FLORIDA EVENT MEDICAL

PROTOCOLS FOR ALL BLS & ALS PROVIDERS

November 2022 Version 1.0

TABLE OF CONTENT

SECTION ONE

SECTION TWO

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION THREE

TABLE OF CONTENTS

SECTION FOUR

TABLE OF CONTENTS

SECTION FIVE

SECTION ONE

ADMINISTRATIVE POLICIES

I. AUTHORIZATION

A. The CLINICAL CARE GUIDELINES were developed and circulated under the authorization of the below signed Medical Director for Florida Event Medical in accordance with Florida Statute 401 and Florida Administrative Code (FAC) 64-1.

B. The information contained within this document is intended to provide and ensure uniform treatment for all patients who receive pre-hospital care by approved Florida Event Medical agencies. These GUIDELINES apply exclusively to the present and future ALS and BLS Florida Event Medical staff who are working under the Medical Director. While attempts have been made to cover all patients who access our system, the Medical Director realizes that unforeseen scenarios or situations may arise. It is suggested that for those instances, medical personnel will follow the INITIAL MEDICAL CARE PROTOCOL (or other appropriate PROTOCOLS), exercise their own judgement, and contact Medical Control online should any questions or problems arise. Our goal is to provide care when appropriate, relieve pain and suffering and do no harm. The patient's best interest should be the final determinant for all decisions.

C. The CLINICAL CARE GUIDELINES contain the following sections:
   1. ADMINISTRATIVE POLICIES
   2. PROTOCOLS
   3. FORMULARY
   4. PROCEDURE GUIDELINES
   5. APPENDICES
   6. SPECIAL OPERATIONS TEAM PROTOCOLS

D. Changes in these GUIDELINES can only be made and promulgated by the Medical Director for Florida Event Medical. Any use or duplication of this document requires the written consent of the administration of Florida Event Medical.

E. The following agencies have agreed to abide by the contents of these CLINICAL CARE GUIDELINES:

F. Approved By:

Pushpal R. Banerjee, D.O.
Medical Director

II. PURPOSE AND RATIONALE

A. The FEM CLINICAL CARE GUIDELINES document is written as treatment parameters for the management of patient care. The Paramedic and EMT are given the authority through these GUIDELINES to function under the license and approval of the Medical Director. The intention of these GUIDELINES is to facilitate the rapid dispersal of adequate and acceptable measures aimed at stabilizing the afflicted and ensuring safe and comfortable delivery to an appropriate receiving facility.

B. These GUIDELINES shall not circumvent the need to establish radio contact with Medical Control but will provide a means to initiate care in a timely manner. They are used only when the Paramedic or EMT is on duty and is acting as a duly authorized representative of their particular agency under the direction of the Medical Director of Florida Event Medical, LLC

C. Modifiaction: Modification of these GUIDELINES may be required and such modifications will be dictated by patient assessment to customize the most appropriate treatment for each individual patient. These modifications will be done in conjunction with Medical Control. Personnel are encouraged to make early and frequent contact with Medical Control whenever a doubt exists as to the proper management of any individual patient.

2. Medical Control is defined as:
    a. FEM Medical Director, Associates and designated Supervisors with Paramedic Credentials.
    b. Receiving facility physician where the patient will ultimately be transported.

D. Authority

1. Florida Event Medical is charged with the presumption of ultimate responsibility and thus maintains control of all aspects of patient care including treatment and transport destination decisions. Unless negligent in nature, which will be handled by Medical Control, discrepancies between Paramedics of FEM and the First Responder Agency will be awarded to the FEM Paramedic or officer, if necessary a FEM Supervisor may be contacted for resolution.

   The First Responder Agency Paramedic will be allowed to assist in the continuation of patient care under the FEM Paramedic discretion during transport but at no time will there be more than three people (FEM, First Responder, LEO, intern, etc.) in the back of the ambulance during transport based on safety concerns. Any conflicts regarding patient care between FEM and First Responder Agency Paramedic will be reported immediately to each respective supervisory officer.

III. TREATMENT ALGORITHMS

A. These GUIDELINES are designed to rely heavily on the training and good judgement of the individuals using them. APPENDICES are provided for reference and are considered a part of the FEM CLINICAL CARE GUIDELINES. Several PROTOCOLS are divided between the care and treatment of the stable patient versus the unstable patient. Most of which revolve around the treatment of tachyarrhythmias and bradyarrhythmias. As a matter of general definition, the **UNSTABLE** patient is one who presents with the following:
    1. ACUTE ALTERED MENTAL STATUS
    2. MAP <70 WITH SIGNS AND SYMPTOMS OF SHOCK

The following GENERAL MEASURES shall be applied to help promote speed and efficiency when rendering emergency medical care to the sick and injured. These measures provide general parameters for pre-hospital emergency care delivery in Florida Event Medical.

I. Life Safety: The overall safety of personnel is paramount to quality patient care.

A. Vehicle Operation Safety: All crews are expected to use knowledge, foresight, and judgement at all times while operating an emergency vehicle. This is vital to response, care and delivery of the patient to an appropriate facility. Patients should be prioritized in such a manner as to send the most appropriate resource(s) in the most appropriate manner whether emergency or non-emergency based upon initial dispatch information.
B. Scene Safety: Each scene should be properly evaluated for hazardous materials, fire, violent patients, etc. The scene should be secured by appropriate agencies, if necessary, prior to arrival and before patient contact.
C. Body Substance Isolation (BSI): Proper Personal Protective Equipment (PPE) MUST be utilized according to Exposure Control Plan Policies.
D. Medical Equipment: Only medical equipment/supplies approved by the Medical Director will be utilized for patient care. New equipment/supplies may be field tested (with specific parameters), but only after evaluation and approval by the Medical Director

II. Incident Management

A. Resources: Assess the need for additional support and request appropriate resources as necessary. Additional resources should be requested to the scene as early as possible and response mode prioritized by the on scene incident commander.
B. Mass Casualty: The goal is to rapidly identify patients' injuries and sort them according to their severity and need for treatment. Refer to TRIAGE SYSTEM ADMINISTRATIVE POLICY for specific details. Mutual Aid from Out of County Agencies: all requests for mutual aid transport must be approved by FEM Supervisor or Administrative Staff.
C. Incident Command: A dynamic organizational structure that expands and contracts as needed to manage an event. Every effort will be utilized to follow the incident command structure.
D. Mutual Aid: In cases of out of county mutual aid response, Florida Event Medical personnel are directed to utilize the FEM CLINICAL CARE GUIDELINES for all facets of pre- hospital medical care.

III. Patient Care

A. Informed consent: Always attempt to obtain informed consent prior to treatment. Respect the patient's right to privacy and dignity. Courtesy, concern, and common sense will ensure the patient receives the best possible care.
B. Rapid initial assessment: A Paramedic should generally be able to decide within 3 minutes after patient contact if Advanced Life Support (ALS) will be needed and should be instituted simultaneously with the initial assessment.
    1. Rapid stabilization should, in most cases, be done on scene (where the patient is encountered) prior to movement from the scene to the unit.
    2. A comprehensive exam is appropriate after the patient has been stabilized.

C. Assessment and care: Generally, the assessment and initial therapy (including IV insertion[s]) should be completed within the first 15 minutes after patient contact. Except for extensive extrication, or other significantly atypical situations, the patient should be enroute to a receiving facility within this time frame. Additional treatment if indicated should be continued during transport.

D. Care level: The Paramedic is ultimately responsible for all patient care and will perform an assessment on all patients to determine their level of care.

1. Advanced Life Support (ALS): The Paramedic is required to attend all patients deemed ALS. As a general rule, an ALS patient is defined as one who portrays signs/symptoms that fit into 1 or more of the chief complaints as outlined in the PROTOCOLS. Patients who have a pre-hospital intravenous line are NOT considered BLS patients, regardless of the complaint, and must be tended to by a Paramedic.
2. Basic Life Support (BLS): The transport Paramedic may designate an EMT to attend BLS patients, but remains ultimately responsible for patient care. The EMT must document on the run report that the Paramedic, stating name and credentials, initially assessed the BLS patient. An EMT may tend to patients. **Common sense plays a large role in these situations.**
3. Refusal of Transport: All patients who receive treatment are to be transported if any medications (other than Nebulized Updraft, Normal Saline, D10, Thiamine, or Zofran) has been given by appropriate means to an appropriate facility for further evaluation. If the patient refuses transport, refer to the REFUSAL OF TREATMENT/TRANSPORT ADMINISTRATIVE POLICY.
4. Personnel with Paramedic privileges: As noted in the ALS Intern Program, IF an intern successfully completes all phases of the program and there are no Paramedic positions available, the Intern will continue to have full Paramedic privileges. If an intern successfully completes all phases and elects not to take a Paramedic position then the Intern will have Paramedic privileges except the administration of narcotic substances or attending ALS patients during transport to the hospital for a period of no more than one year.

DI. Medication dosing for Medicals All medication dosages listed are for adults, unless otherwise specified.

1. Adult: an adult patient is one who is 8 years of age or older.
2. Pediatric: a pediatric patient is under 8 years of age or ≤ 25kg.
3. Infant: an infant patient is from birth to 1 year of age.

DII. Trauma: for traumatic situations, ages are defined by the State of Florida Trauma Transport criteria:

1. Adult: an adult patient is one who is 16 years of age or older.
2. Pediatric: a pediatric patient is one with the anatomical characteristics of a person fifteen (15) years or younger.

IV. Medical Control

A. Definition: An on-line emergency room physician who is willing to accept responsibility for the actions of EMS/Rescue personnel or the Medical Director and/or his associates.
B. Contact: If needed to deviate from or modify the FEM CLINICAL CARE GUIDELINES, the following will be utilized to receive orders:
    1. FEM Medical Director, Associates or designated FEM Supervisors with Paramedic credentials.
    2. Receiving facility physician where the patient will ultimately be transported.
C. FEM MEDICAL DIRECTOR ORDERS: If the FEM Medical Director has given an order, the Paramedic does not have to receive a signature for the EPCR. The Paramedic will make a notation in the report stating that orders were received and verified with the FEM Medical Director.
D. Disclaimer: The above contact information is intended to be utilized to receive further information or orders from a physician. If a physician has been contacted and orders given contrary to the request, it is not prudent to contact another physician to attempt to countermand the previous orders.
E. Documentation: Provide contact name, time, orders requested, and ordered received on the patient care report (EPCR). Also document if unable to contact a particular resource, as justification for contacting the next appropriate medical control.

V. Transfer of Care

A. On scene
    1. A two or more tier system is designed to provide minimum response times to the maximum area and/or population. In order to be effective there must be a prompt initial assessment by the 1st response unit, a rapid but appropriate treatment, and a smooth transfer of patient care to the transport unit. This allows for minimal scene time and the return of the 1st response unit to available status.
    2. There will be occasions when the transport medic will need to change the initial assessment and/or treatment plan. This in no way indicates less than optimal assessment or care by the 1st responder, but recognizes that signs and symptoms are dynamic and will change during the course of patient care. Therefore, the following procedures will be applied to the transfer of patient care "on-scene":
        a. The 1st responder will perform an initial assessment and appropriate treatment will be initiated. Common sense, teamwork, and professionalism will be used to ensure optimal patient care.
        b. Transfer of patient care will occur upon arrival of the transport unit's Paramedic; therefore the FEM transport Paramedic is ultimately responsible for patient care.
        c. If additional care is necessary due to the critical nature of the patient, the transporting Paramedic will re uest continued assistance enroute to receiving facility.
        d. If there is a significant difference of opinion as to proper patient care, it will be decided by online Medical Control or designated FEM Supervisors with Paramedic credentials. A review of the call may include a discussion at a later date by all involved parties and a mutual understanding reached.

B. Documentation
   1. A PCR will be generated at the conclusion of each patient encounter. You MUST enter the name of the person receiving the verbal report from you in the Electronic PCR/ PCR signature section and if possible obtain their name (Transporting PMD).
      a. If, for some significant reason, an PCR is unable to be completed; an abbreviated report, at a minimum shall sufficiently identify-in writing- the crew, patient, vital signs, chief complaint, treatment, and the times observations were made or treatment was rendered.
   2. No copies or patient information will be given to anyone other than the Transporting Agency. Law Enforcement agencies may be provided copies of reports and/or EKG strips from Refusals, pronouncement of death, Legal Blood Draws, etc., if the following circumstances exist: the officer is performing a death investigation, the patient is under arrest, or incarcerated.
   3. In general, extra attention needs to be given for documentation of patient belongings including dentures, large sums of money, weapons, etc., along with transfer to who/whom at hospital ER (name preferably). Remember current policy states we do not transport patient medications unless absolutely necessary.

C. Suspected Abuse and Neglect
   1. INITIAL MEDICAL CARE as indicated.
   2. Note environment, patient's interaction with caregivers, discrepancies in the history obtained from patient and caregivers, and any signs of obvious injury.
   3. If parents/guardians refuse to let you transport the patient, leave the scene and remain in a safe location until aid from law enforcement can be enlisted.
   4. Transport. It is mandatory to report your suspicions to the ER physician upon arrival.
   5. Contact Department of Children and Families (DCF) (800) 96A-BUSE. ALL Paramedics AND EMTS ARE LEGALLY BOUND TO CONTACT DCF IN ALL SITUATIONS THAT ARE SUSPECTED TO BE DUE TO CHILD AND ELDER ABUSE OR NEGLECT.
   6. Carefully document history and physical exam findings as well as environmental/circumstantial data on the run report.

For victims of sexual assault, if patient meets Trauma Alert criteria, transport to designated trauma center

For victims age of 16 and under that present with any associated injury, transport must be called

For victims age 17 and over that present with any associated injury, transport must be called

For victims that do not present with any injury, contact Sheriff Department or Municipal Law Enforcement for transport to appropriate facility.

I. General Information

A. Stable patients: The goal is to provide a quick synopsis of the patient's condition. Only pertinent information needs to be relayed to the receiving facility. This information should include:
   1. ALS agency and unit number
   2. Patient age, sex, personal physician if known, and approximate weight in kilograms
   3. Chief complaint
   4. Vital signs:
      a. Blood pressure
      b. Pulse
      c. Respirations
   5. Treatment initiated
   6. Estimated Time of Arrival (ETA)

B. Unstable patients: a radio report should be delivered ASAP or at least 3 minutes prior to arrival at hospital and a heads up call for unstable patients should be given from the scene if warranted and time permits.

II. Physician's Orders (in addition to the above information):

A. State the need for physician's consult or a request for physician's orders.
B. State specific request up front and provide all supporting information to justify the request (example: requesting orders for Cardizem…. I have a 68 y/o male pt).
C. Level of consciousness (A-V-P-U) and orientation to person, place, time, and incident.
D. Chief Complaint:
   a. Pertinent positives: symptoms, degree of distress
   b. Mechanism of injury/history of present illness/pertinent scene information
   c. Pertinent negatives
E. Medical History, Medications and Allergies
F. Clinical Findings:
   1. Assessment findings
   2. Basic and 12 lead ECG assessments
   3. Vital Signs:
      a. Blood pressure, auscultated or palpated
      b. Pulse: rate, rhythm, force
      c. Respirations: rate, rhythm, effort
      d. Skin: color, temperature, condition
      e. Other pertinent observations
G. Treatment initiated and patient response
H. Confirm physician's orders received by repeating information and confirm physician's name or hospital ID number.
I. Update patient status to receiving facility if patient deteriorates.

I. General

A. In all cases, patients presenting with an illness or injury should be approached with the intent to transport. The option of refusal of treatment and/or transport should be a last resort.

B. Any patient encountered, regardless of their transport status, must have a history and physical exam completed, this includes at least one set of vital signs to rule out threats to life.

II. Patient

A. The definition of a patient is any human that:
   1. Has a complaint suggestive of potential illness or injury
   2. Requests evaluation for potential illness or injury
   3. Has obvious evidence of illness or injury
   4. Has experienced an acute event that could reasonably lead to illness or injury

B. All individuals meeting any of the above criteria are considered patients in the FEM System. These criteria are intended to be considered in the widest sense. If there are any questions or doubts, the individual should be considered a patient.

III. Competency

A. Competency shall be defined as one who is all of the following:
   1. 18 years of age or older
   2. Awake, alert, and fully oriented to person, place, time, and incident
   3. Has no signs of injury or illness which may impair the ability to make an informed decision inclusive of the use of drugs and/or alcohol
   4. Has the mental capacity to understand and appreciate the nature and consequences of his/her condition and ability to make rational decisions
   5. Showing no current evidence of bizarre/psychotic thoughts and/or behavior or displaying behavior that is inconsistent with the circumstances of the situation
   6. Shows no current evidence of suicide ideations, suicide attempts, or any indication that they may be a danger to themselves or others

B. Minors
   1. The following person(s) may consent, or refuse, the evaluation, treatment and/or transportation of a minor:
      a. Parent
      b. Grandparent
      c. Adult (>18) brother or sister
      d. Adult (>18) aunt or uncle
      e. Educational institution in which the child is enrolled that has received written authorization to consent/refuse from a person having the right to consent/refuse
      f. Adult who has actual care, control, and possession of the child and/or has written authorization to consent/refuse from a person having the right to consent/refuse (i.e. daycare camps, soccer moms, carpools, etc.)
      g. Adult who has actual care, control and possession of a child under the jurisdiction of a juvenile court
      h. A court having jurisdiction over a suit affecting the parent-child relationship of which the child is the subject

i. A peace officer who has lawfully taken custody of minor, if the peace officer has reasonable grounds to believe the minor is in need of immediate medical treatment
j. A managing or possessory conservator or guardian

2. A Provider may be denied access to minor children by a parent or guardian if there is no obvious immediate life threat to the patient. However, in general, parents or guardians cannot refuse life-saving therapy for a child based on religious or other grounds.
3. In certain circumstances, a patient under 18 years of age who has the legal competency (emancipated) and present mental capacity to consent or refuse evaluation/treatment may do so. In such cases, the law states that a person under 18 years of age may consent to evaluation and/or treatment if the person:
    a. Is on active duty with the Armed Services of the United States of America
    b. Is 16 years of age or older and resides separate and apart from his/her parents, managing conservator (an individual appointed by the court, usually during divorce proceedings, to have custody of a minor, to make decisions for the minor and to make a home for the minor), or guardian, with or without the consent of the parents, managing conservator, or guardian regardless of the duration of the residence and managing their own financial affairs, regardless of the source of the income.
    c. Is consenting to the diagnosis and treatment of an infectious, contagious, or communicable disease that is required by law or rule to be reported by the licensed physician or dentist to a local health officer or the Florida Department of Health
    d. Is consenting to examination and treatment for drug or chemical addiction, drug or chemical dependency, or any other condition directly related to drug or chemical use
    e. Is unmarried, pregnant and consenting to evaluation and/or treatment related to the pregnancy
    f. Is unmarried, is the parent of a child, and has actual custody of the child, consenting to evaluation and/or treatment of the child
4. A pregnant minor must have adult consent unless she fits within one of the previously mentioned exceptions.
5. When treating minors, it is important that there be an interactive process between them and the provider. The interaction should involve developmentally appropriate disclosure about the illness/injury, the solicitation of the minor's willingness and preferences regarding treatment and decision options. Although the intent of this interaction is to involve the child in decisions, the way in which the participation is framed is important. As with any patient, minors should be treated with respect.

C. When a patient is refusing treatment or transport and fails to meet the above competency criteria, law enforcement, Supervisors, and/or medical control must be actively consulted and participate in determining the outcome. Medical Control and Supervisor must be contact prior to any patient being treated and/or transported against their will.

IV. Consent

A. With certain exceptions (see Implied Consent) all adult patients and select minor patients have a right to consent to medical evaluation and/or treatment. If they have the legal competency and present mental capacity to do so. There are three specific forms of consent that apply to EMS: Informed Consent, Implied Consent and Substituted Consent.

B. Informed Consent:
   1. Informed consent is more than a legality. It is a moral responsibility on the part of the Provider, based on the recognition of the individual autonomy, dignity, and the present mental capacity for self-determination.
   2. With informed consent, the patient is aware of, and understands, the risk(s) of any care provided, procedures performed, medications administered, and the consequences of refusing treatment and/or transport.
   3. They should also be aware of the options available to them if they choose not to accept evaluation and/or treatment.

C. Implied Consent:
   1. In potentially life-threatening emergency situations, consent for treatment is not required. The law presumes that if the individual with a real or potential life-threating injury or illness were conscious and able to communicate, he/she would consent to emergency treatment.
   2. In life-threatening emergency situations, consent for emergency care is not required if the individual meets any of the following criteria:
      a. Unable to communicate because of an injury, accident, illness, or unconsciousness and suffering from what reasonably appears to be a lfie-threatening injury or illness
      b. Suffering from impaired present mental capacity
      c. A minor who is suffering from what appears to be a life-threating injury or illness and whose parents, managing or possessory conservator, or guardian is not present

D. Substituted Consent:
   1. This is the situation in which another competent adult consents for the patient, as in minors, incapacitated patients, incarcerated patients, and those determined by courts to be legally incompetent.
   2. Parents or guardians are entitled to provide permission because they have the legal responsibility. In the absence of abuse or neglect, it is assumed they act in the best interests of the child. However, there is a moral and ethical need to respect the rights and autonomy of every individual, regardless of age.
   3. If patient is 16 years old, driver of a vehicle, and not injured, patient may sign refusal form for self and any other non-injured minor family member involved. **This pertains to family members only!!!**
   4. Incarcerated: Law Enforcement

V. Restraint/Transport Against Will

A. If, based on Provider assessment, the patient is not capable of making an informed decision AND the patient has a potentially harmful illness or injury, the patient should be extensively counseled regarding the need for medical care

B. If the patient STILL refuses further care/evaluation, or is a harm to (him/her) self or others, the patient should be physically restrained by EMS personnel with law enforcement assistance, if available.

1. PHYSICAL RESTRAINTS (refer to PHYSICAL RESTRAIN PROCEDURE GUIDELINE) should be safe and humane. At NO TIME should a patient be struck or managed in such a way as to impose pain. Restrain in a position of comfort and safety.
2. You must thoroughly document on the EPCR the reason for restraint, the mental status exam, options attempted, and method of restraint.
3. If CHEMICAL RESTRAINT is deemed necessary, refer to the PSYCHOLOGICAL AND BEHAVIORAL EMERGENCIES PROTOCOL.
4. Patients should be monitored every 5 minutes during restraint period and findings documented on the EPCR. Never leave a patient alone after any form of restraint. Always restrain and transport in supine position.

VI. Close call/cancelled enroute

A. During mutual response to a scene, the first arriving unit will determine the need for treatment and/or transport. If conditions exist where the patient meets refusal criteria, the first arriving unit will cancel incoming units and must obtain refusal documentation.

B. No refusal needs to be taken by the units that were cancelled. If there are any questions or concerns about the assessment or competency of the patient, the ALS unit should not be cancelled.

VII. Public Assist

A. If a transport unit arrives on-scene of an incident in which a well-being check or assistance in moving is requested and other public safety units are on scene, only one unit is required to generate full documentation of the call. The first unit on scene will complete the EPCR including a refusal of treatment/transport documentation and the other unit(s) will document assisting/referral to other documentation.

VIII. Refusal After Treatment

A. There may be times when patients are refusing further treatment or transport after a corrected Episode

B. These patients will be allowed to refuse transport if all of the following criteria are met:

C. If there is a documented low glucose reading pre-treatment and a normal glucose reading post treatment

D. The patient is awake, alert and oriented x4 post treatment (understands current situation)

E. The patient is not going to operate any moving vehicle or equipment immediately following treatment

F. There is a competent adult who will assume the responsibility of caring for the patient for the next 1-2 hours or no decrease in glucose reading (second normal reading) after 30 minute period

G. There are no other underlying medical or trauma conditions requiring treatment at the time of service

H. The patient is not taking any of the following medications- Sulfonylureas: Glucotrol, Glipizide, Glyburide, Diabeta, Glynase, Amaryl, Glimepiride

IX. Refusal of Treatment or Transport

A. IF THE PATIENT IS REFUSING ANY CARE OR TREATMENT DETERMINED TO BE BENEFICIAL AS PRESCRIBED IN THESE PROTOCOLS, SUPERVISOR WILL BE NOTIFIED FOR DIRECTION AND THE PATIENT WILL BE INFORMED OF THE POSSIBLE CONSEQUECES OF THIS WITHHOLDING OF CARE. The patient must sign the EPCR acknowledging his/her understanding of the decision with complete documentation of the specific care refused.

B. If the competent patient refuses transport, a patient care report (PCR) must be completed, inclusive of the patients informed refusal signature. This will be done on all patients with an illness or injury that are refusing service, regardless of how the call was received (911 request, still-alarm, third party caller, etc.). If an incident occurred that prompted the 911 call and symptoms resolved prior to patient contact, a PCR must still be written to document the incident and the patient's refusal of service.

X. Rejection or inability to sign refusal

A. The patient (or parent or guardian) who is judged competent to refuse care and then refuses to sign the refusal form should prompt the crew to reassess the competency of the individual. If still considered competent to refuse care, such refusal must be documented on the PCR and preferably witnessed by law enforcement. Supervisor must be involved, notified in the determination of this call.

Example: Agitated subject in custody of LEO

B. If the patient (or parent or guardian) is unable to sign refusal paperwork, such inability must be documented on the PCR and witnessed by law enforcement. Supervisor must be involved/notified in the determination of this call.

Example: Quadriplegic patient and false alarm call

IF ANY DOUBTS, CONTACT A SUPERVISOR FOR ADVICE

It is the goal of FEM to provide the best possible care to all patients who are in need of service. For those patients who are found in cardiopulmonary arrest, the Paramedic should examine the circumstances surrounding the event and take appropriate action as determined by the situations listed below. If END OF LIFE is determined, further supportive care should be given to the family on scene so they are better able to cope with this event. Assistance might include, but not be limited to, notification of the patient's physician, Hospice if applicable, and funeral home. Patients who deteriorate into cardiopulmonary arrest in the presence of rescue personnel, or for whom cardiopulmonary resuscitation is in progress prior to the arrival of rescue personnel, will receive cardiopulmonary resuscitation.

I. Discontinue Cardiopulmonary Resuscitation when:

A. Effective spontaneous ventilation and circulation have been restored

B. Resuscitation efforts have been transferred to persons of no less skill than the initial providers

II. Cardiopulmonary resuscitation may be <u>TERMINATED</u> in non-hypothermic adults provided all the following criteria have been met:

A. The patient was initially found asystolic in 2 or more leads (all other rhythms or change in rhythm must be worked to the hospital).

B. Airway secured (iGEL Supraglottic Airway) and confirmed by capnography. If there is no presence of good waveform and ETCO2 is less than or equal to 10 consistently for twenty (20) minutes.

C. At least 2 round of Epinephrine have been administered

-If there is no response to the above treatments after a minimum of twenty (20) minutes, the Paramedic may elect to discontinue resuscitative efforts without a physician's order provided all EMTs and Paramedics on scene agree; otherwise resuscitative efforts will continue and patient is to be transported to closest IRF.

D. If there are any deviations from the above criteria, CESSATION OF RESUSCITATION MUST BE MADE IN CONJUNCTION WITH MEDICAL CONTROL.

E. <u>IF IN DOUBT, CONTINUE ALL RESUSCITATIVE EFFORTS!</u>

III. For OBVIOUS DEATHS, cardiopulmonary resuscitation may be <u>WITHHELD</u> provided all of the following criteria are met:

a. Pulseless, apneic, no other signs of life and

b. Not exposed to an environment likely to produce hypothermia and

c. The presence of one or more of the following:

- Rigor Mortis (generally starts after 2 hours of death)
- Decomposition of body tissues (≥ 24 hours depending on a broad variety of individual and environmental conditions)
- Dependent lividity (may present after 20 minutes)
- Incineration
- Evidence of massive blunt or penetrating head or torso trauma including decapitation (details of the events, the mechanism of injury, scene and patient assessment must be completely documented)

IV. Cardiopulmonary resuscitation may be <u>WITHHELD</u> or <u>WITHDRAWN</u> from a patient:

A. When presented with a State of Florida DNR form or State of Florida Yellow DNR device which is a miniature copy of the DNR form. **NOTE: This form does not expire.**
   1. The form must be properly completed, including physician signature.
   2. This form shall be printed on yellow paper. A copy of this form may be made so long as rescue staff has witnessed the validity of the yellow original

B. When presented with a DNR written by a physician (who is verifiably licensed in the State of Florida). **NOTE: These forms expire 30 days from the day it is written and are generally created in a hospital.**

C. When a physician is on scene (who is verifiably licensed in the State of Florida) who is willing to write a DNR. The physician must provide a rationale for the DNR and state their relationship to the patient. This information must be recorded in the EPCR along with the physician's signature. REMEMBER: A living will is not equal to a DNR.

During each transport, the DNR form or legal copy shall accompany the patient. A DNR may be revoked at any time. The revocation may be in writing, by physical destruction, by failure to present the DNR form or by orally expressing a contrary intent. The DNR may be revoked by:

A. The patient (if signed by the patient)
B. The patient's healthcare surrogate
C. The patient's proxy, court appointed guardian, or Power of Attorney

Even with a DNR form, the patient shall be provided medically indicated care, comfort, or pain relief (i.e. oxygen administration, CPAP, etc.) unless the patient is in respiratory or cardiac arrest.

Palliative Care parameters for time period prior to respiratory arrest and patient has DNR as noted above.

Based on SPO2% or Respiratory Rate

<u>SpO2%</u>		<u>Respiratory Rate</u>	<u>Treatment</u>
90-95		>9	NC or NRBM
80-89	**<u>OR</u>**	7-8	BVM
<79		<6	INTUBATE

INTUBATION OF PATIENT SHOULD BE BASED ON THE MOST UNSTABLE CLINICAL SIGN

IF PATIENT BECOMES APENIC AND PULSELESS HONOR DNR STATUS/CHOICE!!!

V. Document original body position and location, disposable supplies (i.e., EKG electrodes) will be left in place.

A. Complete ePCR must be completed by Paramedic including: patient information, patient assessment, treatment (if any), DNR notated (if any), body position and location, witness signatures.

End of Life Issues

The purpose of this policy is to establish guidelines for how members of FEM shall handle End of Life Issues. The term **expected death** refers to an individual that due to advanced age or existing, long term medical conditions dies outside of a medical facility and on-scene emergency personnel find no reason(s) to indicate that the death was a result of any extenuating or suspicious circumstances. FEM members are **only** authorized to process Expected Death (Apparent Natural Causes) without law enforcement involvement if certain criteria are met (See below).

FEM personnel are not trained, equipped, or authorized by law to investigate or to determine the cause or manner of death. Any death considered Unexpected Death (Apparent Unnatural Causes); requires the involvement of the Medical Examiner's Office; has suspicious surroundings or events; does **not** fall under the Expected Death (Apparent Natural Causes); or occurs in public, **shall** be turned over to law enforcement for investigation.

When FEM personnel arrive on the scene of a death prior to law enforcement. The following processes should be followed.

Arrival On Scene

- **If individuals are on scene, obtain information regarding:**
    - Was the death witnessed? If so by who?
    - Does anyone present know the deceased (family, friends)?
    - If so try to obtain contact information.
    - Survey the scene and note anything that appears unusual or suspicious.
- **If no one is on scene, determine if the structure is secure?**
    - Ascertain if access into the structure is available.
    - Remember if doors/windows are locked FEM personnel may force entry as necessary. Always look for the access point that will cause the least damage to the structure. Be sure to check for unlocked doors and windows before forcing entry.
    - Law enforcement must be notified to secure structure
    - Look for contact information for an alarm company, usually found on the door or windows.
    - If an aggressive dog is present request ECC to send Law Enforcement and Animal Control.

Once Entry Is Made Survey the scene to determine:

- Does anything appear unusual or suspicious (i.e., evidence of a crime, forced entry struggle, trauma, apparent suicide, indication of overdose) or if illegal drugs or paraphernalia are in plain view. If so, immediately advise law enforcement upon their arrival.
- Note – Prescription medication(s) present, should be recorded in the ePCR (patient medical report). The medication(s) should be **left at the scene**. If unusually high number of pills appear to be missing, advise law enforcement upon their arrival.

Unexpected Deaths (Apparent Unnatural Causes): Law Enforcement shall be contacted immediately when any factors are present that would indicate that the death occurred from **Unnatural Causes.** FEM members shall remain on scene and make every reasonable effort to secure the potential crime scene until law enforcement's arrival. Examples are:

- Any death that resulted from trauma.
- Any death where unusual or suspicious circumstance exist (signs of suicide, criminal activity, apparent overdose, or body in state of decomposition).
- Age is not consistent with death and/or death is absent of expected or known disease process (Expected Deaths (Apparent Natural Causes))
- Signs of a forced entry or attempted forced entry to the premises.
- Body is in public or not in primary residence

Expected Deaths (Apparent Natural Causes): When a death occurs by **apparent natural causes** or the Paramedic terminates his/her treatment of a cardiac arrest patient the following guidelines apply:

- The Paramedic or EMT will make attempt(s) to contact the deceased's personal physician or hospice coordinator (if applicable). Discuss with the physician the events surrounding the death and ask the physician if he/she will sign the death certificate. If the physician agrees to sign the death certificate, inform the next of kin to proceed with contacting their selected funeral home. If next of kin is not present or are unable to select a funeral home call the ECC @ (863) 401-2222 for rotation funeral home or body removal service. FEM members are not allowed to recommend a funeral home.
- If unable to contact the personal physician; or if the personal physician refuses to sign the death certificate; or is not a State of Florida licensed physician, request / advise law enforcement and turn the scene over to them.
- Nursing home and Assisted living facilities are responsible for calling the physician and waiting on funeral home services. Offering to call the physician is good customer service and ePCR documentation of nurse and physician name is required.
- Contact the appropriate Supervisor and provide a briefing and ETA of body removal or other circumstances.

Law enforcement will not be called or expected to take over an Expected (Apparent Natural Causes) scene under the following circumstance:

- Deceased is in a nursing home or assisted living facility
- Deceased is under Hospice care
- Deceased is in their primary residence and not in public
- Death certificate signature is agreed to by State of Florida licensed physician

Emergency Units Return To Service

Due to high call volumes it is imperative that FEM Ambulance Units are returned to service

as soon as possible. Actions to be taken by on-scene units:

- Notify the appropriate Supervisor of the circumstances.
- In the FEM coverage area the engine may stay on scene awaiting arrival of the funeral home, next of kin, or to provide comfort to the family. The engine will be available for emergency calls.
- FEM representative should make every effort to remain on scene to assist the family until relieved by the funeral home, removal service or hospice representative.
- If dispatched to an emergency call an engine staffed with three members should leave one member on scene and respond to the emergency.
- An engine staffed with only two members may remain on scene until the arrival of a chief officer, next of kin, or the funeral home. Two-member engines should contact a chief officer as soon as possible to inform them of the situation. The chief officer can contact law enforcement and request that an officer/deputy be dispatched to allow the engine to respond to the reported emergency.

Securing the Structure

- In the event of an expected natural death (at home) and no family member is on scene. Law Enforcement will be called to secure the residence.

Other Considerations

- Municipal Fire and Law Enforcement agencies may have different protocols or procedures regarding responses to unattended or apparent natural deaths. If a municipal law enforcement agency is willing to assume the incident FEM shall relinquish the scene if no further assistance is needed.

Medical control of the scene of an emergency should be the responsibility of the individual in attendance who is the most appropriately trained in providing pre-hospital stabilization and transport. As an agent of the Medical Director, the Paramedic represents that individual.

Occasions will arise when a physician on the scene will desire to direct pre-hospital care. A standardized plan for dealing with these contingencies will optimize the care given to the patient.

I. The physician desiring to assume care of the patient must:
   1. Provide documentation of his status as a physician (M.D. or D.O.)
   2. Be licensed to practice medicine in the State of Florida
   3. Document his or her assumption of care on the patient care report (PCR)

II. Contact with Medical Control at the receiving facility must be established as soon as possible. The physician assuming responsibility at the scene should be placed in contact with the Medical Control Physician and acknowledgement of his or her acceptance of responsibility confirmed.

III. Orders provided by the physician assuming responsibility for the patient should be followed as long as they do not, in the judgement of the Paramedic, endanger the well-being of the patient. The Paramedic may request the physician to attend the patient during transport if the suggested treatment varies significantly from the PROTOCOLS.

IV. If the physician's care is judged by the Paramedic to be potentially harmful to the patient, the Paramedic should:
   1. Politely voice his or her objections
   2. IMMEDIATELY place the physician on the scene in contact with Medical Control for resolution of the problem
   3. When conflicts arise between the physician on the scene and Medical Control, rescue personnel should follow the directives of the Medical Control Physician. Offer no assistance in carrying out the order in question, but provide no resistance to the physician performing this care. If the physician on scene continues to carry out the order in question, offer no assistance and enlist the aid of law enforcement.

V. All interactions with physicians on the scene must be completely documented in the patient care report (PCR)

CONTROLLED SUBSTANCES INVENTORY/KEY SECURITY

Controlled substance handling, dispensing, storing, ordering and disposal are regulated by DEA Title 21, FS 499, FS 893, and FAC 64J. The Medical Director is responsible for establishing and enforcing as necessary all Protocols, Policies, and/or procedures as related to controlled substances. An employee violating in any form the Florida Event Medical Protocols, Policies and/or Procedures relating to controlled substances may be subject to removal of their privilege to work under the license of the Medical Director and may be subject to payment of any fines and/or penalties levied as a result of said violations.

1. Controlled substances are assigned to individual ALS licensed vehicles. All controlled substances will be inventoried, the Control Substance Usage Forms (CSUF) will be reviewed for completion and accuracy, the Controlled Substance Daily Inventory Log will be reviewed for completion and accuracy by the ON COMING and OFF GOING paramedic at the following times:
    A. Every AM at shift change
    B. When a paramedic is relieved during a shift
2. It will be both paramedic employees' responsibility, when checking the controlled substances, that each individual package will be picked up, the expiration date checked and each item thoroughly inspected for color, clarity, tampering, or seal breakage. The date, time, count of each substance and the signatures of both ON COMING and OFF GOING paramedics will be entered on the CONTROLLED SUBSTANCE DAILY INVETORY LOG that is to be kept with the substances in the locked compartment of the ALS license vehicle. Expiring substances, suspected tampering, seal breakage, incomplete/inaccurate paperwork, or discrepancies/errors of any nature will be reported to the Shift lead and Supervisor immediately by phone and agency e-mail.
3. When changing or trading ALS licensed vehicles, the paramedic will be responsible to ensure that the controlled substances and the associated paperwork are secured in the locked compartment of the ALS licensed vehicle that he/she will be using.
4. The key to the locked cabinet in the ALS licensed vehicle and/or the key to the locked cash box containing the substances will be kept by the ON DUTY paramedic and on his/her person at all times when working. Individual access codes and/or proximity cards to the locked drug cabinet shall remain secured and confidential at all times. If a proximity card is lost/misplaced/stolen immediate notification shall be made to the Shift lead and Supervisor by phone and agency e-mail and to the IT System Administrator by agency e-mail.

DISCREPENCIES/SEAL BREAKAGE

1. If at any time when controlled substances are inventoried, there is a discrepancy between the count and what is documented on the CSUF or the controlled substance daily inventory log, there is suspected tampering or a Safety Seal found broken or loose, it is both paramedics' responsibility to report such discoveries to the Shift lead and Supervisor immediately by phone and agency e-mail. Both paramedics will remain at the station until permitted to leave by the Shift lead and Supervisor.
2. If, in anticipation of administration, the tamper or safety seal on any substance is broken; the paramedic, before leaving the hospital, is to waste the entire substance in the presence of an RN and document this waste on the CSUF. The paramedic is also responsible for documenting on the ePCR circumstances surrounding the non-administration of a drug.

ADMINSITRATION/DOCUMENTATION

1. Controlled Substances may be administered by standing orders or by physician orders. Paramedics are responsible for knowing what controlled substance requires a physician order and what controlled substance may be given without physician order as outlined in the FEM Clinical Care Guidelines.
2. The Controlled Substance Usage Form (CSUF) will be the legally recognized record that will accurately and completely reflect all controlled substance administration and waste documentation. There is one CSUF issued for each substance or concentration of substance carried on the ALS licensed vehicle. Each vial, syringe, or other supplied forms of controlled substances when administered, wasted, broken, or removed from the ALS licensed vehicle is to be accounted for on a separately numbered line on the CSUF. The CSUF will be kept in the locked cash box inside the locked drug compartment of the ALS licensed vehicle.
3. The paramedic that administers or attempts to administer a controlled substance is responsible for the proper completion of the CSUF before leaving the receiving facility or scene of a call if the patient was not transported by their unit. An entry into each field is mandatory either by entering the necessary information or N/A (not applicable). If the ordering physician signature is unobtainable, write "UTO" on the physician signature line on the CSUF, and document the reason(s) why the signature was not obtained on the ePCR.
4. In cases where the paramedic administers a controlled substance or breaks the tamper or safety seal in anticipation of administration, and then turns patient care over to another unit/agency, the RN Waste signature for the waste amount may be obtained from a Shift lead or Supervisor, a Flight Medic/RN, or a paramedic from another unit. (Waste signatures outside of the hospital setting as described above must not be obtained from anyone within the same unit or station).
5. In cases where a paramedic administers the entire quantity of a controlled substance resulting in no waste, N/A (not applicable) shall be entered in the section for amount wasted, time wasted, RN/ Paramedic Name Printed and RN/Paramedic Signature.

AT ALL TIMES THE EMPTY CONTAINER WILL BE SHOWN AT THE TIME OF WASTE TO CONFIRM IDENTITY OF THE SUBSTANCE BEING WASTED AND PLACED INTO RED SHARPS CONTAINER. UNDER NO CIRCUMSTANCES ARE ANY EMPTY VIALS OF CONTROLLED SUBSTANCES PERMITTED IN POCKETS.

RESUPPLY/REMOVAL/MONTHLY INVENTORY/VIOLATIONS

The current Medical Director's designees are Supervisors or Shift leads that have received proper training and have been approved by the Medical Director.

1. When a controlled substance inventory is reduced to three each of a substance for transport units and two each for non-transport units, resupply may be indicated. The on-duty paramedic must contact their Shift lead and Supervisor by phone and agency e-mail to advise them of the current inventory. The Supervisor will make arrangements for resupply of that particular substance.
2. Expired Controlled Substances Procedure
    a. When a controlled substance is set to expire, company officers must make notification to their Supervisor a minimum of seven (7) days prior to the date of expiration. This will allow the Supervisor (s) the opportunity to develop an organized plan to swap all

of the expiring controlled medications within the Supervisor over the ensuing seven (7) day period, thus preventing a rush or emergency swap out of the expiring medication.

b. There should be no need for exchange of the medications on weekends or holidays. Should an emergency exchange be required due to expiration date on a weekend or holiday, an Internal Memo from the Shift lead and the Supervisor will be required to explain the incident.

All controlled medications returned to Logistics will be subject to testing for volume and concentration levels.

3. Completion and/or submission of the electronic monthly drug inventory does not alleviate any on duty Paramedic from their responsibility of making notification of expiring controlled substances as outlined above.
4. Only employees authorized by the Medical Director and trained in proper procedures may be directly involved in the removal, restock or inspection of any controlled substances.

ALS LICENSED VEHICLE CONTROLLED SUBSTANCE MAXIMUMS

SUBSTANCE	Main	ALS Field
Versed	3	1
Valium	2	1

C. UNSTABLE PATIENT
   1. All patients whose condition meets the definition of UNSTABLE will be transported to the closest appropriate receiving facility. If several hospitals are within the same approximate distance from the scene (regardless if the hospital is within the catchment area), allow the patient and/or patient's family to select the closet appropriate receiving facility of their choice.
   2. Refer to TRAUMA TRANSPORT, CARDIAC TRANSPORT, or STROKE TRANSPORT ADMINISTRATIVE POLICIES where an appropriate facility is necessary for these specific circumstances.
   3. Rapid transport may be indicated if circumstances demand for definitive hospital care. If the situation warrants, DO NOT delay at the scene. If there is a delay each case will be unique and a compelling reason MUST be documented.
   4. EXAMPLES OF EMERGENCY TRANSPORT SITUATIONS INCLUDE BUT ARE NOT LIMITED TO:
      a. Inability to establish or maintain a patent airway or effective ventilations
      b. Complicated obstetrical
      c. Respiratory arrest
      d. Cardiac arrest, if patient may significantly benefit from rapid transport
      e. Massive internal/external hemorrhage with shock
      f. Unstable pediatric
   5. Note:
      a. The use of emergency transport must be weighed against the potential injury to both the patient and rescue personnel and the possible benefit to the patient's condition. The few minutes that this type of transport may gain must be significantly more beneficial than the added stress and potential for injury to both the patient and rescue personnel.
      b. If the patient and/or patient's family refuses transport to the closest hospital(s), notify Medical Control and/or the Supervisor of the situation.
      c. Reminder: a student is not considered or defined as a second attendant or crew member.

D. Walking of patients to transport unit or stretcher

As a general rule, transportation is expected when 911 is summoned. With this in mind, patients should not walk/be assisted to the transporting unit or stretcher (any further than absolutely necessary). Certain exceptions may apply such as the patient meeting unit at roadside, mass casualty incidents with walking wounded and the patient's insistence of walking (must be documented thoroughly). Instances where the patient should never walk include but are not limited to respiratory difficulty or history of such, cardiac event or history, inability or claim of inability and any time at which a patient should not exert themselves.

Common sense plays a large role in these situations, if in doubt, don't walk or exert the patient!

IV. STEMI ALERT:

Upon arrival at the scene, the Paramedic will initiate Initial Medical Care and assess the patient using the following methodology as outlined. Those patients that meet the following criteria will be classified as a STEMI ALERT.

A. Patient presents with one or more ACS signs/symptoms including angina equivalents
   AND
B. ST elevation ≥ 1.0mm in 2 or more contiguous leads
   OR

   ST elevation in V2 and V3 for the following patients:

   - Women with > 1.5 mm of elevation
   - Men >40 with 2mm of elevation
   - Men < 40 with 2.5 mm of elevation

V. CARDIAC ALERT:

Patients presenting with Unstable Angina, Non-STEMI or appearance to Paramedic that could be in a life threatening state will be classified as a CARDIAC ALERT.

12 Lead EKG should be acquired within five (5) minutes or less from patient contact. Scene time should be limited to fifteen (15) minutes or less for STEMI and CARDIAC Alerts unless delayed and delay must be documented on EPCR.

VI. Transportation:

A. For patients who are suspected of having an acute MI as evidenced by Paramedic assessment findings, it is important to make contact with the receiving hospital (on-line medical control) as early as possible with transmission of the 12 lead EKG by telemetry (if available). Additional instructions or orders may include, but are not limited to:
   1. Specific destination at the receiving facility such as catheterization lab, cardiac holding area, etc.
   2. Additional treatments, interventions, or medications.
B. Patients who meet the above STEMI ALERT criteria as determined by the on scene Paramedic will be transported to the nearest PCI center.
   A. If the transporting Paramedic deems the patient too unstable for transport to the nearest PCI center, the patient should be transported to the closest receiving facility.
   B. Aeromedical transport may be utilized provided the following criteria are met:
      a. A Ground transport time is greater than 45 minutes to appropriate receiving facility **and**
      b. Air support response time is less than 30 minutes.

VII. ICE ALERT:

Upon successful Return of Spontaneous Circulation (ROSC), the Paramedic will initiate an ICE ALERT. ROSC patients will be transported to the nearest Hypothermia Center listed in the FEM CLINICAL CARE GUIDELINES. If the nearest Hypothermia Center is unavailable for any reason, the Paramedic should transport the patient to the next closest Hypothermia Center

I. Recognition

All patients that present as a potential acute CVA will be evaluated utilizing the BE-FAST criteria.

II. Confirmation:

Patients found to be positive for any of the BE-FAST criteria within the last 24 hours should be considered for Stroke. If the patient has signs/symptoms of a Subarachnoid Hemorrhage, refer to the SAH PROTOCOL. Perform the LA Motor Scale and notate Score. If indicated, perform the VAN criteria score and add to LAMS score. Identify the time last seen normal, the Rankin score and any exclusion criteria.

Stroke Alert status will be based upon the findings of the FEM Stroke Alert Checklist.

1. **"Possible CVAA with exclusion":** if a patient is excluded by the exclusions criteria checklist, **they are not a Stroke Alert** but will be transported to a Primary Stroke Center.
2. **"Stroke Alert":** if a patient meets the Stroke Alert criteria as set forth by the checklist, the on-scene Paramedic will contact the Communications Center and issue a Stroke Alert.

III. Destination Decision:

A. The on-scene Paramedic will then utilize the Stroke Alert Checklist to determine the closest appropriate receiving facility and method of transportation to that destination. This decision will be made according to the guidelines for transportation that follow:
   1. The patient and family will be informed of the patient's need for specialized care and the facility to which the patient is being transported.
   2. The FEM Stroke Alert Checklist **will be completed and given** to the receiving facility or air transport agency via EPCR.
   3. The treating Paramedic will document on the patient care report his/her findings and justification for transportation to a Stroke Center.

B. When determining appropriate facility, a higher level of care should not be bypassed to transport to a lower level. Comprehensive Stroke Centers can perform Primary Stroke Center care, therefore, if a patient meets the criteria for a Primary Stroke Center and a Comprehensive Stroke Center is closer, the patient will be transported to the comprehensive center.

C. Patients who meet the above STROKE ALERT criteria as determined by the on-scene Paramedic shall be transported to the nearest appropriate Stroke Center.
   A. If the transporting Paramedic deems the patient too unstable for transport to the nearest Stroke Center, the patient should be transported to the closest receiving facility.
   B. All strokes meeting criteria for transport to a Primary Stroke Center should be transported by **GROUND.**
   C. All strokes meeting criteria for transport to a Comprehensive Stroke Center will be transported utilizing the following criteria:

FLY: ONLY if patient is intubated
All others will be ground transported

D. Wake-Up Strokes:

About 20% of all strokes occur during sleep, i.e., without knowledge of exact time of symptom onset. The hypothesis is that wake-up stroke patients most likely have a time of onset of when they wake up with stroke symptoms or within a brief time frame from waking up. (Reminder for assessment questions: Did the patient get up at any point during the night and is it possible to gain a time from that occurrence?)

Wake Up Stroke Transport: all new acute strokes upon awakening from sleep should be transported to the closest Advanced Primary Stroke Center or Comprehensive Stroke Center by ground.

East of Highway 27: Osceola Regional **West of Highway 27: Lakeland Regional Health**

E. Suspected Subarachnoid Hemorrhage

Approximately 15% of all strokes are hemorrhagic. Subarachnoid Hemorrhage strokes are graded on a scale called the Hunt Hess Criteria. This scale rates the symptoms and level of consciousness a patient presents with and classifies them according to survivability. Once you have completed your BEFAST stroke assessment and scored the patient's LAMS, if the patient presents with a LAMS > 3 and three (3) or more SAH symptoms, you will chose you chose your transport destination based upon the Hunt Hess grade. Grades 4 and 5 will go to an Advanced Primary Stroke Center (APSC), Grades 1-3 will go to the closest Comprehensive Stroke Center.

All patients designated as STROKE ALERT should be transported within 15 minutes or less of patient contact time.

The following is a list of Stroke Centers to where Florida Event Medical may routinely ground transport or send via aeromedical transport those patients meeting criteria for Stroke.

Stroke Receiving Centers:

Hospital Name:	Address:	City:
Bartow Regional Medical	Center 2200 Osprey Blvd	Bartow
Lake Wales Medical Center	410 11th St S.	Lake Wales

Primary Stroke Centers:

Hospital Name:	Address:	City:
Heart of Florida Regional Medical Center	40100 US Highway 27	Davenport
Florida Hospital Heartland	4200 Sun n Lake Blvd	Sebring
South Florida Baptist Hospital	301 N. Alexander St	Plant City
Winter Haven Hospital	200 Ave F NE	Winter Haven

Advanced Primary Stroke Centers:

Hospital Name:	Address:	City:
Lakeland Regional Health	1324 Lakeland Hills Blvd	Lakeland

Comprehensive Stroke Centers:

Hospital Name:	Address:	City:
Osceola Regional Medical Center	700 W. Oak St	Kissimmee
St Joseph's Hospital	3001 W. Martin Luther King Blvd	Tampa
Shands Gainesville (UF Health)	1600 SW Archer Rd	Gainesville
Florida Hospital Orlando	601 E. Rollins St	Orlando
Orlando Regional Medical Center	52 W. Underwood St	Orlando
Tampa General Hospital	1 Tampa General Circle	Tampa

II. Adult Trauma Triage Criteria:

Upon arrival at the scene, the crew will initiate Initial Trauma Care and a Primary Survey to assess the patient(s) using the following methodology as outlined in 64J-2.002 Florida Administrative Code. Those patients with anatomical and physiological characteristics of a person sixteen (16) years of age or older that meet the following criteria will be classified as a "trauma alert" patient and will be transported according to Section IV of this TTP.

A. Patient presenting with: any one (1) RED - or any two (2) BLUE criteria below- transport as a trauma alert;
Any two (2) GREY= Ground transport (non-emergency unless deemed necessary, age only counts if injured) to trauma center ("Trauma Grey")

	RED	BLUE	GREY
AIRWAY	ACTIVE AIRWAY ASSISTANCE[1] or RESPIRATORY RATE <10 or >29 BPM		
CIRCULATION	LACK OF RADIAL PULSE or BP <90 mmHg BP<110 IN PATIENT OVER 65 YEARS		
DIASBILITY	GCS < 13 or PRESENCE OF PARALYSIS, or SUSPICION OF SPINAL CORD INJURY or LOSS OF SENSATION	HEAD INJURY WITH LOSS OF CONSCIOUSNESS, AMNESIA or NEW ALTERED MENTAL STATUS	
SOFT TISSUE	SOFT TISSUE 2ND OR 3RD DEGREE BURNS TO 15% or MORE TBSA AMPUTATION PROXIMAL TO THE WRIST or ANKLE ANY PENETRATING INJURY TO HEAD, NECK, or TORSO[3] CHEST WALL INSTABILITY or DEFORMITY (FLAIL CHEST)	SOFT TISSUE LOSS[2] or PENETRATING INJURY TO THE EXTREMITIES DISTAL TO THE ELBOW or DISTAL TO THE KNEE	
LONG BONE FRACTURE/ SKELETAL[4]	FRACTURE OF TWO or MORE LONG BONES[4]	SINGLE LONG BONE FX SITE DUE TO MVC[4]	
AGE		AGE 55 YEARS or OLDER	AGE 55 YEARS or OLDER
MECHANISM OF INJURY	PENETRATING INJURY TO THE EXTREMITY AT or PROXIMAL TO ELBOW or KNEE	EJECTION (PARTIAL or COMPLETE) FROM AUTOMOBILE DEATH IN SAME PASSENGER COMPARTMENT INTRUSION INCLUDING ROOF >12 INCHES OCCUPANT SITE; >18 INCHES ANY SITE INTO THE PASSENGER COMPARTMENT VEHICLE TELEMETRY DATA CONSISTENT WITH HIGH RISK OF INJURY[5] FALL 20 FT or MORE AUTO VS. PEDESTRIAN/BICYCIST THROWN, RUN OVER or WITH IMPACT GREATER THAN 20 MPH MOTORCYCYLE CRASH >20mph PREGNANCY >20wks WITH ABDOMINAL PAIN AND BLUNT TRAUMA	BLUNT HEAD, CHEST, ABDOMINAL, MUSCULAR SKELETAL TRAUMA IN PATIENT ON ANTICOAGULANTS OR BLEEDING DISORDERS BLUNT ABDOMINAL or CHEST TRAUMA IN PATIENT WITH HISTORY OF PARALYSIS (PARAPLEGIA or QUADRIPLEGIA) EITHER ELECTROCUTION or LIGHTNING WITH LOSS OF CONSCIOUSNESS or VISIBLE SIGNS OF INJURY SEATBELT MARK ON TORSO

1. Airway assistance includes manual jaw thrust, continuous suctioning, or use of other adjuncts to assist ventilatory efforts.
2. Crushed, Major de-gloving injuries, mangled extremity or deep flap avulsion (>5in.)
3. Excluding superficial wounds in which the depth of the wound can be determined.
4. Long bone fracture sites are defined as the (1) shaft of the humerus, (2) radius and ulna, (3) femur, (4) tibia and fibula.
5. Vehicle Telemetry Data when available will be relayed to dispatch; the data can assist in predicting potential serious injuries from the data collected at the time of the crash.

B. Paramedic's Judgment: If the patient does not meet any of the criteria listed above and the on scene Paramedic or Paramedic Officer (Lt, BC, etc.) believes the patient may benefit from Trauma Alert criteria due to extenuating circumstances surrounding the incident, the patient may be classified as a "Trauma Alert" and therefore transported according to section IV of this TTP. It shall be documented in the patient care report as required in section 64J-1.014, F.A.C.

III. Pediatric Trauma Triage Criteria:

Upon arrival at the scene, the crew will initiate Initial Trauma Care and a Primary Survey to assess the patient(s) using the following methodology as outlined in 64J-2.005 Florida Administrative Code. Those injured individuals with anatomical and physiological characteristics of a person fifteen (15) years of age or younger that meet the following criteria will be classified as a pediatric trauma alert patient and will be transported according to Section IV of this TTP.

A. Patient presenting with: any one (1) RED - or any two (2) BLUE criteria below- transport as a trauma alert;

Any two (2) GREY= Ground transport (non-emergency unless deemed necessary, age only counts if injured) to trauma center ("Trauma Grey")

	RED	BLUE	GREY
SIZE			WEIGHT ≤ 11 Kg
AIRWAY	ACTIVE AIRWAY ASSISTANCE[1] RESP RATE <20 IN INFANT <1 YR RESP RATE <10 IN CHILDREN 1YR – 15 YR		
CIRCULATION	FAINT or NON-PALPABLE CAROTID or FEMORAL PULSE or SBP <50 mmHg	CAROTID or FEMORAL PULSES PALPABLE, BUT THE RADIAL or PEDAL NOT PALPABLE or SBP <90 mmHg	
DIASBILITY	ALTERED MENTAL STATUS[2] or PRESENCE OF PARALYSIS or SUSPICION OF SPINAL CORD INJURY or LOSS OF SENSATION	AMNESIA or LOSS OF CONSCIOUSNESS	SUSPECTED DEPRESSED SKULL FRACTURE
SOFT TISSUE	MAJOR SOFT TISSUE DISRUPTION[3] or MAJOR FLAP AVULSION[3] 2° OR 3° BURNS TO ≥10% TBSA AMPUTATION PROXIMAL TO THE WRIST or ANKLE MAJOR DE-GLOVING INJURY[3]		
LONG BONE FRACTURE/ SKELETAL[4]	DISLOCATION(S), or MULTIPLE FRACTURE SITES[5]	SINGLE LONG BONE FRACTURE SITE[5]	SUSPECTED UNSTABLE PELVIC FRACTURE
MECHANISM OF INJURY	ANY PENETRATING INJURY TO HEAD, NECK, OR TORSO[4] PENETRATING INJURY TO THE EXTREMITY AT or PROXIMAL TO ELBOW or KNEE	EJECTION (PARTIAL or COMPLETE) FROM AUTOMOBILE DEATH IN SAME PASSENGER COMPARTMENT INTRUSION INCLUDING ROOF >12 INCHES OCCUPANT SITE; >18 INCHES ANY SITE INTO THE PASSENGER COMPARTMENT VEHICLE TELEMETRY DATA CONSISTENT WITH HIGH RISK OF INJURY[6] FALL 10 FT or 2-3 TIMES THE HEIGHT OF THE CHILD AUTO VS. PEDESTRIAN/BICYCIST THROWN, RUN OVER or WITH IMPACT GREATER THAN 20 MPH	BLUNT HEAD, CHEST, ABDOMINAL, MUSCULAR SKELETAL TRAUMA IN PATIENT ON ANTICOAGULANTS OR BLEEDING DISORDERS BLUNT ABDOMINAL or CHEST TRAUMA IN PATIENT WITH HISTORY OF PARALYSIS (PARAPLEGIA or QUADRIPLEGIA) EITHER ELECTROCUTION or LIGHTNING WITH LOSS OF CONSCIOUSNESS or VISIBLE SIGNS OF INJURY SEATBELT MARK ON TORSO

1. Airway assistance includes manual jaw thrust, continuous suctioning, or use of other adjuncts to assist ventilatory efforts.
2. Altered mental status include drowsiness, lethargy, inability to follow commands, unresponsiveness to voice, totally unresponsiveness.
3. Crushed, Major de-gloving injuries, mangled extremity or deep flap avulsion (>5in.)
4. Excluding superficial wounds in which the depth of the wound can be determined.
5. Long bone fracture sites are defined as the (1) shaft of the humerus, (2) radius and ulna, (3) femur, (4) tibia and fibula. Long bone fractures do not include isolated wrist or ankle fractured or dislocations.
6. Vehicle Telemetry Data when available will be relayed to dispatch; the data can assist in predicting potential serious injuries from the data collected at the time of the crash.

C. Paramedic's Judgment: If the patient does not meet any of the criteria listed above and the on scene Paramedic or Paramedic Officer (Lt, BC, etc.) believes the patient may benefit from Trauma Alert criteria due to extenuating circumstances surrounding the incident, the patient may be classified as a "Trauma Alert" and therefore transported according to section IV of this TTP. It shall be documented in the patient care report as required in section 64J-1.014, F.A.C.

I. ENROUTE

While you are responding to the scene, you should prepare yourself mentally for what you may find. Perhaps you've been to the same location before. Where might additional resources come from? How long may they take to arrive?

II. INITIAL ASSESSMENT

The first thing is to stay calm and get an overview of the scene. This initial size-up will give you an impression of the situation, including the potential number of patients, and possibly the mechanism and severity of their injury. This "size-up" may clue you as to additional resources that may be needed.

III. INITIAL REPORT As you prepare to give the first initial report, use clear and concise information. The key points to communicate are:

A. Location of the incident
B. Type of incident
C. Any hazards
D. Approximate number of victims
E. Type of additional resources needed

IV. SORTING THE PATIENTS

A. It is important not to become involved with the treatment of the first or second patient you initially encounter on scene. Your job is to triage each and every patient as quickly as possible. Each patient should receive a rapid assessment and assigned to broad categories based on their need for treatment.
B. During triage, you will only correct airway and severe bleeding problems. Further treatment will be performed in the treatment area.
C. Patients are sorted into 4 categories and color classifications:

1. **IMMEDIATE** (Red): Those patients who at risk for early death who need urgent treatment and transport.
2. **DELAYED** (Yellow):
3. **MINOR** (Green): walking wounded identified by verbal instructions
4. **DEAD** (Black):

V. THE S.T.A.R.T. SYSTEM- Simple Triage and Rapid Treatment

This system is based upon 3 observations: R.P.M. defined as RESPIRATIONS, PERFUSION and MENTAL STATUS.

A. RESPIRATIONS- If the patient is breathing, you need to determine the respiratory rate. Patients with respiratory rates greater than 30 per minute are triaged as "IMMEDIATE". These patients are showing one of the signs of shock and need immediate care. If the patient is breathing less than 30 times per minute, move on to step # 2. If the patient is not breathing, quickly clear the mouth of foreign matter. Use a head tilt or jaw-thrust (as applicable) to open the airway (You may have to initially ignore cervical spine guidelines when opening the airway in a triage process. This is the only time in emergency care when there may not be time to properly stabilize every injured patient's spine). If the patient begins to breathe, they are categorized as "IMMEDIATE". If they don't spontaneously begin to breathe, the patient should be categorized as "DEAD".

B. **PERFUSION**- The best field method for checking circulation and distal perfusion is to check the patient's radial pulse. If the radial pulse is absent, weak or irregular, the patient is categorized as "IMMEDIATE".

C. **MENTAL STATUS**- The last part of the initial triage tests is to assess the patient's mental status. This assessment is done on patients who have adequate breathing and circulation. Test the patient's mental status by having the patient follow a simple command such as "open your eyes", "close your eyes", or "squeeze my hand". Patients who can follow these simple commands are tagged as "DELAYED". A patient who is unresponsive or cannot follow these simple commands is categorized as "IMMEDIATE".

The S.T.A.R.T. system is designed to assist rescuers to find the most seriously injured. The initial triage should take 30 seconds or less. As more rescuers arrive on scene, the remaining patients will be re-triaged for further evaluation, treatment, stabilization, and transportation. A patient may be re-triaged multiple times during the course of the incident. When resources are limited or the number of injured patients is greater than the number of rescue personnel (patient to Paramedic ratio), the Paramedic must focus treatment and stabilization efforts on the "IMMEDIATE" patient and assign supportive personnel to care for the "DELAYED" patients. In the event of more than one "IMMEDIATE" patient, the initial rescuer must choose the most viable of the "IMMEDIATE" patients to focus their care efforts. Other patients can be cared for by assisting personnel until additional resources arrive. If circumstances permit, the other patients can be moved to a central location by which the Paramedic can monitor care efforts, so long as it doesn't interfere with care of the primary "IMMEDIATE" patient selected.

SECTION TWO

PROTOCOLS

I. GENERAL

A. Assess and secure scene safety
B. Use universal blood and body substance precautions while treating all patients
C. Identify and treat immediate life threats per specific PROTOCOLS
D. Attempt to limit on-scene time to 10 minutes
E. Apply INITIAL TRAUMA CARE as applicable

II. INITIAL ASSESSMENT

A. General Impression of the patient's condition including severity of distress
B. Determine Responsiveness/Level of Consciousness (LOC)1
    1. 1.A-Alert
    2. 2.V-Verbal
    3. 3.P-Painful
    4. 4.U-Unresponsive
C. The ABCDE
    1. CARDIAC ARREST: if patient is found in arrest, initiate CPR and place cardiac monitor's combo/defibrillation pads on patient and perform a "quick look". Defibrillate as applicable. Apply mechanical chest compression device (if available).
    2. AIRWAY/C-SPINE: establish and maintain airway. Utilize cervical spine precautions when indicated. If unable to secure airway by other means and airway is not patent, perform Cricothyrotomy- refer to FOREIGN BODY AIRWAY OBSTRUCTION PROTOCOLS for specifics.
    3. BREATHING: Check for inadequate breath sounds, JVD, tracheal deviation, and the use of accessory muscles for respirations.
        a. Administer the appropriate dosage and route of supplemental O2 as necessary to alleviate the patient's chief complaint, keep O2 sats >94% (unless specifically notated otherwise) and keep the patient's skin condition pink, warm, and dry. All ALS patients will have pulse oximetry monitored and documented X2.

        b. If indicated by ineffective breathing patter/impaired gas-exchange, assist ventilation, provide an airway and suction as necessary. Following intubation, confirm proper tube placement by auscultating the gastric area and the lungs bilaterally, and noting positive waveform on EtCo2 reading. Following application required documentation includes notation of positive waveform on EtCo2 reading in narrative and numerical value X2 in vitals chart of PCR.

        c. If indicated by ineffective breathing pattern/impaired gas-exchange, provide NASAL CAPNOGRAPHY for specific protocols. Following application required documentation includes notation of positive waveform on EtCo2 reading and numerical value X2 in vitals chart of PCR.

    4. CIRCULATION: evaluate peripheral pulses for presence, quality and equality. CPR as indicated. Treat severe external hemorrhage with direct pressure.
        a. ADEQUATE PERFUSION: Establish IV of Normal Saline with macro-drip tubing at KVO or IV Lock system as indicated by patient condition. Micro-drip tubing shall be used for IV infusions for pediatric patients. Attempt X2 unless situation demands further repeated attempts. Failure to obtain IV access does not preclude the intervention of other definitive therapy.

Cardiac Arrest: If IV access is apparent, one IV attempt is acceptable, otherwise initiate humeral IO.

b. INADEQUATE PERFUSION: Refer to SHOCK PROTOCOLS

5. DISABILITY: Assess distal PMS impairment
   a. P-Pulse
   b. M-Motor
   c. S-Sensory
6. EXPOSE: Remove clothing as applicable to assess for hidden illnesses or injuries while protecting patient's modesty.

III. ORIENTATION

A. 4/4- Person, Place, Time and Event
B. 3/4 – Indicates 1 faculty absent
C. 2/4- Indicates 2 faculties absent
D. 3/4- Indicates 3 faculties absent
E. 0/4- Indicates all faculties absent

(1) An Altered Mental Status (AMS) is defined as an alteration in either the patient's LOC or orientation.

IV. FOCUSED AND DETAILED HISTORY AND PHYSICAL EXAM

A. History of present illness or injury
B. Past medical history, drugs, and allergies
C. Systematic head-to-toe assessment

V. PERFORM INITIAL MEDICAL CARE SIMULTAENOUSLY WITH THERAPIES

A. Place patient in position of comfort if not contraindicated
B. Paramedic should decide within three (3) minutes after patient contact whether the patient requires ALS
C. Once a medication route has been established, administer medication as indicated per PROTOCOLS (e.g., IO vs IV, IM or IN)
D. Use the cardiac monitor to observe rhythm. Confirm assessment in another lead if necessary to correctly identify rhythm. Record strips every 5 minutes (unstable) to 15 minutes (stable), and to document intervention necessities and outcome. Perform a 12 lead EKG on all patients with suspected cardiac or respiratory problems including associated complaints of syncope, near syncope or general weakness.
E. Assess vital signs and patient condition every 5 minutes (unstable) to 15 minutes (stable) and before and after medication administrations.

If there is no response to the appropriate treatment, consider contacting Medical Control.

