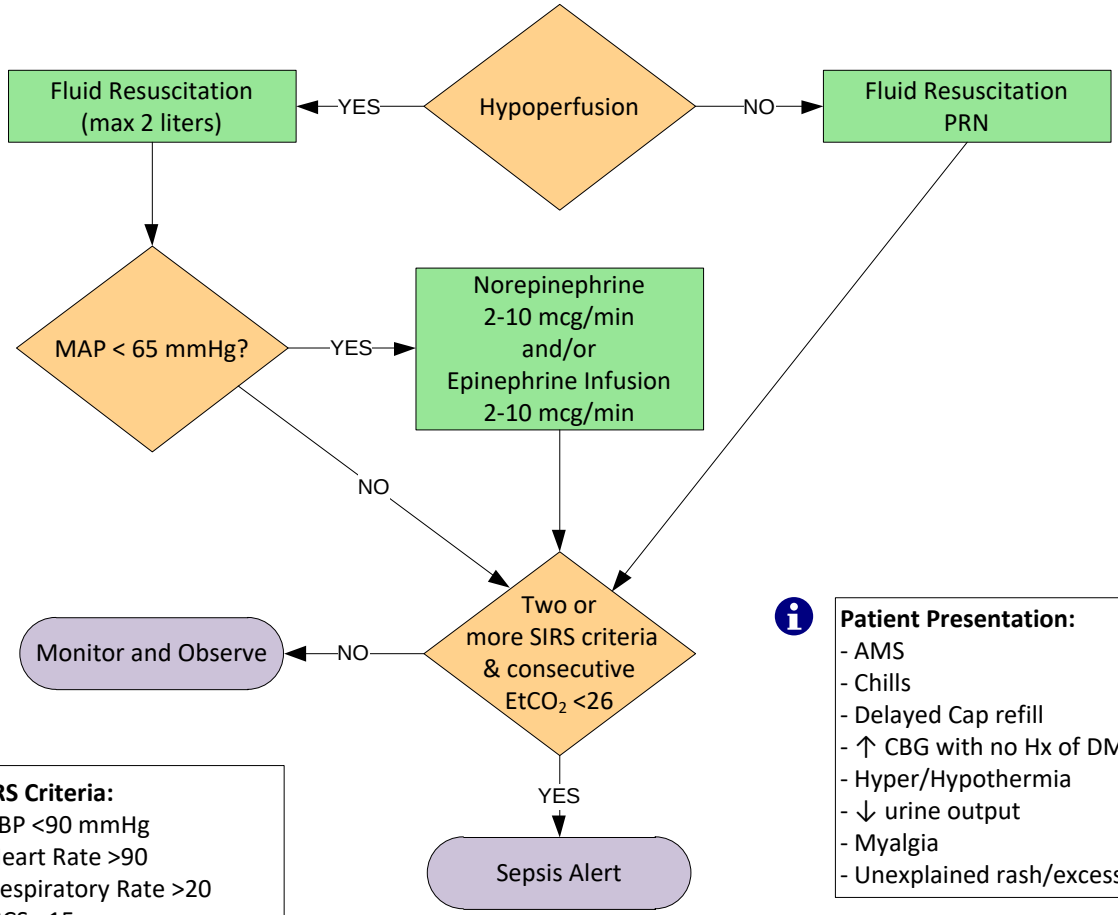
Pearls:
- IV's should not routinely be attempted for young children who are stable.
- Supportive care only should be used for mild croup.
- Children with respiratory distress commonly sit up and lean forward to improve leverage for the accessory muscles and to allow for easy diaphragmatic movement.

SEPTIC SHOCK/INFECTION

Occurs when sepsis leads to dangerously low blood pressure and abnormalities in cellular metabolism. Classified as distributive shock. Septic shock is defined as hypotension following an infectious process that persists despite treatment with fluid administration. Bacterial infections are the most common culprit.

GOALS

- Fluid resuscitation for vasodilation and third spacing—"Fill up the tank".
- Reduce "run away" vasodilation
- Early antibiotic administration (in-hospital)
- Temperature management
- MAP of >65 mmHg to regain end organ perfusion



SIRS Criteria:
- SBP <90 mmHg
- Heart Rate >90
- Respiratory Rate >20
- GCS <15
- Temp >100.4°F or <96.8°F

Patient Presentation:
- AMS
- Chills
- Delayed Cap refill
- ↑ CBG with no Hx of DM
- Hyper/Hypothermia
- ↓ urine output
- Myalgia
- Unexplained rash/excessive bruising

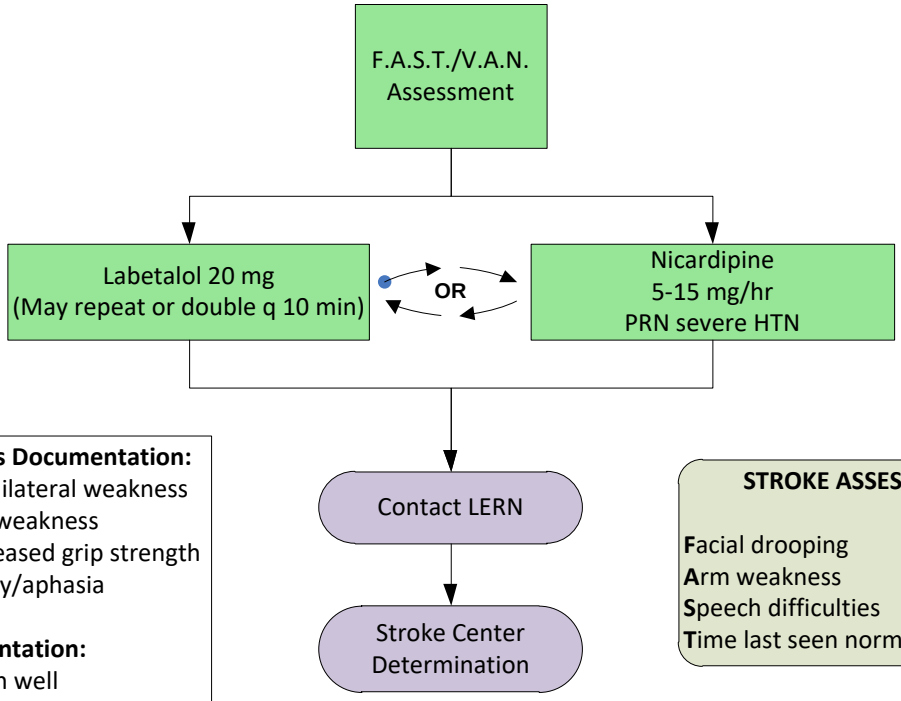
Pearls:
- $EtCO_2$ assessment should be used to aid in sepsis identification
- Early ED notification of "Sepsis Alert"
- These patients require high flow and high concentration of oxygen
- CPAP may be indicated for ARDS (5 cmH_2O max)
- Temperature management included fluid resuscitation and passive external cooling for *hyperthermia*
- Advanced stages of sepsis may present with *hypothermia*; management includes passive re-warming techniques

STROKE/TIA

A life threatening condition in patients with a thrombus or vessel rupture within the cranial space resulting in neurological compromise.

GOALS

- Determine last seen normal time.
- Maximize cerebral perfusion and drainage.
- Target BP below 185/110 to reduce TPA time.
- Rapid determination and notification of appropriate stroke center.



Signs/Symptoms Documentation:
- facial droop/unilateral weakness
- unilateral arm weakness
- unilateral decreased grip strength
- speech difficulty/aphasia

History Documentation:
- time last known well
- seizure activity
- trauma before onset of symptoms
- recent illness, surgery, trauma
- current medications

STROKE ASSESSMENT TOOLS:

Facial drooping	**V**ision
Arm weakness	**A**phasia
Speech difficulties	**N**eglect
Time last seen normal	

Pearls:
- Early LERN notification "Stroke Activation"
- Continuous 12-Lead monitoring
- Place patients supine for ischemic strokes
- Place patients 15-30 degrees for hemorrhagic strokes
- Ischemic vs hemorrhagic=7:1; when in doubt, transport supine unless airway compromise apparent
- Oxygen is not recommended for SPo2 ≥92% room air
- Limit scene time to 10 minutes
- Hypertension control only if systolic BP >185 mmHg or diastolic BP >110 mmHg and Last Seen Normal time to estimated arrival time at destination facility is ≤4 hours.
- "Wake up" stroke still requires rapid assessment, treatment and transport
- Have a family member/witness remain with patient or obtain phone number
- A VAN Assessment should be done on every stroke patient with arm weakness.
- VAN positive patients are eligible for endovascular thrombectomy up to 24 hours after time of onset.

THORACIC AORTIC CATASTROPHE

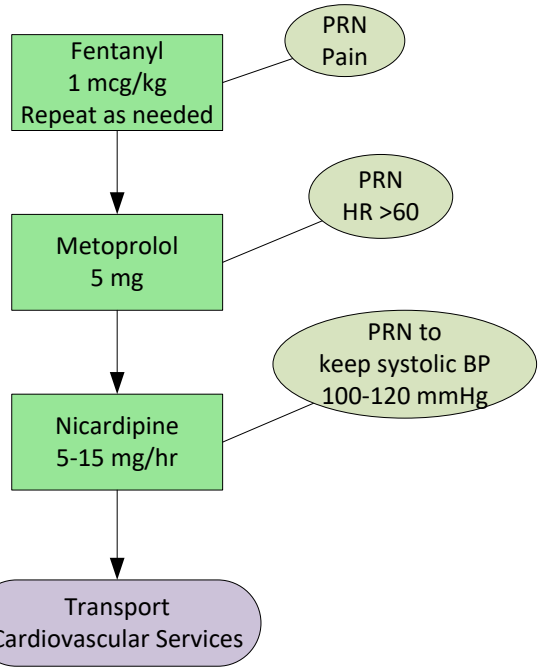
Aortic aneurysm: "ballooning of the vessel"
Dissecting aortic aneurysm: tearing of the tunica intima
Aortic rupture: Complete vessel transection, spilling blood into the thoracic and/or abdominal cavity causing exsanguination

GOALS

- Pain management
- Blood pressure and heart rate management: SBP between 100-120 and HR <60

Patient Presentation:

- Abrupt and severe pain described as sharp or tearing.
- Ascending aortic catastrophe may cause pain in the anterior and/or posterior chest
- Descending aortic catastrophe may cause pain in flank, back or abdomen.
- May show s/s of MI and/or stroke
- Disparity of blood pressure between upper extremities.
- Pericardial tamponade may be present, and is the most common cause of death.



Pearls:

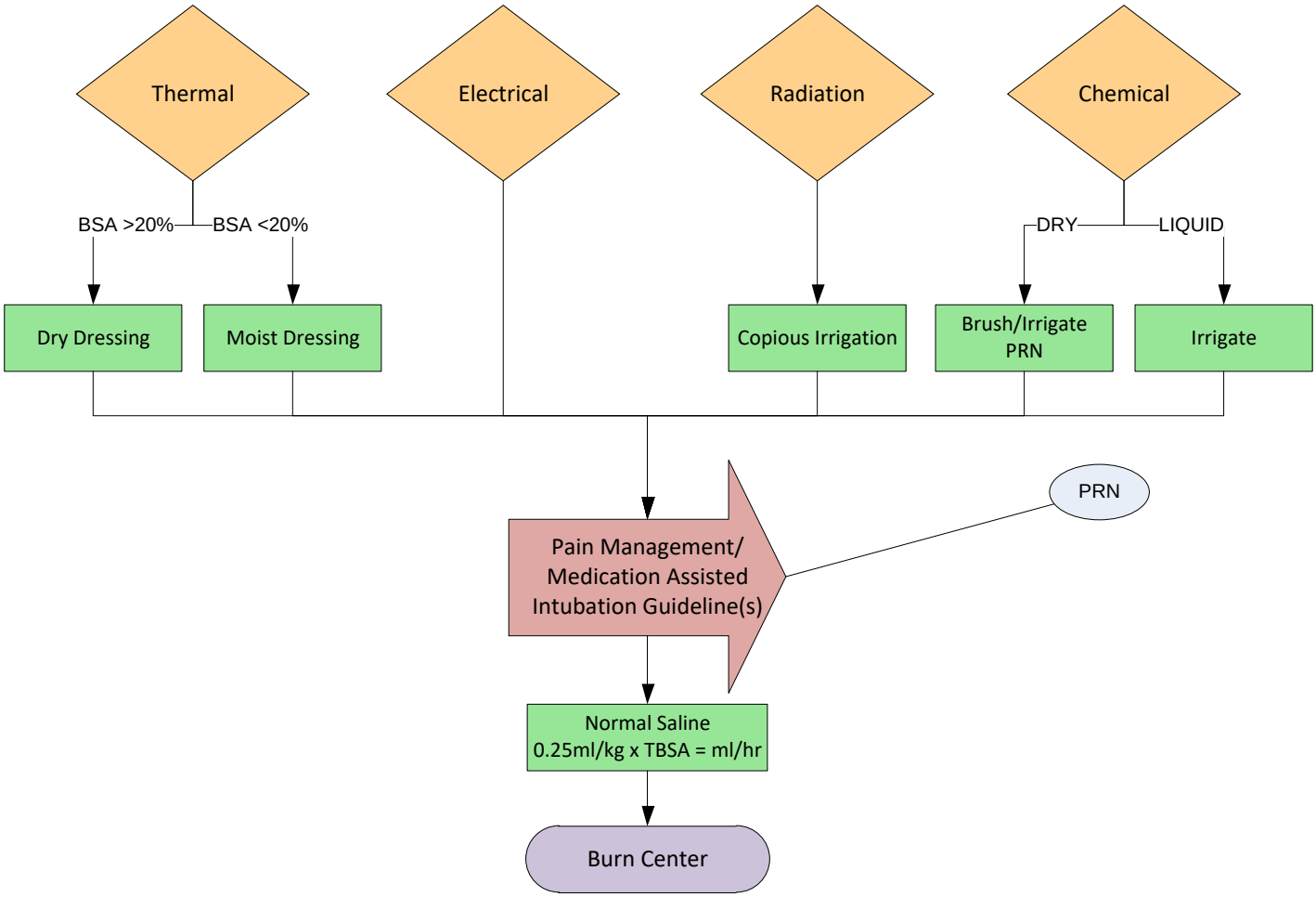
- Hypertension and tachycardia are extremely dangerous in these patients!
- Aggressive pain management will aid in managing BP and HR.
- Pain management and heart rate control is priority. Once the HR ≤60, then BP management can be initiated.
- Marfan syndrome and Ehlers-Danlos syndrome are contributing factors in patients primarily under the age of 40
- Risk factors include chronic HTN, atherosclerosis, previous cardiovascular surgery

BURNS

A type of injury to the skin caused by heat, cold, electricity, chemicals, friction or radiation

GOALS

- Consider inhalation injury and secure airway EARLY-as needed.
- Remove patient from source and stop burning process
- Remove restrictive garments, equipment and/or devices
- Prevent hypothermia



Pearls:

- Critical burns include: full thickness burns, partial thickness >10% BSA; burns to face, eyes, hands, feet, genitalia and major joints; electrical burns to include lightning injury; chemical burns; inhalation burns; burns with extremes of age or chronic disease; burns associated with major traumatic injury. These patients should be transported to a burn center with the exception of critical trauma patients. Critical trauma patients with burns should be transported to a trauma center.
- Consult the Emergency Response Guidebook for guidelines on chemical decontamination and burn management
- Do not apply ointments, creams or lotions during the initial management of a burn
- Electrical burns: DO NOT touch the patient until you are certain that the electrical source is disconnected. Anticipate EKG disturbances.
- Fluid resuscitation should be started @ 0.25 ml/kg x TBSA = ml/hr (ex: 70 kg pt with 40% TBSA = 700 ml/hr)
- Consider carbon monoxide and/or cyanide poisoning when appropriate.

CRUSH INJURY/SYNDROME

Crush Injury is defined as compression of extremities or other major muscle groups causing muscle swelling and/or neurological impairment.
Crush Syndrome is defined as systemic manifestations of crush injury due to traumatic rhabdomyolysis and the release of potentially toxic cell components and electrolytes. This may lead to lethal dysrhythmias, hyperkalemia, hypocalcemia, renal failure, local tissue injury or death. May also lead to altered mental status and hypotension.

GOALS

- Rapid identification
- Minimalize/avoid renal failure or death
- Avoid hyperkalemia

Pearls:

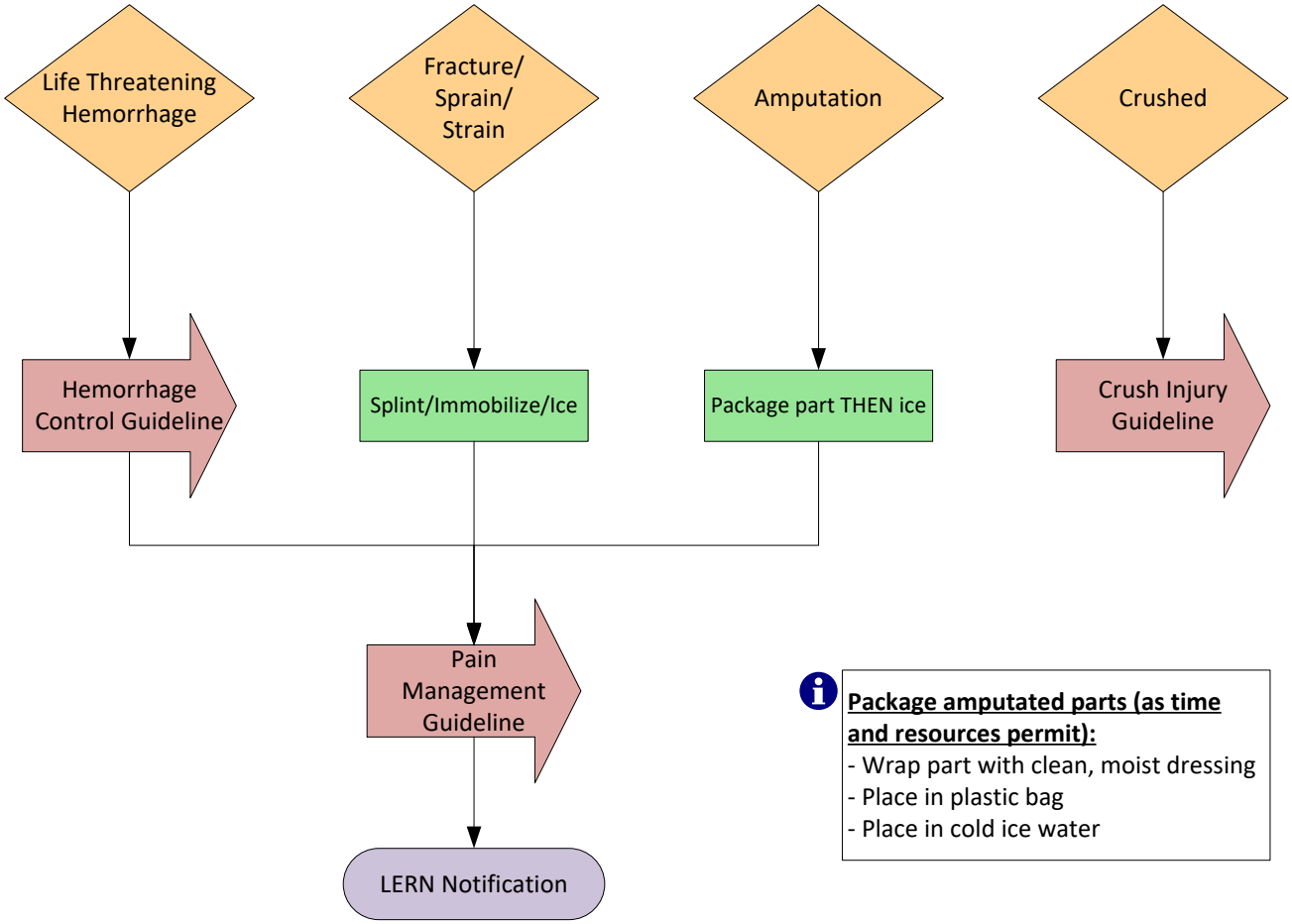
- Be aware of air quality in confined spaces.
- It's a good principle to start this therapy during extrication
- Hyperkalemia: Peaked T waves, QRS >0.12 seconds, QT interval >0.46 seconds, loss of P wave, sine wave
- Early, aggressive pain management/control is strongly encouraged
- Patients may become hypothermic rapidly even in warm environments
- **ONE AMPULE OF SODIUM BICARBONATE IS 50 mEq**

EXTREMITY INJURY

Any classification of a major injury to an extremity.

GOALS

- Preserve limb
- Prevent exsanguination
- Prevent further injury



Package amputated parts (as time and resources permit):

- Wrap part with clean, moist dressing
- Place in plastic bag
- Place in cold ice water

Pearls:

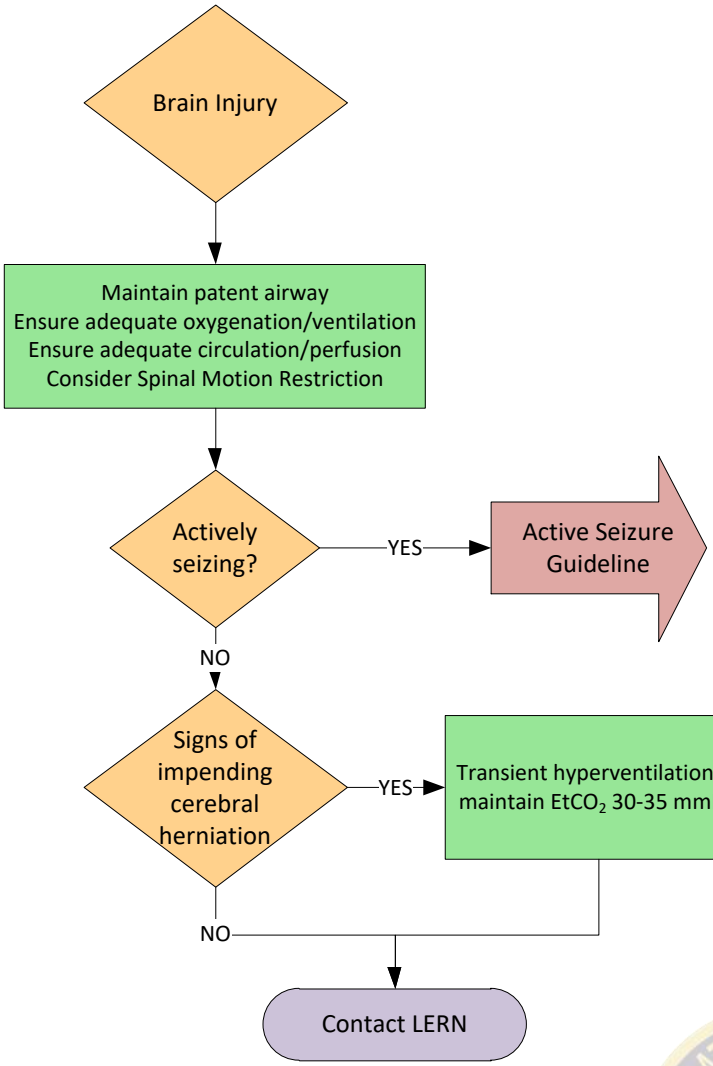
- There are many times that these extremity injuries may be associated with one another.
- Femur fractures are at HIGH risk for hemorrhagic shock secondary to internal bleeding.
- Open fractures are at HIGH risk for infection.
- Constant distal CMS assessment is critical, when applicable

HEAD TRAUMA

Blunt and/or penetrating trauma to the head

GOALS

- Prevent or manage secondary brain injury
- Ensure adequate oxygenation, ventilation and perfusion
- Prevent or correct hypoxia and hypotension



Brain Injury S/S:

- Altered mental status
- Unconscious or Loss of consciousness
- Confused or combative
- Seizures
- Posturing
- Trismus
- Headache
- Nausea/vomiting
- Loss of coordination

Pearls:

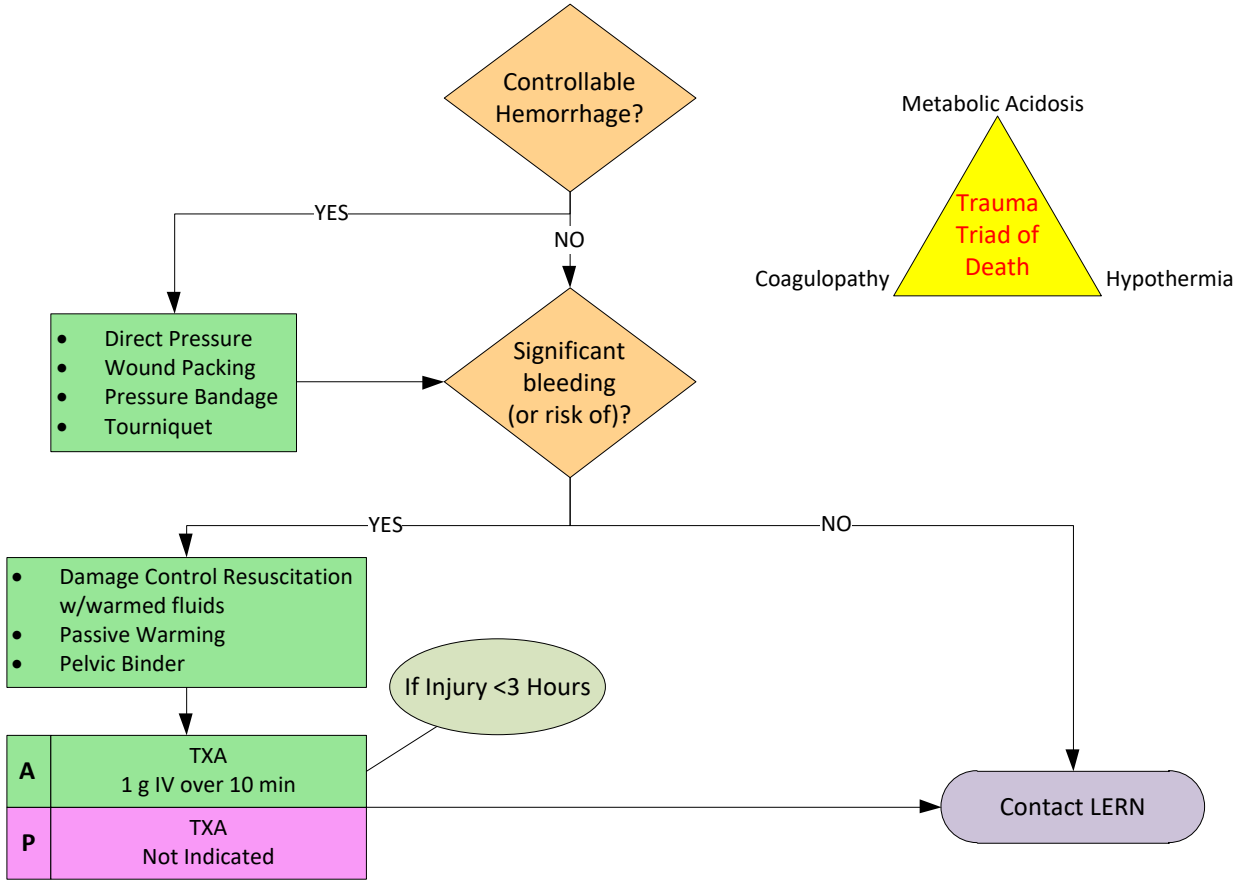
- Consider elevating the head of the stretcher 30° if patient has a systolic blood pressure of ≥90 mmHg to reduce ICP
- Maintain SpO2 ≥94% and $EtCO_2$ 35-45 mmHg. Do not hypoventilate or hyperventilate. Transient hyperventilation is only indicated if signs of cerebral herniation are present. If transient hyperventilation is indicated, maintain $EtCO_2$ of 30-35 mmHg.
- Maintain a systolic blood pressure of 90 mmHg if hypotension is present.
- If patient is hypoglycemic (CBG ≤ 60), contact medical control for treatment orders
- Signs of impending cerebral herniation may include: decreased mental status, posturing, unilateral/bilateral pupil dilation, hypertension, bradycardia and abnormal ventilatory patterns

HEMORRHAGE CONTROL

Patients that present with significant internal or external hemorrhage requiring manual, pharmaceutical and/or surgical intervention to control hemorrhage

GOALS

- **LIMIT SCENE TIME TO 5 MINUTES FOR UNCONTROLLABLE HEMORRHAGE**
- Interventions should not be completed on scene unless an immediate correctable life threat is identified.
- Rapid transport to closest trauma center
- Maintain patient condition until surgical intervention



Pearls:

- Damage Control Resuscitation, also known as "permissive hypotension" is defined by the management of patient clinical signs and symptoms with limited minimal pre-hospital intervention. The goal is to ensure vital organs are being perfused while avoiding massive crystalloid resuscitation. Key indications that would prompt intervention include: systolic BP <80 mmHg, change in mental status, or loss of radial pulses. The preferred intervention is administering a limited amount of warmed crystalloid solution while enroute to the trauma center.
- The "Trauma Triad of Death" is a visual representation describing the combination of hypothermia, acidosis and coagulopathy. This combination is commonly seen in patients who have sustained severe traumatic injuries and results in a significant rise in the mortality rate.
- Pelvic Binders should be considered for patients who sustain significant blunt trauma and have signs of internal bleeding. Crepitus or pelvic instability is not required for the consideration of placement of a pelvic binder.

SPINAL MOTION RESTRICTION

Maintenance of the spine in anatomic alignment and minimizes gross movement and does not mandate the use of specific adjuncts.

GOALS

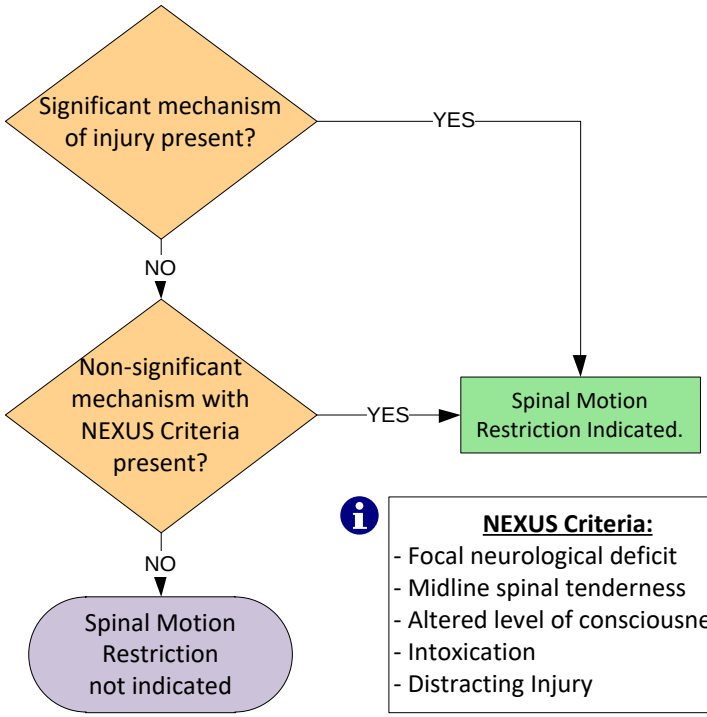
- Should not interfere with critical airway management, hemorrhage control or rapid transport.
- Backboards should not be used as a therapeutic intervention or as a precautionary measure.
- Should not be used for patients with penetrating trauma without evidence of spinal injury and when spinal motion restriction will delay care.
- Assess risk for spinal injury

Significant Mechanism of Injury:

- MVC with any Ejection, death of occupant, rollover, 12 inch intrusion into passenger compartment.
- Pedestrian struck or run over >20 mph
- Motorcycle/bicycle/ATV >20 mph
- Blast injuries
- Major blunt trauma to torso
- Falls of patient or objects >20 feet

Non-Significant Mechanism of Injury:

- Falls <20 feet
- Pedestrian struck <20 mph
- Minor MVC's
- Mechanism of isolated injury should not be included in this guideline (GSW to leg, fracture to ankle, industrial hand injury, etc.)



NEXUS Criteria:

- Focal neurological deficit
- Midline spinal tenderness
- Altered level of consciousness
- Intoxication
- Distracting Injury

Pearls:

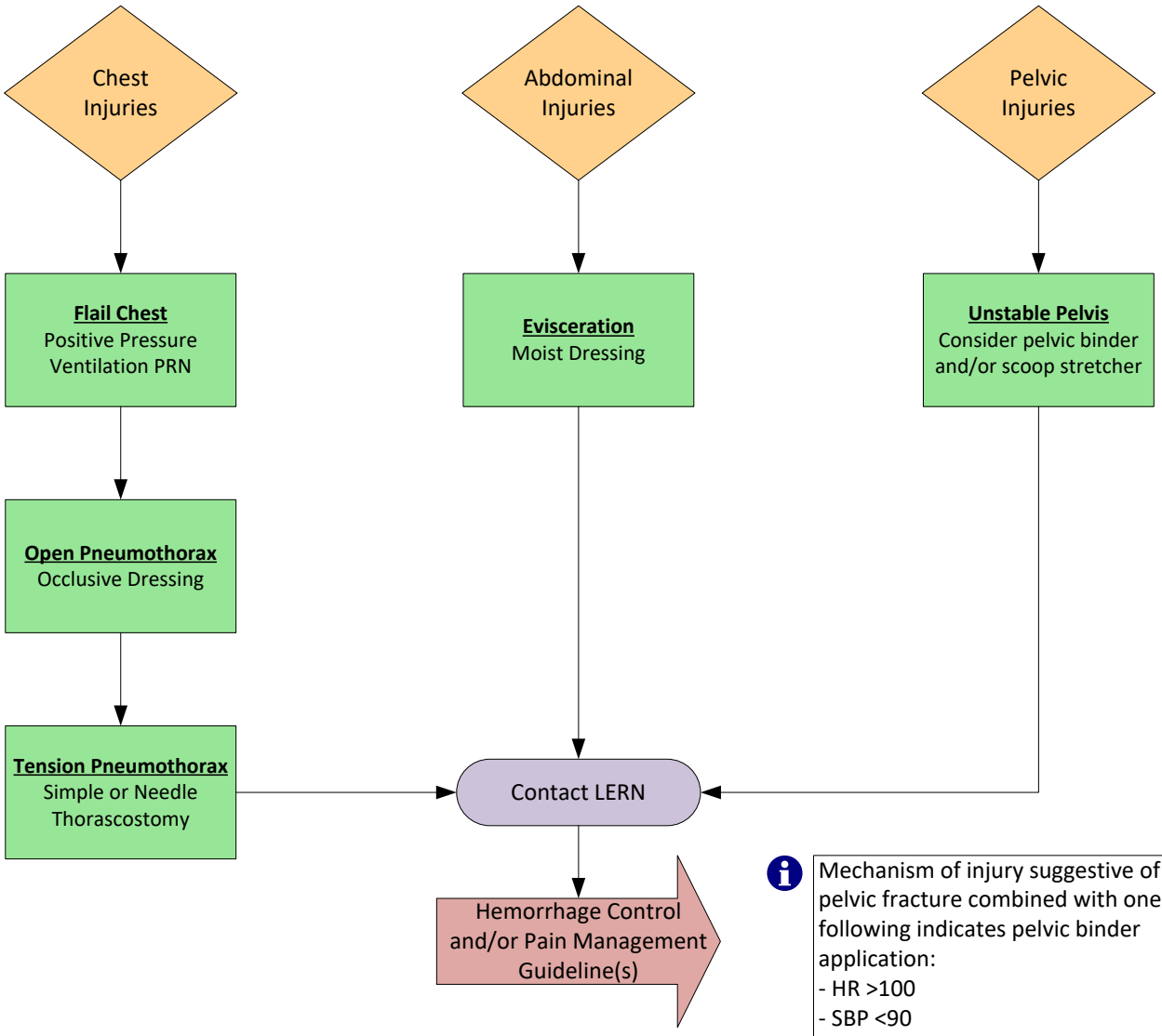
- Spinal Motion Restriction is best achieved by applying a cervical collar and lying the patient on the stretcher (preferably supine if tolerated by patient). The patient should be secured to the stretcher with all available straps to include the shoulder harness, or you have the option to achieve Spinal Motion Restriction by using alternate means of securing the patient supine to the bench seat (long spine board, scoop stretcher, folding stretcher, etc.).
- LSB's can be used as an extrication device
- It is recommended to remove motorcycle helmets
- Smaller children and others with cognitive impairment may not tolerate cervical collars therefore causing unwanted movement. It may be reasonable to withhold application of a cervical collar and leave small children in a car seat
- Patients 65 years or older have a higher risk of spinal injury that can be overlooked with NEXUS criteria. It is important to exercise sound clinical judgment when determining the need for spinal motion restriction in these patients. Insignificant mechanisms of injury can cause spinal fractures in the elderly population
- Patients with communication barriers (language, very old/young, or any other reason a patient cannot accurately report signs and symptoms) should be selected for spinal motion restriction
- Patients may be allowed to self-extricate to the stretcher when appropriate. Studies have shown that there is less manipulation to the spine when patients are allowed to move on their own versus being manually extricated or immobilized.

TORSO TRAUMA

Blunt and/or penetrating trauma to the chest, abdomen or pelvic region.

GOALS

- Reduce hemorrhage
- Improve ventilation/oxygenation/perfusion
- Manage pain



Mechanism of injury suggestive of a pelvic fracture combined with one of the following indicates pelvic binder application:

- HR >100
- SBP <90
- GCS <14
- Distracting injury
- Pelvic pain on clinical assessment

Pearls:

- Springing the pelvis to evaluate for pelvic fractures is unreliable and dangerous
- Pelvic injuries should be suspected when s/s of shock are present with blunt trauma and obvious causes of blood loss can't be determined.
- Bulky dressings are no longer recommended to stabilize a flail chest injury.

TRAUMA ARREST

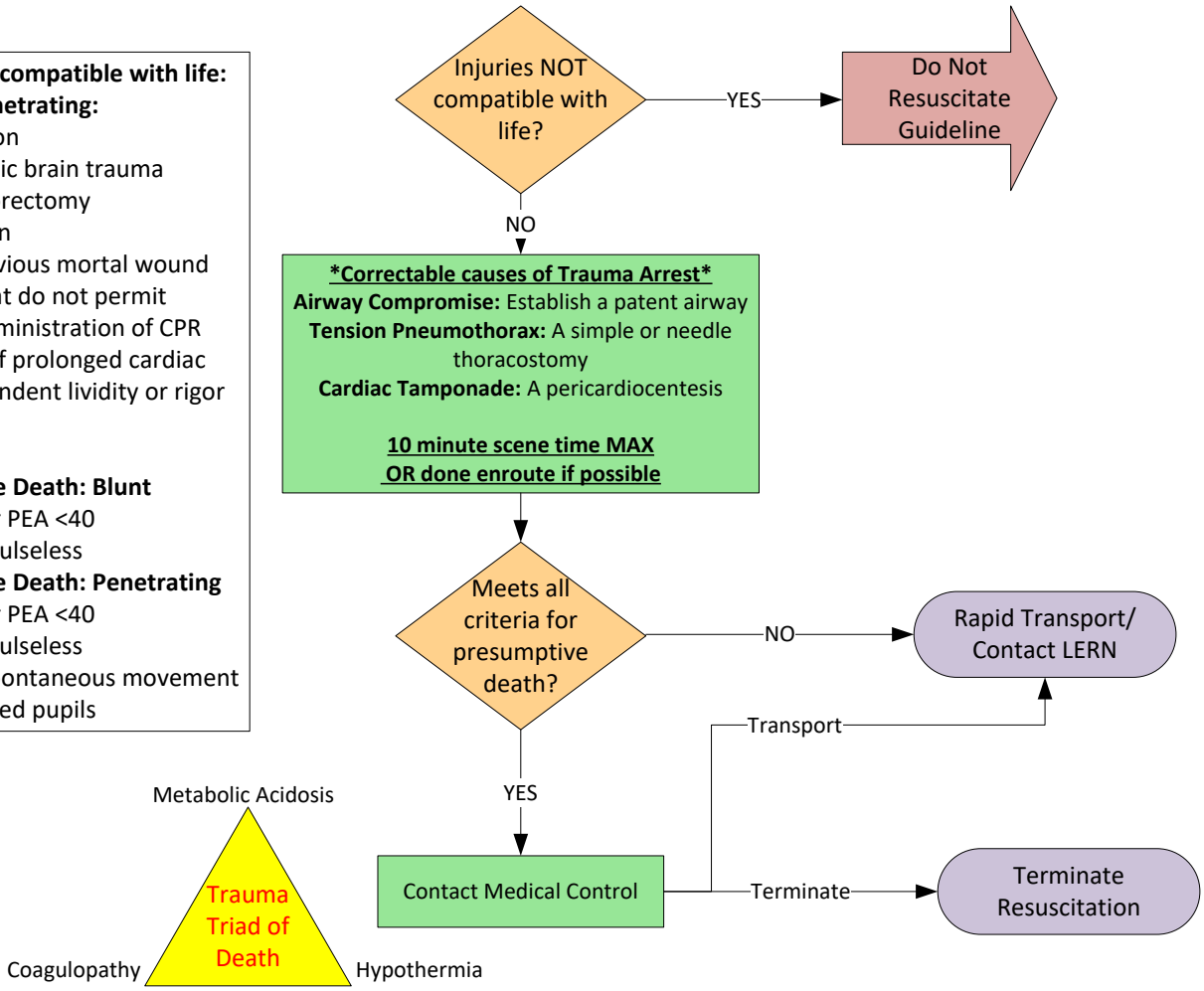
A pulseless patient caused by blunt and/or penetrating trauma. These patients may not be in cardiac arrest, rather just "pulseless".

GOALS
- Rapid identification of any correctable cause of the patient being pulseless, **OR**
- Identification of injuries non-compatible with life.
- Rapid transport to a trauma center when indicated.

Injuries not compatible with life:
Blunt or penetrating:
- Decapitation
- Catastrophic brain trauma
- Hemicorporectomy
- Incineration
- Grossly obvious mortal wound
- Injuries that do not permit effective administration of CPR
- Evidence of prolonged cardiac arrest, dependent lividity or rigor mortis

Presumptive Death: Blunt
- Asystole or PEA <40
- Apneic & Pulseless

Presumptive Death: Penetrating
- Asystole or PEA <40
- Apneic & Pulseless
- Without spontaneous movement
- Fixed, dilated pupils



Pearls:
- Surgical intervention is definitive care. Do not waste time on scene establishing an advanced airway unless the compromised airway is suspected to be the cause or a contributing factor of the arrest and an advanced airway is required to address the compromise.
- When no correctable causes of trauma arrest exist, when there are no signs of presumptive death, and there are no injuries incompatible with life – **LOAD and GO**
- Contact LERN as time permits
- CPR is to be performed without emphasis on cardiac medication administration. Fluid resuscitation may be indicated and up to 2 liters of **warmed crystalloids** can be given under standing order if needed.
- Do not over ventilate
- Paramedics should use sound clinical judgment when determining "dead at scene"
- Trauma center arrival goal is 17 minutes OR LESS from arrest.

****This guideline does not supersede mass causality incident triage.****

APPENDIX A—MEDICATIONS

Adenosine
Albuterol
Amiodarone
Aspirin
Atropine
Atrovent
Calcium Chloride
Dextrose
Diltiazem
Diphenhydramine
Dobutamine
Dopamine
Epinephrine
Etomidate
Famotidine
Fentanyl Citrate
Furosemide
Geodon
Glucagon
Heparin
Insta-Glucose
Ketamine
Ketorolac
Labetalol
Lidocaine
Magnesium Sulfate
Metoprolol
Midazolam
Naloxone
Nicardipine
Nitroglycerin
Norepinephrine
Ondansetron
Plavix
Rocuronium
Sodium Bicarbonate
Solu-Medrol
Succinylcholine
Thiamine
Tranexamic Acid

ADENOSINE

Additional Names:

Adenocard

Classification:

Endogenous nucleotide, atrial antiarrhythmic

Physiological Effects:

Adenosine is an endogenous nucleotide a derivative of Adenosine Triphosphate (ATP) which is 1 of 4 base pairs that makes up the structural unit of RNA and DNA. This means that adenosine is found in all cells of all living tissue. Adenosine slows conduction time through the AV-node and can interrupt re-entry pathways through the AV-node thus restoring sinus rhythms to patients experiencing SVT's.

Indications:

Stable narrow complex tachycardia (PSVT)
Consider for "unstable" narrow complex tachycardia while preparing for cardioversion
Consider a trial regimen for stable, regular wide-complex tachycardia with monomorphic QRS of undetermined etiology

Contraindications:

Known hypersensitivity
Bradycardias and AV blocks > than 1°
Sick-sinus syndrome
Poison induced tachycardias

Dosage:

Adult: Initial: 12 mg rapid IV/IO followed by 20 ml flush
2nd: 12 mg rapid IV/IO followed by 20 ml flush after 1 – 2 min

Pediatric: Initial: 0.1 mg/kg rapid IV/IO followed by 5 ml flush (max 6mg)
2nd: 0.2 mg/kg rapid IV/IO followed by 5 ml flush after 1 – 2 min (max 12 mg)

Side Effects:

Facial flushing, headache, sweating, chest pain, palpitations, hypotension, dyspnea, dizziness, tingling, burning, or heavy sensation in arms, apprehension

Additional Information:

Vagal maneuvers first when clinically appropriate
Half-life is less than 10 seconds
Administration in vein closest to cardiac circulation is preferred
Asystole and short lasting 1st, 2nd, or 3rd degree AV blocks possible
Does not convert atrial fibrillation, atrial flutter, or ventricular tachycardia
Larger doses may be required for patients taking Theophylline or Caffeine
Reduced doses may be required for patients taking dipyridamole (Persantine) or carbamazepine (Tegretol)

Clinical Guideline(s):

Tachycardia

ALBUTEROL

Additional Names:

Proventil, Ventolin, Salbutamol

Classification:

β_2 selective, sympathomimetic

Physiological Effects:

β_2 sympathomimetic that produces bronchodilation by causing smooth muscle relaxation of the smooth bronchial muscles through the stimulation of the β_2-adrenergic receptors in the lung tissue.

Indications:

Relief of bronchospasm
Asthma
COPD disease, chronic bronchitis, emphysema
Suspected Hyperkalemia

Contraindications:

Hypersensitivity
Symptomatic tachycardia

Dosage:

Adult: 2.5 mg/3 ml of NS added to nebulizer (oxygen flow rates of 6 – 8 lpm), may be repeated prn

Pediatric: 2.5 mg/3 ml of NS added to nebulizer (oxygen flow rates of 6 – 8 lpm), may be repeated prn

Side Effects:

Tachycardia, hypertension, angina, nervousness, tremors, headache, dizziness, insomnia, cough, dry mouth, exacerbation of symptoms, nausea, vomiting, GI distress

Additional Information:

Use cautiously in patients with CAD, hypertension, hyperthyroidism, and diabetes mellitus
Administer cautiously to patient on MAOI s or tricyclic anti-depressants
Albuterol and beta blockers are antagonistic (inhibit each other)
β_2 selectivity is not absolute and some β_1 effects (tachycardia or dysrhythmias) can occur in some patients

Clinical Guideline(s):

Asthma
Allergic Reaction / Anaphylactic Shock
Respiratory Distress / COPD
Respiratory Distress (Pediatric)
Crush Syndrome / Injury

AMIODARONE

Additional Names:

Cordarone

Classification:

Antiarrhythmic (class III)

Physiological Effects:

Amiodarone is a complex, multiple anti-arrhythmic agent. Amiodarone prolongs the action potential and refractory period of the myocardium, while slowing the sinus rate. Amiodarone increases PR and QT intervals and decreases peripheral vascular resistance.

Indications:

Ventricular Tachycardia and other wide-complex tachycardias
Ventricular Fibrillation
Stable, narrow-complex tachycardia — PSVT

Contraindications:

Hypersensitivity
Poison induced tachycardia
Bradycardias, 2° and 3° AV Blocks

Dosage:

Adult:

Cardiac Arrest
Initial: 300 mg IV/IO
2nd: 150 mg IV/IO 3 – 5 min after 1st dose

Non-Cardiac Arrest (perfusing tachyarrhythmias)
Initial: 150 mg IV/IO bolus infusion over 10 minutes
2nd: 150 mg IV/IO bolus infusion q 10 min, prn
Maintenance Infusion 1 mg/min, (mix 250 mg in 250 cc, run at 60 cc/hr)
Max 2.2 g / day

Amiodarone (Mix 250mg in 250cc) 1mg/cc

Dosage (mg/min)	cc/hr
1 mg/min	60

Pediatric:

Cardiac Arrest
Initial: 5 mg/kg IV/IO (Maximum single dose 300 mg)
2nd: 5 mg/kg IV/IO up to total dose 15 mg/kg or 2.2 g in 24 hours (Max single dose 150 mg)

Non-Cardiac Arrest (perfusing tachyarrhythmias)
Initial: 5 mg/kg IV/IO bolus infusion over 20 – 60 min (Max single dose 300 mg)
2nd: 5 mg/kg IV/IO bolus infusion over 20 – 60 min (Max total dose 15 mg/kg or 2.2 g / day)

AMIODARONE

Side Effects:

Significant hypotension with cumulative doses 2.2 g IV in 24 hours, flushing, chest pains, tightness in chest, brief periods of asystole, bradycardia, and ventricular Ectopy

Additional Information:

Do not administer with other medications that prolong QT intervals
Terminal elimination extremely long (1/2 life up to 40 days)
Potentiates bradycardia and hypotension with β-blocker and Ca++ channel blockers
Increases the risk of AV block and hypotension with Ca++ channel blockers
Increases anticoagulant effects of Warfarin
Decreases the metabolism of Phenytoin, Procainamide, Quinidine, and Theophylline, therefore increasing their serum levels

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Post Resuscitation Care
Tachycardia

ASPIRIN

Additional Names:

Ecotrin, Ascriptin, Bufferin, Excedrin

Classification:

Analgesic, non-steroidal anti-inflammatory (NSAID), antipyretic, antiplatelet

Physiological Effects:

Aspirin seems to cause inhibition of synthesis and the release of prostaglandins. Aspirin blocks the formation of thromboxane A – 2 which causes platelets to aggregate and arteries to constrict.

Indications:

ACS
Mild to moderate pain
Fever

Contraindications:

Hypersensitivity (relative)
Asthma with hypersensitivity
Active GI ulcerations or bleeding
Hemophilia or other bleeding disorders
Pregnancy
Children less than 12 y/o
Hemorrhagic stroke

Dosage:

Adult: 325 mg PO, chew and swallow

Pediatric: Contact Medical Control

Side Effects:

Nausea, vomiting, heartburn, stomach pain, tinnitus

Additional Information:

Do not administer for ACS if less than 4 hours since last full dose
Reduces the mortality associated with myocardial infarction
Caution in patients taking blood thinning medications
Ecotrin brands are enterically coated and will not dissolve in the mouth without being chewed
Morphine may reduce aspirin's ability to block platelet aggregation which leads to higher mortality in AMI patients

Clinical Guideline(s):

ACS/STEMI/NSTEMI/Angina

ATROPINE

Additional Names:

Atropisol

Classification:

Parasympatholytic, Anti-cholinergic

Physiological Effects:

An alkaloid extract from the atropa belladonna plant that competitively antagonizes the effects of acetylcholine at the muscarinic receptors of the parasympathetic nervous system. Secretions are decreased at salivary and bronchial glands at low doses. At moderate doses atropine causes relaxation of the bronchial smooth muscles causing bronchodilation, increased heart rate through a blockade of the vagus nerve activity of the parasympathetic nervous system, and causes dilated pupils. Atropine decreases gastric motility and stomach acid secretions at high doses.

Indications:

Hypersalivation
Pre-medication for medication assisted intubation
Symptomatic bradycardia
Organophosphate and some "nerve" agent poisoning

Contraindications:

None in the emergency setting

Dosage:

Adult:

Bradycardia
0.5 – 1 mg IV/IO q 3 – 5 min, prn to maximum of 3 mg

Organophosphate Poisoning
2 – 4 mg IV/IO q 5 - 10 min prn, until SLUDGEM dissipates

Pediatric:

Bradycardia
Initial 0.02 mg/kg IV/IO- (pre-medication dose or Medication Assisted Intubation)
2nd: 0.04 mg/kg IV/IO
Minimum individual dose 0.1 mg
Maximum individual doses 0.5 mg (child), 1 mg (adolescent)
Maximum total dose 1 mg (child), 2 mg (adolescent)

Organophosphate Poisoning
0.05 mg/kg IV/IO q 3 – 5 min prn, until SLUDGEM dissipates

Side Effects:

Pupil dilation, blurred vision, headache, restlessness, confusion, tachycardia, angina, palpitations, hypertension, flushing of skin, drying of secretions, dry mouth, difficulty swallowing

Additional Information:

Use only when O2, ventilation, and epinephrine have failed for pediatric bradycardia
TCP is the primary treatment in AV blocks 2° or greater
SLUDGEM - salivations, lacrimation, urination, defecation, gastrointestinal pain, emesis, meiosis

ATROPINE

Clinical Guideline(s):

Medication Assisted Intubation
Bradycardia (Adult & Pediatric)
Overdose/Toxicity

ATROVENT

Additional Names:

Ipratropium bromide

Classification:

Inhaled anti-cholinergic, muscarinic antagonist

Physiological Effects:

A synthetic atropine derivative that antagonizes the effects of acetylcholine almost exclusively at the muscarinic receptors. Competitively binds to the muscarinic receptors without stimulating them. Decreases secretions at salivary and bronchial glands at low doses, while relaxing the bronchial smooth muscles causing bronchodilation, increased heart rate and causes dilated pupils at moderate doses. Atrovent decreases gastric motility and stomach acid secretions at high doses. Minimizes the side effects caused by organic belladonna.

Indications:

Relief of bronchospasms
Asthma
COPD disease chronic bronchitis, emphysema

Contraindications:

Hypersensitivity

Dosage:

Adult: 500 mcg nebulized (in addition to standard albuterol dose), (oxygen flow rates of 6 – 8 lpm)

Pediatric: 500 mcg nebulized (in addition to standard albuterol dose), (oxygen flow rates of 6 – 8 lpm)

Side Effects:

Tremor, dry mouth, blurred vision, photophobia, cough, exacerbation of symptoms, nervousness, dizziness, headache, palpitations, nausea, vomiting, GI Distress, anhidrosis

Additional Information:

Not indicated in the initial treatment of acute episodes of bronchospasms where rapid response is required
Acts along different pathway than β_2 agonist (albuterol). Concurrent administration has additive effects
Most common side effect is dry mouth from residual in oral pharynx during administration

Clinical Guideline(s):

Allergic Reaction / Anaphylactic Shock
Asthma
Respiratory Distress / COPD
Respiratory Distress (Pediatric)

CALCIUM CHLORIDE

Additional Names:

None listed

Classification:

Electrolyte

Physiological Effects:

Calcium chloride is essential for the physiological integrity of the nervous and muscular systems. It is necessary for normal cardiac function by increasing contractility, and operates the mechanism in the coagulation of blood.

Indications:

Suspected hypocalcemia
Hyper-magnesemia (magnesium sulfate overdose)
Suspected hyperkalemia
Calcium Channel blocker overdose

Contraindications:

Hypercalcemia
Digitalis toxicity
Cardiac arrest with ventricular fibrillation

Dosage:

Adult: 500 mg – 1 g IV/IO SIVP

Pediatric: 20 mg/kg IV/IO SIVP (Max 1 g)

Side Effects:

Sensation of "heat wave" or tingling, metal taste in mouth, local burning sensation

Additional Information:

Must be administered as a *slow* IV/IO push
Do not exceed 1 g/min for non-cardiac arrest situations
Rapid infusion may cause hypotension, bradycardia, or asystole
May antagonize effects of homebound calcium channel blockers
Do not administer simultaneously with Sodium Bicarbonate (flush with 5 – 10 cc of saline after administration to clear line)

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Crush Injury / Syndrome
Overdose / Toxicity

DEXTROSE

Additional Names:

D_5W, $D_{10}W$, $D_{25}W$, $D_{50}W$

Classification:

Carbohydrate, hyperglycemic

Physiological Effects:

Dextrose is a monosaccharide which provides calories for the metabolic needs of the cell as an aerobic metabolic substrate of ATP synthesis. Dextrose reverses the CNS effects of hypoglycemia by rapidly elevating serum blood glucose when given parenterally.

Indications:

Known hypoglycemia
AMS of unknown origin (if hypoglycemia suspected)
Chronic alcoholic rehabilitation (if malnutrition suspected)
Malnutrition

Contraindications:

None in the emergency setting

Dosage:

Adult: 8 years and above: 12.5 g – 25 g IV/IO as needed

Pediatric: Less than 8 years: Use $D_{10}W$
0.5 – 1 g/kg IV/IO (5 – 10 ml/kg $D_{10}W$) as needed

Side Effects:

Irritation, thrombosis, or necrosis can occur if dextrose is infiltrated into tissue

Additional Information:

Use largest possible IV site and verify patency before administering
Solutions containing dextrose should not be used for volume replacement in the presence of hypovolemia or shock
Dextrose may cause Wernicke-Korsakoff syndrome in acute ETOH intoxication if given without thiamine supplement
Use caution with administering dextrose to patients with known or suspected intracranial bleeding ($D_{10}W$ or Glucagon should be considered)
Dextrose solutions should not be diluted (For example, do not attempt to dilute $D_{50}W$ to make $D_{10}W$ or $D_{25}W$)

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Adrenal Crisis
Diabetic

DILTIAZEM

Additional Names:

Cardizem, Tiazac, Tiamate, Adizem

Classification:

Slow calcium ion blocker

Physiological Effects:

Diltiazem is a calcium ion influx inhibitor. Diltiazem selectively inhibits the movement of calcium across the cell membrane of cardiac muscle, coronary and systemic arteries, and the cells of the intra-cardiac conduction system. Through the latter mechanism, Diltiazem suppresses activity of the SA and AV nodes and prolongs their refractory periods. Diltiazem is also a potent vasodilator.

Indications:

Atrial Fibrillation
Atrial Flutter
SVT

Contraindications:

Sick sinus syndrome
Wolff-Parkinson-White Syndrome
AV node conduction disturbances (Blocks)
Bradycardia
Impaired left ventricular function (CHF)
COPD

Dosage:

Adult: Initial: 20 mg IV/IO, over 2 min
2nd: 20 mg IV/IO, over 2 min (15 minutes after first dose)

Pediatric: Not recommended

Side Effects:

Dizziness, light-headedness, headache, nausea, vomiting, flushing, warm-feeling, bradycardia

Additional Information:

Give over 3 minutes in older patients
May cause sudden and profound hypotension and bradycardia
Calcium chloride is administered as an antidote in the event of an overdose
Do not give concurrently with IV β-blockers
Increase blood levels of digoxin and carbamazepine (Tegretol) can occur when given with these medications
Cimetidine (Tagamet) interferes with the hepatic breakdown of Diltiazem

Clinical Guideline(s):

Tachycardia

DIPHENHYDRAMINE

Additional Names:

Benadryl

Classification:

Antihistamine

Physiological Effects:

Antihistamines competitively bind the H_1 (located in the smooth muscle, vascular endothelium, the heart, and in the CNS) and H_2 (same as H_1 and gastric parietal cells) receptor sites on effector cells thus blocking the receptors stimulation by histamines during an immune system response to an antigen. Diphenhydramine prevents but does not reverse histamine responses. Antihistamines are also quite specific for reversal of the extrapyramidal (dystonic) reaction.