- **GENERAL**
  A. Assess and secure scene safety
  B. Use universal blood and body substance precautions while treating all patients
  C. Identify and treat immediate life threats per specific PROTOCOLS
  D. Refer to TRIAGE SYSTEM ADMINISTRATIVE POLICY for multiple patients and injuries.
  E. Identify and treat immediate life threats per specific PROTOCOL
  F. Initiate Trauma Alert if applicable
  G. Attempt to limit on-scene time to 10 minutes
  H. Apply INITIAL MEDICAL CARE as applicable
- **INITIAL ASSESSMENT**
  A. General Impression of the patient's condition including severity of distress
  B. Determine Responsiveness/Level of Consciousness (LOC)1
    1. A-Alert
    2. 2.V-Verbal
    3. 3.P-Painful
    4. 4.U-Unresponsive
  C. The ABCDE
    1. CARDIAC ARREST: if patient is found in arrest, initiate CPR and place cardiac monitor's combo/defibrillation pads on patient and perform a "quick look". Defibrillate as applicable. **IF trauma patient deteriorates into cardiac arrest that is witnessed by EMS personnel:** 1- Start CPR or apply mechanical chest compression device (if available). 2- Perform bilateral needle decompression of chest cavity and intubate. 3-transport all traumatic cardiac arrest patient's to closest IR or terminate efforts upon EKG of Asystole and Capnography <10 for greater than 20 minutes.
    2. AIRWAY/C-SPINE: establish and maintain airway. Utilize cervical spine precautions when indicated. If unable to secure airway by other means and airway is not patent, perform Cricothyrotomy- refer to FOREIGN BODY AIRWAY OBSTRUCTION PROTOCOLS for specifics.
    3. BREATHING: Check for inadequate breath sounds, JVD, tracheal deviation, and the use of accessory muscles for respirations. Assess for tension pneumothorax and treat as per PLEURAL DECOMPRESSION PROCEDURE.
      a. Administer the appropriate dosage and route of supplemental O2 as necessary to alleviate the patient's chief complaint, keep O2 sats >94%(unless specifically notated otherwise) and keep the patient's skin condition pink, warm, and dry. All ALS patients will have pulse oximetry monitored and documented X2.
      b. If indicated by ineffective breathing patter/impaired gas-exchange, assist ventilation, provide an airway and suction as necessary. Following intubation, confirm proper tube placement by auscultating the gastric area and the lungs bilaterally, and noting positive waveform on EtCo2 reading. Following application required documentation includes notation of positive waveform on EtCo2 reading in narrative and numerical value X2 in vitals chart of PCR.

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  E. 0/4- Indicates all faculties absent
  [1]An Altered Mental Status (AMS) is defined as an alteration in either the patient's LOC or orientation.

- **FOCUSED AND DETAILED HISTORY AND PHYSICAL EXAM**
  A. History of present illness or injury
  B. Past medical history, drugs, and allergies
  C. Systematic head-to-toe assessment
- **PERFORM TRAUMA CARE SIMULTAENOUSLY WITH THERAPIES**
  A. Place patient in position of comfort if not contraindicated
  B. Paramedic should decide within three (3) minutes after patient contact whether the patient requires ALS
  C. Once a medication route has been established, administer medication as indicated per PROTOCOLS (e.g. IO vs. IV, IM or IN)
  D. Use the cardiac monitor to observe rhythm. Confirm assessment in another lead if necessary to correctly identify rhythm. Record strips every 5 minutes (unstable) to 15 minutes (stable), and to document intervention necessities and outcome. Perform a 12 lead EKG on all patients with suspected cardiac or respiratory problems, including associated complaints of syncope, near syncope or general weakness.
  E. Assess vital signs and patient condition every 5 minutes (unstable) to 15 minutes (stable) and before and after medication administrations.

If there is no response to the appropriate treatment, consider contacting Medical Control.

Acute Coronary Syndrome

Items in this color and/or notated with an 'E' are Basic Level E	Items in this color and/or notated with a 'P' are Paramedic Level P	The items in this color and/or notated with an 'I' are Information I
Items in this color and/or notates with a 'C' refer to appropriate protocol C	Items in this color and/or notated with a 'D' are Decisions D	Items in this color and/or notated with an 'M' require a Physician's Order M
	Items in this color and/or notated with an 'CCT' are CCT Level CCT	

Acute Coronary Syndrome – Pearls

- **Currently the AHA recognizes 1 mm of ST elevation in 2 or more contiguous leads as a STEMI.**
- **Depression of ½ mm or dynamic T- wave inversion with pain or discomfort is significant for ischemia.**
- **According to the 2015 AHA Guidelines you should consider a STEMI for ST Elevation in V2 & V3 for the following patients:**
    - **Women with > 1.5 mm of elevation**
    - **Men > 40 with 2 mm of elevation**
    - **Men ≥ 40 with 2.5 mm of elevation**

- If ST elevation in inferior leads (II, III, aVF) obtain V4R. If ST depression in early V leads (V1-V3) obtain V7-V9. Triage EKG into one of the three following categories. Remember to document this in EPCR.
    - **<u>Non-diagnostic</u> – No ST abnormalities.**
    - **<u>Suspicious for Ischemia</u> – ST depression (without elevation). If patient has ST depression in 2 or more contiguous leads**
    - **<u>Suspicious for injury</u> – ST elevation. If patient has ST elevation in 2 or more contiguous leads**

<u>2015 AHA guideline on Supplemental Oxygen in ACS</u>
EMS providers should administer oxygen if the Pt is dyspneic, hypoxemic, has obvious signs of heart failure, or has an SP02 saturation of < 90%. Providers should titrate oxygen therapy to an SP02 saturation of > 90% with an end point not to exceed 95% to avoid oxygen toxicity and coronary vasoconstriction.

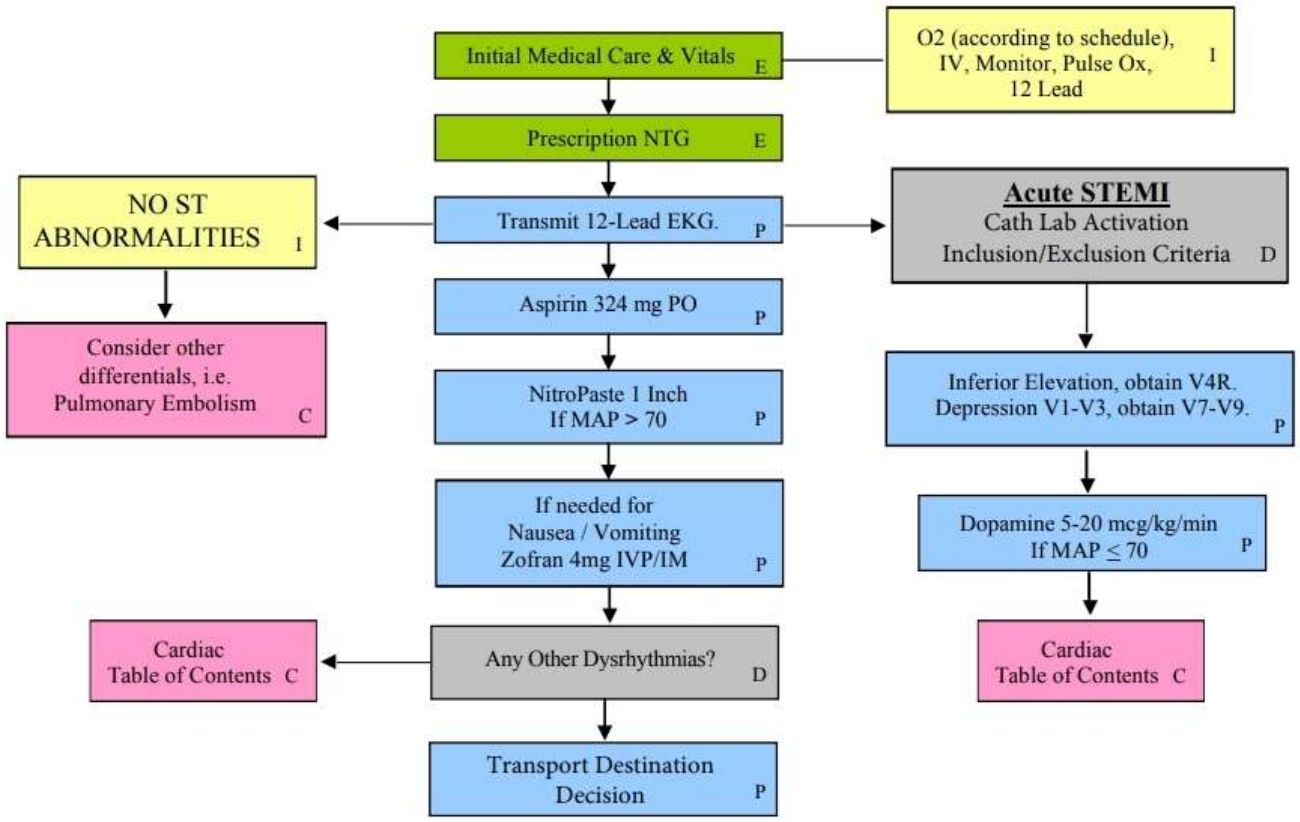
Because its usefulness has not been established in normoxic Pt's with suspected or confirmed ACS, providers may consider withholding supplemental oxygen therapy in these Pt's.

ALL 12 leads should be completed within the first five minutes of patient contact unless circumstances prevent attainment!!

- Withhold **ASA** if patient self administered 324 mg or more ASA in last 8 hours.
- EMTs may assist with the patient's ASA.
- Do not administer **NTG** if the patient has taken: Viagra, Levitra, Stendra, Staxyn, Addyi, or Cialis within the last 24 hours. Remember that although not typically prescribed to women they may have handled the medication, use caution.
- NitroPaste: 1 inch=14mg or Nitrostat .4mg
- **NTG: Use caution in patients with possible Right Ventricular Infarct**
- **ZOFRAN** may be given IM (undiluted) in absence of an IV.

Acute Coronary Syndrome

History:	Signs and Symptoms	Differential:
• Age • Medications • Viagra, Levitra, Cialis • Past Medical history • Allergies • Recent physical exertion • Onset • Palliation / Provocation • Quantity (crampy, constant, sharp, dull, etc.) • Region / Radiation / Referred • Severity (0-10) • Time (duration, repetition)	• Chest Pain (pressure, aching, vice-like tightness, discomfort) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting • Weakness • Syncope/Near Syncope • Dizziness	• Trauma vs. Medical • Angina vs. Myocardial Infarction • Pericarditis • Pulmonary embolism • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or Hiatal hernia • Esophageal Spasm • Chest wall injury or pain • Pleural pain • Overdose (Cocaine) • Anginal equivalents



Asystole/PEA

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Asystole/PEA PEARLS

- Correctable causes should be considered, ruled out or treated accordingly in all cases of cardiac arrest.
- Epinephrine 1:1000: 1mg/cc mixed in 10cc syringe with 9cc NS can be used as an alternative to 1 mg Epinephrine 1:10,000.
- Consider administration of Narcan only in situations in which narcotic or mixed drug overdose is present or suspected (i.e., constricted pupils, paraphernalia, reported or noted signs of substance abuse.
- DO NOT administer Narcan to patients who are intubated or have iGel airway management in place unless the patient is hemodynamically unstable and known or suspected to be suffering from a narcotic overdose.
- **In dialysis patients, or patients with known renal failure and suspected hyperkalemia, administer 50meq Sodium Bicarb and 2mg/kg Calcium Chloride. Be sure to flush line between medications, Sodium Bicarb and Calcium precipitate in line when mixed!!**
- iGel supraglottic airway is a higher priority in an Asystole/PEA cardiac arrest.
- 12 French Orogastric tubes or soft suction shall be utilized in iGel in cardiac arrest patients to assist in the decompression of the abdomen.

Cardiac Arrest Management

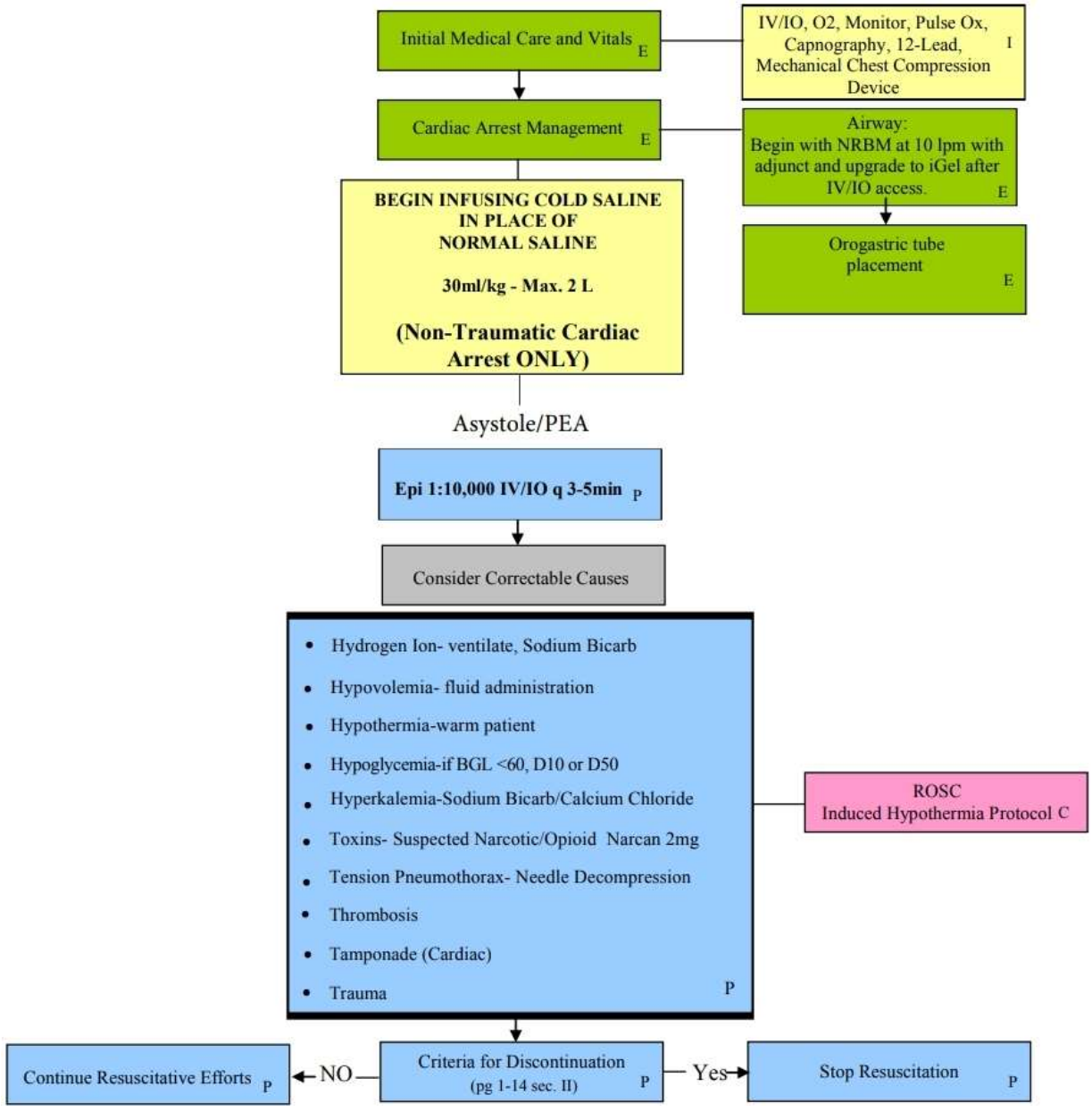
ALL CARDIAC ARREST PTS SHOULD BE WORKED ON SCENE A MINIMUM OF 10 MIN PRIOR TO TRANSPORT

- If arrest is > 4 min, complete one cycle (2 min) of CPR prior to assessing rhythm. The pt is most likely in the circulatory phase of arrest and will respond better to treatments once blood is circulated.
- If arrest is ≤ 4 min or witnessed by rescuer, assess rhythm prior to CPR and defibrillate (200J) if pt is in shockable rhythm.
- Compressions should be delivered at a rate of 120 per min and at a depth of at least 2 inches.
- If vascular access is apparent, one IV attempt is acceptable, otherwise initiate humeral IO.
- Reassess rhythm every 2 minutes. Remember that the rescuer performing compressions should be rotated every 4 minutes and compressions should never stop for more than 10 seconds.

Asystole / PEA
After IV/IO access has been obtained and first round of Epi administered, place iGel without interrupting chest compressions and begin delivery of asynchronous ventilations 1 breath every 10 seconds after confirming placement.
Administer Epinephrine every 3-5 minutes while these rhythms persist.
Consider all correctable causes, ruling out or treating accordingly.

Asystole/PEA

History:	Signs and Symptoms:	Differential:
• Past medical history • Medications • Events leading to arrest • End stage renal disease • Estimated downtime • Suspected hypothermia • Suspected overdose • DNR	• Pulseless • Apneic • No auscultated heart tones	• Medical or Trauma • Hypoxia • Potassium (hypo/hyper) • Drug overdose • Acidosis • Hypothermia • Device (lead) error • Death



Bradycardia

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Bradycardia – Pearls

- **TCP** should be administered when HR < 40bpm and patient is unstable
- Refer to Transcutaneous Pacing Procedure Guideline for procedure steps

- **ATROPINE** could be administered when HR < 40bpm and patient unstable if no abnormal ST segment abnormalities.
    - Use shorter dosing intervals (3 minutes) and higher doses of ATROPINE in severe clinical conditions, especially with Organophosphate Poisoning where 2 to 4 mg doses may be required.
- **Do not administer ATROPINE** to Pt's with 2nd degree type II or 3rd degree heart blocks.
- **ATROPINE** administration should not delay treatment of unstable Pt's that need TCP.
- **ATROPINE should not be administered** to Pt's with ST segment abnormalities **(ST segment depression)** or **Myocardial Infarction (STEMI).**

- **DOPAMINE:** Increase in 5 mcg/kg/min increments q 5minutes until you reach a MAP of 70 or greater. Max dose (20mcg/kg/min)

(2x Diastolic) + Systolic / 3 = MAP (MAP can also be found next to the BP on the MRX monitor)

Dopamine drip: 400mg in 250ml D5W: 1600mcg/ml solution.

Weight (kg)	5mcg/kg/min	10mcg/kg/min	15mcg/kg/min	20mcg/kg/min
40	8	15	23	30
50	9	19	28	38
60	11	23	34	45
70	11	26	39	53
80	15	30	45	60
90	17	34	51	68
100	19	38	56	75
110	21	41	62	83
120	23	45	68	90

IF MAX DOSE OF DOPAMINE REACHED AND MAP STILL <70mmHg

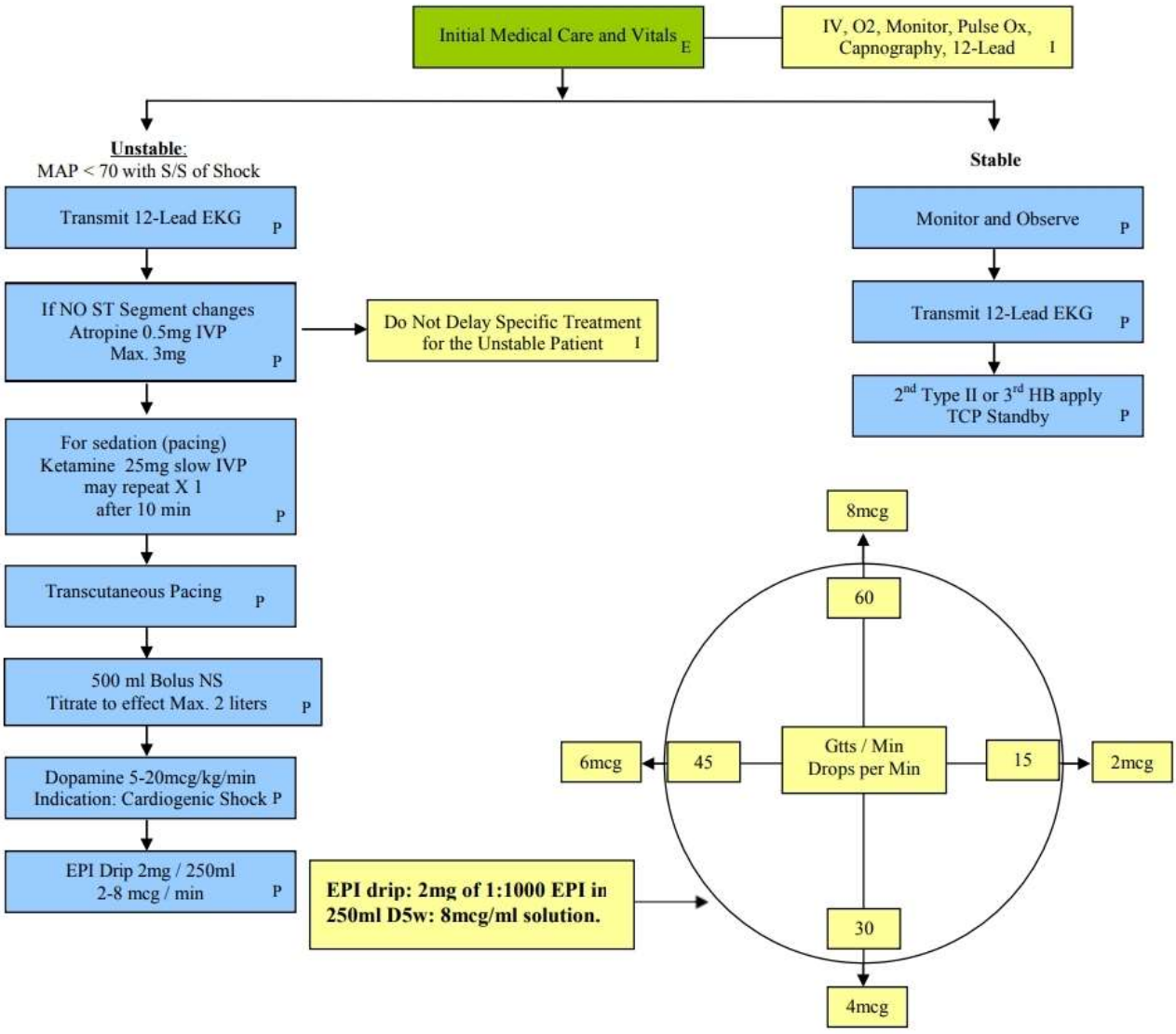
- **EPI Drip:** Initial dose 2mcg/min; increase by increments of 2mcg Q5 minutes to max dose of 8mcg/min.

EPI drip: 2mg of 1:1000 EPI in 250ml D5w: 8mcg/ml solution.

15 drips per min	1 drip per 4 seconds	2 mcg
30 drips per min	1 drip per 2 seconds	4 mcg
45 drips per min	3 drips per 4 seconds	6 mcg
60 drips per min	1 drip per second	8 mcg

Bradycardia

History:	Signs and Symptoms	Differential:
• Medical history • Medications • Beta blockers (Toprol, Atenolol) • Calcium channel blockers (Verapamil, Calan) • Clonidine • Digitalis • Pacemaker	• Heart rate < 40 • Chest pain • Respiratory distress • Hypotensive or shock • Altered mental status • Syncope	• Acute MI • Hypoxia • Hypothermia • Sinus Bradycardia • Athletes • Head injury (elevated ICP or stroke) • Spinal cord lesion • Sick sinus syndrome • AV blocks (1°, 2°, 3°) • Overdose



Induced Hypothermia

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Induced Hypothermia – Pearls

- Criteria for Induced Hypothermia:
  - Age greater than 18
  - Patient has an advanced airway in place and remains comatose (no purposeful response to pain)
  - Non-Traumatic Cardiac Arrest
- Exclusion Criteria for Induce Hypothermia:
  - Trauma Cardiac Arrest
  - Awake and responsive to verbal commands after cardiac arrest (D/C cold fluids)

- **BEGIN COOLING PATIENTS WITH COLD SALINE IMMEDIATELY!**

- If patient meets criteria for induced hypothermia and does not have an advanced airway in place, then place either an ET Tube or Supraglottic Airway according to protocol.

- When exposing patient for purpose of cooling undergarments may remain in place. Be mindful of your environment and take steps to preserve the patient's modesty.

- Do not delay transport for the purpose of cooling.
- Reassess airway frequently and with every patient move.
- Patients develop metabolic alkalosis with cooling. Do not hyperventilate.
- **GOAL is to drop body temperature 1 degree C.** Survival rates drop 29% each hour of delay in cooling.
- **DOPAMINE:** Increase in 5 mcg/kg/min increments q 5minutes until you reach a MAP of 70 or greater.

$$\frac{(2 \times \text{Diastolic}) + \text{Systolic}}{3} = \text{MAP}$$

(MAP can also be found next to the BP on the MRX monitor)

DOPAMINE MAXIMUM 20 mcg/kg/min.

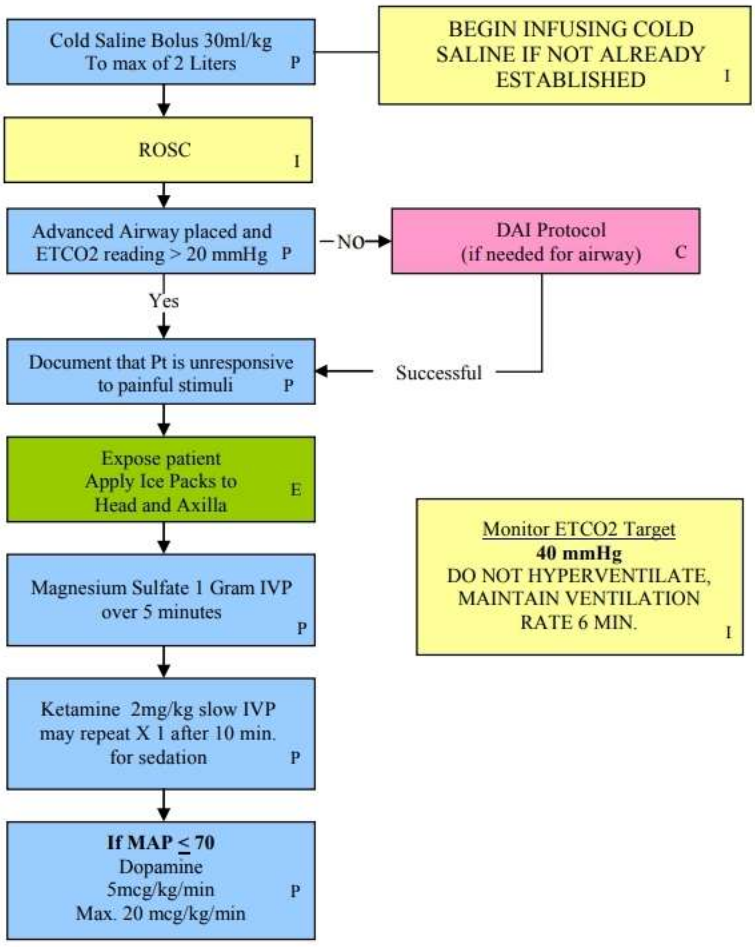
Hospitals That Are Continuing Induced Hypothermia

Hospital Name:	Address	City:
Heart of Florida Regional Medical Center	40100 US Highway 27	Davenport
Florida Hospital Orlando	601 East Rollins St.	Orlando
Lakeland Regional Health	1324 Lakeland Hills Blvd.	Lakeland
Lake Wales Regional Medical Center	410 11th St. S.	Lake Wales
Orlando Regional Medical Center	1414 South Kuhl Ave.	Orlando
Osceola Regional Medical Center	700 W. Oak St.	Kissimmee
South Lake Hospital	1900 Don Wickham Dr.	Clermont
Winter Haven Hospital	200 Ave F NE	Winter Haven

Induced Hypothermia

History:	Signs and symptoms:	Differential:
• Non-Traumatic Cardiac Arrest • Over 18 years of age	• Return of Pulse • Remains unresponsive after ROSC	• Continue to address specific differentials associated with the original dysrhythmia

Celsius	Fahrenheit
42	107.6
41	105.8
40	104
39	102.2
38	100.4
37	98.6
36	96.8
35	95
34	93.2
33	91.4
32	89.6
31	87.8
30	86
29	84.2
28	82.4



Narrow Complex Tachycardia

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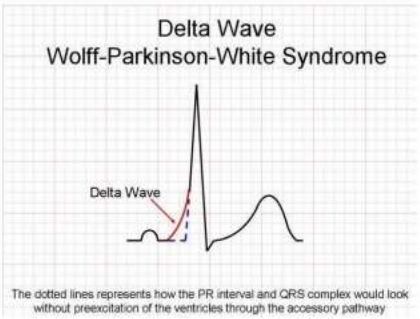
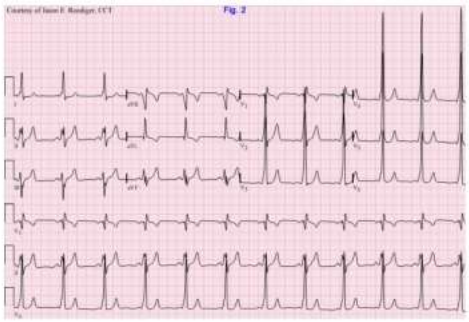
Narrow Complex Tachycardia – Pearls

- If rhythm does not convert with one or more doses of ADENOSINE, reconfirm rhythm and consider alternate treatment.
- **NOTE: ONLY** administer two doses of **ADENOSINE (6mg followed by only one dose of 12mg)**
- **ADENOSINE** administration or **VAGAL** attempts.
  - **EXAMPLE: Rapid rhythm slows momentarily with ADENOSINE administration then speeds up again and noted to be irregular. CARDIZEM may be used in this situation as long as MAP > 70.**
  - **DO NOT USE CARDIZEM** if rate and/or rhythm does not change with VAGAL attempts, ADENOSINE or if DELTA WAVES are noted. This may indicate accessory pathway issues (i.e. Wolfe Parkinson White).

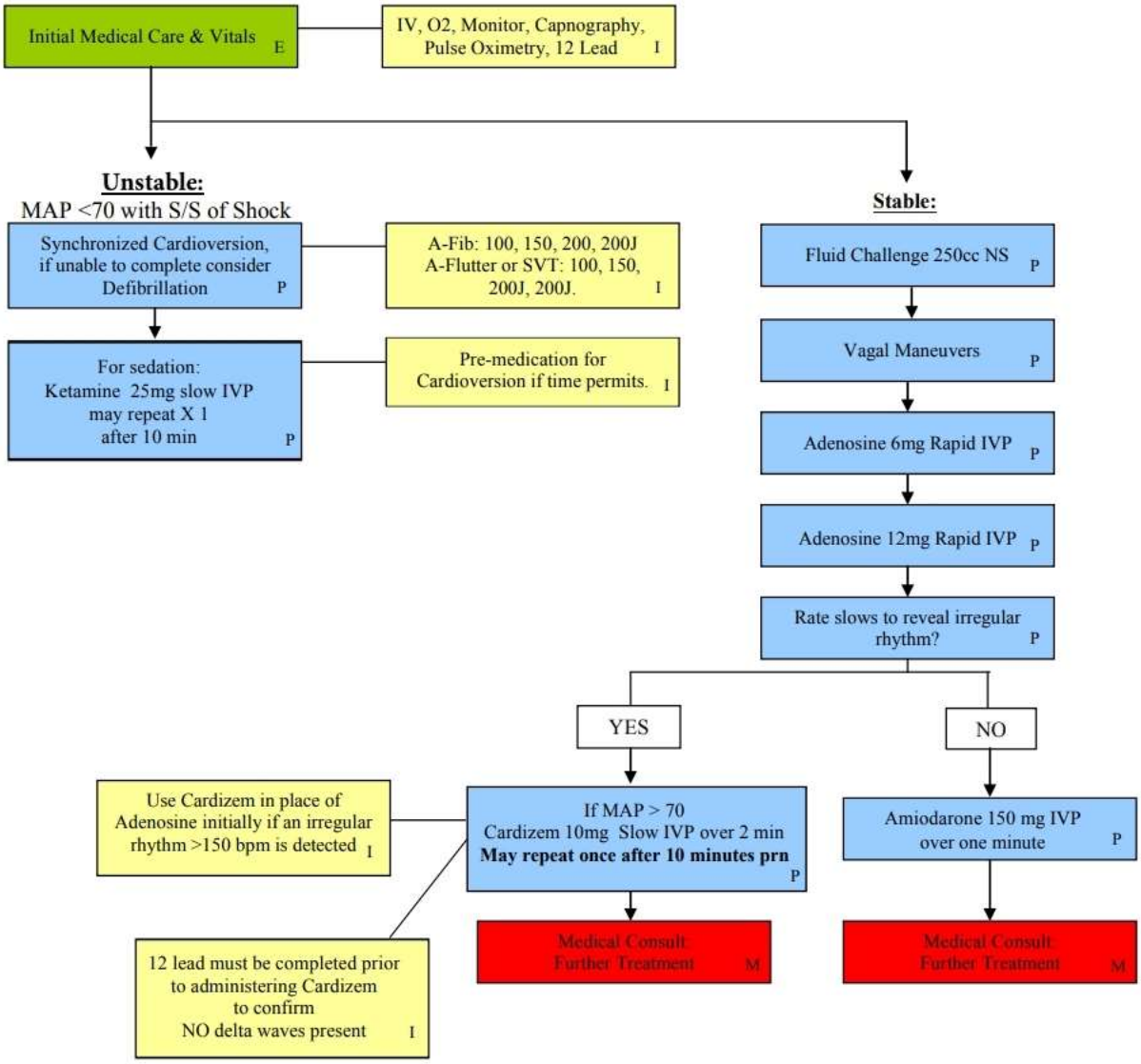




- **CARDIZEM** should be administered when there is a recognized change in the rhythm (to irregular i.e. A-FIB)
- **CARDIZEM** should be the primary drug administered when an irregular rhythm is detected initially (A-Fib RVR >150)
- **CARDIZEM** is contraindicated when MAP < 70
- **CARDIZEM slow IVP over 2 minutes**
- Consider pre-medication to achieve sedation for synchronized cardioversion
- If rhythm does not convert, escalate energy level for subsequent SYNCHRONIZED CARDIOVERSION:
  - Atrial Fibrillation: Start at 100J, 150J, 200J, 200J.
  - SVT and Atrial Flutter: Start at 100J, 150J, 200J, 200J.
- If unable to complete synchronization, proceed immediately to unsynchronized shocks, i.e. defibrillation with above escalating shock/joule setting.

Narrow Complex Tachycardias

History:	Signs and Symptoms:	Differential:
• Medications (Aminophylline, Diet pills, Thyroid, decongestants, Digoxin) • Diet (Caffeine, Chocolate) • Drugs (Nicotine, Cocaine) • Medical History • History of Palpitations / heart racing • Syncope / Near Syncope	• HR > 150 • QRS < 0.12 sec • Dizziness, C/P, Dyspnea • Potential presenting rhythm • Sinus Tachycardia • Atrial Fib / Flutter • Multifocal Atrial Tachycardia	• Heart disease (WPW, Valvular) • Sick Sinus Syndrome • Myocardial Infarction • Electrolyte Imbalance • Exertion, Pain, Stress • Fever • Hypoxia • Hypovolemia or Anemia • Drug effect • Hyperthyroidism • Pulmonary Embolus



Traumatic Cardiac Arrest

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Traumatic Cardiac Arrest – Pearls

- **Traumatic Cardiac arrest is considered any traumatic injury patient who deteriorates into cardiac arrest witnessed by EMS personnel**
- If using an AED, follow the manufacturer's prompts for cardiac arrest management
- **EPINEPHRINE 1:1,000**: 1mg/cc mixed in 10cc syringe with 9cc NS can be used as an alternative to 1mg of Epinephrine 1:10,000.
- In crush injury patients with impingement greater than 45 minutes, administer 50meq Sodium Bicarb and 1 gram Calcium Chloride (Calcium Chloride in this situation will be a drip, place 1gram in 50mL D5W with microdrip set, wide open for infusion over 10 minutes). FLUSH LINE between medications, Bicarb and Calcium form precipitates in line when mixed!!!
- Begin with passive oxygenation, upgrade to advanced airway after first round of Epinephrine

- IV drugs should be followed with an immediate 10ml bolus of cold NS and raising the arm for 15-20 seconds.
- 12 French Orogastric tubes or soft suction shall be utilized with iGel in cardiac arrest patients to assist in the decompression of the abdomen

Cardiac Arrest Management

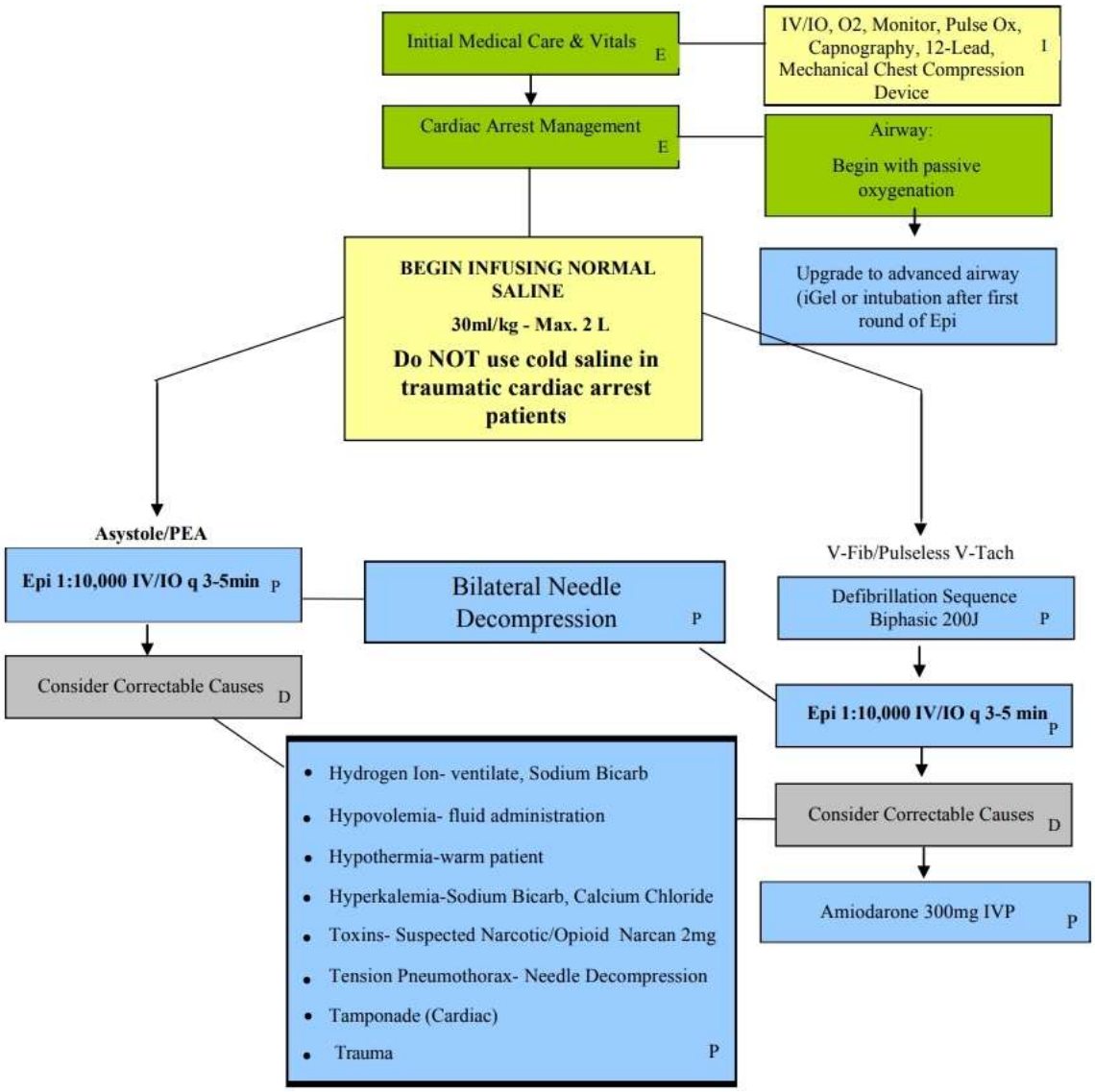
ALL CARDIAC ARREST PT'S SHOULD BE WORKED ON SCENE A MINIUMUM OF 10 MIN PRIOR TO TRANSPORT

- If arrest is > 4 min complete one cycle (2 min) of CPR prior to assessing rhythm. The Pt is most likely in the circulatory phase of arrest and will respond better to treatments once blood is circulated.
- If arrest is ≤ 4 min or witnessed by rescuer, assess rhythm prior to CPR and defibrillate (200J) if Pt is in shockable rhythm.
- Airway management for all cardiac arrest Pt's should begin with passive oxygen delivered via NRBM at 10 lpm with a nasal or oral adjunct.
- Compressions should be delivered at a rate of 120 per min and at a depth of at least 2 inches.
- If vascular access is apparent, one IV attempt is acceptable, otherwise initiate humeral IO.
- Reassess rhythm every 2 minutes. Remember that the rescuer performing compressions should be rotated every 4 minutes, and compressions should never stop for more than 10 seconds.

Traumatic Cardiac Arrest
After IV/IO access has been obtained and first round of Epinephrine administered, place advanced airway (iGel or ETT) and continue CPR with asynchronous ventilation at a rate of 1 breath every 10 seconds with ETCO2 between 40-50.
Perform bilateral needle decompression
Continue with Epinephrine 1:10000 every 3-5 minutes
Consider all other causes (Hs and Ts) and treat accordingly. (i.e. fluid, Sodium Bicarb, etc.)

Traumatic Cardiac Arrest

History:	Signs and Symptoms:	Differential:
• Past medical history • Medications • Events leading to arrest • End stage renal disease • Estimated downtime • Suspected hypothermia • Suspected overdose • DNR	• Pulseless • Apneic • No auscultated	• Medical or Trauma • Hypoxia • Potassium (hypo/hyper) • Drug overdose • Acidosis • Hypothermia • Device (lead) error • Death



V-Fib – Pulseless V-tach

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V-Fib/Pulseless V-Tach – PEARLS

- Consider administration of Narcan *only* in situations in which narcotic or mixed drug overdose is present or suspected. (i.e. constricted pupils, paraphernalia, reported or noted signs of substance abuse).
- DO NOT administer Narcan to patients who are intubated or have iGel airway management in place unless the patient is hemodynamically unstable *and* known or suspected to be suffering from a narcotic overdose.
- 12 French Orogastric tubes or soft suction shall be utilized with iGel in cardiac arrest patients to assist in the decompression of the abdomen.

Amiodarone: If a bolus of Amiodarone has been given (i.e. 300mg or 150mg in a code) a maintenance drip should not be administered. Use a drip when conversion occurs without an initial bolus (after defibrillation or cardioversion).

Amiodarone Drip: (150mg/10 minutes): Mix 150mg in 50mL NS=300mL/hr via IV pump or 50gtts/min via 10gtt IV set (if pump unavailable).

Magnesium Sulfate (Torsade): Mix 1gm in 10mL NS, SIVP over 5 minutes

Cardiac Arrest Management

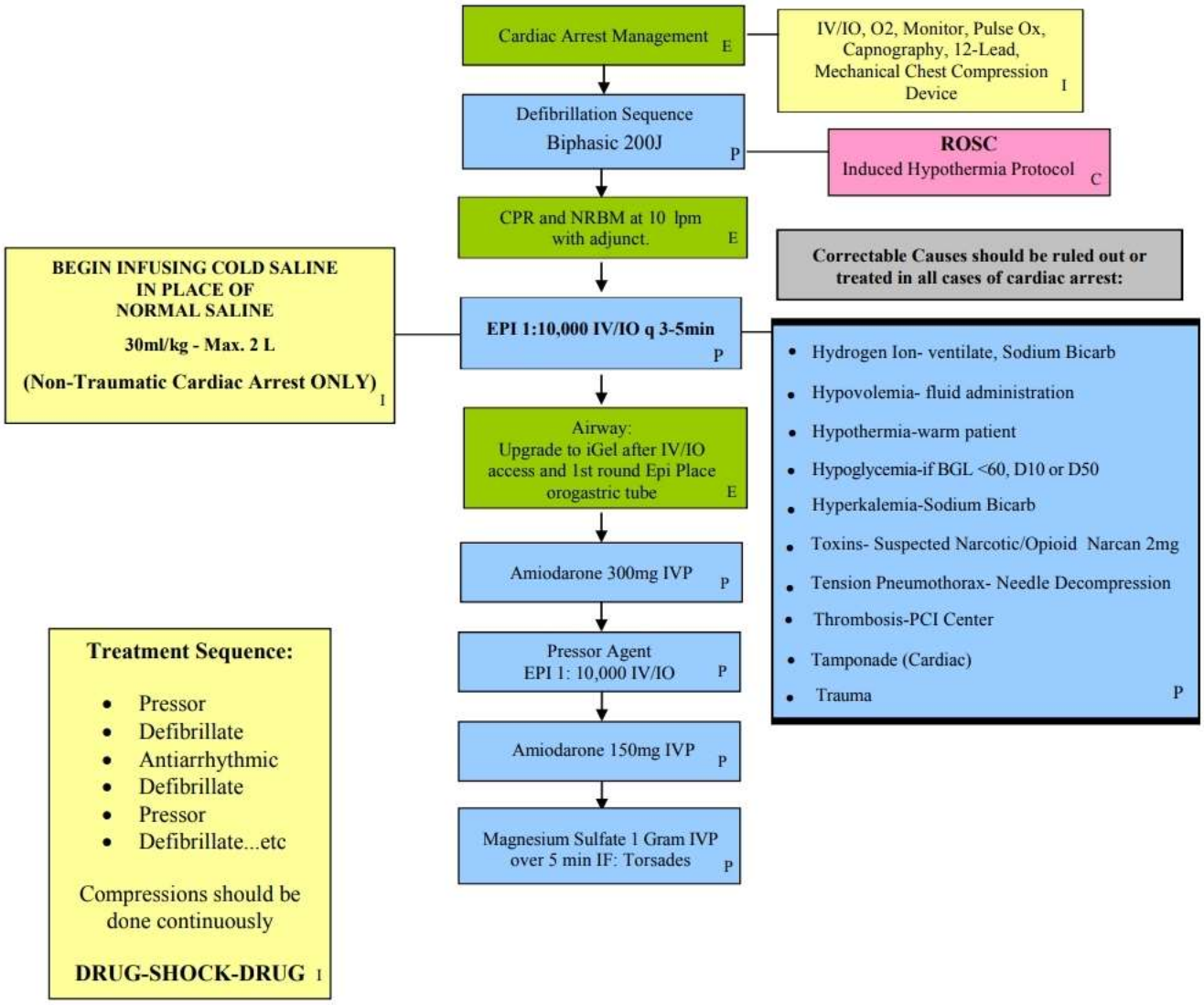
ALL CARDIAC ARREST PATIENTS SHOULD BE WORKED ON SCENE A MINIMUM OF 10 MIN PRIOR TO TRANSPORT

- If arrest is > 4 min, complete one cycle (2 min) of CPR prior to assessing rhythm. The pt is most likely in the circulatory phase of arrest and will respond better to treatments once blood is circulated.
- If arrest is ≤ 4 min or witnessed by rescuer, assess rhythm prior to CPR and defibrillate at 200J, if pt is in shockable rhythm.
- Compressions should be delivered at a rate of 120 per min and at a depth of at least 2 inches.
- If vascular access is apparent, one IV attempt is acceptable, otherwise initiate humeral IO.
- Reassess rhythm every 2 minutes. Remember that the rescuer performing compressions should be rotated every 4 minutes and compressions should never stop for more than 10 seconds.

V-Tach / V-Fib
Defibrillate at 200J when shockable rhythm is detected.
After IV/IO access has been obtained and first round of Epinephrine administered, place iGel without interrupting chest compressions and begin delivery of asynchronous ventilations 1 every 10 seconds after confirming placement.
Administer Epinephrine every 3-5 minutes
Antiarrhythmics such as Amiodarone and Magnesium Sulfate will be administered when appropriate according to protocol.
Double Sequential Defibrillation is to be utilized for the fourth and subsequent shocks while these rhythms persist.

Ventricular Fibrillation
Pulseless Ventricular Tachycardia

History:	Signs and Symptoms:	Differential:
• Estimated downtime • Past medical history • Medications • Events leading to arrest • Renal failure / dialysis • DNR	• Unresponsive, apneic, pulseless • Ventricular fibrillation or ventricular tachycardia on ECG	• Asystole • Artifact / Device failure • Cardiac • Endocrine / Metabolic • Drugs • Pulmonary



Wide Complex Tachycardia

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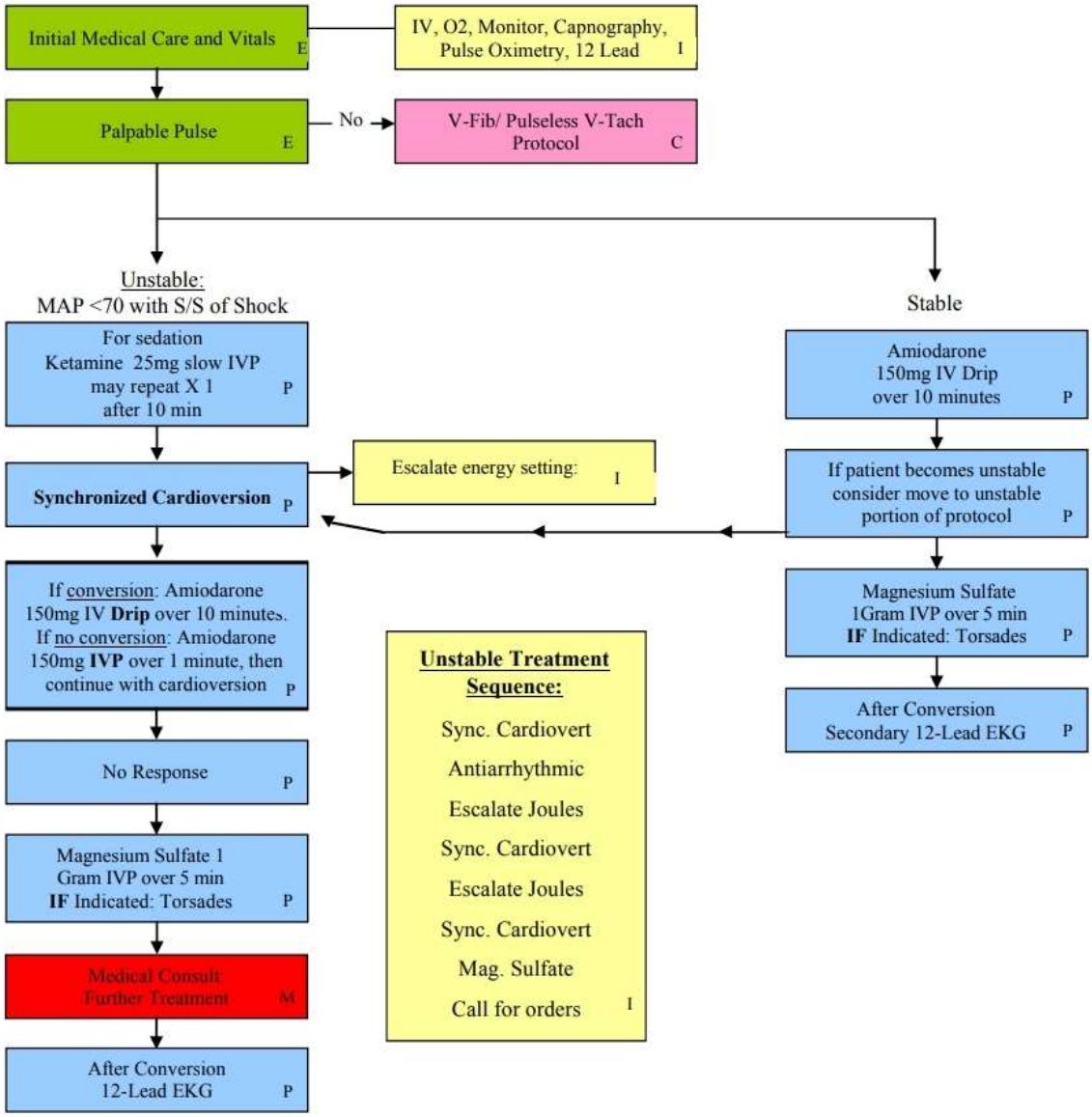
Wide Complex Tachycardia – Pearls

- For witnessed/monitored ventricular tachycardia attempt Valsalva or modified Valsalva maneuver.
- Only treat sustained wide complex tachycardia with Amiodarone/Cardioversion. Sustained wide complex tachycardia is considered to be runs of 6 or more wide complexes. Patients with shorter runs or extensive ectopy should receive high flow O2 and be monitored closely.
- **AMIODARONE:** If a bolus of Amiodarone has been given (ie 300mg or 150mg in a code) a maintenance drip should ***not*** be administered. Use a drip when conversion occurs without an initial bolus (in pulseless V-fib/V-Tach).
- **AMIODARONE:** A stable patient in a Wide Complex Tach rhythm should receive 150mg IV drip over 10min.
    - Mix 150mg in 50ml NS or D5W=300ml/hr via IV pump or 50gtts/min via 10gtt IV set (if pump unavailable).
- **AICD: Amiodarone drip** may be administered provided that 6 or more wide complexes were witnessed and the patient converts. If an AICD fires and complexes were not witnessed **DO NOT** administer Amiodarone Drip.
- Consider pre-medication to achieve sedation for synchronized cardioversion with **Ketamine 25mg slow IVP (may repeat X 1 after 10 min).**
- If rhythm does not convert, escalate energy level for subsequent SYNCHRONIZED CARDIOVERSION:
    - Wide Complex: Start at 100J, 150J, 200J, 200J.
    - Atrial Fibrillation: Start at 100J, 150J, 200J, 200J.
- If unable to complete synchronization, proceed immediately to unsynchronized shocks, i.e. defibrillation
- Magnesium Sulfate: Torsades
    - Mix 1gm in 10ml NS Slow IVP. Administer over 5 minutes.

Wide Complex Tachycardia

History:	Signs and Symptoms:	Differential:
• Past medical history • Medications, diet, drugs • Syncope / near syncope • Palpitations • Pacemaker • Allergies: Lidocaine/Novocain	• Ventricular tachycardia on ECG (Runs or sustained) • Conscious, rapid pulse • Chest pain, shortness of breath • Dizziness • Rate usually 150-180 bpm for sustained V-Tach • QRS > 0.12 Sec	• Artifact / Device failure • Cardiac • Endocrine / Metabolic • Hyperkalemia • Drugs • Pulmonary



Ventricular Assist Device
(VAD)

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Ventricular Assist Device- PEARLS

- **IF A PATIENT IS EXPRIENCING ISSUES WITH THEIR VAD, BEGIN BY ATTEMPTING TO CONTACT THE HOSPITAL WHERE THE VAD WAS INSTALLED.**
  - Most patients will have this contact information attached to the VAD itself or in the VAD carrying case.
  - Ask family members about the contact information and call for instructions for the VAD Coordinator.
  - Some VADs are equipped with a manual pump, follow VAD Coordinator instructions.
- There may not be a measurable blood pressure because the VAD is a continuous flow pump.
- The patient may be pulseless while the device is functioning.
- In some cases, the patient's heart still has some function, you may feel a thready pulse.
- The Pump is connected to an electric line exiting the patient's abdominal area which is attached to a computer that runs the pump.
- The Pump should not affect the EKG reading.
- All ACLS drugs may be administered with the exception of Epinephrine for the Total Artificial Heart (pink VAD pages).
- Patients can be defibrillated while connected to the device and nothing needs to be disconnected in order to defibrillate.
- Battery life is generally about 10 to 14 hours (bring extra batteries for transport).
- Any emergency mode of transport is acceptable.
- These patients are permitted to fly if need and the VAD hospital recommends that mode of transport.
- Be sure to bring ALL of the patient's VAD equipment with them and follow the VAD Coordinators instruction if contact is made.
- Approved VAD Hospitals are hospitals that can implant and maintain the VAD

All VAD interfacility transfers must be accompanied by nurse rider from sending facility with VAD experience.

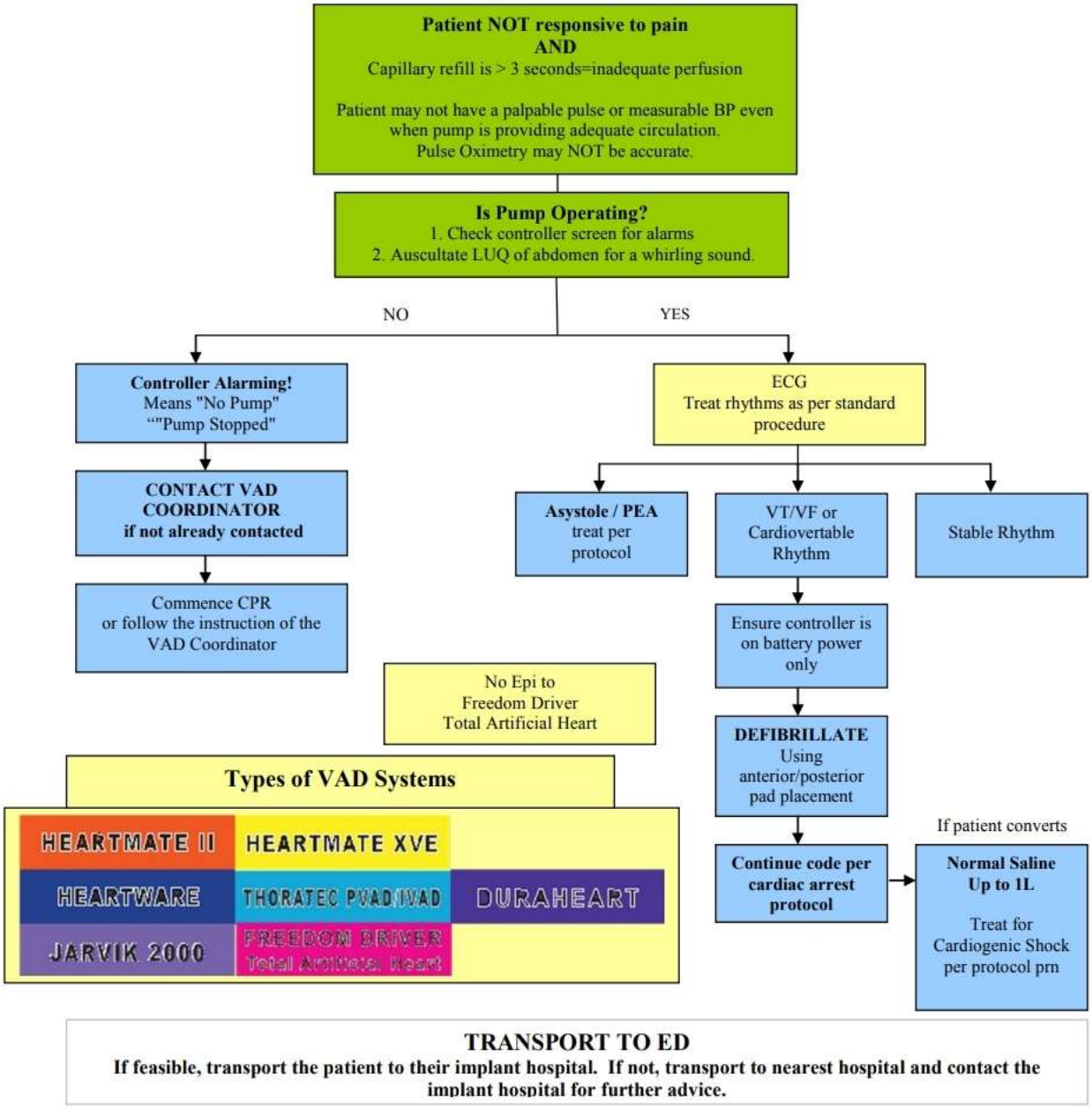
Approved VAD Hospitals		
Florida Hospital Orlando	601 East Rollins St	Orlando
Shands at University of Florida	1600 SW Archer Rd.	Gainesville
Tampa General Hospital	1 Tampa General Circle	Tampa

- "Shared Care Center"- not an implanting center. They do not have a VAD certified cardiac surgeon however they have a VAD trained heart failure Cardiology team.

Approved Shared Care Centers		
Orlando Regional Medical Center	1414 South Kuhl Ave	Orlando

Ventricular Assist Device

History:	Signs and Symptoms:	Differential:
• Past medical history • Medications, diet, drugs • Syncope / near syncope • Palpitations • Pacemaker • Heart failure • Patient awaiting heart transplant	• Ventricular tachycardia on ECG (Runs or sustained) • Conscious, no pulse • Shortness of breath • Dizziness • May not have a palpable BP	• Artifact / Device failure • Cardiac Arrest • Pump not functioning • Pump functioning = patient issue is unrelated to VAD



Pulmonary Embolism

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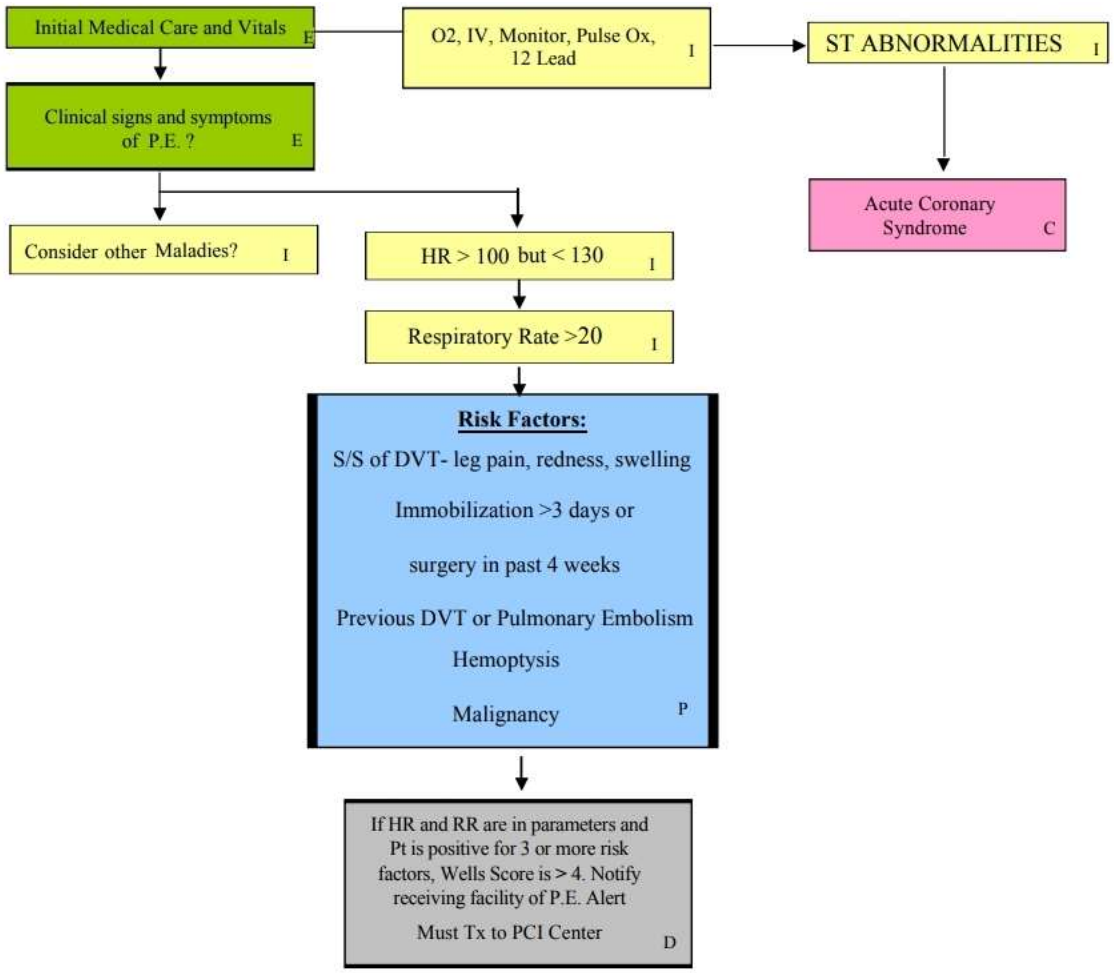
Pulmonary Embolism – Pearls

- A Pulmonary Embolism is not necessarily a disease in itself but is a symptom of an underlying condition which results from a blockage in the pulmonary artery or one of its larger branches blocking all or some of the blood flow from the right ventricle of the heart to one or both of the lungs. This condition can cause anything from mild symptoms to sudden death.
- Usually a pulmonary embolism presents with a sudden onset of symptoms: chest pain is usually sharp and located on one side of the sternum. The pain generally exacerbates with inspiration and patients sometimes describe the pain as a burning, an ache or a dull heaviness
- Other signs and symptoms include: tachypnea, tachycardia, hypotension, wheezing, anxiety, dyspnea, cyanosis. pale, cool and moist skin, dizziness, lightheadedness, or syncope
- Leg pain, redness, or swelling, are signs and symptoms of a deep vein thrombosis
- **Hemoptysis** - Sudden cough, possibly producing blood or bloody mucus

Modified Wells Criteria: clinical assessment for pulmonary embolism	
Clinical symptoms of DVT (leg swelling, pain with palpation)	3.0
Heart rate > 100	1.5
Immobilization (≥ 3 days) or surgery in previous four weeks	1.5
Previous DVT/PE	1.5
Hemoptysis	1.0
Malignancy	1.0
Probability Score	
High	>6.0
Moderate	2.0 to 6.0
Low	<2.0
Simplified Clinical Probability Assessment	
PE Likely	>4.0
PE Unlikely	≤4.0

Pulmonary Embolism

History:	Signs and Symptoms:	Differential:
• Age • Medications • Past medical history • Allergies • Recent physical exertion • Onset • Palliation / Provocation • Quality (crampy, constant, sharp, dull, etc.) • Region / Radiation / Referred • Severity (0-10) • Time (duration, repetition)	• Sudden sharp chest pain (pressure, aching, burning, discomfort) • Location (one side of sternum, worse on inspiration) • Shortness of breath, tachypnea • Tachycardia • Pale, cool, diaphoretic • Dizziness • Cyanosis • Syncope/Near Syncope • DVT, leg pain/redness/swelling • Hypotension	• Trauma vs. Medical • Angina vs. Myocardial Infarction • Pericarditis • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or Hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain • Overdose (Cocaine) • Anginal equivalents



Carbon Monoxide/Cyanide Exposure and Inhalation Injury

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Carbon Monoxide-PEARLS

- Pulse oximetry may indicate a FALSE positive.
- Document exact time oxygen was initiated and relay to receiving facility.
- Apply nasal capnography before any medication administration.
- Due to cerebral edema caused by CO poisoning, IV fluids should be kept to a minimum unless warranted by hypotension.

Cyanide-PEARLS

- Pulse oximetry may indicate a FALSE positive or an UNRELIABLE reading.
- Document exact time oxygen was initiated and relay to receiving facility.
- Apply nasal capnography before any medication administration
- For patients with S/S of Cyanide poisoning to include exposure to an enclosed space of smoke/fire AND soot around mouth or nose AND confusion/disorientation/altered mental status AND positive shock index: Administer Cyanokit:
  - Adult: Infuse 5g reconstituted Cyanokit vial over 15 minutes.
  - Pediatric: Per Handtevy Guide

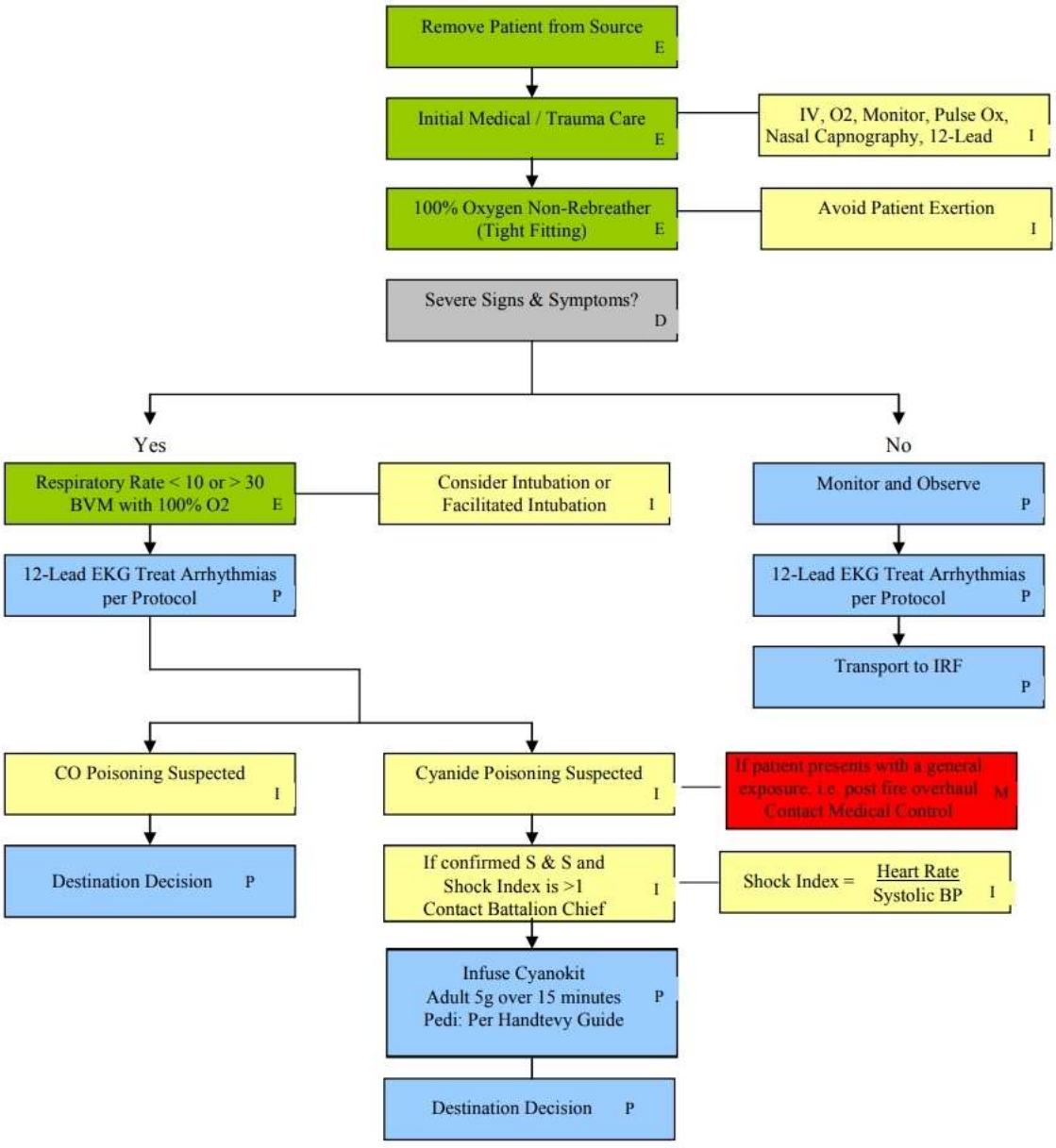
Inhalation Injury-PEARLS

- For patients who present with exposure to smoke or fire in an enclosed environment, have a high index of suspicion for inhalation injuries. Signs and symptoms of inhalation injuries or burns may include one or all of the following:
  - Burned in an enclosed space
  - Dark or reddened oral and/or nasal mucosa
  - Burns to the face, lips, nares, singed eyebrows, singed nasal hairs
  - Carbon or soot on teeth, tongue, or oral pharynx
  - Raspy, hoarse voice or cough
  - Stridor or inability to clear secretions may indicate impending airway occlusion
- Inhalation injury patients may not present with immediate airway constriction or edema, this can occur within hours after the injury. If you suspect an inhalation injury, establish ALS and advanced airway management as soon as possible.