Indications:

Allergy symptoms (rhinitis, urticaria, itching)
Anaphylaxis
Dystonic reactions common with neuroleptics
Sedation
Motion sickness
Antiemetic

Contraindications:

Hypersensitivity
Patients taking MAOI's
Nursing Mothers
Patient with lower respiratory symptoms (asthma)

Dosage:

Adult: 25 – 50 mg deep IM/IV/IO (max 400 mg/day)

Pediatric: 1 mg/kg deep IM/IV/IO (max 50 mg/day)

Side Effects:

Drowsiness, confusion, sedation, disturbed coordination, palpitation, tachycardia, bradycardia, dry mouth and throat, thickening of bronchial secretions

Additional Information:

CNS depressants may enhance effects
Diphenhydramine toxicity can cause cardiac arrhythmias such as Torsades de Pointes

Clinical Guideline(s):

Allergic Reaction / Anaphylactic Shock
Overdose / Toxicity

DOBUTAMINE

Additional Names:

Dobutrex

Classification:

Ionotropic Agent

Physiological Effects:

Dobutamine is a direct-acting inotropic agent whose primary activity results from stimulation of the β receptors of the heart while producing comparatively mild chronotropic, hypertensive, arrhythmogenic, and vasodilative effects. It does not cause the release of endogenous norepinephrine similar to dopamine.

Indications:

Ionotropic support for cardiac decompensation due to depressed contractility in heart failure and cardiogenic shock

Contraindications:

Hypersensitivity
Idiopathic hypertrophic subaortic stenosis

Dosage:

Adult: 5 – 20 mcg/kg/min IV/IO infusion

Dobutamine (Mix 250mg in 250cc) - 1000 mcg/cc

mcg/kg/min	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
5 mcg	12	15	18	21	24	27	30
10 mcg	24	30	36	42	48	54	60
15 mcg	36	45	54	63	72	81	90
20 mcg	48	60	72	84	96	108	120
	Microdrips per minute or cc/hr						

Pediatric: Contact Medical Control

Dobutamine (Mix 250mg in 250cc) - 1000 mcg/cc

mcg/kg/min	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
5 mcg	2	3	5	6	8	9	11
10 mcg	3	6	9	12	15	18	21
15 mcg	5	9	14	18	23	27	32
20 mcg	6	12	18	24	30	36	42
	Microdrips per minute or cc/hr						

Side Effects:

Increased heart rate and blood pressure, ventricular ectopy, hypotension caused by vasodilation, nausea/vomiting, chest pain, shortness of breath

DOBUTAMINE

Additional Information:

Ensure patient is not fluid depleted before administering Dobutamine.

Clinical Guideline(s):

CHF/Cardiogenic Shock

DOPAMINE

Additional Names:

Intropin

Classification:

Sympathomimetic, catecholamine

Physiological Effects:

Dopamine is a naturally occurring neurotransmitter in the body that mediates through dopaminergic receptors in the CNS. Dopamine is also a sympathomimetic "amine" vasopressor, a member of the catecholamine family. A precursor to epinephrine and norepinephrine, Dopamine affects the sympathetic nervous system through α-adrenergic and β-adrenergic receptor stimulation. The sympathetic stimulation yields an increase in both heart rate and blood pressure. Receptor stimulation is dose dependent.

Indications:

Hypotension from Cardiogenic Shock
CHF (use with caution)

Contraindications:

Shock due to hypovolemia
Tachycardia
Patients with pheochromocytoma (adrenal gland tumor)

Dosage:

Adult: 2 – 20 mcg/kg/min infusion, titrate to effect
(Mix 400 mg in 250 ml NS, equals 1.6 mg/ml or 1600 mcg/ml)

Dopaminergic response: 1 – 4 mcg/kg/min
β-adrenergic response: 5 – 10 mcg/kg/min
α-adrenergic response: 10 – 20 mcg/kg/min

Dopamine (Mix 400mg in 250cc) - 1600 mcg/cc

mcg/kg/min	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
5 mcg	8	9	11	13	15	17	19
10 mcg	15	19	23	26	30	34	38
15 mcg	23	28	34	39	45	51	56
20 mcg	30	38	45	53	60	68	75
	Microdrips per minute or cc/hr						

DOPAMINE

Pediatric: Contact Medical Control

Dopamine (Mix 400mg in 250cc) - 1600 mcg/cc

mcg/kg/min	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
5 mcg	1	2	3	4	5	6	7
10 mcg	2	4	6	8	9	11	13
15 mcg	3	6	8	11	14	17	20
20 mcg	4	8	12	15	19	23	27
	Microdrips per minute or cc/hr						

Side Effects:

Tachycardia, tissue injury with extravasations

Additional Information:

> 20 mcg/kg/min doses may produce peripheral, renal, splenic vasoconstriction and ischemia
Do not mix with sodium bicarbonate
MAOI s may potentiate the effects of dopamine
Antagonists may inhibit inotropic response

Clinical Guideline(s):

Bradycardia (Adult)
CHF/Cardiogenic Shock

EPINEPHRINE

Additional Names:

Adrenaline

Classification:

Sympathomimetic, catecholamine

Physiological Effects:

Epinephrine is an endogenous catecholamine that stimulates the α-adrenergic and β-adrenergic receptor sites in the sympathetic nervous system. In doing so, the general physiological expectation is smooth muscle relaxation of the bronchi, vasoconstriction in the arterioles of the skin and mucosa, and an increase in heart rate and blood pressure.

Indications:

Bronchoconstriction (bronchial asthma)
Croup/Stridor
Allergic reaction
Anaphylaxis
Pulseless arrest
Symptomatic bradycardia
Vasopressor in various shock states

Contraindications:

Hypersensitivity
Hemorrhagic Shock
Hypertension (relative)

Dosage:

Adult:

Cardiac Arrest
1 mg 1:10,000 IV/IO q 3 -5 min

Bronchoconstriction (Asthma or Moderate Allergic Reaction)
0.3 – 0.5 mg 1:1,000 IM, or EpiPen, repeat as needed
3 mg in 3 ml 1:1,000 added to nebulizer

Anaphylaxis (severe allergic reaction)
0.1 mg 1:100,000 IV/IO SIVP (contact medical control for subsequent dosages)

Bradycardia
10 mcg/min 1:100,000 SIVP, repeat as needed
2 – 10 mcg/min IV/IO infusion

Vasopressor in various shock states
2 – 10 mcg/min IV/IO infusion

Epinephrine Infusion (Mix 1mg in 250cc) - 4 mcg/cc

Dosage	2 mcg/min	3 mcg/min	4 mcg/min	5 mcg/min	6 mcg/min	7 mcg/min	8 mcg/min	9 mcg/min	10 mcg/min
	30	45	60	75	90	105	120	135	150
	Microdrips per minute or cc/hr								

EPINEPHRINE

Pediatric:

Cardiac Arrest
0.01 mg/kg 1:10,000 IV/IO q 3 – 5 min (Max single dose – 1 mg)

Bronchoconstriction (asthma)
3 mg 1:1,000 (3 mL) added to nebulizer, repeat as needed
0.01 mg/kg 1:1,000 IM, repeat as needed (Max single dose – 0.3 mg)

Croup/Stridor
3 mg 1:1,000 (3 mL) added to nebulizer, repeat as needed

Bradycardia
0.01 mg/kg 1:10,000 IV/IO q 3 – 5 min (Max single dose – 1 mg)
Less than 20kg use weight-based dose: 0.1 – 0.5 mcg/kg/min infusion
Greater than or equal to 20kg use adult dose: 2 – 10 mcg/min infusion

Allergic Reaction (moderate allergic reaction)
0.01 mg/kg 1:1,000 IM, repeat as needed (Max single dose – 0.3 mg)

Anaphylaxis (severe allergic reaction)
0.01 mg/kg 1:100,000 IV/IO SIVP, max dose 0.1 mg (contact medical control for subsequent dosages)

Epinephrine Infusion (Mix 1mg in 250cc) - 4 mcg/cc

Dosage	2 mcg/min	3 mcg/min	4 mcg/min	5 mcg/min	6 mcg/min	7 mcg/min	8 mcg/min	9 mcg/min	10 mcg/min
	30	45	60	75	90	105	120	135	150
	Microdrips per minute or cc/hr								

Side Effects:

Sweating, dizziness, nervousness, weakness, pale skin, headache

Additional Information:

Contact medical control for allergic reactions and anaphylactic patients with a history of CAD
May be deactivated by alkaline solutions, do not administer simultaneously
Contact medical control for use during pregnancy (risk to fetus)

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Neonatal Resuscitation
Post Resuscitation Care
Bradycardia (Adult & Pediatric)
Allergic Reaction / Anaphylactic Shock
Asthma
Neurogenic Shock
Respiratory Distress (Pediatric)
Septic Shock / Infection

ETOMIDATE

Additional Names:

Amidate

Classification:

Hypnotic, anesthetic, amnesic

Physiological Effects:

Etomidate is a hypnotic, short acting, anesthetic agent with amnesic properties. Etomidate's action is not clearly known, but is thought to work at the g-aminobutyric acid (GABA) receptor to produce hypnosis without analgesia. IV injection is characterized by a rapid onset of hypnotic action, usually within a minute "arm to brain circulation time." Etomidate is a potent suppressant of adrenal steroidogenesis producing a pharmacological adrenalectomy lasting up to 24 hours after one dose.

Indications:

Induction
Sedation

Contraindications:

Hypersensitivity

Dosage:

Adult: 0.3 mg/kg IV/IO over 30 – 60 seconds

Pediatric: 0.3 mg/kg IV/IO over 30 – 60 seconds (max 20 mg)
(Only in peds ≥ 10 y/o)

Side Effects:

Suppression of steroid synthesis (glucocorticoid and mineralcorticoid) in adrenal cortex
Transient venous pain at the site of injection
Transient skeletal muscle movements (myoclonic in nature)
Apnea of short duration (5 – 90 seconds) with spontaneous recovery

Additional Information:

Closely monitor the airway, may produce hiccupping, hypo/hyperventilation, laryngospasm, and snoring. Manage with conventional countermeasures.
N/V can occur post recovery.
Overdose can occur from too rapid of an administration
Patients suspected of septic shock may require a dose of corticosteroid prior to administration.
Skeletal muscle movements can be unilateral or bilateral and can be severe in nature. Movement may involve arms, legs, shoulders, neck, chest wall and trunk. One or more of the muscle groups may predominate. Unilateral movement will usually involve the arm of the injection site.
May interact with levodopa and St. John's Wort.

Clinical Guideline(s):

FAMOTIDINE

Additional Names:

Pepcid

Classification:

Histamine H_2 – receptor antagonist

Physiological Effects:

Pepcid is a competitive inhibitor of histamine H_2 receptors. The primary clinically important pharmacologic activity of Pepcid is inhibition of gastric secretion.

Indications:

Given in combination with Histamine H_1 – receptor antagonist in allergic reactions
Heartburn
Acid indigestion
GERD

Contraindications:

Hypersensitivity to other H_2 – receptor antagonists

Dosage:

Adult: 20 mg IV/IO

Pediatric: Contact Medical Control

Side Effects:

Headache, dizziness, constipation, diarrhea, arrhythmia, AV Blocks, palpitations

Clinical Guideline(s):

Allergic Reaction / Anaphylactic Shock

FENTANYL CITRATE

Additional Names:

Sublimaze, Duragesic, Actiq

Classification:

Narcotic Analgesic

Physiological Effects:

Fentanyl is one of the most powerful opioid analgesics with a potency of approximately 81 times that of morphine. Fentanyl, a lipid soluble drug, is extensively used for anesthesia and analgesia. Fentanyl binds the opioid mu (μ) receptor. Like other opioids, Fentanyl acts directly on the CNS, through competitive binding to the receptor. Activation of these receptors is associated with euphoria, pain relief, dependence, and respiratory depression. Alterations in respiratory rate and alveolar ventilation may last longer than anesthesia. The onset of action is immediate upon IV injection, but the maximal analgesic and respiratory depressant effect may not be noted for several minutes.

Indications:

Pain management
Adjunct for anesthesia
Sedation

Contraindications:

Hypersensitivity

Dosage:

Adult: Initial: 1 mcg/kg IV/IO/IM/IN
2nd: 0.5 mcg/kg IV/IO/IM/IN, repeat as needed

ACS: Initial: 0.25 mcg/kg IV/IO/IM/IN
2ND : 0.25mcg/kg IV/IO/IM/IN

Pediatric: Initial: 1 mcg/kg IV/IO/IM/IN
2nd: 0.5 mcg/kg IV/IO/IM/IN, repeat as needed
(Do not use in pediatrics < 2 y/o)

Side Effects:

Bradycardia, respiratory depression, apnea, muscle rigidity (particularly the muscles of respiration), diarrhea, nausea, constipation, dry mouth

Additional Information:

Effects are related to the dose and speed of administration. May cause sudden respiratory depression and respiratory arrest.
Usual effect last for 30 – 60 minutes, IM onset is 7 – 8 minutes with duration of 1 – 2 hours
Narcan must be available prior to administration
Use caution in the elderly or debilitated patients
Use with caution in patients taking other CNS depressant medications or consuming ETOH
Use with caution in patients with respiratory disease (i.e. COPD, asthma)

Clinical Guideline(s):

Pain Management
Delayed Sequence Intubation
Post Advanced Airway Care

FENTANYL CITRATE

Clinical Guideline(s) (continued):

Post Advanced Airway Care
Cardiocerebral Resuscitation (Adult & Pediatric)
ACS/STEMI/NSTEMI/Angina
Thoracic Aortic Catastrophe

FUROSEMIDE

Additional Names:

Lasix

Classification:

Diuretic

Physiological Effects:

A sulfonamide derivative and potent diuretic which inhibits the reabsorption of sodium and chloride ions in the proximal and distal renal tubules as well as the Loop of Henle in the glomerulus. As the sodium is eliminated water follows depleting volume from the body as a result.

Indications:

Pulmonary edema
Congestive Heart Failure

Contraindications:

Anuria
Pregnancy
Dehydration

Dosage:

Adult: 0.5 – 1 mg/kg IV/IO over 1 – 2 min (max 100 mg)

Pediatric: Contact Medical Control

Side Effects:

Dizziness, tinnitus, hearing loss, headache, blurred vision, weakness, nausea, vomiting, water and electrolyte depletion

Additional Information:

Double the daily dose for patients taking furosemide
Should be protected from light
Do not administer to renal patients that do not urinate

Clinical Guideline(s):

CHF / Cardiogenic Shock

GEODON

Additional Names:

Ziprasidone HCL (oral), ziprasidone mesylate (for injection)

Classification:

Neuroleptic, anti-psychotic

Physiological Effects:

As with other agents having efficacy in the treatment of schizophrenia, it is not clearly known the mechanism of action for Geodon. What is known, is that there is an affinity for the Dopamine$_2$ and the serotonin 5HT α_1 – adrenergic receptor sites. Antagonism of the D_2 and serotonin 5HT receptors prevent the synaptic re-uptake of serotonin and norepinephrine and may be responsible for abating symptoms common to bipolar disorders. The somnolence associated with Geodon is thought to be associated with histamine H_1 receptors antagonism, while orthostatic hypotension may be associated with antagonism of the α_1 – adrenergic receptors.

Indications:

Psychosis or violent behavior with Schizophrenia, Bipolar Mania, or other psychiatric manifestation

Contraindications:

Hypersensitivity
Prolonged Q-T interval
Patient taking medications that cause prolonged Q-T intervals
Elderly patients with dementia related psychosis

Dosage:

Adult: 20 mg IM only

Pediatric: Not recommended

Side Effects:

Slurred speech, seizures, dystonic reaction (particularly of head and neck)

Additional Information:

In the case of accidental overdose, ensure adequate airway and ventilation
Tegretol can reduce the effects of Geodon
For dystonic reactions administer Diphenhydramine as an antidote.

Clinical Guideline(s):

Anxious / Violent / Agitated

GLUCAGON

Additional Names:

GlucaGen

Classification:

Endogenous hormone

Physiological Effects:

Glucagon is a hormone produced by the α-cells of the Islets of Langerhans in the pancreas. When released by the pancreas, it causes an increase in serum glucose concentrations by acting on liver glycogen stores. Glucagon converts glycogen to glucose through a processes called glycogenolysis and gluconeogenesis. Through a complicated chemical process, glucagon has an ability to bypass the β-adrenergic receptors in myocardial cells allowing the reversal of the effects from a β-blocker overdoses. In high doses Glucagon may also reverse the effects of calcium channel blockers.

Indications:

Hypoglycemia
β-blocker / Calcium Channel Blocker overdose resulting in symptomatic bradycardia
Steakhouse syndrome

Contraindications:

Hypersensitivity

Dosage:

Adult: 1 mg IM/IN/IV/IO, q 20 min prn

Pediatric: 0.03 – 0.1 mg/kg IM/IN/IV, q 20 min prn (max 1 mg)

Side Effects:

Dizziness, light-headedness, SOB, nausea, vomiting, irregular heart rhythm

Clinical Guideline(s):

Diabetic
Overdose / Toxicity

HEPARIN

Additional Names:

Heparin Sodium

Classification:

Anticoagulant

Physiological Effects:

Heparin inhibits reactions that lead to the clotting of blood and the formation of fibrin clots. Heparin also prevents the formation of a stable fibrin clot by inhibiting the activation of the fibrin stabilizing factor.

Indications:

Treatment of pulmonary embolism
STEMI patients who are expected to receive Percutaneous Coronary Intervention

Contraindications:

Thrombocytopenia
Uncontrollable active bleeding

Dosage:

Adult: 50-70u/kg max of 4000 units IV/IO

Pediatric: Not recommended

Side Effects:

Thrombocytopenia, hemorrhage

Additional Information:

Use with extreme caution in disease states in which there is an increased danger of hemorrhage

Clinical Guideline(s):

ACS/STEMI/NSTEMI/Angina
CHF / Cardiogenic Shock

INSTA-GLUCOSE

Additional Names:

Glucola

Classification:

Carbohydrate, hyperglycemic

Physiological Effects:

Glucose provides calories for the metabolic needs of the cell as an aerobic substrate of ATP synthesis. Glucose reverses the CNS effects of hypoglycemia by rapidly elevating serum blood glucose when given orally.

Indications:

Known hypoglycemia (conscious patient with the ability to follow simple commands)

Contraindications:

Semi-conscious or unconscious patients (unable to manage airway or follow commands)

Dosage:

Adult: 15 G, 1 tube PO, in sips until CBG improves and patient feels better, repeat as needed

Pediatric: 15 G, 1 tube PO, in sips until CBG improves and patient feels better, repeat as needed

Side Effects:

Nausea/vomiting

Additional Information:

May cause Wernicke-Korsakoff syndrome in acute ETOH intoxication if given without thiamine supplement

Clinical Guideline(s):

Diabetic

KETAMINE

Additional Names:
Ketalar

Classification:
Dissociative anesthetic

Physiological Effects:
Ketamine acts primarily as an antagonist of the NMDA receptor which is mostly responsible for its anesthetic, hallucinogenic, and analgesic properties. In low doses Ketamine is a potent analgesic. In higher doses Ketamine will induce anesthesia and put the patient in a dissociative state. Unlike opiates, Ketamine does not suppress the central nervous system which makes it ideal for use when sedation or pain management is needed in the hemodynamically compromised patient.

Indications:
Induction agent for Delayed Sequence Intubation
Pain management
Sedation
Agitation / Excited Delirium

Contraindications:
Hypersensitivity
Hypertensive Crisis

Dosage:
Adult:

Pain Management
0.5 mg/kg IM/IN
0.25 mg/kg IV bolus infusion over 10 minutes

Induction
2 mg/kg IV/IO over 30-60 seconds

Sedation
1-2 mg/kg IV/IO
4 mg/kg IM

Continued Sedation
1-2 mg/kg/hr

Ketamine for Continuous Sedation (Mix 250mg in 250cc) - 1 mg/cc

mg/kg/hr	40kg	50kg	60kg	70kg	80kg	90kg	100kg
1	40	50	60	70	80	90	100
1.5	60	75	90	105	120	135	150
2	80	100	120	140	160	180	200
	Microdrips per minute or cc/hr						

KETAMINE

Pediatric:

Pain Management
0.5 mg/kg IM/IN
0.25 mg/kg IV bolus infusion over 10 minutes

Induction
1 mg/kg IV/IO

Sedation
1-2 mg/kg IV/IO
4 mg/kg IM

Continued Sedation
1-2 mg/kg/hr

Ketamine for Continuous Sedation (Mix 250mg in 250cc) - 1 mg/cc

mg/kg/hr	5kg	10kg	15kg	20kg	25kg	30kg	35kg
1	5	10	15	20	25	30	35
1.5	7.5	15	22.5	30	37.5	45	52.5
2	10	20	30	40	50	60	70
	Microdrips per minute or cc/hr						

Side Effects:

Emergence Phenomenon, hallucinations, respiratory depression when given rapidly, hypertension, elevated heart rate, bronchodilation, hypersalivation

Additional Information:

Use with caution in OB Patients
Administer slowly to avoid respiratory depression. If respiratory depression occurs, support ventilations.
IV infusion is recommended to reduce the negative effects of Ketamine.
Psychological effects such as hallucinations and emergence phenomenon occur when Ketamine begins to wear off. This can be mitigated with benzodiazepines.
Atropine can be administered in the presence of hypersalivation

Clinical Guideline(s):

Pain Management
Procedural Sedation
Delayed Sequence Intubation
Post Resuscitation Care
Anxious / Violent / Agitated

KETOROLAC

Additional Names:

Toradol

Classification:

Non-steroidal anti-inflammatory

Physiological Effects:

Ketorolac is a nonsteroidal anti-inflammatory drug (NSAID) that inhibits synthesis of prostaglandins and may be considered a peripherally acting analgesic. Ketorolac possesses no sedative or anxiolytic properties.

Indications:

Pain

Contraindications:

Hypersensitivity to NSAIDS
Peptic Ulcer Disease or any form of GI Bleeding
At-risk for other types of internal bleeding
Current use of Aspirin or other NSAIDS
Pregnant or nursing mothers
Renal impairment (relative)
Asthma (Relative – Can cause bronchospasm)

Dosage:

Adult: 30 mg IM/IV/IO (15mg for ≥ 65 years of age, renal impaired, and/or less than 110lbs)

Pediatric: Not recommended it patients < 16 years of age

Side Effects:

Renal failure, headache, indigestion, nausea, vomiting, diarrhea, abdominal pain, internal bleeding, bronchospasm

Additional Information:

For breakthrough pain, it is recommended to supplement the lower end of the Ketorolac dosage range with low doses of narcotics as needed.

Clinical Guideline(s):

Pain Management

LABETALOL

Additional Names:

Trandate, Normodyne

Classification:

Sympathetic blocker

Physiological Effects:

Labetalol combines both selective, competitive α_1-adrenergic blocking and non-selective, competitive β-adrenergic blocking activity in one substance. As a result, Labetalol decreases blood pressure without causing a reflex tachycardia.

Indications:

Hypertensive crisis

Contraindications:

Bronchial asthma
Decompensated CHF (BP < 100 mmHg)
2° and 3° AV block
Bradycardia
Cardiogenic shock

Dosage:

Adult: 20 mg IV/IO over 1 – 2 min. May repeat or double dose q 10 min (max 150 mg)

Pediatric: Not recommended

Side Effects:

Headache, dizziness, vertigo, fatigue, ventricular arrhythmias, SOB, hypotension

Additional Information:

Use caution with Labetalol if there is any reason to suspect cocaine use by the patient
EKG, blood pressure and pulse rate must be constantly monitored
Place patient supine to administer
May blunt effect of bronchodilators and other β-adrenergics
NTG may enhance hypotensive effects
Observe for signs of bradycardia, CHF, and bronchospasms
Use with caution in patients with pulmonary disease and CHF

Clinical Guideline(s):

Hypertensive Crisis
Stroke / TIA

LIDOCAINE

Additional Names:

Xylocaine

Classification:

Antiarrhythmic, sodium channel blocker

Physiological Effects:

Lidocaine has both an anesthetic property and an antiarrhythmic property. The anesthetic properties are caused when depolarization of the neuron is altered by a blockade of the fast Na^+ channels on the cell membrane. As an anti-arrhythmic agent, the Na^+ channels of the myocardial action potential are blocked. This slows automaticity by increasing the time the ventricle is depolarized. The suppression of premature ventricular depolarizations results.

Indications:

Anesthetic during intraosseous placement
Pre-Medication used to blunt ICP during Medication Assisted Intubation
Ventricular Arrhythmias

Contraindications:

Hypersensitivity
Stokes-Adams syndrome
AV blocks > than 1°
Bradycardia
Wolff-Parkinson-White
In conjunction with Amiodarone

Dosage:

Adult:

EZ-IO
40 mg over 2 min— Dwell for 1 min — Rapid flush of saline — 20 mg over 1 min

Pre-medication to blunt ICP during MAI:
1.5 mg/kg IV/IO

Pediatric:

EZ-IO
0.5 mg/kg (max 40 mg) over 2 min— Dwell for 1 min — Rapid flush of saline — 0.25 mg/kg over 1 min (max 20 mg)

Pre-medication to blunt ICP during MAI:
1.5 mg/kg IV/IO

Side Effects:

Light-headedness, confusion, blurred vision, tinnitus, widening QRS, muscle twitching, seizure

Additional Information:

Elimination time increased in patients with liver dysfunction or taking β-blockers
Increased plasma concentrations may cause myocardial and circulatory depression and seizures
Use extreme caution when administering Lidocaine to the following: hypotension not caused by arrhythmia, accelerated idioventricular rhythms, elderly patients, and patients with impaired liver function.
Anesthetic properties usually begin at the four minute mark and lasts from 30 minutes to 3 hours.

LIDOCAINE

Clinical Guideline(s):

Vascular Access
Medication Assisted Intubation

MAGNESIUM SULFATE

Additional Names:

Epsom salt, Phillip's Milk of Magnesia

Classification:

Anticonvulsant, Antiarrhythmic, Smooth muscle relaxant, Bronchodilator.

Physiological Effects:

Magnesium is the second most abundant ion in the intracellular fluid. It is essential for the activity of many enzyme systems and plays an important role in neuro -chemical transmission and muscular excitability. Magnesium sulfate reduces striated muscle contractions and blocks peripheral neuromuscular junction (synapses) by reducing acetylcholine release. Magnesium Sulfate effectively decreases the risk of preeclampsia progressing to eclampsia by preventing and treating seizures. Magnesium Sulfate reduces systolic blood pressure while having no effect on diastolic blood pressure which aids in maintaining perfusion to the fetus when treating the OB patient.

Indications:

Torsades de Pointes
Suspected hypomagnesemia
Preeclampsia & Eclamptic seizure
Bronchospasms after β-agonists and anticholinergic agents

Contraindications:

Heart Blocks / Bradycardia
Myocardial damage
Renal Failure
Shock

Dosage:

Adult: Torsades de Pointes / Bronchospasm / Pre eclampsia
2 g IV/IO bolus infusion over 10 min

Eclamptic Seizure
4 g IV/IO bolus infusion over 10 minutes

Pediatric: Torsades de Pointes / Bronchospasm
50 mg/kg IV/IO over 20 minutes (max 2 g)

Side Effects:

Respiratory depression, drowsiness, flushing, depressed reflexes, reduced heart rate, circulatory collapse

MAGNESIUM SULFATE

Additional Information:

May enhance CNS depressants
Calcium gluconate and calcium chloride should be used as an antagonist to magnesium sulfate
Signs of magnesium sulfate intoxication include flushing, sweating, hypotension, depressed reflexes, flaccid paralysis, hypothermia, circulatory collapse, cardiac and CNS depression proceeding to respiratory paralysis.

Clinical Guideline(s):

Cardiocerebral Resuscitation
Tachycardia
Asthma
Complications of Pregnancy
Pediatric Respiratory Distress

METOPROLOL

Additional Names:

Lopressor, Toprol

Classification:

β-adrenergic blocker

Physiological Effects:

Metoprolol is a β-adrenergic receptor blocker, with preferential effect on β_1- adrenoceptors chiefly located in cardiac muscle. The preferential effect is not absolute and at high doses, β_2-adrenoreceptors chiefly located in the smooth bronchial muscles and vascular musculature can be affected. β-blocking activity in man is shown to reduce heart rate and cardiac output. Metoprolol has no intrinsic sympathomimetic activity.

Indications:

Acute Coronary Syndromes
Tachycardias
Electrical storm

Contraindications:

Bronchial asthma
Bradycardia
2° or 3° AV Blocks
Cardiogenic Shock

Dosage:

Adult: 5 mg IV/IO SIVP q 5 min (max 15 mg)

Pediatric: Safety has not been established

Side Effects:

Bradycardia, SOB, light-headedness, dizziness, weakness, nausea, vomiting, swelling ankles

Additional Information:

Use with caution in pulmonary disease and CHF

Clinical Guideline(s):

ACS/STEMI/NSTEMI/Angina
Tachycardia
Thoracic Aortic Catastrophe

MIDAZOLAM

Additional Names:

Versed, Hypnovel, Dormicum

Classification:

Benzodiazepine derivative, anxiolytic, anticonvulsant

Physiological Effects:

Induces effects by acting on parts of the gamma-amino butyric acid (GABA) and benzodiazepine receptors, the major inhibitory neurotransmitter in the CNS. Contains anxiolytic, anticonvulsant, sedative, muscle relaxant, and amnesic properties.

Indications:

Seizures
Sedation
Anxiety
Violent behavior
Adverse reaction to stimulants

Contraindications:

Hypersensitivity
Hypotension (except with ROSC)
Narrow angle glaucoma

Dosage:

Adult:

Seizures/Violent/Overdose
2.5 – 5 mg IM/IN/IV/IO q 2 min, titrate to effect (max 20 mg)

Procedural sedation/Anxiety
1 mg – 2.5 mg IM/IN/IV/IO q 2 min, titrate to effect (max 20 mg)

Continued Sedation
2.5 – 5 mg IV/IO, titrate to effect (2.5 – 5 mg increments)

Pediatric:

Seizures/Procedural sedation/Anxiety/Violent/Overdose
0.05 mg/kg IV/IO (max single dose 2.5 mg, max total dose 5 mg)
0.2 mg/kg IM (max single dose 2.5 mg, max total dose 5 mg)
0.2 mg/kg IN (max single dose 2.5 mg, max total dose 10 mg)
Administer initial dose and monitor for 5 minutes; subsequent doses may be repeated PRN up to max dose. If more than the max dose is needed, contact medical control.

Continued Sedation
0.1 mg/kg IV/IO, titrate to effect (0.1 mg/kg increments)

Side Effects:

Anterograde amnesia, apnea, respiratory arrest

MIDAZOLAM

Additional Information:

The IM and IN routes are not a preferred route for procedural sedation.
Dose increments may be shorter than 2 minutes for emergency procedures
May cause drowsiness, tiredness, or weakness for 1 – 2 days
Potentiates the effects of other CNS depressants
Rarely is > 5 mg required to reach desired effects
Considered to be 2x as potent as diazepam, milligram for milligram
May cause respiratory depression, be prepared to intubate

Clinical Guideline(s):

Procedural Sedation
Post Advanced Airway Care
Active Seizures
Anxious/Violent/Agitated
Complications of Pregnancy
Overdose/Toxicity

NALOXONE

Additional Names:

Narcan

Classification:

Opioid antagonist (synthetic)

Physiological Effects:

Naloxone competitively binds to the β-endorphin receptors in the CNS thereby reversing the effects of opiates and their derivatives. Because naloxone has a higher affinity for the β-endorphin receptors, it completely reverses the effects of opiates and opioids and causes a sudden rapid onset of withdrawal symptoms.

Indications:

Opiate/Opioid Toxicity

Contraindications:

Hypersensitivity

Dosage:

Adult: 0.4 – 2 mg IM/IN/IV/IO q 2 min, titrate to adequate breathing (max 10 mg)

Pediatric: 0.1 mg/kg IM/IN/IV/IO q 2 min, titrate to adequate breathing (max 2 mg)

Side Effects:

Tachycardia, hypertension, dysrhythmias, nausea, vomiting

Additional Information:

May cause opiate withdrawal
Half-life is shorter than narcotic, may need to repeat doses. Continuously monitor respirations.
Narcan may be given as a bolus infusion to provide continuous titration as needed
IM injection produces a more long term effect than IV administration
In cardiac arrest situations where opiate/opioid toxicity is suspected focus should be placed on providing adequate oxygenation and ventilation. Narcan may then be considered as a treatment modality.

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Overdose/Toxicity

NICARDIPINE

Additional Names:

Cardene

Classification:

Calcium Channel Blocker

Physiological Effects:

Nicardipine inhibits the transmembrane influx of calcium ions into cardiac muscle and smooth muscle without changing serum calcium concentrations. The contractile processes of cardiac muscle and vascular smooth muscle are dependent upon the movement of extracellular calcium ions into these cells through specific ion channels. The effects of nicardipine are more selective to vascular smooth muscle than cardiac muscle. In animal models, nicardipine produced relaxation of coronary vascular smooth muscle at drug levels which cause little or no negative inotropic effect.

Indications:

Short-term treatment of hypertension

Contraindications:

Hypersensitivity
Advanced aortic stenosis

Dosage:

Adult: Initiate infusion at 5mg/hr. If desired effect is not achieved increase dose by 2.5 mg/hr every 5 minutes until desired effect or a max of 15 mg/hr. Once the desired blood pressure is achieved the infusion should be set at 3 mg/hr.

Nicardipine (Mix 25mg in 250cc) - 100 mcg/cc

Dosage	3 mg/hr	5 mg/hr	7.5 mg/hr	10 mg/hr	12.5 mg/hr	15 mg/hr
	30	50	75	100	125	150
	Microdrips per minute or cc/hr					

Pediatric: Not recommended

Side Effects:

Hypotension, headache, tachycardia, nausea, vomiting, dizziness, sweating

Additional Information:

Use with caution in patients with impaired liver function
Should be infused through large peripheral veins to minimize the risk of venous irritation
If unacceptable hypotension or tachycardia occur the infusion should be discontinued

Clinical Guideline(s):

CHF / Cardiogenic Shock
Hypertensive Crisis
Stroke / TIA
Thoracic Aortic Catastrophe

NITROGLYCERIN

Additional Names:

Nitrostat, Transderm Nitro, Nitro-Dur, Nitrobid

Classification:

Vasodilator

Physiological Effects:

When nitroglycerin is administered, it is converted to nitric oxide by a chemical process that is not understood. Nitric oxide is a potent vasodilator in the body. Acting directly on the coronary arteries, this would enhance blood flow and subsequent oxygenation to the myocardium. NTG also has a dilatory effect on the peripheral vasculature thereby reducing both preload and afterload. This is beneficial in reducing the workload (myocardial oxygen demand) of the heart.

Indications:

Acute Coronary Syndromes
Congestive Heart Failure
Hypertension

Contraindications:

Hypersensitivity
If erectile dysfunction medications used in last 24 hours, (taldalafil 48 hours)
Heart rates < 50 bpm or > 100 bpm in ACS
Relative Hypotension
Right ventricular infarction

Dosage:

Adult:

Acute Coronary Syndromes
400 mcg (1 spray) SL q 3-5 min, to desired effect

Congestive Heart Failure
400 mcg (1 spray) SL q 3-5 min, to desired effect
200 – 400 mcg IV/IO every 3-5 minutes, to desired effect
5 – 400 mcg/min maintenance infusion

Hypertensive crisis
5 – 400 mcg/min infusion

NITROGLYCERIN

Adult (Continued):

Nitroglycerin (Mix 50mg in 250cc) 200mcg/cc

Dosage (mcg/min)	cc/hr	Dosage (mcg/min)	cc/hr
5	1.5	210	63
10	3	220	66
20	6	230	69
30	9	240	72
40	12	250	75
50	15	260	78
60	18	270	81
70	21	280	84
80	24	290	87
90	27	300	90
100	30	310	93
110	33	320	96
120	36	330	99
130	39	340	102
140	42	350	105
150	45	360	108
160	48	370	111
170	51	380	114
180	54	390	117
190	57	400	120
200	60		
Microdrips per minute or cc/hr			

Pediatric: Not recommended

Side Effects:

Headache, transient hypotension (postural syncope), reflex tachycardia, nausea, vomiting, abdominal cramps

Additional Information:

Do not shake aerosol spray because this affects metered dose
Not recommended in pregnancy
Light sensitive, protect from direct sunlight
Wear gloves when handling and use caution as to not inadvertently inhale the medication or get in eyes
While treating CHF, the IV/IO route is recommended to avoid interruptions in providing continuous positive airway pressure

Clinical Guideline(s):

ACS/STEMI/NSTEMI/Angina
CHF / Cardiogenic Shock
Hypertensive Crisis

NOREPINEPHRINE

Additional Names:

Levophed

Classification:

Vasopressor

Physiological Effects:

Norepinephrine acts primarily on α_1-adrenergic receptors and has some effect on β_1-adrenergic receptors resulting in potent vasoconstriction with a mild ionotropic response resulting in increased cardiac output.

Indications:

Distributive Shock
Cardiogenic Shock

Contraindications:

Hypovolemia

Dosage:

Adult: 2 – 10 mcg/min IV/IO infusion

Norepinephrine Infusion (Mix 1mg in 250cc) - 4 mcg/cc

Dosage	2 mcg/min	3 mcg/min	4 mcg/min	5 mcg/min	6 mcg/min	7 mcg/min	8 mcg/min	9 mcg/min	10 mcg/min
	30	45	60	75	90	105	120	135	150
	Microdrips per minute or cc/hr								

Pediatric: Not recommended

Side Effects:

Severe hypertension, ischemic injury due to vasoconstriction, bradycardia, headache

Additional Information:

When possible, infusions of norepinephrine should be given into a large vein, particularly an antecubital vein
Avoid Hypertension. Close blood pressure monitoring is required.
Use with extreme caution in patients receiving monoamine oxidase inhibitors (MAOI) or antidepressants of the triptyline or imipramine types
Ensure patient is not fluid depleted. Fluid resuscitation should be considered when appropriate.

Clinical Guideline(s):

Post Resuscitation Care
CHF / Cardiogenic Shock
Septic Shock / Infection

ONDANSETRON

Additional Names:

Zofran

Classification:

Antiemetic

Physiological Effects:

Zofran is a serotonin 5-HT_3 receptor antagonist. Mechanism of action has not been fully characterized although it is not a dopamine-receptor antagonist. Serotonin 5-HT_3 receptors are present both peripherally on vagal nerve terminals and centrally in the chemoreceptor trigger zone of "the area postrema," the part of the medulla oblongata that controls vomiting.

Indications:

Nausea
Vomiting

Contraindications:

Hypersensitivity

Dosage:

Adult: 4 mg PO/IM/IV/IO SIVP (may be repeated once)

Pediatric: 0.1 mg/kg IM/IV/IO SIVP for patients weighing < 40 kg, use adult dosing for ≥ 40 kg (max 4 mg)

Side Effects:

Rare EKG changes including elongated Q-T intervals and angina
Diarrhea, headache, fever

Additional Information:

Multiday administration is shown to slow colonic transiting
Reduction in clearance and increase in elimination half-life seen in patients > 75 y/o

Clinical Guideline(s):

Nausea / Vomiting

PLAVIX

Additional Names:
clopidogrel bisulfate

Classification:
Antiplatelet

Physiological Effects:
Plavix (clopidogrel bisulfate) is a thienopyridine class inhibitor of $P2Y_{12}$ ADP platelet receptors. Plavix is used in conjunction with aspirin to prevent a coronary thrombosis during and after placement of a coronary stent.

Indications:
STEMI

Contraindications:
Uncontrollable active bleeding
Hypersensitivity
ST elevation caused by conditions other than ACS (drug use, inflammation, infection, systemic hypoxia, etc.)
Possible CVA

Dosage:
Adult: 600 mg PO

Pediatric: Not recommended

Side Effects:
Thrombocytopenia, hemorrhage, headache, nausea, bruising, itching, heartburn

Additional Information:
Use with extreme caution in disease states in which there is an increased danger of hemorrhage

Clinical Guideline(s):
ACS/STEMI/NSTEMI/Angina

ROCURONIUM

Additional Names:

Zemuron, Esmeron

Classification:

Skeletal muscle relaxant

Physiological Effects:

Rocuronium bromide is a non-depolarizing neuromuscular blocking agent with a rapid to intermediate onset depending on dose and intermediate duration. It acts by competing for cholinergic receptors at the motor end-plate. This action is antagonized by acetylcholinesterase inhibitors, such as neostigmine and edrophonium.

Indications:

Induce paralysis to facilitate endotracheal intubation

Contraindications:

Hypersensitivity

Dosage:

Adult: 1 mg/kg IV/IO

Pediatric: 1 mg/kg IV/IO

Side Effects:

Apnea, transient hypotension and hypertension

Additional Information:

Presents intubation conditions in patients with intubation initiated at 60 – 70 seconds

Should not be administered unless 2 or more clinicians skilled in endotracheal intubation are present

All airway equipment needed to facilitate intubation as well as all equipment needed to facilitate back-up and rescue airway placement (Supraglottic airways, surgical cric) should be readily available

Clinical Guideline(s):

Delayed Sequence Intubation

SODIUM BICARBONATE

Additional Names:

None

Classification:

Buffer

Physiological Effects:

Bicarbonate is an anion (negative charge) that forms a salt (sodium bicarbonate) when it combines with its conjugate acid. Bicarbonate serves as the principal buffer for the body's acid/base buffer system maintaining the CO_2 level

Indications:

Hyperkalemia
Known preexisting bicarbonate responsive acidosis (Diabetic ketoacidosis, Tricyclic or ASA overdose, cocaine overdose, or Diphenhydramine overdose)

Contraindications:

Excessive vomiting or continuous gastric suctioning (resulting in metabolic alkalosis)
Metabolic alkalosis
Hypocalcemia
Hypokalemia

Dosage:

Adult:

Acidosis/Overdose
Initial: 1 mEq/kg IV/IO
2nd: 0.5 mEq/kg IV/IO q 5 – 10 min

Crush Injury/Syndrome
Injury: 100 mEq added to 2 liters of NS (50 mEq per liter of saline)
Syndrome: 100 mEq bolus IV/IO

Pediatric:

Acidosis/Overdose
Initial: 1 mEq/kg IV/IO
2nd: 0.5 mEq/kg IV/IO q 5 – 10 min

Crush Injury/Syndrome
Injury: Add 50 mEq to 1 liter of NS and administer at 20 cc/kg
Syndrome: 1 mEq/kg bolus IV/IO

Side Effects:

Metabolic alkalosis, Rise in intracellular PCO_2, Seizures

Additional Information:

Do not mix with calcium chloride or other salts
Do not mix with epinephrine
Sloughing will occur if infiltrated out of vein into tissue

SODIUM BICARBONATE

Clinical Guideline(s):

Cardiocerebral Resuscitation (Adult & Pediatric)
Overdose/Toxicity
Crush Injury/Syndrome

SOLU-MEDROL

Additional Names:

Methylprednisolone, A-methaPred, DepoMedrol

Classification:

Adrenocortical steroid

Physiological Effects:

Solu-medrol is a synthetic corticosteroid. Corticosteroids are hormones produced by the adrenal glands adjacent to the kidney. Corticosteroids are involved in a number of physiological systems such as stress response, immune system response, and regulation of inflammation to name a few.

Indications:

Anaphylaxis
Asthma
COPD

Contraindications:

Hypersensitivity
Use with caution in patients with GI bleeding
Use with caution in diabetics

Dosage:

Adult: 125 mg deep IM/IV/IO

Pediatric: 0.5 – 2 mg/kg deep IM/IV/IO

Side Effects:

Dizziness, weakness, sleep disorders, weight gain, sodium and water retention, nausea, induced Cushing Syndrome, hypokalemia, hyperglycemia

Additional Information:

Caution in pregnancy, only if benefit outweighs the risk to fetus
Enhanced effect in patients with hypothyroidism and cirrhosis
Peak efficiency and onset times are not immediate

Clinical Guideline(s):

Adrenal Crisis
Allergic Reaction / Anaphylactic Shock
Asthma
Respiratory Distress / COPD
Pediatric Respiratory Distress

SUCCINYLCHOLINE

Additional Names:

Quelicin, Anectine

Classification:

Skeletal muscle relaxant

Physiological Effects:

Succinylcholine is a short acting depolarizing neuromuscular blocking agent used to induce paralysis to facilitate endotracheal intubation

Indications:

Induce paralysis to facilitate endotracheal intubation

Contraindications:

Hyperkalemia or the risk of hyperkalemia
Personal or family history of malignant hyperthermia
Narrow angle glaucoma or penetrating eye injury

Dosage:

Adult: 1 – 2 mg/kg IV/IO

Pediatric: 1 – 2 mg/kg IV/IO

Side Effects:

Hyperkalemia or the risk of hyperkalemia, fasciculations, bradycardia

Additional Information:

Onset of flaccid paralysis is rapid (less than one minute after intravenous administration), and with single administration lasts approximately 4 to 6 minutes
Should not be administered unless 2 or more clinicians skilled in endotracheal intubation are present
All airway equipment needed to facilitate intubation as well as all equipment needed to facilitate back-up and rescue airway placement (Supraglottic airways, surgical cric) should be readily available

Clinical Guideline(s):

THIAMINE

Additional Names:

Vitamin B_1, Betaxin

Classification:

Vitamin B_1

Physiological Effects:

Thiamine is a coenzyme in the citric acid cycle (Kreb's cycle) responsible for carbohydrate and fat metabolism that serves as an energy currency for the cell. Thiamine is essential for normal growth and development of the nervous and the digestive systems, as well as cardiac functioning.

Indications:

Hypoglycemia in the presence of chronic alcohol use or malnutrition
Thiamine deficiency
Delirium Tremens
Wernicke's encephalopathy
Korsakoff Psychosis
Beriberi (rare)

Contraindications:

None in the emergency setting

Dosage:

Adult: 100 mg IM/IV/IO

Pediatric: Not recommended

Side Effects:

Allergic reaction, weakness, fatigue, psychosis, nerve damage, nausea, vomiting

Additional Information:

When treating hypoglycemia in the presence of suspected ETOH abuse, thiamine must be given in close proximity to the dextrose injection
Wernicke's encephalopathy is eye disturbance, unsteady gait, and confusion caused by a Thiamine deficiency commonly caused by chronic alcohol use.
Korsakoff psychosis is confusion and short term memory loss caused by a Thiamine deficiency commonly caused by chronic alcohol use.
Wernicke-Korsakoff syndrome is the combined presence of Wernicke's encephalopathy and Korsakoff psychosis.

Clinical Guideline(s):

Diabetic

TRANEXAMIC ACID

Additional Names:

Cyklokapron

Classification:

Antifibrinolytic Agent

Physiological Effects:

Tranexamic Acid (TXA) is a synthetic amino acid (lysine) that prevents plasminogen from being converted to plasmin. Plasmin is responsible for breaking down already formed clots in the body in a process known as fibrinolysis. When TXA is administered, it will prevent the body from breaking down clots so that the natural clotting processes can work to control non-compressible hemorrhage.

Indications:

Major Hemorrhage (trauma)

Contraindications:

> 3 hours from time of injury
Hypersensitivity
Subarachnoid hemorrhage
Active intravascular clotting

Dosage:

Adult: 1 g bolus infusion over 10 min

Pediatric: Not recommended

Side Effects:

Hypotension if given rapidly, diarrhea, nausea, vomiting, and blurred vision.

Additional Information:

Administer TXA no later than 3 hours from time of injury
TXA administered within 1 hour of time of injury has shown to significantly reduce the risk of death due to bleeding
If hypotension occurs slow down infusion rate
TXA should be considered in any patient who has experienced significant blood loss (internal or external) and for patients who have suspected ongoing internal hemorrhage secondary to trauma

Clinical Guideline(s):

Hemorrhage Control
Complications of Pregnancy

APPENDIX B—PROCEDURES

Apneic Oxygenation
Capillary Blood Glucose (CBG)
Clinical Guideline Deviation Report
CPAP
Cricothyroidotomy-Adult
Cricothyroidotomy-Pedi (QuickTrach)
Electrical Therapy
Emergency Childbirth
Emergent Infectious Disease
End Tidal CO_2 Detection ($EtCO_2$)
Endotracheal Intubation
EZ-IO™ Insertion
Gastric Tube Insertion
King LTS-D
Medication Assisted Intubation
Nebulizer
Needle Thoracostomy
Pelvic Binder
Pericardiocentesis
Pulse Oximeter
Sedation
Simple Thoracostomy
Targeted Temperature Management
Tourniquet
Traction Splint
Trans-Cutaneous Pacing (TCP)
Vagal Maneuvers
Vascular Access

APNEIC OXYGENATION

Apneic oxygenation is a technique used to supplement the pre-oxygenation phase of advanced airway management. Oxygen desaturation is one of the most frequent complications associated with emergent airway procedures. Current evidence supports the use of apneic oxygenation to reduce rates of desaturation and extend the safe apnea time.

Indications:

Patients requiring oxygenation prior to and during endotracheal intubation

Procedure:

1. During pre-oxygenation phase apply nasal cannula with NRB mask, CPAP or BVM
2. Connect nasal cannula to secondary source of oxygen
3. Adjust flow rate to 15lpm or higher
4. Maintain flow rate and maximum spo2 until airway procedure is complete
5. Ventilate patient with positive pressure ventilation via advanced airway
6. Disconnect nasal cannula from oxygen source

Additional Information:

1. Factors that decrease safe apnea include inadequate pre-oxygenation, increased oxygen consumption, critical illness, obesity, pregnancy, small children, airway occlusion, and pulmonary shunt.
2. In critically ill patients critical desaturation can occur almost immediately despite optimal attempts at pre-oxygenation
3. Alveoli will continue to take up oxygen even without diaphragmatic movements or lung expansion assuming there is no airway obstruction.
4. Apneic oxygenation is merely an adjunct, it is not a substitute for effective pre-oxygenation
5. High flow rates of oxygen via nasal cannula provide very high levels of oxygen and a small amount of PEEP
6. Delivering gas at high flow rates without heating and humidification causes nasal irritation, however most patients requiring intubation are extremely sick and are past the point of noticing this discomfort.

CAPILLARY BLOOD GLUCOSE (CBG)

CBG evaluation is utilized to test the blood for the glucose levels. Glucose levels typically range between 60 mg/dL and 120 mg/dL. Some glucometers can display either "low" or "high". The Optium EX Blood Glucose Monitoring System that we currently use will show "LO" for blood glucose levels less than 20. It will show "HI" for blood glucose levels greater than 500. If using a different monitoring system you should refer to the owner's manual to determine the measured levels HI and LO indicate for that particular device.

Indications:

Any patient present with altered mental status
Reported hypoglycemia
Diabetic patients with vague medical complaints
Strokes
Seizures

Procedure:

1. Prepare and assemble necessary equipment
   a. Glucometer
   b. Test Strip
   c. Lancet
   d. Alcohol Swab
   e. 4X4 Dressing
   f. Band-Aid
2. Select sample site on patient's finger
3. Insert test strip into glucometer
4. Clean site with alcohol swab using aseptic techniques
5. Wipe site with sterile 4X4 dressing
6. Prick the finger at the site previously selected.
7. Maintain the extremity in a position lower than the patients heart to facilitate blood return
8. Squeeze to accumulate blood droplet
9. Wipe away first droplet with 4X4 dressing (to avoid sample contamination with alcohol)
10. Squeeze again to accumulate blood droplet
11. Apply blood to test strip
12. Observe and document blood glucose level

Additional Information:

Test strips have an expiration date (maintain current date)

CLINICAL GUIDELINE DEVIATION REPORT

The following report is to be completed in its entirety and routed to the Training Division no later than the end of the affected shift, for any and all instances in which a medic administers patient care not specifically delineated in the East Baton Rouge Parish, Department of EMS Patient Care Protocols as a standard method or procedure, while representing the Department as a medical responder.

Date of Occurrence: _____ Time of Occurrence: _____

EM-Unit #: _____ On Duty Shift: _____ PCR#: _____

Physician Ordering (on radio): _____ Receiving Hosp: _____
(Print First and Last)

Attending Medic: _____ 2nd Crewmember: _____

Description of Occurrence:

_____

_____

_____

_____

_____

_____

_____

_____

_____

**********Office Use Below**********

CQI Notes: _____ **Training Notes:** _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____
Signature Signature

CPAP

Continuous Positive Airway Pressure has been shown to rapidly improve vital signs, gas exchange, and work of breathing, decrease the sense of dyspnea, and decrease the need for endotracheal intubation in the patients who suffer from hypoxemia caused by congestive heart failure, asthma, and COPD. The improvement seen following CPAP administration occurs through a combination of 1) preventing alveolar collapse and facilitating oxygen delivery to pulmonary capillaries; 2) increasing the functional residual capacity and opening collapsed alveoli which enhances gas exchange and oxygenation; and 3) reducing transmural pressure resulting in increased cardiac output.

Indications:
Patients who are in respiratory distress with signs and symptoms consistent with hypoxic hypoxia to include chronic obstructive pulmonary disease, asthma, pneumonia, congestive heart failure, neuromuscular disorders, acute lung injury, etc.

Contraindications:
1. < 30 Kg
2. Inability to protect airway or follow commands
3. Respiratory Arrest/inadequate ventilatory effort
4. Unstable Cardiorespiratory Status / Hypotension (shock)
5. Uncooperative patients
6. Trauma/Burns involving face
7. Penetrating chest trauma
8. Pneumothorax
9. Active upper GI bleeding or history of recent gastric surgery

Procedure:
1. Prior to use, check to be sure the device is free of obstructions and is structurally intact.
2. Connect directly to a 50psi gas source. For maximum flow, open the valve completely. Listen for leaks.
3. Place mask over patients face while explaining procedure. Use coaching as necessary to keep the patient calm. Utilize the head strap to secure the mask firmly in place.
4. Start with the O2-CPAP valve at the appropriate pressure depending on patient's presentation.
5. Add nebulizer to the built-in port to administered medications as necessary.
6. Noticeable improvement should be seen in approximately 2-3 minutes. If the patient does not improve, increase the O2-CPAP valve until the desired pressure is obtained (5.0 → 7.5 → 10 cmH_2O)

Additional Information:
1. CPAP works in the setting of CHF by impacting the osmotic pressures that leads to pulmonary edema. CPAP reverses the pressure gradients causing intra-alveolar fluid to be reabsorbed into the intravascular space.
3. CPAP works in the setting of COPD and Asthma by splinting airways for gas exchange and medication delivery. Use of the end-tidal capnography may assist in determining which patients are suitable for CPAP versus intubation
4. CHF patients typically benefit from higher CPAP pressures due to the higher pressure needed for oxygenation and reducing hydrostatic pressure in the lungs which is responsible for preventing pulmonary edema. COPD/Asthma patients typically respond well to lower CPAP pressures when the goal is exclusively to splint the airways to allow for exhalation of trapped CO_2 or for nebulized medication administration.
4. Do not remove CPAP until hospital therapy is ready to be placed on the patient
5. Monitor patient for gastric distension which may lead to vomiting
6. IV Nitroglycerin is the preferred route of administration during CPAP use to prevent having to remove the mask and lowering airway pressures.

CRICOTHYROIDOTOMY-ADULT

Cricothyroidotomy is an emergency procedure involving surgical cutting of the cricothyroid membrane to access the trachea for ventilation in patients where all other airway maneuvers have been unsuccessful or not possible.

Indications:
1. Inability to establish an airway and death is eminent due to a lack of an airway
2. FBAO, when methods to relieve obstruction have failed
3. Patients experiencing trismus (clinching) with airway compromise
4. Severe Facial trauma with airway compromise and other airway measures have failed
5. Laryngeal edema
6. Failed airway when rescue airways and BVM ventilations are unsuccessful

Contraindications:
1. Underlying anatomic abnormality (goiter or tumor)
2. Tracheal transection

Procedure:
Scalpel-finger-bougie approach
Equipment: Scalpel blade (#10)
Bougie
Size 6.0mm ETT (or tracheostomy tube) / appropriately sized pediatric ETT w/ cuff

1. Once decision is made to proceed, extend neck in supine position to make anatomy more accessible by palpation (a.k.a. the 'laryngeal handshake'); note that airway has priority over suspected c-spine injury
2. Stabilize the thyroid cartilage with the non-dominant hand. Dominant hand holds scalpel and rests on the patients sternum for stability and support
3. Make a 4 cm vertical incision through skin over cricothyroid membrane. If impalpable anatomy you may need to extend incision from mandible to sternum. If landmarks are easily identifiable, a horizontal incision can be made through skin and membrane during this step.
4. Once skin is incised, palpate cricothyroid membrane position and blunt dissect with fingers through subcutaneous tissue until the membrane is readily identifiable. Ignore bleeding until airway is secure (ETT placement usually has a tamponade effect)
5. Horizontal incision through membrane, drag scalpel blade from one side to the other then rotate 180 degrees and extend to the other side. The cricothyroid membrane is bound by a 'cartilaginous cage' so resistance will be felt at the margins of the membrane when the scalpel blade abuts cartilage.
6. Dilate with gloved little finger and palpate tracheal lumen, ideally identifying the cartilage of the posterior wall of the trachea/cricoid ring.
7. Pass bougie alongside little finger into trachea. Confirm bougie position with finger, ensuring it passes through membrane. Bougie usually holds up at carina <10cm from the skin (may feel tracheal rings as the bougie advances). Do not force if resistance is met as to not perforate the carina.
8. Pass ETT over bougie and intubate trachea. Ensure the ETT balloon is fully deflated and twist ETT as it passes the skin (hold up here is common). Only advance the ETT until the balloon is within the airway and no longer visible (endobronchial intubation is likely if advanced further).
9. Ensure ETT is held secure while bougie is removed and ETT is connected to BVM
10. Ensure proper ETT placement with physiological and mechanical methods of confirmation ($EtCO_2$, breath sounds, equal chest rise, etc.)
11. Secure tube

CRICOTHYROIDOTOMY-ADULT

Additional Information:

1. Excessive bleeding can occur (control with direct pressure)
2. Assess for displacement or false passage by assessing for inability to ventilate, subcutaneous emphysema, or signs of pneumomediastinum.
3. "Surgical" Cricothyroidotomy is not recommended for smaller children due to their anatomical differences. It may be safer to establish a percutaneous airway with the pediatric QuickTrach or by placing a 14 gauge over-the-needle catheter.

CRICOTHYROIDOTOMY-PEDI (QUICKTRACH)

A Percutaneous Cricothyroidotomy is used on our pediatric patients as an emergency procedure involving puncturing the cricothyroid membrane to access the trachea for ventilation in patients where all other airway maneuvers have been unsuccessful or not possible.