For patients with Signs and Symptoms of Carbon Monoxide or Cyanide poisoning, transport to trauma center or burn center if patient presents with burn injuries or suspected inhalation injury.

Carbon Monoxide/Cyanide Poisining

History:	Signs and Symptoms:	Differential:
• Exposure Time	• Headache • Nausea/Vomiting • Syncope • Chest Pain • Dyspnea • Weakness • Coma/AMS • Seizures	• Acute Respiratory • Depression • Diabetes • Migraines • Meningitis • Toxicity – Alcohol – Drugs



Esophageal Foreign Body Obstruction

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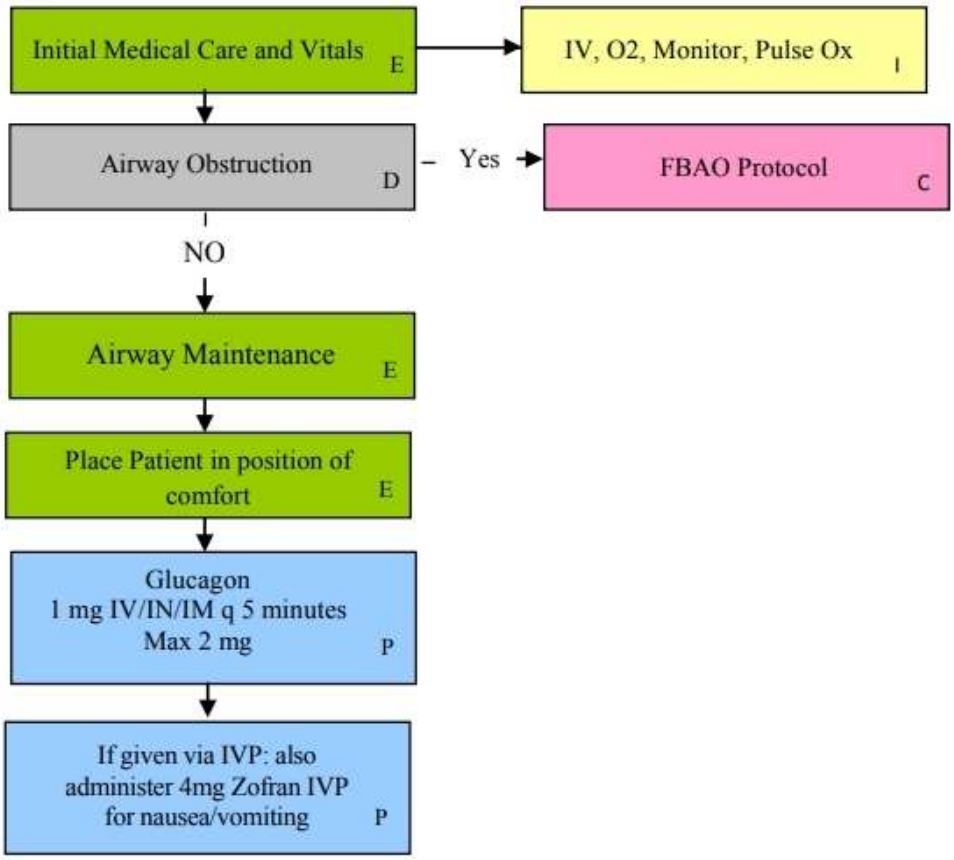
Esophageal Foreign Body Obstruction – Pearls

- Establish Initial Medical Care and Vitals including Capnography after airway is secured. All patients should be encouraged to seek medical attention.
- Glucagon decreases lower esophageal sphincter tone without interfering with esophageal contractions (acts as a smooth muscle relaxer).
- Usually caused by food and/or bones.
- Most common obstruction among children is a coin (80%).

Esophageal Foreign Body Obstruction

History:	Signs and Symptoms:	Differential:
• Partial obstruction • Complete obstruction • Esophageal CA • Esophageal strictures • Esophageal disease	• Coughing • Difficulty or inability to swallow • Drooling • Apparent distress • Anxiety/Stress • Throat pain • Gagging • Blood-stained saliva • Chest Pain	• Globus Hystericus ("lump in throat") • Esophagitis • Croup • Epiglottitis • Upper respiratory tract infection



Foreign Body Airway Obstruction

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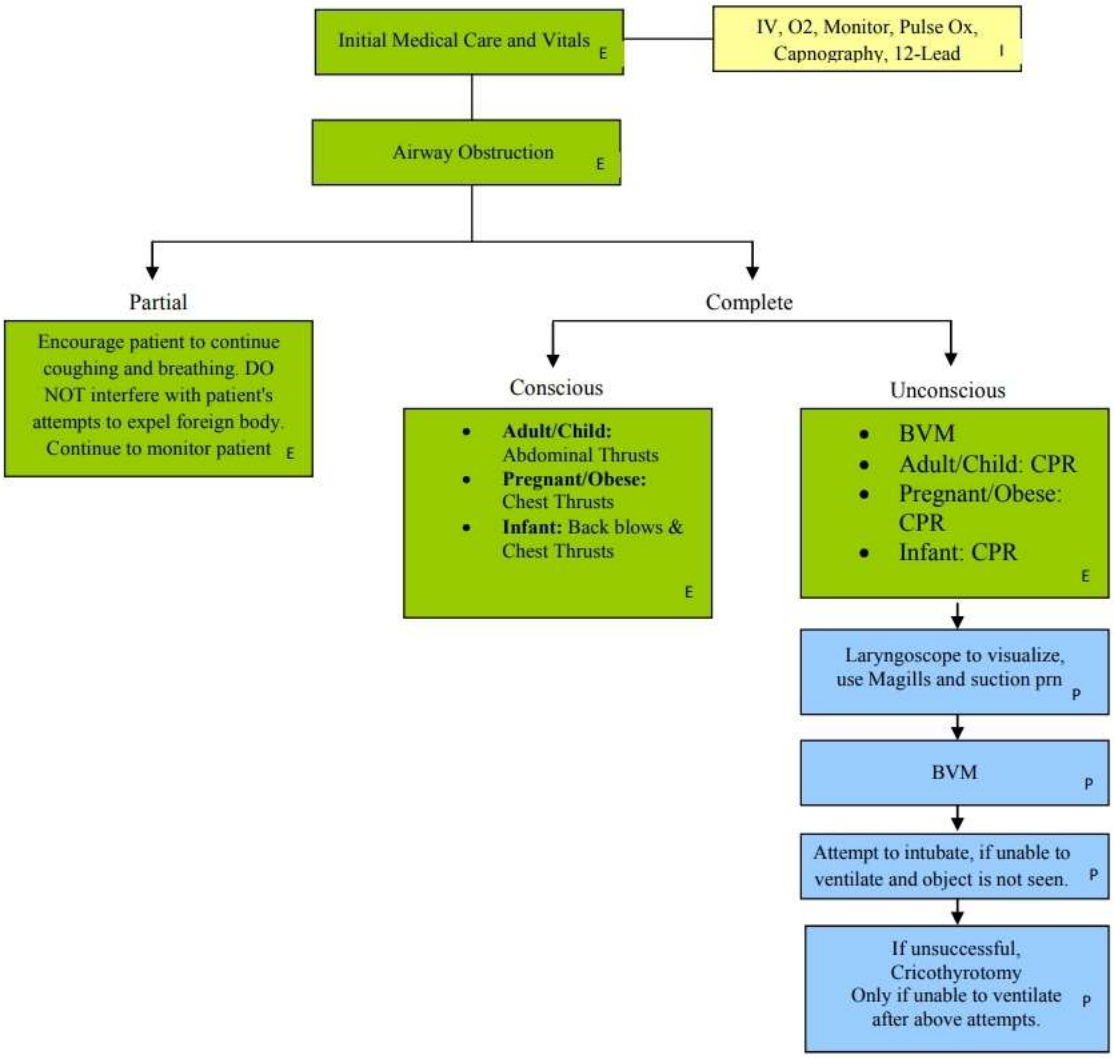
Foreign Body Airway Obstruction – Pearls

- Establish Initial Medical Care and Vitals-including Capnography- after airway is secured. All patients should be encouraged to seek medical attention.
- Repeat Abdominal/Chest thrusts and/or back blows until foreign object expelled and airway is cleared, or patient becomes unconscious. **Never blindly insert anything in to oropharynx!!**
- Alternate attempts to ventilate with airway clearing techniques. Once airway is cleared, support ventilations as needed with 100% oxygen.
- Monitor for signs of hypoxia and/or cardiac dysrhythmias.
- If the patient is physiologically difficult to intubate (severe anxiety, etc.) refer to DIFFICULT AIRWAY - FACILITATED INTUBATION PROCEDURE GUIDELINE.

Foreign Body Airway Obstruction

History:	Signs and Symptoms:	Differential:
• Partial Obstruction • Complete obstruction • Tracheal stenosis	• Coughing • Cyanosis • Choking sign (hands around neck) • Drooling • Inability to speak or cough • Apparent distress • Anxiety/Stress	• Epiglottitis • Anaphylaxis • Tonsil abscess • Fractured larynx



Respiratory Distress

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Respiratory Distress- PEARLS

- If time, circumstances, and patient severity permit, apply nasal capnography and record capnographic strip before any medications. Continue to monitor and record strips as treatment progresses. Do not treat solely on waveform findings.
- Combine Albuterol/Atrovent when HR <120 and no significant ectopy. Indication: wheezing
- Combine Xopenex/Atrovent when HR >120 or if patient relates use of home nebulized medicine/prescription inhaler >3 times in the past two hours with no improvement and no significant ventricular ectopy. Indication: wheezing.
- If patient presents with mild ventricular ectopy that is unresolved or worsens discontinue updraft immediately.
- Atrovent: (500mcg) is contraindicated in patients <12 years of age.
- Xopenex (0.63mg) is contraindicated for children < 6 years of age.
- Albuterol (2.5mg) is indicated for all ages when given solely.
- If needed, CPAP all COPD patients having respiratory distress with 5-7.5 PEEP valve.
- If patient is unable to tolerate CPAP mas, coach patient, hold mask approximately 10-20 inches away from face and slowly advance to proper placement and continue to coach patient. If all else fails, remove mask and decide if ETT is best care for patient, but remember to limit intubation attempts x2.

Asthma-PEARLS

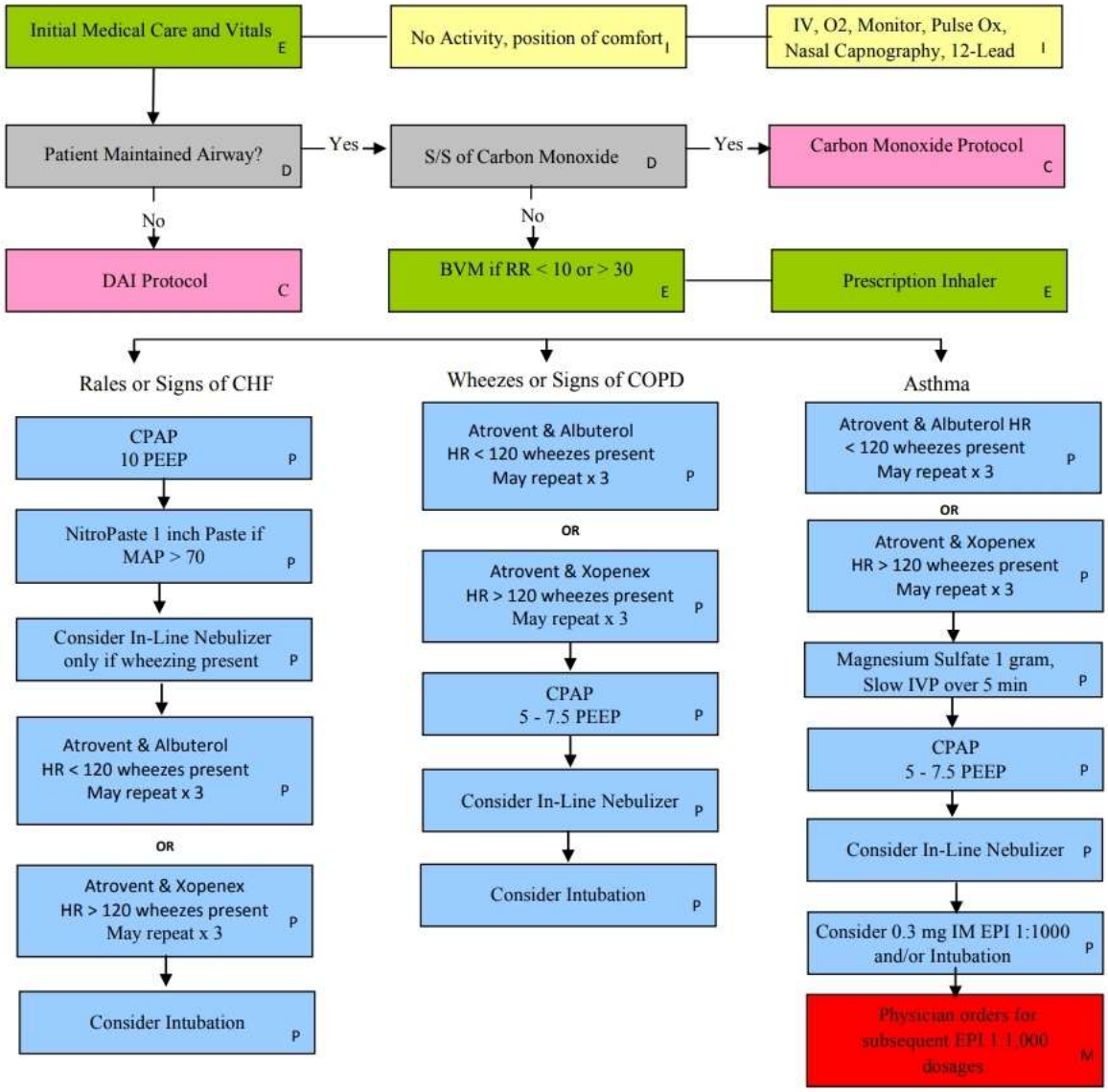
- If no significant clinical improvement, continue with the following:
- Magnesium Sulfate: indications- acute severe asthma. Administer 1 gram in 10mL NS Slow IVP over 5 minutes.
- If still no improvement: consider 0.3mg IM of Epinephrine 1:1,000 in an unstable patient. Epi should be administered in the thigh.

Pulmonary Edema- PEARLS

- Do not administer NTG-Paste if the patient has taken: Viagra, Levitra, Stendra, Staxyn, Addyi, or Cialis within the last 24 hours.
- Nitropaste: 1 inch=14mg- this is the entire packet.
- If needed, CPAP all CHF patients having respiratory distress with 10 PEEP valve.

Respiratory Distress

History:	Signs and Symptoms:	Differential:
• Asthma; COPD – chronic bronchitis, emphysema, congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Pursed lip breathing • Decreased ability to speak • Increased resp. rate and effort • Wheezing, rhonchi, rales, stridor • Accessory muscle use • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration • COPD • Pleural effusion • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial Tamponade • Hyperventilation • Inhaled toxin (Carbon monoxide)



Abdominal Disorder
GI Bleed and Nausea & Vomiting

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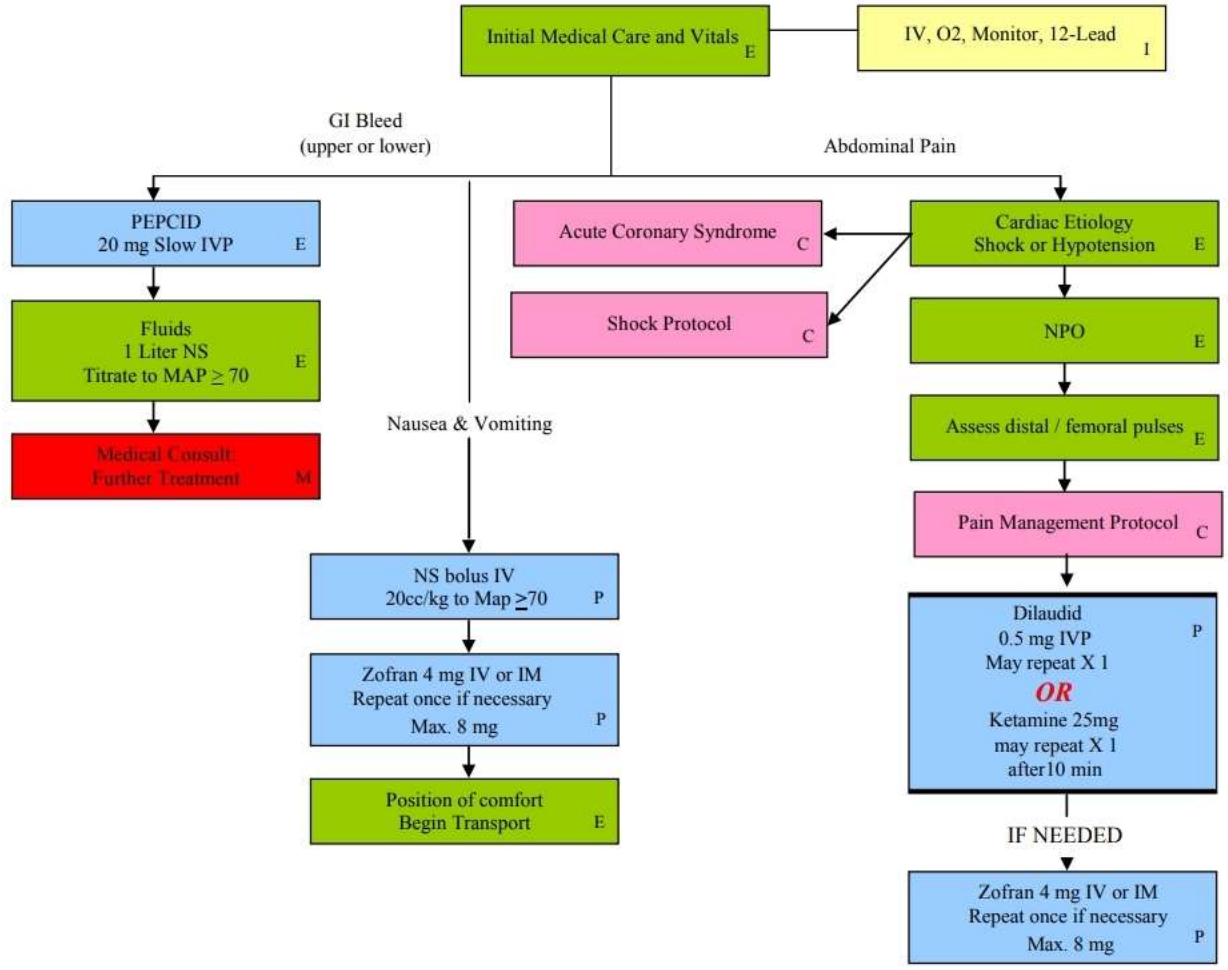
Abdominal Pain- PEARLS

- Abdominal pain in women of child bearing age should be treated as an ectopic pregnancy until proven otherwise.
- Antacids should be avoided in patients with renal disease.
- Flank pain radiating to the area of the groin may represent kidney stones.
- The diagnosis of abdominal aneurysm should be considered with abdominal or flank pain in patients over 50.
- Appendicitis presents with vague, periumbilical pain, which migrates, to RLQ over time.
- Repeat vital signs after each fluid bolus. May give fluid bolus PRN based on vitals signs and patient condition.
- Pepcid (Famotidine) 20mg Slow IVP: is a histamine H2-receptor antagonist that inhibits stomach acid production, commonly used in the treatment of peptic ulcer disease (PUD) and gastroesophageal reflux disease (GERD)
    - Rare instances of arrhythmias and hypotension have been reported following rapid IV bolus.
    - SLOW IVP- over 2 minutes
    - Pepcid is indicated even in the presence of hypotension.

Abdominal Disorder
GI Bleed and Nausea & Vomiting

History:	Signs and Symptoms:	Differential:
• Age • Past medical/surgical history • Medications • Onset • Palliation/Provocation • Quality (crampy, constant, sharp, dull, etc.) • Region/Radiation/Referred • Pain severity (0-10) • Time (duration, repetition) • Fever • Last meal • Last BM/Urination • Menstrual history	• Pain (location/migration) • Tenderness • Nausea • Vomiting • Diarrhea • Dysuria • Constipation • Vaginal bleeding/discharge	• Abdominal aneurysm • Appendicitis • Pneumonia, pulmonary embolus • Peptic ulcer disease • Gallbladder • GERD • Myocardial infarction or Chest Pain • Liver (hepatitis) • Pancreatitis • Kidney stone • Bladder/prostate disorder • Pelvic (PID, Ectopic pregnancy, Ovarian cyst) • Spleen enlargement • Diverticulitis • Bowel obstruction • Gastroenteritis



Allergic Reaction

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Allergic Reaction- PEARLS

- Epinephrine may precipitate cardiac ischemia. These patients should receive a 12-lead EKG.
- Scrape away and remove any stingers and/or flush any contaminated skin.

KNOWN ALLERGY TO: FOOD, MEDICATION, INSECT OR LATEX

Confirmed ingestion OR envenomation OR significant signs and symptoms:

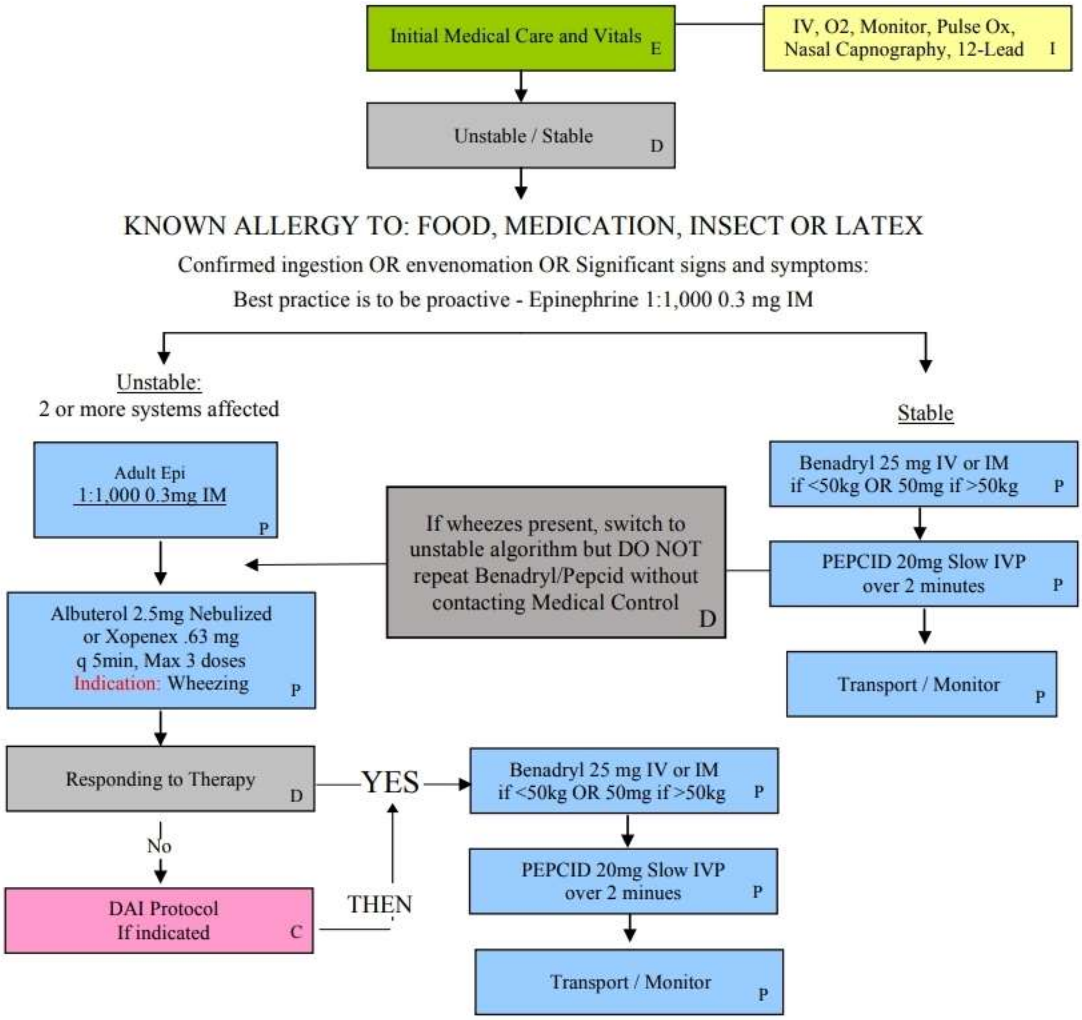
Epinephrine 1:1,000 0.3mg IM

Stable	**Unstable**
Usually longer onset (one hour or days)	Usually rapid onset (30-60 seconds)
Normal Vitals	Signs of Shock (Map <70)
Urticaria (Hives)/Rash/Itching Localized Reaction	Urticaria (Hives)/Rash/Itching Systemic Reaction
	Objective signs of respiratory distress: such as stridor or wheezing
	Objective signs of airway compromise

- Any patient with respiratory symptoms or extensive reaction (urticarial) should receive. IV or IM Benadryl (max dose: 25mg if <50kg OR 50mg if >50kg).
- The shorter the onset of symptoms from contact, the more severe the reaction.
- Pepcid (famotidine) 20mg SLOW IVP: can be used in combination with an H1 antagonist (Benadryl) to treat and prevent urticarial caused by an acute allergic reaction.
  - Pepcid competitively inhibits the action of histamine at the histamine H2-receptors
  - Slow IVP over 2 minutes
  - Rare instances of arrhythmias and hypotension have been reported following rapid IV bolus
  - Pepcid is indicated even in the presence of hypotension

Allergic Reaction

History:	Signs and Symptoms:	Differential:
• Onset and location • Insect sting or bite • Food allergy/exposure • Medication allergy/exposure • New clothing, soap, detergent • History of reactions • Past medical history • Medication history	• Itching or hives • Coughing/wheezing or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotensive or shock • Edema	• Urticaria (rash only) • Anaphylaxis (systemic effect) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration/airway obstruction • Vasovagal event • Asthma or COPD • CHF



Altered Mental Status

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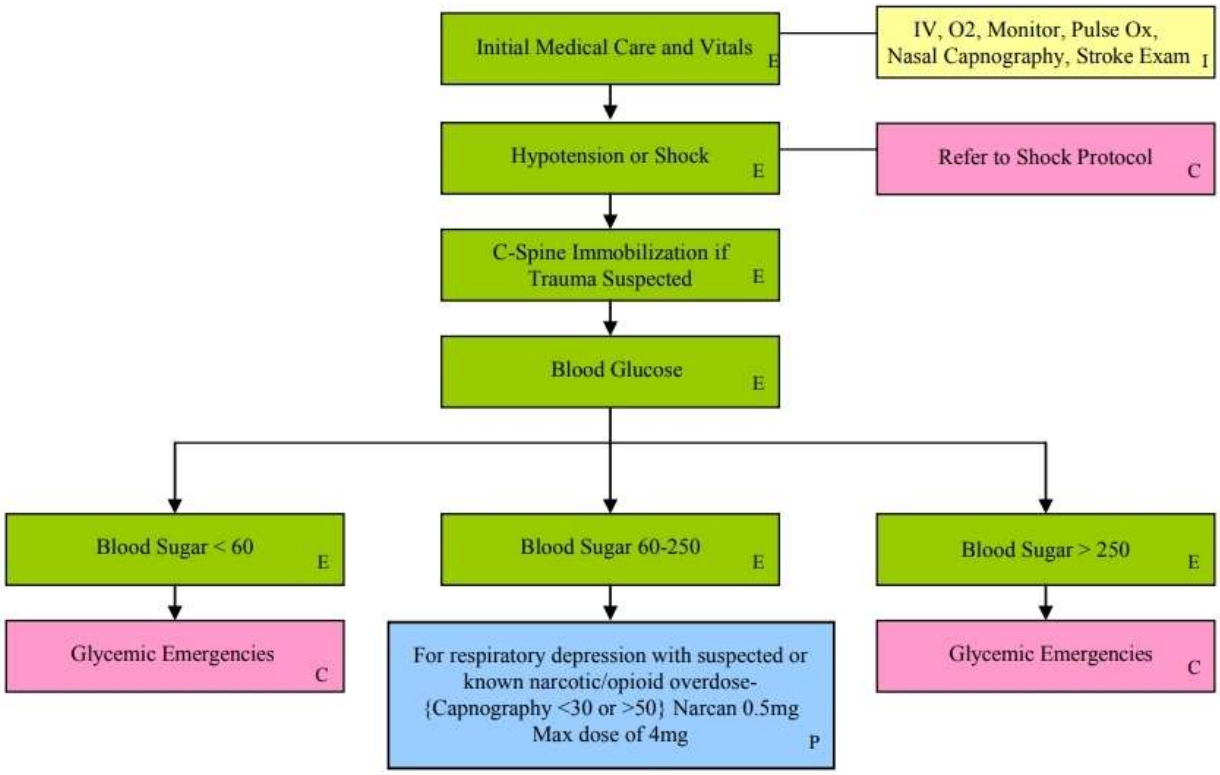
Altered Mental Status- PEARLS

- Be aware of Altered Mental Status as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose level after Dextrose or Glucagon.
- Do not let alcohol confuse the clinical picture. Alcoholics frequently develop hypoglycemia.
- Do not give oral glucose if patient cannot protect his or her own airway.
- Consider restraints if necessary for patient and/or personnel protection per the RESTRAINT PROCEDURE.
- Consider administration of Narcan ***only*** in situations in which narcotic or mixed drug overdose is present or suspected (i.e., constricted pupils, paraphernalia, reported or noted signs of substance abuse.
- DO NOT administer Narcan to patients who are intubated or have iGel airway management in place unless the patient is hemodynamically unstable ***and*** known or suspected to be suffering from a narcotic overdose.
- For Altered Mental Status with respiratory depression, use Nasal Capnography and record reading. If suspected or known narcotic or opioid overdose and Capnography <30 or >50, administer Narcan 0.5mg increments. Max dose: 4mg

Altered Mental Status

History:	Signs and Symptoms:	Differential:
• Known diabetic/medic alert tag • Drugs, drug paraphernalia • Report of illicit drug use or toxic ingestion • Medical history • Medications • History of trauma • Change in condition	• Decreased mental status • Change in baseline behavior • Bizarre Behavior	• Head trauma • CNS (stroke, tumor, seizure, infection) • Cardiac (MI, CHF) • Infection • Thyroid • Shock • Diabetes • Toxicological • Acidosis, alkalosis • Environmental (exposure) • Pulmonary (hypoxia) • Electrolyte • Psychiatric



Cerebrovascular Accident

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Cerebrovascular Accident – Pearls

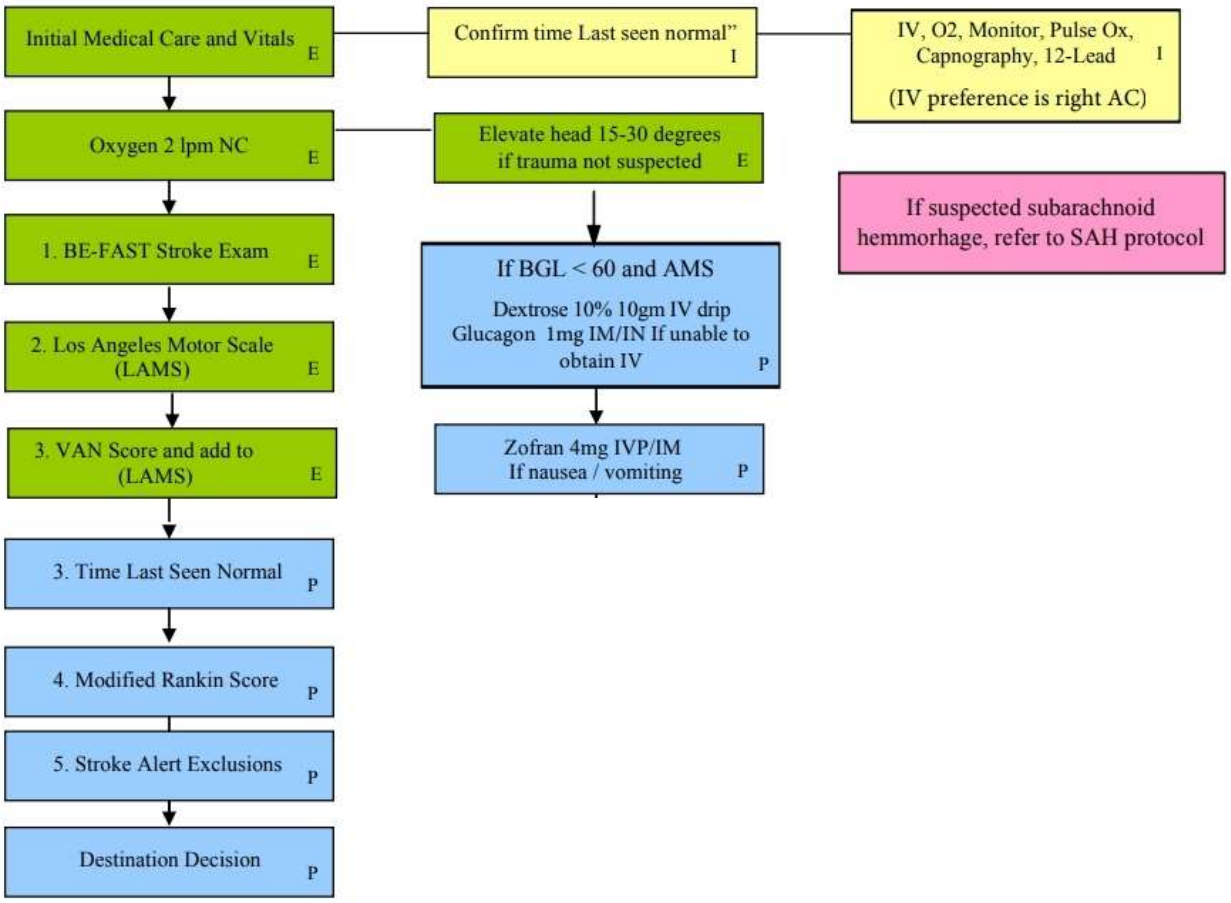
- **1. BE-FAST Stroke Screen:** Balance, Eyes, Facial droop, Arms/legs weak, Speech, and Time - if any acute deficits consider Stroke.
- **If suspected SAH- refer to Subarachnoid Hemorrhage Protocol**
- **2. Los Angeles Motor Scale (LAMS):** Utilize Stroke Alert Checklist to document findings and score.
- **3. Time Last Seen Normal:** Utilize Stroke Alert Checklist to document TLSN and determine if < 3 hours, or 3-24 hours.
- **4. If patient has one sided arm weakness: perform VAN Score.** Vision (blurry or field cut), Aphasia, Neglect (including forced gaze, inability to feel bilateral or ignores one side. Add VAN score with LAMS score.
- **5. Document the Modified Rankin Score:** This is critical to determine transport destination and needs to be documented in the EPCR.
- **6. Consider Stroke Alert exclusions:** Utilize Stroke Alert Checklist to determine if Pt has any criteria that would exclude them from Stroke Alert status.
  "Stroke Alert" - Pts that exhibit acute stroke symptoms with onset < 24 hours and no exclusion criteria.
  "Possible CVA with exclusion" - Pts that exhibit stroke symptoms, but have one or more exclusions in step 5.
- **After determining Pt's status, utilize the Stroke Alert Checklist to determine appropriate destination.**
- With an onset of symptoms less than 2 hours, scene times and transport times should be minimized. Consider delay of procedures such as IV initiation until transport is under way.
- Whenever possible, a family member should accompany the patient to hospital to provide additional history and/ or consent.
- Be alert for airway problems (swallowing difficulty, vomiting).
- The transport Paramedic will be responsible to determine the closest appropriate receiving hospital for patients who meet criteria for immediate transport to a comprehensive stroke center or a primary stroke facility.
- Document: witness information (name and telephone numbers)
- Begin treating BP when SBP is > 230mmHg.
- **LABETALOL SHOULD BE USED TO TREAT BLOOD PRESSURE TO 150-160 SYSTOLIC**
- **LABETALOL SHOULD BE ADMINSTERED OVER 5 MINUTES.**
- **LABETALOL IS CONTRAINDICATED IN HYPERTENSIVE PATIENT WITH BRADYCARDIA**

There is an 85% chance of a hemorrhagic stroke if the patient meets the following four criteria:

- **GCS of < 8**
- **Seizures**
- **BP ≥ 220/120**
- **Sudden witnessed LOC**

Cerebrovascular Accident

History:	Signs and Symptoms:	Differential:
• Previous CVAs / TIAs • Previous cardiac/vascular surgery • Assoc. diseases: DM, HTN, CAD • Atrial Fibrillation • Medications • History of trauma	• AMS • Weakness / paralysis • Blindness or other sensory loss • Aphasia / Dysarthria • Syncope • Vertigo / Dizziness • Vomiting • Headache • Seizures • Respiratory pattern change • HTN / hypotension	• AMS • TIA • Seizure • Hypoglycemia • Stroke ○ Thrombotic (~85%) ○ Embolic ○ Hemorrhagic (~15%) • Tumor • Trauma



Drug Overdose

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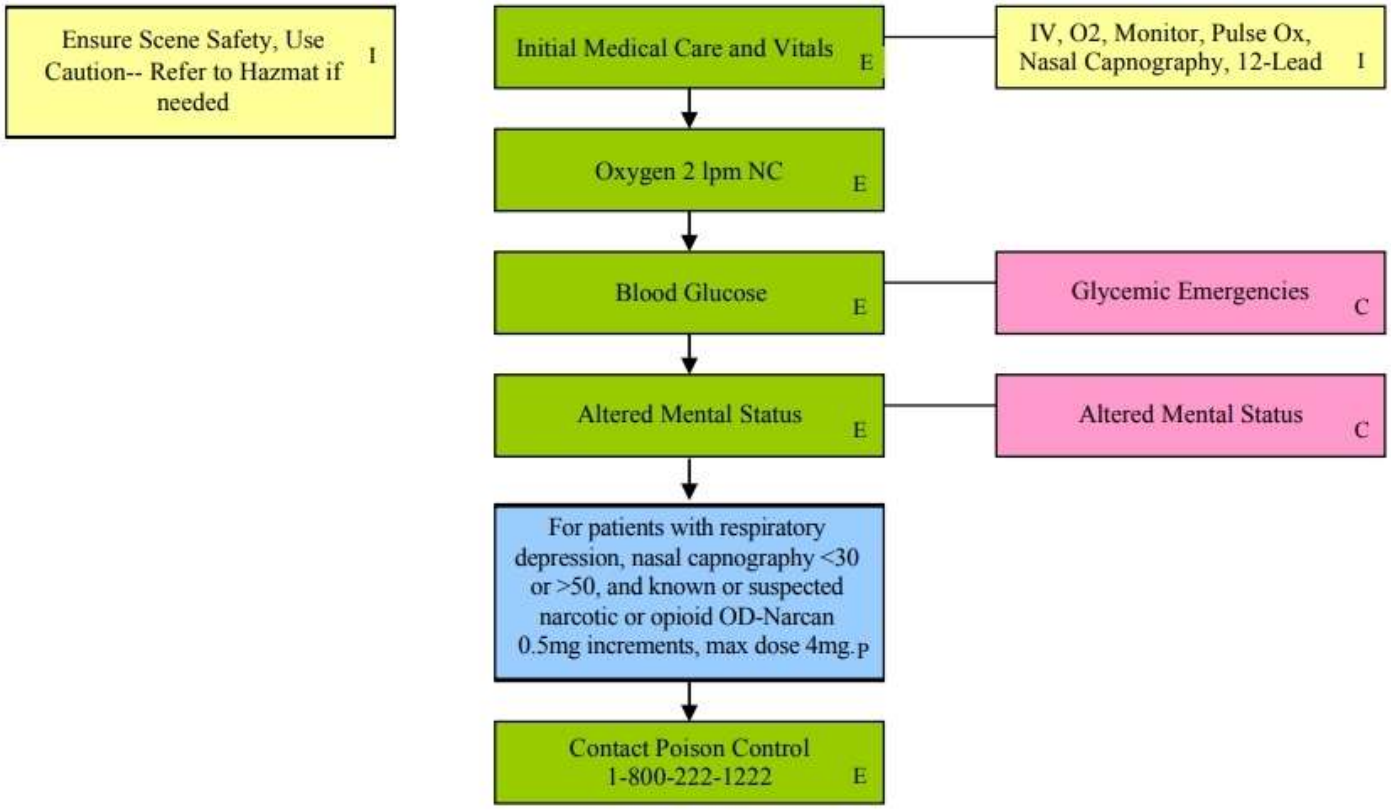
Drug Overdose- PEARLS

- Do not rely on patient history of ingestion- especially in suicide attempts.
- Bring bottles, contents and emesis to ED.
- Common Signs and Symptoms from overdoses:
  - **Tricyclic**: 4 major areas of toxicity- seizures, tachydysrhythmias, hypotension, decreased mental status or coma
    - Rapid progression from alert mental status to death
  - **Acetaminophen**: initially normal or nausea/vomiting. If not detected and treated, causes irreversible liver failure.
  - **Depressants**: decreased HR, decreased BP, decreased temperature and decreased respirations, non-specific pupils.
  - **Stimulants**: increased HR, increased BP, increased temperature, dilated pupils, seizures.
  - **Sulfonylureas**: may begin with hypoglycemia and escalate to hemiparesis anoxia from Glucotrol, Diabeta, Glynase, Amaryl.
  - **Anticholinergic**: increased HR, increased temperature, dilated pupils, mental status changes.
  - **Cardiac Meds**: dysrhythmias and mental status changes.
  - **Solvents**: nausea, vomiting, mental status changes.
  - **Insecticides**: increased or decreased HR, increased secretions, nausea, vomiting, diarrhea, pinpoint pupils.
- Do NOT give beta blockers (Labetalol) to Cocaine overdoses!
- Consider contacting the Florida Poison Control Center for guidance: 1-800-222-1222.
- Consider administration of Narcan *only* in situations in which narcotic or mixed drug overdose is present or suspected (i.e., constricted pupils, paraphernalia, reported or noted signs of substance abuse.
- DO NOT administer Narcan to patients who are intubated or have iGel airway management in place unless the patient is hemodynamically unstable *and* known or suspected to be suffering from a narcotic overdose.
- For overdose patients with respiratory depression, use Nasal Capnography and record reading. If suspected or known narcotic or opioid overdose and Capnography <30 or >50, administer Narcan 0.5mg increments. Max dose: 4mg

The American Association of Poison Control Centers will assume responsibility and provide home management and follow-up per their standard operating protocols as required by Florida Statutes 401.23(13) and 395.1027. Dispatch can cancel the call via Poison Network's Authority.

Drug Overdose or Poisoning

History:	Signs and Symptoms:	Differential:
• Ingestion or suspected ingestion of potentially toxic substance • Substance ingested, route, qty. • Time of ingestion • Reason (suicidal, accidental) • Available meds in home • Medical history • Medications	• Mental status changes • Hypotension • Hypertension • Bradypnea • Tachycardia • Dysrhythmias • Seizures	• TCA • Tylenol • Depressants • Stimulants • Anticholinergic • Cardiac meds • Solvents, Alcohols, Cleaning agents • Insecticides



Glycemic Emergencies

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Glycemic Emergencies- PEARLS

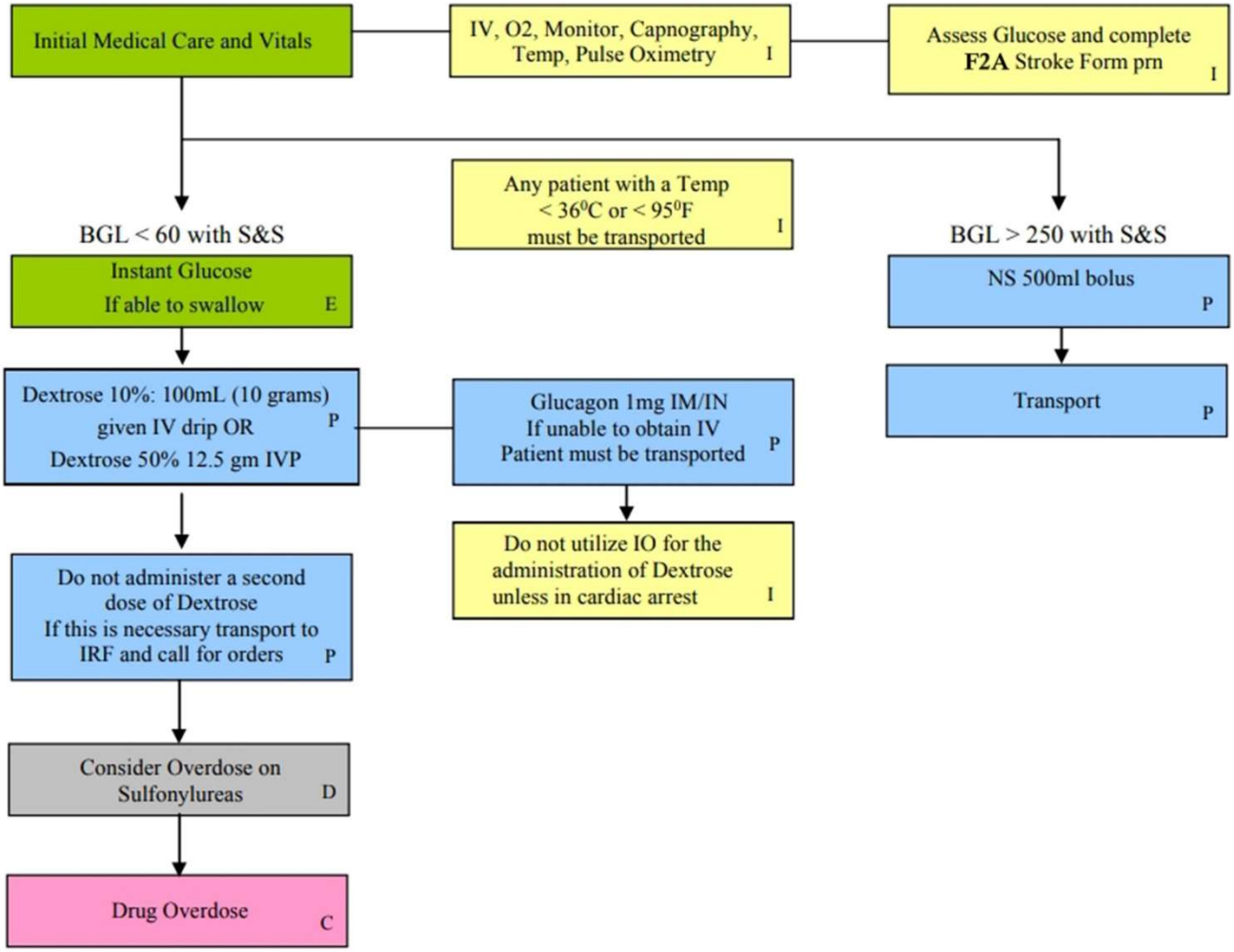
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists.
- Recheck blood glucose after administration of instant Glucose, Dextrose or Glucagon.
- Do not let alcohol confuse the clinical picture. Alcoholics frequently develop hypoglycemia.
- Instant Glucose: if patient is stable and can protect their airway utilize oral glucose first.
- Do not give oral glucose if patient cannot protect their own airway.
- There may be times when patients refuse further treatment or transport after a hypoglycemic episode. These patients will be allowed to refuse transport under the following criteria:
    - Refer to REFUSAL OF SERVICE ADMINISTRATIVE POLICY.
    - IF PATIENT IS TAKING ANY OF THE FOLLOWING THEY MUST BE TRASNPORTED:
      Sulfonylureas: Glucotrol, Glipizide, Glyburide, Diabeta, Glynase, Amaryl, Glimepiride
- Minimize the number of IV attempts (<3) in these patients. If unable to establish IV, utilize IM/IN Glucagon.
- All patients receiving IM/IN Glucagon must be transported to the IRF.
- Interosseous (I.O.) administration of Dextrose is not authorized unless the patient is in cardiac arrest. Administer IM/IN Glucagon and transport to IRF.

D10 vs D50:

- D50 is a very hypertonic fluid, and this can lead to toxicity as well as thrombophlebitis and necrosis. Administration must be done through a patent IV line, and even then extravasation risk is high.
- D50 causes an unpredictable, uncontrolled over-correction of blood glucose levels.
- D50 administration is not shown to correct blood glucose levels any faster than D10, and it comes with more risk of administration than D10.
- D50 also results in more profound rebound hypoglycemia than D10. This is due to the excess glucose available and the increase of both uptake and utilization of glucose by the tissues. The body then slows its own production (gluconeogenesis) and breakdown (glycogenolysis) of glucose. This leads to a repeat episode of hypoglycemia because the body no longer compensates for itself when it recognizes an excess of glucose circulating in the bloodstream.
- D10 is packaged as 25 grams in 250mL. FEM dosage is 100mL given IV drip.

Glycemic Emergencies (Hypo/Hyperglycemia)

History:	Signs and Symptoms:	Differential:
• Onset and Duration • History of hypertension • Seizures • Medical History • Pre-Eclampsia • Drug or alcohol use • Head trauma • Current medications • Allergies	• Headache • Nose bleed • Dizziness • Syncope • Weakness • Speech difficulties • Abdominal pain • Visual disturbances • Projectile vomiting	• Altered mental status • Hypoglycemia • Hyperglycemia • Trauma • CNS disorders



Hypertensive Crisis

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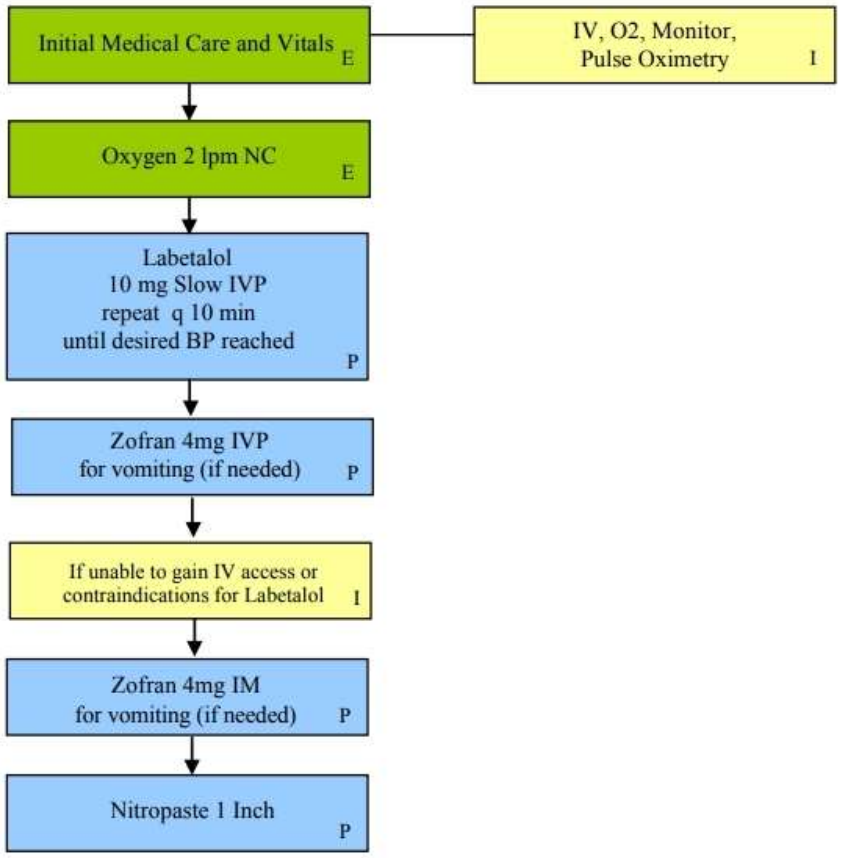
Hypertensive Crisis- PEARLS

- If patient is hypoxic, apply appropriate oxygen adjunct with appropriate oxygen flow.
- Treatable at 230 systolic and/or 120 diastolic
- Treat BP to end point of 185 systolic and/or 90 diastolic
- Never treat hypertension based on one set of vital signs.
- All symptomatic patients with hypertension should be transported with their head elevated 15-30 degrees.
- As an alternative to Labetalol in absence of IV:
  - Zofran may be given IM (undiluted)
  - Nitropaste may also be utilized in these patients and especially with any cocaine use or precaution due to bradycardia!
  - If intubating a patient who is hypertensive: if Versed has already been administered, consider using Nitropaste as an alternative to Labetalol to lower BP if it remains treatable.
-

Call Medical Control for other alternative medications and doses.

Hypertensive Crisis

History:	Signs and Symptoms:	Differential:
• Onset and Duration • History of hypertension • Seizures • Medical History • Pre-Eclampsia • Drug or alcohol use • Head trauma • Current medications • Allergies	• Headache • Nose bleed • Dizziness • Syncope • Weakness • Speech difficulties • Abdominal pain • Visual disturbances • Projectile vomiting	• Altered mental status • Hypoglycemia • Trauma • Major surgery < 14 days



Hyperthermia, Non-Environment

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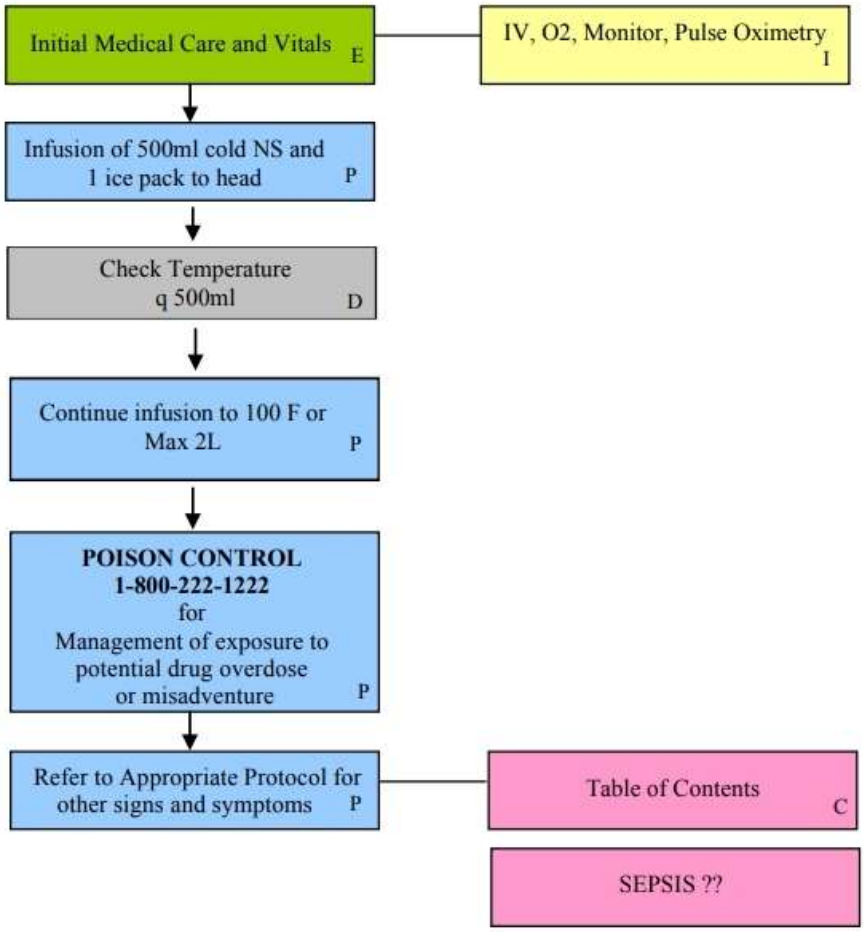
Hyperthermia, Non-Environmental- PEARLS

- Hyperthermia is a temperature of 102 degrees F or higher.
- Do not decrease temperature below 100 degrees.
- Causes include but are not limited to: infectious disease (most common), anesthesia (malignant hyperthermia) and drug use.
- Cocaine, amphetamines, and Salicylates (i.e. Aspirin) may elevate body temperature
- If OD suspected, contact Poison Control: 1-800-222-1222

The American Association of Poison Control Centers will assume responsibility and provide home management and follow-up per their standard operating protocols as required by Florida Statutes 401.23(13) and 395.1027. Dispatch can cancel the call via Poison Network's Authority.

Hyperthermia, Non-Environmental

History:	Signs and Symptoms:	Differential:
• Age • Duration of fever • Severity of fever • Medical history • Medications • Immunocompromised • Environmental exposure • Last acetaminophen or ibuprofen	• Warm • Flushed • Sweaty • Chills/Rigors Associated symptoms: • Myalgias, cough, chest pain, headache, dysuria, abdominal pain, AMS, rash, stiff neck	• Infections/sepsis • Cancer/tumors/lymphomas • Medication or drug reaction • Arthritis/vasculitis • Hyperthyroid • Meningitis • Cocaine/PCP



Psychological and Behavioral Emergencies

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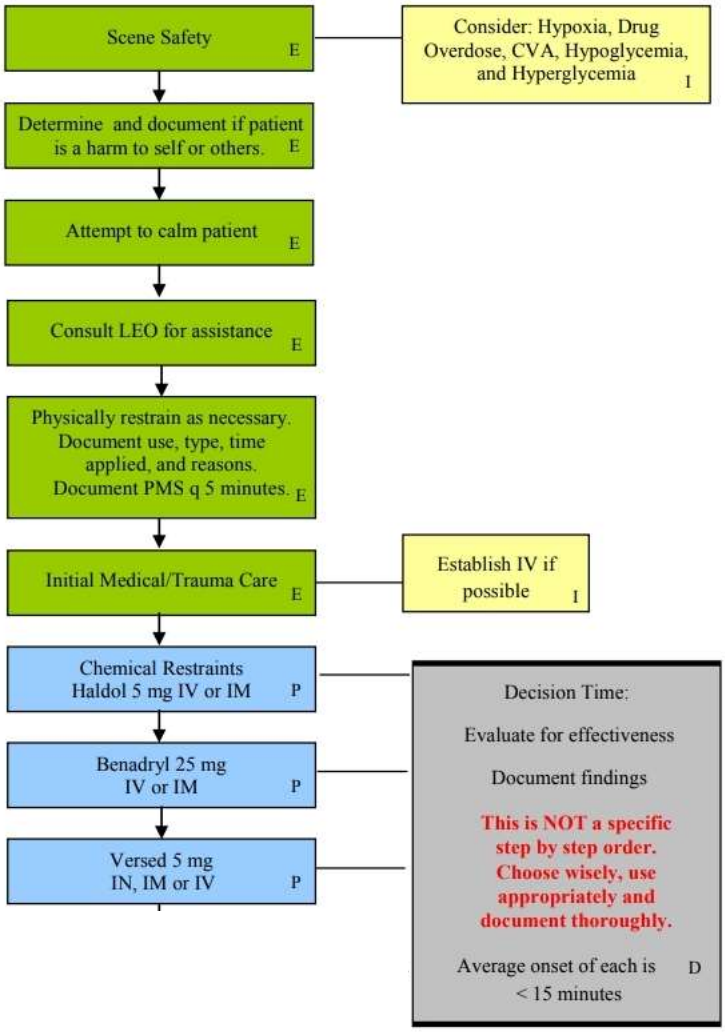
Psychological Emergency- PEARLS

- Be sure to consider all possible medical/trauma causes for behavior (hypoglycemia, overdose, substance abuse, hypoxia, head injury, etc.)
- Do not overlook the possibility of associated domestic violence or child abuse.
- Contact Law Enforcement ASAP.
- A Paramedic must continuously observe all patients who receive chemical restraint.
- Chemical restraints should only be utilized when physical restraints either fail or patient continues to be a danger to themselves and the crew.
- Haldol can be given IV or IM.
- For patients with extreme agitation such as Excited Delirium Syndrome (ExDS) that interferes with patient care or crew safety, DAI Protocol and pharmacologic agents may be used as a last resort.
- Look for signs and symptoms consistent with Excited Delirium Syndrome, Flakka, Bath Salts, etc., and treat accordingly.
- At a minimum Law Enforcement must follow transport unit to the closest appropriate psychiatric facility as noted:
    - Lakeland Regional Health (any age)
    - Winter Haven Hospital (18 years or older)
    - Lake Wales Regional Medical Center (60 years or older)
    - Osceola Regional Medical Center (any age)

The use of pharmacologic agents is NOT a specific step by step order. Choose wisely, use appropriately and document thoroughly.

Psychological and Behavioral Emergencies

History:	Signs and Symptoms:	Differential:
• Situational crisis • Psychiatric illness/medications • Injury to self/others • Medic alert tag • Substance abuse/overdose • Diabetes	• Anxiety, agitation, confusion • Hallucinations • Delusional thoughts • Bizarre behavior • Combative/violent • Expression of suicidal/homicidal thoughts • Any consistency with Excited Delirium Syndrome?	• See AMS differential • Hypoxia • Alcohol intoxication • Medication effect/overdose • Withdrawal syndromes • Depression • Bipolar disorder • Schizophrenia • Anxiety



Seizures

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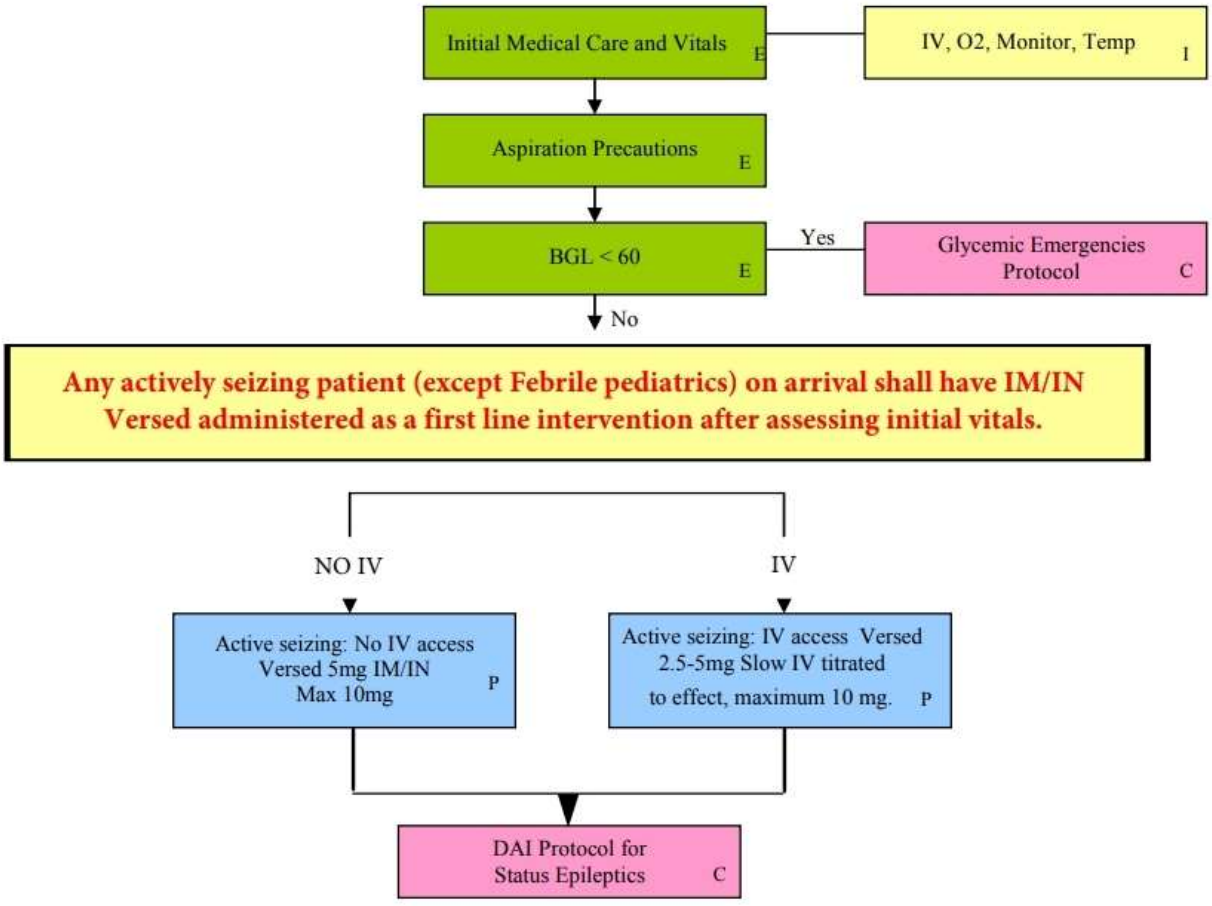
Seizures- PEARLS

Any actively seizing patient (except febrile pediatrics) on arrival shall have IM/IN Versed administered as a first line intervention after assessing initial vital signs.

- After IM/IN Versed, establish IV access if possible. If unable to obtain IV access repeat IM/IN Versed as needed to max of 10mg.
- If IV is already established, then utilize IV dosage of Versed.
- Status epilepticus is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment and transport.
    - **Grand mal seizures (generalized)-** associated with loss of consciousness, incontinence and tongue trauma.
    - **Focal seizures (petit mal)-** effect only one part of the body and are not usually associated with loss of consciousness.
    - **Jacksonian seizures-** start as a focal seizure and become generalized (grand mal)
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- Be prepared to assist ventilations, especially if Versed is used.
- For any seizure in a pregnant patient, follow the OB Emergencies protocol.

Seizures

History:	Signs and Symptoms:	Differential:
• Reported/witnesses seizure • Seizure history • Medical alert tag info • Seizure medications • History of trauma • History of diabetes • History of pregnancy	• Decreased mental status • Sleepiness • Incontinence • Observed seizures • Evidence of trauma • Unconscious	• CNS trauma • Tumor • Hypoxia • Electrolyte abnormality • Drug, medications • Infection/fever • Alcohol withdrawal • Eclampsia • Stroke • Hyperthermia • Hypoglycemia



Shock

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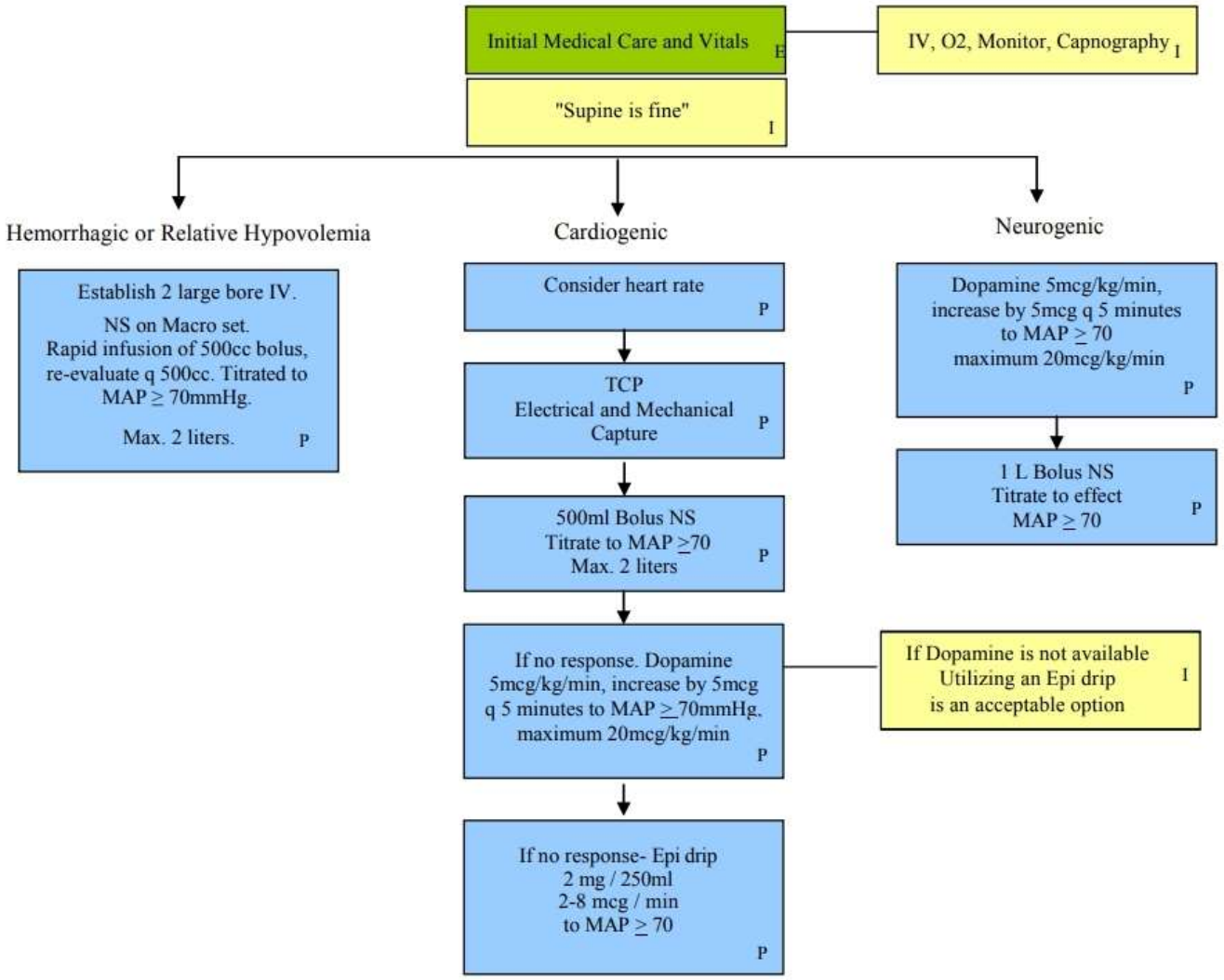
Shock- PEARLS

- Hypotension can be defined as a systolic blood pressure of less than 90 and/or MAP <70.
- Consider performing orthostatic vital signs on patients in non-trauma situations if suspected blood or fluid loss.
    - Positive orthostatic changes:
        - Decrease in systolic blood pressure by 10 mmHg or
        - Increase in pulse rate by 10 beats per minute
- Consider **Cardiogenic Shock** when patient presents with an EKG that shows **ST elevation or depression** and sustained **MAP <70 and/or HR <40**.
- **Neurogenic Shock-** pressors are needed to maintain BP
- 2 large bore IVs should be established in all shock patients when possible.