Indications:
1. Inability to establish an airway and death is eminent due to a lack of an airway
2. FBAO, when methods to relieve obstruction have failed
3. Patients experiencing trismus (clinching) with airway compromise
4. Severe Facial trauma with airway compromise and other airway measures have failed
5. Laryngeal edema
6. Failed airway when rescue airways and BVM ventilations are unsuccessful

Contraindications:
1. Underlying anatomic abnormality (goiter or tumor)
2. Tracheal transection

Procedure:
1. Provide all supplemental support and necessary stabilizers
2. Assemble and check all necessary equipment
3. Place the patient in the supine position and assure stable positioning of the neck
4. Hyper-extend the neck (contraindicated in c-spine trauma) to expose thyroid cartilage (larynx)
5. Identify and localize landmarks (thyroid cartilage, cricoid cartilage, cricothyroid membrane)
6. Secure the larynx laterally between the thumb and forefinger
7. Find the cricothyroid membrane, which is in the midline between the thyroid cartilage and the cricoid cartilage (puncture site)
8. Clean the puncture site with alcohol or betadine swab using aseptic techniques
9. Grasp the laryngeal structure and hold firmly
10. Firmly hold the QuickTrach and puncture the cricothyroid cartilage while holding the syringe at a 90 degree angle from the structure (needle should be angled slightly downward toward the feet to avoid the vocal cords and glottic structures)
11. Advance the QuickTrach enough for the distal tip to move into the trachea or the spacer at the bottom of the 15 mm adapter contacts the skin
12. Aspirate with the attached syringe to get air return (indicates you are in the trachea)
13. Holding the stylet firmly to avoid further advancement, remove the spacer and advance the tracheal tube off of the stylet into the trachea (push in downward direction towards the feet)
14. Carefully remove the needle and syringe
15. Secure the cannula with the neck strap
16. Apply the corrugated extension tube to the 15mm adapter of the tracheal tube
17. Connect the BVM to the corrugated extension and ventilate the patient
18. Ensure proper placement with physiological and mechanical methods of confirmation ($EtCO_2$, breath sounds, equal chest rise, etc.)
19. Continue to provide high flow oxygen and ventilate using BVM
20. Continuously monitor the integrity of the patient's airway by utilizing the $EtCO_2$ and SpO_2 monitoring

Additional Information:
1. Excessive bleeding can occur (control with direct pressure)
2. Assess for displacement or false passage by assessing for inability to ventilate, subcutaneous emphysema, or signs of pneumomediastinum
3. In the really young patient the pediatric QuickTrach may be too large to place. In these cases it may be appropriate to use a 14 gauge over-the-needle catheter.

ELECTRICAL THERAPY

Defibrillation

Energy Levels:
Biphasic

Adult:	Initial:	200 J
	All subsequent:	200 J
	Dual sequential:	200 J each monitor
Peds:	Initial:	2 J/kg
	All subsequent:	4 J/kg

Cardioversion

Energy Levels:
Biphasic

Adult:	SVT and A-Flutter:	50 J → 100 J → 120 J → 150 J → 200 J
	V-Tach with pulse:	
	— Monomorphic:	100 J → 120 J → 150 J → 200 J
	— Polymorphic:	120 J → 150 J → 200 J **"unsynchronous"**
	Atrial fibrillation:	120 J → 150 J → 200 J
Peds:	All rhythms:	0.5 J/kg → 2 J/kg → 2 J/kg all subsequent shocks
	(if 2nd shock is unsuccessful, give anti-arrhythmic trial before third shock)	

Dual Sequential External Defibrillation

Indications:

Refractory ventricular fibrillation/tachycardia (not recurrent) despite 5 defibrillations. (including bystander or first responder defibrillations with AED)

Procedure:

1. Ensure quality CPR is not compromised.
2. Prepare and attach an additional set of defibrillation pads (anterior/posterior) while avoiding contact with initial pads.
3. Ensure that both monitors are able to be controlled by a single provider who will be delivering shocks.
4. Simultaneously charge both cardiac monitors. When both monitors are charged to selected energy setting and all persons are clear, the provider will push both shock buttons in sequence as close together as possible while avoiding simultaneous delivery of shocks. The shocks should be one right after the other. Delivery of simultaneous shocks (shocks at the same time) can result in harm to the provider, patient, and/or monitor.

Additional Information:

An AED can be used when a second monitor is not available. When the AED is analyzing, the Zoll monitor can be charged. When ready, the AED and Zoll monitor can be used to deliver a sequential shock as described above.

Emergency Childbirth

Emergency childbirth is the birth of an infant in places or situations other than what was planned. Emergency measures for delivery are indicated when childbirth is imminent

Indications:
Imminent childbirth

Procedure:
1. Gather, assemble, and check all supplies and equipment
2. Place clean pad under the patient
3. During contractions, urge the patient to push
4. Deliver and support the emerging fetal head
5. Check for nuchal cord and manage appropriately if present
6. Assess for the presence of meconium and consider suctioning if delivery is delayed
7. Deliver the shoulders and the remainder of the body
8. Place the newborn on mother's abdomen or at the level of the mother's uterus
9. Suction airway if needed. Routine suctioning is not recommended unless the newborn has visible meconium in the airway.
10. Dry, warm, and stimulate newborn.
11. After 1 minute (or sooner if the umbilical cord stops pulsating), clamp and cut the umbilical cord approximately 6 – 8 inches from the abdomen
12. Acquire 1 minute APGAR score
13. Resuscitate newborn according to Neonatal Resuscitation Pyramid if necessary
14. Place newborn on mother (skin to skin)
15. Acquires 5 minute APGAR sore
16. Acquire CBG from newborn if indicated
17. Monitor mother and newborn
18. Upon delivery of the placenta, place in provided bag and give to hospital staff

Additional Information:
1. Crowning, bulging of the perineum, and the urge to push are all signs of imminent delivery. Preparation for delivery should be completed immediately. If in the ambulance, the crew should pull over, if safely able to do so, to prepare for delivery.
2. Neonatal resuscitation is indicated for patients who are breathing inadequately or who have a sustained heart rate of less than 100. Proceed to the Neonatal Resuscitation Guidelines as needed
3. A Meconium Aspirator is used by intubating the patient and then attaching the Meconium Aspirator to the endotracheal tube and to suctioning. Once adequately suctioned, the provider can intubate, if necessary, with a clean endotracheal tube.

EMERGENT INFECTIOUS DISEASE

This procedure is intended to address the transport and PPE requirements for a patient with a suspected emergent infectious disease. Responding crews will be notified of a suspected emergent infectious disease by medical communications using the statement, "Positive screening, additional PPE required."

PPE Requirements

At a minimum, the following PPE will be needed for each practitioner when treating and transporting a patient with an emergency infectious disease.

- Eye protection (goggles) and face shield
- N95 Respirator
- Exam gloves – three pair
- Tychem suit with hood
- Shoe covers
- Boot Covers

At a minimum, the following PPE will be needed for the donning/doffing partner to assist the practitioner when donning and doffing PPE.

- Eye protection (goggles)/face shield
- N95 Respirator
- Exam gloves three pain
- Shoe covers
- Boot Covers
- Disposable gown and/or Tyvek jumpsuit/coverall

Donning and Doffing of PPE

Donning and doffing procedures will be completed using a 'buddy system' to ensure the lowest possible risk of contamination. Do not attempt to don or doff PPE without a partner to monitor the situation.

<u>Donning Procedure</u>

When donning PPE, it is important to have an additional person not involved in patient care watch over and supervise the donning procedure to assure PPE is donned appropriately. All taping should be done with duct tape so that there is no tenting; and covering with a spacing of 50/50 on gloves/shoe covers and Tyvek/Tychem material. The following steps should be taken to don the PPE.

1. Remove all jewelry, watches, and belt attachments.
2. Remove outer uniform shirt.
3. With donning partner, inspect the Tychem suit for defects.
4. Place shoe covers over work foot gear.
5. Cleanse hands with alcohol hand gel.
6. Place Tyvek sleeves on each forearm.*
7. Apply first layer of gloves.
8. Tape first layer of gloves to Tyvek sleeves.*
9. Carefully place Tychem suit over shoe covers and slide arms into sleeves.
10. Place second, longer pair of gloves over the sleeves of the Tychem suit.
11. Tape second pair of gloves to the sleeves of the Tychem suit.
12. Apply boot covers over feet. If boot covers do not have elastic to fit snugly against Tychem suit, tape boot covers to the suit.
13. Apply N95 mask, making sure of a good fit and skin coverage.
14. Apply safety glasses/goggles.

15. Place hood on head, making sure all hair is inside of the hood.
16. Zip the suit.
17. Remove paper from adhesive and press the flap in place for the entire length.
18. Apply face shield.
19. Apply 3rd pair of gloves. These gloves may be removed, put into a bio hazard bag, and then replaced as they become soiled.

** The Tyvek sleeves may be omitted if longer gloves are used.

Doffing Procedure

When doffing PPE, an additional person not involved in patient care shall watch over the doffing procedure to assure it is doffed appropriately minimizing the risk for contamination. The order and procedure in which PPE should be doffed is as follows:

1. Lay disposable sheet on ground to stand on and designate "clean/dirty" area.
2. Have doffing partner don PPE, except for Tychem suit.
3. Have biohazard bag within arms' reach.
4. Have doffing partner remove any gross contamination with MEDI-WIPE or similar product.
5. Have doffing partner mist Tychem suit, gloves and boot covers with disinfectant or 10% bleach solution and wait 10 minutes.
6. Remove boot covers and place in bio hazard bag.
7. Remove outer (3rd) layer glove and place in bio hazard bag.
8. Apply a clean pair of gloves.
9. Remove face shield and place in bio hazard bag.
10. Remove hood and place in bio hazard bag.
11. Unzip and remove Tychem suit by rolling it inside out with doffing partner assisting in the process – take care not to allow outside of suit to contact skin or clothing.
    a. When removing hands from sleeves, the outer layer and the taped layer of gloves should be carefully removed during this step.
12. Before proceeding in completely removing suit, apply a clean pair of gloves (there should two gloves on each hand).
13. Using the inside of the Tychem suit, roll it down to the ankles.
14. Remove feet from the suit, taking care to step only on the inside of the suit.
15. Remove inner boot covers and step into "clean" area after each removal.
16. Remove outer layer of gloves and place into "dirty" area.
17. Remove safety glasses/goggles and place into "dirty" area.
17. Remove N95 mask, taking care not to touch the face, and place into "dirty" area.
18. Remove last layer of gloves along with Tyvek sleeves (if applicable).
19. Using alcohol hand sanitizer, cleanse hands and/or wash hands as soon as possible.
20. Doffing partner will contain all of removed items onto disposable sheet and place into doubled bio hazard bags for proper disposal.

EMERGENT INFECTIOUS DISEASE

Ambulance Preparation

Ambulance preparation will be done with the purpose of segregating the cab from the patient compartment and covering the cabinets/shelves, ceiling, seating and floor with an impermeable barrier.

Supplies that will be needed include:

Plastic sheeting (visqueen)
Duct tape
Scissors

Procedure:

All sheeting should overlap prior sheets of plastic by a minimum of 1 inch. All seams should be sealed completely by duct tape.

1. Remove all unnecessary medical equipment and place in the cab of the ambulance.
2. Cover the ceiling of the patient compartment with plastic sheeting and affix with duct tape.
3. Place sheeting on the floor of the patient compartment area and affix to the bench seat, jump seat, and walls to create a bowl effect in an effort to channel any body fluids toward the center of the floor causing fluids to collect in one area.
4. Place plastic sheeting over the walls (sides and bulkhead) by affixing it to the edges of the sheeting for the ceiling and floor with duct tape to enable any flow of fluid to be captured on the sheet on the floor.
5. Wall sheeting should overlap with the upper portion over the lower portion to prevent any body fluid from leaking between sheets by gravity.
6. The stretcher mounts will need to be accessible through the plastic sheeting for safe transport of the stretcher and the patient. Seal these openings generously with duct tape so that all fluids flow to the sheeting on the floor.
7. Leave openings around ventilation ports to allow proper airflow and exchange.
8. Continue to overlap sheeting down and over seating to the floor. Cover rear doors with plastic sheeting and duct tape.

Stretcher Preparation

Stretcher preparation will be done with the purpose of preventing contamination of areas that cannot be clean with disinfectant (i.e., mattress pad).

Supplies that will be needed:

Impermeable Mattress Cover
Disposable blanket
Patient containment bag

Procedure:

Cover mattress pad with fitted impermeable mattress cover. Place disposable blanket on top of cover so that the patient can be wrapped with the blanket once on the stretcher.

EMERGENT INFECTIOUS DISEASE

Patient Care

If possible, prior to patient contact, each caregiver will don the PPE while the other crewmember assists by both checking for integrity issues or exposed body parts. Patient care should be limited to supportive care.

Ambulatory patient

If the patient is able to walk to the ambulance, have them don the PPE that is required for EMS personnel and walk to the ambulance

Non-ambulatory patient

If the patient is not ambulatory, place the patient in a patient containment bag and then put the patient on the protected stretcher.

Transport to the Hospital

1. Family or friends of the patient should not ride in the ambulance and should be instructed to stay home. Should there be an issue (i.e., minor child), consult with your supervisor and/or wait for a decision from the state authorities.
2. When calling the receiving facility, make them aware of the situation as soon as possible and ask for specific instructions as to where to unload the patient.
3. Preplan the unloading procedure with the receiving facility.
4. Upon arrival at the receiving facility, make contact with the staff and do not unload the patient until they are ready to receive them.

End Tidal CO_2 Detection ($EtCO_2$)

$EtCO_2$ is utilized to evaluate a patient's perfusion status, confirm proper advanced airway placement, and the ongoing monitoring of advanced airway placement by measuring the capnometry and capnography during exhalation. $EtCO_2$ is the "gold standard" in monitoring the respiratory integrity of the patient and perfusion status. $EtCO_2$ is also valuable in assessing the level of severity in and the therapeutic response of medications for patients experiencing bronchospasm and chronic obstructive lung diseases.

Indication:

Non-intubated patients:

1. Patients presenting with or suspected of having any type of hypoxic or hypercapnic disease pathology (Any form of shock, CHF, Asthma, Pneumonia, DKA, etc.)
2. Patients requiring any type of sedation
3. Patients receiving pain management or any other medication that affects circulation and/or respiration

Intubated patients:

1. After initial advanced airway placement of any type
2. Continuous monitoring of correct advanced airway placement and ventilation
3. Detection of loss of circulatory function
4. Verification of the effectiveness of CPR
5. Confirmation of return of spontaneous circulation

Procedure:

Non Intubated Patients

1. Determine mechanism of distress (i.e. asthma, emphysema, CHF, etc.)
2. Attach $EtCO_2$ monitor utilizing nasal cannula
3. Verify proper waveform and quantitative measures
4. Utilize diagnostic information (waveform and quantitative value) to verify the patient's condition
5. Initiate appropriate Clinical Guideline for pharmacological care

Intubated or Ventilated Patients (BVM, ETT, Surgical airway, or Supraglottic airways)

1. Intubate according to intubation procedure
2. Set up $EtCO_2$ monitor
3. Attach $EtCO_2$ monitor between advanced airway or mask and Bag valve
4. Verify proper waveform and quantitative measure to confirm tube placement and/or ventilation
5. Continuously monitor placement by assuring proper waveform and quantitative value

Additional Information:

1. In intubated patients, $EtCO_2$ does not replace clinical confirmation of placement (chest rise, tube moisture, bag compliance, (+) breath sounds, and (-) gastric sounds)
2. Shark fin pattern is indicative of the severity and presence of bronchospasms
3. $EtCO_2$ will be placed on all intubated patients and the non-intubated ones listed in above
4. Normal capnometry values are between 35-45mmhg. Values less than 35mmhg suggest decreased cellular metabolism (shock, poisoning, etc.) or hyperventilation. Values higher than 45 suggest hypoventilation or increased metabolic metabolism (hyperthermia, hyperthyroidism)

ENDOTRACHEAL INTUBATION

The endotracheal intubation, or placement of an endotracheal tube, into the trachea is the preferred method of airway management when definitive airway care is warranted. Patients unable to maintain an adequate airway from various etiologies are candidates.

Indications:

1. Failure of ventilation/oxygenation or pending failure of ventilation/oxygenation
2. Patients unable to maintain or protect their airway
3. Patients with the potential of clinical deterioration
4. Airway obstruction of any type (edema, foreign body, trauma)
5. Crash airway scenarios

Procedure:

1. Assure a patent airway and hyperoxygenate with 100% O_2 prior to the procedure
2. Assemble and check all the necessary equipment. Utilize Delayed Sequence Intubation Guideline as needed
3. Select the appropriate sized ETT
4. Place the patient in the "sniffing" position with the head extended
5. Insert laryngoscope blade into the right side of the mouth while sweeping the tongue to the left
6. Visualize right tonsillar fossa, centralize blade to the uvula
7. Look for the epiglottis and utilize the tip of the blade appropriately
   a. Macintosh inserts into the vallecula while lifting mandible to expose glottis
   b. Miller goes under the epiglottis to manually lift it to expose glottis
8. Visualize the glottic opening (vocal cords)
9. Insert the Coude-tip Bougie into the trachea while feeling for tracheal rings and advance until hold up.
10. Insert the ETT over the Bougie using a counter-clockwise motion and into the trachea until the desired depth is achieved
11. Withdraw the laryngoscope blade followed by the Bougie taking care as to not dislodge the ETT.
12. Inflate the distal cuff on the ETT with 10 ml of air or until you feel resistance on the syringe, whichever occurs first
13. Confirm bilateral breath sounds and absent epigastric sounds by auscultation
14. Confirm bilateral chest rise by visualization
15. Confirm placement with proper $EtCO_2$ waveform
16. Visualize moisture in the ETT
17. Verify adequate BVM compliance
18. Secure the ETT appropriately using a commercial device
19. Continue to provide oxygen as needed and ventilate using a bag valve device

Additional Information:

1. To problem solve any difficulty with the intubated airway, remember the pneumonic **DOPE**: **D**-dislodgement, **O**-obstruction, **P**-pneumothorax, **E**-equipment
2. Suction should be available at all times while performing this procedure
3. Supraglottic airway and/or equipment needed for surgical airway should be readily available in the event of unsuccessful endotracheal intubation. (Failed Airway Guideline)
4. The $EtCO_2$ and SpO_2 must be applied to all intubated patients for continuous airway monitoring
5. To protect the cervical spine in trauma, manual stabilization may be used when performing endotracheal intubation.
6. The Miller blade is recommended for pediatric patients

EZ-IO™ INSERTION

EZ-IO insertion is used when fluid resuscitation or medication therapy is necessary and IV access is unobtainable or when a delay in gaining IV access would be detrimental to the patient's outcome.

Indications:
The EZ-IO is recommended for use on adult and pediatric patients any time vascular access is difficult to obtain in emergent, urgent, or medically necessary situations for up to 24 hours. Only 3 insertion attempts, per patient, is permitted.

Adult/Pediatric Sites Include:

Proximal Humerus (preferred)
Proximal Tibia
Distal Tibia
Distal Femur (Pediatrics only)

Select EZ-IO® Needle Set based on patient weight, anatomy and clinical judgment. The EZ-IO® Catheter is marked with a black line 5 mm proximal to the hub. Prior to drilling, with the EZ-IO® Needle Set inserted through the soft tissue and the needle tip touching bone, adequate needle length is determined by the ability to see the 5 mm black line above the skin.

- EZ-IO® 45 mm Needle Set (yellow hub) should be considered for proximal humerus insertion in patients 40 kg and greater and patients with excessive tissue over any insertion site
- EZ-IO® 25 mm Needle Set (blue hub) should be considered for patients 3 kg and greater
- EZ-IO® 15 mm Needle Set (pink hub) should be considered for patients approximately 3-39 kg

Contraindications:
1. Fracture of the target bone
2. Previous, significant orthopedic procedures at insertion site (e.g. prosthetic limb or joint)
3. IO in the targeted bone within the past 48 hours including unsuccessful attempts
4. Infection at area of insertion
5. Excessive tissue or absence of adequate anatomical landmarks

Procedure:

Proximal Humerus (Adult)

Site Identification
- Proximal Humerus (Adult)
- Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)
- Place your palm on the patient's shoulder anteriorly; the "ball" under your palm is the general target area
- You should be able to feel this ball, even on obese patients, by pushing deeply
- Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally
- Place your thumbs together over the arm; this identifies the vertical line of insertion on the proximal humerus

EZ-IO™ INSERTION

- Palpate deeply up the humerus to the surgical neck
- This may feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck
- The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle
- Select EZ-IO® Needle Set based on patient weight, anatomy and clinical judgment. The EZ-IO® Catheter is marked with a black line 5 mm proximal to the hub. Prior to drilling, with the EZ-IO® Needle Set inserted through the soft tissue and the needle tip touching bone, adequate needle length is determined by the ability to see the 5 mm black line above the skin.

Insertion Technique

- Aim the needle set at a 45-degree angle to the anterior plane and posteromedial
- Push the needle set tip through the skin until the tip rests against the bone
- The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
- Gently drill into the humerus approximately 2 cm or until the hub is close to the skin; the hub of the needle set should be perpendicular to the skin

Tibia (Adult)

Site Identification

Proximal Tibia

- Extend the leg.
- Insertion site is approximately 2 cm medial to the tibial tuberosity, or approximately 3 cm below the patella and approximately 2 cm medial, along the flat aspect of the tibia.

Distal Tibia

- Insertion site is located approximately 3 cm proximal to the most prominent aspect of the medial malleolus.
- Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.

Insertion Technique

- Aim the needle set at a 90-degree angle to the bone
- Push the needle set tip through the skin until the tip rests against the bone
- The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
- Gently drill, advancing the needle set approximately 1-2 cm after entry into the medullary space or until the needle set hub is close to the skin

EZ-IO™ INSERTION

Proximal Humerus (Pediatric)

Site Identification

- Place the patient's hand over the abdomen (elbow adducted and humerus internally rotated)
- Place your palm on the patient's shoulder anteriorly; the "ball" under your palm is the general target area
- You should be able to feel this ball, even on obese patients, by pushing deeply
- Place the ulnar aspect of your hand vertically over the axilla and the ulnar aspect of your other hand along the midline of the upper arm laterally
- Place your thumbs together over the arm
- This identifies the vertical line of insertion on the proximal humerus
- Palpate deeply up the humerus to the surgical neck
- This may feel like a golf ball on a tee – the spot where the "ball" meets the "tee" is the surgical neck
- The insertion site is 1 to 2 cm above the surgical neck, on the most prominent aspect of the greater tubercle

Insertion Technique

- Aim the needle set tip at a 45-degree angle to the anterior plane and posteromedial
- Push the needle set tip through the skin until the tip rests against the bone
- The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
- Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger

Tibia (Pediatric)

Site Identification

Proximal Tibia

- Extend the leg. Pinch the tibia between your fingers to identify the medial and lateral borders.
- Insertion site is approximately 1 cm medial to the tibial tuberosity, or just below the patella (approximately 1 cm) and slightly medial (approximately 1 cm), along the flat aspect of the tibia.

Distal Tibia

- Insertion site is located approximately 1-2 cm proximal to the most prominent aspect of the medial malleolus.
- Palpate the anterior and posterior borders of the tibia to assure insertion site is on the flat center aspect of the bone.

Insertion Technique

- Aim the needle set at a 90-degree angle to the bone
- Push the needle set tip through the skin until the tip rests against the bone
- The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
- Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger

EZ-IO™ INSERTION

Distal Femur (Pediatric)

Site Identification

- Secure the leg out-stretched to ensure the knee does not bend.
- Identify the patella by palpation. The insertion site is just proximal to the patella (maximum 1 cm) and approximately 1-2 cm medial to midline.

Insertion Technique

- Aim the needle set at a 90-degree angle to the bone
- Push the needle set tip through the skin until the tip rests against the bone
- The 5 mm mark must be visible above the skin for confirmation of adequate needle set length
- Gently drill, immediately release the trigger when you feel the loss of resistance as the needle set enters the medullary space; avoid recoil – do NOT pull back on the driver when releasing the trigger

Insertion Completion

- Hold the hub in place and pull the driver straight off; continue to hold the hub while twisting the stylet off the hub with counter clockwise rotations; catheter should feel firmly seated in the bone (1st confirmation of placement);
- Dispose of all sharps and biohazard materials using standard biohazard practices and disposal containers.
- If using the NeedleVISE® 1 port sharps block, place on stable surface and use a one-handed technique.
- Place the EZ-Stabilizer® Dressing over the hub
- Attach a primed extension set to the catheter hub, firmly secure by twisting clockwise
- Pull the tabs off the dressing to expose the adhesive, apply to the skin
- Aspirate for blood/bone marrow (2nd confirmation of placement)*
- *Inability to withdraw/aspirate blood from the catheter hub does not mean the insertion was unsuccessful.
- Proceed with technique below, based on situation:

A. ADULT - RESPONSIVE TO PAIN – RECOMMENDED ANESTHETIC

- Observe recommended cautions/contraindications to using 2% preservative and epinephrine-free lidocaine (intravenous lidocaine) and confirm lidocaine dose per institutional Clinical Guideline
- Prime extension set with lidocaine
- Note that the priming volume of the EZ-Connect® Extension Set is approximately 1.0 mL
- Slowly infuse lidocaine 40 mg IO over 120 seconds
- Allow lidocaine to dwell in IO space 60 seconds
- Flush with 5 to 10 mL of normal saline
- Slowly administer an additional 20 mg of lidocaine IO over 60 seconds.
- Repeat PRN; consider systemic pain control for patients not responding to IO lidocaine

B. ADULT - UNRESPONSIVE TO PAIN

- Prime extension set with normal saline
- Flush the IO catheter with 5-10 mL of normal saline
- If patient develops signs indicating responsiveness to pain, refer to adult recommended anesthetic technique.

EZ-IO™ INSERTION

C. INFANT/CHILD - RESPONSIVE TO PAIN – RECOMMENDED ANESTHETIC

- Observe recommended cautions/contraindications to using 2% preservative and epinephrine-free lidocaine (intravenous lidocaine) and confirm lidocaine dose per institutional Clinical Guideline; usual initial dose is 0.5 mg/kg, not to exceed 40 mg
- Prime extension set with lidocaine; priming volume of the EZ-Connect® Extension Set is approximately 1.0 mL
- For small doses of lidocaine, consider administering by carefully attaching syringe directly to needle hub (prime extension set with normal saline)
- Slowly infuse lidocaine over 120 seconds
- Allow lidocaine to dwell in IO space 60 seconds
- Flush with 2-5 mL of normal saline
- Slowly administer subsequent lidocaine (half the initial dose) IO over 60 seconds.
- Repeat PRN; consider systemic pain control for patients not responding to IO lidocaine

D. INFANT/CHILD - UNRESPONSIVE TO PAIN

- Prime extension set with normal saline
- Flush the IO catheter with 2-5 mL of normal saline
- If patient develops signs indicating responsiveness to pain, refer to infant/child recommended anesthetic technique.

- Connect fluids if ordered and pressurize up to 300 mmHg for maximum flow
- Verify placement/patency prior to all infusions.
- Stabilize and monitor site and limb for extravasation or other complications
- For proximal humerus insertions, ensure arm is secured to avoid movement
- For distal femur insertions, maintain securement of the leg to ensure the knee does not bend
- Document date and time on wristband and place on patient

GASTRIC TUBE INSERTION

Nasogastric tube intubation is indicated to relieve gastric distention

Indications:

1. Decompression of the stomach to reduce potential for aspiration and difficulty with ventilation
2. Decompression of the stomach to relieve pressure inside the thoracic cavity to improve preload

Contraindications:

1. Nasal or facial trauma or Basilar skull fracture
2. If resistance is met upon insertion into both nostrils
3. Anatomical alterations from previous surgeries
4. Suspected esophageal varices

Procedure:

1. Select the proper size tube according to the size of the patient
2. Measure the tube by placing the distal end over the stomach region and extend to behind the ear, and then to the corner of the mouth or nostril (Mark tube at desired depth at this time)
3. Place the patient in an upright, seated position for procedure if possible. Supine for unresponsive patients is appropriate.
4. Lubricate the distal end of the tube and insert into the largest nostril or corner of mouth
5. Advance the tube while having the patient swallow continuously (if conscious), until the desired marked depth is at the nostril or corner of the mouth
6. Verify tube placement by auscultating over stomach while injecting 30 mL of air with a syringe
7. Tape the tube in place
8. Attach clear tube with adaptor to suction tubing (lowest suction setting needed to decompress stomach)
9. If suction is to be removed then the blue tube should be capped on to the clear tube with adaptor

Additional Information:

1. Withdraw the tube immediately if the patient's respiratory status deteriorates
2. NG tubes should be placed in all intubated patients when gastric distention is suspected or present. Especially, when the patient was being ventilated without an advanced airway.
3. The clear tube on the Salem Sump Tube is used for suction/decompression. The blue tube is a vent tube that can be used as an irrigation tube. Typically, in the pre-hospital setting, you would only want to consider irrigating the NG tube through the blue tube is if it becomes blocked from gastric contents. If irrigation is needed flush the blue tube with sterile water. You would then flush the line again with air to ensure it remains patent to be used as a vent when hooked to suction.

KING LTS-D

The King LTS-D is a color coded supraglottic airway designed for positive pressure ventilation. The King LTS-D ranges in size (0 – 5) to accommodate pediatric patients less than 5 kg to adult patients greater than 6 ft. The anatomically shaped distal tip and cuff assist in the device's passage behind the larynx and into the normally collapsed esophagus providing ventilation into the trachea.