Trendelenburg is no longer required in shock patients… "Supine is fine"

Shock

History:	Signs and Symptoms:	Differential:
• Blood loss • Fluid loss: vomiting, diarrhea, fever • Infection • Cardiac ischemia • Medications • Allergic reaction • Pregnancy • History of poor oral intake	• Restlessness, confusion • Weakness, dizziness • Weak, rapid pulse • Pale, cool, clammy skin • Delayed cap refill • Hypotension • Coffee-ground emesis • Tarry stools	• Ectopic pregnancy • Dysrhythmias • Pulmonary embolus • Tension Pneumothorax • Medication effect/overdose • Vasovagal • Physiologic



Sickle Cell Anemia Crisis

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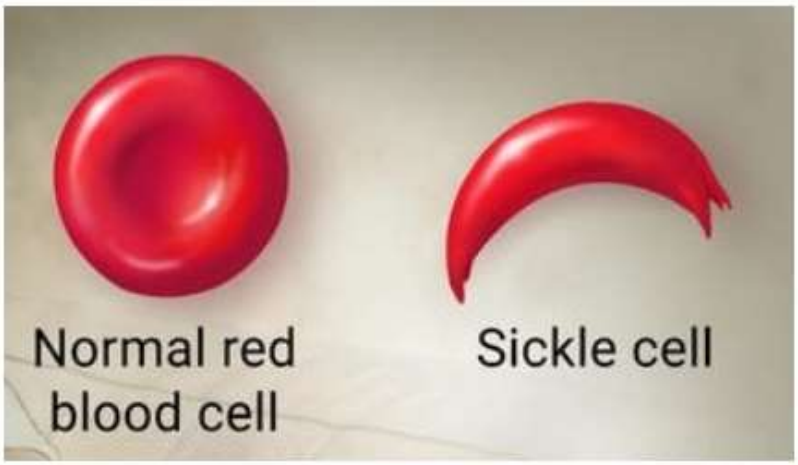
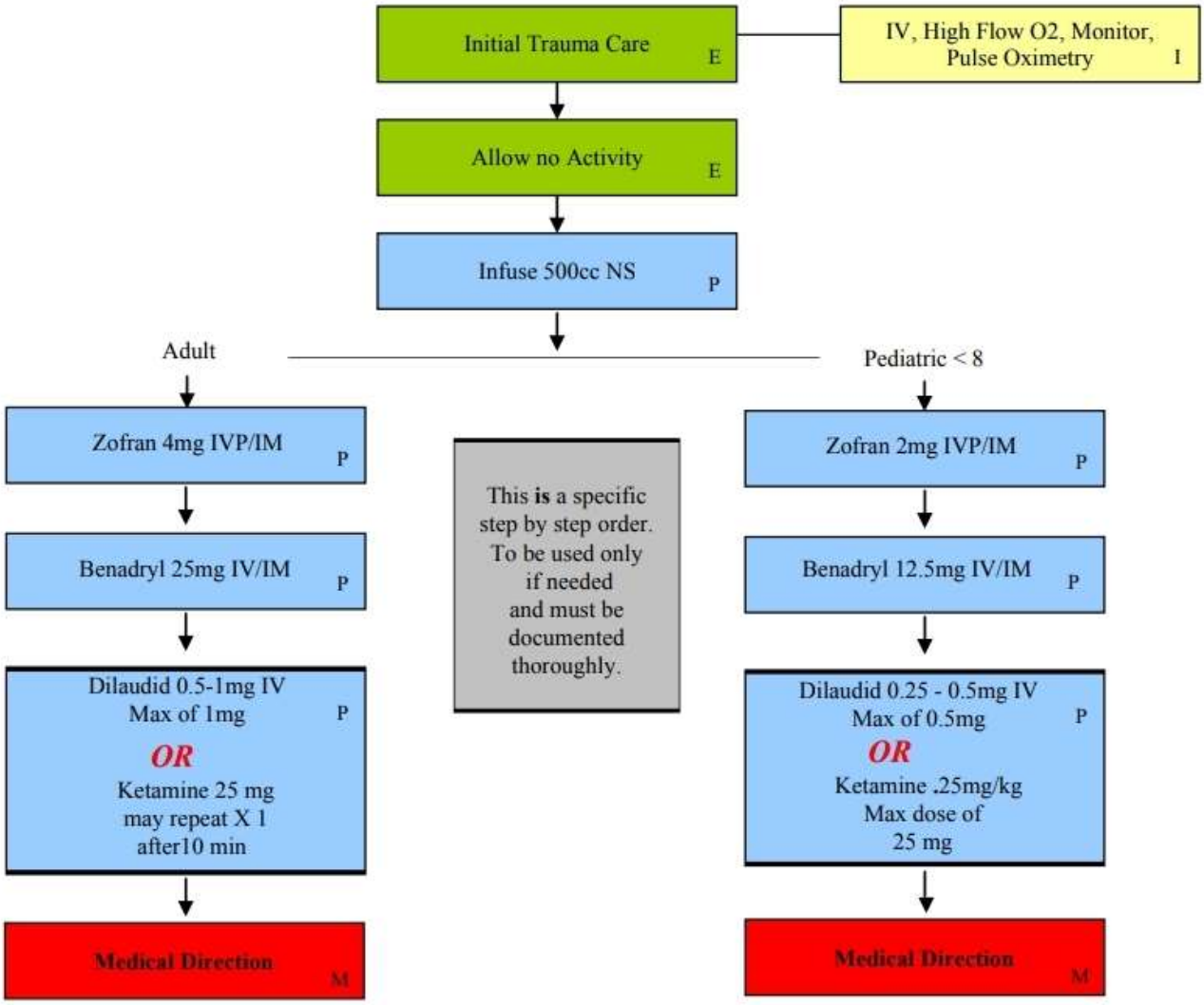
Sickle Cell- PEARLS

- The highest frequency of sickle cell disease is found in tropical regions, particularly sub-Saharan Africa, tribal regions of India and the Middle-East.
- The prevalence of the disease in the United States is approximately 1 in 5,000; mostly affecting Americans of Sub-Saharan African descent according to the National Institute of Health.
- Sickle-cell disease (SCD), also known as sickle-cell anemia (SCA) and drepanocytosis, is a hereditary blood disorder. It is characterized by an abnormality in the oxygen carrying hemoglobin molecule in red blood cells. This leads to a propensity for the cells to assume an abnormal, rigid, sickle-like shape under certain circumstances.
- Sickle-cell disease is associated with a number of acute and chronic health problems, such as severe infections, attacks of severe pain (sickle-cell crisis), and stroke. There is an increased risk of death associated with sickle-cell disease.
- Definitive emergency medical treatment is high-flow O2 via NRB and pain management.



Sickle Cell Anemia Crisis

History:	Signs and Symptoms:	Differential:
• Age • Medications • Medical history	• Severe dyspnea • Severe pain to any large muscle mass • Priapism • Abnormal Cramping	• Abdominal pain of different etiology • Chest Pain • Acute Chest Syndrome • Joint Ischemia



SIRS / Sepsis

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SIRS/Sepsis/Shock- PEARLS

SIRS is Systemic Inflammatory Response Syndrome

Key priority in care of patient with severe sepsis:

- Recognize the patient has severe sepsis
- Identify as early as possible patients with overt shock
- Provide emergent support for failing or dysfunctional organs (shock treatment)
- Antibiotics started within 60 minutes of diagnosis of severe sepsis (with or without shock)
- Provide timely source control of infection

Dopamine: Increase in 5 mcg/kg/min increments q 5 minutes until you reach a MAP of 70 or greater.

{(2 x Diastolic) + Systolic} / 3 = MAP (MAP can also be found next to the BP on the MRX monitor)

Dopamine drip: 400mg in 250ml D10W: 1600mcg/ml solution.

Weight (kg)	5mcg/kg/min	10mcg/kg/min	15mcg/kg/min	20mcg/kg/min
40	8	15	23	30
50	9	19	28	38
60	11	23	34	45
70	11	26	39	53
80	15	30	45	60
90	17	34	51	68
100	19	38	56	75
110	21	41	62	83
120	23	45	68	90

IF MAX DOSE OF DOPAMINE REACHED (OR DOPAMINE IS UNAVAILABLE) MAP STILL <70mmHg

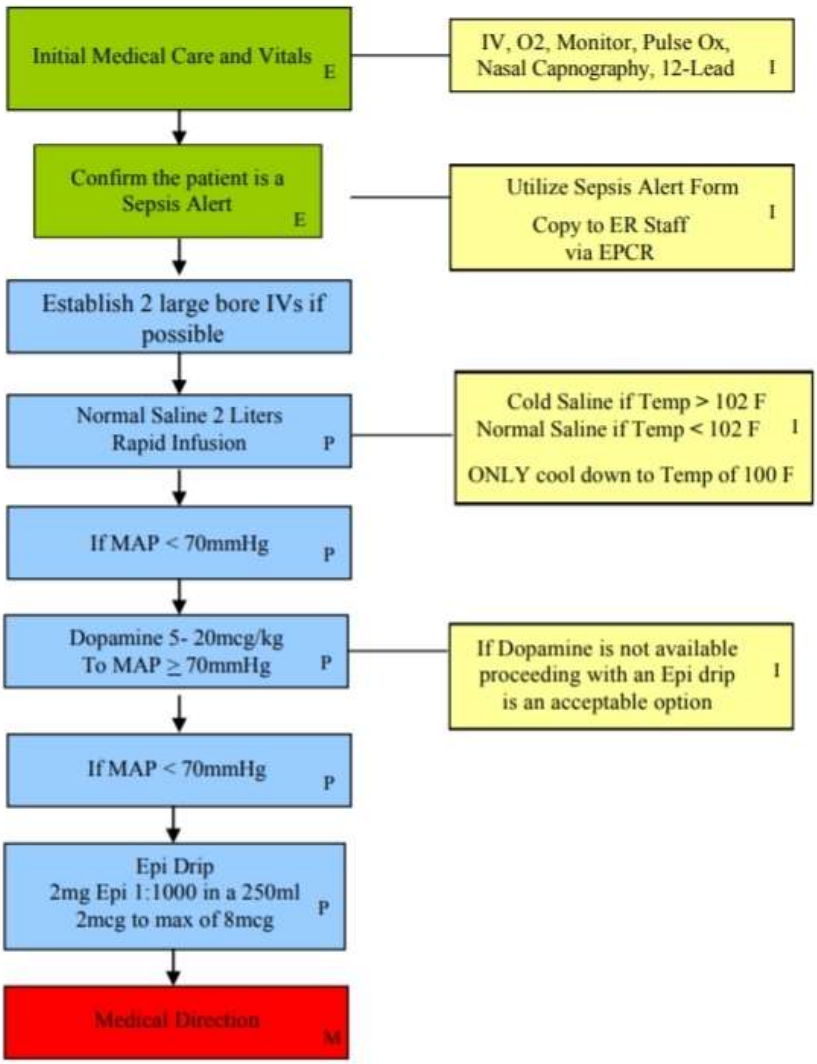
- EPI Drip: Initial dose 2mcg/min; increase by increments of 2mcg Q5 minutes to max dose of 8mcg/min.

EPI drip: 2mg of 1:1000 EPI in 250ml D10W: 8mcg/ml solution.

15 drips per min	1 drip per 4 seconds	2 mcg
30 drips per min	1 drip per 2 seconds	4 mcg
45 drips per min	3 drips per 4 seconds	6 mcg
60 drips per min	1 drip per second	8 mcg

SIRS / Sepsis

History:	Signs and Symptoms:	Differential:
• Medications • Infection • Indwelling catheters • Immunocompromised patients: (i.e. cancer, sickle cell, nursing home, low WBC, HIV) • Burns • Open wounds • Fluid loss: vomiting, diarrhea, fever	• Confusion • High fever • Accelerated breathing • Accelerated heart rate • Low blood pressure • Rash	• Acute Renal Failure • Acute Respiratory Distress Syndrome • Adrenal Insufficiency and Adrenal Crisis • Diabetic Ketoacidosis • Drug overdose • Heatstroke • Pulmonary Embolism • Shock • Toxins



Subarachnoid Hemorrhage

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Subarachnoid Hemorrhage – Pearls

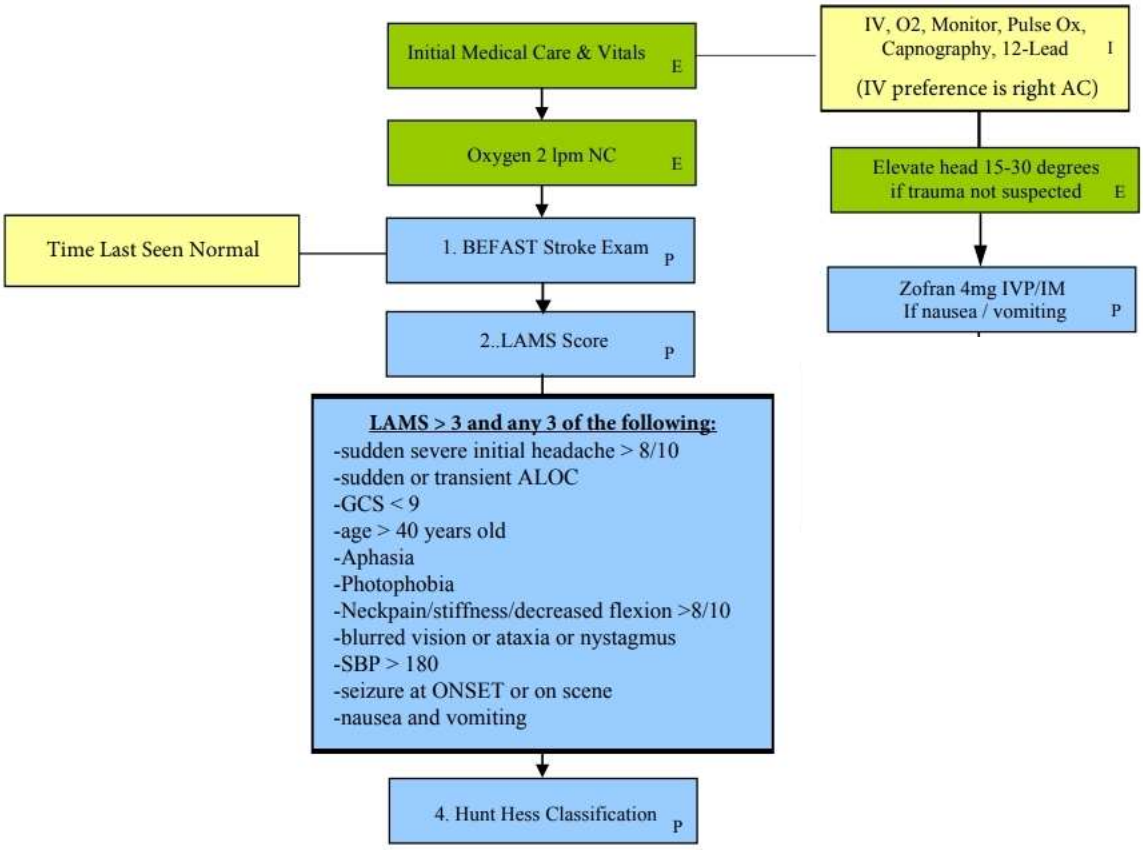
- Roughly 15% of all strokes are hemorrhagic.
- Some signs and symptoms of a possible hemorrhagic stroke include:
  - Sudden or transient ALOC
  - Age > 40 years old
  - GCS < 9
  - Aphasia – inability to speak and understand words
  - Photophobia – pain to light
  - Sudden severe initial headache > 8/10
  - Neck pain/stiffness/decreased flexion > 8/10
  - Blurred vision
  - Ataxia – lack of coordination, gait abnormality
  - Nystagmus – uncontrolled eye movement
  - SBP > 180 mmHg
  - Seizure at ONSET or on scene
  - Nausea and vomiting
- Headache red flags: First (first HA the patient has ever had like this), Worst (the worst HA a patient has ever had), Different (this HA is different from any other HA), Persistent (this HA will not go away despite other remedies).
- Subarachnoid Hemorrhage is graded on a scale based on level of consciousness or deficit similar to LAMS, called the Hunt Hess Classification

Hunt Hess GRADE	Symptoms	GCS	Survival Rate	Destination
1	Minimal Headache	15	70%	CSC
2	Severe Headache/neck pain	13-14	60%	CSC
3	Confused Drowsy Mild Motor Deficit	13-14	50%	CSC
4	Stupor Moderate/Severe Motor Deficit	7-12	20%	APSC
5	Coma/Posturing/Flaccid	3-6	10%	APSC

- Classification on the Hunt Hess Scale determines the transport destination for the SAH patient.
  - Grades 4 and 5 will be transported to an Advanced Primary Stroke Center
  - Grades 1-3 will be transported to a Comprehensive Stroke Center

Subarachnoid Hemorrhage

History:	Signs and Symptoms:	Differential:
• Previous CVAs / TIAs • Previous cardiac/vascular surgery • Assoc. diseases: DM, HTN, CAD • Atrial Fibrillation • Medications • History of trauma	• AMS • Weakness / paralysis • Blindness or other sensory loss • Aphasia / Dysarthria • Syncope • Vertigo / Dizziness • Vomiting • Headache • Seizures • Respiratory pattern change • HTN / hypotension	• AMS • TIA • Seizure • Hypoglycemia • Stroke ○ Thrombotic (~85%) ○ Embolic ○ Hemorrhagic (~15%) • Tumor • Trauma



Grade	Symptoms	GCS	Destination
1-3	Sudden Severe Headache Confusion/AMS Mild Motor Deficit	≥ 13	CSC
4-5	Altered Level of Consciousness Moderate/Severe Motor Deficit	≤ 12	APSC

Destination Decision P

Syncope, Near Syncope, General Weakness

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Syncope, Near Syncope- PEARLS

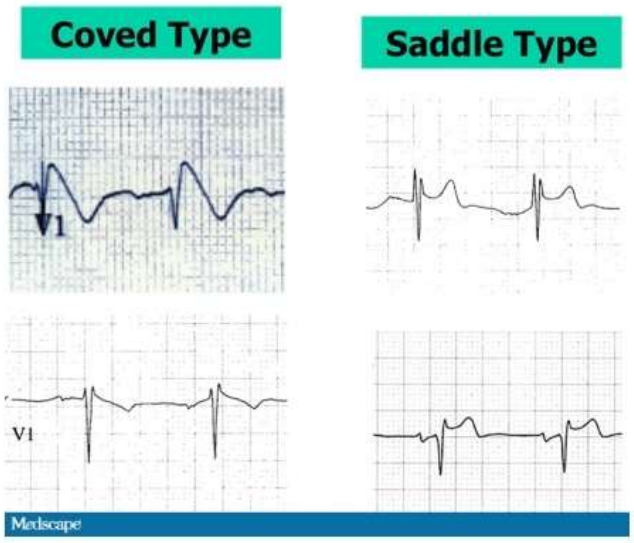
- Assess for signs and symptoms of trauma
- Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope
- ALL patients should be transported
- More than 25% of geriatric syncope is cardiac dysrhythmia based
- Orthostatic changes:
    1. Lying, sitting, standing: Increased heart rate, decreased BP when sitting and/or standing

Supine position is definitive care. "Supine is fine"

Brugada Syndrome

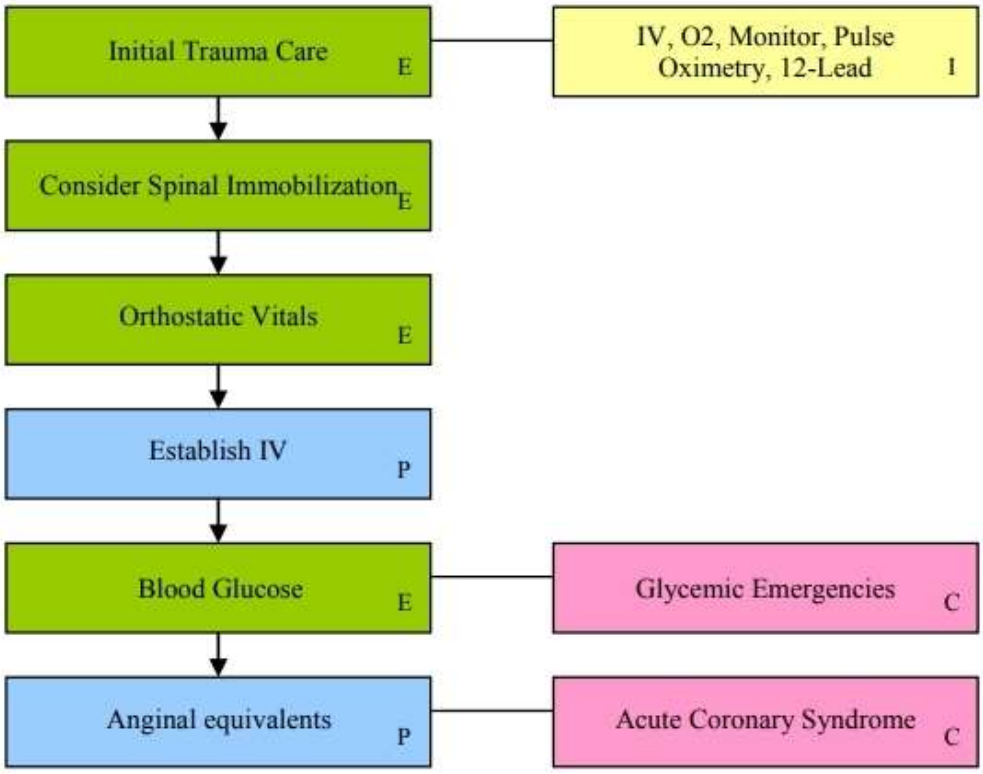
First identified and described in the early 1990s, the Brugada Syndrome is an abnormality in the electrical system of the heart that predisposes patients to develop episodes of ventricular tachycardia and loss of consciousness. The arrhythmia may spontaneously terminate, after which the patient wakes up and presents for evaluation of syncope or the arrhythmia may degenerate into ventricular fibrillation, resulting in sudden death.

ST-segment elevation in leads V1-V2 in these patients comes in 2 varieties (Figure 2): a coved-type (straight or convex upward) terminating in an inverted T-wave, and a saddle-type (concave upward). The coved type is far more predictive of arrhythmic events.



Syncope, Near Syncope, and General Weakness

History:	Signs and Symptoms:	Differential:
• History cardiac, stroke, seizure • Occult blood loss • Females: LMP, vaginal bleeding • Fluid loss: vomiting, diarrhea • Medical history • Medications	• Loss of consciousness with recovery • Lightheadedness, dizziness • Palpitations, slow or rapid pulse • Irregular pulse • Decreased blood pressure	• Stroke • Hypoglycemia • Seizure • Shock • Toxicologic • Medication effect • Vasovagal • Orthostatic hypotension • Cardiac syncope • Psychiatric



Animal or Human Bite

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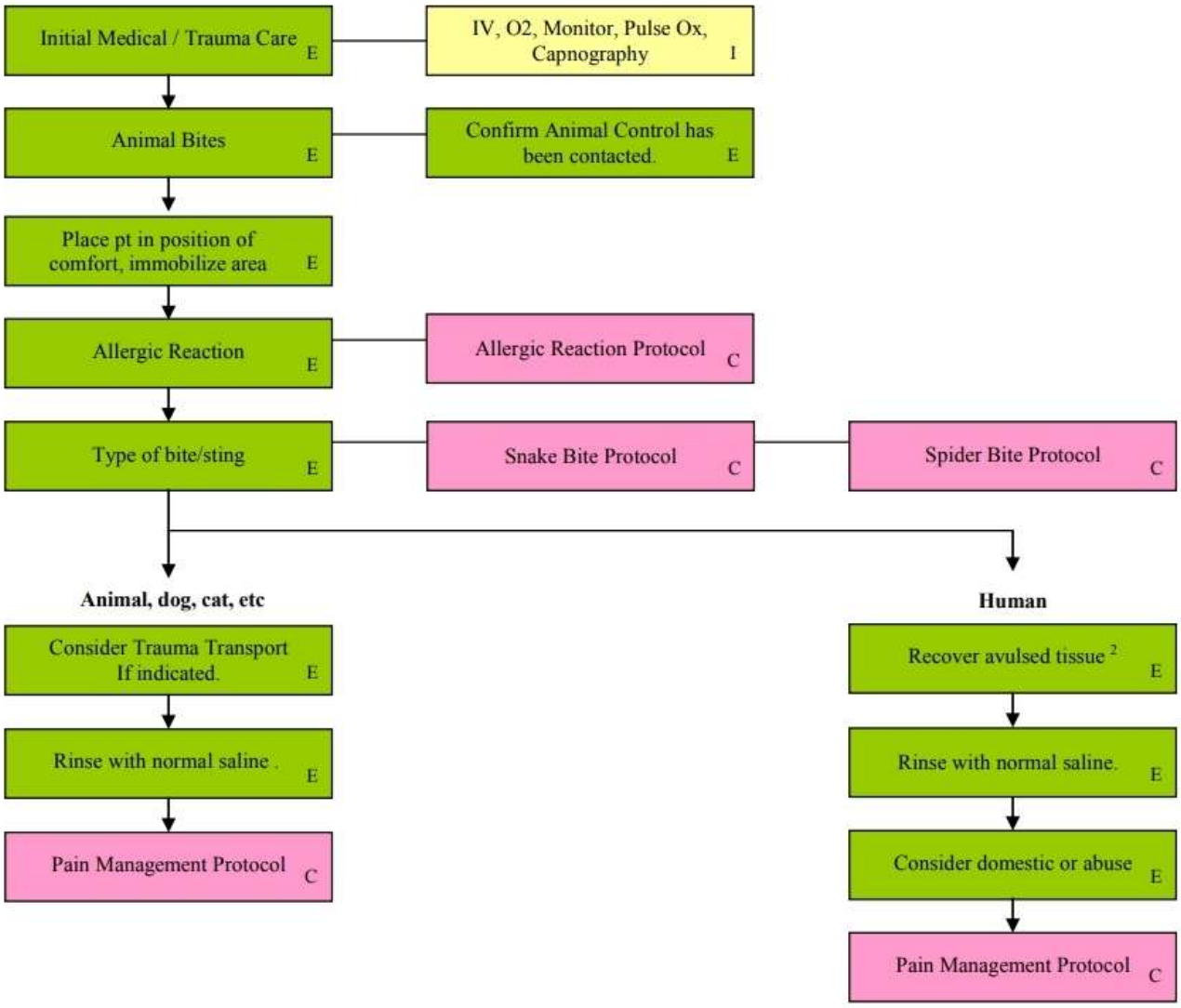
Animal or Human Bite – Pearls

- Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neurological exam if systemic effects are noted.
- Human bites are much worse than animal bites due to normal mouth bacteria.
- Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
- Cat bites may progress to infection rapidly due to the bacteria (Pasteurella multocida).

Animal or Human Bite

History:	Signs and Symptoms:	Differential:
• Type of bite/sting • Description/photo of insect/animal/snake • Time, location, size of insult • Previous reaction to like same • Domestic vs. wild/feral • Tetanus and rabies risk • Immunocompromised patient • Does animal appear healthy • Prior first aid	• Rash, skin break, wound • Pain, soft tissue swelling, redness • Blood oozing from wound • Evidence of infection • Shortness of breath, wheezing • Allergic reaction, hives, itching • Hypotension or shock	• Animal bite • Human bite • Snake bite • Spider bite • Insect sting/bite • Marine sting/bite • Infection risk • Rabies risk • Tetanus risk • MRSA



Burns

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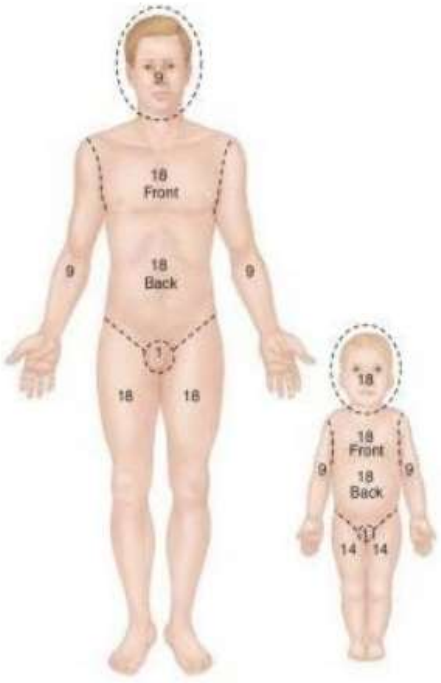
Burns – Pearls

- Refer to Pain Management Protocol for 2nd and 3rd degree burns.
- Classify and evaluate the burn in three ways: source, degree, and percentage.
    - Source: Never assume the agent or source of the burn.
    - Degree: Burns involving the skin are classified as superficial, partial thickness, and full thickness; or first, second, third degree.
- Evaluate depth of burn and estimate percentage using Rule-of-nines:
    - Wear gloves and mask until wounds are covered.
    - Do NOT break blisters.
- Treatment:
    - Place sterile burn sheet on stretcher before moving patient to stretcher.
    - Cover burns with dry sterile dressings.
    - Cover patient with blanket to maintain body temperature.
    - Remove all distal jewelry.
- Parkland Formula: $\frac{4 \text{ ml x kg x \% of burn}}{2}$

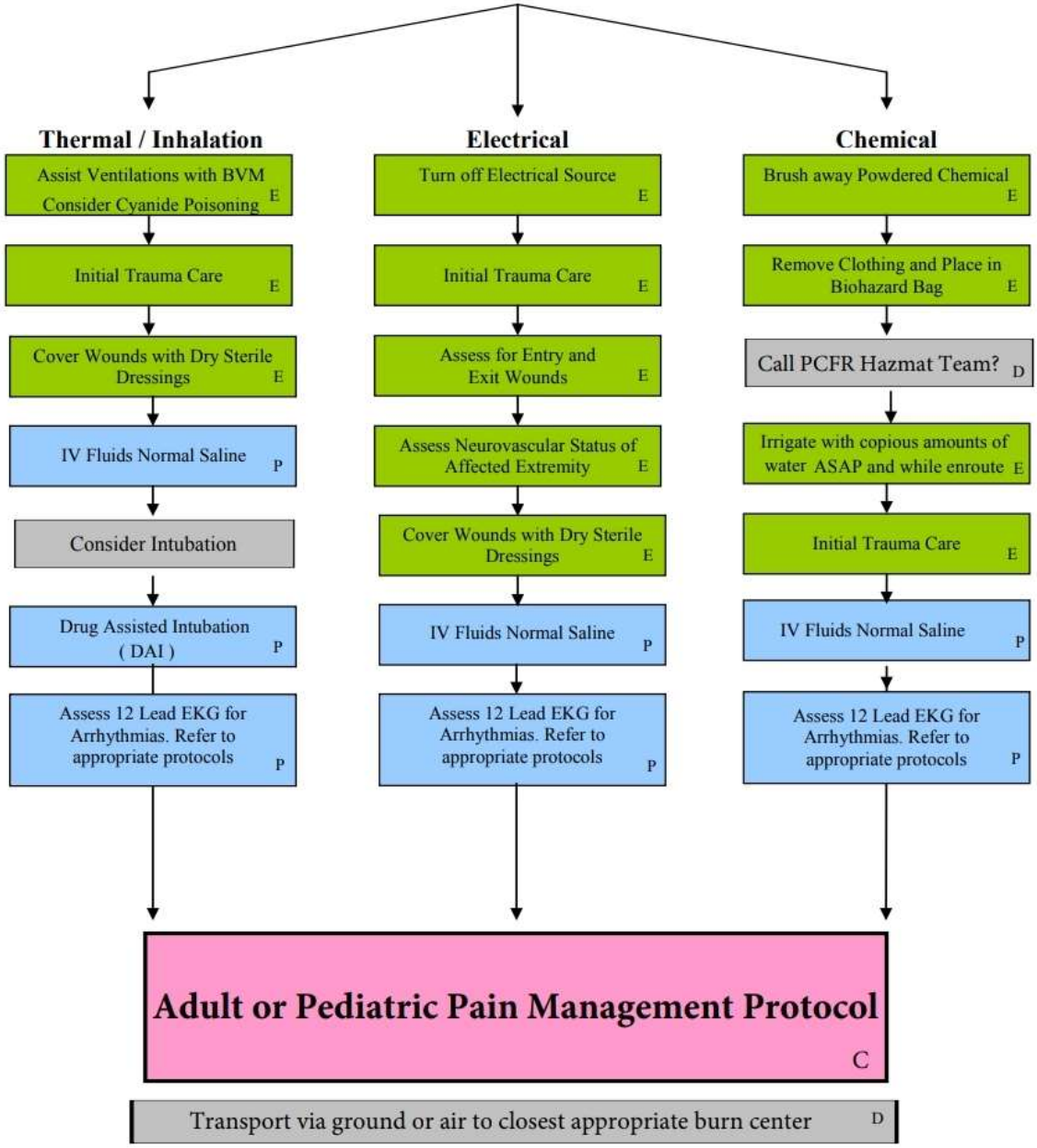
<u>Lightning Injuries: (Electrical Burns) Signs and Symptoms</u>

- Cardiorespiratory
    - Due to direct current
    - May resolve spontaneously as automaticity resumes
- Respiratory Arrest
    - Due to paralysis of medullary center
    - May lead to hypoxic induced V. Fib
- Shock
    - Neurogenic (Spinal Injury)
    - Hypovolemic (trauma)
- Ruptured Tympanic Membrane
- Featherlike burns
- Corneal Lesions
- Hyphema (blood in anterior chamber of eye)
- Retinal detachment



Burns

Mechanism:	Signs and Symptoms:	Differential:
• Trauma/Medical • Time of Contact • May Be Immediate or Delayed effects • Scene Safe	• Singed Nasal Hair, Eyebrows, Eyelashes • Wheezing/Stridor Present	• Asses Severity by using the Rule of Nines • Wear Gloves and Mask until Wounds are Covered • DO NOT Break Blisters • Use Sterile Sheet • Remove Distal jewelry



Chest Injuries

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Chest Injuries – Pearls

- Pericardial Tamponade Suspected –-Assess for **Beck's Triad:** (Narrowing Pulse Pressures, JVD, Muffled Heart Sounds).
- Pneumothorax/Hemothorax suspected: Refer to Pleural Decompression.
- Reassess lung sounds often when the above are suspected.
- 12 Lead EKG should be obtained in serious/severe chest injuries.
- Observe for symmetrical chest rise.
- Do not over fluid resuscitate.
- DO NOT UTILIZE A FLUTTER VALVE

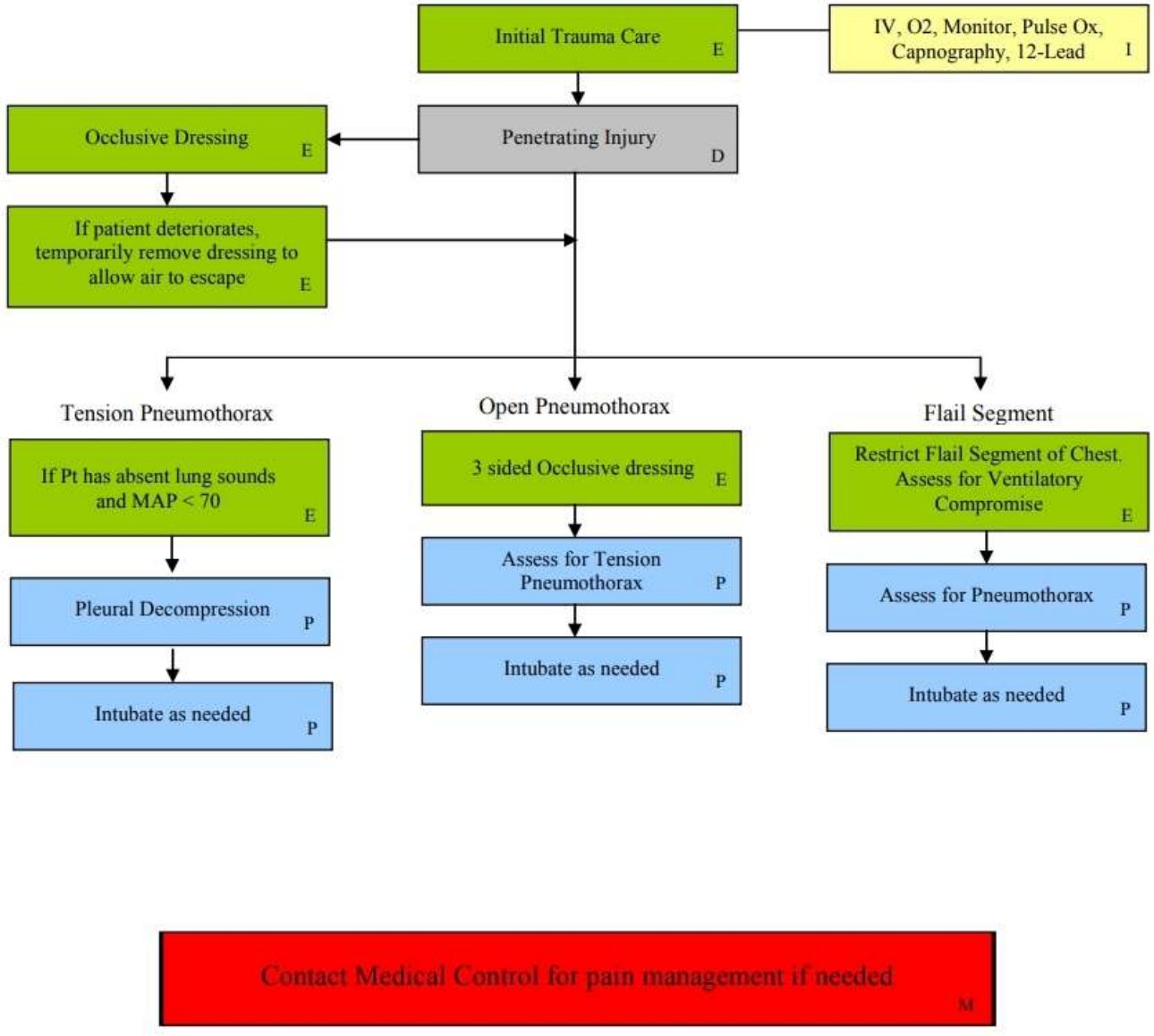
Injury	Trachea	Breath Sounds	Percussion
Tension Pneumothorax	Away from affected lung	Diminished or absent	Hyper resonant
Simple Pneumothorax	Midline	May be diminished	Usually normal
Pulmonary Contusion	Midline	Normal/Crackles	Normal
Lung Collapse	Towards affected lung	May be reduced	Normal

SIGNS AND SYMPTOMS OF TENSION PNEUMOTHORAX

- Anxiety, agitation, and apprehension
- Diminished or absent breath sounds
- Dyspnea with cyanosis (lips, inside of mouth, fingertips, and/or nail beds)
- Rapid, shallow breathing (tachypnea)
- Distended neck veins (JVD)
- Hypotension - evidenced by a loss of radial pulse
- Cool, clammy skin
- Decreased level of consciousness (AVPU scale)
- Visible deterioration
- Loss of consciousness
- Tracheal deviation (a late sign, might not be observed)

Chest Injuries

History:	Signs and Symptoms:	Differential:
• Assault • MVC • Fall • Blunt Trauma • Penetrating Injuries • Crush Injuries	• Hypotension • Severe Respiratory Distress • JVD • Diminished or absent lung sounds • Tracheal Deviation • Muffled Heart Sounds	• Open Pneumothorax • Tension Pneumothorax • Pericardial Tamponade • Flail Segment



Crush Syndrome

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Crush Syndrome – Pearls

Indications for use of Crush Protocol: Any Extremity or Torso impingement injury > 45 min

- Be aware of complications of Rhabdomyolysis
  - Muscle pain, Tenderness, Swelling – Compartment Syndrome
  - Hypovolemic state
  - Decreased urine output
  - Dark Urine
  - Peaked T-waves (possible hyperkalemia), hypocalcemia
- Other possible S/S of Crush Syndrome
  - Skin may be bruised/discolored, but can remain intact
  - Swelling usually appears rapidly after pressure is released
  - Pain after pressure is released can become excruciating
  - Pulses may or may not be present
  - Erythema, Ecchymosis, Bullae, etc.

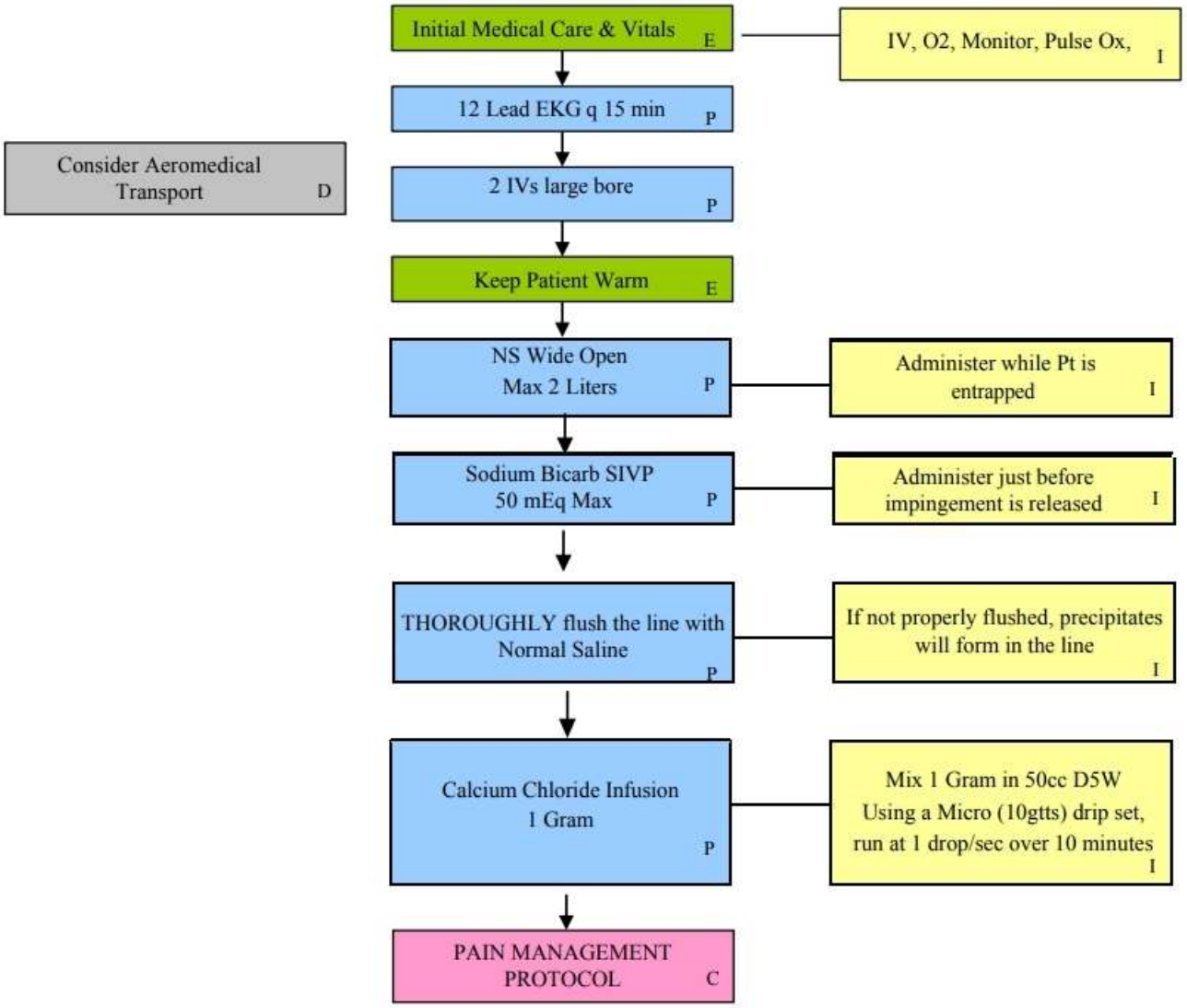
Although crush syndrome is relatively rare, natural and manmade disasters are a sobering reminder that EMS personnel must be ready to manage patients who suffer this damage. Early recognition that the potential exists will be the all-important first step. Aggressive management to correct the syndrome's negative consequences will reduce morbidity and mortality. Fundamentally it is based on three criteria:

1. Involvement of muscle mass (most common include lower extremity and/or the pelvic region).
2. Prolonged compression (not only inclusive of building collapse but possible in MVC or machinery)
3. Compromised blood circulation (if unrelieved and poor perfusion is not corrected, the affected tissue will eventually begin to die)

- You should initiate fluid resuscitation while the victim is still trapped to effect hydration to prevent hypotension and forced diuresis to prevent ARF (acute renal failure).
- Definitive treatment and the cornerstone of Advanced Trauma Life Support is fluid resuscitation and Sodium Bicarbonate and Calcium Chloride administration.
- **Immediately prior to the release of the compression** on the victim's affected body areas, administer 1 mEq/kg of Sodium Bicarbonate (Max 50 mEq) to help alkalinize the urine and to attempt to control hyperkalemia and acidosis.
- Once the victim has been extricated, ensure that the airway, breathing, and circulation (ABCs) are still intact, and be prepared to treat for hypovolemic shock. Also, pay close attention to the cardiac monitor for signs of hyperkalemia.
- Continue fluid administration and administer an infusion of Calcium Chloride (1 Gram) over 10 minutes using a 10 gtt set. Administration faster than 100 mg/min (10cc) can cause arrhythmia and sudden cardiac arrest.
- Cardiac arrest from crush injury due to prolong entrapment with V-Fib being the most common dysrhythmia encountered. Be cautious of peaked T waves, prolonged PR interval, and QRS widening
- Control pain by following pain management protocol.

Crush Syndrome

History:	Signs and Symptoms:	Differential:
• Age • Past medical history • Renal disease or insufficiency • Heart disease • Medications • Allergies • Dialysis patient	• Compression > 60 minutes • Large muscle mass involvement • Absent pulse & capillary refill • Pale, clammy, cool skin • Weak rapid pulse • Usual pain 0/10 • Shock	• Isolated arterial lesion • Isolated nerve damage • Cellulitis • Osteomyelitis • Tenosynovitis • Synovitis • Thrombophlebitis



Drowning / Near Drowning

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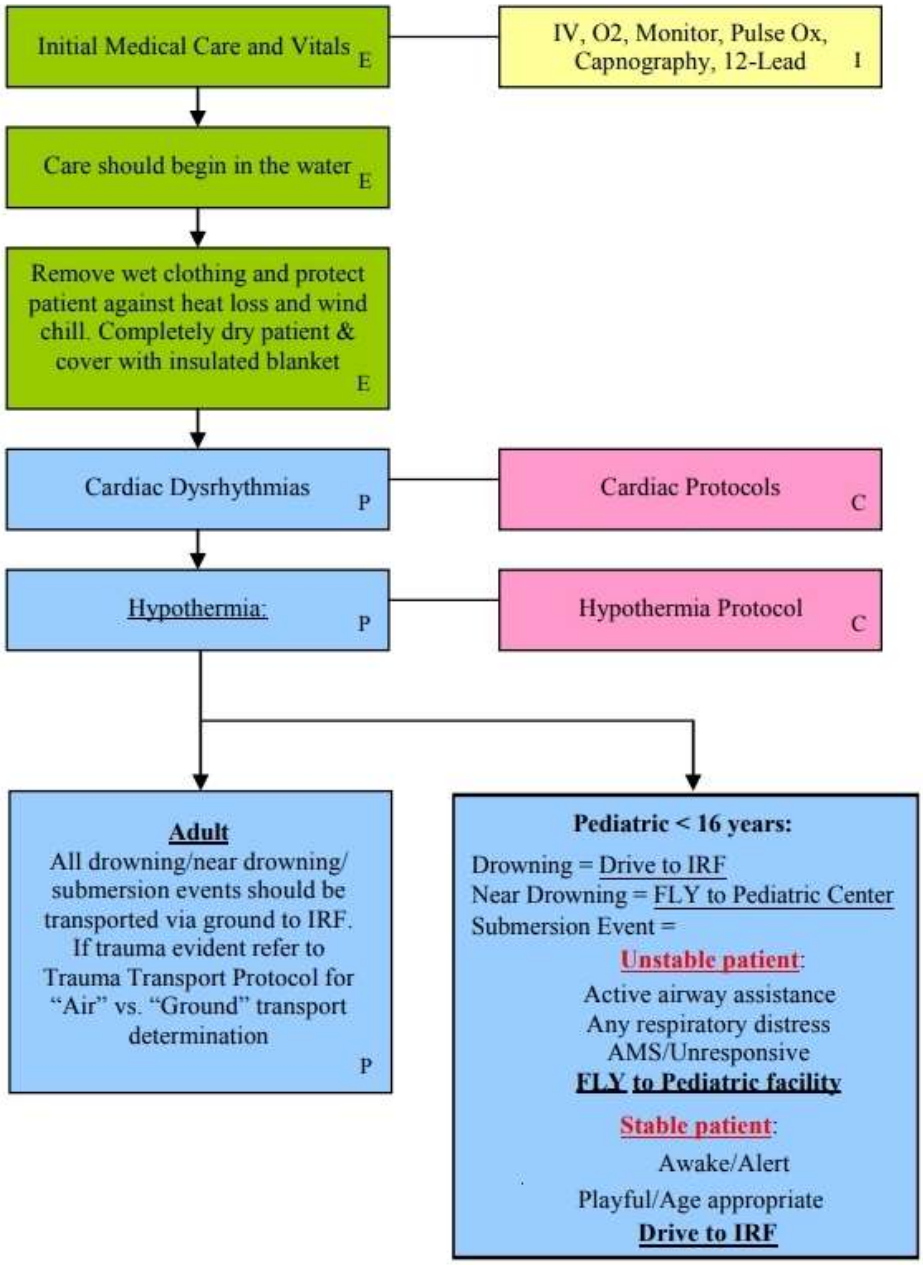
Drowning / Near Drowning – Pearls

- Exam: Trauma Survey, Head, Neck, Chest, Abdomen, Pelvis, Back, Extremities, Skin, and Neurological.
- With cold water no time limit - resuscitate all.
- All victims should be transported for evaluation due to potential for worsening over the next several hours.
- **Drowning is a leading cause of death among would-be rescuers.**
- **Allow appropriately trained and certified rescuers to remove victims from areas of danger.**
- **With pressure injuries (decompression / barotrauma), transport to closest Trauma Center and suggest need for a HYPERBARIC CHAMBER**
- **NEAR DROWNING is defined as a submersion event with a loss of pulse and/or respirations with an eventual ROSC. If this is a Pediatric patient he/she should be transported to a Pediatric facility not IRF.**
- **DROWNING is defined as a submersion event to include death due to suffocation within 24 hours after submersion in a liquid medium with no ROSC and should be transported to an IRF.**
- **SUBMERSION EVENT is defined as an emergency event in which a person experiences some swimming related distress that is sufficient to require Emergency Services support in the field and transport to a hospital.**
- **If any patient is involved in a submersion event and is deemed medically and clinically stable (no loss of pulse or respiration during event & vitals WNL) the patient may be transported to an IRF for evaluation.**

Drowning / Near Drowning

History:	Signs and Symptoms:	Differential:
• Submersion of water regardless of depth • History of trauma i.e.: diving • Duration of immersion • Temperature of water • Fresh / Salt water	• Unresponsive • Mental states changes • Decreased or absent vital signs • Vomiting • Coughing	• Trauma • Pre-existing medical condition • Pressure injury ○ Barotrauma ○ Decompression sickness



Isolated Extremity Trauma

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Extremity Trauma – Pearls

- In amputations of the hand or the foot, time is critical. Transport to Level One (1) Trauma Center.
- **Severe bleeding not rapidly controlled may necessitate application of a tourniquet.**
- Urgently transport any injury with vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Hip, knee, and elbow dislocations/fractures have a high incidence of vascular compromise.
- Lacerations must be evaluated for repair within 6 hours from the time of injury.
- **Ancef**- reconstitute and dilute 1 gram with 10mL NS, 2 grams with 20mL NS. Ancef is administered slow IV push over 3-5 minutes.

Transport Destination Determination for Traumatic Amputations

Patient to be ground transported to nearest receiving facility with reattachment capabilities (Tampa General in most cases) for the following situations:

Amputations of more than one (1) complete finger
Amputation of thumb
Amputation distal to the wrist on hand and/or distal to the ankle
Amputations of more than one (1) complete toe
Notify receiving facility as soon as possible
Do not discuss possibility or impossibility of reimplantation with patient from the time of injury.

Contraindications for transport to reattachment facility

If patient is hemodynamically unstable (MAP < 70) transport to closest Trauma Center.
Severely crushed or mangled parts
Amputations at multiple levels
Amputations in patients with other serious injury or disease
Amputation of single digit (finger/toe), excluding the thumb
Any amputation > six (6) hours

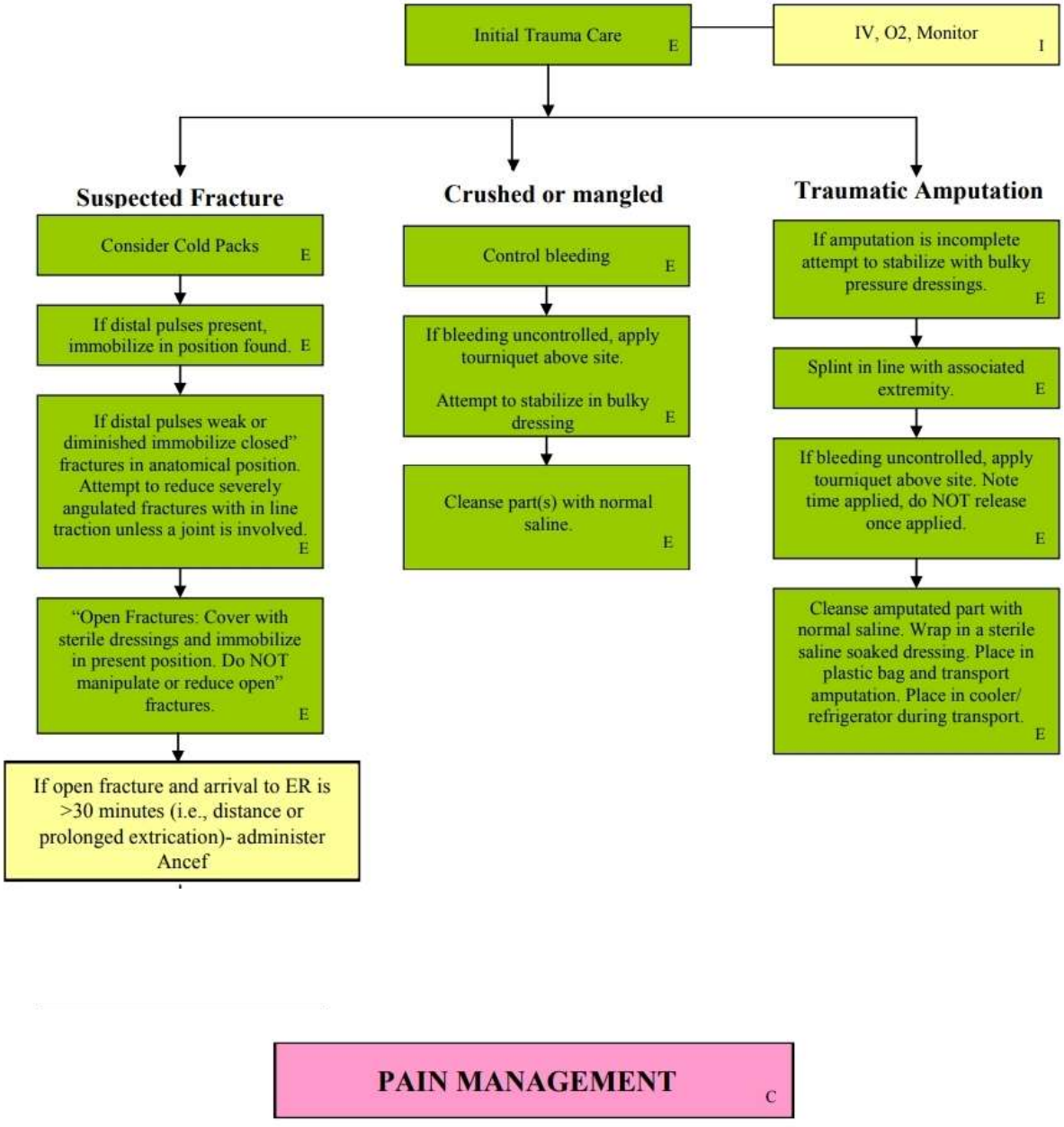
Common Anticoagulants and Antiplatelets

Warfarin (**Coumadin**)
Dabigatran (**Pradaxa**)
Rivaroxaban (**Xarelto**)
Apixaban (**Eliquis**)
Edoxaban (**Savaysa**)
Enoxaparin (**Lovenox**)
Dalteparin (**Fragmin**)
Clopidogrel (**Plavix**)
Aspirin/Dipyridamole (**Aggrenox**)
Cilostazol (**Pletal**)
Dipyridamole (**Persantine**)
Ticagrelor (**Brilinta**)
Prasugrel (**Effient**)

REMINDER: Head/Chest/Musculoskeletal injury + Anticoagulants + Age >55 = Grey Trauma Criteria

Isolated Extremity Trauma

History:	Signs and Symptoms:	Differential:
• Type of injury • Mechanism: Crush/penetrating/amputation • Time of injury • Open vs. closed • Wound contamination • Medical history • Medications	• Pain, swelling • Deformity • Altered sensorium / motor function • Diminished pulse / cap refill • Decreased extremity temperature	• Abrasion • Contusion • Laceration • Sprain • Dislocation • Fracture • Amputation



Head Injury

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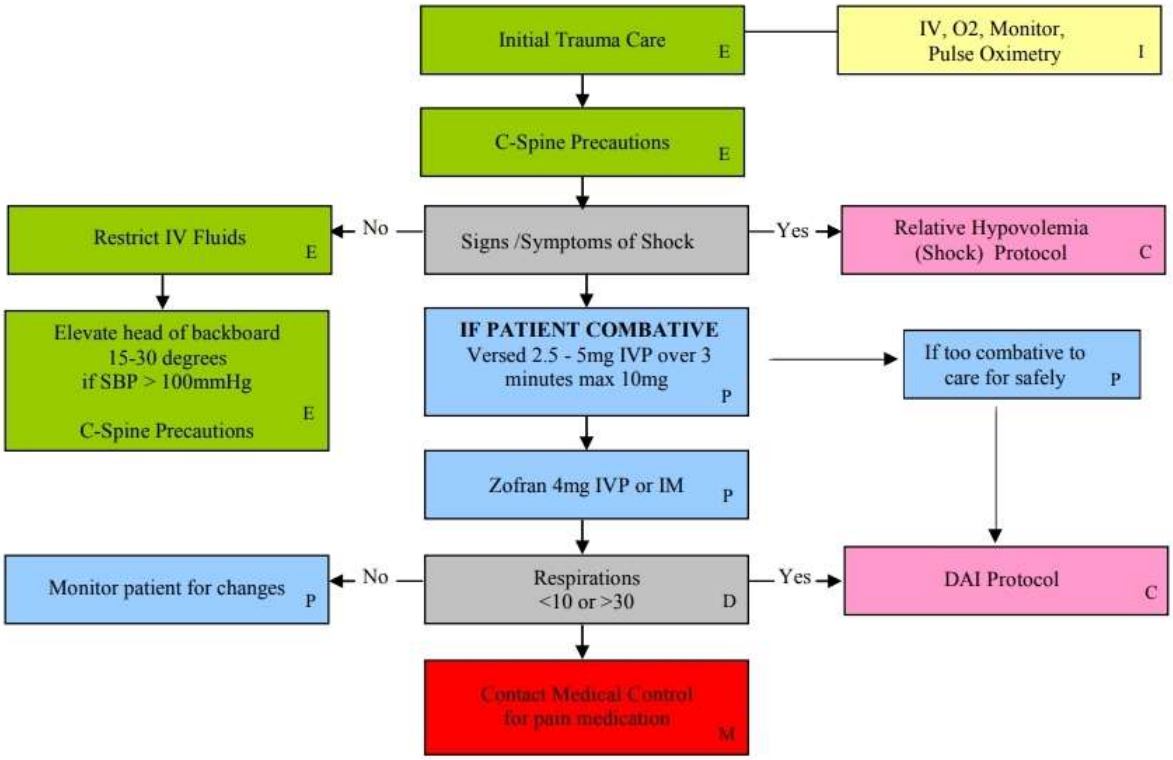
Head Injuries- PEARLS

- In absence of capnography, mildly hyperventilate patient (adult: 20 breaths per minute, child: 30 and infant: 35) only if ongoing evidence of brain herniation (blown pupil, decorticate or decerebrate posturing, or bradycardia)
- Increased intracranial pressure (ICP) may cause Cushing's Response (HTN, bradycardia, and irregular respirations)
- Hypotension usually indicates injury or shock unrelated to the head injury and should be aggressively treated
- The most important item to monitor and document is a change in the level of consciousness and GCS
- Consider restraints if necessary for patient's and/or personnel's protection
- Concussions are periods of confusion or loss of consciousness with trauma that may have resolved by the time EMS arrives. A physician should evaluate any prolonged confusion or mental status abnormality, which does not return to normal within 15 minutes or any documented loss of consciousness

	Infant <1 year	Child 1-4 years	Age 4-Adult
	EYES		
4	Open	Open	Open
3	To Voice	To Voice	To Voice
2	To Pain	To Pain	To Pain
1	No response	No response	No response
	VERBAL		
5	Coos, babbles	Oriented, Speaks	Oriented and Alert
4	Irritable	Confused	Disoriented
3	Cries persistently	Inappropriate Words	Inappropriate Words
2	Moans to Pain	Incomprehensible Words	Incomprehensible Words
1	No response	No response	No response
	MOTOR		
6	Spontaneous Movement	Spontaneous Movement	Obeys Commands
5	Localizes Pain	Localizes Pain	Localizes Pain
4	Withdraws from pain	Withdraws from pain	Withdraws from pain
3	Decorticate flexion	Decorticate flexion	Decorticate flexion
2	Decerebrate extension	Decerebrate extension	Decerebrate extension
1	No response	No response	No response

Head Injuries

History:	Signs and Symptoms:	Differential:
• Age • Medical history • Mechanism • LOC	• Altered Mental Status • Amnesia • Combative • Vomiting • Battle Signs • Raccoon Eyes	• Closed • Open • LeFort Fractures



REMINDER: Head/Chest/Musculoskeletal injury + Anticoagulants + Age >55 = Grey Trauma Criteria

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Aspirin/Dipyridamole **(Aggrenox)**
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Dipyridamole **(Persantine)**
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Prasugrel **(Effient)**

I

Ophthalmic Emergencies/Injuries

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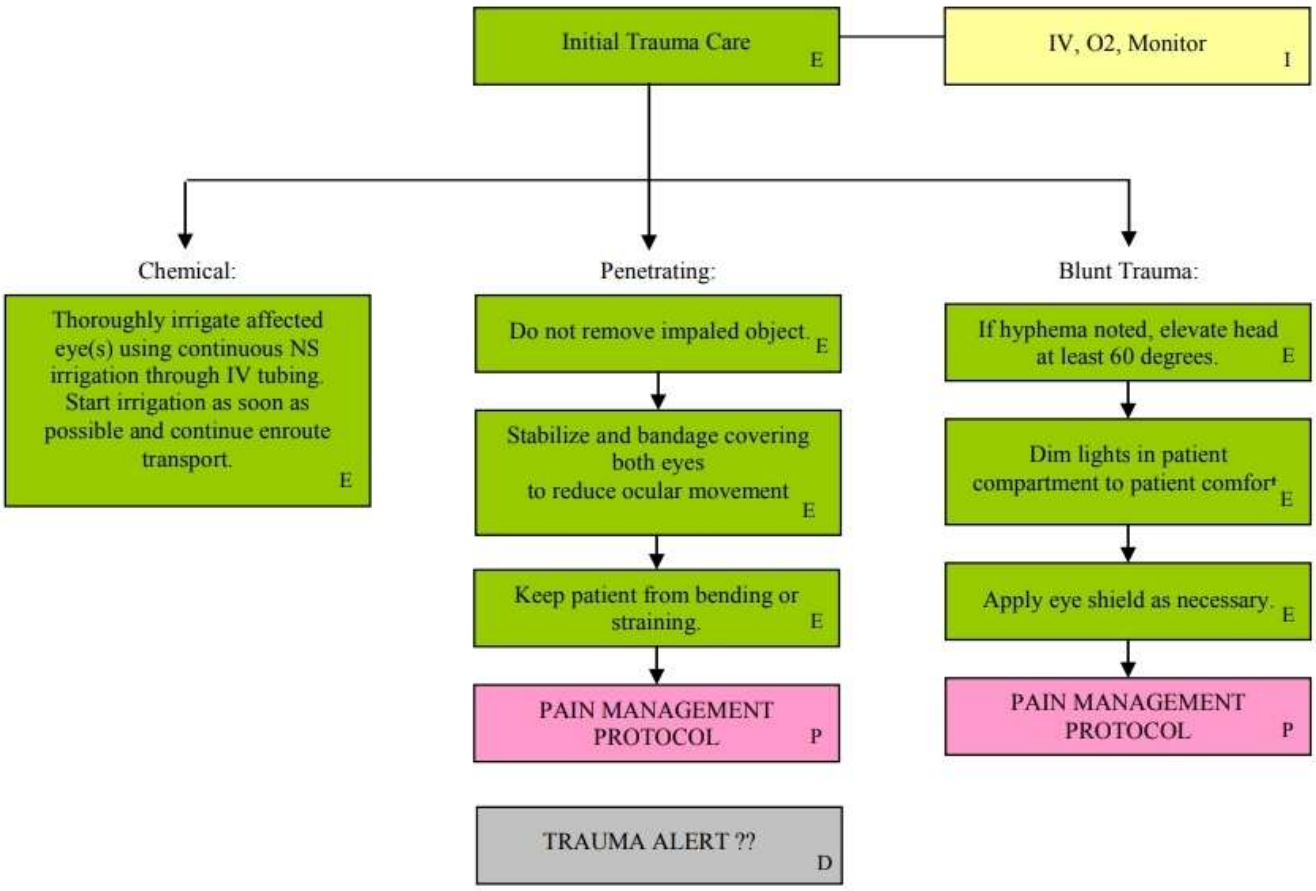
Ophthalmic Emergencies – Pearls

Outside of a general traumatic event other medical issues could cause an Ophthalmic Emergency

- Amaurosis Fugax – Visual disturbance of Curtains Across the Eyes"
- Pseudotumor Cerebri – occurs when intracranial pressure increases for no obvious reason generally causing headaches but the increased intracranial pressure associated with pseudotumor cerebri can cause swelling of the optic nerve and result in vision loss; can occur in children and adults, but it is most common in obese women of childbearing age
- Sympathetic eye movement refers to the voluntary or involuntary movement of the eyes, helping in acquiring, fixating and tracking visual stimuli therefore it is a requirement to cover both eyes for any injury but especially impaled objects.
- HYPHEMA – Blood in the anterior chamber of the eye.