Indications:

1. Need for positive pressure ventilation
2. Rescue airway when endotracheal intubation cannot be achieved
3. Securing and maintaining airway patency when endotracheal intubation is unwarranted

Contraindications:

1. Intact airway reflexes
2. Conscious/semi-conscious patients
3. Ingestion of caustic substances
4. Known esophageal disease

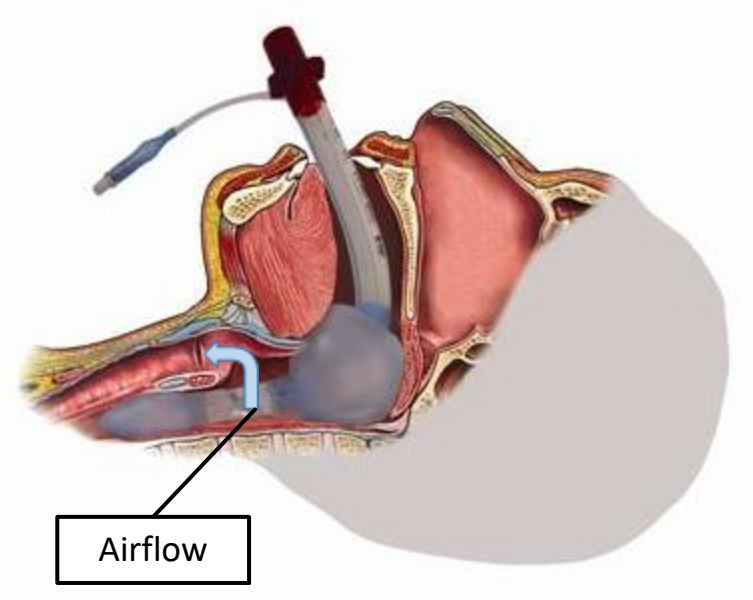
Procedure:

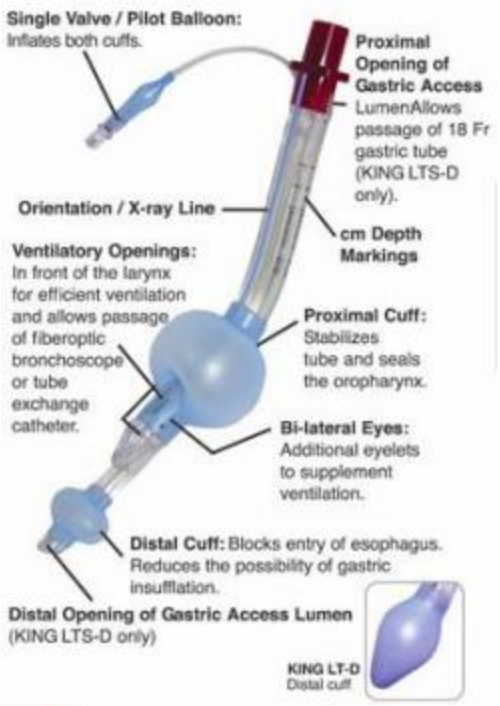
1. Lubricate distal tip while avoiding applying lubricant over ventilation or suction ports.
2. Place patient in sniffing position and perform tongue-jaw lift.
3. Introduce KING LTS-D into corner of mouth
4. Advance tip under base of tongue, while rotating tube back to midline
5. Without exerting excessive force, advance tube until base of connector is aligned with teeth or gums
6. Fully inflate cuffs using the maximum volume of air as listed on the airway device.
7. Attach resuscitation bag. While gently bagging, slowly withdraw tube until ventilation is easy and free flowing (large tidal volume with minimal airway pressure)
8. If necessary, adjust/add cuff inflation volume to maximize the seal of the airway
9. Confirm proper placement by auscultation and monitoring $EtCO_2$.
10. Secure the device using a commercial tube restraint or tape.
11. Note device depth
12. Measure and insert gastric tube through posterior port as needed
13. Lubricate gastric tube prior to inserting into the KING LTS-D's gastric access lumen

Additional Information:

1. This device may not protect the airway or allow for effective ventilation in the following situations:
    - Active Vomiting – aspiration is likely
    - FBAO
    - Trauma/bleeding in the airway
    - Edema to the airway – Burns, anaphylaxis, etc.
2. The second lumen of the KING LTS-D, which is open at the distal tip of the tube, provides three key additional benefits:
    - Passage of gastric tube up to 18 French
    - Channel for regurgitation, which significantly reduces potential for regurgitation to get past the cuff and therefore aids in reducing the chance for aspiration
    - Provides "vent" for gastric pressure and stomach decompression

KING LTS-D





Sizing Information

	Pediatric				Adult		
Tube Size	**Size 0**	**Size 1**	**Size 2**	**Size 2.5**	**Size 3**	**Size 4**	**Size 5**
Connector Color	Transparent	White	Green	Orange	Yellow	Red	Purple
Patient Criteria	<5 kg	5-12 kg	12-25 kg 90-115 cm	25-35 kg 105-130 cm	4-5 feet (122-155 cm)	5-6 feet (155-180 cm)	greater than 6 feet (>180 cm)
Recommended Cuff Volume	10 ml	20 ml	35 ml	40-45 ml	50-60 ml	70-80 ml	80-90 ml
Maximum Cuff Pressure	60 cm H_2O						
External Diameter of the Tube	9 mm	9 mm	14 mm	14 mm	17.6 mm	17.6 mm	17.6 mm
Bronchoscopy Via Ventilation Lumen	< 3.0 mm	< 3.0 mm	< 4.0 mm	< 4.0 mm	< 6.0 mm	< 6.0 mm	< 6.0 mm
Suction Catheter	10 Fr	10 Fr	16 Fr	16 Fr	18 Fr	18 Fr	18 Fr

MEDICATION ASSISTED INTUBATION

Delayed Sequence Intubation is the use of pharmacologic agents to facilitate endotracheal intubation in patients where intubation may be difficult or impossible. This includes patients that are combative, have intact airway reflexes or other unfavorable conditions.

Indications:
Patients requiring advanced airway placement which fall into one of the below categories:

- Conscious
- Combative
- Trismus
- Intact Airway Reflexes
- Other unfavorable conditions

Considerations:
Not all patients that have indications for this procedure are necessarily candidates for Delayed Sequence Intubation. Examples include patients who may have contraindications to the medications used for this procedure. Or, patients who are expected to be a difficult intubation in situations where management with supraglottic devices or a cricothyroidotomy is contraindicated or expected to also be difficult or unsuccessful thus providing no secure back up plan.

Procedure:

1. Gather, assemble, and check all equipment for ETI
2. Gather all need backup airway equipment (King LTS-D, Cric)
3. Properly position your patient. Back up approximately 20° - 30° and head elevated in the sniffing position.
4. Consider administration of pre-medications (Lidocaine, Fentanyl, Atropine)
5. Pre-Oxygenate patient (100% O_2 with NRB or BVM, Apneic Oxygenation) for at least 5 minutes
6. If patient does not allow for pre-oxygenation or resuscitation administer Ketamine as part of a delayed sequence intubation. Oxygenate and resuscitate your patient. Once patient's SpO_2 improves to > 90%, continue preoxygenation for 3 minutes.
7. If patient is adequately pre-oxygenated and does not require resuscitation administer Ketamine as your induction agent.
8. Intubation can be performed without the use of a paralytic if able.
9. If not, administer Rocuronium
10. Attempt intubation with bougie while maintaining Apneic Oxygenation once paralysis is achieved.
11. If the patient's SpO_2 falls below 90% then the attempt should be abandoned. When this occurs or if the attempt is unsuccessful then the crew should proceed to the Failed Airway Guideline. The patient should be ventilated and oxygenated before subsequent intubation attempts.
12. If intubation is successful verify tube placement and depth (breath sounds, equal rise & fall, $EtCO_2$)
13. Secure tube with commercial tube restraint
14. Continue with ventilations at appropriate rate and volume
15. Administer Fentanyl for analgesia
16. Administer Ketamine and/or Midazolam for continued sedation
17. Continuously monitor patient (especially after any patient movement)

MEDICATION ASSISTED INTUBATION

Additional Information:

1. Etomidate is not the best induction agent to use in patients who are hemodynamically unstable. Ketamine is a safer option.
2. Patients must be adequately oxygenated and resuscitated before a paralytic can be administered. Administering a paralytic to a hypoxic patient can cause rapid deterioration into cardiac arrest. Resuscitate and oxygenate your patients first before attempting DSI. If the patient's presentation does not allow for adequate oxygenation/ventilation (uncooperative or combative due to hypoxia or other cause), perform DSI where Ketamine is used to sedate the patient to allow for oxygenation and stabilization.
3. All patients who are administered a paralytic should receive an induction agent first to ensure patients are sedated before paralyzed.
4. Continued sedation must be administered in patients to prevent them from waking up while remaining paralyzed.
5. Pain management must be administered to manage the body's physiological response to pain caused by this procedure.

NEBULIZER

The nebulizer is a mechanical device utilized to administer medications via the tracheal-bronchial tree. Bronchodilators are the typical pharmacological agent administered via this route of administration. The nebulizer uses pressure from the oxygen flow delivered into a liquid medication of approximately 3 – 5 mLs to aerosolize the liquid allowing absorption via the respiratory tissues.

Indications:
1. Bronchoconstriction
2. In conditions when the delivery of aerosolized medications is useful, efficient, and indicated

Procedure:
1. Assemble the nebulizer unit and place the correct dosage of medication into the medication chamber
2. Connect the oxygen tubing to the bottom of the medication chamber and set the flow rate at between 6 – 8 ltrs/min to deliver the medication over a 10 - 20 minute time frame
3. Utilizing mouthpiece, have the patient form a seal around the piece with their lips
4. Utilizing the mask, form a proper mask seal by securing against the face with the cinch strap and pinching the nose piece to prevent aerosol escape at the eyes
5. Encourage the patient to take slow, deep breaths from the nebulizer to enhance deliver of the medication into the lower airways
6. It may be necessary to pluck or swirl the medication chamber ensure all of the medication is delivered
7. Utilizing the BVM, assemble the mouthpiece style nebulizer with a valved, blue T adaptor and remove the actual mouthpiece. This end will connect to the blue T adaptor and the Bag Valve. Place the elbow adaptor on the opposite end of the corrugate tubing. This will connect to the ETT and allow for tracheal suctioning.
8. Additional treatments may be given as indicated per Clinical Guideline

Additional Information:
1. Place the patient in either Fowler's or Semi-Fowler's position to administer the nebulizer
2. Note: the above flow range is based on necessary pressure to adequately deliver the mediations in aerosolized form. If nebulizer is placed on CPAP you may have to increase flow rate to allow for adequate aerosolization.

NEEDLE THORACOSTOMY

Needle Thoracostomy is an emergency procedure utilized to evacuate trapped air that can cause an increase in intrathoracic pressure resulting in a tension pneumothorax. Needle thoracostomy is accomplished by placing a 3.25 inch, 14 gauge, over-the-needle catheter into the pleural space.

Indications:

Tension pneumothorax

Procedure:

1. This procedure is performed as a standing order
2. Confirm that a tension pneumothorax exists by assessing for s/s listed below
3. Administer high concentration oxygen and assist ventilations as needed
4. Identify landmark: 2nd or 3rd intercostal space, mid-clavicular (preferred site)
   4th or 5th intercostal space, anterior-axillary (alternate site to be used only when preferred site is not available)
5. BSI
6. Prepare the site by cleansing with an alcohol swab
7. Insert the catheter while listening for air expulsion (feel for "pop" as you enter the pleural space)
8. When air escapes stop advancing the needle and push the remaining Teflon catheter into the cavity
9. Secure the catheter in place with tape
10. Assess for signs of successful decompression (improved mental status/perfusion, increased BP, decreased heart rate/respiratory rate). Equal chest rise / lung sounds may not be present if lung is compromised.
11. Monitor for signs of a reoccurring tension pneumothorax

Additional Information:

1. Signs and symptoms of a tension pneumothorax:
   a. Dyspnea or difficulty ventilating with BVM
   b. Tachypnea
   c. Unilateral decreased or absent lung sounds
   d. Hypotension
   e. Tachycardia
   f. Narrowing pulse pressures
   g. JVD
   h. Tracheal deviation (late sign)
   i. Mediastinal shift (late sign)
2. A pneumothorax develops in to a tension pneumothorax once pressure in the pleural space increases enough so that the heart and great vessels are compressed causing hemodynamic compromise.
3. The needle should be inserted over the top of the chosen rib to avoid the nerves and vasculature on the underside of the rib.
4. Continuously monitor the patient's respiratory status via pulse oximetry and $EtCO_2$ monitoring
5. Tracheal deviation is a late sign of a tension pneumothorax. The patient will typically be hemodynamically compromised well before tracheal deviation occurs. Chest decompression should not be delayed in the absence of tracheal deviation.
6. If a suspected tension pneumothorax reoccurs and the catheter is no longer patent then you must attempt decompression with a new 14g x 3.25" over-the-catheter needle lateral of the previous insertion site.

PELVIC BINDER

A Pelvic Binder is a circumferential pelvic belt that is used to reduce and stabilize open-book pelvic ring fractures. Stabilizing these types of fractures can reduce morbidity and mortality and improve outcomes by reducing blood loss.

Indications:
1. Pelvic instability, crepitus, or suspected pelvic fracture
2. Significant blunt trauma with signs of internal bleeding (Major MVA, pedestrian struck, motorcycle MVA, etc.)

Contraindications:
1. Impaled object to the pelvis
2. Not to be used for isolated hip fractures

Procedure:
1. Remove objects from patient's pockets or pelvic area. Place SAM Pelvic Sling II black side up beneath patient at level of trochanters (hips not waist).
2. Place the black strap through buckle and pull completely through.
3. Hold orange strap and pull black strap in opposite direction until you hear and feel the buckle click.
4. Maintain tension and immediately press black strap onto Velcro surface to secure.
   Note: do not be concerned if you hear a second "click" after the device is secured

Additional Information:
1. Use caution when assessing for pelvic instability or crepitus. To assess the pelvis, apply gentle manual pressure anterior to posterior and from the sides.
2. Pelvic fractures are a common result of high energy impacts such as significant falls, crushing injuries, motor vehicle collisions, or blast injuries.
3. Pelvic binding has been shown to reduce mortality and morbidity and thereby improve outcomes in the prehospital and hospital settings by lessening internal bleeding, lowering the number of blood transfusions required, and decreasing the hospital length of stay.

PERICARDIOCENTESIS

A pericardiocentesis is an emergency procedure used to evacuate fluid, to include blood, from the pericardial sac in the event of a cardiac tamponade. The goal of a pericardiocentesis is to restore normal heart function by evacuating any fluid in the pericardial sac that may be compromising the heart causing obstructive, cardiogenic shock.

Indications:

Cardiac Tamponade

Procedure:

1. Place patient on EKG.
2. Identify the appropriate insertion site.
    a. 1-2 cm inferior to the left of the xiphoid process
3. Prepare the site using aseptic technique
4. Insert needle at proper angle.
    a. 30-45 degrees aiming towards the left scapula
5. Aspirate with a 30-60 ml syringe during insertion of needle until fluid return is noted
6. Withdraw as much fluid as possible
7. Continuously monitor EKG for changes indicating needle has been inserted too far into myocardium (ventricular ectopy, ST segment changes)
8. Once aspiration is complete, remove needle
9. Monitor patient for subsequent pericardial tamponade

Additional information:

1. This procedure can be performed under standing order when the patient is in traumatic cardiac arrest and the cardiac arrest is suspected to be caused by a cardiac tamponade.
2. This procedure can be performed with medical control orders in all other situations when a cardiac tamponade is suspected.
3. Cardiac tamponades are more often caused by penetrating trauma to the chest or back.
4. Signs of a cardiac tamponade include the following:
    a. Mechanism of Injury / Nature of Illness which correlates with a possible cardiac tamponade.
    b. If the patient has a pulse you may observe Beck's Triad (narrow pulse pressure, muffled heart tones, JVD), electrical alternans, and other signs of cardiogenic shock
    c. In cases of traumatic cardiac arrest a pericardiocentesis should be considered if the patient as a correlating injury as well as PEA.

PULSE OXIMETER

Pulse oximeters are utilized to detect saturation of the hemoglobin molecule in the blood. Ultimately it is the oxygen saturation of hemoglobin that is the target. There are other gases and molecules that bind to the hemoglobin and those will render a saturation percentage as well. Pulse oximeters are also dependent on circulating volume to the periphery of the patient. Keeping those two limitations in mind, the pulse oximeter displays the quantified SpO_2 measurement.

Indications:
1. Patients with a chief complaint of respiratory distress
2. All patients receiving oxygen administration
3. All patients with the potential to develop hypoxia
4. All intubated patients and those being monitored with an $EtCO_2$
5. Patients receiving procedural sedation

Procedure:
1. Provide all supplemental support and necessary stabilizers
2. Attach appropriate size sensor to appropriate patient region
3. Obtain a measure prior to oxygen administration to determine a baseline
4. Verify reading is valid and consistent with patient's condition
5. Administer oxygen via the appropriate adjunct prn
6. Manage patient's airway accordingly

Additional Information:
There are certain issues that may represent an inaccurate reading:
1. Remove nail polish or artificial nails as necessary to obtain accurate reading
2. Obscure the sensor from bright light
3. The waveform should correlate with the radial pulse and/or the EKG waveform
4. CO gas has a higher affinity for hemoglobin and can measure 100% saturation
5. Other limiting factors:
   a. Cardiac arrest
   b. Local circulation dynamics
   c. Temperature of the extremity
6. Measures of hypoxia:
   a. 95% - 99% normal
   b. 91% - 94% mild hypoxia
   c. 86% - 90% moderate hypoxia
   d. < 85% severe hypoxia

SEDATION

The following procedure is recommended for the patient requiring sedation for the purpose of performing a medical procedure necessary to treat the patient or in situations where a patient's behavior is physically dangerous to self or others. Appropriate emergency equipment for maintaining the patient's airway, ventilatory status and cardiac status must be readily available when sedation/analgesia medications are given to the patient.

Indications:

1. Patients requiring endotracheal intubation for ventilatory assistance, not able to tolerate laryngoscopy
2. Combative behavior that compromises patient care or patient/provider safety
3. Patients who experience CPR induced consciousness
4. Sedative medication prior to electrical cardioversion
5. Patients experiencing discomfort during transcutaneous pacing
6. Patients with ROSC who require sedation

Procedure:

1. IV access, airway equipment, and cardiac monitor should be available
2. Administer agent according to Clinical Guideline directive via appropriate route
3. Observe for signs of sedation
4. Monitor the patient's respirations, heart rate, and blood pressure closely
5. Apply pulse oximeter, $EtCO_2$, and cardiac monitor

Additional Information:

1. Midazolam will typically be utilized for sedating patients who require procedural sedation, or for continued sedation during post airway management.
2. Ketamine is utilized for the sedation of patients who needs intubation, but cannot tolerate laryngoscopy. Once laryngoscopy is achieved, administer Midazolam and/or Ketamine to maintain sedation of the patient.
3. Fentanyl and/or Ketamine can be used for the sedation of patients who experience CPR induced consciousness.
4. Ketamine should be utilized when patients have a compromised circulatory system or poor perfusion status
5. Midazolam and/or Ketamine can be used for the sedation of patients experiencing excited delirium or other behavioral emergencies.
6. Geodon is utilized exclusively for behavioral emergencies who are violent and/or agitated with a psychiatric history

SIMPLE THORACOSTOMY

Emergency chest decompression is a lifesaving procedure in the setting of a tension pneumothorax. Chest decompression can be achieved by needle or simple thoracostomy. Unlike needle thoracostomy, simple thoracostomy allows maximum release of air/liquid from the pleural cavity and full lung re-expansion, making it the only effective option in some patients

Indications:

1. Any pneumothorax in a patient undergoing positive pressure ventilation
2. Actual or near traumatic cardiac arrest
3. Tension pneumothorax unrelieved with needle thoracostomy

Procedure:

1. Place the patient supine with the arm on the affected side abducted and externally rotated with palm of the hand behind the patient's head if possible.
2. Site should be cleansed using chlorhexidine
3. Using a #10 scalpel, a 1–2-inch incision is made between the fourth and fifth intercostal space at the anterior to mid-axillary line over the rib through skin and subcutaneous tissue only.
4. Blunt dissection using large curved kelly clamps, in a controlled fashion, is used to pass through the intercostal muscles over the top of the rib and penetrate into the pleural space
5. With the curved tips remaining just inside the pleural space, the clamp is opened widely to allow the expulsion of air and blood and subsequently pulled out. The ostomy through the intercostal muscles should allow free insertion of a finger without pushing and should be large enough to prevent re-tension from occurring.
6. A finger is inserted through the ostomy site and into the pleural space. Once in the pleural space, palpation of the parietal pleura and lung with the finger is necessary to ensure you've entered the thoracic cavity and that the possible tension pneumothorax has been managed.
7. A "hyfin chest seal" with one way valve is used to seal the opening.

Additional Information:

1. Frequently check for redevelopment of tension pneumothorax and re-sweep the thoracostomy as needed
2. Recent literature suggests there is a significant failure rate with chest decompression using the needle thoracostomy approach.

TARGETED TEMPERATURE MANAGEMENT

Targeted Temperature Management (TTM), commonly referred to as Therapeutic Hypothermia, is a treatment used in an effort to improve health outcomes of patients who were resuscitated from cardiac arrest. AHA recommends that all comatose adult patients with ROSC after any form of cardiac arrest should have TTM. However, they do not recommend the use of chilled intravenous fluids to accomplish TTM. Part of how TTM works is by slowing metabolism and decreasing a cell's permeability. This prevents the cascade of reactions caused by an ischemic event which can cause irreparable and fatal damage. Another part to TTM is that it protects the body from the potential of reperfusion injury. During reperfusion, various inflammatory responses occur which can lead to cellular death. By preventing the body from becoming hyperthermic and slightly reducing body temperatures, TTM will lessen these inflammatory responses which in turn should improve clinical outcomes.

Indications:

ROSC after cardiac arrest

Contraindications:

1. GCS > 3
2. Traumatic cardiac arrest
3. < 16 years old
4. Initial temperature < 93°
5. Sepsis
6. Active bleeding (internal or external)
7. Recent major surgery
8. DNR
9. Pregnancy

Procedure:

1. Assess patient for exclusion criteria.
2. Obtain and monitor core temperature using esophageal probe
3. Apply non-invasive cooling measures (ice packs, Cryothermic Systems)
4. Monitor temperature, EKG, and vital signs
5. Assess for adverse reactions. If at any time the patient rearrests, discontinue TTM.

Additional Information

1. Targeted temperature management should be started as soon as possible with a target temperature of 89.6°F - 95.2°F
2. Shivering is common once TTM is implemented and temperature reaches at or below 95.2°F. You can help prevent shivering by administering Fentanyl. If Fentanyl is unsuccessful it may be appropriate to administer a paralytic.
3. AHA does not recommend the use of chilled IV fluids to accomplish TTM in the prehospital setting.

TOURNIQUET

Tourniquets have often been described as the technique of "last resort." Military experience in Afghanistan and Iraq plus the routine and safe use of tourniquets by surgeons, has led to reconsideration of this approach. The use of "elevation" and pressure on "pressure points" is no longer recommended because of insufficient data supporting their effectiveness. Tourniquets are very effective in controlling severe hemorrhage and should be used if direct pressure or a pressure dressing fails to control hemorrhage from an extremity

Indications:

1. Any external hemorrhage of an extremity that cannot be controlled by direct pressure and pressure dressing.

Procedure:

1. Apply the tourniquet proximal to the wound, directly on the skin, and not over a joint or fracture (if able).
2. Insert the free end off the tourniquet through the loop and ensure the band is pulled tight as to not allow the tips of three fingers to be placed between the tourniquet and the skin.
3. Turn the windlass until the bleeding has stopped **AND** the distal pulse is eliminated.
4. Secure the windlass and any excess band with the small Velcro strap
5. Note and document the application time on the tourniquet.

Additional Information:

1. If one tourniquet does not completely stop the hemorrhage, then another one should be applied just proximal to the first.
2. Once applied, the tourniquet site should not be covered so that it can be easily seen and monitored for recurrent hemorrhage.
3. A device that only occludes venous outflow from a limb will actually increase hemorrhage from a wound.
4. A direct relationship exists between the amount of pressure required to control hemorrhage and the size of the limb. Thus, on average, a tourniquet will need to be placed more tightly on a leg to achieve hemorrhage control than on an arm.
5. If application of a tourniquet is required, the patient will most likely need emergency surgery to control hemorrhage. Thus, the ideal receiving facility for such a patient is one with surgical capabilities
6. A tourniquet can be painful for a conscious patient to tolerate, and pain management should be considered.
7. A tourniquet should not be periodically loosened to allow for perfusion.
8. Tourniquets should not be placed over fractures.

Traction Splint

A Traction Splint is used to apply mechanical traction to one or both lower limbs in an attempt to realign the limb to reduce pain and minimize vascular and neurological complications.

Indications:
1. Proximal third and mid-shaft femoral fractures

Contraindications:
1. Pelvic fractures
2. Distal Femur Fracture
3. Knee, Ankle, Tib/Fib, & Foot Fractures

Procedure:
1. Gather, assemble, and check all equipment
2. Expose the injured leg(s) and assess PMS
3. Remove all extremity and toe jewelry from injured extremities
4. Position the splint firmly between the patient's leg, resting the ischial perineal cushion against the ischial tuberosity
5. Attach the thigh strap around the upper thigh of the fracture extremity.
6. Push down on the ischial perineal cushion while pulling the thigh strap laterally under the patient's thigh to seat the end of the cushion comfortably against the ischial tuberosity.
7. Tighten and secure the thigh strap
8. Lift the spring clip and extend the inner shaft of the splint until the crossbar rests adjacent to the patient's heal
9. Apply the ankle hitches to both ankles and secure only the fractured leg(s) to the device.
10. Ensure each ankle hitch is on the appropriate side and also ensure that the hitch is on the posterior aspect of the foot
11. Apply traction until the desired amount of traction is achieved (Not to exceed 10% (max 15 pounds) of the patient's body weight for unilateral femur fracture or 20% (max 30 pounds) for bilateral femur fractures).
12. Apply elastic straps by placing each strap below the knee and gently sliding into position
13. Secure all straps around both legs and splint
14. Secure the feet to prevent outward rotation by placing the provided strap in a figure 8 pattern around both ankles and feet
15. Assess PMS

Additional Information:
1. Compound fractures of the femur with bone fragments sticking through the skin may be a contraindication. Further harm could be done in an attempt to apply traction. Also, if a compound fracture is present, it is less likely that a traction splint will provide benefit to the patient.
2. Both ankle hitches should be placed on every patient even if not pulling traction on both lower extremities. This is to ensure the device does not cause discomfort while rubbing on the inside of the ankles.

TRANS-CUTANEOUS PACING (TCP)

External pacing is an electrical stimulation of the cardiac muscle used when the rate is bradycardic (< 60 bpm) and causes hemodynamic compromise.

Indications:

Bradycardia (hemodynamically unstable)

Procedure:

1. Assess the patient to determine need for pacemaker
2. Attach 3 – lead monitoring and electrodes
3. Attach pacing electrodes and cables anterior/posterior
4. Provide pain management/sedation prn.
5. Set pacemaker rate to 70 bpm
6. Click to turn pacer on
7. Default energy level begins at 30mA. Gradually increase by 10mA every 2 to 3 seconds until electrical capture is achieved on the oscilloscope
8. Assess carotid pulse to verify mechanical capture is achieved
9. Once mechanical capture is verified, increase 10 mA above threshold to ensure capture is maintained
10. If no mechanical capture is achieved, discontinue pacing
11. Contact medical control

Additional Information:

1. Hemodynamic instability: hypotension, chest pains, SOB, pulmonary edema, or altered mental status (must have hypoperfusion)
2. Pacer pads should be placed in the anterior/posterior position. Anterior/Posterior placement is clinically superior.
3. Pacing is the primary treatment if bradycardia presents with 2° AV block or higher (atropine may be considered while or after applying the pacemaker)
4. Utilize pediatric pads for patients < 15 kg
5. Electrical capture occurs when the pacer spike combines with the patient's intrinsic beat and becomes wide and bizarre compared to the intrinsic beat
6. Mechanical capture is when the carotid pulse equals the rate setting of the pacemaker and improvement in blood pressure, level of consciousness, skin color, and temperature occurs
7. Muscle twitching or shoulder shrugging is common

VAGAL MANEUVERS

Modified Valsalva maneuvers are a manual stimulation of the parasympathetic nervous system via one of several cranial nerves. Slowing of the heart rate is the result. Valsalva maneuvers are the first line treatment in stable patients prior to medication administration or electrical therapy. Electrical therapy remains primary treatment in the unstable patient.

Indications:
1. PSVT specifically
2. Tachycardia's in general

Procedure:
1. Provide all supplemental support and necessary stabilizers
2. Place the patient on the cardiac monitor
3. Place the patient in a semi- recumbent position
4. Modified Valsalva Maneuver:
   a. Instruct the patient to take a deep breath and blow into a 10cc syringe for a 15 second strain.
   b. Immediately reposition patient to a supine position and raise legs 45 degrees for additional 15 seconds
   c. Monitor EKG for results
   d. This procedure may be repeated
5. Ice water immersion of the face
   a. Prepare two ice packs (actual ice in water)
   b. Place the ice packs on both sides of the face to cover nose and eyes
   c. Monitor EKG for results.
   d. This procedure may be repeated

Additional Information:
1. Carotid sinus massage should not be attempted in the prehospital setting
2. Ice water immersion is preferred treatment for pediatric patients
3. Profound bradycardia or asystole may occur
4. The patient must be connected to a cardiac monitor
5. Postural modification to the standard Valsalva maneuver is highly effective, returning more than 40% of patients to sinus rhythm compared with 17% with a standard Valsalva

VASCULAR ACCESS

This procedure is utilized to establish a portal of entry into the patient's vascular space for the purposes of medication administration and volume replacement. The procedure may be initiated at the discretion of the paramedic and by standing order.

Indications:
1. Patients that may need pre-hospital medication administration
2. Patients requiring pre-hospital volume replacement
3. Prophylactic access in anticipation of either of the above
4. Patients requiring venous access for definitive care at the hospital

Procedure:
1. Assess the patient to establish the need for vascular access
2. Provide other stabilization in anticipation of the procedure
3. BSI
4. Assemble all the necessary equipment and inspect for expiration dates and defects
5. Select an access point suitable to the patient and appropriate for the condition of the patient
6. Tourniquet the arm, palpate and distend a suitable vein
7. Swab with 70% alcohol swab (observe aseptic technique)
8. Perform venipuncture while watching for blood return (flash), entering the vein far enough to guarantee the Teflon has entered the vein
9. Push the Teflon off of the needle advancing only the catheter into the vein until the hub of the catheter touches the skin
10. Withdraw the catheter and place into sharps (never re-introduce the needle into the catheter to avoid shearing)
11. Attach either the IV tubing with assembled bag of fluid or primed saline lock connector set
12. Cover with tegaderm or similar dressing to secure the catheter
13. Flush with 10 ml of saline to verify patency of line and that there is no extravasation or infiltration
14 Observe patient and monitor site

Additional Information:
1. A saline lock may be utilized in all cases except volume replacement and cardiac arrest
2. Greater than 3 repeated attempts without medical control is discouraged. Consider IO access if applicable.