Ophthalmic Emergencies/Injuries

History:	Signs and Symptoms:	Differential:
• Time of injury/onset • Blunt/penetrating/chemical • Open vs. closed injury • Involved chemicals/MSDS • Wound contamination • Medical history • Tetanus status • Normal vision acuity • Medications	• Pain, swelling, blood • Deformity, contusion • Visual deficit • Leaking aqueous/vitreous humor • Upwardly fixed eye • Shooting or streaking light • Visible contaminants • Rust ring • Lacrimation	• Abrasion/Laceration • Globe rupture • Retinal nerve damage • Chemical/thermal burn • Orbital fracture • Orbital compartment syndrome • Neurological event • Acute glaucoma • Retinal artery occlusion



Adult Pain Management

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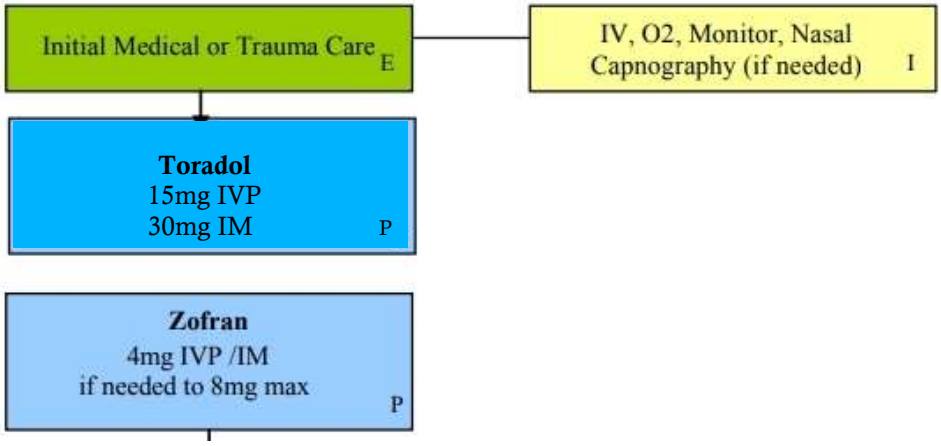
Pain Management – Pearls

- Be aware of patient mental status prior to administration of medication.
- Note patient nasal capnography prior to medication administration and monitor closely for hypoventilation.
- Pt circumstance should dictate pain management medication choice.
  Examples:
  Use Dilaudid if: Pt has penetrating eye injury, uncontrolled hypertension, or sensitivity to Ketamine.
  Use Ketamine if: Pt may have hypovolemia, hypotension, multi-system trauma, or sensitivity to Dilaudid.
  If Pt has no contraindications, use either medication.
- **NARCAN** should be accessible when Dilaudid is used if Pt shows signs of over sedation:
  - Respiratory Depression
  - AMS
  - Unresponsive
  - Low SpO2 saturation (<94%), may add NRBM
- Paramedic judgement for intubation versus pain management reversal

Adult Pain Management



Snake Bites

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Snake Bites – Pearls

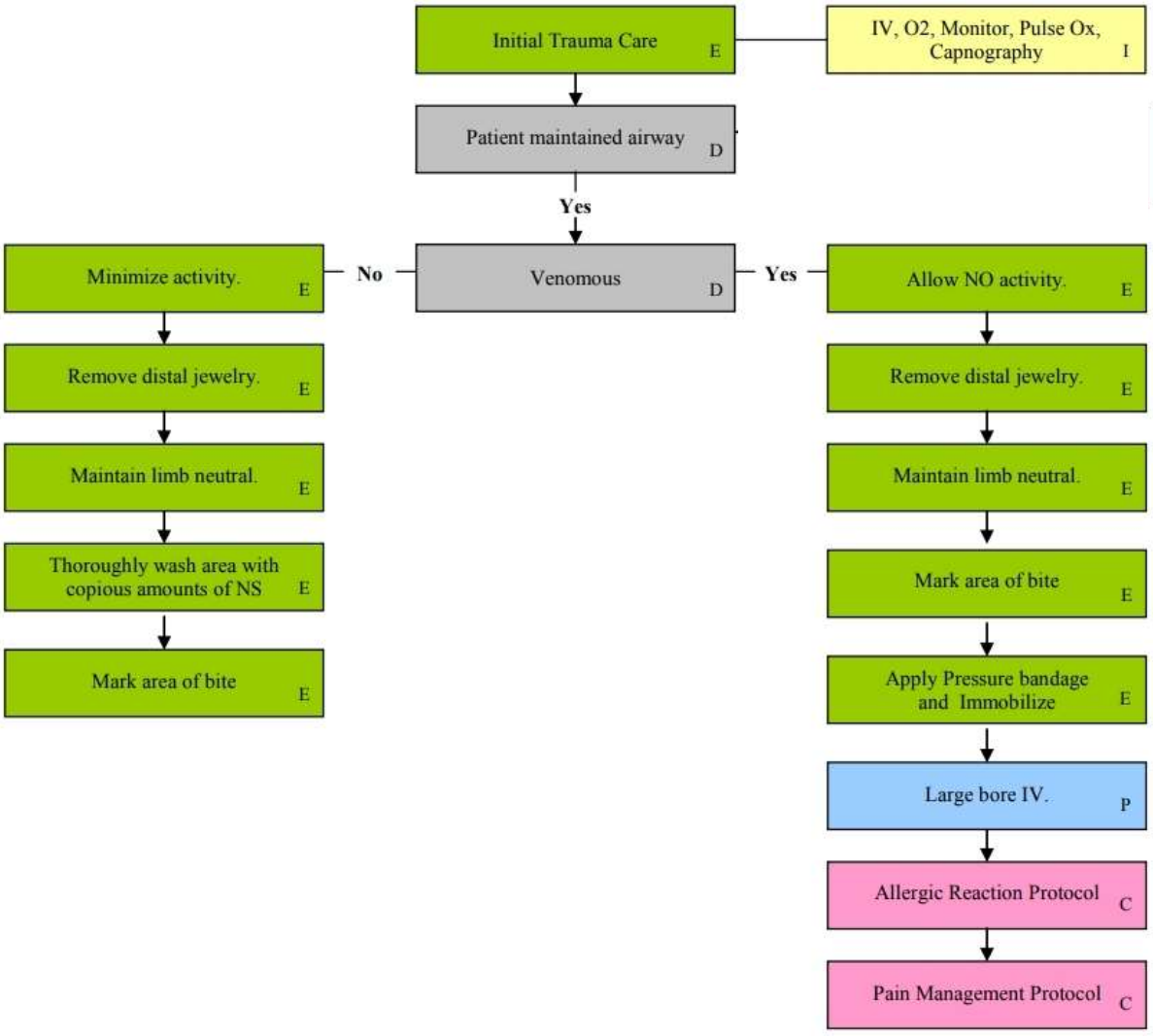
- Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neurological exam if systemic effects are noted.
- Poisonous snakes in this area are generally of the pit viper family: rattlesnake, copperhead, and water moccasin.
    1. Coral snake bites are rare: Very little pain but very toxic.

       "Red on yellow - kill a fellow, red on black - venom lack."
    2. Amount of envenomation is variable, generally worse with larger snakes and early in spring.
    3. If no pain or swelling, envenomation is unlikely.
    4. It is **NOT** necessary to take the snake to the ED with the patient.
- Evidence of infection: swelling, redness, drainage, fever, and red streaks proximal to wound.
- Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplants patients.
- Do not apply ice or cold pack to snake bites or marine stings.
- **Crotaline: Includes all native pit vipers; rattlesnake, moccasin, copper head.**
- **Elapid: Includes coral snake and non-native cobras.**
- **Venom 1 Response Unit (ENVENOMATION EMERGENCY) 1-786-336-6600**
- **Don't cut the wound**
- **Don't use a tourniquet – concentrates venom to a certain area causing more damage**
- **Don't use ice – found to be a major factor leading to amputation**

Symptoms of Snakebite Envenomation	
Hemotoxic Symptoms	**Neurotoxic Symptoms**
Intense Pain	**Minimal Pain**
Edema	**Ptosis (drooping eyelid)**
Weakness	**Weakness**

Snake Bites

History:	Signs and Symptoms: (Elapid)	Signs and Symptoms: (Crotaline)	Differential:
• Description or photo of snake • Medication history • History of reactions • Past medical history • Time of bite • Prior first aid	• Respiratory distress/ depression • Hypersalivation • Cyanosis • Trismus • Altered mental status • Ptosis • Weakness • Muscle fasciculations • Hypotension • Tachycardia • Ophthalmoplegia • Dysphagia, dysphasia	• Pain at bite site • Swelling • Nausea, vomiting, diarrhea • Syncope • Vesicles • Local edema • Ecchymosis • Bullae • Bleeding • Tachycardia, hypotension	• Venomous vs. non-venomous • Severity of envenomation • Elapid vs. Crotaline • Coral snake vs. cobra



Spider Bites / Stings

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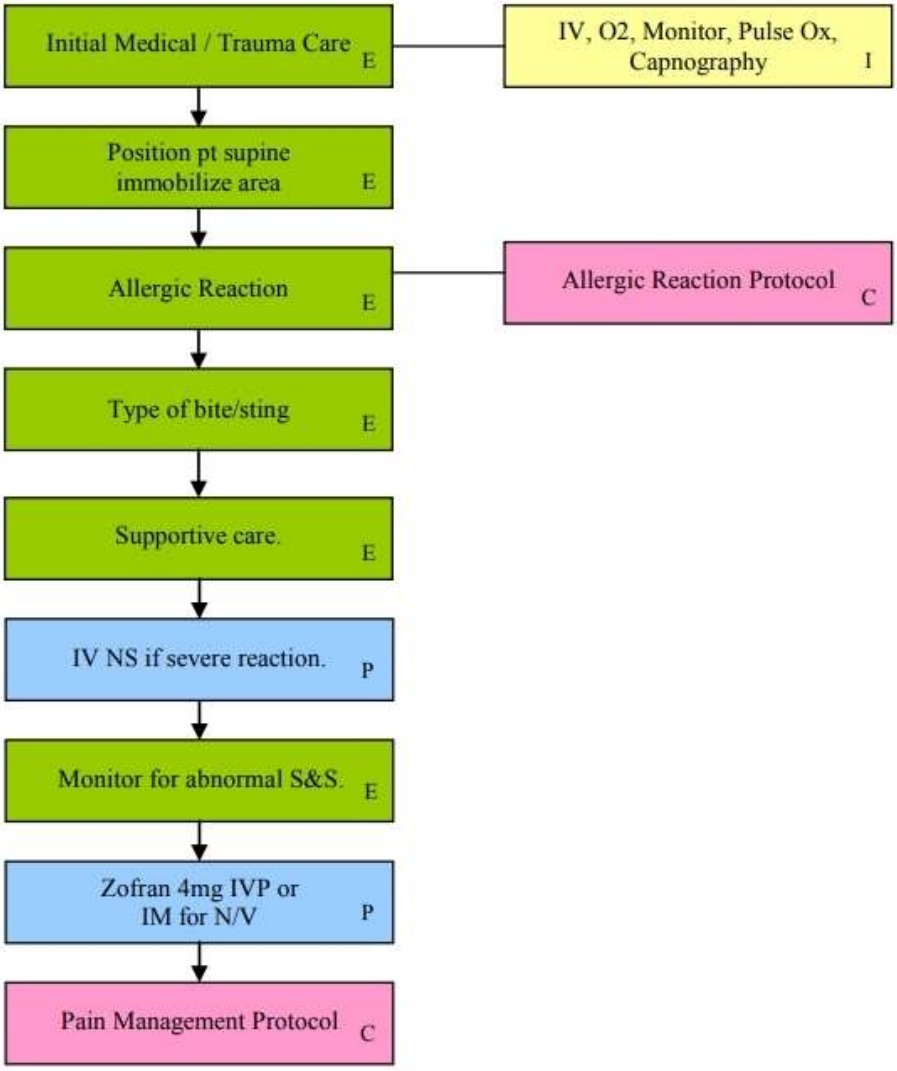
Spider Bites – Pearls

- Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neurological exam if systemic effects are noted.
- **Black Widow spider** bites tend to be minimally painful, but over a few hours, muscular pain and severe abdominal pain may develop (spider is black with red hour glass on belly).
- **Brown Recluse spider** bites are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite develops over the next few days (brown spider with fiddle shape on back).
- Evidence of infection: swelling, redness, drainage, fever, and red streaks proximal to wound.
- Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplants patients.
- Do not apply ice or cold pack to spider bites or marine stings.
- It should be noted here that most "injuries" attributed to spiders are in fact not. They are generally an infection, MRSA being one of the prominent.
- **Tarantulas** discharge small hairs as a defense mechanism these hairs often lodge in the eye or nasal passages.
- **Venom Response Unit (ENVENOMATION EMERGENCY) 1-786-336-6600.**

Spider Bites

History:	Signs and Symptoms:	Differential:
• Type of bite/sting • Description/photo of spider • Time, location, size of insult • Previous reaction to like same • Immunocompromised patient • Prior first aid	• Erythema • Edema • Irritation • Severe pruritus • Mild pain • Muscle cramping • Nausea/vomiting • Headache, anxiety • Hypertension, tachycardia	• Animal bite • Human bite • Snake bite • Insect sting/bite • Marine sting/bite • Infection risk • Rabies risk • Tetanus risk • MRSA



Spinal Immobilization Rule Out

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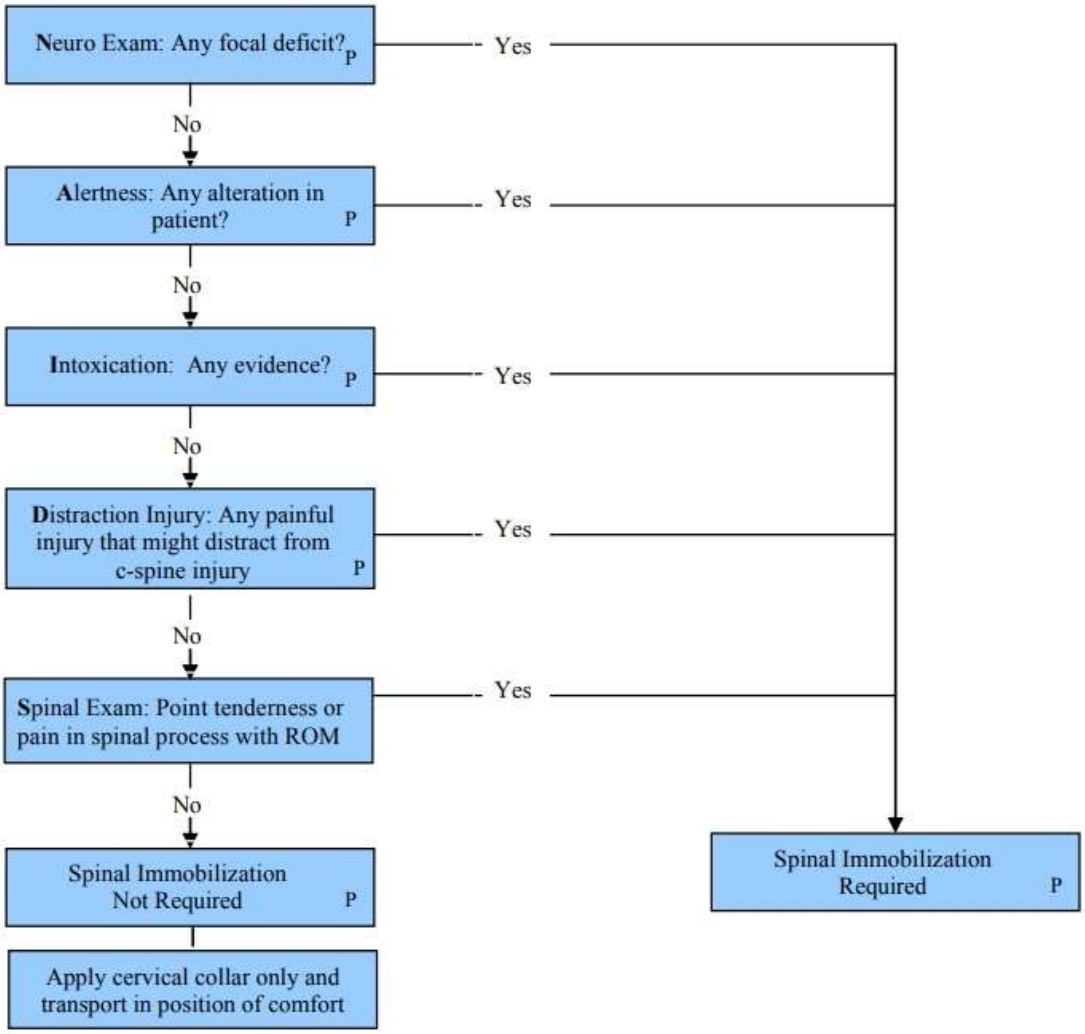
Spinal Immobilization Rule Out – Pearls

- **Consider immobilization in any patient with arthritis, cancer, or other underlying disease.**
- Significant mechanism includes high-energy events such as ejection, high falls, and abrupt deceleration crashes and may indicate the need for spinal immobilization in the absence of symptoms.
- Assess patient for midline spinal tenderness, if pain/discomfort found, range of motion should NOT be assessed and patient should be fully c-spine immobilized.
- If no pain/discomfort, assess Range of Motion: the patient should touch their chin to their chest, extend their neck (look up) and turn their head from side to side (shoulder to shoulder) without spinal process pain.
- **Neurologic Exam**. Look for focal deficits such as tingling, reduced strength, or numbness in an extremity.
- **Alertness**. Is patient alert and oriented to person, place, time, and situation? Any change to alertness with this incident? Confirm normal GCS = 15
- **Intoxication**. Is there any indication that the person is intoxicated (impaired decision making ability)?
- **Distracting Injury**. Is there any other injury which is capable of producing significant pain in this patient?

  Was the patient ambulatory after event?
- **Spinal Exam**. Look for point tenderness in any spinous process or spinal process tenderness with range of motion.
- **In the very old and very young patients, a normal exam may not be sufficient to rule out spinal injury.**
- **The decision NOT to implement spinal immobilization in a patient is the responsibility of the transporting Paramedic; however if full spinal immobilization has been applied prior to arrival it is not to be removed.**
- **In penetrating trauma- if patient is neuro-intact, consider ruling out C-Spine/Spinal Immobilization**
- **Mechanisms of Injury:**
  - **Axial Loading (diving)**
  - **Blunt trauma**
  - **MVC or bicycle crash**
  - **Fall > 3 feet (children)**
  - **Adult fall from standing height**

Spinal Immobilization Rule Out



Taser Deployment

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Taser Deployment – Pearls

- **Any patient that has been tasered should be considered an ALS patient.**
- **Scene Safety Consideration:** Before touching any patient who has been subdued using a Taser ensure that Law Enforcement has disconnected the wires from the hand held unit.

  Assessment of a Patient that has been Tasered:

  1. Paramedic Assessment required, also documentation of the location of the probes on the patient's body is required on PCR and transport the patient to the closest Emergency Department.
  2. Confer with Law Enforcement and determine the patient's condition from the time of the Taser discharge until FEM arrival.
  3. Determine from the patient:
     a. Date of Last Tetanus
     b. Any Cardiac History
     c. Any ingestion of a mind altering stimulant (Phencyclidine (PCP), Cocaine, etc.)
- All patients who have been subdued with a taser **MUST** receive a 12-lead. If, for any reason, the patient is not being transported to the ER and instead going with Law Enforcement- the 12 lead must be transmitted via Bluetooth to "Taser" under facility list. This transmits the 12 lead to the county jail.
- **Transporting patients in prone position is contraindicated.**
- **At a minimum Law Enforcement must follow transport unit to the closest appropriate psychiatric facility as noted:**

  Lakeland Regional Health (any age)

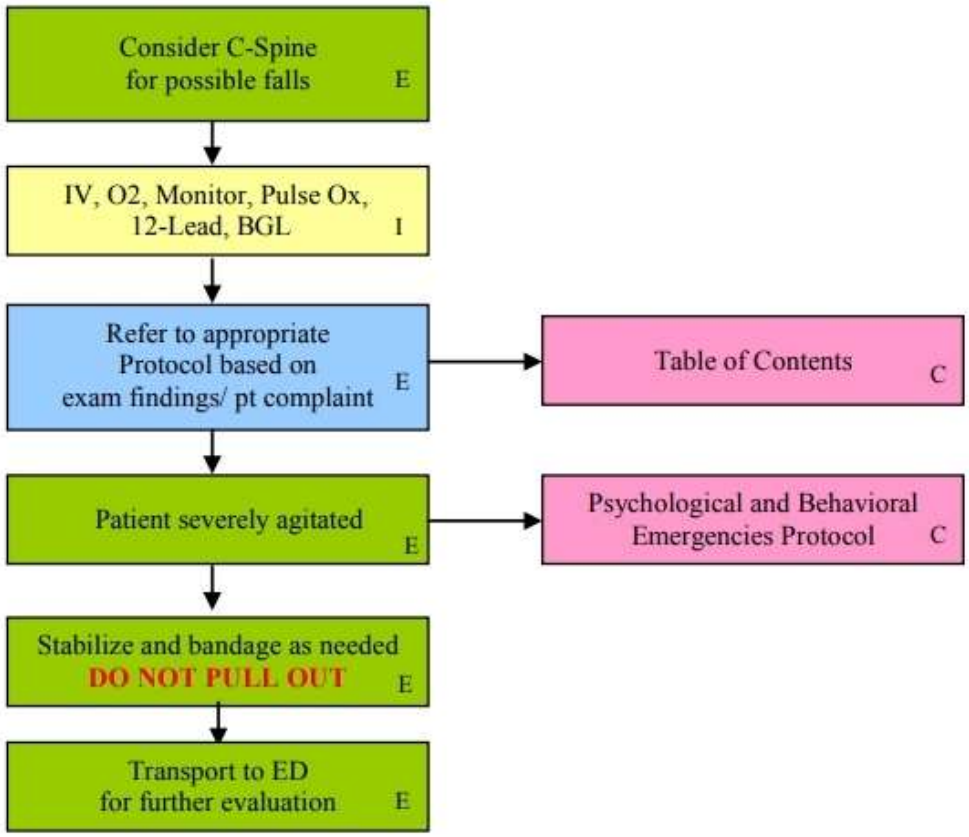
  Winter Haven Hospital (18+ y/o only)

  Lake Wales Regional Medical Center (60+ y/o only)

  Osceola Regional Medical Center (any age)

Taser Deployment

History:	Signs and Symptoms:	Differential:
• Substance Abuse / Drug Overdose • Agitated • Alcohol abuse • Psychiatric Illness • Diabetes • Cardiac Disease • Situational Crisis • Injury to Self or others • Traumatic Injury	• Probes embedded • Anxiety, Agitation, Confusion • Combative / Violent • Cardiac Arrythmia	



Environmental Cold Emergencies

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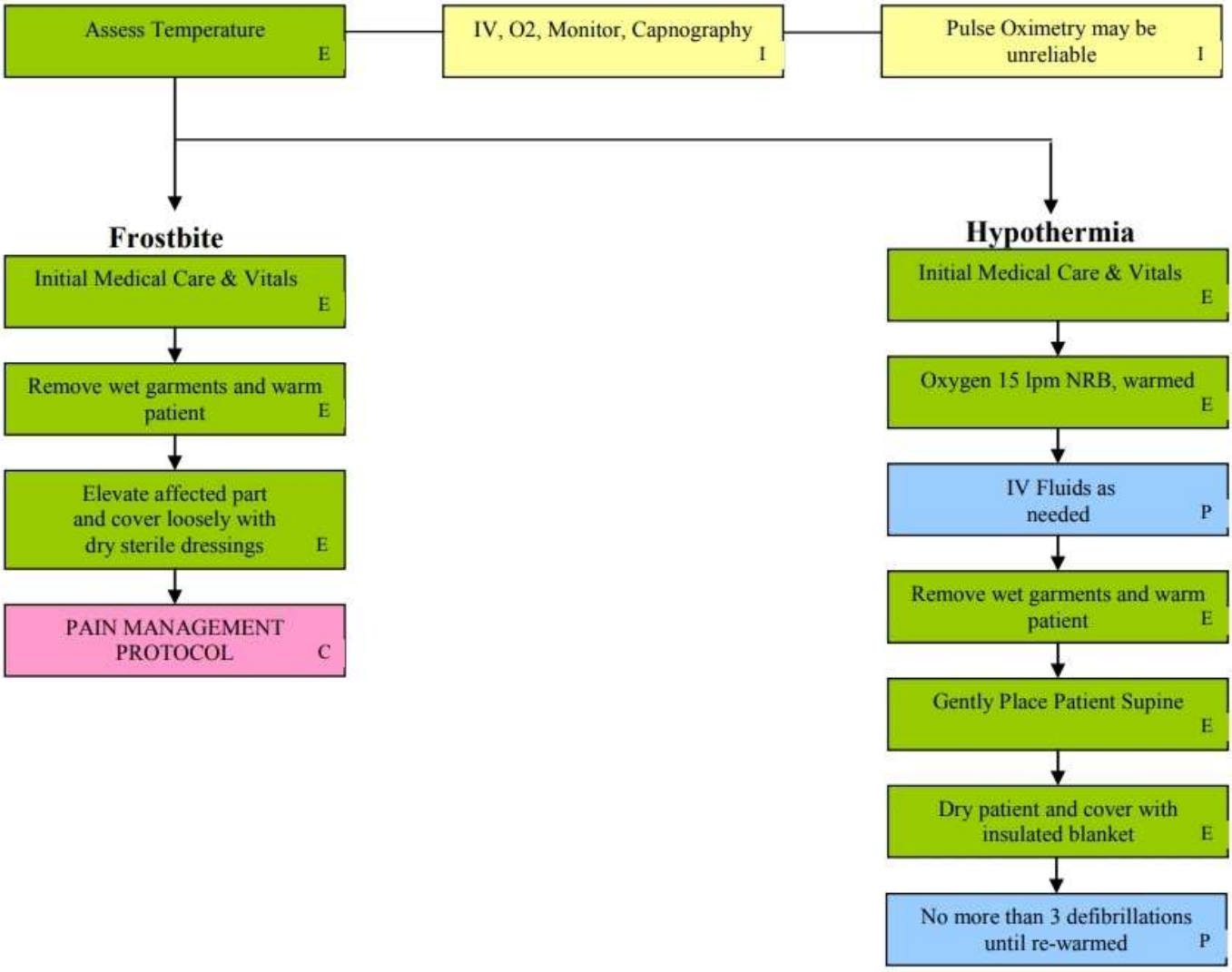
Cold Emergencies – Pearls

- Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, and Neurological.
- NO PATIENT IS DEAD UNTIL WARM AND DEAD.
- Hypothermia is defined as core temperature < 36° C (95° F).
- Extremes of age are more susceptible (i.e. young and old).
- With temperature less than 31° C (88° F) ventricular fibrillation is common cause of death.
- Handling patients gently may prevent this (rarely responds to defibrillation).
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- Hypothermia may produce severe bradycardia.
- Shivering stops below 32° C (90° F).
- PASSIVE REWARMING ONLY

Environmental Cold Emergencies

History:	Signs and Symptoms:	Differential:
• Medical history • Medications • Exposure to environment even in normal temperatures • Exposure to extreme cold • Extremes of age • Drug or alcohol use • Infection or sepsis • Length of exposure/wet	• Cold • Clammy • Shivering • Altered mental status • Extremity pain • Sensory abnormality • Bradycardia • Hypotension • Shock	• Sepsis • Environmental • Hypoglycemia • Stroke • Head injury • Spinal cord injury



Hazardous Materials

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Hazardous Materials – Pearls

Hazmat contaminated patients are not caused only by accident. They can often be caused by self intention (Ingestion, Inhalation, and Injection)

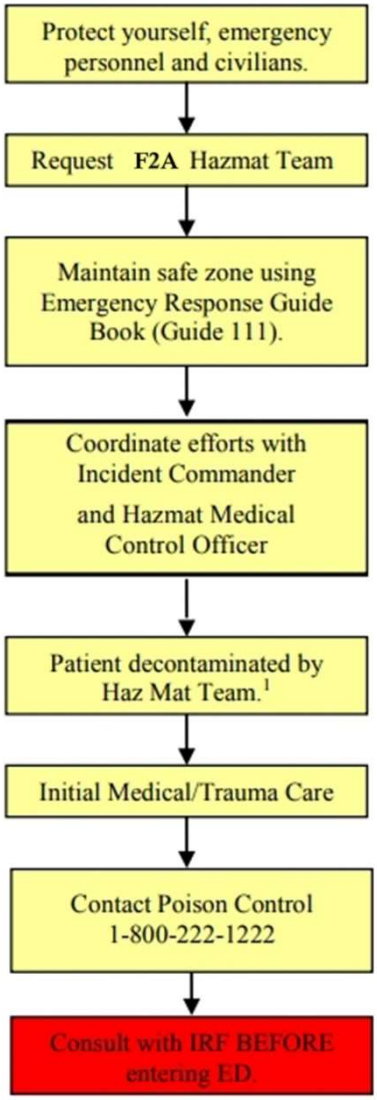
Recognition is the key.

The primary risk of secondary exposure for pre-hospital provides is inhalation.

- Appropriate protective clothing and respiratory protection should be worn by transport crew members (PAPR, SCBA).
- Determination of the appropriate level of BSI should be done in conjunction with the Incident Commander.
- The decision to transport patients from a hazmat incident is ultimately under the control of the incident commander, but usually delegated to the hazmat medical control officer.
- In general, no victim with skin decontamination should be transported from the hazmat scene without being properly decontaminated.
- Patient should be wrapped in a blanket and outer plastic sheet to prevent contamination. An alternative would be to utilize a dedicated hazardous materials transport unit.
- Maintain maximum patient compartment ventilation.

Hazardous Materials

History:	Signs and Symptoms:	Differential:
• Ingestion or suspected ingestion of potentially toxic substance • Substance ingested, route, qty. • Time of ingestion • Reason (suicidal, accidental) • Available meds in home • Medical history • Medications	• Mental status changes • Hypotension • Hypertension • Bradycardia • Tachycardia • Dysrhythmias • Seizures	• TCA • Tylenol • Depressants • Stimulants • Anticholinergic • Cardiac meds • Solvents, Alcohols, Cleaning agents • Insecticides



Environmental Heat Emergencies

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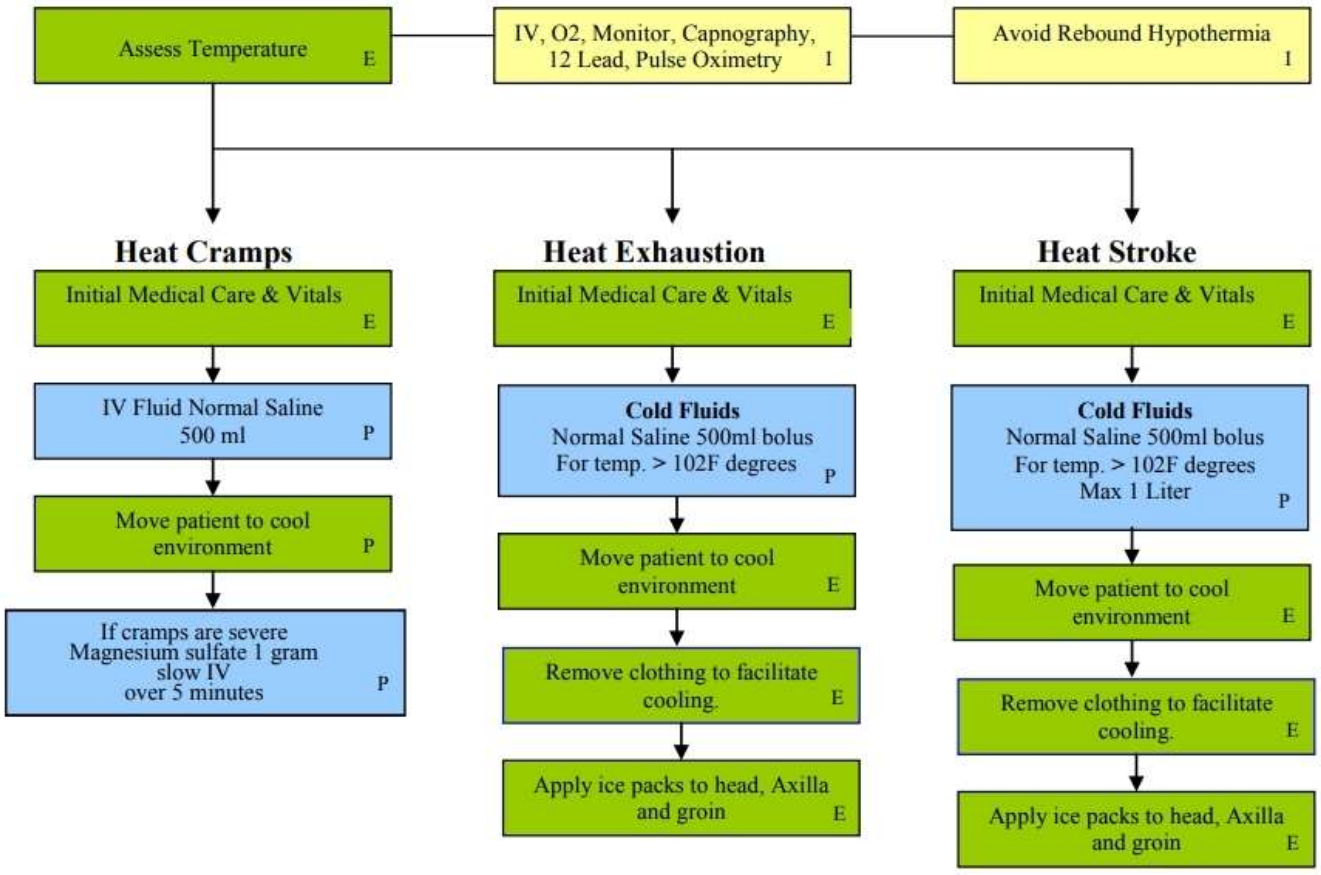
Heat Emergencies – Pearls

- All patients should have temperature assessed.
- Avoid rebound hypothermia with rapid cooling- shivering is too far!
- Extremes of age are more prone to heat emergencies (i.e. young and old).
- Predisposed by use of tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Sweating generally disappears as body temperature rises above 104 degrees F (40 degrees C).
- **Heat Cramps** consist of benign muscle cramping secondary to dehydration and are not associated with an elevated temperature.
- **Heat Exhaustion** consists of dehydration, salt depletion, dizziness, fever, weakness, AMS, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- **Heat Stroke** consists of dehydration, tachycardia, hypotension, temperature > 102 degrees F (39 degrees C), and an altered mental status.

Environmental Heat Emergencies

History:	Signs and Symptoms:	Differential:
• Age • Exposure to increased temperatures and/or humidity • Medical history/medications • Extreme exertion • Length or exposure • Poor PO intake • Fatigue and/or muscle cramps	• AMS • Hot, dry, or sweaty skin • Hypotension • Shock • Seizures • Nausea	• Fever • Dehydration • Medications • Hyperthyroidism • DT's • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions / tumor



Chemical Agent Exposure

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Organophosphate Poisoning – Pearls

Consult the Emergency Response Guide (ERG)

- **Mnemonic: SLUDGE**
  - **S**alivation
  - **L**acrimation
  - **U**rination
  - **D**iaphoresis
  - **G**astrointestinal Motility
  - **E**mesis

Mnemonic: RAIN
- **R**ecognize – **characteristics of the agent**
- **A**void - the hazardous agent
- **I**solate - the hazards of the agent
- **N**otify - the appropriate resources

Mnemonic: DUMBELS:
Diarrhea
Urination
Miosis
Bronchospasms
Bronchorrhea
Bradycardia
Emesis
Lacrimation
Salivations
Secretions
Sweating

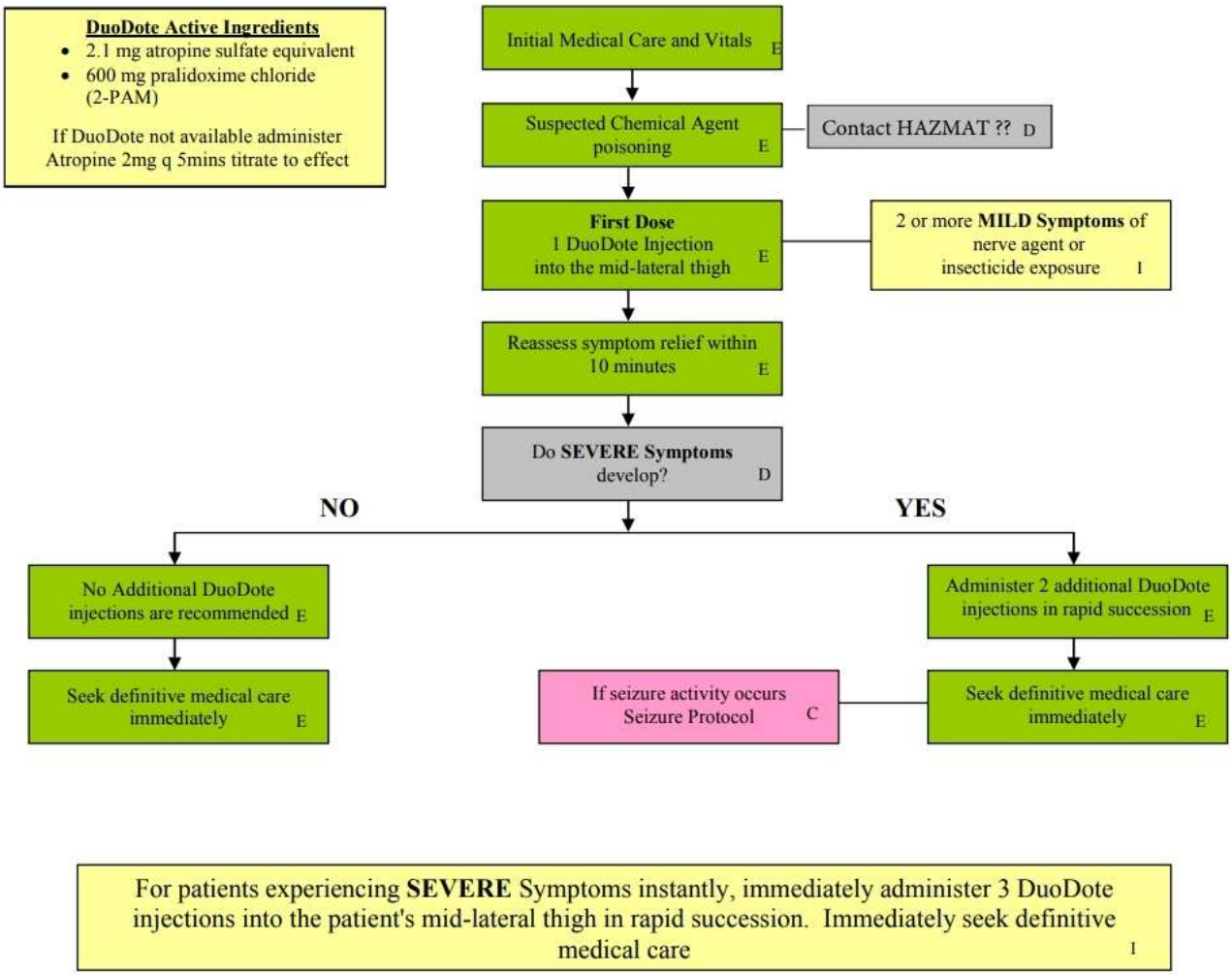
- **<u>Mild</u> Symptoms of Organophosphate Poisoning**
  - Blurred vision, miosis (excessive constriction of the pupils)
  - Excessive, unexplained teary eyes
  - Excessive, unexplained runny nose
  - Increased salivation, such as sudden drooling
  - Chest tightness or difficulty breathing
  - Tremors throughout the body or muscular twitching
  - Nausea and/or vomiting
  - Unexplained wheezing, coughing, or increased airway secretions
  - Acute onset of stomach cramps
  - Tachycardia or bradycardia (abnormally fast or slow heartbeat)
- **<u>Severe</u> Symptoms Organophosphate Poisoning**
  - Strange or confused behavior
  - Severe difficulty breathing or copious secretions from lungs/airway
  - Severe muscular twitching and general weakness
  - Involuntary urination and defecation
  - Convulsions
  - Loss of consciousness
  - Respiratory arrest (possibly leading to death)

No more than 3 doses of DuoDote will be administered

Chemical Agent Exposure

History:	Signs and Symptoms:	Differential:
• Age • Exposure to increased temperatures and/or humidity • Medical history/medications • Extreme exertion • Length of exposure • Poor PO intake • Fatigue and/or muscle cramps	• Blurred vision • Miosis (constricted pupils) • SLUDGE • Chest tightness • Tremors • N/V • Wheezing • Stomach cramps • Tachycardia or Bradycardia • Altered Mental Status • Respiratory Arrest • Death	• Fever • Dehydration • Medications • Hyperthyroidism • DT's • Heat cramps • Heat exhaustion • Heat stroke • CNS lesions / tumor

DuoDote



For patients experiencing **SEVERE** Symptoms instantly, immediately administer 3 DuoDote injections into the patient's mid-lateral thigh in rapid succession. Immediately seek definitive medical care I

Viral Disease/Alert

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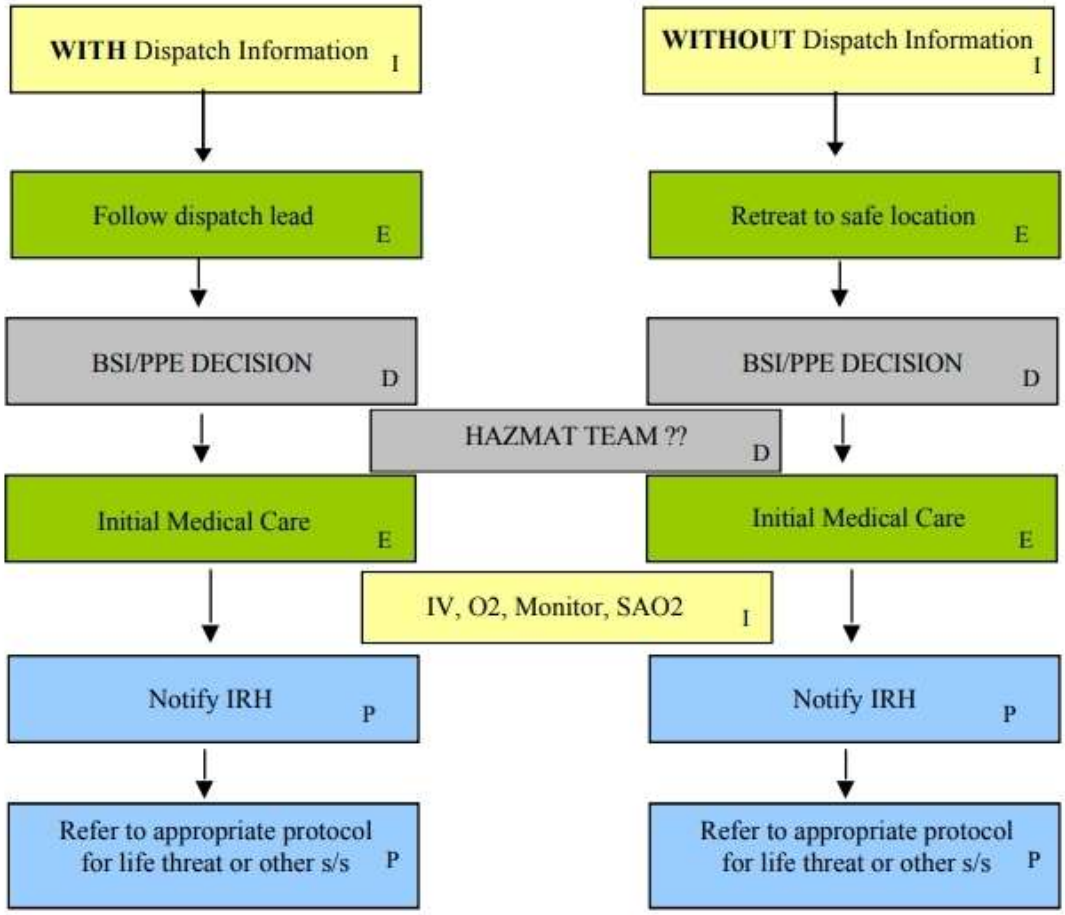
Viral Disease/Alert – Pearls

- Many Viral Diseases will mimic flu like symptoms: fever, headache, joint/muscle aches, weakness, fatigue, diarrhea, vomiting, stomach pain, and lack of appetite.
- With Viral Diseases bleeding is an additional sign/symptom that can be part of late stages and usually the reason for 911 to be called but important information for differential.
- If a patient has a **fever** >100.4 and 3 out of 4 of the following: *vomiting, headache, diarrhea or bleeding* a strong suspicion should be placed on the secondary and very important question of "TRAVEL to a foreign country and/or contact with someone who has had a Viral Disease in the **last 21 days**".
- **If both criteria are met above,** then standard CONTACT and DROPLET precautions must be followed during further assessment and transport.
- BSI/PPE PROCEDURE
- IMMEDIATELY report any person under suspicion of Viral Disease and notify Viral Alert to the IRH. Transmit a full patient radio report of possible infection suspicion.
- Other precautions to take could include covering the patient with sheet or blanket; if the patient is coughing apply disposable mask or NRBM with O2 at 8-12 lpm
- Use extreme caution with any Aerosol Generating Procedure (AGP) e.g. Bipap, CPAP, suctioning or intubation

Travel countries vs. viral disease possibility examples with date of initial discovery:

Country	Disease	Origination date
Africa	Ebola (Hemorrhagic fever)	1976
Caribbean	Chikungunya	2013
China	SARS (Severe Acute Respiratory Syndrome)	2002
China	Avian Flu	1997
Saudi Arabia	MERS (Middle East Respiratory Syndrome)	2012
UK/Ireland	Meningitis (many different strains)	50+yrs ago
USA	Enteroviruses	50+yrs ago

Viral Disease/Alert



Scene Rehabilitation

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Scene Rehabilitation - Pearls

Responders who meet any of the following will report to the Rehabilitation Unit Leader for mandatory rehab:

- Depletion of two 45-minute SCBA cylinders
- After 45 minutes of intense work without SCBA
- Whenever encapsulating chemical protective clothing is worn
- Whenever directed by an officer

Revitalization area includes:

- 10-min. Rehab if:
  - Depletion of one 45-minute SCBA cylinder
  - After 20 minutes of intense work without SCBA
  - If members enter the rehab area prior to going through two 45-minute SCBA cylinders
- 20-min. Rehab if:
  - Depletion of two 45-minute SCBA cylinders
  - Depletion of one 60-minute SCBA cylinder
  - Whenever encapsulating chemical protective clothing is worn
  - After 45 minutes of intense work without an SCBA
- Revitalization provides rest, rehydration (2-4 oz./20-min. work), nourishment, repeat medical evaluation:
  - Drinks should be cool (50-60 °F)

Treatment area includes:

- Personnel cared for until:
  1. Heart rate: < 110
  2. Temperature: < 100.6º F tympanic OR temporal scanner
  3. Blood Pressure: < 160/100 mmHg
  4. Respirations: > 10 or < 24
  5. Pulse oximetry: > 90%
  6. IF available measurement of SpCO < 5%
  7. Fatigue abates and skin color within normal limits

Personnel that require ALS treatment, such as the establishment of an IV in the rehab area, may not require transport but must have a completed EPCR.

- Up to 1 L of cold Normal Saline can be administered
- Consult with Incident Command or Safety Officer will be necessary

If after administration of 1 L of NS, vital signs do not return to baseline, personnel will be transported for medical follow up:

- All unstable personnel will be immediately transported
- All personnel who are unable to return to normal vital signs within 30-minutes will be transported for continual care

Scene Rehabilitation

Childbirth Complications

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Childbirth Complications – Pearls

- **Gravida:** The total number of times a woman has been pregnant, regardless if the pregnancies were carried to term. A current pregnancy is included in this count.
- **Para:** The number of viable (> 20 weeks) births.
- Be aware with multi-gravida patients, if they indicate the baby is coming, the crew should prepare for delivery.
- Ask approximate age of gestation, LMP, Estimated Date of Confinement (EDC).
- History of C-Section.
- History of High Risk birth (i.e. Gestational Diabetes, Pre-eclampsia, Eclampsia, PIH, etc.).
- PIH: Pregnancy Induced Hypertension

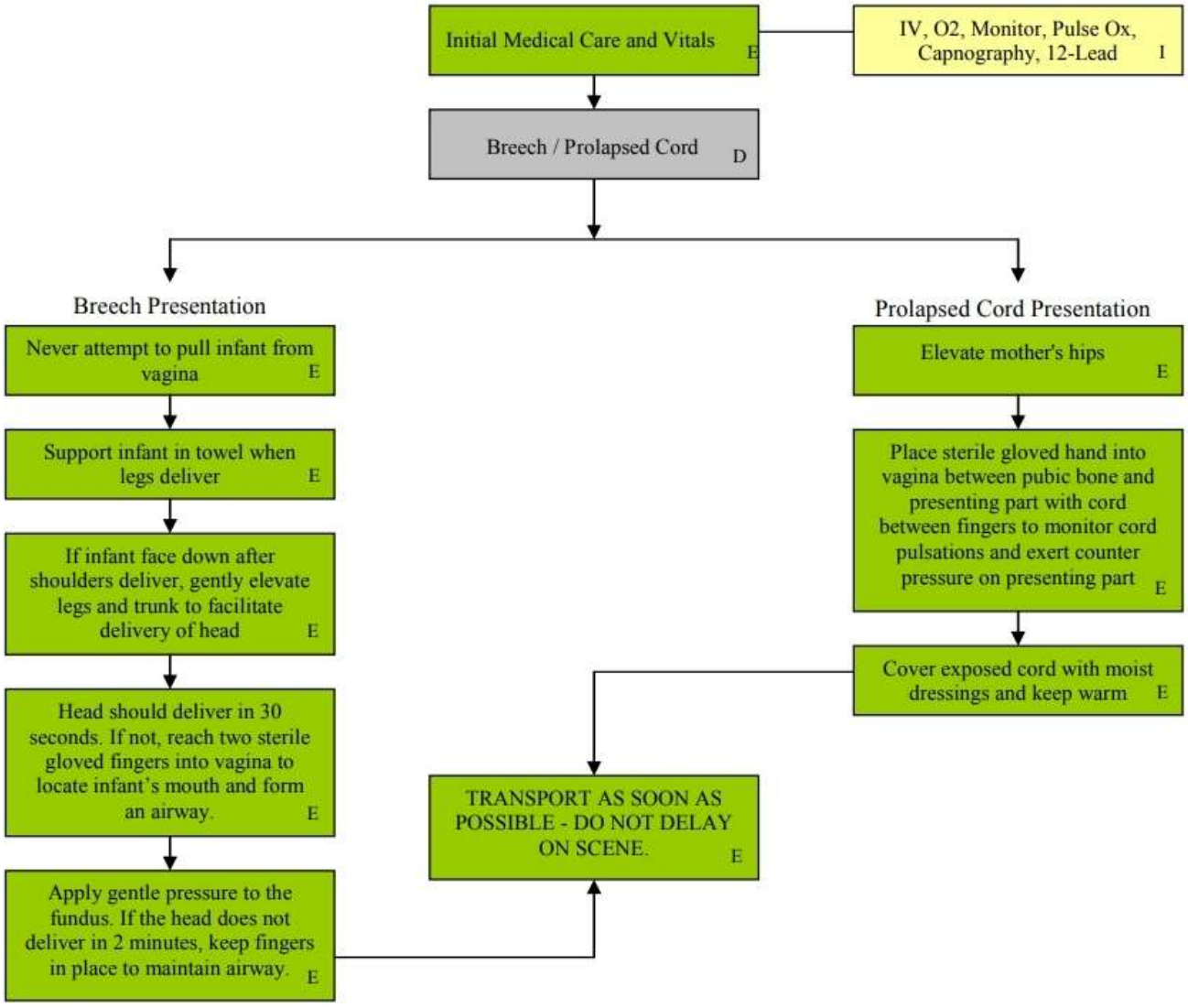
NOTE: Any patient with unstable vitals can be transported to the closest facility for stabilization then same crew will transfer to OB receiving facility.

OB Receiving Facilities

Hospital Name	Address	City
Brandon Regional Medical Center	119 Oakfield Dr	Brandon
Celebration	400 Celebration Pl	Celebration
Heart of Florida Regional Medical Center	40100 US Highway 27	Davenport
Florida Hospital Heartland	4200 Sun n Lake Blvd	Sebring
Florida Hospital Kissimmee	2450 N. Orange Blossom Trail	Kissimmee
Lakeland Regional Health	1324 Lakeland Hills Blvd	Lakeland
Osceola Regional Medical Center	700 West Oak St	Kissimmee
South Florida Baptist Hospital	301 N. Alexander St	Plant City
Winter Haven Women's Hospital (Regency)	101 Ave O SE	Winter Haven

Childbirth Complications

History:	Signs and Symptoms:	Differential:
• Due date • LMP • High risk • Previous births • Miscarriage / abortions • Vaginal/cesarean birth • Breech • Water broke/when/color • Is there adequate time to transport	• Amniotic fluid • Bulging perineum • Crowning • Involuntary pushing • Contractions 2 minutes apart or less	• Imminent birth • Breech presentation • Prolapsed cord • Limb presentation • Multiple birth • Placenta previa • Abruptio placenta • Meconium Staining



Childbirth Emergency

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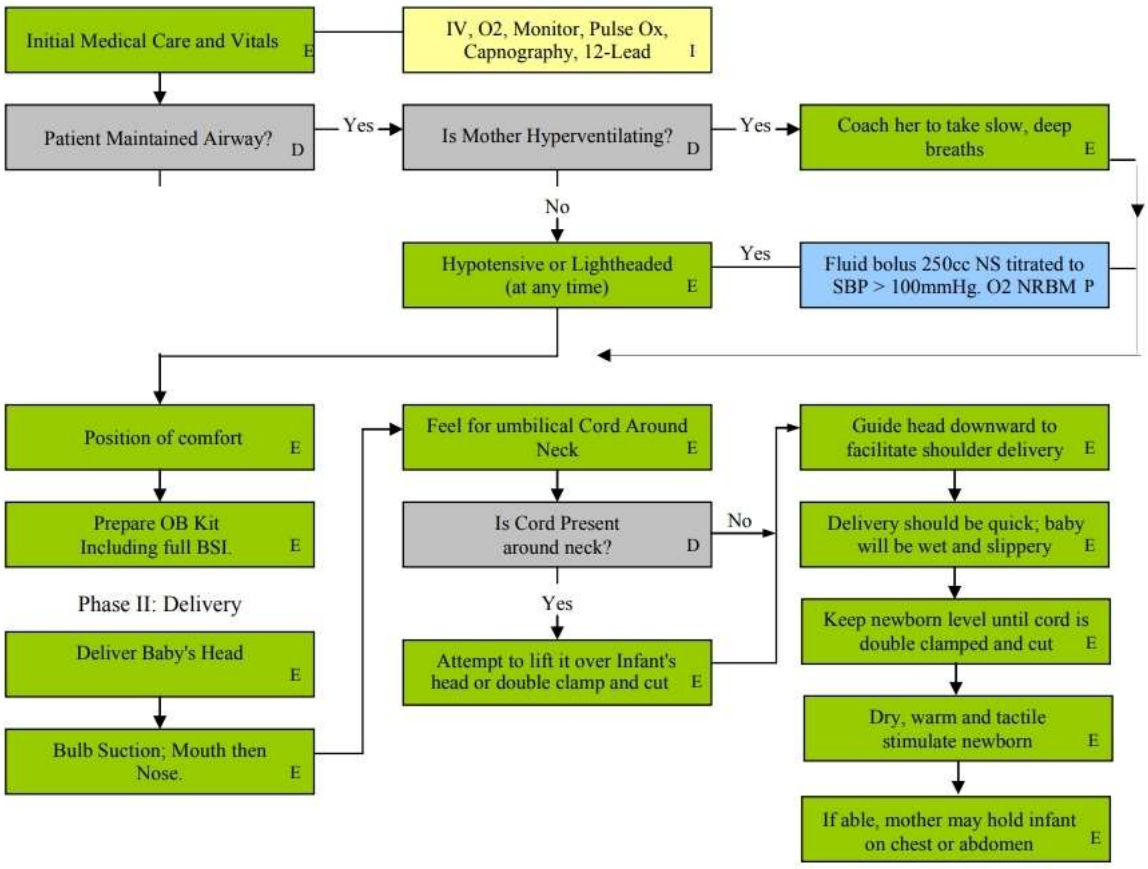
Childbirth Emergency- PEARLS

- Severe headache, vision changes, or RUQ pain may indicate pre-eclampsia.
- IF IMMINENT DELIVERY, DO NOT TREAT HYPERTENSION BUT BE AWARE OF
- POSSIBLE POST-PARTUM ISSUES.
- Maintain patient in a left lateral position to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding- number of pads used per hour. Approximately 30cc per pad.
- A physician should evaluate any pregnant patient involved in a motor vehicle collision.
- Magnesium may cause hypotension and decreased respiratory drive. Use with caution.
- Gravida: the total number of times a woman has been pregnant, regardless if the pregnancies were carried to term. A current pregnancy is included in this count.
- Para: the number of viable (>20 weeks) births.
- Be aware with multi-gravida patients, if they indicate the baby is coming, the crew should prepare for delivery

DOCUMENTATION REMINDER: TWO PCRs MUST BE COMPLETED (MOTHER & NEWBORN)

Child Emergency

History:	Signs and Symptoms:	Differential:
• Due date • LMP • High risk • Previous births • Miscarriages / abortions • Vaginal/cesarean birth • Breech • Water broke / when • Is there adequate time to transport	• Amniotic fluid • Bulging perineum • Crowning • Involuntary pushing • Contractions 2 minutes apart or less	• Imminent birth • Breech presentation • Prolapsed cord • Limb presentation • Multiple birth



Proceed to **New Born Care.**

Proceed to **Post-Partum Care.**

New Born Care

Post Delivery Care

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Newly Born Care – Pearls

- Record APGAR score at 1 minute the repeat at 5 minutes.

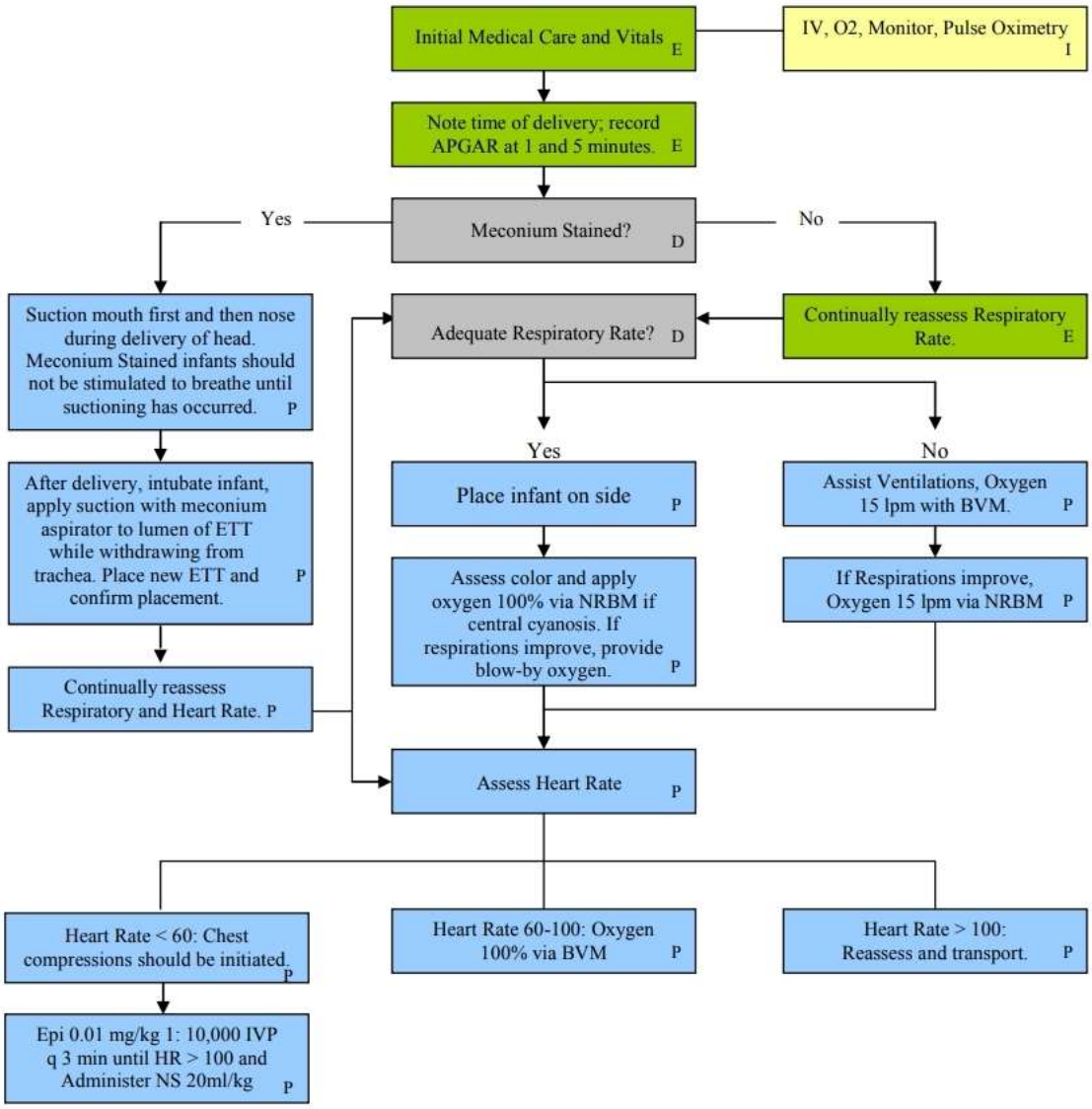
Sign	0	1	2
Appearance	Pale/Blue	Pink body, blue extremities	Pink body, pink extremities
Pulse	Absent	Less than 100	100 or greater
Grimace	No response	Grimace	Cough, sneeze
Activity	Limp	Some flexion	Action
Respiratory effort	Absent	Slow, irregular	Strong crying

- Continually assess respiratory rate.

If respiratory adequate/pt crying	If respiratory shallow, slow or absent
• Place infant on side	• Assist ventilations with O2 100% via BVM
• Assess color and provide O2 100% via NRBM if central cyanosis present	• If respirations improve, provide O2 100% via NRB
• If respirations improve, administer blow-by O2	

New Born Care

History:	Signs and Symptoms:	Differential:
• Due date / gestational age • Multiple gestations • Meconium • Delivery difficulties • Congenital disease • Medications • Maternal risk factors ○ Substance abuse ○ Smoking	• Respiratory distress • Peripheral cyanosis or mottling • Central cyanosis • Altered level of consciousness • Bradycardia	• Airway failure ○ Secretions ○ Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Congenital heart disease • Hypothermia



Post-Partum Care

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Postpartum Care- PEARLS

- Postpartum pre-eclampsia is a rare condition that occurs when a woman has high blood pressure and excess protein in her urine soon after childbirth. However, it may not develop for up to six weeks.
- The most frequent secondary cause of post-partum headache is pre-eclampsia/eclampsia.
- Postpartum pre-eclampsia can be difficult to detect.
- Signs and symptoms of postpartum pre-eclampsia (which are typically similar to those of pre-eclampsia that occurs during pregnancy) might include:
  - High blood pressure (hypertension) – 140/90 mmHg or greater
  - Excess protein in urine (proteinuria)
  - Severe headaches
  - Changes in vision, including temporary loss of vision, blurred vision or light sensitivity
  - Swelling of the face and limbs
  - Upper abdominal pain, usually under the ribs on the right side
  - Nausea and/or vomiting
  - Decreased urination
  - Sudden weight gain, typically more than 2 pounds (0.9kg) per week

Risk Factors

Limited research suggests that risk factors for postpartum pre-eclampsia might include:

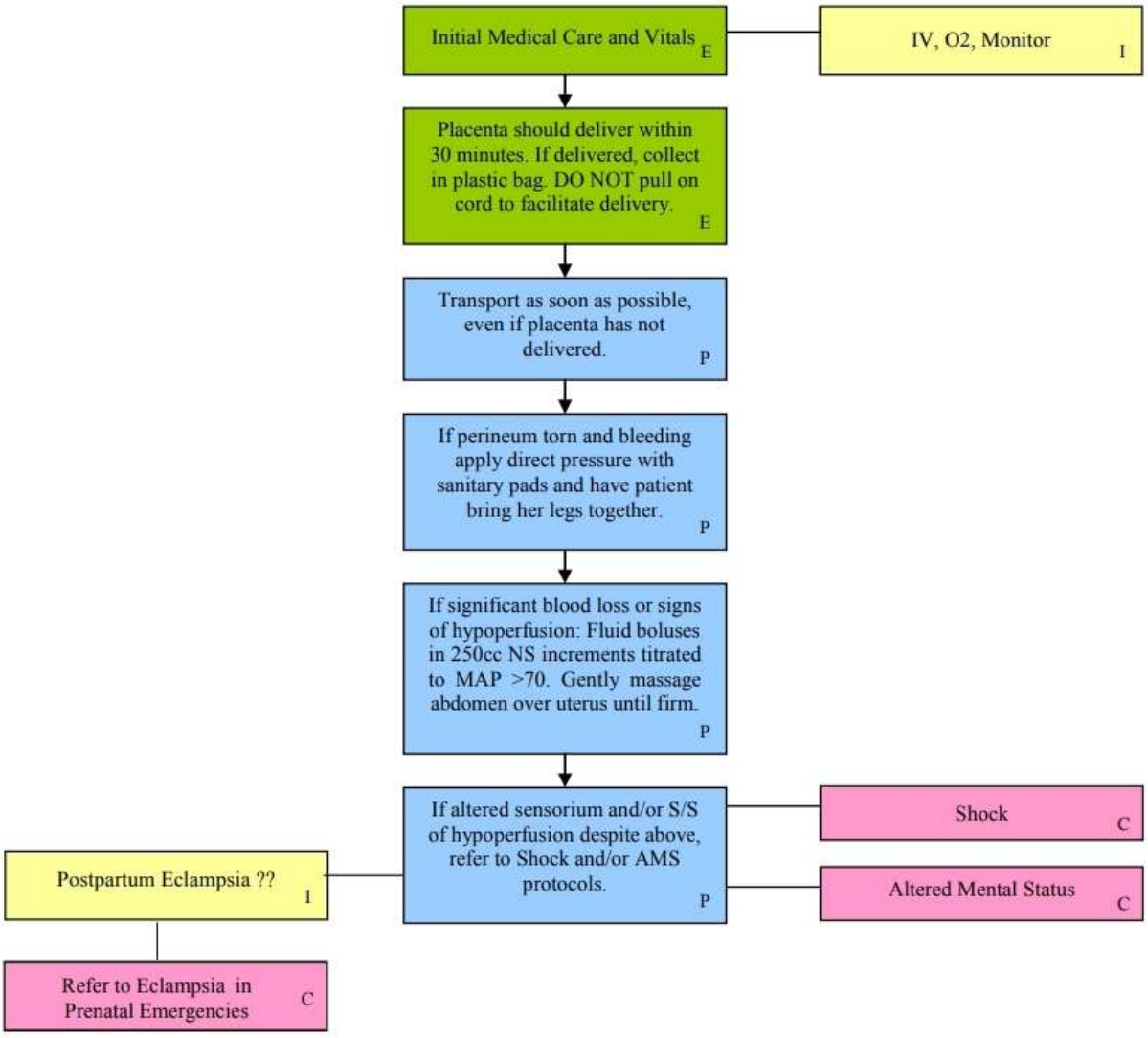
- High blood pressure during your most recent pregnancy (hypertensive disease). You're at an increased risk of postpartum pre-eclampsia if you developed high blood pressure after 20 weeks of pregnancy (gestational hypertension).
- Obesity- the risk of postpartum pre-eclampsia is higher if you're obese.
- Family history- having a first-degree relative (a parent or sibling) with a history of pre-eclampsia increases your risk of pre-eclampsia.
- Age- Women who are younger than 20 or older than 40 are at an increased risk of pre-eclampsia.
- Having multiples- having twins or more babies increases your risk of pre-eclampsia.
- Recent studies suggest that the father's genes may play a role in an increased risk of pre-eclampsia

Postpartum pre-eclampsia/eclampsia facts:

- Postpartum eclampsia is essentially postpartum pre-eclampsia plus seizures.
- Postpartum eclampsia can permanently damage vital organs, including the brain, liver and kidneys
- If left untreated, postpartum eclampsia can cause coma. In some cases, the condition is fatal.
- Other complications of postpartum pre-eclampsia/eclampsia include:
  - Stroke
  - Pulmonary edema
  - Thromboembolism- blockage of a blood vessel by a blood clot that travels from another part of the body
  - HELLP syndrome- hemolysis (destruction of red blood cells), elevated liver enzymes and low platelet count

Post-Partum Care

History:	Signs and Symptoms:	Differential:
• Due date / gestational age • Multiple gestations • Meconium • Delivery difficulties • Congenital disease • Medications • Substance abuse • Smoking	• Respiratory distress • Peripheral cyanosis or mottling • Central cyanosis • Altered level of consciousness • Bradycardia	• Secretions • Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Congenital heart disease • Hypothermia



Prenatal Emergencies

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Prenatal Emergencies - PEARLS

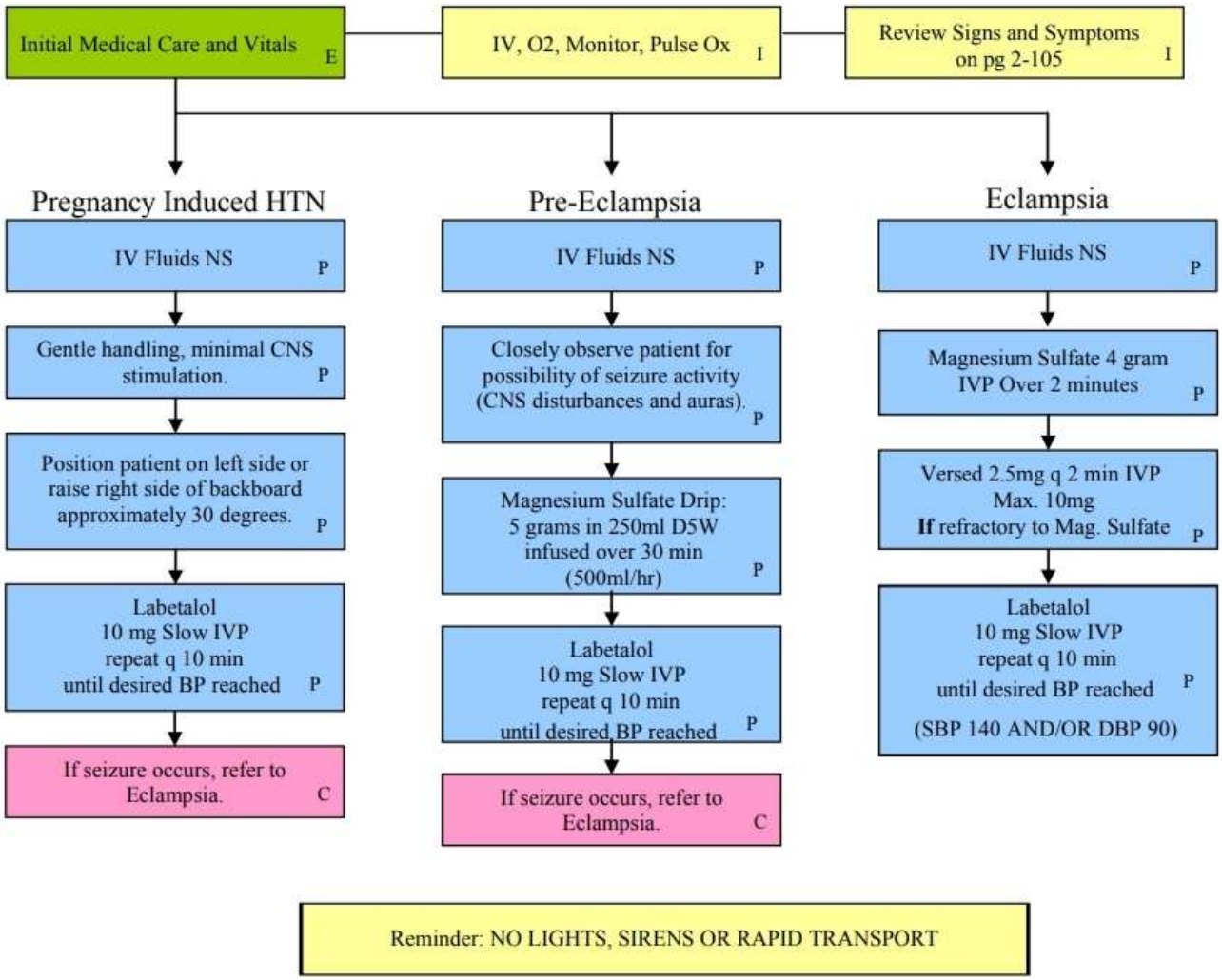
- **First time mothers are more prone to Preeclampsia**
- **Up to 2% of women with Preeclampsia progress to Eclampsia**
- **Pregnancy Induced Hypertension (PIH): Begin treating when SBP >160 and/or a DBP >110.**
- **PIH: Treat to a SBP of 140 and/or a DBP of 90.**
- **LABETALOL** is contraindicated for hypotension, bradycardia, AV blocks, heart failure, COPD, or asthma.
- **LABETALOL Slow IV Push over 5 min**

- **Use the following table to assist in differentiating these prenatal emergencies:**

Signs and Symptoms of PIH	Signs and Symptoms of Pre-eclampsia	Signs and Symptoms of Eclampsia
HTN	**HTN**	**HTN**
Weight Gain	**Epigastric or RUQ Pain**	**Seizures (tonic-clonic)**
Peripheral Edema	**N/V**	**Pre, Peri, or Postpartum up to 30 days after delivery**
	Severe and worsening headache	**Unrelenting severe headache with or without visual changes** **(often precedes seizures)**
	Possible visual disturbances **(may include blindness)**	
	Thrombocytopenia – lower than normal number of platelets in the blood **(only seen in lab test)**	
	Protein urea (spilling proteins) (only seen in lab test)	

Prenatal Emergencies

History:	Signs and Symptoms:	Differential:
• Due date / gestational age • Multiple gestations • Meconium • Delivery difficulties • Congenital disease • Medications • Substance abuse • Smoking	• Respiratory distress • Altered level of consciousness • Hypertension	• Secretions • Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Congenital heart disease • Hypothermia • Epilepsy



Trauma in Pregnancy

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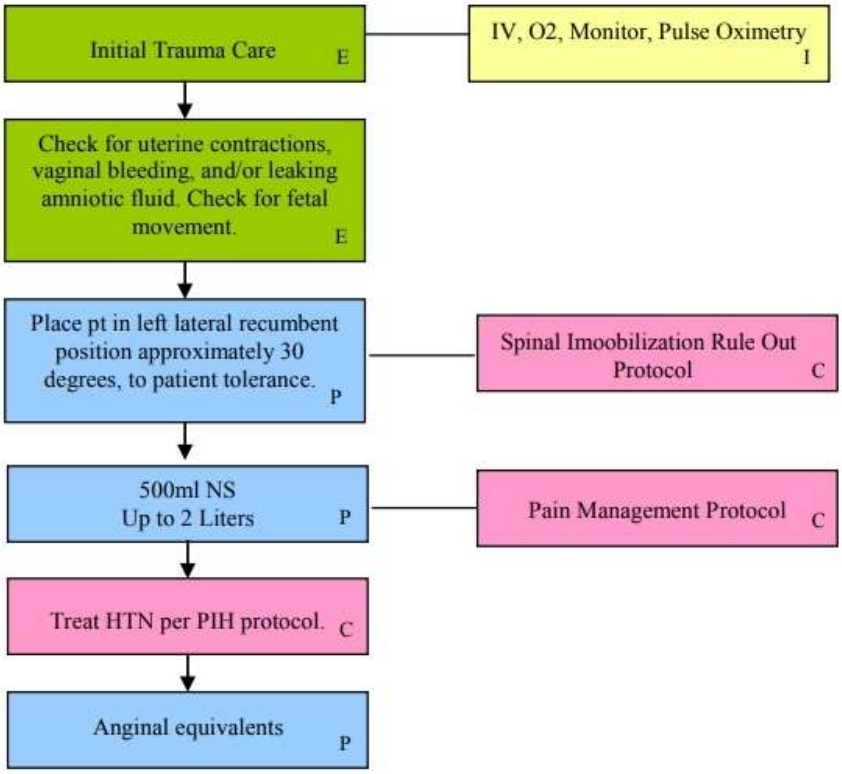
Trauma in Pregnancy – PEARLS

- Any pregnant patient involved in a MVC should be seen immediately by a physician for evaluation and fetal monitoring.
- Refer to Spinal Immobilization Rule Out protocol prior to full immobilization if patient ambulatory on scene and denies any c-spine complaints.
- If deemed necessary to fully immobilize raise right side of backboard 30 degrees, unless patient distress / pain is increased
- **MOST COMMON CAUSE OF FETAL DEATH IS MATERNAL DEATH.**
- **If patient is >20 weeks gestation AND a trauma alert or trauma code transport to closest appropriate State Approved Trauma Center as per trauma transport protocol by ground or air.**

Trauma in Pregnancy

History:	Signs and Symptoms:	Differential:
• Due date / gestational age • Multiple gestations • Delivery difficulties • Congenital disease • Medications • Substance abuse • Smoking	• Respiratory distress • Altered level of consciousness • Hypertension	• Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Hypothermia



MOST COMMON CAUSE OF FETAL DEATH IS MATERNAL DEATH.

Vaginal Bleeding

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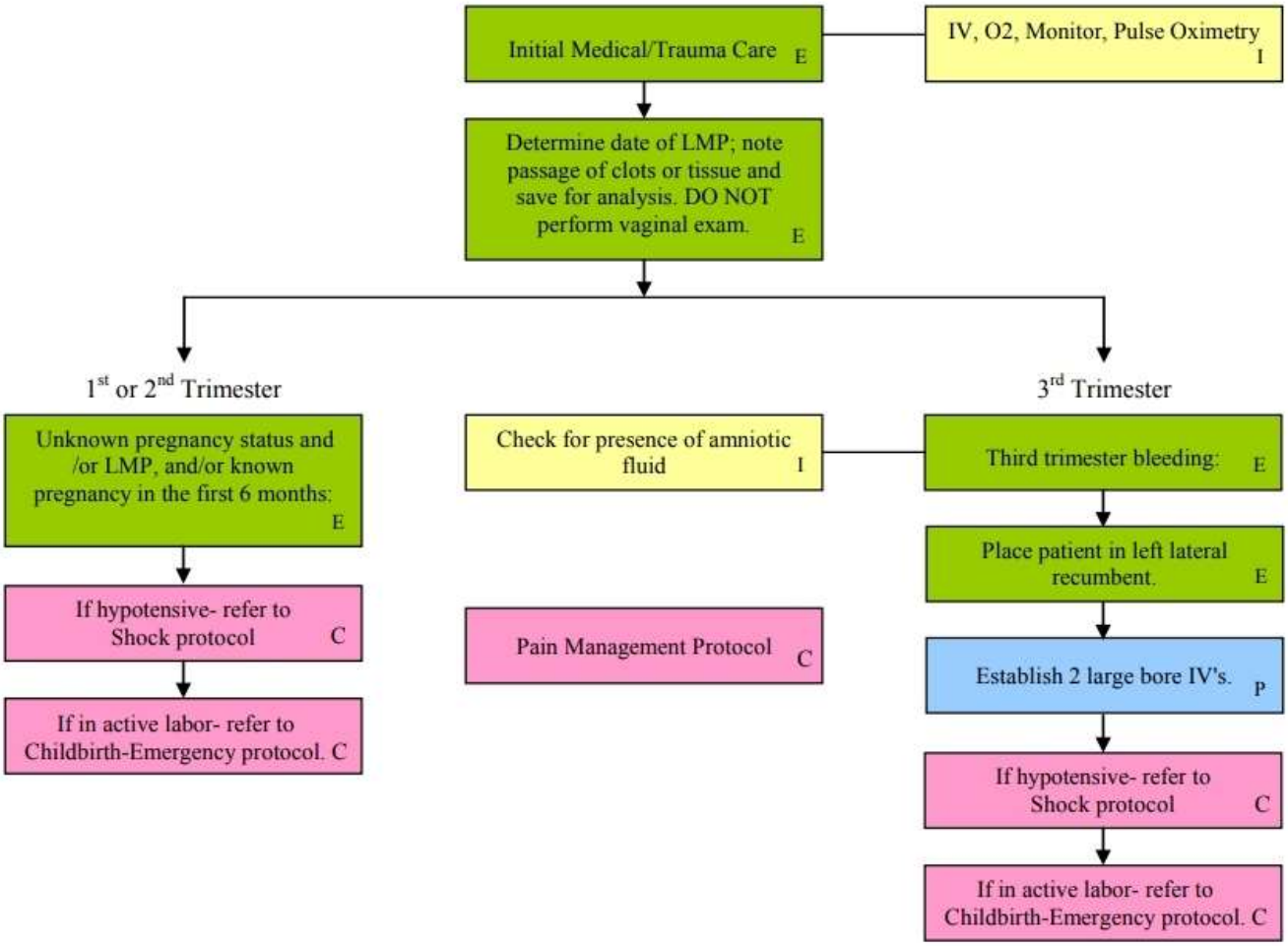
Vaginal Bleeding – Pearls

- Third Trimester bleeding:
  - Placenta previa: bright red blood, no pain.
  - Abruptio placenta: dark red blood, pain present.
  - Uterine rupture: possible bleeding, pain present and usually associated with sudden onset N/V.
- Supine hypotensive disorder: Consider left lateral recumbent position.

Vaginal Bleeding

History:	Signs and Symptoms:	Differential:
• Due date / gestational age • Multiple gestations • Meconium • Delivery difficulties • Congenital disease • Medications • Substance abuse • Smoking	• Respiratory distress • Altered level of consciousness • Hypertension	• Respiratory drive • Infection • Maternal medication effect • Hypovolemia • Hypoglycemia • Hypothermia



Bradycardia – Pediatric

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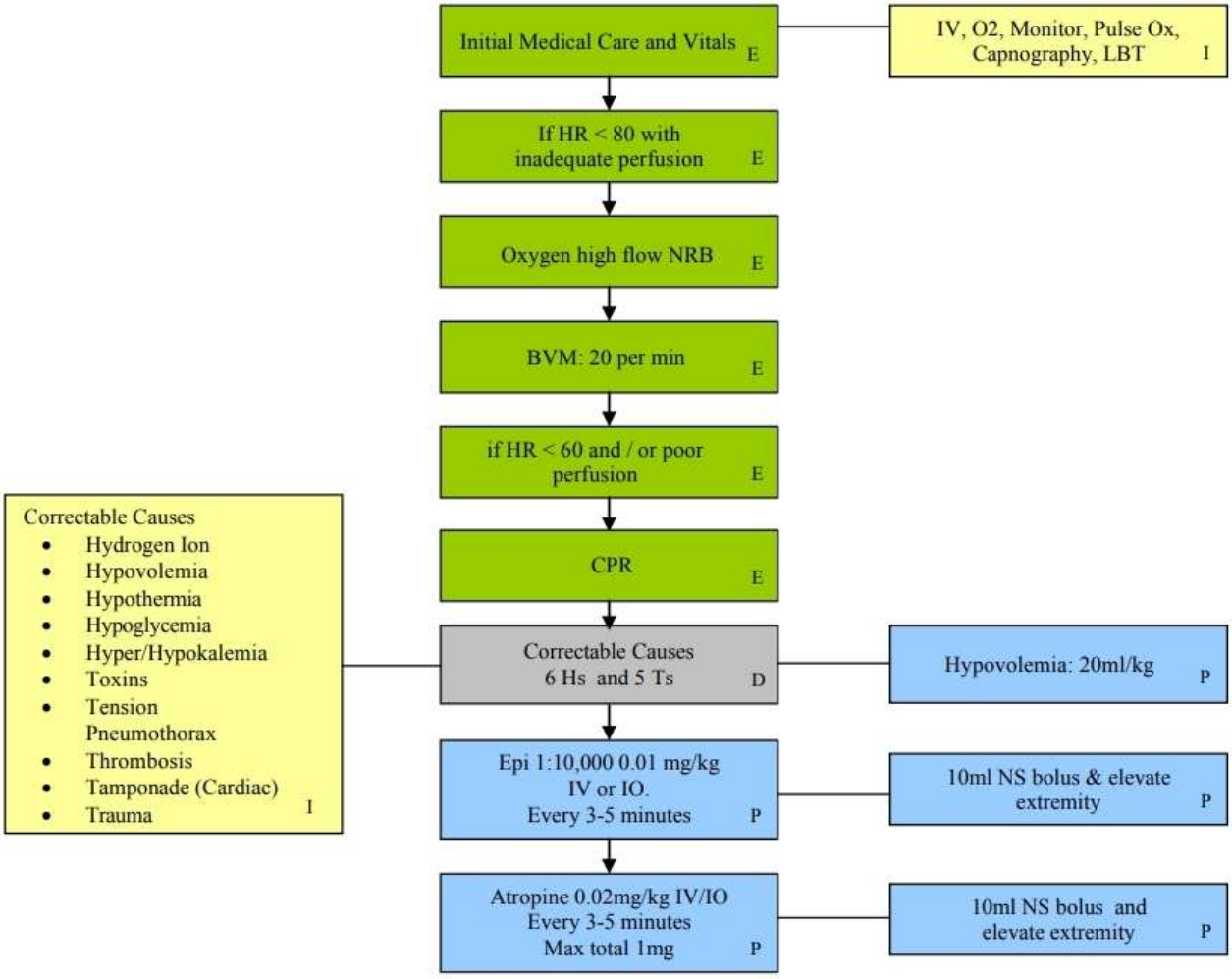
Bradycardia – Pearls

- **Use Handtevy System for pediatric patients.**
- CARDIOPULMONARY SUPPORT should be administered in a linear approach starting with OXYGEN and progressing to BVM and/or CPR if limited or no response to therapy after 30-60 seconds.
- If hypovolemia known or suspected, administer fluid boluses as calculated by Handtevy System
- IV drugs should be followed with an immediate 10 ml bolus of NS and raising the arm for 15-20 sec.
- **ATROPINE:** minimum dose of 0.1 mg.
- **ATROPINE:** Max dose 1 mg

Bradycardia – Pediatric

History:	Signs and Symptoms:	Differential:
• Medical history • Foreign body exposure • Respiratory distress or arrest • Apnea • Toxin or poison exposure • Congenital disease	• Decreased heart rate • Delayed capillary refill or cyanosis • Mottled cool skin • Hypotension • Altered level of consciousness	• Respiratory effort • Respiratory obstruction • Foreign body / secretions • Croup / epiglottitis • Hypovolemia • Hypothermia • Infection/sepsis • Toxin or medication • Hypoglycemia • Trauma



Cardiac Arrest – Pediatric

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Pediatric Cardiac Arrest – Pearls

- Use Handtevy System for pediatric patients.
- If using an AED, follow the manufacturer's prompts for cardiac arrest management (use pediatric AED system if available for children 1 to 8 years of age).
- Treatment Sequence: Prepare next drug prior to rhythm check. Administer drug during CPR, as soon as possible after the rhythm check confirms VF/pulseless VT. Do not delay shock. Continue CPR while drugs are prepared and administered and defibrillator is charging.
- IV drugs should be followed with an immediate 10 ml bolus of NS and raising the arm for 15-20 sec.
- Ideally, chest compressions should be interrupted only for ventilation (until advanced airway placed), rhythm check, and shock delivery.
- After initial intubation, confirm ETT placement after repositioning or moving patient. Administer 8-10 breaths/minute via BVM; avoid hyperventilation.
- If hypovolemia known or suspected, administer fluid boluses as calculated by Handtevy System.
- If confirmed CPR in progress with known age and when possible- draw up Epi 1:10,000 per Handtevy dosing prior to arrival on scene.

ALL CARDIAC ARREST PATIENTS WILL BE WORKED ON SCENE A MINIMUM OF TEN MINUTES PRIOR TO TRANSPORT.

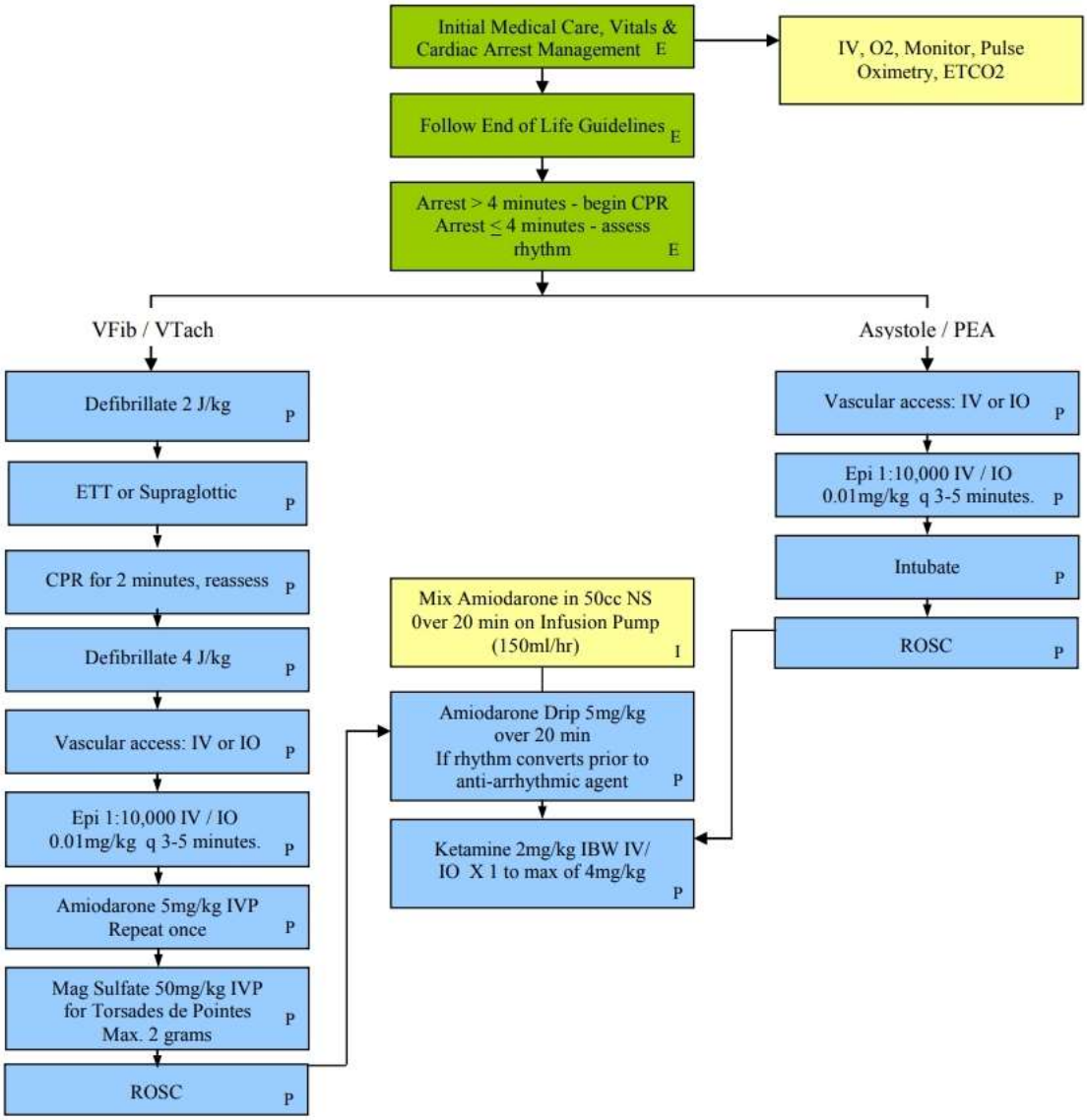
Remember in Pediatric Cardiac Arrest: **E**arly **A**ction **B**eats **D**eparting **F**ast

Pneumonic	Medication	Rule
Early	Epinephrine	Place the decimal in between numbers for age and deliver that many ml's
Action	Amiodarone	Place the decimal in between numbers for age and deliver that many ml's
Beats	Bicarbonate	Sodium = Same – Deliver same ml's as age of Pt
Departing	D25W	Dextrose = Double – Deliver double the same amount of Pt's age in ml's
Fast	Fluid	Add a zero to number from Dextrose (above) and deliver that many ml's

Medication	1=10kg	3=15kg	5=20kg	7=25kg
Epinephrine	1ml	1.5ml	2ml	2.5ml
Amiodarone	1ml	1.5ml	2ml	2.5ml
Bicarbonate	10ml	15ml	20ml	25ml
D25W	20ml	30ml	40ml	50ml
Fluid	200ml	300ml	400ml	500ml

Cardiac Arrest – Pediatric

History:	Signs and Symptoms:	Differential:
• Time of arrest. • Medication history • Medications • FBAO • Hypothermia • Shaken baby syndrome • Pattern of injuries • SIDS	• Unresponsive • Cardiac arrest	• Foreign body • Secretions • Infection • Hypovolemia • Congenital heart disease • Trauma • Tension Pneumothorax • Hypothermia • Toxin or medication • Hypoglycemia • Acidosis



Tachycardia – Pediatric

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Tachycardia – Pearls

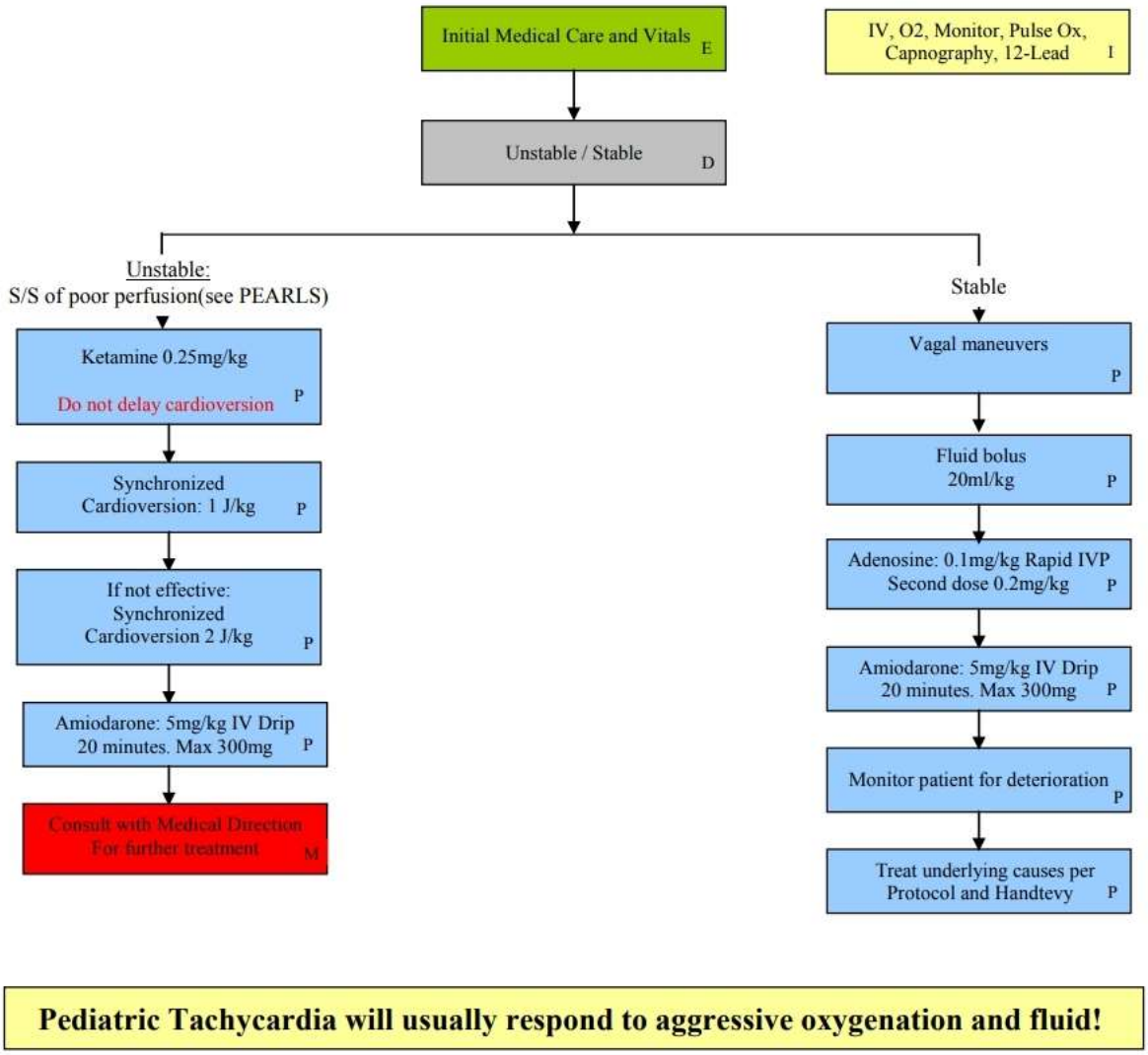
- **Use Handtevy System for pediatric patients.**
- Unstable Pediatric: Signs and symptoms of poor perfusion - weak or absent peripheral pulses with AMS or lethargy.
- Sinus tachycardia: p-waves present and normal, usually has variable RR intervals (varies during respirations and agitation), and constant PR interval.
    - Infants: HR usually < 220 bpm.
    - Children: HR usually < 180 bpm.
- SVT or narrow-complex tachycardia: p-waves absent / abnormal, RR intervals not variable, and history of abrupt rate changes.
    - Infants: HR usually > 220 bpm.
    - Children: HR usually > 180 bpm.
- Consider pre-medication with **Ketamine 0.25mg/kg [max single dose 6.25mg (25kg 7yo Pt)].**
- If rhythm does not convert after first synchronized cardioversion attempt, escalate energy level to 2 J/kg to a max of 200J for subsequent SYNCHRONIZED CARDIOVERSIONS.
- If delays in synchronization occur and clinical condition is critical, proceed immediately to unsynchronized shocks i.e. defibrillation.

PEDIATRIC / CHILDREN VITAL SIGNS

Age	Respiratory	Pulse	Weight (kg)
Preemie	40-70	120-170	2
4 months	30-60	105-160	6
6 months	24-38	110-160	8
1 year	22-30	90-150	10
2 years	22-30	85-140	12
3 years	22-30	85-140	15
4 years	22-26	75-120	17
5 years	20-24	70-115	20
6 years	20-24	70-115	22
7 years	16-22	70-110	25

Tachycardia – Pediatric

History:	Signs and Symptoms:	Differential:
• Medical history • Medications or toxic ingestion • Drugs • Congenital heart disease • Respiratory distress • Syncope or near syncope	• Heart rate • Pale or cyanosis • Diaphoresis • Tachypnea • Hypotension • AMS • Pulmonary congestion • Syncope	• Heart disease • Hypo/hyperthermia • Hypovolemia/anemia • Electrolyte imbalance • Anxiety / Pain / Stress • Fever / Infection / Sepsis • Hypoxia • Hypoglycemia • Pulmonary embolus • Trauma • Tension Pneumothorax



Pediatric Tachycardia will usually respond to aggressive oxygenation and fluid!

Abdominal Pain – Pediatric

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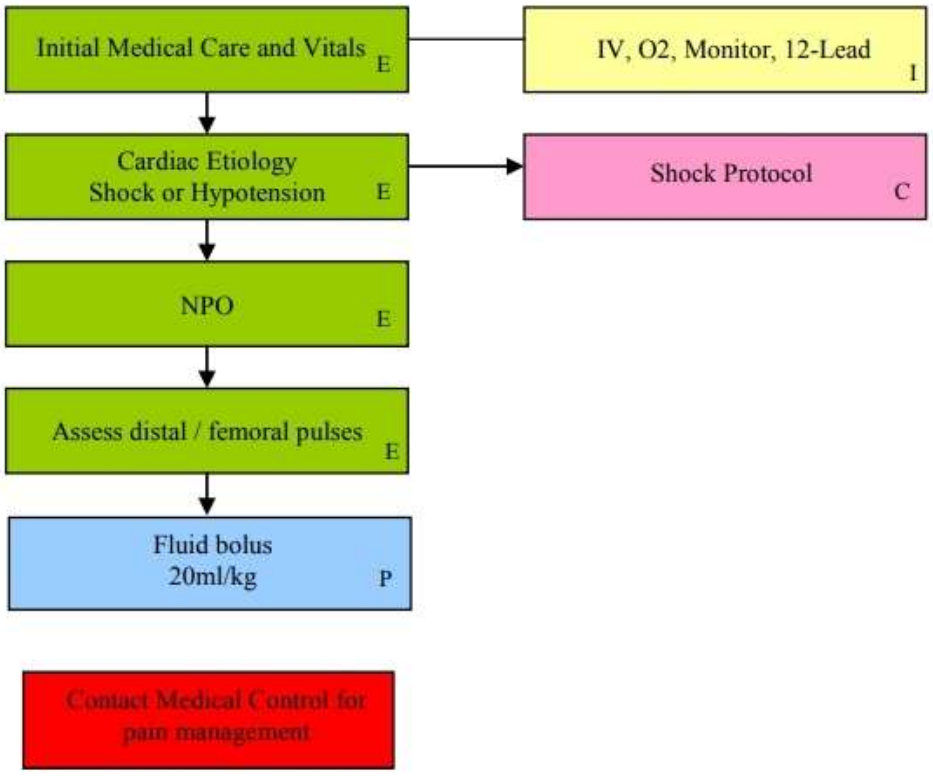
Abdominal Pain- PEARLS

- **Use Handtevy System for pediatric patients**
- Appendicitis presents with vague, periumbilical pain, which migrates to the RLQ over time.
- May give fluid boluses as needed to improve signs and symptoms of poor perfusion. Repeat vitals and document patient condition after each bolus.

Most common causes of abdominal pain and their locations broken down to nine quadrants

Abdominal Pain – Pediatric

History:	Signs and Symptoms:	Differential:
• Age • Past medical/surgical history • Medications • Onset • Palliation/provocation • Quality (crampy, constant, sharp, dull, etc.) • Region/Radiation/Referred • Pain severity (0-10) • Time (duration, repetition) • Fever • Last meal • Last BM/Urination • Menstrual history	• Pain (location/migration) • Tenderness • Nausea • Vomiting • Diarrhea • Dysuria • Constipation • Vaginal bleeding/discharge	• Pneumonia, pulmonary embolus • Liver (hepatitis) • Peptic ulcer • Gallbladder • Myocardial infarction • Pancreatitis • Kidney stone • Abdominal aneurysm • Appendicitis • Bladder-prostate disorder • Spleen enlargement • Diverticulitis • Bowel obstruction • Gastroenteritis



Allergic Reaction – Pediatric

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Allergic Reaction – Pearls

- Use Handtevy System for pediatric patients.
- Scrape away and remove any stingers and/or flush any contaminated skin

KNOWN ALLERGY TO: FOOD, MEDICATION, INSECT OR LATEX
Confirmed ingestion OR envenomation OR Significant signs and symptoms:
Epinephrine 1:1,000 0.01 mg/kg IM
OR
Epinephrine 1:100,000 0.01mg/kg IV/IO
Per Handtevy System for Anaphylaxis
(for the unstable/imminent cardiac arrest patient)
EPINEPHERINE 1:100,000 is made by combining 1ml of EPINEPHRINE 1:10,000 and 9ml of Normal Saline

Stable
Usually longer onset (one hour or days)
Normal vitals
Urticaria (Hives)/Rash/ Itching {**Localized Reaction**}

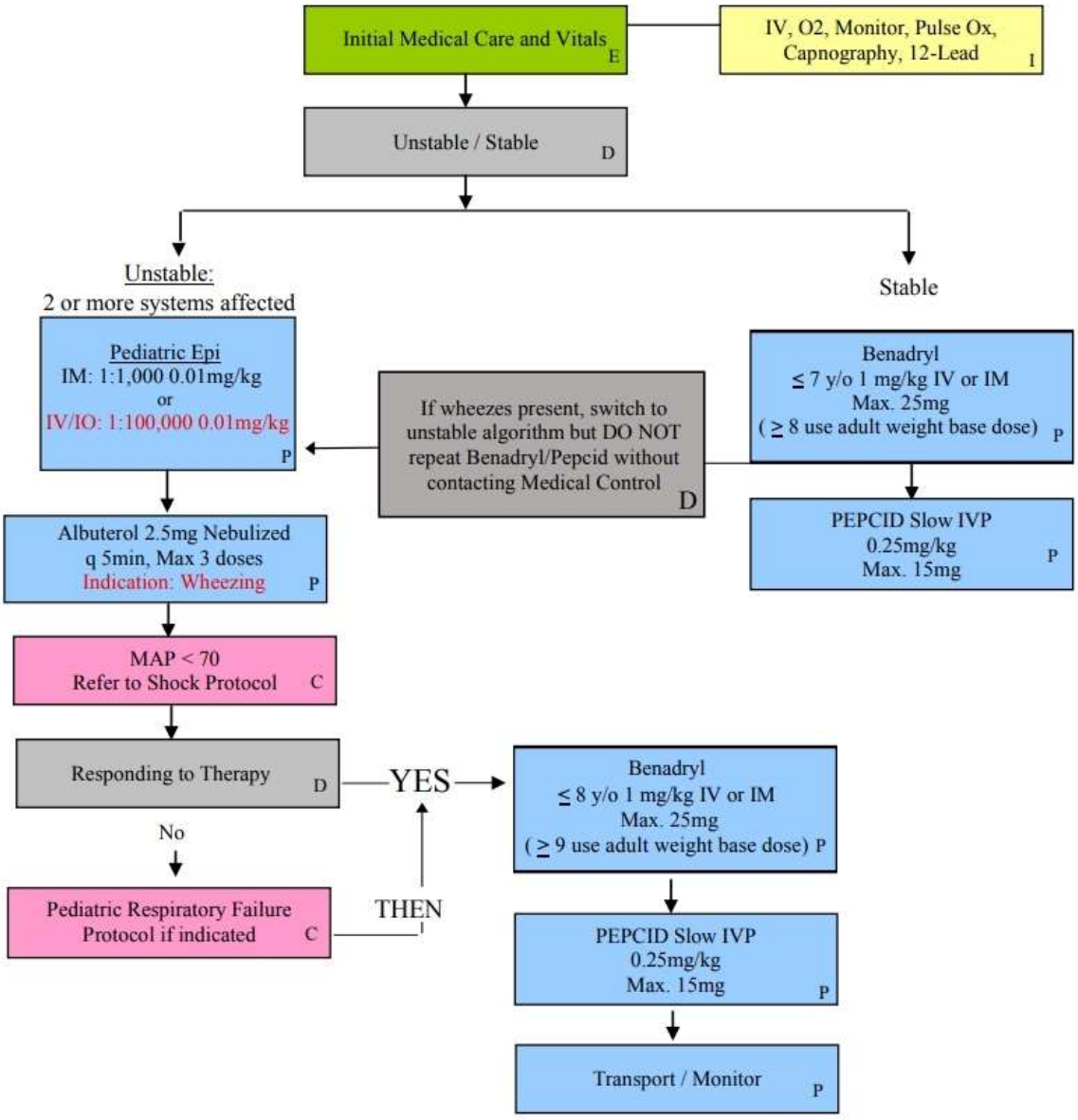
Unstable
Usually rapid onset 30-60 seconds
Signs of Shock (MAP < 70)
Urticaria (Hives)/Rash/ Itching {**Systemic Reaction**}
Objective Signs of Respiratory Distress: such as stridor or wheezing
Objective signs of Airway Compromise

- The shorter the onset from symptoms to contact, the more severe the reaction.
- Epinephrine may precipitate cardiac ischemia. These patients should receive a 12 lead ECG.
- **PEPCID (0.25mg/kg IVP)** Famotidine can be used in combination with an H1 antagonist (Benadryl) to treat and prevent urticaria caused by an acute allergic reaction.
    - PEPCID competitively inhibits the action of histamine at the histamine H2-receptors.
    - Rare instances of arrhythmias and hypotension have been reported following rapid IV bolus
    - PEPCID - SLOW IVP- over 2 minutes
    - PEPCID is indicated even in the presence if hypotension

MONITOR THE PATIENT CLOSELY FOR RAPID DETERIORATION.

Allergic Reaction – Pediatric

History:	Signs and Symptoms:	Differential:
• Onset and location • Insect sting or bite • Food allergy/exposure • Medication allergy/exposure • New clothing, soap, detergent • History of reactions • Past medical history • Medication history	• Itching or hives • Coughing/wheezing or respiratory distress • Chest or throat constriction • Difficulty swallowing • Hypotensive or shock • Edema	• Urticaria (rash only) • Anaphylaxis (system effect) • Shock (vascular effect) • Angioedema (drug induced) • Aspiration/airway obstruction • Vasovagal event • Asthma or COPD • CHF



Glycemic Emergencies – Pediatric

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Glycemic Emergencies – Pearls

- Use Handtevy System for pediatric patients.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists.
- Recheck blood glucose after administration of DEXTROSE or GLUCAGON.
- Do not give oral glucose if patient cannot protect own airway.
- There may be times when patients refuse further treatment or transport after hypoglycemic episode. These patients will be allowed to refuse transport under the following criteria:

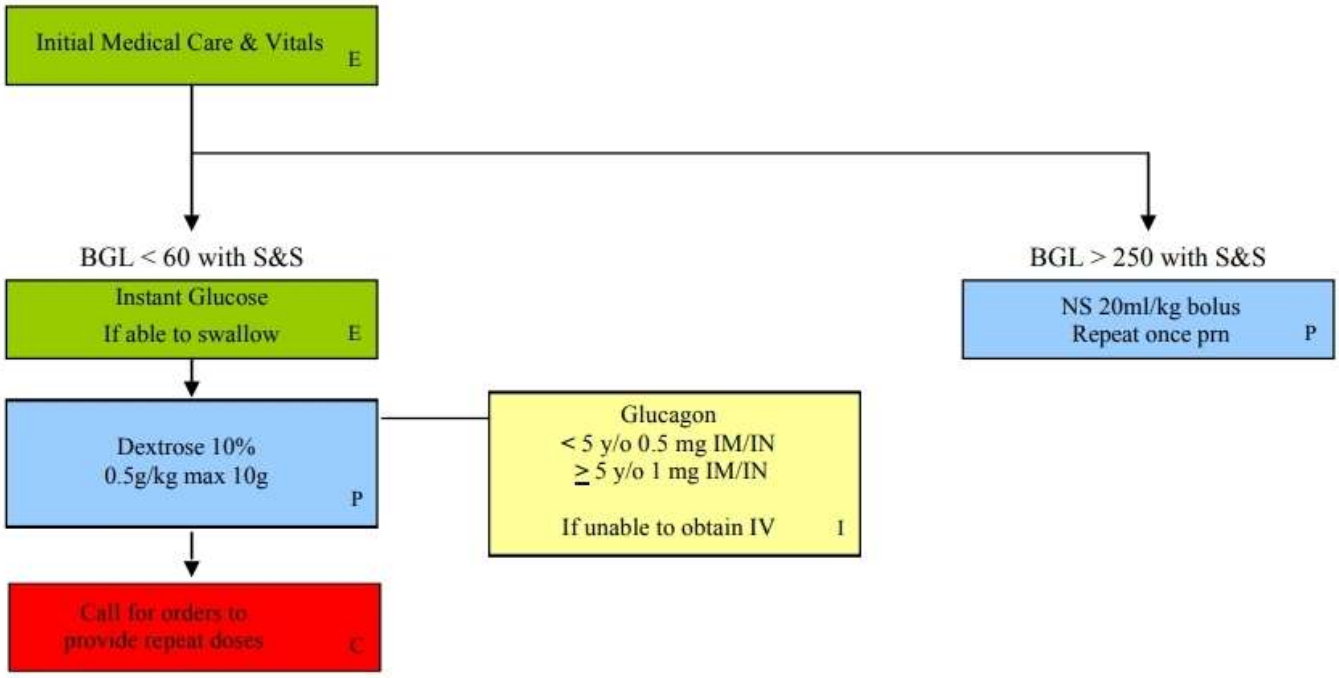
REFER TO REFUSAL OF SERVICE ADMINISTRATIVE POLICY.

D10 vs D50:

- D50 is a very hypertonic fluid, and this can lead to toxicity as well as thrombophlebitis and necrosis. Administration must be done through a patent IV line, and even then extravasation risk is high.
- D50 causes an unpredictable, uncontrolled over-correction of blood glucose levels.
- D50 administration is not shown to correct blood glucose levels any faster than D10, and it comes with more risk of administration than D10.
- D50 also results in more profound rebound hypoglycemia than D10. This is due to the excess glucose available and the increase of both uptake and utilization of glucose by the tissues. The body then slows its own production (gluconeogenesis) and breakdown (glycogenolysis) of glucose. This leads to a repeat episode of hypoglycemia because the body no longer compensates for itself when it recognizes an excess of glucose circulating in the bloodstream.
- D10 is packaged as 25 grams in 250mL. FEM dosage is 100mL given IV drip using a micro- drip set.

Glycemic Emergencies – Pediatric

History:	Signs and Symptoms:	Differential:
• Onset and Duration • History of hypertension • Seizures • Medical History • Pre-Eclampsia • Drug or alcohol use • Head trauma • Current medications • Allergies	• Headache • Nose bleed • Dizziness • Syncope • Weakness • Speech difficulties • Abdominal pain • Visual disturbances • Projectile vomiting	• Altered mental status • Hypoglycemia • Hyperglycemia • Trauma • CNS disorders



Nausea and Vomiting – Pediatric

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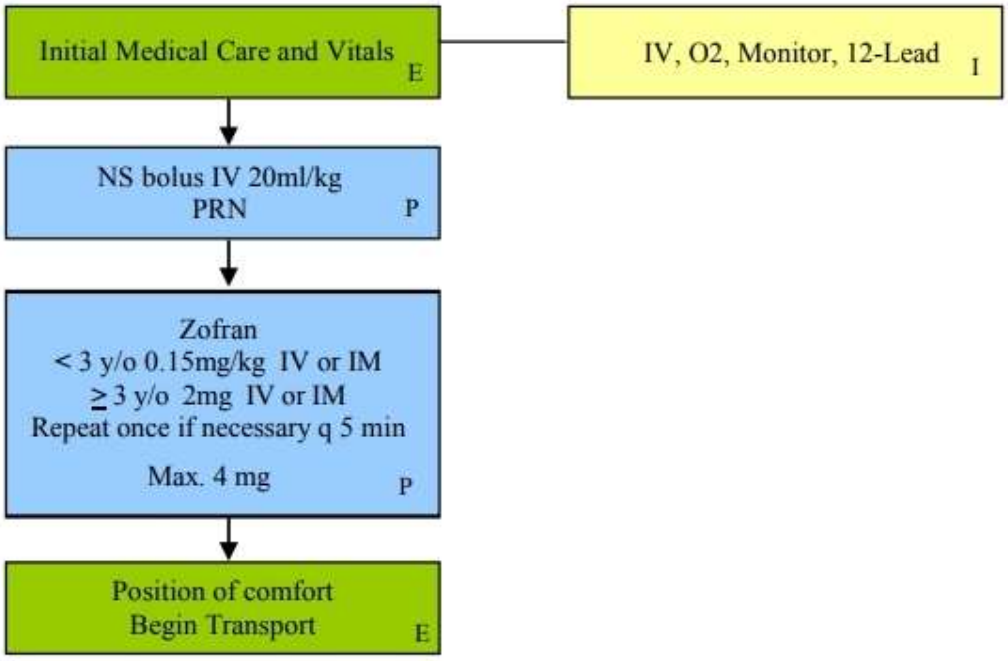
Nausea & Vomiting – Pearls

- **Use Handtevy System for pediatric patients.**
- Required Exam: Mental Status, Skin, HEENT, Neck, Heart, Lung, Abdomen, Back, Extremities, Neurological
- Frequent reassessments are needed to monitor vascular status.

Nausea and Vomiting – Pediatric

History:	Signs and Symptoms:	Differential:
• Age • Past medical/surgical history • Medications • Onset • Travel history • Other sick contacts • Improvement with food/activity • Region/Radiation/Referred • Pain severity (0-10) • Time (duration, repetition) • Fever • Last meal • Last BM/Urination	• Pain (location/migration) • Distention • Nausea • Vomiting • Diarrhea • Dysuria • Constipation	• CNS (increased pressure, headache, stroke, CNS lesions, trauma) • Drugs (NSAIDs, antibiotics, narcotics, chemotherapy) • GI or Renal disorders • Diabetic ketoacidosis • Infections (pneumonia, influenza) • Electrolyte imbalances • Food or toxin induced • Psychological



Seizures – Pediatric

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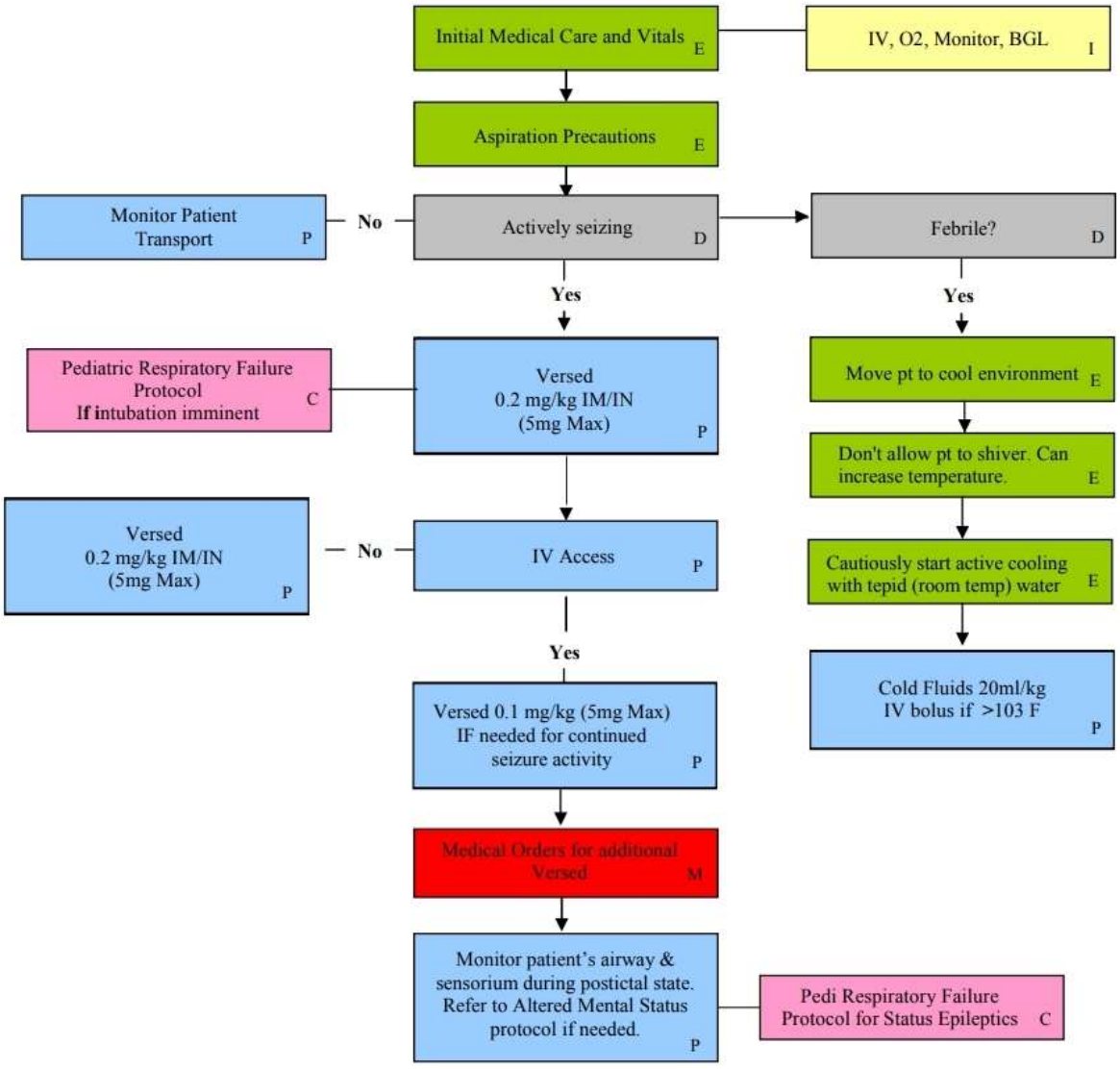
Seizures – Pearls

- Use Handtevy System for pediatric patients.
- **Any actively seizing patient (except Febrile Pediatrics) on arrival shall have IM/IN Versed administered as a first line intervention after assessing initial vitals.**
- After IM/IN Versed establish IV access X1 attempt. If unable to obtain IV access repeat IM/IN Versed to max of 5mg
- If IV is already established then refer to IV access
- Status epilepticus is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures (petit mal)** effect only a part of the body and are not usually associated with loss of consciousness.
- **Jacksonian seizures** are seizures which start as a focal seizure and become generalized (grand mal).
- Be prepared for airway problems and continued seizures.
- If evidence or suspicion of trauma, immobilize.
- If febrile, remove clothing and sponge with **room temperature water.**
- In an infant, a seizure may be a sign of a closed head injury.

EZ-IO is not indicated in stable seizure patients

Seizures – Pediatric

History:	Signs and Symptoms:	Differential:
• Reported/witnessed seizure • Seizure history • Medical alert tag info • Seizure medications • History of trauma • History of diabetes • History of pregnancy	• Decreased mental status • Sleepiness • Incontinence • Observed seizures • Evidence of trauma • Unconscious	• CNS trauma • Tumor • Hypoxia • Electrolyte abnormality • Drugs, medications • Infection/fever • Alcohol withdrawal • Eclampsia • Stroke • Hyperthermia • Hypoglycemia



Shock – Pediatric

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Pediatric Shock – Pearls

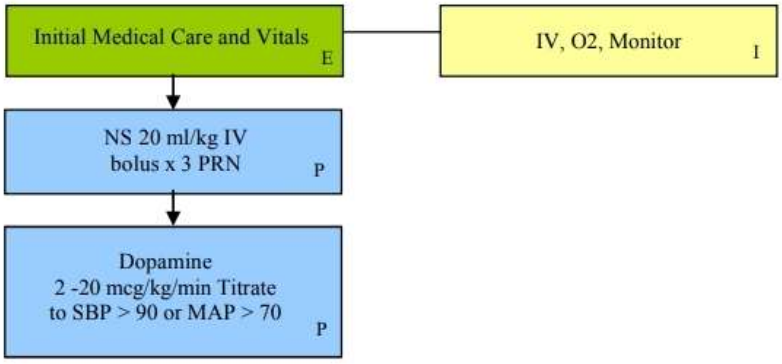
- **Use Handtevy System for pediatric patients.**
- When determining pediatric shock: consider age appropriate vitals and signs and symptoms of poor perfusion - weak or absent peripheral pulses with AMS or lethargy.
- Consider performing orthostatic vital signs on patients in non-trauma situations if suspected blood or fluid loss.
    - Positive orthostatic changes:
        - Decrease in systolic blood pressure by 10 mmHg or
        - Increase in pulse rate by 10 beats per minute.
- Consider all possible causes of shock and treat per appropriate protocol.
- **RELATIVE HYPOVOLEMIA**
    - Neurologic, septic, metabolic, psychogenic, or other volume depleted states.

PEDIATRIC / CHILDREN VITAL SIGNS

Age	Respiratory	Pulse	Weight (kg)
Preemie	40-70	120-170	2
4 months	30-60	105-160	6
6 months	24-38	110-160	8
1 year	22-30	90-150	10
2 years	22-30	85-140	12
3 years	22-30	85-140	15
4 years	22-26	75-120	17
5 years	20-24	70-115	20
6 years	20-24	70-115	22
7 years	16-22	70-110	25

Shock – Pediatric

History:	Signs and Symptoms:	Differential:
• Blood loss • Fluid loss: vomiting, diarrhea, fever • Infection • Medications • Allergic reaction • History of poor oral intake • Cardiac	• Restlessness, confusion • Weakness, dizziness • Weak, rapid pulse • Pale, cool, clammy skin • Delayed cap refill • Hypotension • Bloody stools	• Dysrhythmias • Pulmonary embolus • Tension Pneumothorax • Medication effect/overdose • Vasovagal • Physiologic



Dopamine 400mg / 250ml

Age	Minimum Volume	Maximum Volume
Newborn	1 gtt/min	4 gtt/min
4 months	1 gtt/min	4 gtt/min
6 months	2 gtt/min	8 gtt/min
1 year	2 gtt/min	8 gtt/min
2 years	2 gtt/min	8 gtt/min
3 years	3 gtt/min	12 gtt/min
4 years	3 gtt/min	12 gtt/min
5 years	4 gtt/min	16 gtt/min
6 years	4 gtt/min	16 gtt/min
7 years	5 gtt/min	20 gtt/min
8 years	5 gtt/min	20 gtt/min
9 years	6 gtt/min	24 gtt/min
10 years	7 gtt/min	28 gtt/min
11 years	8 gtt/min	32 gtt/min
12 years	9 gtt/min	36 gtt/min
13 years	11 gtt/min	44 gtt/min

Esophageal Foreign Body Obstruction – Pediatric

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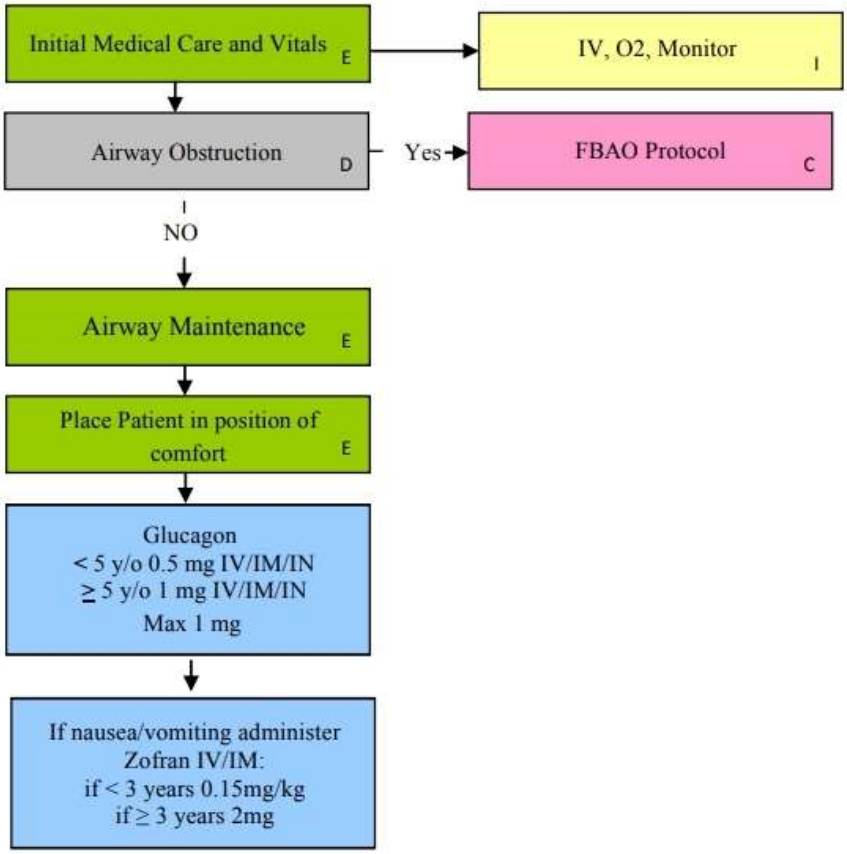
Esophageal Foreign Body Obstruction – Pearls

- Use Handtevy System for pediatric patients.
- Establish initial medical care and vitals including capnography after airway is secured. All patients should seek medical attention.
- Glucagon decreases lower esophageal sphincter tone without interfering with esophageal contractions (acts as a smooth muscle relaxer).
- Usually caused by food and/or bones.
- Most common obstruction among children is a coin (80%).

Esophageal Foreign Body Obstruction – Pediatric

History:	Signs and Symptoms:	Differential:
• Partial obstruction • Complete obstruction • Esophageal CA • Esophageal strictures • Esophageal disease	• Coughing • Difficulty or inability swallowing • Drooling • Apparent distress • Anxiety/Stress • Throat pain • Gagging • Blood-stained saliva • Chest Pain	• Globus hystericus (lump in throat) • Esophagitis • Croup • Epiglottitis • Upper respiratory tract infection



Respiratory Distress – Pediatric

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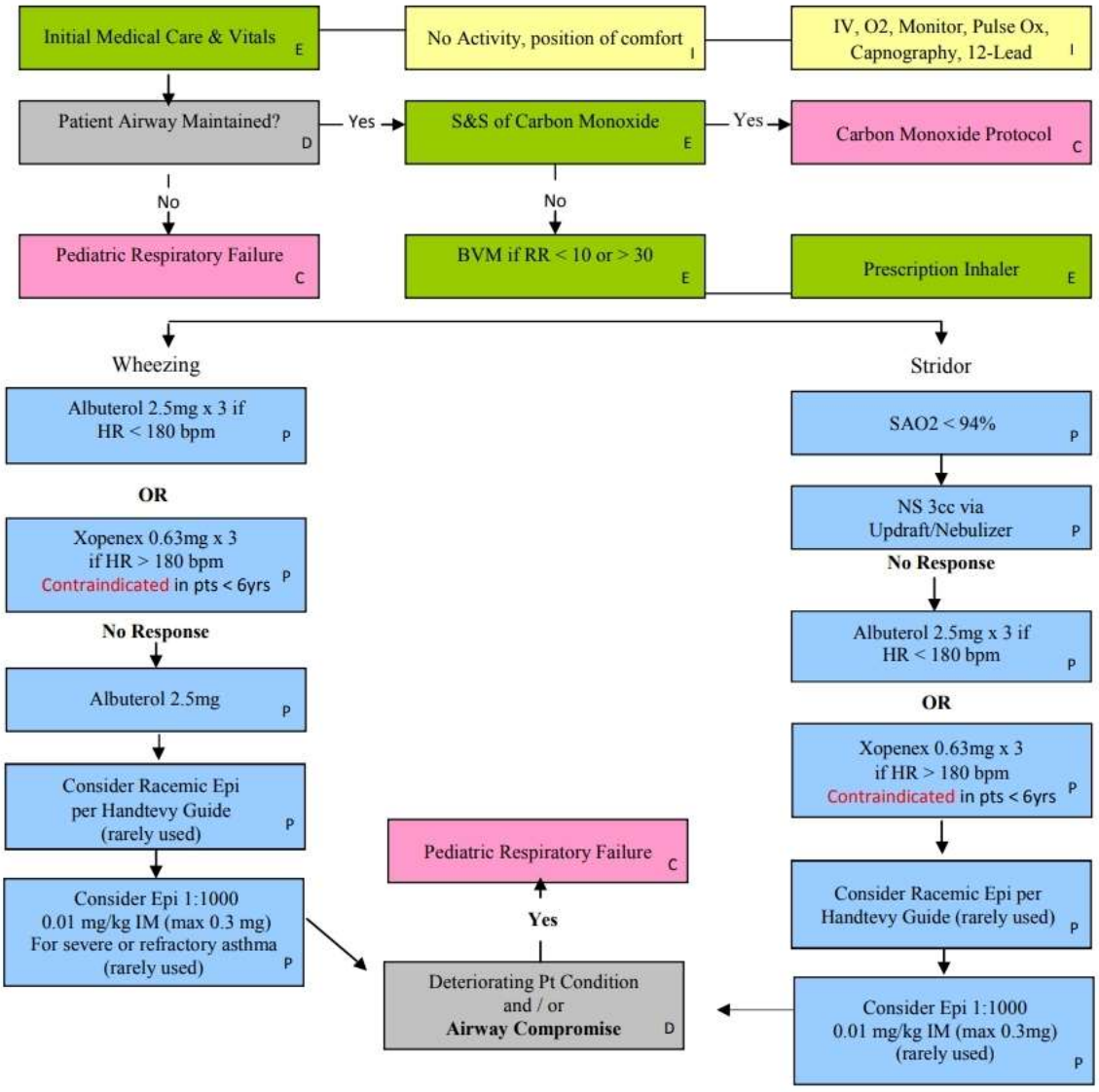
Respiratory Distress – Pearls

- Use Handtevy System for pediatric patients.
- If time, circumstances, and patient severity permit, apply capnography and record capnographic strip, before any medications. Continue to monitor and record strips as treatment progresses. **Do not treat solely on waveform findings.**
- Do not administer **ALBUTEROL** if significant ventricular ectopy. If patient presents with mild ventricular ectopy that is unresolved with aggressive oxygen therapy, **XOPENEX** is the preferred medication if child > 6 y.o. If ventricular ectopy is unresolved or worsens discontinue updraft immediately.
- **XOPENEX** contraindicated for children < 6 y.o.
- **ATROVENT** is contraindicated in patients <12 y.o.
- **ALBUTEROL** no age restriction.
- Maximum dose of IM Epinephrine is 0.25mg/dose (this correlates with a 7yo Pt per Handtevy).
- Do not force a child into a specific position; children will protect their airway by their body position.
- **Bronchiolitis** is a viral infection that typically affects infants, results in wheezing, does not usually respond to Albuterol.
- **Croup** typically affects children < 2 y.o. +viral infection, ++/- fever, gradual onset, - drooling.
- **Epiglottitis** typically affects children > 2 y.o. +bacterial, +fever, rapid onset, +drooling, possible stridor, patient will want to sit upright to keep airway open. Manipulation of the airway may worsen the condition.
- **Wheezing** typically requires consideration of foreign body occlusion.
- Racemic Epi is made by nebulizing 3ml of Epinephrine 1:1000, refer to Handtevy for dilution and dose.

Respiratory Distress – Pediatric

History:	Signs and Symptoms:	Differential:
• Asthma; COPD -chronic bronchitis, emphysema, congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Pursed lip breathing • Decreased ability to speak • Increased resp. rate and effort • Wheezing, rhonchi, rales, stridor • Accessory muscle use • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration • COPD • Pleural effusion • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin (Carbon monoxide)



Respiratory Failure – Pediatric

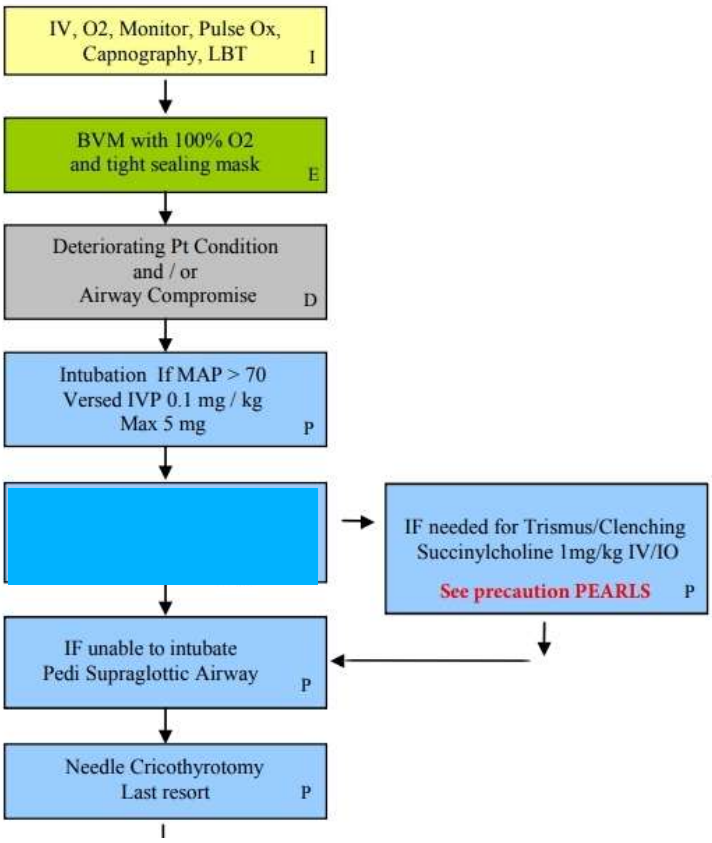
Items in this color and/or notated with an 'E' are Basic Level E	Items in this color and/or notated with a 'P' are Paramedic Level P	The items in this color and/or notated with an 'I' are Information I
Items in this color and/or notates with a 'C' refer to appropriate protocol C	Items in this color and/or notated with a 'D' are Decisions D	Items in this color and/or notated with an 'M' require a Physician's Order M

Pediatric Respiratory Failure – Pearls

- **Use Handtevy System for pediatric patients.**
- Apply CAPNOGRAPHY before any medication is administered (if time, circumstances, and patient severity permit). Record a capnographic strip as documentation of the patient's dyspnea ("shark-fin" waveform indicative of bronchial constriction). Continue to monitor and record waveforms as treatment progresses. **Do not treat based solely upon capnographic waveform findings.**
- Do not attempt aggressive airway intervention unless airway becomes obstructed. Use an ET tube one size smaller than the recommended size according to the LENGTH-BASED TAPE if the patient is physiologically difficult to intubate (severe anxiety, etc.).
- IBW- Ideal body weight
- ETT size is determined by the following formula:
    - 16 plus the patient's age divided by 4 (Round Down To Lowest Number)
- **It is suggested to avoid the use of Succinylcholine unless absolutely necessary and contraindicated for pediatric patients presenting as febrile (Malignant Hyperthermia).**

Have **Atropine 0.02mg/kg (max 0.5 mg)** readily available to administer if Pt is bradycardic or becomes bradycardic according to age appropriate vitals during airway procedure.

Pediatric Respiratory Failure – Pediatric



AGE	WEIGHT	KETAMINE DOSE	ETOMIDATE DOSE	VERSED DOSE
1 y/o	10 kg	20 mg	3 mg	1 mg
2 y/o	12 kg	24 mg	3.6 mg	1.2 mg
3 y/o	15 kg	30 mg	4.5 mg	1.5 mg
4 y/o	17 kg	34 mg	5.1 mg	1.7 mg
5 y/o	20 kg	40 mg	6 mg	2 mg
6 y/o	22 kg	44 mg	6.6 mg	2.2 mg
7 y/o	25 kg	50 mg	7.5 mg	2.5 mg
8 y/o	27 kg	54 mg	8.1 mg	2.7 mg
9 y/o	30 kg	60 mg	9 mg	3 mg
10 y/o	35 kg	70 mg	10.5 mg	3.5 mg
11 y/o	40 kg	80 mg	12 mg	4 mg
12 y/o	50 kg	100 mg	15 mg	5 mg
13 y/o	60 kg	120 mg	18 mg	5 mg

Pediatric Pain Management

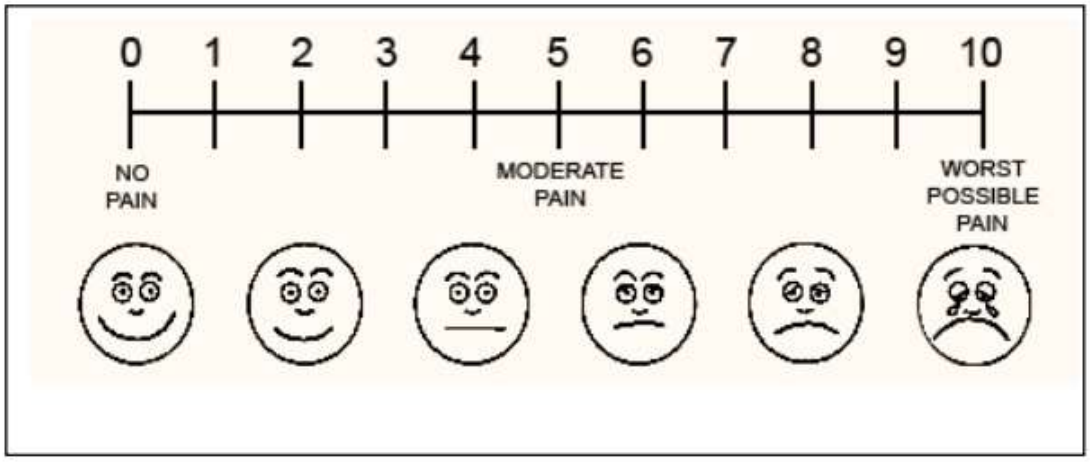
Items in this color and/or notated with an 'E' are Basic Level E	Items in this color and/or notated with a 'P' are Paramedic Level P	The items in this color and/or notated with an 'I' are Information I
Items in this color and/or notates with a 'C' refer to appropriate protocol C	Items in this color and/or notated with a 'D' are Decisions D	Items in this color and/or notated with an 'M' require a Physician's Order M

Pediatric Pain Management – Pearls

- **Use Handtevy System for pediatric patients.**
- Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.
- Vital signs should be obtained before administering medication, 5 minutes post medication, and at disposition with all pain medications.
- All patients should have drug allergies documented prior to administering pain medications.
- All pain medication that is given that is not related to isolated extremity trauma or burns requires medical control consultation prior to administration.