APPENDIX C—REFERENCES

12 Lead Guidelines
APGAR
BLS Guidelines
Drip Rates (Adult and Pediatric)
End-Tidal CO_2 Waveforms
Fluid Infusion Rates
GCS
Medical Abbreviations
Pain Scale
Rule of 9's
SALT Triage
Scope of Practice
Toxidromes
Trauma Score
Vital Signs

12 Lead Guidelines

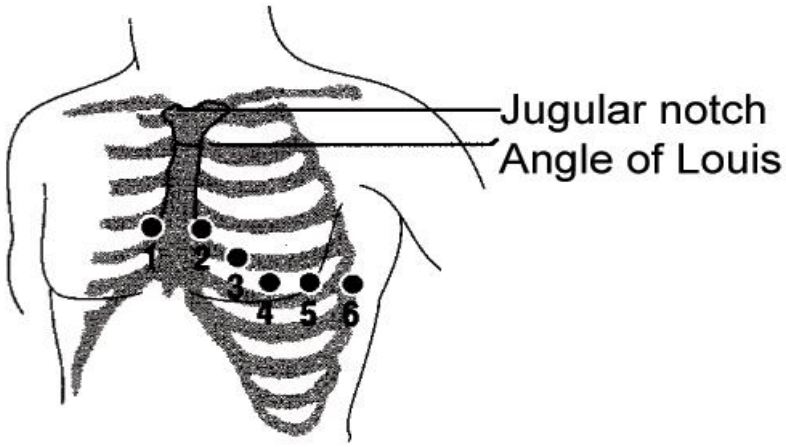
A 12-lead EKG must be transmitted to the receiving emergency department prior to transporting if possible in the following situations:

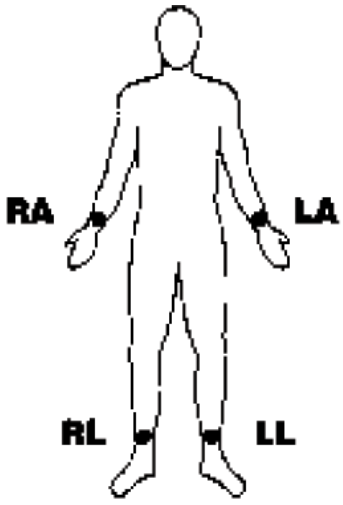
1. A STEMI is noted on the 12-lead EKG
2. A patient is being, or is going to be treated under a Cardiac Guideline (ACS, Bradycardia, or Tachycardia) or if the patient is being treated under the Post Resuscitation Care Guideline.
3. Any time the EMS practitioner feels that a 12-lead should be reviewed by a physician or is seeking advice or orders for a patient with a cardiopulmonary complaint.

When a STEMI is identified and after the EKG is transmitted, a radio report should be provided to the receiving emergency department as soon as possible to allow for ample time for mobilization of the heart team.

It is good clinical practice that patients being treated under the ACS Guideline or when the patient has a cardiopulmonary complaint, that the clinician utilize continuous 12-lead monitoring along with acquiring subsequent 12-lead EKGs to monitor EGK changes. Subsequent 12-lead EKGs which show significant changes should be transmitted to the receiving emergency department as soon as possible.

12 Lead EKG Placement





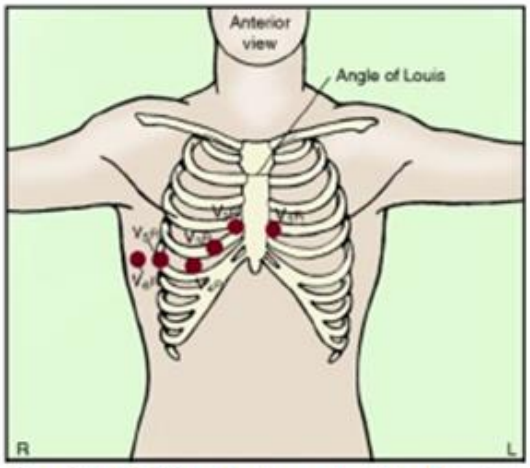
Place the precordial electrodes across the chest in the following locations:
V1 : Fourth intercostal space, at the right sternal margin.
V2 : Fourth intercostal space, at the left sternal margin.
V3 : Fifth rib, between leads V2 and V4.
V4 : Fifth intercostal space, on the left midclavicular line.
V5 : Left anterior axillary line, at the horizontal level of V4.
V6 : Left midaxillary line, at the same horizontal level as V4 and V5.

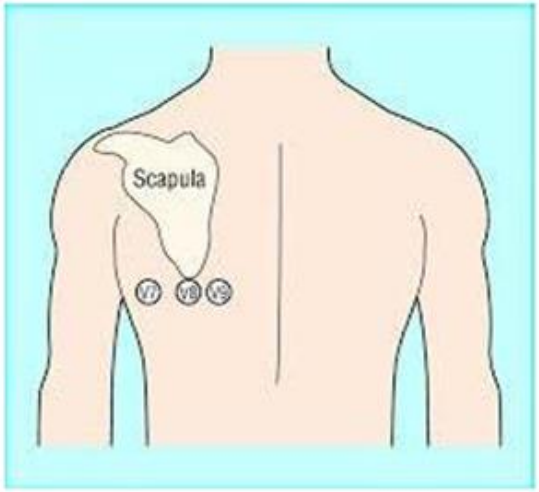
Note:

1 . When placing electrodes on female patients, always place leads V3-V6 under the breast rather than on the breast.
2. Limb leads must be placed on limbs. The 12-lead analysis is based on the assumption that the leads are placed on the limbs.

12 Lead Guidelines

Right Side and Posterior Wall EKG Placement

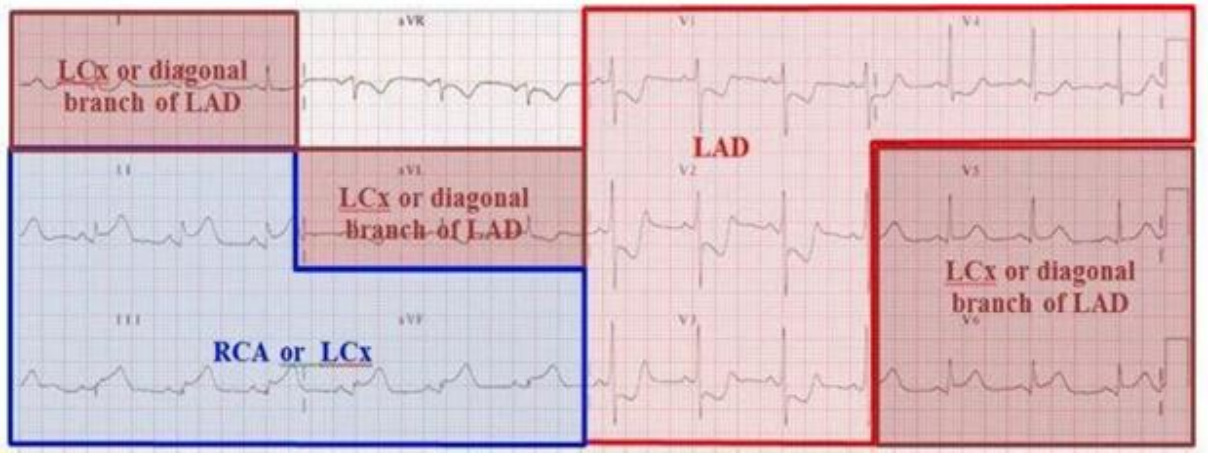




AMI Summary Chart

Leads	Artery	Presentation	Reciprocal Changes
V1, V2 Septal / V3, V4 Anterior	LAD	Classic, Hollywood MI- crushing CPR, diaphoresis	V7, 8, 9 Posterior
Lateral V5, V6	LAD or LCx		Inferior II, III, AVF
Inferior II, III, aVF	RCA or CIRX LCx	1) Epigastric Pain, N/V 2) Syncope 2° bradyarrhythmias from SA or AV node involvement	High Lateral I, aVL
I, aVL Lateral	LCx or LAD	Subtle signs, non-descript CP	Inferior II, III, aVF
Posterior V7, V8, V9	PDA: 80% RCA / 20% LCx	Back pain, Common with inferior	Anterior V1, V2, V3, V4
Right Ventricle V4R, V5R, V6R	RCA	Hypotension, can be associated with Inferior AMI	None

Culprit Artery Chart



APGAR

Sign	0	1	2
Appearance	Blue/Pale	Body pink, extremities blue	Pink
Pulse Rate	None	< 100	>100
Grimace	None	Grimace	Cries
Activity	Limp	Some	Active
Respiration	Absent	Slow/irregular	Strong cry

*APGAR should be measured and documented at the 1 and 5 minute intervals post delivery.

Score Range	Condition	Expectation
7 - 10	No Distress	Routine Care
4 - 6	Moderate Distress	Stimulation/Oxygenation/PPV
< 4	Severe Distress	Neonatal Resuscitation

BLS GUIDELINES

Component	Adults/Adolescents	Children (Age 1 to puberty)	Infant (Age less than 1 year, excluding newborns)
Compression - Ventilation ratio without advanced airway	**1 or 2 rescuers:** 30:2	**1 rescuer:** 30:2 **2 rescuers:** 15:2	
Compression - Ventilation ratio with advanced airway	Continuous compressions at a rate of 100-120/min Give 1 breath every 6 seconds (10 breaths/min)		
Respiratory Arrest with Pulse	Give 1 breath every 5-6 seconds	Give 1 breath every 3 to 5 seconds	
Compression Rate	100 - 120/min		
Compression Depth	2 - 2.4 inches	At least one third AP diameter of the chest (about 2 inches)	At least one third AP diameter of the chest (about 1.5 inches)
Hand Placement	2 hands on the lower half of the sternum	1 or 2 hands on the lower half of the sternum	**1 rescuer:** 2 fingers in the center of the chest **2 rescuers:** 2 thumb-encircling hands in the center of the chest
Chest Recoil	Allow full recoil of the chest after each compression Do not lean on the chest after each compression		
Minimizing Interruptions	Limit interruptions in chest compressions to less than 10 seconds		

Newborn BLS Guidelines

The guidelines for neonatal resuscitation are the same as the infant guidelines listed above with the exception of the compression to ventilation ratios. In the presence of a neonatal cardiac arrest or if the neonate's heart rate is less than 60, presumably due to poor gas exchange, compressions and ventilations should be coordinated at a **3:1** ratio whereas compressions and ventilations are not being given simultaneously. The clinician could elect to increase the ratio to 15:2 if the arrest was presumed to be of cardiac origin.

DRIP RATES-ADULT

Dobutamine (Mix 250mg in 250cc) - 1000 mcg/cc

mcg/kg/min	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
5 mcg	12	15	18	21	24	27	30
10 mcg	24	30	36	42	48	54	60
15 mcg	36	45	54	63	72	81	90
20 mcg	48	60	72	84	96	108	120
	Microdrips per minute or cc/hr						

Dopamine (Mix 400mg in 250cc) - 1600 mcg/cc

mcg/kg/min	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
5 mcg	8	9	11	13	15	17	19
10 mcg	15	19	23	26	30	34	38
15 mcg	23	28	34	39	45	51	56
20 mcg	30	38	45	53	60	68	75
	Microdrips per minute or cc/hr						

Epinephrine and Norepinephrine (Mix 1mg in 250cc) - 4 mcg/cc

Dosage	2 mcg/min	3 mcg/min	4 mcg/min	5 mcg/min	6 mcg/min	7 mcg/min	8 mcg/min	9 mcg/min	10 mcg/min
	30	45	60	75	90	105	120	135	150
	Microdrips per minute or cc/hr								

Ketamine for Continuous Sedation (Mix 250mg in 250cc) - 1 mg/cc

mg/kg/hr	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg
1	40	50	60	70	80	90	100
1.5	60	75	90	105	120	135	150
2	80	100	120	140	160	180	200
	Microdrips per minute or cc/hr						

Nicardipine (Mix 25mg in 250cc) - 100 mcg/cc

Dosage	3 mg/hr	5 mg/hr	7.5 mg/hr	10 mg/hr	12.5 mg/hr	15 mg/hr
	30	50	75	100	125	150
	Microdrips per minute or cc/hr					

Nitroglycerin (Mix 50mg in 250cc) 200mcg/cc

Dosage (mcg/min)	cc/hr	Dosage (mcg/min)	cc/hr
5	1.5	210	63
10	3	220	66
20	6	230	69
30	9	240	72
40	12	250	75
50	15	260	78
60	18	270	81
70	21	280	84
80	24	290	87
90	27	300	90
100	30	310	93
110	33	320	96
120	36	330	99
130	39	340	102
140	42	350	105
150	45	360	108
160	48	370	111
170	51	380	114
180	54	390	117
190	57	400	120
200	60		
Microdrips per minute or cc/hr			

Amiodarone (Mix 250mg in 250cc) 1mg/cc

Dosage (mg/min)	cc/hr
1 mg/min	60

DRIP RATES-PEDIATRIC

Dobutamine (Mix 250mg in 250cc) - 1000 mcg/cc

mcg/kg/min	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
5 mcg	2	3	5	6	8	9	11
10 mcg	3	6	9	12	15	18	21
15 mcg	5	9	14	18	23	27	32
20 mcg	6	12	18	24	30	36	42
	Microdrips per minute or cc/hr						

Dopamine (Mix 400mg in 250cc) - 1600 mcg/cc

mcg/kg/min	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
5 mcg	1	2	3	4	5	6	7
10 mcg	2	4	6	8	9	11	13
15 mcg	3	6	8	11	14	17	20
20 mcg	4	8	12	15	19	23	27
	Microdrips per minute or cc/hr						

Epinephrine (Mix 1mg in 250cc) - 4 mcg/cc

mcg/kg/min	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
0.1 mcg	8	15	23	**≥20 kg Use Adult Dosaging 2 - 10 mcg/min**			
0.2 mcg	15	30	45				
0.3 mcg	23	45	68				
0.4 mcg	30	60	90				
0.5 mcg	38	75	113				
	Microdrips per minute or cc/hr						

Ketamine for Continuous Sedation (Mix 250mg in 250cc) - 1 mg/cc

mg/kg/hr	5 kg	10 kg	15 kg	20 kg	25 kg	30 kg	35 kg
1	5	10	15	20	25	30	35
1.5	8	15	23	30	39	45	53
2	10	20	30	40	50	60	70
	Microdrips per minute or cc/hr						

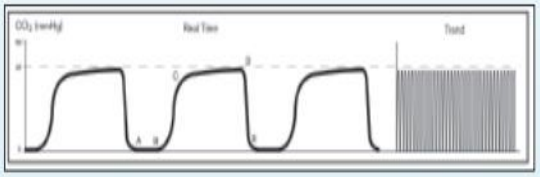
End Tidal CO_2 Detection ($EtCO_2$)

END-TIDAL CO_2

Normal and Abnormal Capnogram Waveforms

Normal Capnogram Waveform

Indications:
- ET tube is correctly positioned
- Proper ventilation is occurring

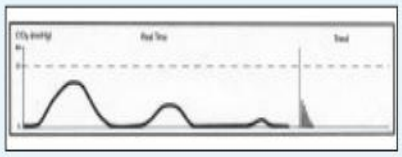


A-B: Baseline
B-C: Expiratory Upstroke
C-D: Expiratory Plateau
D: End-tidal Concentration
D-E: Inspiration

Abnormal Capnogram Waveforms

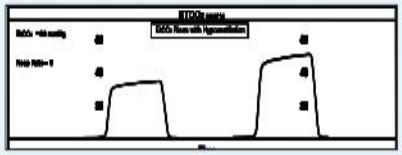
Esophageal Intubation

Observations:
- No CO_2 sensed
- Small transient waveforms



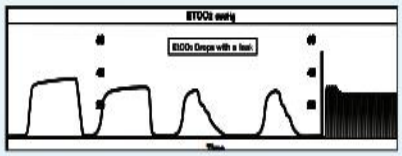
Increasing $EtCO_2$ Level

Possible Causes:
- Decrease in respiratory rate and/or tidal volume (hypoventilation)
- Increase in metabolic rate
- Rapid rise in body temperature (malignant hyperthermia)



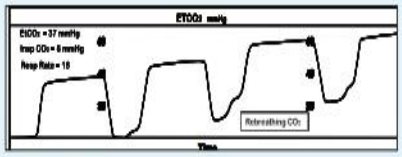
Leak

Possible Causes:
- ET tube cuff may be deflated or ruptured
- ET tube in the vocal cords
- Mask or Bag Mask Valve leak
- Artificial airway is too small for patient



Rebreathing

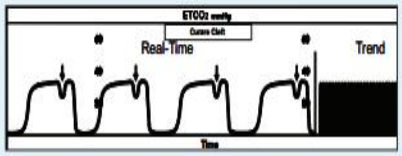
Possible Causes:
- Mechanical dead space
- Mechanical ventilator failure



Muscle Relaxants (Curare Cleft)

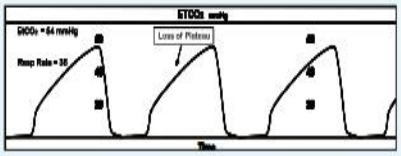
Possible Causes:
- Patient is mechanically ventilated

Observations:
- Depth of cleft is proportional to degree of drug activity



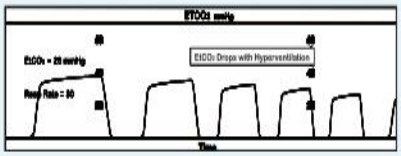
Airway Obstruction

Possible Causes:
- Partially kinked or occluded artificial airway
- Presence of foreign body in the airway
- Bronchospasm
  - Elevated end-tidal CO_2 valve
  - Loss of alveolar plateau



Decreasing $EtCO_2$ Level

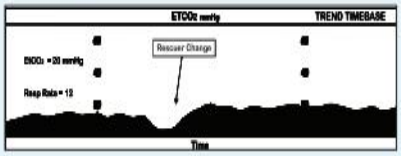
Possible Causes:
- Increase in respiratory rate and/or tidal volume (hyperventilation)
- Decrease in metabolic rate
- Fall in body temperature

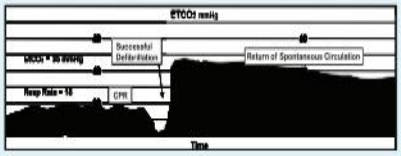


$EtCO_2$ During Cardiac Arrest

$EtCO_2$ increases significantly with the return of effective heart function.

Observations:
- $EtCO_2$ drops during cardiac arrest
- As rescuer tires, a decrease in $EtCO_2$ is observed
- Increases with effective chest compressions and heart function





Fluid Infusion Rates

100 cc / 10 gtts set

Time	5 min	10 min	15 min	20 min	30 min	60 min
	200	100	67	50	33	17
	gtts/min					

100 cc / 60 gtts set or Dial-a-Flow

Time	5 min	10 min	15 min	20 min	30 min	60 min
	1200	600	400	300	200	100
	gtts/min or cc/hr					

250 cc / 10 gtts set

Time	5 min	10 min	15 min	20 min	30 min	60 min
	500	250	167	125	83	42
	gtts/min					

250 cc / 60 gtts set or Dial-a-Flow

Time	5 min	10 min	15 min	20 min	30 min	60 min
	3000	1500	1000	750	500	250
	gtts/min or cc/hr					

500 cc / 10 gtts set

Time	5 min	10 min	15 min	20 min	30 min	60 min
	1000	500	333	250	167	83
	gtts/min					

500 cc / 60 gtts set or Dial-a-Flow

Time	5 min	10 min	15 min	20 min	30 min	60 min
	6000	3000	2000	1500	1000	500
	gtts/min or cc/hr					

1000 cc / 10 gtts set

Time	5 min	10 min	15 min	20 min	30 min	60 min
	2000	1000	667	500	333	167
	gtts/min					

1000 cc / 60 gtts set or Dial-a-Flow

Time	5	10	15	20	30	60
	12000	6000	4000	3000	2000	1000
	gtts/min or cc/hr					

GLASGOW COMA SCALE

Adult GCS

Eye Opening		Verbal Response		Motor Response	
Spontaneous	4	Oriented	5	Follows Commands	6
To voice	3	Disoriented	4	Localizes Pain	5
To pain	2	Incoherent Words	3	Withdrawals from pain	4
None	1	Incomprehensible sounds	2	Decorticate Posturing	3
		None	1	Decerebrate Posturing	2
				None	1

Pediatric GCS

Eye Opening		Verbal Response		Motor Response	
Spontaneous	4	Smiles/Coos; Oriented; Follows Objects	5	Spontaneous Movement	6
To voice	3	Consolable crying	4	Withdraws from touch	5
To pain	2	Inappropriate crying and/or screaming	3	Withdraws from pain	4
None	1	Grunts	2	Decorticate Posturing	3
		None	1	Decerebrate Posturing	2
				None	1

MEDICAL ABBREVIATIONS

This list is the approved abbreviation list for East Baton Rouge Parish EMS.
It is intended that these abbreviations can be used with all capital letters and/or all lower-case letters.

>	greater than
=	equal
A&O	alert and oriented
A/C	antecubital
AIDS	acquired immunodeficiency syndrome
AFD	Alsen Fire Department
ALOC	altered level of consciousness
AMA	against medical advice
AMLS	Advanced Medical Life Support
ASA	acetylsalicyclic acid (aspirin)
BBS	bilateral breath sounds
BFFD	Brownsfield Fire Department
BKA	below knee amputation
BM	bowel movement
BFD	Baker Fire Department
BPM	beats per minute
BRFD	Baton Rouge Fire Department
BRG-MC	Baton Rouge General Mid-City
BSA	body surface area
CA	cancer
CBBS	clear bilateral breath sounds
C/C	chief complaint
CEC	Coroner's Emergency Certificate
CPD	Central Police Department
CHF	congestive heart failure
CM	centimeter
CO	carbon monoxide
C/O	complains of
CP	chest pain
CPR	cardiopulmonary resuscitation
CVA	cardiovascular accident
D50	dextrose 50%
D/C	discontinue(d)
DL	deciliter
DNR	do not resuscitate
DOB	date of birth
DPS	Department of Public Safety
Dx	diagnosis
DWI	driving while intoxicated
ED	emergency department
EJ	external jugular
EMS	emergency medical services
ER	emergency room
ESRD	end-stage renal disease
<	less than
AAA	abdominal aortic aneurysm
ABD	abdominal/abdomen
A-FIB	atrial fibrillation
AED	automated external defibrillator
AKA	above knee amputation
AM	morning
AMI	acute myocardial infarction
ARDS	acute respiratory distress syndrome
BBB	bundle branch block
BCLS	basic cardiac life support
BID	twice a day
BLS	basic life support
BP	blood pressure
BPD	Baker Police Department
BRCC	Baton Rouge Community College
BRG-BB	Baton Rouge General Bluebonnet
BRPD	Baton Rouge Police Department
BSI	body substance isolation
CAD	coronary artery disease
CBG	capillary blood glucose
CCU	coronary/critical care unit
CFD	Central Fire Department
CHD	coronary heart disease
CID	cervical immobilization device
CNS	central nervous system
CO2	carbon dioxide
COPD	chronic obstructive pulmonary disease
CPAP	continuous positive airway pressure
CSF	cerebrospinal fluid
CVFD	Chaneyville Fire Department
D6FD	District 6 Fire Department
DKA	diabetic ketoacidosis
DM	diabetes mellitus
DOA	dead on arrival
DOE	dyspnea on exertion
DVT	deep vein thrombosis
D5W	dextrose 5% in water
ECF	extended care facility
EDD	estimated date of delivery
EKG	electrocardiogram
ePCR	electronic patient care report
ESFD	East Side Fire Department
EBRP	East Baton Rouge Parish

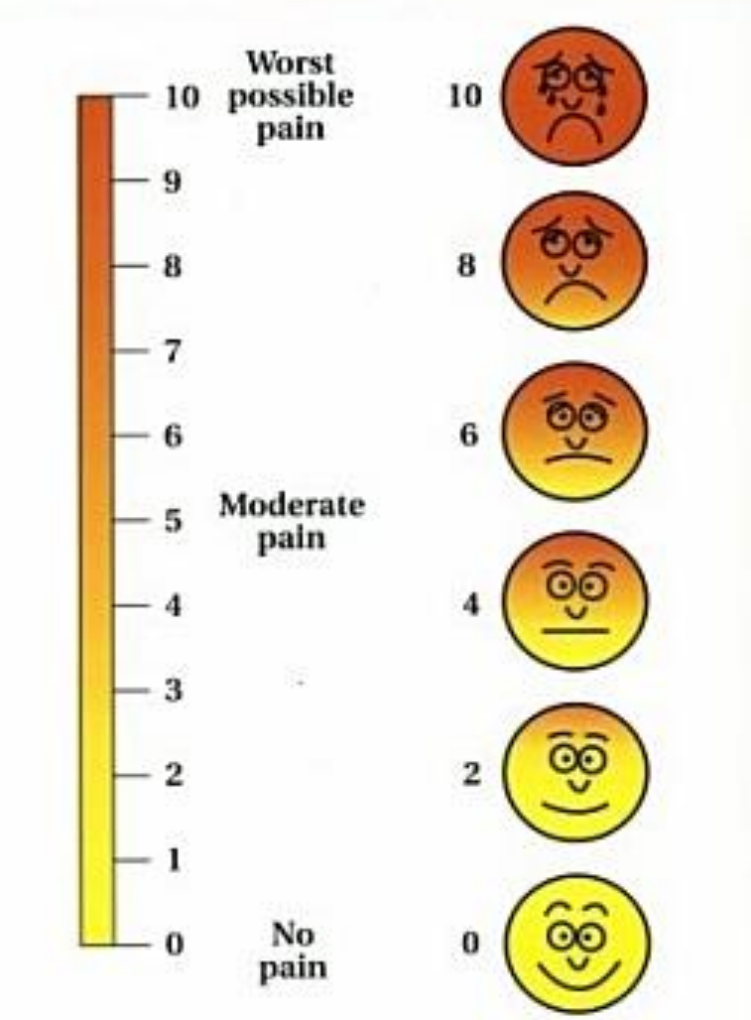
MEDICAL ABBREVIATIONS

EBRSO	East Baton Rouge Sheriff's Office
EtCO2	end tidal carbon dioxide
ETT	endotracheal tube
F	female
Fx	fracture
GCS	Glasgow coma score
GI	gastrointestinal
GSW	gunshot wound
GU	genitourinary
HR	heart rate
HAV	hepatitis A virus
HCP	health care professional
HDV	hepatitis D
HEV	hepatitis E
H/O	history of
HPI	history of present illness
HR	heart rate
HX	history
ICP	intracranial pressure
IDDM	insulin-dependent diabetes mellitus
INF	Inferior
IR	incident report
IV	intravenous
J	joule
JT	Joint
KG	kilogram
L	left
LAT	lateral
LLE	left lower extremity
LMP	last menstrual period
LPM	liters per minute
LSB	long spine board
LSU	Louisiana State University
LUQ	left upper quadrant
MAE	moves all extremities
MDI	metered-dose inhaler
MG	milligram
ML	milliliter
mmHg	millimeters of mercury
MS	Morphine Sulfate
NAD	no acute distress
NC	nasal cannula
NIDDM	noninsulin-dependent diabetes mellitus
NKDA	no known drug allergies
NRB	non-rebreather
ETOH	ethyl alcohol
ETI	endotracheal intubation
EXT	extremities
FD	fire department
G	gravida (as in number of pregnancies)
GERD	gastroesophageal reflux disease
GP	general practitioner
GTT	drops
GYN	gynecology
H1N1	hemagglutinin type 1 and neuraminidase type 1
HBV	hepatitis B virus
HCV	hepatitis C virus
HEENT	head, eyes, ears, nose and throat
HIV	human immunodeficiency virus
H2O	water
HPV	human papillomavirus
HTN	hypertension
ICD	implantable cardioverter defibrillator
ICU	intensive care unit
IM	intramuscular
IO	intraosseous
ISA	initial scene assessment
IVPB	intravenous piggyback
JVD	jugular vein distention
K	potassium
KVO	keep vein open
L&D	labor and delivery
LERN	Louisiana Emergency Response Network
LLQ	left lower quadrant
LOC	level of consciousness
LR	lactated ringers
LSP	Louisiana State Police
LUE	left upper extremity
M	male
MCG	microgram
mEq	millequivalent
MI	myocardial infarction
MM	millimeter
MR	medical release
Na	Sodium
NEB	Nebulizer
NICU	neonatal intensive care unit
NKA	no known allergies
NPO	nothing by mouth
NS	normal saline