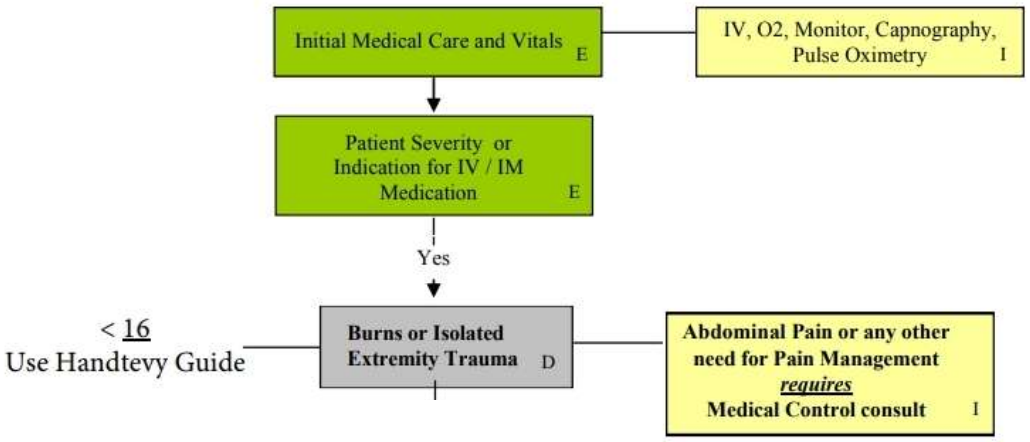
To dilute Ketamine 50mg/mL (FEM 'adult') to the 20mg/ml concentration listed in Handtevy guide do the following:

Use a 5mL syringe and draw up 1mL of Ketamine 50mg/mL
Add 4mL normal saline, this gives you 50mg/5mL which is 10mg/mL



Pediatric Pain Management

History:	Signs and Symptoms:	Differential:
• Age • Location • Duration • Severity (1-10) • Past medical history • Medications • Drug allergies	• Severity (pain scale) • Quality (sharp, dull, etc.) • Radiation • Relation to movement, respiration • Increased with palpation of area	• Per the specific protocol • Musculoskeletal • Visceral (abdominal) • Cardiac • Pleural / Respiratory • Neurogenic • Renal (colic)



AGE	WEIGHT	KETAMINE DOSE	Amount 10mg/mL
1 year	10 kg	2.5 mg	0.25 mL
2 years	12 kg	3 mg	0.3 mL
3 years	15 kg	3.75 mg	0.38 mL
4 years	17 kg	4.25 mg	0.43 mL
5 years	20 kg	5 mg	0.5 mL
6 years	22 kg	5.5 mg	0.55 mL
7 years	25 kg	6.25 mg	0.63 mL
8 years	27 kg	6.75 mg	0.68 mL
9 years	30 kg	7.5 mg	0.75 mL
10 years	35 kg	8.75 mg	0.88 mL
11 years	40 kg	10 mg	1.0 mL
12 years	50 kg	12.5 mg	1.3 mL
13 years	60 kg	15 mg	1.5 mL
14 years	70 kg	17.5 mg	1.75 mL
15 years	80 kg	20 mg	2.0 mL

SECTION THREE

PROCEDURES

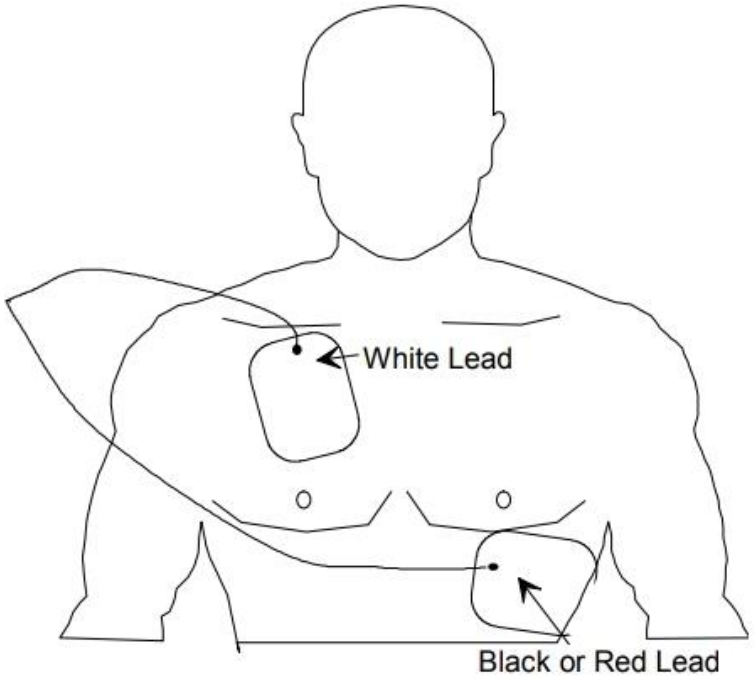
PROCEDURE GUIDELINE
AED

1. Indications:
   - Cardiac Arrest.
   - 8 years of age or older.
2. Procedure:
   - Remove clothing from patient's chest.
   - Wipe patient's chest dry, and trim any long hair in areas where you will place defibrillator pads.
   - Turn AED "ON".
   - Attach defibrillator pads to white and black chest leads.
   - Apply defibrillator pads to patient using Anterior/Anterior placement:

     Apply PAD and STERNUM (white) wire to upper sternum (above the right nipple, below right the clavicle).

     Apply PAD and APEX (black or red) wire to the lower left chest (below and to the left of the left nipple toward midaxillary line). ***(SEE DIAGRAM BELOW.)***

   - Stop CPR, activate analyze sequence.
   - Follow commands given by AED.



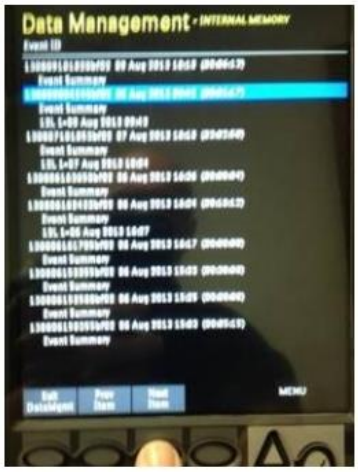
PROCEDURE GUIDELINE
Bluetooth

PART ONE:

Transferring EKG's & all monitor event data from Philips monitor to the Tough Book

- **Once it is safe for you to leave patient monitoring, i.e. (Stable patient; at the hospital; end of call; etc…) continue with the following steps:**
- On your Phillips EKG monitor go to Menu and select "other"
- Then select "Data Management"
- Acknowledge leaving patient monitoring

- Select event you want to attach to the ePCR using PREV/NEXT buttons.



- Scroll up to "send" button on "Menu" (check mark)
  Select "All event data"
- Confirm Tough Book ID

- "Connecting to device window" will appear
- Sending data could take several minutes
- After "Disconnecting" displays, EKG records have been transferred to the Tough Book

- Then select "Exit Data Management" to return to patient monitoring or to shut down the monitor

PROCEDURE GUIDELINE
BLOOD GLUCOSE TEST

CONTROL TEST

The Control Test confirms that the system is functioning properly and must be done each Monday, any time you receive a new vial of test strips and anytime blood glucose test results are in question.

1. Equipment:
- Glucometer Meter
- Glucometer Control Solution
- Glucometer Test Strip

2. Control Test:
- Insert the test strip and turn on the meter
- Apply control solution
- Read and compare the results with the test strip vial

If the Control Test result does not fall within the stated range, the Meter is malfunctioning.

BLOOD GLUCOSE TEST

1. Indications:
- Altered sensorium or suspected blood sugar abnormality based on history.

2. Equipment:
- Glucose Meter
- Glucometer Test Strip
- Lancet

3. Prepare Lancing Device for a finger stick

4. Performing the test
- Insert test strip to turn on the meter
  - Wait for the meter to display the test strip and blood symbol
- Clean a desired site
- Obtain a blood sample
  - Use the lancet to puncture the clean desired site. After penetration, discard the first drop of blood with a clean 4x4.
  - Gently squeeze the area around the puncture site to obtain another drop of blood.
  - Don't smear the blood
- Apply the sample
  - Hold the drop to touch the absorbent hole of the test strip. Blood will be drawn in and after the confirmation window is completely filled.
  - The meter will count down.
- Read the results
- Eject the test strip
- Discard the lancet

PROCEDURE GUIDELINE
BLOOD GLUCOSE TEST (continued)

Assure Prism Multi Glucometer Error Codes

"HI" appears when the blood glucose level is greater than 600 mg/dL.

"LO" appears when the blood glucose level is less than 20mg/dL.

A used test strip was inserted. Repeat the test with a new test strip.

The blood or control solution sample was applied before the symbol appeared. Repeat the test with a new test strip and wait until the symbol appears before applying the blood or control solution sample.

The blood sample has abnormally high viscosity or insufficient volume. Repeat the test with a new strip.

This error message may appear when the wrong blood glucose test strip is used.

There is a problem with the meter.

The temperature during the test was above the operating range. The operating range temperature is 50-104*F.

The temperature during the test was below the operating range. The operating range temperature is 50-104*F.

If you see the symbol, the battery is low and should be replaced as soon as possible.

PROCEDURE GUIDELINE
BLOOD GLUCOSE TEST (continued)

Assure Prism Multi Glucometer Troubleshooting

Problem	Troubleshooting
The display is blank even after inserting a test strip	• Check whether the test strip is inserted with the contact bar facing up • Check if the strip has been inserted completely into the test strip port • Check if the appropriate test strip was used • Check if the batteries are inserted with the "+" side facing up • Replace the batteries
The test does not start even after applying the blood sample on the strip	• Check if the confirmation window is filled completely • Repeat the test after inserting a new test strip
The patient's test result does not match their symptoms	• Repeat the test after inserting a new test strip • Check the expiration date of the strip • Perform control solution test

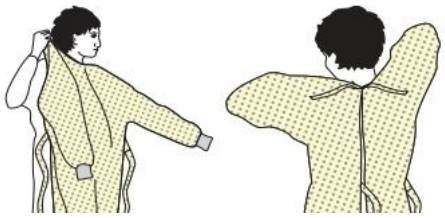
PROCEDURE GUIDELINE
BSI/PPE

SEQUENCE FOR PUTTING ON PERSONAL PROTECTIVE EQUIPMENT (PPE)

The type of PPE used will vary based on the level of precautions required, such as standard and contact, droplet or airborne infection isolation precautions. The procedure for putting on and removing PPE should be tailored to the specific type of PPE.

1. GOWN

- Fully cover torso from neck to knees, arms to end of wrists, and wrap around the back
- Fasten in back of neck and waist



2. MASK OR RESPIRATOR

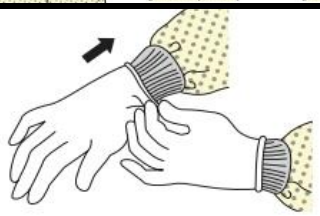
- Secure ties or elastic bands at middle of head and neck
- Fit flexible band to nose bridge
- Fit snug to face and below chin
- Fit-check respirator

3. GOGGLES OR FACE SHIELD

- Place over face and eyes and adjust to fit

4. GLOVES

- Extend to cover wrist of isolation gown



USE SAFE WORK PRACTICES TO PROTECT YOURSELF AND LIMIT THE SPREAD OF CONTAMINATION

- Keep hands away from face
- Limit surfaces touched
- Change gloves when torn or heavily contaminated
- Perform hand hygiene

CS250672-A

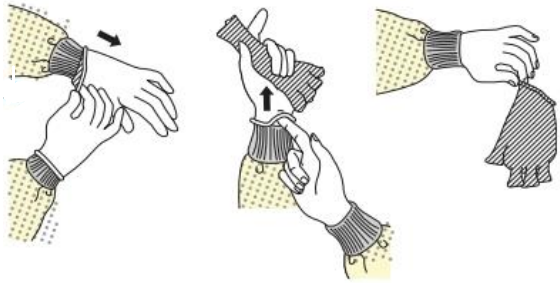
PROCEDURE GUIDELINE
BSI/PPE

SEQUENCE FOR REMOVING PERSONAL PROTECTIVE EQUIPMENT

Except for respirator, remove PPE at doorway or in anteroom. Remove (PPE) respirator after leaving patient room and closing door.

1. GLOVES

- Outside of gloves is contaminated!
- Grasp outside of glove with opposite gloved hand; peel off
- Hold removed glove in gloved hand
- Slide fingers of ungloved hand under remaining glove at wrist
- Peel glove off over first glove
- Discard gloves in waste container

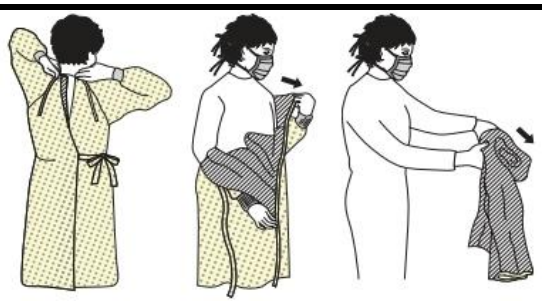


2. GOGGLES OR FACE SHIELD

- Outside of goggles or face shield is contaminated!
- To remove, handle by head band or ear pieces
- Place in designated receptacle for reprocessing or in waste container

3. GOWN

- Gown front and sleeves are contaminated!
- Unfasten ties
- Pull away from neck and shoulders, touching inside of gown only
- Turn gown inside out
- Fold or roll into a bundle and discard



4. MASK OR RESPIRATOR

- Front of mask/respirator is contaminated— DO NOT TOUCH!
- Grasp bottom, then top ties or elastics and remove
- Discard in waste container

PERFORM HAND HYGIENE BETWEEN STEPS IF HANDS BECOME CONTAMINATED AND IMMEDIATELY

PROCEDURE GUIDELINE
CAPNOGRAPHY

END-TIDAL CO_2 ($EtCO_2$) MONITORING:

I. INDICATIONS:

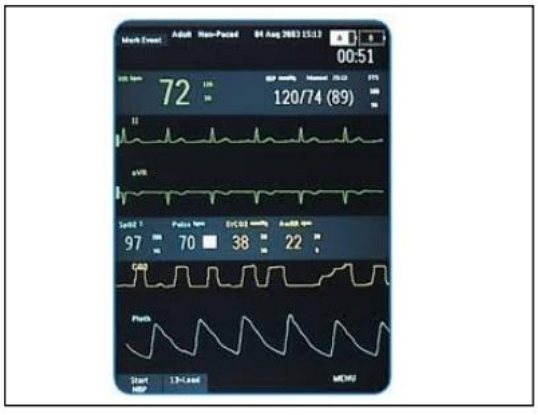
A. Intubation:
   1. Verifying ETT or iGel placement.
   2. Continuous monitoring and detection of tube dislodgment.
   3. Loss of circulatory function.
   4. Monitoring CPR:
      a. Effectiveness of cardiac compression.
      b. Earliest sign of ROSC (Return of Spontaneous Circulation).
      c. Predictor of survival.

II. EQUIPMENT:

A. Phillips MRX equipped with Capnography.
B. Intubated: FilterLine for adult and pediatric patients- connects between Ambu and ETT or iGel

III. PROCEDURE:

A. Connect appropriate FilterLine to MRX and allow for initialization (approx. 5 seconds). The $EtCO_2$ monitor performs the autozero routine as part of the initialization self-test.
B. MRX automatically defaults CO_2 waveform (capnogram) on channel 3 of the display. Verify that the CO_2 capnogram is displayed.
C. Adjust scale, if necessary. To change the CO_2 scale, select CO_2 and choose the desired scale from the scale overlay. There are three options available for the display scale:
   1. Autoscale (default: selects appropriate scale based on measured $EtCO_2$ value)
   2. 0-50 mmHg
   3. 0-100 mmHg.
D. Place the FilterLine on patient, or connect to airway device, and verify waveform.
E. The CO_2 level and capnogram should be monitored and documented with the patient's vital signs. Any loss of CO_2 detection or waveform indicates an airway problem and should be corrected immediately.
F. For intubated patients, record a capnographic waveform strip following any patient movement and before transferring care to determine that there has not been a tube dislodgment.

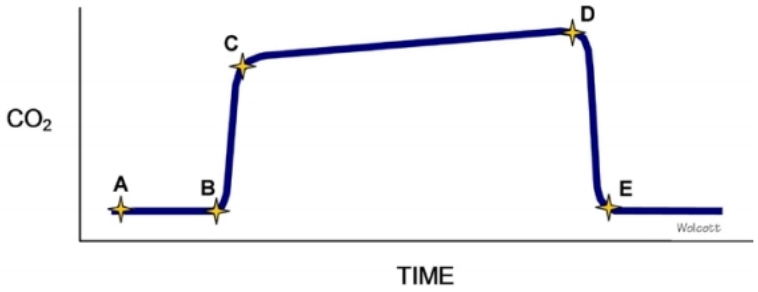


IV. NOTES:

A. Connect the FilterLine tubing to the Phillips MRX Biphasic defibrillator/monitor first; then connect it to the patient's airway.

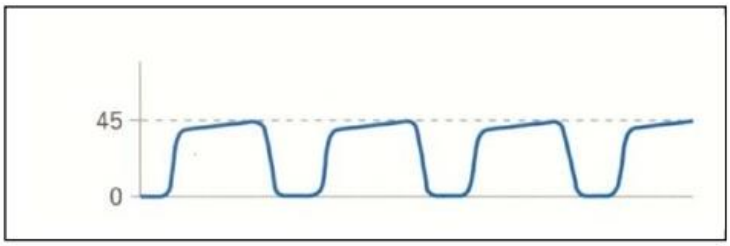
B. Capnography is more effective than pulse oximetry in the early detection of adverse respiratory events. The MRX will display 3 main items in reference to Capnography: Respiratory Rate, Capnogram (capnography waveform), and Carbon Dioxide measurements in mmHg.

1. Respiratory Rate: The MRX will display an objective average of the patient's respiratory rate or ventilation rate based upon the waveform width.
2. Capnogram:
   a. Normal Capnogram:



A-B: Respiratory baseline- exhalation of CO_2-free gas contained in dead space.
B-C: Expiratory upslope- exhalation of mixed dead space and alveolar gas.
C-D: Alveolar plateau- exhalation of mostly alveolar gas.
D: End-tidal value- peak CO_2 concentration, normally at the end of exhalation.
D-E: Inhalation- rapid, sharp downstroke.

   b. Normal Waveform:

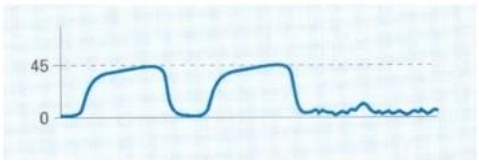
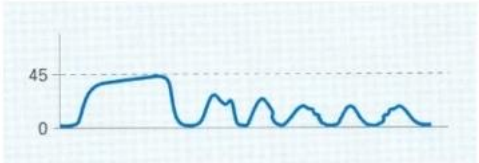


3. Carbon Dioxide Measurements:
   a. Normal range is 35-45 mmHg.
   b. Values below 35 mmHg are indicative of respiratory alkalosis.
   c. Values greater than 45 mmHg are indicative of respiratory acidosis.
   d. Cardiopulmonary resuscitation is estimated to provide only 33% of normal cardiac output. Typical $EtCO_2$ values in cardiac arrest are 10-12 mmHg or 1/3that of normal $EtCO_2$ values.
   e. An $EtCO_2$ of zero following intubation indicates a displaced airway

C. Alarms:
1. CO_2 FILTER LINE OFF message: the FilterLine is disconnected.
2. ALARM APNEA message: This alarm is on whenever $EtCO_2$ monitoring is in use and the device detects a valid breath. It is not controlled by the Phillips MRX defibrillator/monitor Quick Set feature. The APNEA alarm appears when no valid breath has been detected for 30 seconds. The message ALARM APNEA appears in the status region on the display along with the time since the last detected breath.
3. CO_2 FILTERLINE BLOCKAGE message: FilterLine is kinked or clogged with moisture. This message appears after 30 seconds of unsuccessful purging or clearing of FilterLine. Check the FilterLine and if it is kinked, unkink it, then disconnect and reconnect the Filter line and it will start monitoring. If it doesn't start monitoring after disconnecting and reconnecting, assume the filter is saturated and change the FilterLine. Never blow out FilterLines!
4. CO_2 FILTERLINE PURGING message: FilterLine tube twisted or clogged, or a rapid altitude change occurred.

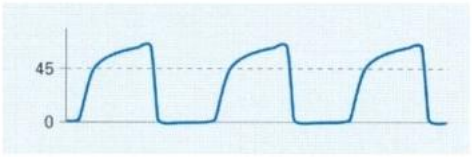
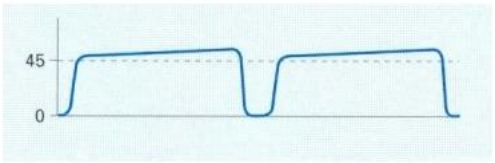
D. Troubleshooting tips:
1. $EtCO_2$ values are erratic: leak in the tubing or the ventilated patient breathes spontaneously.
2. $EtCO_2$ values are consistently higher or lower than expected: physiological cause, ventilator malfunction, or improper calibration.
3. XXX appears in place of $EtCO_2$ value: CO_2 module not calibrated successfully, or CO_2 module fails.

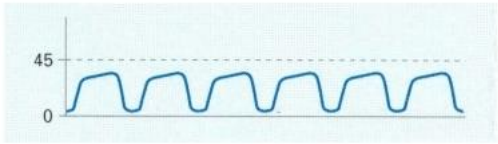
E. Abnormal Capnograms:
1. Intubated:

Sudden loss of waveform, $EtCO_2$ near zero	Decreasing $EtCO_2$ with loss of plateau
	
Possible causes: Airway disconnection Dislodged ET tube/esophageal intubation Totally obstructed/kinked ET tube Complete ventilator malfunction	Possible Causes: Leak in the airway system ET tube in hypopharynx ET tube cuff leak or deflated cuff Partial airway obstruction Partial disconnect from ventilator circuit

CPR Assessment	**Sudden increase in $EtCO_2$**
	
Possible causes: Attempt to maintain minimum of 10-12 mmHg	**Possible causes:** Return of spontaneous circulation

2. Non-Intubated:

Plateau has curved, "shark-fin" appearance	**Slow rate with increased $EtCO_2$**
	
Possible causes: Bronchospasm found in Asthma or COPD Incomplete exhalation Partially kinked ET tube Mucous plugging Poor sampling techniques	**Possible causes:** Hypoventilation Altered mental status (sedation, post-ictal states, drug or alcohol intoxication, head trauma, CVA) Partial airway obstruction Respiratory-depressant drugs

Rapid rate with decreased $EtCO_2$	**Decreased $EtCO_2$, variable waveform**
	
Possible causes: Hyperventilation Hypothermia Pulmonary embolism	**Possible causes:** Apnea, inadequate breath Sedation

PROCEDURE GUIDELINE
CARDIAC MONITOR

OPERATIONAL CHECKS SHOULD ONLY BE DONE IF AN ISSUE OCCURS WITH THE MONITOR.

QUICK LOOK METHOD

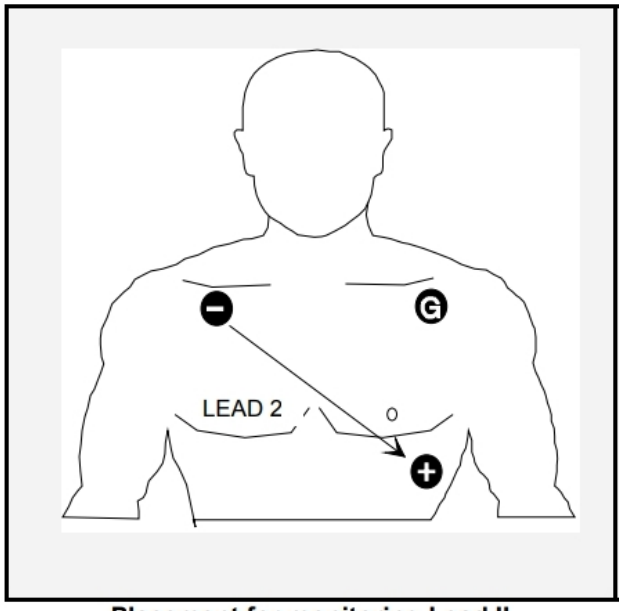
1. **Indications:**
   - In cardiac arrest for initial rhythm observation prior to application of Fast patch or 3 Lead Electrodes.
2. **Procedure:**
   - Remove clothing from patient's chest.
   - Apply Fast Patch pads:
     - ***Apply PAD and STERNUM wire*** *to upper sternum slightly toward right shoulder.*
     - ***Apply PAD and APEX wire*** *to the anterior (mid-axillary) line below the nipple.*
   - Ensure the monitor is in the PADDLES mode in the lead selection.

1. **Indications:**
   - Determination and monitoring of cardiac rhythms with anticipation of defibrillation.
2. **Procedure:**
   - Remove clothing from patient's chest.
   - Apply Fast Patch pads:
     - Apply PAD and STERNUM wire to upper sternum slightly toward right shoulder.
     - Apply PAD and APEX wire to the anterior (mid-axillary) line below the nipple.
   - Ensure the paddles are in FAST PATCH adapter with the paddles in the proper side.
   - Ensure the monitor is in the PADDLES mode in the lead selection.

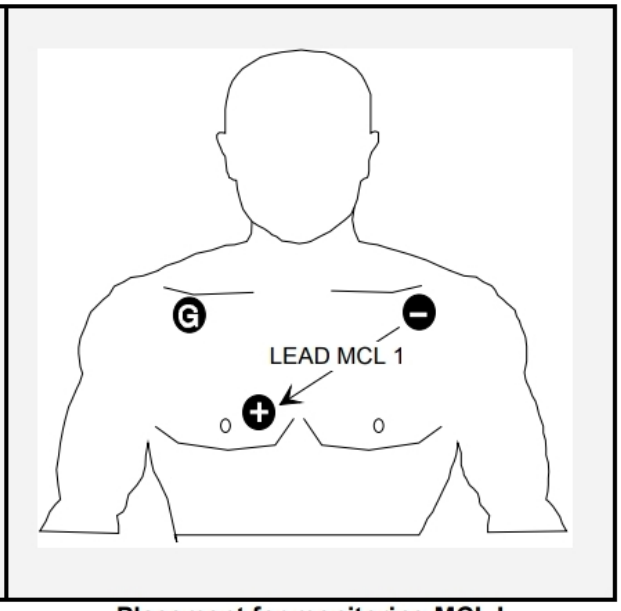
THREE LEAD METHOD

1. **Indications:**
   - Determination and monitoring of cardiac rhythms.
2. **Procedure:**
   - Remove clothing from area electrodes will be placed.
   - Apply wires to electrodes.

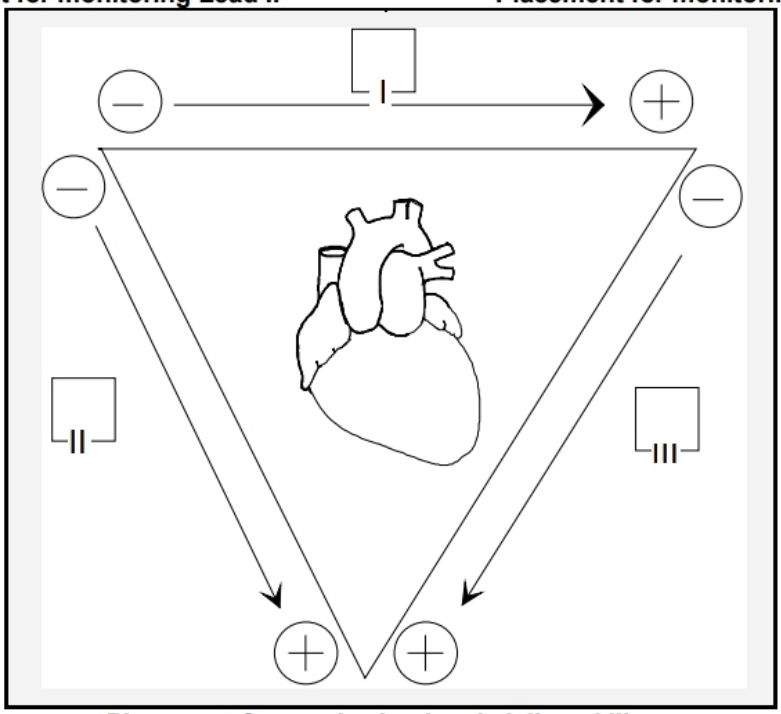
PROCEDURE GUIDELINE
CARDIAC MONITOR (continued)



Placement for monitoring Lead II



Placement for monitoring MCL I

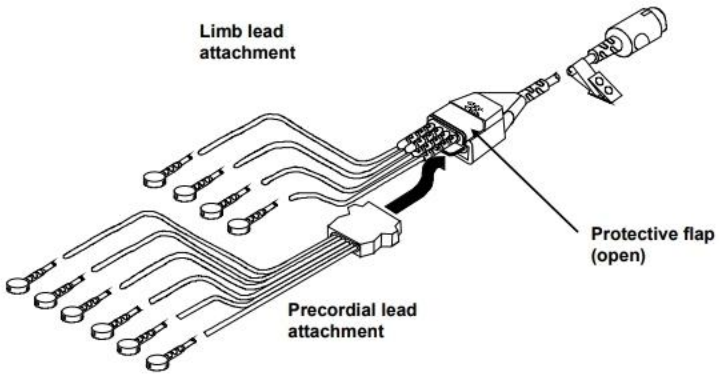


Placement for monitoring Leads I, II, and III

The 12 lead ECG

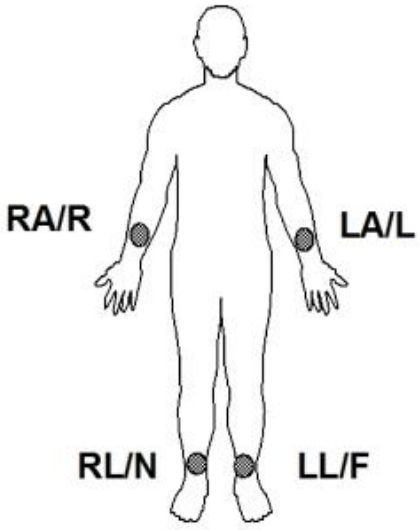
To acquire a 12-Lead ECG.

Insert the limb lead and the precordial lead attachment into the main cable as shown below:



Limb Lead Electrode Sites

When acquiring a 12-Lead ECG, the limb lead electrodes are typically placed on the wrists and the ankles as illustrated below. In fact the limb lead electrodes can be placed anywhere along the limbs. However, do not place the leads on the torso when acquiring a 12-Lead ECG or you will record a non-standard report.

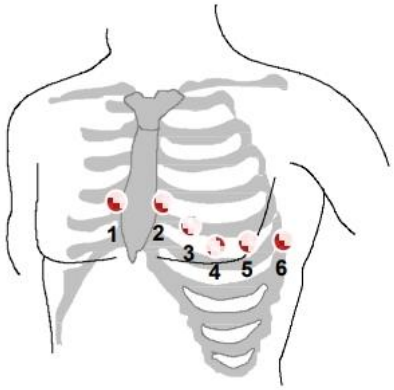


AHA	Labels		IEC	Labels
RA	Right Arm		**R**	Right
LA	Left Arm		**L**	Left
RL	Right Leg		**N**	Negative
LL	Left Leg		**F**	Foot

PROCEDURE GUIDELINE
CARDIAC MONITOR (continued)

Limb Lead Electrode Sites continued

The six precordial (chest) leads are placed on specific locations on the chest. Proper placement is important for accurate diagnosis and should be identified as shown below:



Lead	Location
V1	Fourth intercostal space to the right of the sternum
V2	Fourth intercostal space to the left of the sternum
V3	Directly between leads V2 and V4
V4	Fifth intercostal space at midclavicular line
V5	Level with V4 at left anterior axillary line
V6	Level with V5 at left midaxillary line (Midpoint of armpit)

Locating the V1 position (fourth intercostal space) is critically important because it is the reference point for locating the placement of the remaining V leads. To locate the V1 position:

1. Place your finger at the notch in the top of the sternum.
2. Move your finger slowly downward about 1.5 inches until you feel a slight horizontal ridge or elevation. This is the "angle of Louis" where the manubrium joins the body of the sternum.
3. Locate the second intercostal space on the right side, lateral to and just below the angle of Louis.
4. Move your finger down two more intercostal spaces to the fourth intercostal space which is the V1 position.

Other important considerations:

- When placing electrodes on female patients, always place leads V3 - V6 ***under*** the breast rather than ***on*** the breast.
- Never use the nipples as reference points for locating the electrodes for men or women patients because nipple locations may vary widely.

The monitor acquires 10 seconds of ECG data for each 12-Lead ECG requested. If the monitor detects signal noise while acquiring data (such as patient movement or disconnected electrode), the monitor displays the message WAITING FOR GOOD DATA.

PROCEDURE GUIDELINE
CARDIOVERSION

1. **Indications:**
   - NARROW COMPLEX TACHYCARDIA PROTOCOL.
   - VENTRICULAR TACHYCARDIA WITH A PULSE PROTOCOL.

   If the patient presents with one or more unstable criteria, (acute altered mental status, or hypotension with signs of decreased tissue perfusion), ***DEFIBRILLATION*** may be administered at the same joule setting listed in the PROTOCOL to avoid delays associated with Synchronization.

   - Symptomatic Atrial Fibrillation / Atrial Flutter with RVR.
2. **Check the equipment** - Turn on the monitor / defibrillator.
3. **Apply monitor per PROCEDURE GUIDELINE.**
4. **Verify function of synchronizer button.**
   - QRS complex must be upright on monitor - inverted or low amplitude complexes may not trigger synchronizing circuit. Turn up machine gain until a small dot appears on the QRS complex. This indicates that the synchronizer circuit has been activated.
5. **Confirm the rhythm.**
6. **Cardioversion:**
   - Confirm the rhythm.
   - Ensure synchronizer is turned on and activate synchronizer.
   - Check fast patch pads position and conduction.
   - Select appropriate energy level per Standing Order.
   - Call ALL CLEAR. Check to ensure all people including you are clear of the patient. Ensure ALL personnel are in a safe operating location.
   - Discharge energy by pressing discharge buttons simultaneously and hold until energy is delivered. Machine will not deliver energy until the proper time.
   - **Observe for rhythm change and check the patient for a pulse, (If applicable).**
   - Repeat as necessary per PROTOCOL.

PROCEDURE GUIDELINE
CHILD BIRTH

Clinical Indications:

- Imminent delivery with crowning

Procedure:

1. Delivery should be controlled so as to allow a slow controlled delivery of the infant. This will prevent injury to the mother and infant.
2. Support the infant's head as needed.
3. Check for umbilical cord around the neck. If it is present, slip it over the head. If unable to free the cord from the neck, double clamp the cord and cut between the clamps.
4. Suction the airway with a bulb syringe.
5. Grasping the head with hands over the ears, gently pull down to allow delivery of the anterior shoulder
6. Gently pull up on the head to allow delivery of the posterior shoulder.
7. Slowly deliver the remainder of the infant.
8. Clamp the cord approximately 8 inches from the abdomen with 2 clamps 2 inches apart and cut the cord between the clamps.
9. Record APGAR scores at 1 and 5 minutes.
10. Follow the New Born Protocol for further treatment.
11. The placenta will deliver spontaneously, usually within 30 minutes of the infant. Do not force the placenta to deliver.
12. Massaging the uterus may facilitate delivery of the placenta and decrease bleeding by facilitating uterine contractions.
13. Continue rapid transport to the hospital.

PROCEDURE GUIDELINE
CPAP

CPAP is defined as the application of positive end expiratory pressure by facemask for relief of hypoxemia, which doesn't respond to conventional therapy. In order for CPAP to be used, the patient must be breathing.

A. INDICATIONS: Hypoxemia secondary to COPD, severe Asthma or Pulmonary Edema.

B. CONTRAINDICATIONS:

1. Penetrating chest trauma
2. Severe hypotension
3. Persistent nausea and or vomiting
4. Obtundation
5. Respiratory / Cardiac arrest
6. Patient unable to protect their own airway

C. PROCEDURE:

1. Do not bypass, delay or withhold conventional treatment while assembling or using the CPAP device.
2. Choose appropriate setting: PEEP valve- 5-7.5 cm for COPD or 10 cm for Pulmonary Edema.
3. Assemble the equipment as per **Figure 1.**
4. Explain the procedure to the patient to help alleviate any anxiety.
5. Test the equipment prior to placing on the patient.
6. Make sure the on / off valve is in the **off** position.
7. Ensure the flow adjustment valve is open completely and the oxygen adjustment valve is in the lowest flow position.
8. Turn the on / off valve to the on position.
9. Secure the mask to the face of the patient using the least amount of pressure to make a seal.
10. Watch the PEEP valve to ensure that it remains open during inspiration.
11. Decrease the flow adjustment valve until there is slight continuous flow from the PEEP valve during inspiration.
12. Monitor the patient's condition for improvement, including the respiratory rate, mental status and SaO2 percentage.
    A. If the patient's condition is improving, continue to monitor the patient.
    B. If the patient's condition is not improving, increase the oxygen adjustment valve. Titrate in increments of ½ turns q 2 minutes to SaO2 of 100%.
    C. If the patient's condition is deteriorating despite increasing the oxygen adjustment valve, discontinue the CPAP device and prepare for orotracheal intubation.

PROCEDURE GUIDELINE
CPAP (continued)

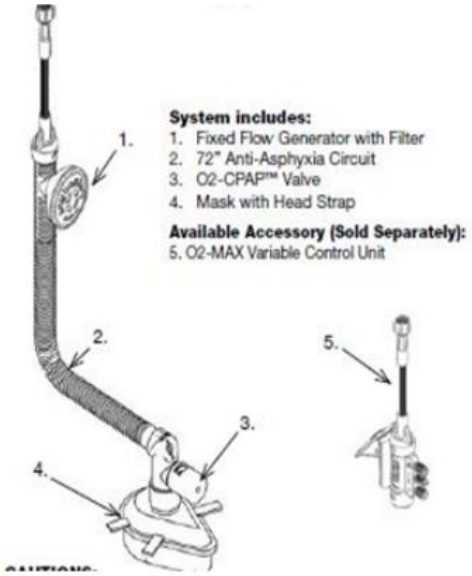


Figure 1

PROCERUDE GUIDELINE

CRICOTHYROTOMY - NEEDLE

1. Indications:

- If unable to ventilate and airway **not patent**, perform Needle Cricothyrotomy, as listed in the PROTOCOLS.
- Preferred over surgical cricothyrotomy in children under 12 years old.
- Preferred over surgical cricothyrotomy in patients with known clotting disorders and/or anticoagulant therapy.

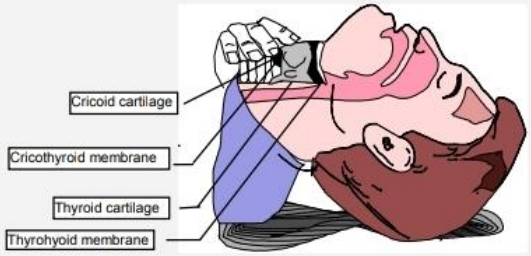
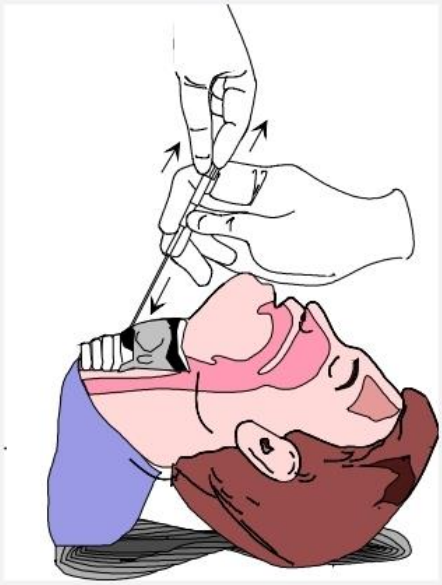
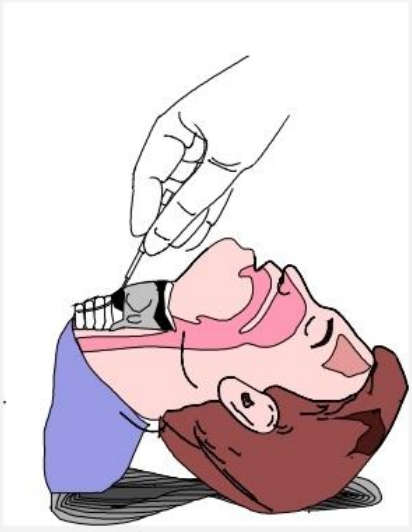
2. Equipment:

- 14 gauge over the needle catheter.
- 3.0 mm endotracheal tube adapter.
- Antiseptic swabs.
- 10 cc syringe.
- Tape.
- Occlusive dressing.
- BVM.

3. Procedure (refer to illustration):

- Place the patient in a supine position with the neck in a neutral position.
- Gather and prepare equipment.
- Prepare site with Antiseptic swabs.
- Palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage. Stabilize the trachea with the thumb and forefinger of one hand. Stretch skin taut.
- Puncture the skin midline with the needle attached to the syringe, directly over the cricothyroid membrane.
- Direct the needle at a 45 degree angle caudally, while applying negative pressure to the syringe.
- Carefully insert the needle through the lower half of the cricothyroid membrane, aspirating as the needle is advanced.
- Aspiration of air signifies entry into the tracheal lumen.
- Remove the syringe and withdraw the needle while gently advancing the catheter downward into position, being careful not to perforate the posterior wall of the trachea.
- Attach 3.0 mm ET adapter to hub of catheter, connect BVM and ventilate while manually stabilizing catheter.
- Observe breath sounds and auscultate the chest for adequate ventilation.
- Secure the catheter to the patient's neck with tape (chevron) after area prepped with benzoin.
- Continue to ventilate and observe chest rise.

PROCEDURE GUIDELINE
CRICOTHYROTOMY – NEEDLE (continued)

1  		**2** 
Palpate the cricothyroid membrane, anteriorly, between the thyroid cartilage and cricoid cartilage.		**Puncture the skin directing the needle at a 45 degree angle caudally.**
3 		**4** 
Remove needle from catheter.		**Gently advance catheter downward into position.**

PROCEDURE GUIDELINE
CRICOTHYROTOMY - SURGICAL

1. Indications:

- If unable to ventilate and airway not patent, perform Cricothyrotomy.
- When an airway is needed and intubation is unsuccessful.

2. Contraindications:

- Children under 12 years old.
- Known bleeding disorder and/or anticoagulant therapy.
- Unable to locate landmarks.

3. Equipment:

- #10 or #11 size scalpel blade with handle.
- Needle nose hemostats.
- 5.0 to 7.0 mm endotracheal tube, cut above pilot balloon.
- Antiseptic swabs.
- Tape.
- BVM.

4. Procedure

a. Place the patient in a supine position with the neck in a neutral position.

b. Palpate the thyroid notch, cricothyroid membrane, and the sternal notch for orientation. Gather equipment.

c. Prepare site with Antiseptic swabs.

d. Stabilize the thyroid cartilage with thumb and 3rd finger of hand. Stretch skin taut.

e. Orient yourself thoroughly with the anatomical landmarks by grasping the larynx with your thumb and middle finger. Using your index finger, first locate the Laryngeal prominence (point of the Adams apple) and then slide your finger caudally (toward the feet) to the cricothyroid membrane (the V notch just superior to the Cricoid cartilage).

f. Stabilize the thyroid cartilage with your non-dominant hand. If you lose the midline, the anatomy will be distorted and you may find that you have cut muscles and/or blood vessels on either side of the trachea.

g. Using a number 10 or 11 scalpel blade, make a vertical incision from the superior border of the thyroid cartilage, caudally about 3-cm to just above the sternal notch. (A vertical incision promotes dissection in the midline and rapid identification of the structures.) Try to cut through the skin and subcutaneous tissue in one clean stroke. There will be some brisk bleeding. Sponge it if necessary, but don't waste much time trying to stop it.

h. With your index finger, locate and feel the cricothyroid membrane. Carefully make a transverse (horizontal) incision through the cricothyroid membrane about the width of the cricothyroid space. If the patient is breathing spontaneously, secretions, blood, and air will spray out of the opening. Protect yourself.

i. Insert the scalpel handle into the incision (use caution) and rotate it 90 degrees to open the airway or insert hemostats to enlarge the opening for passage of the ET tube.

j. Insert a cuffed endotracheal tube (5.0 to 7.0 mm) into the cricothyroid membrane incision directing the tube caudally (toward the feet) into the trachea. Inflate the cuff and ventilate the patient with a BVM connected to oxygen.

k. Observe the chest rise and fall; auscultate the lungs and stomach to ensure proper tube placement. Secure the endotracheal tube, and continue to monitor the patient.

PROCEDURE GUIDELINE
DEFIBRILLATION - ADULT

1. Indications:

- Ventricular Fibrillation
- Pulseless Ventricular Tachycardia

2. Check the equipment - Turn on the monitor / defibrillator.

3. Apply monitor per Procedure Guideline.

4. Confirm the rhythm.

5. Defibrillation:

- Confirm the patient is unresponsive and pulseless.
- Ensure synchronizer is turned **off.**
- Check fast patch pads position and conduction.
- Select appropriate energy level per Standing Order.
- Stop CPR and call ALL CLEAR. Check to ensure all people including you are clear of the patient. Ensure ALL personnel are in a safe operating location.
- Discharge energy by pressing shock button.
- Observe for rhythm change and check the patient for a pulse (If applicable).
- Repeat per PROTOCOL

PROCEDURE GUIDELINE
DEFIBRILLATION - PEDIATRIC

1. Rhythms to defibrillate:

- Ventricular Fibrillation and Pulseless Ventricular Tachycardia:
  - First Defibrillation: 2 J per kilogram.
  - Second Defibrillation: 4 J per kilogram.
  - Third and Continuous Defibrillation: 4 J per kilogram.

2. Check the equipment:

- Turn on the monitor / defibrillator.
- Apply appropriate size pads. Use the largest pad surface which makes complete contact with the patient. Entire pad should make complete contact with patient.

3. Defibrillation:

- Confirm the patient is unresponsive and pulseless.
- Ensure synchronizer is turned **off**.
- Position pads
- Stop CPR and call **ALL CLEAR**. Check to ensure all people, including you, are clear of the patient. Ensure ALL personnel are in a safe operating location.
- Discharge energy by pressing shock button.
- Observe for rhythm change and check the patient for a pulse (if applicable).
- Repeat per PROTOCOL

PROCEDURE GUIDELINE
EXTERNAL JUGULAR

1. Equipment:

- *IV solution.*
- *Micro drip, macro drip, blood set tubing.*
- *# 14 - #24 catheter over the needle.*
- *Alcohol Prep*
- *Gauze pad or adhesive bandage.*
- *Tape and / or veniguard.*

2. Assemble the equipment:

- Open IV bag for clarity, expiration date, etc.
- Examine the IV bag envelope at the edge where it is notched.
- Read the name of the solution.
- Open IV tubing.
- Close control valve below the drip chamber.
- Insert IV tubing in the IV solution bag port.
- Squeeze the drip chamber until the drip chamber is half full of solution.
- Uncap distal end of tubing and hold the cap so it does not become contaminated.
- Open the IV tubing valve to allow the solution to flow through until all bubbles are out of the tubing.
- Close the tubing valve and recap the distal end of the tube.

3. Insertion:

- Explain to the patient (if conscious) that an IV is going to be started in the neck region.
- Palpate veins for resilience. It may be necessary to turn the patient's head to one side or the other (if not contraindicated)
- Clean the skin with the antiseptic swab in an increasing sized concentric circle and follow it with an alcohol swab.
- Stabilize the vein distally with the Paramedic's thumb/fingers.
- Enter the skin with the bevel of the needle facing upward.
- Enter the vein, obtain a flashback, and advance the catheter off of the needle and remove the needle while compressing the proximal tip of the catheter to minimize blood loss.
- Connect IV tubing to the catheter.
- Open the IV clamp to assure free flow.
- Set IV infusion rate.

PROCEDURE GUIDELINE
EXTERNAL JUGULAR (continued)

4. Secure:

- Tape or Tegaderm over the insertion site of the skin.
- Secure the IV catheter and tubing with tape.
- Recheck IV drip rate to make sure it is flowing at appropriate rate.

5. Troubleshooting the IV, (if the IV is not working well):

- Check the IV insertion site for swelling.
- Check the IV tubing clamp to make sure it is open.
- Check the drip chamber to make sure it is half full.
- Lower the IV bag below IV site and watch for blood to return into the tubing.

REMINDER: Unilateral procedure only.

PROCEDURE GUIDELINE
INTRAOSSEOUS INFUSION

ADVANCED CARE PROCEDURE

I. INDICATIONS:

A. Cardiopulmonary arrest for first line medication administration and fluid resuscitation where IV access is unavailable or not easily obtainable.

B. Unstable patient (Medical or Trauma) presenting with definitive shock symptoms whose condition has the potential to rapidly deteriorate into cardiopulmonary arrest. IO access should be instituted if IV access is unavailable or unobtainable (after 2 attempts) for ***fluid resuscitation and subsequent medication administration.***

II. CONTRAINDICATIONS:

A. Ability to obtain IV access by another route (peripheral or external jugular).
B. Fracture or burns of the tibia or femur (tibial site), fracture of the humerus (humeral site).
C. Previous orthopedic procedures at or proximal to insertion site.
D. Infection or burn at the insertion site.
E. Inability to locate landmarks or excessive tissue over the insertion site.
F. Known congenital defect of the involved bone.
G. Known bone pathology (cancer or osteoporosis).

III. EQUIPMENT:

A. EZ-IO Drill.
B. EZ-lO Intraosseous needle:
   1. EZ-IO PD- indicated for patients 3-39 kg.
   2. EZ-IO AD- indicated for patients > 40 kg.
C. EZ-Connect IV extension set.
D. Yellow instructional wrist band.
E. Appropriate IV tubing and IV fluid.
   1. Pediatric: Micro tubing (60 gtts/ml).
   2. Adult: Macro tubing (10 gtts/ml).
F. Betadine and alcohol prep pads.
G. Pre-filled 10 ml of Normal Saline.
H. **Ketamine** (Subanesthetic dose, if needed).

IV. EZ-IO PROCEDURE:

A. Always observe body substance isolation procedures and aseptic technique.
B. Set up IV solution checking for clarity and expiration date. Clear air from tubing.
C. Assure that there are no contraindications present.
D. Insertion sites:
   1. Locate the desired site. If you can't identify landmarks, choose an alternate site:
   2. **Pediatric** (3-39 kg):
      a. **Proximal tibia** (primary): Locate the patella and the tibial tuberosity. The needle will be inserted 1 cm width below the tibial tuberosity on the medial aspect of the tibia (flat area or tibial plateau). If the tibial tuberosity is not prominent, locate the patella and the needle will be inserted 2 fingers width below the patella on the tibial plateau (see Figure 1).
      b. **Distal tibia** (alternate): Locate the medial malleolus. The insertion site will be 1 finger width above the medial malleolus (see Figure 2).
   3. **Adult** (40 kg and above):
      a. **Proximal tibia** (alternate): Locate the patella and the tibial tuberosity. The needle will be inserted 1 cm width below the tibial tuberosity on the medial aspect of the tibia (flat area or tibial plateau) (see Figure 3).
      b. **Distal tibia** (alternate): Locate the medial malleolus. The insertion site will be 2 fingers width above the prominent portion of the medial malleolus (see Figure 2).
      c. **Proximal humerus** (***primary***- Cardiac arrest or no access or fractures to lower extremities): orient the arm at the patient's side, firmly adducted, with the forearm flexed across the umbilicus (elbow placed posterior). Locate the greater tubercle of the humerus. The needle will be inserted slightly anterior to the arms lateral midline and perpendicular to the bone at 90 degrees (see Figure 4).

E. Preparation:

1. Clean the skin with the Betadine swab in an increasing sized concentric circle and follow it with an alcohol swab.
2. Prepare the EZ-IO driver and needle set. The needle is sterile and should remain sterile during the procedure. The top of the needle is magnetized and will attach to the end of the driver. Once the needle is attached to the driver, remove the needle from its plastic container.
3. Twist the sterile needle cap (cover) and gently remove it from the end of the needle. Do not touch the end of the needle otherwise.
4. Place the driver in your dominant hand. Relocate your insertion site with the opposite hand.

F. Insertion:

1. Position the needle over the insertion site with the needle at a 90-degree angle to the surface of the bone. Power the needle with firm pressure thru the skin until it reaches the surface of the bone (see Figure 5). There is a 5 mm mark on the needle that should still be visible. If it is not, the procedure should be abandoned or relocated to an alternate site as the needle may not be long enough to penetrate the IO space.
2. If appropriate, continue the insertion, powering the needle with firm and steady pressure until the flange touches the skin or a sudden lack of resistance is felt (indicating entrance into the bone marrow cavity).
3. Remove the driver.
4. While grasping the hub with one hand, rotate the stylet counterclockwise (unscrew it) and remove it (see Figure 6).

G. Confirmation:

1. Attach the EZ-Connect IV extension set to the catheter hub's luer lock.
2. Flush 1-2 ml NS to clear needle of any bony particulates.
3. Immediately aspirate a small amount looking for a return of blood.
4. The needle should be well seated in the bone at 90 degrees.
5. After confirmation, flush the needle forcefully with 8-10 ml of sterile saline. There should be a free flow of fluid with no leakage of fluid under the skin (see Figure 7).
6. Attach IV and cover with sterile dressing.
7. The IV solution should flow by gravity through the IO, but it may be necessary to apply a pressure infusion bag to the IV bag to increase the rate of infusion (see Figure 8).
8. Note the date and time of insertion on the yellow instructional wrist band and apply to patient in a prominent location (wrist or ankle).

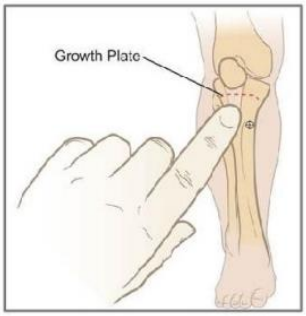
V. NOTES:

A. The EZ-IO should not be left in place for more than 24 hours. It can be removed by rotating gently in a clockwise fashion while gently pulling the on the hub of the IO at 90 degrees.

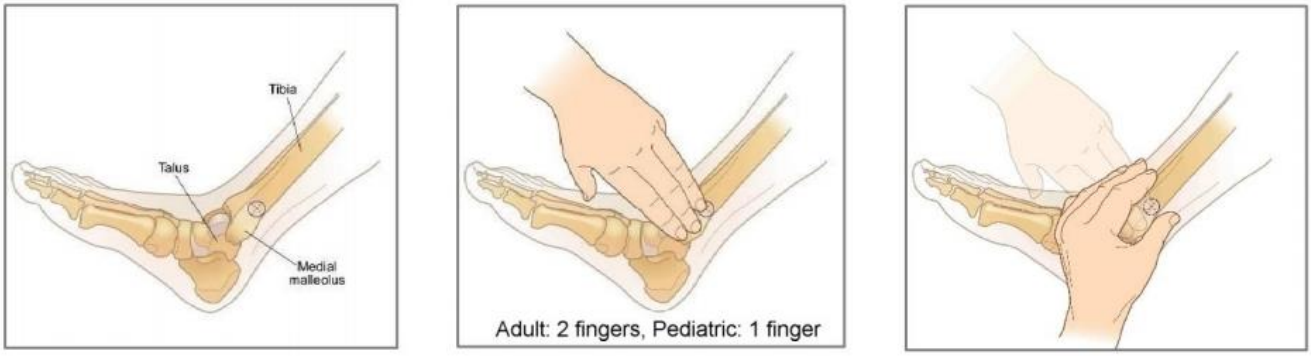
B. **Ketamine**: adult 25mg, 50 MG MAX via SLOW IO;
pediatric 0.25 mg/kg IBW, 25MG MAX via SLOW IO.
Indications: pain/discomfort associated with post insertion and/or subsequent fluid resuscitation.

VI. FIGURES:

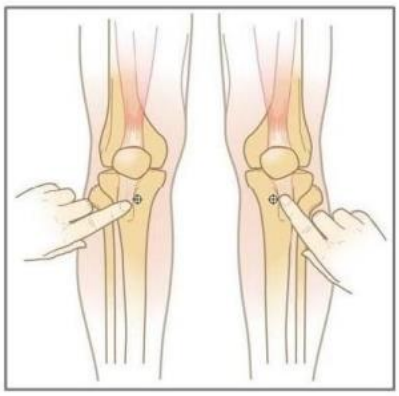
A. Figure 1: Pediatric Proximal Tibia



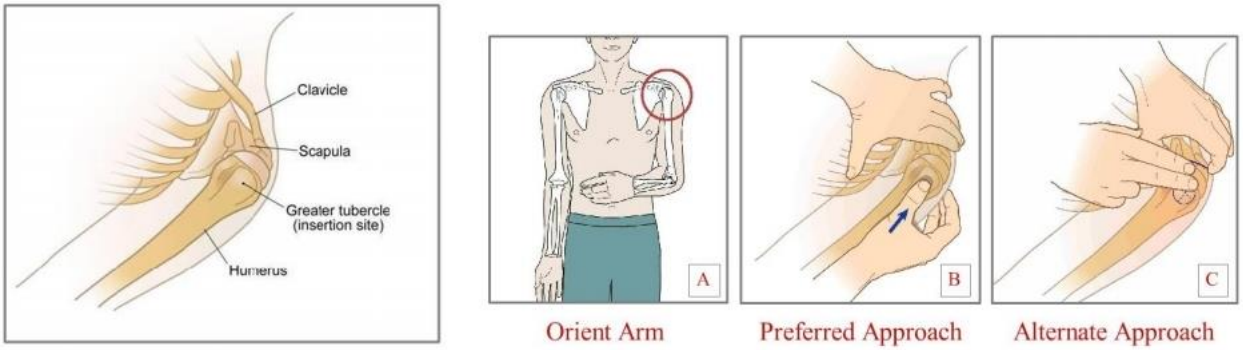
B. Figure 2: Adult and Pediatric Distal Tibia



C. Figure 3: Adult Proximal Tibia

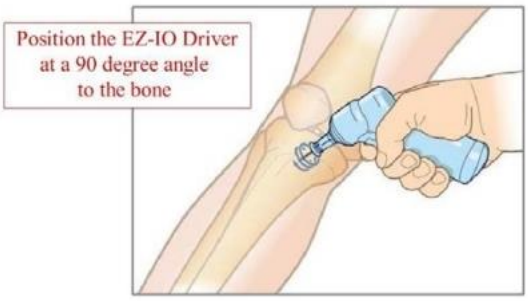


D. Figure 4: Adult Proximal Humerus

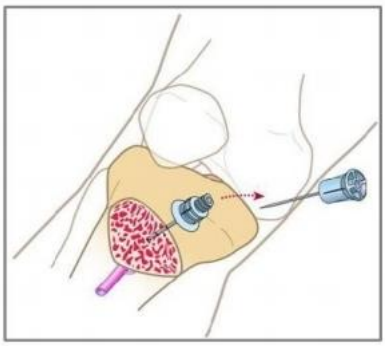


PROCEDURE GUIDELINE
INTRAOSSEOUS INFUSION (continued)

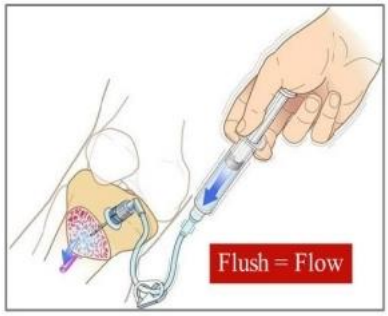
E. Figure 5:



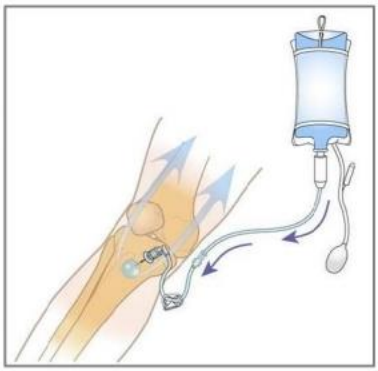
F. Figure 6:



G. Figure 7:



H. Figure 8:

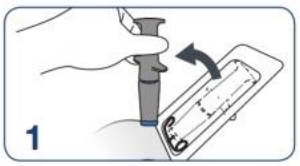


NIO- Adult

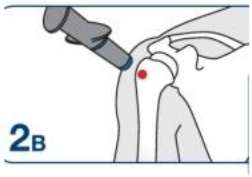
The NIO Adult can be used in the Tibia or Humeral Head. First line site for adult patients under FEM CCG is the humeral head.

Operational Steps:

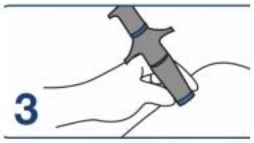
1. Open the pack and take out the NIO. Make sure that it is free of all packaging parts.



2. Select the appropriate site



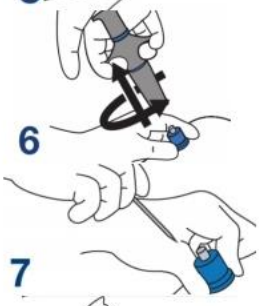
3. Place your non-dominant hand on the texture sides located on the lower part of the NIO, position it at a 90° angle to the skin at the injection site. The non-dominant hand should maintain this position throughout this procedure.



4. Unlock the NIO by rotating the cap 90 degrees in either direction.

5. Place the palm of your dominant hand over the cap. Press the device against the patient's skin and maintain pressure. While pressing down on the device, pull the trigger wings upwards. *This will activate the device.*

6. Gently pull the NIO in a rotational motion while holding the base of the needle stabilizer against the insertion site.



7. Continue holding the needle stabilizer in place and pull up on the stylet (twisting may be necessary).

8. Confirm successful placement by attempting to aspirate (2-5cc for lab if needed). Flush with 10-20 mL of normal saline.

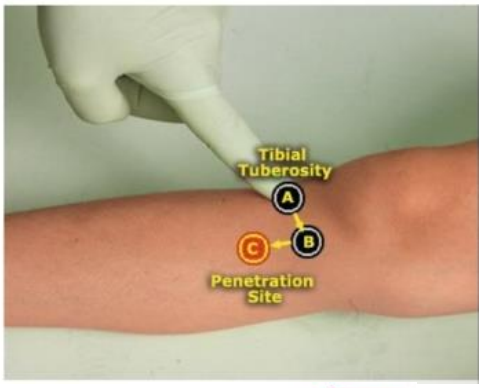
PROCEDURE GUIDELINE
INTRAOSSEOUS INFUSION (continued)

NIO-Pediatric

The NIO Pediatric device can be used for patients 3 years old to 12 years old. Patients less than 3 years old will still require the EZ-IO with the use of the pink needle. The insertion site for the NIO Pediatric is the proximal tibia.

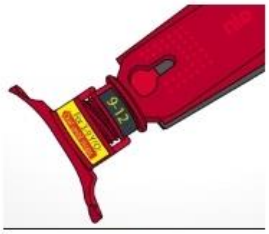
Location-

1. Find the Tibial Tuberosity.
2. Go 0.5-1 inch towards the inner part of the leg (medially).
3. Go DOWN (distally) 0.5-1 inches towards the foot.

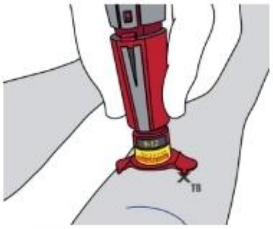


Operational Steps:

1. Open the pack and remove the NIO Pediatric.
2. Select the appropriate depth:
    a. Patients 9-12: the device is ready to use.
    b. Patients 3-9: dial the red needle stabilizer until it stops.

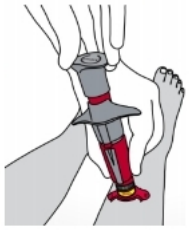


3. Place the designated location pointer (R for right leg, L for left leg) on the prominent aspect of the Tibial Tuberosity.
4. Place the device medially to the Tibial Tuberosity, and point the location pointer towards the knee (aligned parallel to the Tibial line).



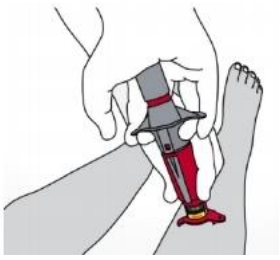
5. Hold and unlock the NIO-P by rotating the cap 90° in either direction.

    Note- Hold NIO body and NOT the stabilizer to prevent depth change



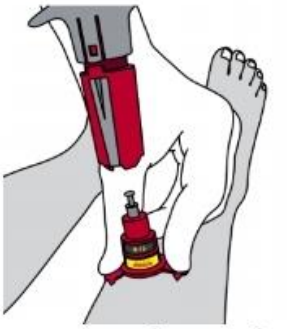
6. Two-handed control should be maintained throughout the procedure.

7. Place your non-dominant hand on the raised dots located at the lower part of the NIO-P and position the NIO-P 90° to the surface of the skin at the insertion site.
8. Place the palm of your dominant hand over the safety cap and press the device against the skin.
9. While maintaining downward pressure, pull the trigger wings upward. *This action will activate the device.*



PROCEDURE GUIDELINE
INTRAOSSEOUS INFUSION (continued)

10. Hold the base of the needle stabilizer and lift the device upwards.



11. Hold the red needle stabilizer in place while pulling out the stylet. The keyhole notch on the distal end of the NIO-P can be used to assist in removing the stylet from the cannula. Place the stylet into a sharps container.

12. If indicated, aspirate bone marrow. Always confirm successful needle placement by flushing with up to 10mL normal saline.

PROCEDURE GUIDELINE
INJECTIONS: IM AND IN

Clinical Indications:

- When medication administration is necessary and the medication must be given via the SQ (not auto-injector) or IM route or as an alternative route in selected medications.

Procedure:

1. Receive and confirm medication order or perform according to standing orders.
2. Prepare equipment and medication expelling air from the syringe.
3. Explain the procedure to the patient and reconfirm patient allergies.
4. The possible injection sites for intramuscular injections include the arm, buttock and thigh. Injection volume should not exceed 1 cc for the arm. Injection volume should not exceed 2 cc in the thigh or buttock.
5. The thigh should be used for injections in pediatric patients and injection volume should not exceed 1 cc.
6. Expose the selected area and cleanse the injection site with alcohol.
7. Insert the needle into the skin with a smooth, steady motion

IM: 90-degree angle-skin flattened

8. Aspirate for blood.
9. Inject the medication.
10. Withdraw the needle quickly and dispose of properly without recapping.
11. Apply pressure to the site.
12. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
13. Document the medication, dose, route, and time on/with the patient care report (PCR).

Basic Technique for Intranasal Device:

1. Draw up medication in 3ml syringe
2. Attach atomizer tip and eject any air from syringe
3. Place atomizer tip approximately 1.5 cm within the nostril
4. Briskly compress the syringe plunger to spray atomized solution into the nasal cavity/on to the nasal mucosa (gently pushing the plunger **will not** result in atomization).

Maximum volume per nostril is 1ml. If dose is >0.5ml apply in two separate doses allowing 5-10 min in between.

PROCEDURE GUIDELINE

KENDRICK EXTRICATION DEVICE (KED)

1. Indications:

- In some situations a patient with possible spinal injury cannot be immediately secured to a Long Spineboard, e.g., when a patient is in a confined space or seated in a vehicle. In such cases a flexible piece of equipment (such as a vest-type Short Spineboard), is useful for immobilizing possible spinal injury patients.
- You should **always suspect** a possible spinal injury anytime you encounter a patient with complaints of "pain in the neck or back", following any of the following mechanisms of injury:
  - Motor Vehicle Accident (MVA).
  - Pedestrian vs. Motor Vehicle Collisions.
  - Fall.
  - Blunt trauma.
  - Penetrating trauma to the head, neck, or torso.
  - Diving accidents.

2. Equipment:

- KED ® (Kendrick Extrication Device).
- Head/neck pad.
- Cervical Collar - correct size for the patient.

3. Procedure:

- Stabilize neck in a neutral, in-line position and apply a cervical collar.
- Any assessment of the back, scapulae, arms, or clavicles must be done before applying the device.
- The EMT-B applying the board must angle it to fit between the arms of rescuer who is stabilizing patient's head and neck from behind.
- The EMT-B must push the device as far down into the seat as possible, otherwise the board may shift when moving patient. The base of the board should not extend past patient's coccyx.
- Never place a chin cup or strap on patient. Such devices may prevent patient from opening his mouth if he has to vomit.
- Position the side flaps around patient's torso.
- Secure torso straps.
- Secure groin loops.
- Pad behind patient's head and neck to fill in the gaps, and secure forehead strap and lower head strap.
- Fasten remaining chest straps.
- After moving patient to a Long Spineboard, release groin straps and loosen chest strap.
- Secure patient to Long Spineboard following Procedure Guideline.

PROCEDURE GUIDELINE

IGel SUPRAGLOTTIC AIRWAY

Indications for Blind Insertion Airway Device (BIAD) Use: iGel device

- Inability to adequately ventilate a patient with a Bag Valve Mask or longer EMS transport distances requires a more advanced airway.
- Appropriate intubation is impossible due to patient access or difficult airway anatomy.
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex where at least one failed intubation attempt has occurred.
- Patient must be unconscious.
- Primary airway for Pt's in cardiac arrest.

Contraindications:

- Responsive patients with a gag reflex
- Patients in whom caustic substance ingestion is suspected

Procedure:

1. Preoxygenate and hyperventilate the patient.
2. Select the appropriate tube size for the patient.
   - #3 Small Adult 30-60 Kg (65-130 Lbs.)
   - #4 Medium Adult 50-90 Kg (110-200 Lbs.)
   - #5 Large Adult 90+ Kg (200 + Lbs.)
3. Open packet of lubrication and place small bolus on inner shell of main packaging. Lubricate the back, sides and front of iGel with thin layer. (Ensure any excess is removed prior to insertion
4. Use head tilt when not contraindicated to achieve anatomical alignment of the patient's airway for optimal airway access.
5. Insert the leading soft tip into the mouth of the patient towards the hard palate. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt. (1) The tip of the airway should be located into the upper esophageal opening, (2) with the cuff located against the laryngeal framework (3). The incisors should be resting on the bite block.
6. Secure the device by sliding the strap underneath the patient's neck and attaching to the hook ring. Take care to ensure the strap is not secured too tight.
7. **Ventilate confirming placement.**
8. Auscultate for breath sounds and sounds over the epigastrium and look for the chest to rise and fall.
9. Confirm tube placement using end-tidal CO2 detector. Monitor with capnography.
10. Reassess after each time patient is moved..
11. Use an OG tube to assist in decompressing the stomach. *(See Orogastric Tube Insertion Procedure Guideline pg.3-74).*

PROCEDURE GUIDELINE
NEBULIZED MEDICINE / UPDRAFT

1. Equipment:

- 1 oxygen supply tubing.
- 1 nebulizing chamber.
- 1 T piece.
- 1 mouth piece or aerosol mask.
- Non-humidified oxygen with a flow meter.
- Medication to be given.

NOTE: Aerosol mask doesn't require patient's help and may deliver a higher O_2 percentage.

2. Procedure:

- Assemble oxygen supply tubing to the nebulizer.
- Add the medication to the nebulizing chamber.
- Connect the top of the nebulizing chamber.
- Connect the T piece to the top of the nebulizing chamber.
- Connect the mouth piece or aerosol mask to the T piece.
- Connect the oxygen supply tubing to the oxygen flow meter.
- Set the flow meter to 6-8 liters / minute and watch for the medication to mist.
- Give the nebulizer to the patient and have them breathe the medication.
- If the patient is unable to hold the nebulizer, remove the mouth piece from the T piece and apply T piece to an aerosol mask.
- Auscultate breath sounds.
- ***Monitor:*** *Blood pressure, heart rate and respiratory status frequently.*

PROCEDURE GUIDELINE
INTUBATION – OROTRACHEAL

1. Indications:

- Respiratory or cardiac arrest.
- Glasgow Coma Scale of 8 or less.
- Possible airway obstruction.