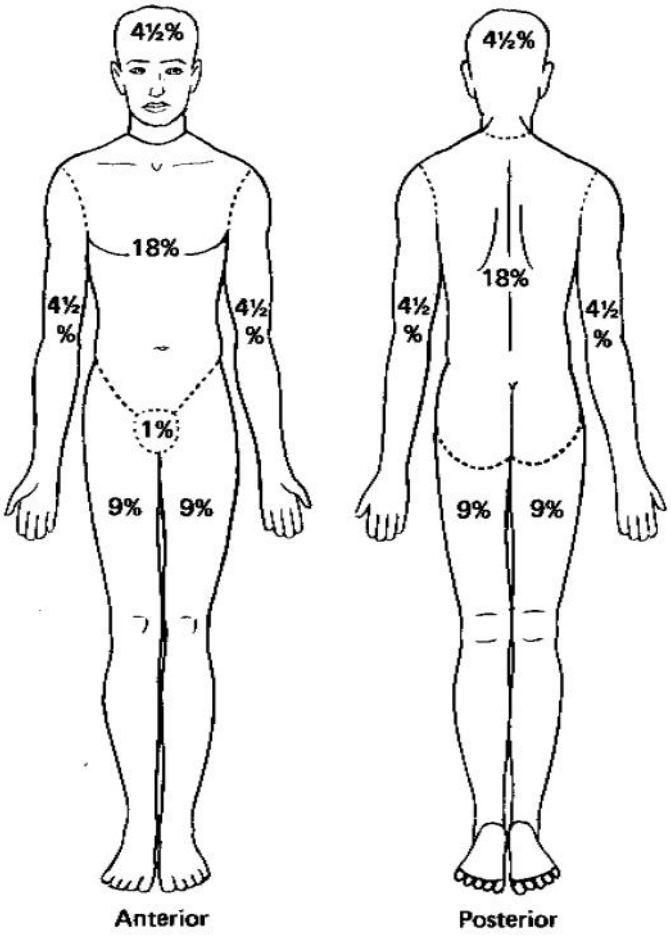
MEDICAL ABBREVIATIONS

NSR	normal sinus rhythm
N/V	nausea and vomiting
OB	obstetrics
OLOL-Peds	Our Lady of the Lake Pediatrics
OPC	Order of Protective Custody
OSHA	occupational safety and health administration
P	para (as in number of children)
PALS	pediatric advanced life support
PD	police department
PEC	physician's emergency certificate
PEARL	pupils equal and reactive to light
PID	pelvis inflammatory disease
PMS	pulse, motor, sensation
PO	orally
PT	patient
PTOA	prior to our arrival
Q	every
RLE	right lower extremity
R/O	rule out
ROSC	return of spontaneous circulation
RUE	right upper extremity
Rx	prescription
SGFD	St. George Fire Department
SpCO	carbon monoxide saturation
SQ	subcutaneous(ly)
SU	Southern University
Sx	symptoms
TBI	traumatic brain injury
TIA	transient ischemic attach
URI	upper respiratory infection
VF	ventricular fibrillation
VT	ventricular tachycardia
W/O	without
X	multiplied by
YR	year
ZPD	Zachary Police Department
NSTEMI	non-ST segment elevation myocardial infarction
O2	oxygen
OLOL	Our Lady of the Lake
OMC	Ochsner Medical Center
OR	operating room
OTC	over the counter
PAD	peripheral arterial disease
PCP	primary care physician
PE	physical examination
PEEP	positive end expiratory pressure
PFD	Pride Fire Department
PMHx	past medical history
PNS	peripheral nervous system
POST	Posterior
PTA	prior to arrival
PRN	as needed
R	right
RLQ	right lower quadrant
ROM	range of motion
RR	recorded release
RUQ	right upper quadrant
SBP	systolic blood pressure
SIDS	sudden infant death syndrome
SpO2	oxygen saturation
STEMI	s-t segment elevation myocardial infarction
SUP	superior
Sz	seizure
T/D	treatment and disposition
Tx	treatment
UTI	urinary tract infection
V/S	vital signs
W/	with
WT	weight
Y/O	years old
ZFD	Zachary Fire Department

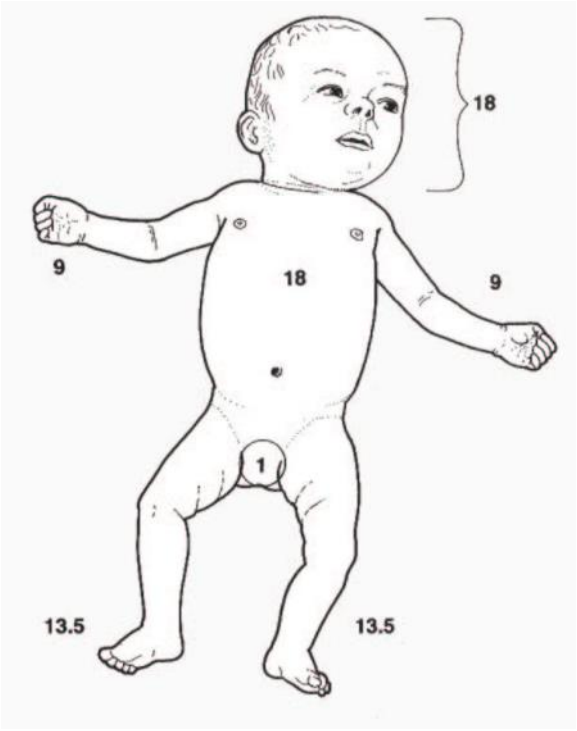
Pain Scale


10
Worst possible pain
9
8
7
6
5
Moderate pain
4
3
2
1
0
No pain
10
8
6
4
2
0

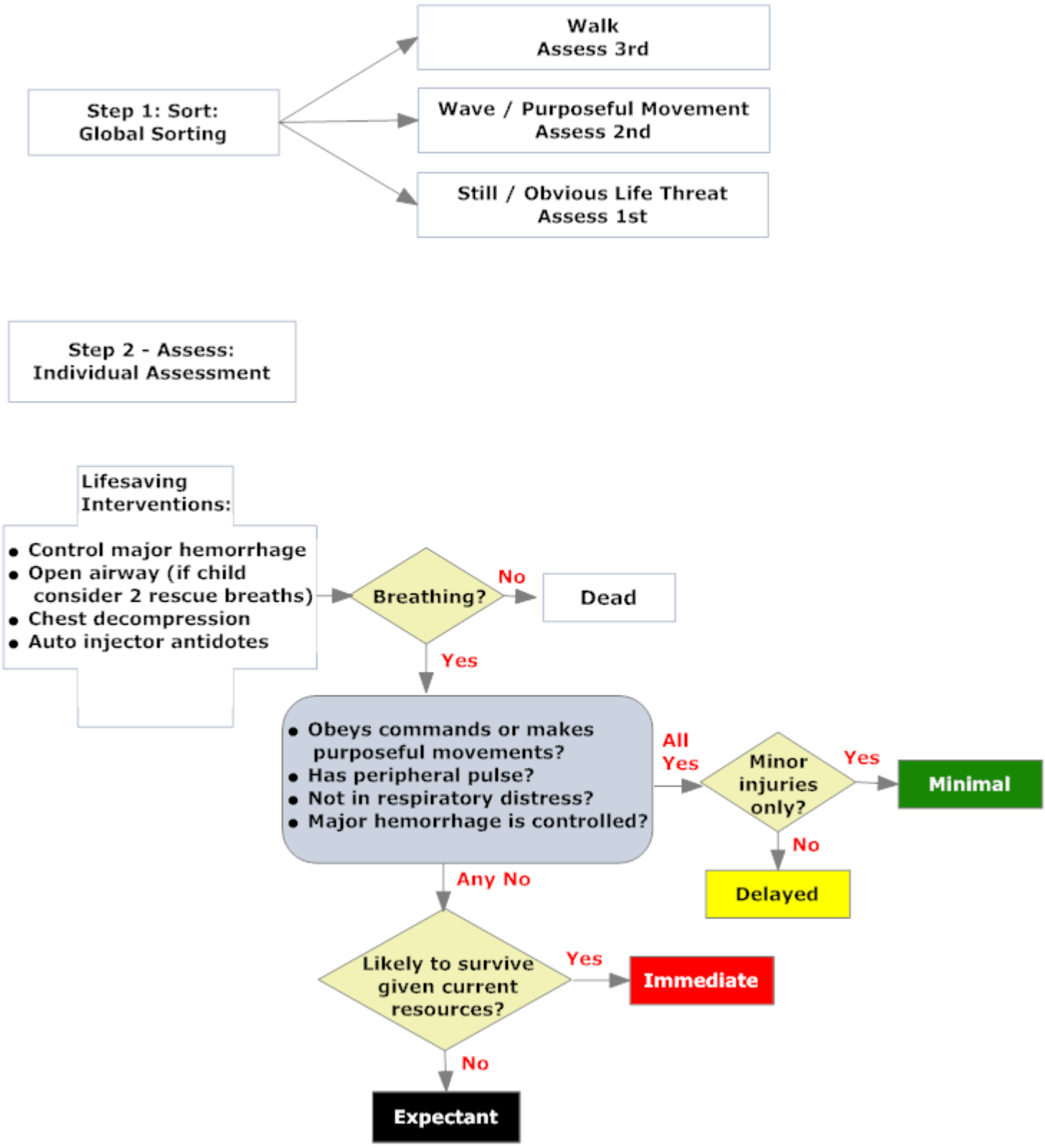
Rule Of 9's



Pre-Hospital Fluid Resuscitation
Normal Saline: 0.25ml/kg x TBSA = ml/hr



SALT TRIAGE


Step 1: Sort:
Global Sorting
Walk
Assess 3rd
Wave / Purposeful Movement
Assess 2nd
Still / Obvious Life Threat
Assess 1st
Step 2 - Assess:
Individual Assessment
Lifesaving Interventions:
• Control major hemorrhage
• Open airway (if child consider 2 rescue breaths)
• Chest decompression
• Auto injector antidotes
Breathing?
No
Dead
Yes
• Obeys commands or makes purposeful movements?
• Has peripheral pulse?
• Not in respiratory distress?
• Major hemorrhage is controlled?
All Yes
Minor injuries only?
Yes
Minimal
No
Delayed
Any No
Likely to survive given current resources?
Yes
Immediate
No
Expectant

EAST BATON ROUGE PARISH SCOPE OF PRACTICE

Approved Scope of Practice Matrix for East Baton Rouge Parish EMS personnel operating at the EMR, EMT, AEMT, or NRP Level

Airway Management

Skill / Procedure	EMR	EMT	AEMT	NRP
BVM	x	x	x	x
Manual removal of obstructed airway	x	x	x	x
Mouth-to-barrier devices	x	x	x	x
Nasal cannula	x	x	x	x
Nasopharyngeal Airway Insertion	x	x	x	x
Non-rebreather mask	x	x	x	x
Open and Maintain the airway	x	x	x	x
Oral Suctioning	x	x	x	x
Oropharynegeal Airway Insertion	x	x	x	x
Endotracheal Suctioning		x	x	x
Extraglottic airways		x	x	x
Partial rebreather mask		x	x	x
Tracheostomy Maintenance		x	x	x
Administration of nebulized bronchodilators		x*	x	x
CPAP administration and management		x*	x	x
Laryngoscopy for removal of airway obstruction			x	x
Tracheostomy tube replacement			x	x
Endotracheal intubation				x
Nasogastric tube insertion				x
Needle decompression				x
Orogastric tube insertion				x
Percutaneous cricothyrotomy				x
Positive end-expiratory pressure (PEEP)				x
Surgical cricothyrotomy				x
Medication assisted intubation				x*
Thoracostomy (Finger)				x*

Cardiac Arrest/Cardiac Management

Skill / Procedure	EMR	EMT	AEMT	NRP
CPR - Manual	x	x	x	x
Defibrillation - AED	x	x	x	x
Application of cardiac rhythm monitor (all leads)	x*	x*	x	x
CPR - External Automated Device	x*	x*	x	x
Interpretation of cardiac rhythm strips			x	x
Defibrillation - Manual			x*	x
Interpretation of 12-Lead ECG				x
Syncronized Cardioversion				x
Transcutaneous Pacing				x
Pericardiocentisis				x*

EAST BATON ROUGE PARISH SCOPE OF PRACTICE

Diagnostics / Other skills

Skill / Procedure	EMR	EMT	AEMT	NRP
Body substance isolation precautions	x	x	x	x
Patient Care Report (PCR) documentation	x	x	x	x
Taking and recording of vital signs	x	x	x	x
Trauma Triage	x	x	x	x
Capnography Application and Monitoring	x*	x	x	x
Carbon Monoxide Monitoring	x*	x	x	x
Emergency Childbirth	x*	x	x	x
Pulse Oximetery	x*	x	x	x
Taser barb removal	x*	x	x	x

Vascular Access

Skill / Procedure	EMR	EMT	AEMT	NRP
Capillary Blood Glucose Analysis	x*	x*	x	x
Intraosseous Access			x	x
Peripheral Venous Access (Excluding external jugular)			x	x
Peripheral Venous Access (Including external jugular)				x

Medications

Medication	EMR	EMT	AEMT	NRP
Aspirin (PO)	x	x	x	x
Epinephrine (Auto-injector)	x	x	x	x
Glucagon (Auto-injector) - Requires Blood Glucose Analysis	x	x	x	x
Metered Dose Inhaler (Patient assist)	x	x	x	x
Naloxone (Auto-injector / Intranasal)	x	x	x	x
Nerve agent antidote auto-injector kit	x	x	x	x
Oral Glucose	x	x	x	x
Sublingual Nitroglycerin (Patient assist)	x	x	x	x
Epinephrine 1:1,000 (intramuscular)	x*	x*	x	x
Albuterol / Atrovent (Duoneb)		x*	x	x
Naloxone (intramuscular)		x*	x	x
Benzodiazepines			x	x
Dextrose in water			x	x
Diphenhydramine			x	x
Glucagon			x	x
Lidocaine for pain relief after intraosseous needle insertions			x	x
Naloxone (Intravenous)			x	x
Narcotics or other analgesics for pain relief			x	x
Normal Saline			x	x
Ondansetron (PO - adults only)			x	x
Epinephrine 1:10,000 (IV - Cardiac Arrest Only)			x*	x
Ondansetron (Intravenous)			x*	x
Medications with evidence of written protocols and education				x*

EAST BATON ROUGE PARISH SCOPE OF PRACTICE

Medication Administration Routes

Routes	EMR	EMT	AEMT	NRP
Auto-injector devices	x	x	x	x
Intranasal Medication Administration	x	x	x	x
Metered Dose Inhaler (Patient assist)	x	x	x	x
Sublingual (Patient assist)	x	x	x	x
Oral Medication Administration	x*	x	x	x
Over the Counter Medications (Patient assist)	x*	x	x	x
Maintenance of pre-established non-medicated IV fluids		x*	x	x
Intramuscular Medication Administration			x	x
Intraosseous Medication Administration			x	x
Intravenous Medication Administration			x	x
Sublingual Medication Administration			x	x

Trauma / Injury Management

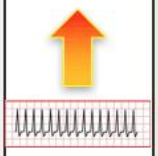
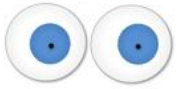
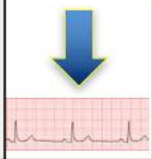
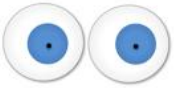
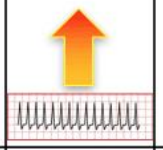
Skill / Procedure	EMR	EMT	AEMT	NRP
Eye Irrigation (Flush with water or saline)	x	x	x	x
Rigid Splints	x	x	x	x
Soft Splints	x	x	x	x
Soft tissue management	x	x	x	x
Tourniquet Application	x	x	x	x
Wound Care - Occlusive Dressing	x	x	x	x
Wound Care - Pressure Bandage (Inclusive of hemostatic bandage)	x	x	x	x
Spinal Stabilization (Manual)	x	x	x	x
Spinal Stabilization (C-Collar only)	x*	x	x	x
Spinal Stabilization (Long-spine Board)	x*	x	x	x
Spinal Stabilzation (KED)		x	x	x
Helmet removal		x	x	x
Rapid extrication procedures		x	x	x
Traction Splints (Femur Fracture)		x	x	x

All skills/procedures/medications/interventions must be included in agency specific protocols approved by a medical director

Procedures marked with a "x*" requires agencies utilizing these skills/procedures to maintain documentation that demonstrates individual competence on a biennial basis.

The East Baton Rouge Parish Scope of Matrix is in alignment with the LA Bureau of EMS approved scope of practice matrix

TOXIDROMES

	HR & BP	Resp.	Temperature	Pupils	Bowel Sounds	Diaphoresis
Anticholinergic **Anticholinergics** –Atropine, scopolamine, glycopyrrolate benztropine, trihexyphenidyl **Antihistamines** – Chlorpheniramine, Cyproheptadine, Doxylamine, Hydroxyzine, Dimenhydrinate, Diphenhydramine, Meclizine Promethazine		No change		Dilated 		
Cholinergic Organic Phosphorous Compounds: Carbamates • Arecholine, Pilocarpine, Urecholine (Betanechol), Carbachol, Choline, Metacholine, Mushrooms	No change	No change	No change	Pinpoint 		
Opioid Morphine • Codeine • Tramadol • Heroin • Meperidine • Diphenoxylate • Hydromorphone • Fentanyl • Methadone • Propoxyphene • Pentazocine • DXM • Oxycodone • Hydrocodone				Pinpoint 		
Sympathomimetic Caffeine, cocaine, amphetamines, methamphetamines, Ritalin, LSD, Theophylline, MDMA				Dilated 		
Sedative-Hypnotic anti-anxiety agents, muscle relaxants, antiepileptics and preanesthetic medications –Barbituates –Benzodiazepines				No change 		

TRAUMA SCORE

Adult Trauma Score

GCS		Systolic BP		Respiratory Rate	
13 - 15	4	> 89	4	10 - 29	4
9 - 12	3	76 - 89	3	>29	3
6 - 8	2	50 - 75	2	6 - 9	2
4 - 5	1	1 - 49	1	1 - 5	1
3	0	0	0	0	0

Pediatric Trauma Score

Assessment / Component	Score		
	2	1	-1
Weight	> 20 kg	10 - 20 kg	< 10 kg
Airway	Normal	Maintainable	Unmaintainable
CNS	Awake	+LOC	Comatose
Systolic BP	> 90 mmHg	50 - 90 mmHg	< 50 mmHg
Open Wounds	None	Minor	Major
Skeletal	None	Closed Fx	Open/Multiple Fx

VITAL SIGNS

Age	SBP	HR	RR
PREEMIE	50 - 90	120 - 170	40 - 70
NB	60 - 100	100 - 160	30 - 60
4MO	70 - 100	105 - 160	30 - 60
6MO	70 - 100	110 - 160	24 - 38
1YR	75 - 105	90 - 150	22 - 30
2YR	75 - 110	85 - 140	22 - 30
3YR	76 - 115	85 - 140	22 - 30
4YR	78 - 115	75 - 120	22 - 26
5YR	80 - 115	70 - 115	20 - 24
6YR	82 - 120	70 - 115	20 - 24
7YR	84 - 120	70 - 110	16 - 22
8YR	86 - 120	70 - 110	16 - 22
9YR	88 - 120	65 - 105	16 - 22
10YR	90 - 120	60 - 100	16 - 22
11YR	90 - 120	60 - 100	16 - 22
12YR	90 - 120	60 - 100	16 - 22
13YR	90 - 120	60 - 100	16 - 22
ADULT	100 - 140	60 - 100	12 - 20

Postural (orthostatic) vital signs should be used as an additional assessment tool in the suspicion of hypovolemia. An initial set of vital signs should be taken with the patient in a supine position. A second set of vital signs should be taken after *one (1) minute* of standing. Indicators of positive orthostatic changes could be any *one* or any *combination* of the following:

1. Increase in pulse rate of ≥ 20 – 30 bpm after standing
2. Drop in systolic blood pressure of ≥ 20 mmHg after standing
3. Significant dizziness, lightheadedness, and/or syncope upon standing

NOTES:

- Certain medications can prevent a patient's pulse from increasing, even in the presence of hypovolemia
- Postural vital signs should not be assessed if a spinal injury is suspected
- Be prepared for the possibility of syncope while having a patient stand

LERN PROTOCOLS/REFERENCES

LERN Trauma Destination Protocol
LERN Stroke Destination Protocol
LERN FAST Exam
LERN VAN Assessment
LERN MCI Procedure

LERN DESTINATION PROTOCOL: TRAUMA

Call LERN Communication Center at 1-866-320-8293 for patients meeting the following criteria:

- Unmanageable airway
- Traumatic cardiac arrest
- Burn patient > 40 % BSA without IV
- Tension pneumothorax
- Burn patient without patent airway

YES → **Closest ED/Trauma Center**

NO

Measure vital signs and level of consciousness

- GCS ≤13
- SBP <90mmHg
- RR <10 or >29 breaths per minute, or need for ventilator Support (<20 in infant aged <1 year)

NO

Assess anatomy of injury

- All penetrating injuries to head, neck, torso, and extremities proximal to elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- Two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fractures
- Open or depressed skull fracture
- Paralysis
- Fractures with neurovascular compromise (decreased peripheral pulses or prolonged capillary refill, motor or sensory deficits distal to fracture)

YES → **Transport to Trauma Center/Trauma Program** These patients should be transported to the highest level of care within the defined trauma system. This is a Level 1 or a Level 2 Trauma Center or Trauma Program. ** If distance or patient condition impedes transport to trauma facility, consider transport to most appropriate resourced hospital.*

NO

Assess mechanism of injury and evidence of high-energy impact

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

YES → **Transport to Trauma Center/Trauma Program** which, depending upon the defined trauma system, need not be the highest level trauma center/program. If no Trauma Center/ Trauma Program in the region, LCC may route to the most appropriate resourced hospital.

NO

Assess special patient or system considerations

- **Older Adults**
  - -- Risk of injury/death increases after age 55 years
  - -- SBP <110 may represent shock after age 65
  - -- Low impact mechanisms (e.g. ground level falls) may result in severe injury
- **Children**
  - -- Should be triaged preferentially to pediatric capable trauma centers
- **Anticoagulants and bleeding disorders**
  - -- Patients with head injury are at high risk for rapid deterioration
- **Burns**
  - -- With trauma mechanism: triage to trauma center
- **Pregnancy >20 weeks**
- Hip Fractures (hip tenderness, deformity, lateral deviation of foot) excluding isolated hip fractures from same level falls
- Major joint dislocations (hip, knee, ankle, elbow)
- Open Fractures
- **EMS provider judgment**

YES → **Transport to Trauma Center/Trauma Program** or hospital capable of timely and thorough evaluation and initial management of potentially serious injuries. Consider consultation with medical control.

NO

Multi / Mass Casualty Incident

NO → **Transport according to local protocol**

LOUISIANA EMERGENCY RESPONSE NETWORK

Destination Protocol
TRAUMA

When in doubt, transport to a trauma center.

Rev. 12/10/15
Eff. 1/1/2016

LERN DESTINATION PROTOCOL: STROKE

LOUISIANA
EMERGENCY RESPONSE NETWORK

STROKE DESTINATION PROTOCOL

The following protocol applies to patients with suspected stroke:

Compromise of:
- Airway
- Breathing
- Circulation

→ Closest ED

NO ↓

All other patients with suspected stroke: Determine time last seen normal (LSN) and screen for large vessel occlusion (LVO)

LSN < 6 hours* AND screen for LVO is positive	LSN > 6 hours OR screen for LVO is negative
↓	↓
Transport to LERN Stroke Level I, II, or III Center	**Transport to LERN Stroke Level I, II, or III Center**
If < 15 minutes of additional transport time to reach Level I or endovascular capable Level II Center, transfer to the Level I or endovascular capable Level II Center	If > 15 minutes of additional transport time to reach Level I, II, or III Center than to reach stroke capable Off Site ED, it is acceptable to transport to a stroke capable Off Site ED

* the LSN < 6 hours should include patients without a definite time of LSN, but who could reasonably be assumed to be within 6 hours of onset, including patients who wake-up with stroke symptoms

Guiding Principles:

- Time is the critical variable in acute stroke care
- Protocols that include pre-hospital notification while en route by EMS should be used for patients with suspected acute stroke to facilitate initial destination efficiency
- Treatment with intravenous tPA is the only FDA approved medication therapy for hyperacute stroke
- EMS should identify the geographically closest hospital capable of providing tPA treatment
- Transfer patient to the nearest hospital equipped to provide tPA treatment
- Secondary transfer to facilities equipped to provide tertiary care and interventional treatments should not prevent administration of tPA to appropriate patients

Adopted 4/20/2017

LERN Communication Center: 1-866-320-8293

LERN FAST ASSESSMENT

FACE

Ask the person to smile. Does one side of the face droop?

ARMS

Ask the person to raise both arms. Does one arm drift downward?

SPEECH

Ask the person to repeat a simple sentence. Does the speech sound slurred or strange?

TIME

If you observe any of these signs (independently or together)...

LERN VAN ASSESSMENT

LOUISIANA
EMERGENCY RESPONSE NETWORK

Table 1 Vision, aphasia, neglect emergent large vessel occlusion screening tool

Stroke VAN

How weak is the patient? Raise both arms	☐ Mild (minor drift) ☐ Moderate (severe drift - touches or nearly touches ground) ☐ Severe (flaccid or no antigravity) ☐ Patient shows no weakness. Patient is VAN negative

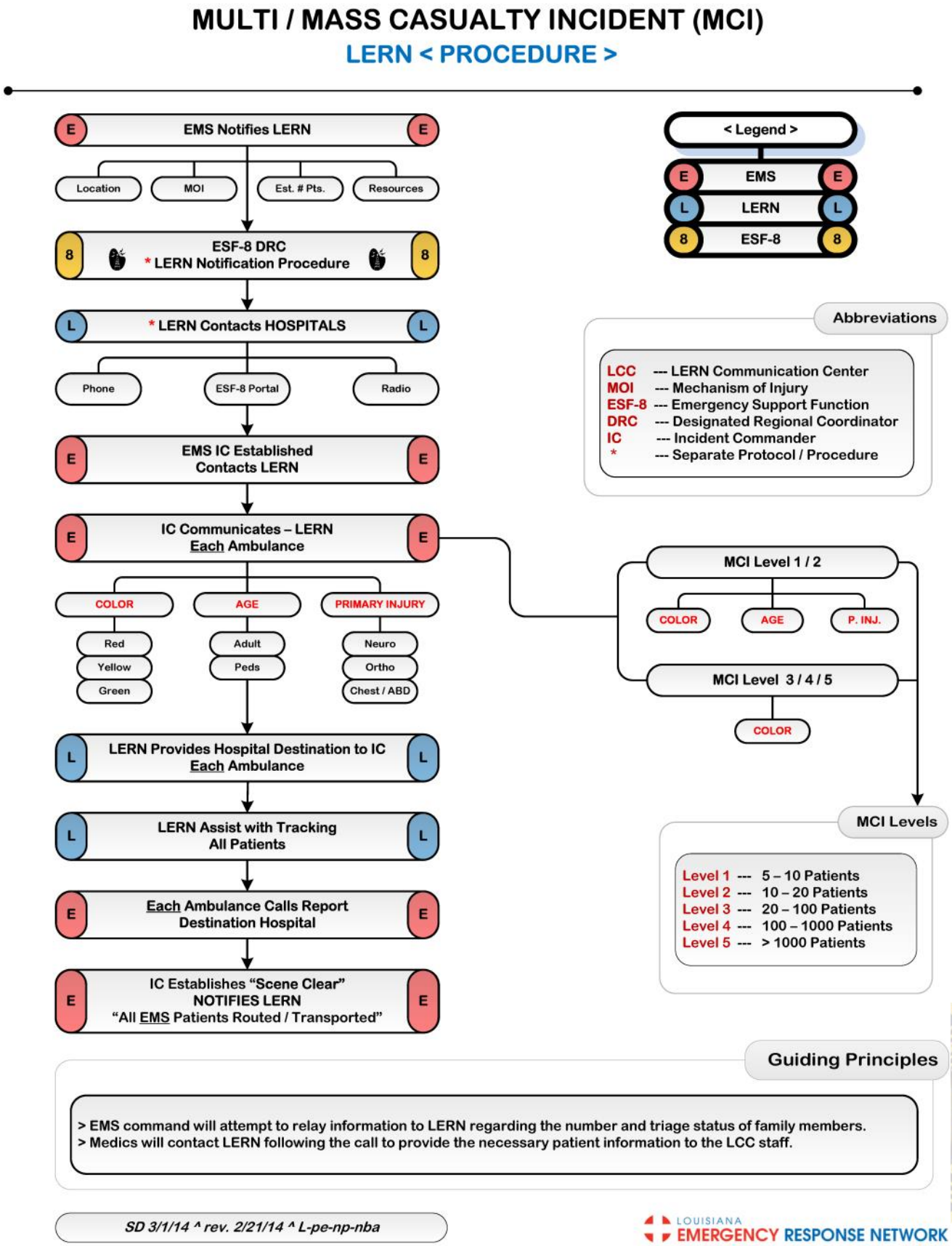
(exceptions are confused or comatose patients with dizziness, focal findings, or no reason for their altered mental status then basilar artery thrombus must be considered; CTA is warranted)

Visual disturbance	☐ Field cut (which side) (4 quadrants) ☐ Double vision (ask patient to look to right then left; evaluate for uneven eyes) ☐ Blind new onset ☐ None
Aphasia	☐ Expressive (inability to speak or paraphasic errors); do not count slurring of words (repeat and name 2 objects) ☐ Receptive (not understanding or following commands) (close eyes, make fist) ☐ Mixed ☐ None
Neglect	☐ Forced gaze or inability to track to one side ☐ Unable to feel both sides at the same time, or unable to identify own arm ☐ Ignoring one side ☐ None

Patient must have weakness plus one or all of the V, A, or N to be VAN positive. VAN positive patients had 100% sensitivity, 90% specificity, positive predictive value 74%, and negative predictive value 100% for detecting large vessel occlusion.
CTA, CT angiography; VAN, vision, aphasia, and neglect.

Source: Teleb MS, Ver Hage A, Carter J, et al.J NeuroIntervent Surg Published Online First: doi:10.1136/ neurintsurg-2015-012131

LERN MCI PROCEDURE




EAST BATON ROUGE PARISH
EMERGENCY MEDICAL SERVICES
EMS
DEPARTMENT