2. Equipment:

- Laryngoscope handle with appropriate size blade.
- Proper size endotracheal tube.
- Water soluble lubrication gel (lubricate distal end of tube at cuff).
- 10 cc syringe (check cuff for patency).
- Stylet (insert into ET tube).
- Tape or endotracheal securing device.
- Proper sized airway adjunct.
- BVM.
- Suction.
- Stethoscope.

3. Insertion:

- If C-spine injury suspected, maintain cervical alignment and apply C-collar.
- Preoxygenate the patient for 1 full minute with 100% O2 (1 breath every 10-12 seconds) before intubation procedure.
- Attach proper blade to laryngoscope handle and check light.
- Grasp laryngoscope handle in left hand.
- Grasp ET tube in right hand.
- Remove all foreign objects, such as dentures, oral pharyngeal airways, etc. and suction the patient's airway if needed.
- Insert the blade into the right side of the patient's mouth sweeping the tongue to the left side.
- Visualize the vocal cords without pressure on the teeth.
- Intubation attempt is considered anytime an endotracheal tube is passed beyond the incisors.
- Insert the endotracheal tube until the cuff passes the vocal cords. (Insert far enough so that balloon port tubing is even with lips.)
- Remove the laryngoscope blade and stylet.
- Inflate the endotracheal cuff with the syringe with 5 - 10 cc of air and remove the syringe from inflation valve.

- Ventilate the patient with a BVM and watch for chest rise. Listen to abdomen to ensure that an esophageal intubation has not been done. Listen for bilateral breath sounds and watch for a positive change on the end-tidal CO2 detector and/or presence of wave form with in-line capnography.
  - **If abdominal sounds are heard,** deflate the endotracheal cuff and remove the endotracheal tube immediately. Ventilate the patient and attempt intubation again.
  - **If lung sounds are unequal,** deflate the endotracheal cuff and reposition the endotracheal tube. Inflate endotracheal cuff and reassess lung sounds. If lung sounds are still unequal, assess the patient for pneumothorax (simple or tension).

- Ventilate patient with BVM.

4. Secure:

- Tape or use endotracheal securing device and secure endotracheal tube in place noting depth of tube.
- Reassess lung sounds to ensure endotracheal tube is still in proper position.
- Continue ventilations.

PROCEDURE GUIDELINE
OXYGEN ADMINISTRATION

1. Indications:

- **Nasal Cannula:** for the spontaneously adequately breathing patient with no significant compromise or potential compromise in condition. Choice is determined by severity of condition, practice parameters and patient tolerance.

- **Non-Rebreather Mask:** for any patient whose condition or complaint suggests that severe hypoxia or ischemia may be a problem. Use on all multi-trauma patients and all patients who present with signs and symptoms of shock.

- **Bag Valve Mask (BVM):**
  - **Assist ventilations in the conscious or unconscious hypoxemic patient** who is not moving air adequately.
  - **Ventilate the apneic patient.**

2. Equipment:

- **Nasal Cannula:** 4 - 6 liters/minute delivers 25 - 40 % of oxygen.
- **Non-Rebreather Mask (NRB):** 15 liters/minute delivers nearly 100 % of oxygen.
- **Bag Valve Mask, (BVM),** with supplemental oxygen at 15 liters/minute and reservoir attached delivers nearly 100% oxygen

PROCEDURE GUIDELINE
PERIPHERAL VENIPUNCTURE

1. Equipment for Fluid Administration:

- IV solution.
- Micro drip, macro drip, blood set tubing.
- #14 - #24 catheter over the needle.
- Venous tourniquet
- Alcohol Prep
- Gauze pad or adhesive bandage.
- Tape and / or tegaderm.

2. Assemble the equipment:

- Open IV bag for clarity, expiration date, etc.
- Examine the IV bag envelope at the edge where it is notched.
- Read the name of the solution.
- Open IV tubing.
- Close control valve below the drip chamber.
- Insert IV tubing in the IV solution bag port.
- Squeeze the drip chamber until the drip chamber is half full of solution.
- Uncap distal end of tubing and hold the cap so it does not become contaminated.
- Open the IV tubing valve to allow the solution to flow through until all bubbles are out of the tubing.
- Close the tubing valve and recap the distal end of the tube.

3. Insertion:

- Explain to the patient that an IV is going to be started.
- Place the tourniquet around the patient's arm proximal to the IV site.
- Palpate veins for resilience.
- Clean the skin with the alcohol prep/swab in an increasing sized concentric circles
- Stabilize the vein distally with the Paramedic's thumb/fingers.
- Enter the skin with the bevel of the needle facing upward.
- Enter the vein, obtain a flashback, and advance the catheter off the needle and remove the needle while compressing the proximal tip of the catheter to minimize blood loss.
- Remove the tourniquet.
- Connect IV tubing to the catheter.
- Open the IV clamp to assure free flow.
- Set IV infusion rate.

4. Secure:

- Apply Tegaderm over the insertion site of the skin.
- Secure the IV catheter and tubing with prepared tape.
- Recheck IV drip rate to make sure it is flowing at appropriate rate.

5. Troubleshooting the IV (if the IV is not working well):

- Make sure the tourniquet is off.
- Check the IV insertion site for swelling.
- Check the IV tubing clamp to make sure it is open.
- Check the drip chamber to make sure it is half full.
- Lower the IV bag below IV site and watch for blood to return into the tubing.

---

1. Equipment for Saline Lock:

- Saline lock.10cc Normal Saline pre-filled syringe
- 10cc Normal Saline pre-filled syringe.
- Blood set tubing..
- #14-#24 Catheter over the needle.
- Venous Tourniquet.
- Alcohol prep.
- Tegaderm and/or tape.

2. Procedure:

- After successful IV cannulation, the open end plastic tip of the Saline Lock is inserted into the IV catheter hub using aseptic technique. The Saline Lock should be placed securely into the IV catheter to prevent accidental removal and blood loss.
- Once the Saline Lock is secured, it must be immediately secured with tape/tegaderm and flushed with 10cc's of normal saline from the available pre-filled syringe.
- Conventional IV site monitoring is indicated to ensure patency during flushing. If resistance is felt during administration, do not force administration. Check for common problems such as tourniquet still in place, swelling in tissues or at puncture site. If the problem is not resolved, the catheter is likely occluded, against a valve, or has infiltrated. In these cases the catheter should be removed and another attempt should be made at venous access.
- In some cases, a patient that initially only required precautionary IV access with a Saline Lock may require an IV push medication or fluid administration. In this situation an IV infusion set shall be used by attaching it to the Saline Lock.
- Certain situations may warrant immediate IV push medication administration directly through the Saline Lock without sufficient time for set up of the infusion set (such as witnessed cardiac arrest). In these instances the Saline Lock shall be flushed immediately after medication administration via use of the 10cc pre-filled syringe.

PROCEDURE GUIDELINE
PHYSICAL RESTRAINTS

Clinical Indications:

- Any patient who may harm himself, herself, or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

Procedure:

a. Attempt less restrictive means of managing the patient.

b. Request law enforcement assistance.

c. Ensure that there are sufficient personnel available to physically restrain the patient safely.

d. Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient. The patient will never be restrained in the prone position.

e. The patient must be under constant observation by the Paramedic at all times. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring.

f. The extremities that are restrained will have a circulation check at least every 5 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This MUST be documented on the PCR.

g. Documentation on/with the patient care report (PCR) should include the reason for the use of restraints, the type of restraints used, and the time restraints were placed.

h. If the above actions are unsuccessful, or if the patient is resisting the restraints, consider administering medications per protocol. (Chemical restraint may be considered earlier.)

i. If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel can not remove; a law enforcement officer must accompany the patient to the hospital behind (in patrol car) or in the transporting EMS vehicle.

PROCEDURE GUIDELINE
PLEURAL DECOMPRESSION

1. **Indications:** Chest decompression for relief of tension pneumothorax

Tension Pneumothorax should be suspected when there is absent lung sounds and marked drop in BP

2. **Equipment: Chest Decompression Kit**

- Air Release System (ARS) 10ga 3.25" Needle
- Tape
- Sterile gauze pads
- Antiseptic Swab / Alcohol Prep
- Occlusive dressing

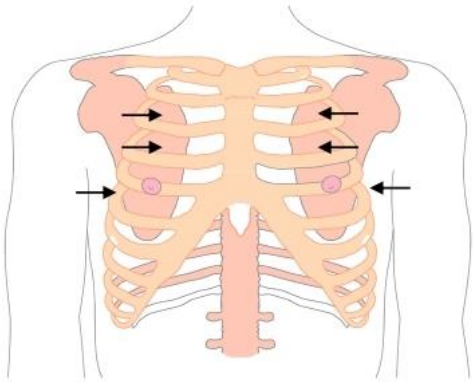
FLUTTER VALVES WILL NO LONGER BE UTILIZED IN THIS PROCEDURE

3. **Procedure:**

- Locate decompression site.
  - ***Identify the 2nd intercostal space in the mid-clavicular line*** *on the same side as the pneumothorax.*

OR

  - ***Identify the 5th intercostal space in the mid-axillary line*** *on the same side as the pneumothorax.*



- Prepare the site with an antiseptic swab
- Remove the red cap with twisting motion and remove ARS from case
- Insert the ARS into the skin over the superior border of the third rib, midclavicular line, and direct it into the intercostal space at a 90-degree angle to the chest wall. Ensure that the ARS entry is not medial to the nipple line and not directed toward the heart.
- Insert the ARS into the plural space and listen for sudden escape of air
- Remove the needle portion of the ARS and leave the catheter in place
- Secure in place and monitor closely for recurrence of tension pneumothorax

BE AWARE: EXCESSIVE POSITIVE PRESSURE VENTILATIONS CAN WORSEN A PNEUMOTHORAX

PROCEDURE GUIDELINE
RECONSTITUTION OF MEDICATIONS

1. **Indications:**
   - Preparation of **Glucagon**
2. **Equipment:**
   - Diluting Solution
   - Glucagon Powder
   - Sterile 1 ml syringe
   - Alcohol swab
3. **Procedure:**
   - Remove the flip-off seals on bottles Nos. 1 and 2.
   - Wipe rubber stoppers on both bottles with the alcohol swab.
   - Pull up 1/2 ml of air.
   - Inject the air into the diluting solution bottle (No. 1). Keep the tip of the needle in the solution and withdraw the entire contents of the solution.
   - Remove syringe from bottle No. 1 and insert into bottle No. 2 (Glucagon powder). Inject all of the diluting solution into bottle No. 2.
   - Remove syringe and dispose of properly. Shake bottle No. 2 gently until the Glucagon powder dissolves and the solution becomes clear.
   - Withdraw the entire contents of the solution and administer the Glucagon immediately after reconstituting.

1. **Indications:**
   - Preparation of **Cyanokit**
2. **Equipment:**
   - Transfer spike
   - Cyanokit Vial
   - 100 ml Normal Saline
   - Alcohol swab
3. **Procedure:**
   - Remove the flip-off seals on bottle.
   - Wipe rubber stoppers on bottle with the alcohol swab.
   - Insert transfer spike.
   - Add 100 ml of 0.9% Sodium Chloride (Normal Saline) in to Cyanokit vial
   - Fill to line keeping vial in upright position.
   - Rock or rotate vial for 30 seconds to mix solution.

     DO NOT SHAKE!!
   - Hang and infuse over 15 minutes.

PROCEDURE GUIDELINE
SCOOP STRETCHER

1. Indications:

- For moving an injured patient who does not require spinal immobilization.

2. Precautions:

- In cases of possible spinal injury, it should be used only to transfer patient to a Long Spine board while patient's head and neck are immobilized in an in-line, neutral position.
- The stretcher may trap clothing, skin, or other objects while "scooping" patient. Use Caution!

3. Equipment:

- Scoop stretcher.
- Spine board straps.
- Cervical collar - properly sized.

4. Procedure:

- Prepare patient by applying a cervical collar and maintaining manual in-line, midline spinal immobilization. Maintain throughout the application procedure.
- Adjust the length of the stretcher so it extends about 4-6 inches beyond the patient. Separate the stretcher halves and place one half on each side of patient.
- Slide the stretcher halves under patient, one at a time. Be careful not to trap clothing, skin, or other objects while "scooping". If necessary, roll patient as a unit to either side to allow for proper positioning of the parts.
- Mate latch parts and make certain the stretcher halves are securely locked together.
- Now patient can be moved to the Long Spine board or ambulance stretcher.

PROCEDURE GUIDELINE
SUCTIONING

1. Indications:

- When patient's mouth or throat becomes filled with vomitus, blood, or secretions, a suction apparatus enables removal of the liquid material quickly and efficiently.

2. Equipment:

- Use PPE for this procedure.
- Fixed or portable suction unit capable of generating a vacuum of 300 mm Hg, with a non-breakable collection bottle.
- Collection tubing - stiff, clear, and long enough to reach patient's head.
- Bottle of water - for rinsing the suction system after suctioning.
- Flexible suction catheters - for suctioning the nose and pharynx.
- Tonsil-tip or Yankauer suction catheter - for suctioning the mouth and pharynx of unconscious patients. (Easier to direct where you want it to go.)

Caution: Suctioning removes not only liquids from the airway; it removes air as well!

3. Procedure:

- Any patient who is to be suctioned should be **pre-oxygenated**, or hyperventilated prior to the procedure.
- Use a rigid tip, tonsil-tip suction catheter to suction the mouth and throat of an unconscious patient. It can remove large volumes of fluid, small food particles, and vomitus quickly.
  a) Inspect suction unit to make sure all parts are working and assembled.
  b) Attach tonsil-tip catheter to tubing.
  c) Open patient's mouth using crossed-finger maneuver.
  d) With **vacuum off**, insert suction catheter into patient's mouth deep enough so that you can see the tip in the area of the mouth that you want to clear. Use Caution: Semiconscious patients may gag or vomit if a hard object touches the back of their throat.
  e) Turn on suction or occlude the side hole and move catheter tip around pharynx to vacuum (clean) it out.
  f) ***DO NOT SUCTION FOR MORE THAN 10 SECONDS AT A TIME!***
  g) Remove catheter, and re-oxygenate, or hyperventilate patient after the suctioning procedure.
  h) RINSE tonsil-tip catheter and tubing with water.

IF YOU NEED TO SUCTION PATIENT DURING CPR, MAKE IT QUICK! DO NOT INTERRUPT ARTIFICIAL VENTILATIONS FOR MORE THAN **10 SECONDS**, AND THEN RESUME VENTILATIONS WITH 100% OXYGEN.

PROCEDURE GUIDELINE
TRANSCUTANEOUS PACING

1. Indications:

- BRADYCARDIA PROTOCOL

2. Procedure:

- Apply monitor and determine rhythm.
- Stop CPR, (if applicable).
- Place electrodes in proper position.
  - ***Place the negative pad and negative pacer wire on left anterior chest,*** *halfway between the xiphoid process and the left nipple, with the upper edge of the electrode below the nipple line.*
  - ***Place the positive pad and positive pacer wire on left posterior chest*** *beneath the scapula and lateral to the spine.*
- Turn the pacer on:
  - ***Precautions:*** *Pacemaker output may cause excessive pain/distress in the conscious patient. Consider administration of* ***Ketamine 25 mg may repeat X 1 after 10 min (this will allow time between dosages for desired effect.)***
- Set the rate at 70 beats per minute.
- Begin pacing at 70 milliamps (mA) and slowly increase mA until electrical and mechanical capture is achieved or maximum output is reached (185mA).
- Keep checking for a femoral pulse to determine the response to the pacing, (mechanical capture).
- If no response to maximum pacing output, interrupt pacing and proceed with appropriate protocol.
- Leave pacing electrodes in place during drug therapy and check every 3 - 5 minutes for capture in maximum output setting if not successful initially.
- If capture present and MAP< 70, increase rate of pacing, (do not exceed 100 BPM).

Telltale signs of true electrical capture is defined as: a wider QRS complex with tall broad T waves seen on EKG. Or a pleth wave that matches every QRS.

3. Standby pacing:

- Turn the pacer on.
  - **Precautions:** Pacemaker output may cause excessive pain/distress in the conscious patient. Consider administration of **Ketamine 25 mg may repeat X 1 after 10 min (this will allow time between dosages for desired effect.)**
- Set rate at 70 BPM.
- Set milliamps at 0.
- If patient becomes unstable, slowly increase milliamps until electrical and mechanical capture is achieved or max. output (185mA) is reached.

PROCEDURE GUIDELINE

TRRACTION SPLINT (HARE TYPE)

1. Indications:

- Fractures of the shaft of femur.

2. Contraindications:

- Fractures to the lower third of leg.
- Fractured pelvis.
- Hip injury with gross displacement.
- Any significant injury to knee, ankle, or foot.

3. Equipment:

- Traction Splint - HARE Type.
- Ankle hitch with D-ring.

4. Procedure:

- Use PPE for this procedure.
- Expose injury site.
- Assess and record the pulse, sensation, and motor function distal to injury site.
- Place splint on side of patients uninjured leg, and adjust it to where it extends from the Pt's ischial tuberosity to 10-12 inches beyond the foot.
- Open and adjust the 4 Velcro support straps so that 2 are positioned mid thigh, 1 above the knee, and 1 above the ankle.
- One EMT-B should gently support and stabilize the injured leg so it will not move.
- The second EMT-B should fasten the ankle hitch around the patients ankle and foot, while the first EMT-B applies longitudinal traction to the hitch and foot.
- The second EMT-B slides the splint under the Pt's injured leg making sure that the padded ring is seated well on the ischial tuberosity. Then the ischial strap is applied.
- The second EMT-B then connects the loop of the ankle hitch to the end of the windless device and applies traction until:
  - Patient feels relief from pain.
  - Injured foot is aligned with uninjured foot.
  - Once proper traction has been applied, fasten support straps into place. **Never fasten over the injury.**
- Reassess and record pulse, sensation, and motor function distal to the injury site.
- Secure patient on a Long Spine board for transport.

PROCEDURE GUIDELINE
OROGASTRIC TUBE INSERTION

INDICATIONS:

- Gastric decompression of an adult patient in cardiac arrest after endotracheal intubation or iGel Airway insertion has been performed and placement verified.

CONTRAINDICATIONS:

Orogastric tubes are contraindicated in people with particular predispositions to injury from tube placement. These may include:

- Patients with a history of esophageal stricture
- Esophageal varices / Mallory Weiss Tear
- Ingestion of caustic substances
- Recent history of upper GI bleed
- History of stomach or esophageal cancer

Caution should be utilized when passing an OG tube in a patient with suspected cervical spine injury.

- Manual stabilization of the head is required during the procedure.

EQUIPMENT REQUIRED:

- Tape
- Gloves
- Stethoscope
- 60 cc Irrigating syringe
- Water soluble lubricant (KY Jelly)
- NG tube (16 French or 18 French

PROCEDURE GUIDELINE
OROGASTRIC TUBE INSERTION (continued)

PROCEDURE:

1. Patient ***must have*** an advanced airway in place (i.e. endotracheal tube or iGel Airway)
2. Using the OG tube as a measuring device determine the length of the OG tube to be passed by measuring the length from
    a. nose to earlobe
    b. earlobe to midpoint between xiphoid process and stomach
3. Add the measurements together and mark this total distance with a small piece of tape or by marking with fingers.
4. Lubricate the first 6 inches of the OG tube liberally with a water soluble lubricant.
5. ***Oral Insertion with Endotracheal Tube:*** Position the gastric tube to the back of the tongue and then direct the tube downwards through the oropharynx to the preselected depth.
6. ***Oral Insertion with iGel Airway:*** Advance the lubricated 12 FR or smaller gastric tube down lumen leading to the stomach. Continue to advance until reaching the preselected depth.
7. Verify OG tube placement in the stomach by one of the following:
    a. Aspirating gastric contents with the irrigation syringe
    b. While listening over the epigastrium with a stethoscope quickly instill a 30cc air bolus with the irrigation syringe. Air entering the stomach will produce a "whooshing" sound.
    c. Begin suction, note aspiration of gastric contents
8. If unable to positively confirm that the OG tube has been placed is in the stomach the tube must be removed immediately and re-attempted if necessary.
9. Once confirmed for placement, secure the OG tube by taping it to the advanced airway tube.
10. Remember when using the Salem Sump, the blue pigtail must be kept at the level of the fluid in the patient's stomach. This will prevent gastric contents from leaking back through vent lumen.
11. To deter the OG tube from dangling and possible dislodgment:
    a. Wrap a small piece of tape around the tube near the connection creating a tab.
12. When possible, the OG tube must remain connected to a low-level of suction (pull the white knob on suction unit for lower level suctioning). When suction is not available (i.e. when moving patient from unit into ER); insert the blue pigtail into the end of the Salem Sump.

SECTION FOUR

FORMULARY

MEDICATION GUIDELINES

INTRODUCTION

The following pages contain guidelines for the medications encountered by FEM Paramedics. The list refers to the medications carried on all ALS units. They identify the name and class of the drug, a short description, indications, contraindications, and precautions. This is only a guideline to medication administration and shall not circumvent the need to refer to the appropriate PROTOCOL or to contact Medical Control for orders and consultation. For detailed and extensive information on each drug, refer to the Physician's Desk Reference, the Advanced Cardiac Life Support text or an emergency pre-hospital pharmacology reference.

Refer to the appropriate PROTOCOL or contact Medical Control for specific dosage information.

The following medications may be stocked in specific quantities on ALS units:

Adenosine
Albuterol
Amiodarone
Aspirin
Atropine Sulfate
Calcium Chloride
Dextrose 50%, 10%
Diltiazem
Diphenhydramine
Dopamine
Epinephrine
Glucagon
Haldol
Ipratropium Bromide
Ketorolac
Lorazepam
Magnesium Sulfate
Methylprednisolone
Midazolam
Naloxone
Nitrostat
Norepinephrine
Oxygen
Pepcid
Sodium Bicarbonate
Sodium Chloride (NS)
Thiamine
Transexamic Acid
Xopenex
Zofran

Cyanokit, DuoDote and other HazMat formularies are not listed here but are approved by the Medical Director if protocol followed is within this Clinical Care Guideline.

All IV piggyback medications must be placed on a micro-gtt solution set for field administration and if available, an infusion pump or rate-minder SHOULD BE UTILIZED

Adenosine (Adenocard)

Class Antidysrhythmic.

Mechanism of action Slows conduction through the AV node; can interrupt re-entrant pathways; slows heart rate by acting directly on the sinus pacemaker cells by slowing impulse formation. The drug of choice for re-entry SVT. Can be used diagnostically for stable, wide-complex tachycardia of unknown origin after two doses of lidocaine.

Indications Conversion of PSVT to sinus rhythm. May convert re-entry SVT due to Wolff-Parkinson-White syndrome. Not effective in converting atrial fibrillation/fl utter or V-tach. Most forms of stable narrow-complex SVT.

Contraindications Second- or third-degree AV block (if no pacemaker is present), sick sinus syndrome (if no pacemaker present), bronchoconstrictive or bronchospastic lung disease (asthma, COPD), poison- or drug-induced tachycardia.

Adverse reactions/side effects Generally short duration and mild; headache, dizziness, dyspnea, bronchospasm, dysrhythmias, palpitations, hypotension, chest pain, facial flushing, cardiac arrest, nausea, metallic taste, pain in the head or neck, paresthesia, diaphoresis.

Drug interactions Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine. Dipyridamole (Persantine) potentiates the effect of adenosine. Carbamazepine (Tegretol) may potentiate the AV node blocking effect of adenosine.

How supplied 3 mg/mL in 2-mL and 5-mL flip-top vials.

Dosage and administration *Adult:* 6-mg rapid IV bolus over 1–3 seconds, followed by a 20-mL saline flush and elevate extremity. If no response after 1–2 minutes, administer second dose of 12–mg rapid IV bolus over 1–3 seconds. *Pediatric:* Initial dose 0.1 mg/kg rapid IV/IO push (maximum first dose, 6 mg), followed by a 5- to 10-mL saline flush. Second dose 0.2 mg/kg rapid IV/IO push (maximum second dose, 12 mg), followed by a 5- to 10-mL saline flush.

Duration of action *Onset:* Seconds. *Peak effect:* Seconds. *Duration:* 12 seconds.

Special considerations Pregnancy safety: Category C. May cause bronchoconstriction in asthma patients. Evaluate elderly for signs of dehydration requiring fluid replacement prior to administering adenosine. Short half-life limits side effects in most patients.

Albuterol (Proventil, Ventolin)

Class Sympathomimetic, bronchodilator.

Mechanism of action Selective beta-2 agonist that stimulates adrenergic receptors of the sympathomimetic nervous system. Results in smooth-muscle relaxation in the bronchial tree and peripheral vasculature.

Indications Treatment of bronchospasm in patients with reversible obstructive airway disease (COPD/asthma). Prevention of exercise-induced bronchospasm.

Contraindications Known prior hypersensitivity reactions to albuterol. Tachycardia, dysrhythmias, especially those caused by digitalis. Synergistic with other sympathomimetics.

Adverse reactions/side effects Often dose-related and include headache, fatigue, lightheadedness, irritability, restlessness, aggressive behavior, pulmonary edema, hoarseness, nasal congestion, increased sputum, hypertension, tachycardia, dysrhythmias, chest pain, palpitations, nausea/vomiting, dry mouth, epigastric pain, and tremors.

Drug interactions Tricyclic antidepressants may potentiate vasculature effects. Beta blockers are antagonistic and may block pulmonary effects. May potentiate hypokalemia caused by diuretics.

How supplied Metered-dose inhaler: 90 μg/metered spray. Solution for aerosolization: 0.5% (5 mg/mL), 0.083% (2.5 mg) in 3-mL unit dose nebulizer.

Dosage and administration *Adult:* Administer 2.5 mg. Dilute in 0.5 mL of 0.5% solution for inhalation with 2.5 mL normal saline in nebulizer and administer over 10–15 minutes. Metered dose inhaler: 1–2 inhalations (90–180 μg); wait 5 minutes between inhalations. *Pediatric:* <20 kg: 1.25 mg/dose via handheld nebulizer or mask over 20 minutes. >20 kg: 2.5 mg/dose via hand-held nebulizer or mask over 20 minutes. Repeat once in 20 minutes.

Duration of action *Onset:* 5–15 minutes. *Peak effect:* 30 minutes to 2 hours. *Duration:* 3–4 hours.

Special considerations Pregnancy safety: Category C. May precipitate angina pectoris and dysrhythmias. In prehospital emergency care, albuterol should be administered only via inhalation.

Amiodarone (Cordarone, Pacerone)

Class Antidysrhythmic.

Mechanism of action Blocks sodium channels and myocardial potassium channels, delaying repolarization and increasing the duration of action potential.

Indications Ventricular fi brillation, pulseless ventricular tachycardia, unstable ventricular tachycardia in patients refractory to other therapy.

Contraindications Known hypersensitivity to amiodarone or iodine, cardiogenic shock, sinus bradycardia, second- or thirddegree AV block (if no pacemaker is present), severe sinus node dysfunction.

Adverse reactions/side effects Dizziness, fatigue, malaise, tremor, ataxia, lack of coordination, adult respiratory distress syndrome, pulmonary edema, cough, progressive dyspnea, congestive heart failure, bradycardia, hypotension, worsening of dysrhythmias, prolonged QT interval, nausea, vomiting, burning at IV site, Stevens-Johnson syndrome.

Drug interactions Use with digoxin may cause digitalis toxicity. Antidysrhythmics may cause increased serum levels. Beta blocker and calcium channel blockers may potentiate bradycardia, sinus arrest, and AV heart blocks.

How supplied 50 mg/mL vials and prefi lled syringes. For rapid infusion, add 150 mg/3 mL to a 10-mL D_5W (1.5 mg/mL) run at 600 mL/h on infusion pump.

Dosage and administration *Adult:* Ventricular fi brillation/ pulseless ventricular tachycardia unresponsive to CPR, defi brillation, and vasopressors: 300 mg IV/IO push. Initial dose can be followed one time in 3–5 minutes at 150 mg IV/IO push. Recurrent life-threatening ventricular dysrhythmias: Maximum cumulative dose: 2.2 g IV/24 h administered as follows: Rapid infusion: 150 mg IV/IO over 10 minutes (15 mg/minute). May repeat rapid infusion (150 mg IV/IO) every 10 minutes as needed. *Pediatric:* Refractory ventricular fi brillation/pulseless ventricular tachycardia: 5 mg/kg IV/IO bolus. Can repeat the 5 mg/kg IV/IO bolus up to a total dose of 15 mg/kg per 24 h. Maximum single dose: 300 mg. Perfusing supraventricular and ventricular tachycardias: Loading dose 5 mg/kg IV/IO over 20–60 minutes (maximum single dose of 300 mg). Can repeat to maximum dose of 15 mg/kg/day (2.2 g in adolescents). Maximum single dose: 300 mg.

Duration of action *Onset:* Immediate. *Peak effect:* 10–15 minutes. *Duration:* 30–45 minutes.

Special considerations Pregnancy safety: Category D. Monitor patient for hypotension. May worsen or precipitate new dysrhythmias.

Aspirin (ASA, Bayer, Ecotrin, St. Joseph,and others)

Class Platelet inhibitor, anti-infl ammatory agent.

Mechanism of action Prevents platelets from clumping together, or aggregating, and forming emboli.

Indications New onset chest pain suggestive of acute myocardial infarction.

Contraindications Hypersensitivity. Relatively contraindicated in patients with active ulcer disease or asthma.

Adverse reactions/side effects Bronchospasm, anaphylaxis, wheezing in allergic patients, prolonged bleeding, GI bleeding, epigastric distress, nausea, vomiting, heartburn, Reye syndrome.

Drug interactions Use with caution in patients allergic to NSAIDs.

How supplied 81-mg, 160-mg, and 325-mg tablets. Chewable and standard.

Dosage and administration *Adult:* 160 mg to 325 mg PO. Chewing is preferable to swallowing. *Pediatric:* Not recommended.

Duration of action *Onset:* 30–45 minutes. *Peak effect:* Variable. *Duration:* Variable.

Special considerations Pregnancy safety: Category D. Not recommended in pediatric population.

Atropine Sulfate

Class Anticholinergic agent.

Mechanism of action Inhibits the action of acetylcholine at postganglionic parasympathetic neuroeffector sites. Increases heart rate in life-threatening bradydysrhythmias.

Indications Hemodynamically unstable bradycardia, organophosphate poisoning, nerve agent exposure, rapid sequence intubation in pediatrics, beta blocker or calcium channel blocker overdose.

Contraindications Tachycardia, hypersensitivity, unstable cardiovascular status in acute hemorrhage with myocardial ischemia, narrow-angle glaucoma, hypothermic bradycardia.

Adverse reactions/side effects Drowsiness, confusion, headache, tachycardia, palpitations, dysrhythmias, nausea, vomiting, pupil dilation, dry mouth/nose/skin, blurred vision, urinary retention, constipation, flushed, hot, dry skin; paradoxical bradycardia when pushed too slowly or when given at low doses.

Drug interactions Potential adverse effects when administered with digitalis, cholinergics, physostigmine. Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines, and antidepressants.

How supplied Prefilled syringes containing 1 mg in 10 mL (0.1 mg/mL). Nebulizer: 0.2% (1 mg in 0.5 mL) and 0.5% (2.5 mg in 0.5 mL).

Dosage and administration *Adult:* Unstable bradycardia: 0.5 mg IV/IO every 3–5 minutes as needed. Not to exceed total dose of 0.04 mg/kg (maximum 3 mg total). Use shorter dosing interval (3 minutes) and higher doses in severe clinical conditions. Organophosphate poisoning: Extremely large doses (2–4 mg or higher) may be needed. *Pediatric:* Unstable bradycardia: 0.02 mg/kg IV/IO (minimum dose: 0.1 mg). May repeat once. Maximum single dose: Child: 0.5 mg. Adolescent: 1 mg. Maximum total dose: Child: 1 mg. Adolescent: 3 mg. ET dose: 0.04–0.06 mg/kg. Rapid sequence intubation: 0.01–0.02 mg/kg IV/IO (minimum: 0.1 mg, maximum: 0.5 mg).

Duration of action *Onset:* Immediate. *Peak effect:* Rapid to 1–2 minutes. *Duration:* 2–6 hours.

Special considerations Pregnancy safety: Category C. Moderate doses may cause pupillary dilation. Paradoxical bradycardia can occur with doses lower than 0.1 mg.

Calcium Chloride

Class Electrolyte (anion).

Mechanism of action Increases cardiac contractile state (positive inotropic effect). May enhance ventricular automaticity.

Indications Hypocalcemia, hyperkalemia, hypermagnesemia, beta blocker and calcium channel blocker toxicity.

Contraindications Hypercalcemia, ventricular fibrillation, digitalis toxicity.

Adverse reactions/side effects Syncope, cardiac arrest, dysrhythmia, bradycardia, hypotension, asystole, peripheral vasodilation, nausea, vomiting, metallic taste, tissue necrosis at injection site, coronary and cerebral artery spasm.

Drug interactions May worsen dysrhythmias secondary to digitalis toxicity. May antagonize the effects of calcium channel blockers. Do not mix or infuse immediately before or after sodium bicarbonate without intervening flush.

How supplied 10% solution in 10 mL (100 mg/mL) ampules, vials, and prefilled syringes.

Dosage and administration *Adult:* Calcium channel blocker overdose and hyperkalemia: 500 mg to 1,000 mg (5–10 mL of 10% solution) IV push. May repeat as needed. *Pediatric:* Calcium channel blocker overdose and hyperkalemia: 20 mg/kg (0.2 mL/kg) slow IV/IO push. Maximum 1-g dose; may repeat in 10 minutes.

Duration of action *Onset:* 1–3 minutes. *Peak effect:* Variable. *Duration:* 20–30 minutes, but may persist for 4 hours (dose dependent).

Special considerations Pregnancy safety: Category C. Do not use routinely in cardiac arrest. Comparable dose of 10% calcium gluconate is 15–30 mL. Central venous administration is the preferred route in pediatrics if available.

Dextrose

Class Carbohydrate, antihypoglycemic.

Mechanism of action Rapidly increases serum glucose levels. Short-term osmotic diuresis.

Indications Hypoglycemia, altered level of consciousness, coma of unknown origin, seizure of unknown origin, status epilepticus.

Contraindications Intracranial hemorrhage.

Adverse reactions/side effects Extravasation leads to tissue necrosis. Cerebral hemorrhage, cerebral ischemia, pulmonary edema, warmth, pain, burning from IV infusion, hyperglycemia.

Drug interactions Sodium bicarbonate, warfarin (Coumadin).

How supplied 500 mg/mL (50%), 250 mg/mL (25%), and 100 mg/mL (10%) prefilled syringes and vials.

Dosage and administration *Adult:* 12.5–25 grams of a 50% solution slow IV push. May be repeated as necessary. *Pediatric:* 1 year and older; 0.5–1 g/kg of a 25% solution slow IV/IO push. May be repeated as necessary. *Neonates and infants:* 200–500 mg/kg of a 10%–25% solution slow IV push (see below). May be repeated as necessary. Maximum concentration of 12.5% (vasculature extremely sensitive to high concentrations).

Duration of action *Onset:* Less than 1 minute. *Peak effect:* Variable. *Duration:* Variable.

Special considerations Pregnancy safety: Category C. Administer thiamine prior to D_{50} in known alcoholic patients. Draw blood to determine glucose level before administering. Do not administer to patients with known CVA unless hypoglycemia documented.

How to prepare D_{10}, $D_{12.5}$, and D_{25} from D_{50}:
To make a 10% solution:
– Take 5 mL (2.5 grams) of a 50-mL stock solution of D_{50} and dilute with 20 mL of injectable sterile water:
2.5 g/25 mL = 2,500 mg/25 mL =
100 mg/1 mL = 10% = D_{10}
To make a 12.5% solution:
– Take 2.5 mL (1.25 grams) of a 50-mL stock solution of D_{50} and dilute with 7.5 mL of injectable sterile water:
1.25 g/10 mL = 1,250 mg/10 mL
= 125 mg/1 mL = 12.5% = $D_{12.5}$
To make a 25% solution:
– Take 25 mL (12.5 grams) of a 50-mL stock solution of D_{50} and dilute with 25 mL of injectable sterile water:
12.5 g/50 mL = 12,500 mg/50 mL
= 250 mg/1 mL = 25% = D_{25}

Diltiazem (Cardizem)

Class Calcium channel blocker, antidysrhythmic.

Mechanism of action Slow calcium channel blocker that blocks calcium ion influx during depolarization of cardiac and vascular smooth muscle. Decreases peripheral vascular resistance and causes relaxation of the vascular smooth muscle, resulting in a decrease of both systolic and diastolic blood pressure. Reduces preload and afterload. Reduces myocardial oxygen demand.

Indications Controls rapid ventricular rates due to atrial fibrillation, atrial fl utter, and re-entry supraventricular tachycardia.

Contraindications Hypotension, sick sinus syndrome (without functioning pacemaker present), second- or third-degree AV block (without functioning pacemaker present), cardiogenic shock, wide-complex tachycardia (ventricular tachycardia may lead to hemodynamic deterioration and ventricular fibrillation), poison- or drug-induced tachycardia.

Adverse reactions/side effects Dizziness, weakness, headache, dyspnea, cough, dysrhythmias, CHF, peripheral edema, bradycardia, hypotension, AV blocks, syncope, ventricular fibrillation, ventricular tachycardia, cardiac arrest, chest pain, nausea, vomiting, dry mouth.

Drug interactions Caution in patients using medications that affect cardiac contractility. In general, should not be used in patients on beta blockers.

How supplied 5 mg/mL vials (requires refrigeration). 100-mg powder (requires reconstitution with attached fluid) for infusion (1 mg/mL). Add 125 mg/25 mL to a 100-mL bag of D_5W (1 mg/mL).

Dosage and administration *Adult:* Initial dose: 0.25 mg/kg (15–20 mg for the average patient) IV over 2 minutes. If inadequate response, may re-bolus in 15 minutes. Secondary dose: 0.35 mg/kg (20–25 mg for the average patient) IV over 2 minutes. Maintenance infusion of 5–15 mg/h titrated to physiologically appropriate heart rate. *Pediatric:* Not recommended.

Duration of action *Onset:* 2–5 minutes. *Peak effect:* Variable. *Duration:* 1–3 hours.

Special considerations Pregnancy safety: Category C. Use with caution in patients with renal or hepatic dysfunction. PVCs may be present on conversion of PSVT to sinus rhythm. 500-mg dose of calcium chloride 5 minutes prior to administration of diltiazem can help to block the hypotensive effects in borderline hypotensive patients (blocks baroreceptors in the great vessels).

Diphenhydramine (Benadryl)

Class Antihistamine, anticholinergic.

Mechanism of action Blocks cellular histamine receptors; decreases vasodilation; decreases motion sickness. Reverses extrapyramidal reactions.

Indications Symptomatic relief of allergies, allergic reactions, and anaphylaxis. Blood administration reactions; used for motion sickness and hay fever, relief of acute dystonic reactions caused by phenothiazines; may be useful in phenothiazine overdoses.

Contraindications Asthma, glaucoma, pregnancy, hypertension, narrow-angle glaucoma, infants, patients taking MAOIs.

Adverse reactions/side effects Drowsiness, sedation, seizures, dizziness, headache, blurred vision, paradoxical CNS excitement in children, wheezing, thickening of bronchial secretions, palpitations, hypotension, dysrhythmias, dry mouth, diarrhea, nausea, vomiting.

Drug interactions Potentiates effects of alcohol and other anticholinergics. May inhibit corticosteroid activity. MAOIs prolong anticholinergic effects of diphenhydramine.

How supplied 25- and 50-mg tablets and capsules. 10 mg/mL and 50 mg/mL vials.

Dosage and administration *Adult:* 25–50 mg IM, IV, PO. *Pediatric:* 1–2 mg/kg IV, IO slowly, or IM. If PO: 5 mg/kg/24h.

Duration of action *Onset:* 15–30 minutes. *Peak effect:* 1 hour. *Duration:* 3–12 hours.

Special considerations Pregnancy safety: Category B. Not used in infants. If used in anaphylaxis, must be in conjunction with epinephrine and corticosteroids.

Dopamine Hydrochloride (Intropin)

Class Sympathomimetic, vasopressor, inotropic agent.

Mechanism of action Immediate metabolic precursor to norepinephrine. Produces positive inotropic and chronotropic effects. Dilates renal and splanchnic vasculature. Constricts systemic vasculature, increasing blood pressure and preload. Increases myocardial contractility and stroke volume.

Indications Cardiogenic and septic shock, hypotension with low cardiac output states, distributive shock, second-line drug for symptomatic bradycardia.

Contraindications Hypovolemic shock, pheochromocytoma, tachydysrhythmias, ventricular fibrillation.

Adverse reactions/side effects Extravasation may cause tissue necrosis. Headache, anxiety, dyspnea, dysrhythmias, hypotension, hypertension, palpitations, chest pain, increased myocardial oxygen demand, PVCs, nausea, vomiting.

Drug interactions Incompatible with alkaline solutions (sodium bicarbonate). MAOIs will enhance the effect of dopamine. Bretylium may potentiate effect of dopamine. Beta blockers may antagonize effects of dopamine. When administered with phenytoin, may cause hypotension, bradycardia, and seizures.

How supplied 40 mg/mL and 80 mg/mL prefilled syringes and vials for IV infusion. 400 mg/250 mL D_5W premixed solutions (1,600 μg/mL).

Dosage and administration *Adult:* IV/IO infusion at 2–20 μg/kg/min, slowly titrated to patient response. *Pediatric:* IV/IO infusion at 2–20 μg/kg/min, slowly titrated to patient response.

Duration of action *Onset:* 1–4 minutes. *Peak effect:* 5–10 minutes. *Duration:* Effects cease almost immediately after infusion is discontinued.

Special considerations Pregnancy safety: Category C. Effects are dose-dependent. Dopaminergic response: 2–4 μg/kg/min: dilates vessels in kidneys; increased urine output. Beta-adrenergic response: 4–10 μg/kg/min: positive chronotropic and inotropic effects. Adrenergic response: 10–20 μg/kg/min: primary alpha stimulant/vasoconstriction. Greater than 20 μg/kg/min: reversal of renal effects/override of alpha effects, consider other agents such as epinephrine or norepinephrine infusions. Should be administered by infusion pump.

Epinephrine (Adrenalin)

Class Sympathomimetic.

Mechanism of action Direct-acting alpha and beta agonist. Alpha: vasoconstriction. Beta-1: positive inotropic, chronotropic, and dromotropic effects. Beta-2: bronchial smooth muscle relaxation and dilation of skeletal vasculature. Blocks histamine receptors.

Indications Cardiac arrest (asystole, PEA, ventricular fibrillation and pulseless ventricular tachycardia), symptomatic bradycardia as an alternative infusion to dopamine, severe hypotension secondary to bradycardia when atropine and transcutaneous pacing are unsuccessful, allergic reaction, anaphylaxis, asthma.

Contraindications Hypertension, hypothermia, pulmonary edema, myocardial ischemia, hypovolemic shock.

Adverse reactions/side effects Nervousness, restlessness, headache, tremor, pulmonary edema, dysrhythmias, chest pain, hypertension, tachycardia, nausea, vomiting.

Drug interactions Potentiates other sympathomimetics. Deactivated by alkaline solutions. MAOIs may potentiate effect. Beta blockers may blunt effects.

How supplied 1:1,000 solution: Ampules and vials containing 1 mg/mL. 1:10,000 solution: Prefi lled syringes containing 0.1 mg/mL. Auto-injector (EpiPen): 0.5 mg/mL (1:2,000).

Dosage and administration *Adult:* Mild allergic reactions and asthma: 0.3–0.5 mg (0.3–0.5 mL 1:1,000) SC.
Anaphylaxis: 1 mg (10 mL of 1:10,000) IV, IO over 5 minutes.
Cardiac arrest: IV/IO dose: 1 mg (10 mL, 1:10,000 solution) 3–5 minutes during resuscitation. Follow each dose with a 20-mL flush and elevate arm for 10–20 seconds after dose.
Continuous infusion: Add 1 mg (1 mL of a 1:1,000 solution) to 250 mL normal saline or D_5W (4 μg/mL). Initial infusion rate of 1 μg/ min titrated to effect (typical dose: 2–10 μg/min).
Endotracheal (ET) dose: 2–2.5 mg diluted in 10 mL normal saline.
Profound bradycardia or hypotension: 2–10 μg/min; titrate to patient response.
Higher dose: Higher doses (up to 0.2 mg/kg) may be used for specific indications: (beta blocker or calcium channel blocker overdose).
Pediatric: Mild allergic reactions and asthma: 0.01 mg/kg (0.01 mL/kg) of a 1:1,000 solution SC (maximum of 0.3 mL).
Anaphylaxis/severe status asthmaticus: 0.01 mg/kg (0.01 mL/kg) IM of a 1:1,000 solution (maximum single dose: 0.3 mg).
Cardiac arrest: IV/IO dose: 0.01 mg/kg (0.1 mL/kg) of a 1:10,000 solution every 3–5 minutes during arrest. All ET doses 0.1 mg/kg (0.1 mL/kg) of a 1:1,000 solution mixed in 3–5 mL of saline until IV/IO access is achieved. Maximum single dose 1 mg.
Symptomatic bradycardia: IV/IO dose: 0.01 mg/kg (0.01 mL/kg) of a 1:10,000 solution.
All ET doses 0.1 mg/kg (0.1 mL/kg) of a 1:1,000 solution.
Continuous IV/IO infusion: Begin with rapid infusion, and then titrate to response. Typical initial infusion: 0.1–1 μg/min. Higher doses may be effective.

Duration of action *Onset:* Immediate. *Peak effect:* Minutes.
Duration : Several minutes.

Special considerations Pregnancy safety: Category C. May cause syncope in asthmatic children. May increase myocardial oxygen demand. To mix an infusion add 1 mg of epinephrine 1:1,000 to 500 mL D_5W for a yield of 2 mcg/mL. Many states and systems are pulling away from IV/IO/IM administration of 1:1,000 and replacing it with auto-injectors due to the vascular side effects of solo epinephrine 1:1,000 injection.

Haloperidol Lactate (Haldol)

Class Tranquilizer, antipsychotic.

Mechanism of action Inhibits central nervous system catecholamine receptors: strong antidopaminergic and weak anticholinergic. Acts on CNS to depress subcortical areas, mid-brain, and ascending reticular activating system in the brain.

Indications Acute psychotic episodes.

Contraindications Parkinsons disease, depressed mental status, agitation secondary to shock and hypoxia, hypersensitivity.

Adverse reactions/side effects Seizures, sedation, confusion, restlessness, extrapyramidal reactions, dystonia, respiratory depression, hypotension, tachycardia, orthostatic hypotension, QT prolongation, sudden cardiac death, constipation, dry mouth, nausea, vomiting, drooling, blurred vision.

Drug interactions Enhanced central nervous system depression and hypotension in combination with alcohol. Antagonized amphetamines and epinephrine. Other CNS depressants may potentiate effects.

How supplied 5 mg/mL ampules and vials.

Dosage and administration *Adult:* 2–5 mg IM ONLY every 30–60 minutes until sedation is achieved. *Pediatric:* Not recommended.

Duration of action *Onset:* 10 minutes. *Peak effect:* 30–45 minutes. *Duration:* Variable (generally 12–24 hours).

Special considerations Pregnancy safety: Category C. Treat hypotension secondary to haloperidol with fluids and norepinephrine, not epinephrine. Patient may also be taking benztropine mesylate (Cogentin) if on long-term therapy with haloperidol.

Ipratropium Bromide (Atrovent)

Class Anticholinergic, bronchodilator.

Mechanism of action Inhibits interaction of acetylcholine at receptor sites of bronchial smooth muscle, resulting in decreased cyclic guanosine monophosphate and bronchodilation.

Indications Persistent bronchospasm, COPD exacerbation.

Contraindications Hypersensitivity to ipratropium, atropine, alkaloids, peanuts.

Adverse reactions/side effects Headache, dizziness, nervousness, fatigue, tremor, blurred vision, cough, dyspnea, worsening COPD symptoms, tachycardia, palpitations, flushing, MI, dry mouth, nausea, vomiting, GI distress.

Drug interactions None reported.

How supplied Aerosol 18 µg/actuation. 500 µg/mL of a 0.02% solution for nebulized inhalation.

Dosage and administration *Adult:* 250–500 µg via inhalation with hand-held nebulizer every 20 minutes up to 3 times. *Pediatric:* Same as adult.

Duration of action *Onset:* 1–3 minutes. *Peak effect:* 90–120 minutes. *Duration:* 4–6 hours.

Special considerations Pregnancy safety: Category B. *Note: When used in combination with beta-agonists (eg, metaproterenol and albuterol), the beta-agonist is always administered first with a 5-minute wait before administering ipratropium.* Shake well before use. Use with caution in patients with urinary retention.

Ketorolac Tromethamine (Toradol)

Class Nonsteroidal anti-inflammatory (NSAID) analgesic.

Mechanism of action Potent analgesic that does not possess any sedative or anxiolytic activities by inhibiting prostaglandin synthesis.

Indications Short-term management of moderate to severe pain.

Contraindications Allergy to salicylates or other nonsteroidal anti-inflammatory drugs. Patients with history of asthma, bleeding disorders (especially GI related, such as peptic ulcer disease), renal failure.

Adverse reactions/side effects Drowsiness, dizziness, headache, sedation, bronchospasm, dyspnea, edema, vasodilation, hypotension, hypertension, GI bleeding, diarrhea, dyspepsia, nausea.

Drug interactions May increase bleeding time in patients taking anticoagulants.

How supplied 15 mg/mL and 30 mg/mL vials.

Dosage and administration *Adult:* 30–60 mg IM. *Pediatric:* Not recommended.

Duration of action *Onset:* 10 minutes. *Peak effect:* 1–2 hours. *Duration:* 2–6 hours.

Special considerations Pregnancy safety: Category C. Use with caution in elderly patients due to higher risk of renal and fatal GI adverse reactions.

Lorazepam (Ativan)

Class Benzodiazepine, short/intermediate acting; sedative, anticonvulsant, schedule IV drug.

Mechanism of action Anxiolytic, anticonvulsant, and sedative effect; suppresses propagation of seizure activity produced by foci in cortex, thalamus, and limbic areas.

Indications Initial control of status epilepticus or severe recurrent seizures, severe anxiety, sedation.

Contraindications Acute narrow-angle glaucoma, coma, shock, suspected drug abuse.

Adverse reactions/side effects Dizziness, drowsiness, CNS depression, headache, sedation, respiratory depression, apnea, hypotension, bradycardia.

Drug interactions May precipitate central nervous system depression if already taking central nervous system depressant medications.

How supplied 2 and 4 mg/mL vials and Tubex syringes.

Dosage and administration Note: When given IV/IO, must be diluted with equal volume of sterile water or sterile saline. When given IM, lorazepam is not diluted. *Adult:* 2–4 mg slow IM/IV at

2 mg/min; may be repeated in 15–20 minutes. Maximum dose of 8 mg. For sedation: 0.05 mg/kg up to 4 mg IM. *Pediatric:* 0.05–0.20 mg/kg slow IV/IO/IM over 2 minutes. May be repeated once in 5–20 minutes. Maximum dose of 0.2 mg/kg.

Duration of action *Onset:* 1–5 minutes. *Peak effect:* Variable. *Duration:* 6–8 hours.

Special considerations Pregnancy safety: Category D. Monitor respiratory rate and blood pressure during administration. Have advanced airway equipment readily available. Inadvertent arterial injection may result in vasospasm and gangrene. Lorazepam expires in 6 weeks when not refrigerated.

Magnesium Sulfate

Class Electrolyte, anti-inflammatory.

Mechanism of action Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction. Manages seizures in toxemia of pregnancy. Induces uterine relaxation. Can cause bronchodilation after beta-agonists and anti-cholinergics have been administered.

Indications Seizures of eclampsia (toxemia of pregnancy), torsades de pointes, hypomagnesaemia, ventricular fi brillation/ pulseless ventricular tachycardia that is refractory to amiodarone, life-threatening dysrhythmias due to digitalis toxicity.

Contraindications Heart block, myocardial damage.

Adverse reactions/side effects Drowsiness, CNS depression, respiratory depression, respiratory tract paralysis, abnormal ECG, AV block, hypotension, vasodilation, hyporeflexia.

Drug interactions May enhance effects of other central nervous system depressants. Serious changes in overall cardiac function may occur with cardiac glycosides.

How supplied 50% solution (500 mg/mL) vials (must be diluted to a 10% solution before administering).

Dosage and administration *Adult:* Seizure activity associated with pregnancy: 1–4 g of a 10% solution IV/IO over 3 minutes; maximum dose of 30–40 g/day. Cardiac arrest due to hypomagnesaemia or torsades de pointes: 1–2 g of a 10% solution IV/IO over 5–20 minutes. Torsades de pointes with a pulse: Loading dose of 1–2 g in 50–100 mL of D_5W over 5–60 minutes IV. Follow with 0.5–1 g/h IV (titrate dose to control torsades). *Pediatric:* Pulseless ventricular tachycardias with torsades de pointes: 25–50 mg/kg IV/IO bolus of a 10% solution to a maximum dose of 2 grams. Torsades de pointes with pulses/hypomagnesaemia: 25–50 mg/kg IV/IO of a 10% solution over 10–20 minutes to maximum dose of 2 grams. Status asthmaticus: 25–50 mg/kg IV/IO of a 10% solution over 15–30 minutes to a maximum dose of 2 grams.

Duration of action *Onset:* IV/IO: immediate. *Peak effect:* Variable. *Duration:* IV/IO: 30 minutes.

Special considerations Pregnancy safety: Category A. Recommended that the drug not be administered in the 2 hours before delivery, if possible. IV calcium gluconate or calcium chloride

Methylprednisolone Sodium Succinate (Solu-Medrol)

Class Corticosteroid.

Mechanism of action Highly potent synthetic glucocorticoid that suppresses acute and chronic infl ammation; potentiates vascular smooth muscle relaxation by beta-adrenergic agonists.

Indications Acute spinal cord trauma, anaphylaxis, bronchodilator for unresponsive asthma.

Contraindications Premature infants, systemic fungal infections, use with caution in patients with gastrointestinal bleeding.

Adverse reactions/side effects Depression, euphoria, headache, restlessness, seizure, increased ICP, pulmonary tuberculosis, hypertension, CHF, nausea, vomiting, peptic ulcer, fl uid retention, hypernatremia, hyperkalemia.

Drug interactions Hypoglycemic responses to insulin and hypoglycemic agents may be blunted.

How supplied 40, 125, 500, 1,000 mg powder (requires reconstitution with solution provided).

Dosage and administration *Adult:* Acute spinal cord trauma: 30 mg/kg IV over 30 minutes followed by: Infusion: 5.4 mg/kg/h. Asthma, COPD, anaphylaxis: 1–2 mg/kg IV. *Pediatric:* Acute spinal cord trauma: Same as adult. Status asthmaticus/anaphylaxis: 2 mg/kg/dose IV/IO/IM to a maximum dose of 60 mg.

Duration of action *Onset:* 1–2 hours. *Peak effect:* Variable. *Duration:* 8–24 hours.

Special considerations Pregnancy safety: Category C. Not effective if time of spinal cord injury greater than 8 hours. Crosses the placenta and may cause fetal harm.

Midazolam Hydrochloride (Versed)

Class Benzodiazepine, short/intermediate acting; schedule IV drug.

Mechanism of action Reversibly interacts with gamma-amino butyric acid (GABA) receptors in the central nervous system causing sedative, anxiolytic, amnesic, and hypnotic effects.

Indications Sedation for medical procedures (eg, intubation, ventilated patients, cardioversion).

Contraindications Acute narrow-angle glaucoma, shock, coma, alcohol intoxication, overdose, depressed vital signs. Concomitant use with barbiturates, alcohol, narcotics, or other central nervous system depressants.

Adverse reactions/side effects Headache, somnolence, respiratory depression, respiratory arrest, apnea, hypotension, cardiac arrest, nausea, vomiting, pain at the injection site.

Drug interactions Should not be used in patients who have taken central nervous system depressants.

How supplied 1 mg/mL and 5 mg/mL vials and Tubex syringes.

Dosage and administration *Adult:* 2–2.5 mg slow IV (over 2–3 minutes). May be repeated to total maximum: 0.1 mg/kg. *Pediatric:* 0.1–0.3 mg/kg IV/IO (maximum single dose: 10 mg).

Duration of action *Onset:* 1–3 minutes, IV and dose dependent. *Peak effect:* Variable. *Duration:* 2–6 hours, dose dependent.

Special considerations Pregnancy safety: Category D. Administer immediately prior to intubation procedure. Requires continuous monitoring of respiratory and cardiac function. Decrease dose by 50% in patients with hepatic and renal dysfunction.

Naloxone Hydrochloride (Narcan)

Class Opioid antagonist, antidote.

Mechanism of action Competitive inhibition at narcotic receptor sites. Reverses respiratory depression secondary to opiate drugs. Completely inhibits the effect of morphine.

Indications Opiate overdose, complete or partial reversal of central nervous system and respiratory depression induced by opioids, decreased level of consciousness, coma of unknown origin. Narcotic agonist for the following: morphine sulfate, heroin, hydromorphone (Dilaudid), methadone, meperidine (Demerol), paregoric, fentanyl (Sublimaze), oxycodone (Percodan), codeine, propoxyphene (Darvon). Narcotic agonist and antagonist for the following: butorphanol (Stadol), pentazocine (Talwin), nalbuphine (Nubain).

Contraindications Use with caution in narcotic-dependent patients. Use with caution in neonates of narcotic-addicted mothers.

Adverse reactions/side effects Restlessness, seizures, dyspnea, pulmonary edema, tachycardia, hypertension, dysrhythmias, cardiac arrest, nausea, vomiting, withdrawal symptoms in opioid-addicted patients, diaphoresis.

Drug interactions Incompatible with bisulfi te and alkaline solutions.

How supplied 0.4 mg/mL and 1 mg/mL ampules and vials.

Dosage and administration *Adult:* 0.4–2 mg IM/IV/IO/SQ/ET/Intranasal (diluted); minimum single dose recommended: 2 mg. Repeat at 5-minute intervals to a maximum total dose of 10 mg (medical control may request higher amounts). *Pediatric:* 0.1 mg/kg/dose IV/IO/IM/SQ every 2 minutes as needed. Maximum total dose of 2 mg. If no response in 10 minutes, administer an additional 0.1 mg/kg/dose.

Duration of action *Onset:* <2 minutes. *Peak effect:* Variable. *Duration:* 30–60 minutes.

Special considerations Pregnancy safety: Category C. Assist ventilations prior to administration to avoid sympathetic stimulation. Seizures without causal relationship have been reported. May not reverse hypotension. Use caution when administering to narcotic addicts (potential violent behavior). Half-life of naloxone is often shorter than the half-life of narcotics; repeat dosing may be required.

Nitroglycerin (Nitrostat, Nitro-Bid, Tridil)

Class Vasodilator.

Mechanism of action Smooth muscle relaxant acting on vasculature, bronchial, uterine, intestinal smooth muscle. Dilation of arterioles and veins in the periphery. Reduces preload and afterload, decreasing workload of the heart and thereby myocardial oxygen demand.

Indications Acute angina pectoris, ischemic chest pain, hypertension, CHF, pulmonary edema.

Contraindications Hypotension, hypovolemia, intracranial bleeding or head injury, pericardial tamponade, severe bradycardia or tachycardia, RV infarction, previous administration in the last 24 hours: tadalafil (Cialis) (48 hours), vardenafil (Levitra), sildenafil (Viagra).

Adverse reactions/side effects Headache, dizziness, weakness, reflex tachycardia, syncope, hypotension, nausea, vomiting, dry mouth, muscle twitching, diaphoresis.

Drug interactions Additive effects with other vasodilators. Incompatible with other drugs IV.

How supplied Tablets: 0.3 mg (1/200 grain). 0.4 mg (1/150 grain). 0.6 mg (1/100 grain). NTG spray: 0.4 mg/actuation. NTG IV (Tridil). 200 μg/mL in D_5W glass vials.

Dosage and administration *Adult:* Tablet: 0.3–0.4 mg sublingually; may repeat in 5 minutes to maximum of 3 doses. NTG spray: 1–2 sprays for 0.5–1 second at 5-minute intervals to a maximum of 3 sprays in 15 minutes. NTG IV infusion: Begin at 10 μg/min; increase by 10 μg/min every 3–5 minutes until desired effect. To a maximum of 200 μg/min. *Pediatric:* Not recommended. IV infusion: 0.25–0.5 μg/kg/min IV, IO titrated by 1 μg/kg/min (max dose: 5 μg/kg/min).

Duration of action *Onset:* 1–3 minutes. *Peak effect:* 5–10 minutes. *Duration:* SL: 20–30 minutes. IV: 1–10 minutes after discontinuation of infusion.

Special considerations Pregnancy safety: Category C. Hypotension more common in the elderly. If 12-lead ECG shows inferior wall infarct, rule out right ventricular infarct via right-sided 12-lead ECG prior to administering nitroglycerin. Nitroglycerin decomposes when exposed to light or heat, must be kept in airtight containers. Must be administered only with an infusion pump direct from bottle with a vented IV set and non-PVC tubing. Active ingredient may have stinging effect when administered.

Norepinephrine Bitartrate (Levophed)

Class Sympathomimetic, vasopressor.

Mechanism of action Potent alpha-agonist resulting in intense peripheral vasoconstriction, positive chronotropic and increased inotropic effect (from 10% beta effect) with increased cardiac output. Alpha-adrenergic activity resulting in peripheral vasoconstriction and beta-adrenergic activity leading to inotropic stimulation of the heart and coronary artery vasodilation.

Indications Cardiogenic shock, unresponsive to fl uid resuscitation, signifi cant hypotensive (<70 mm Hg) states.

Contraindications Hypotensive patients with hypovolemia, pregnancy (relative).

Adverse reactions/side effects Headache, anxiety, dizziness, restlessness, dyspnea, bradycardia, hypertension, dysrhythmias, chest pain, peripheral cyanosis, cardiac arrest, nausea, vomiting, urinary retention, renal failure, decreased blood fl ow to the GI tract, kidneys, skeletal muscle, and skin, tissue necrosis from extravasation.

Drug interactions Can be deactivated by alkaline solutions. Sympathomimetic and phosphodiesterase inhibitors may exacerbate dysrhythmias. Bretylium may potentiate the effects of catecholamines.

How supplied 1 mg/mL vials.

Dosage and administration *Adult:* Dilute 8 mg in 500 mL of D_5W or 4 mg in 250 mL of D_5W (16 μg/mL). Infuse by IV piggyback at 0.1–0.5 μg/kg/min titrated to response (average dose for 70 kg patient 7–35 μg/min). *Pediatric:* Begin at 0.1–2 μg/kg/min IV infusion, adjust rate to achieve desired change in blood pressure and systemic perfusion. Titrated to patient response.

Duration of action *Onset:* 1–3 minutes. *Peak effect:* Variable. *Duration:* 5–10 minutes and lasts only 1 minute after infusion is discontinued.

Special considerations Pregnancy safety: Category C. May cause fetal anoxia when used in pregnancy. Infuse norepinephrine through a large, stable vein to avoid extravasation and tissue necrosis. Often used with low-dose dopamine to spare decreased renal and mesenteric blood fl ow. Drug or poison-induced hypotension may require higher doses to achieve adequate perfusion.

Pepcid (Famotidine)

Classifications: Histamine H2-Receptor Antagonist

Actions: Competitively inhibits the action of histamine at the histamine H2-receptors. This antihistamine property functions to inhibit gastric acid secretion and to inhibit the action of histamine from contributing to anaphylactoid reactions and/or anaphylaxis.

Indications: Allergic/anaphylaxis reactions: in adult and pediatric patients
GI Bleed- upper and lower in adult patients only. Not to be used in pediatric GI bleeding

Contraindications: Known hypersensitivity
Adverse Effects: Rare instances of arrhythmias and hypotension have been reported following rapid IV bolus

Precautions: Administer with slow IV push over 2 minutes

Onset: Within 1 hour

Duration: 10-12 hours

Dosage: 20 mg SIVP

Pregnancy: Category B

Comments: Supplied as 20mg/2cc
Indicated even in the presence of hypotension

Sodium Bicarbonate

Class Systemic hydrogen ion buffer, alkalizing agent.

Mechanism of action Buffers metabolic acidosis and lactic acid buildup in the body caused by anaerobic metabolism secondary to severe hypoxia by reacting with hydrogen ions to form water and carbon dioxide.

Indications Metabolic acidosis during cardiac arrest, tricyclic antidepressant, aspirin, and phenobarbital overdose, hyperkalemia, crush injuries.

Contraindications Metabolic and respiratory alkalosis, hypokalemia, electrolyte imbalance due to severe vomiting or diarrhea.

Adverse reactions/side effects Hypernatremia, metabolic alkalosis, tissue sloughing, cellulitis, or necrosis at injection site. Seizures, fluid retention, hypokalemia, electrolyte imbalance, tetany, sodium retention, peripheral edema.

Drug interactions Increases the effects of amphetamines. Decreases the effects of benzodiazepines, tricyclic antidepressants. May deactivate sympathomimetics (dopamine, epinephrine, norepinephrine).

How supplied 1 mEq/mL of an 8.4% solution in 10- and 50-mL vials and prefilled syringe. 0.5 mEq/mL of a 4.2% solution in 2.5-, 5-, and 10-mL prefilled syringe **.**

Dosage and administration *Adult:* 1 mEq/kg slow IV, IO push may repeat at 0.5 mEq/kg every 10 minutes. *Pediatric:* 1 mEq/kg slow IV, IO push (dilute in small children to 4.2%).

Duration of action *Onset:* Seconds. *Peak effect:* 1–2 minutes. *Duration:* 10 minutes.

Special considerations Pregnancy safety: Category C. Repeat as needed in tricyclic antidepressant overdose until QRS narrows. Must be used in conjunction with effective ventilation and chest compressions in cardiac arrest. Avoid contact with other medications; may precipitate or inactivate them. Always flush IV line well before and after injecting. Use with caution in patients with CHF and renal disease due to high sodium concentration. Monitor patient closely for signs and symptoms of fluid overload.

Thiamine (Betaxin)

Class Vitamin B.

Mechanism of action Combines with ATP to form thiamine pyrophosphate coenzyme, which is a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

Indications Coma of unknown origin, delirium tremens, beriberi, Wernicke encephalopathy.

Contraindications None.

Adverse reactions/side effects Anxiety, dyspnea, respiratory failure, vasodilation, hypotension, nausea, vomiting.

Drug interactions Give thiamine before glucose under all circumstances.

How supplied 100 mg/mL vials.

Dosage and administration *Adult:* 100 mg slow IV or IM. *Pediatric:* 10–25 mg slow IV or IM.

Duration of action *Onset:* Rapid. *Peak effect:* Variable. *Duration:* Depends on degree of deficiency.

Special considerations Pregnancy safety: Category A. Rapid or large IV doses may cause respiratory difficulties, hypotension, and vasodilation. Anaphylaxis reactions reported.

Tranexamic Acid (TXA)

Class: Anti-fibrinolytic agent

Action: Used to treat or prevent excessive blood loss due to trauma.

Indication/s: Blunt trauma patients, with evidence of significant bleeding (systolic BP less than 90 mm Hg and/or heart/pulse rate more than 110 beats/minute); penetrating trauma to the neck and torso; given with one (1) hour of injury.

Contraindications: Patients under 17 years old. Administration of TXA should not delay transport.

Adverse Effects: Acute gastrointestinal disturbances (nausea/vomiting, diarrhea). Hypotension has been observed when intravenous injection is too rapid.

Dosage: Adult: Drip only: 1 gram in 100 mL D5W IV/IO piggyback infused over 10 minutes.

Supplied: 1 gram powder vial • Must be reconstituted via manufacturer recommendation or 1000 mg/10 mL vial Medication

Special Considerations:

Levalbuterol (Xopenex)

Class Sympathomimetic, bronchodilator.

Mechanism of action Stimulates beta-2 receptors resulting in smooth muscle relaxation of bronchial tree and peripheral vasculature.

Indications Treatment of acute bronchospasm in patients with reversible obstructive airway disease (COPD/asthma). Bronchospasm prophylaxis in asthma patients.

Contraindications Known hypersensitivity to the drug and other sympathomimetics. Angioedema, tachydysrhythmias, and severe cardiac disease. Avoid use in patients taking phenothiazines; may cause prolonged QT interval and dysrhythmias.
Avoid use in patients on sotalol; may decrease bronchodilating effects and cause bronchospasm, prolonged QT interval, and dysrhythmias.

Adverse reactions/side effects Headache, anxiety, dizziness, restlessness, hallucinations, throat irritation, tachycardia, hypertension, hypotension, dysrhythmias, angina, nausea, vomiting, dyspepsia, tremors, hypokalemia, hyperglycemia.

Drug interactions Increased actions of bronchodilators, tricyclic antidepressants, MAOIs, and other adrenergic drugs.

How supplied 0.63 mg, 1.25 mg/3 mL solution for inhalation.

Dosage and administration *Adults:* 1.25 mg to 2.5 mg in 3 mL administered by nebulizer every 20 minutes to a maximum of 3 doses. *Pediatric:* 0.075 mg/kg (minimum of 1.25 mg) administered by nebulizer every 20 minutes to a maximum of 3 doses.

Duration of action *Onset:* 5–15 minutes. *Peak effect:* 60–90 minutes. *Duration:* 6–8 hours.

Special considerations Pregnancy safety: Category C. Use with caution in patients with cardiac dysrhythmias and cardiovascular disorders.

Ondansetron Hydrochloride (Zofran)

Class Serotonin receptor antagonist; antiemetic.

Mechanism of action Blocks action of serotonin, which is a natural substance that causes nausea and vomiting.

Indications For the prevention and control of nausea or vomiting. Used in hospital for patients undergoing chemotherapy or surgical procedures.

Contraindications Known allergy to ondansetron or other 5-HT $_3$ receptor antagonists.

Adverse reactions/side effects Headache, malaise, wheezing, bronchospasm, atrial fi brillation, abnormal ECG, prolonged QT interval, ST segment depression, second-degree AV block, constipation, diarrhea, hives, skin rash.

Drug interactions Not recommended if the patient is taking apomorphine, mesoridazine, pimozide, or thioridazine.

How supplied 2 mg/mL vials.

Dosage and administration *Adult:* 4 mg IV/IM may repeat in 10 minutes. *Pediatric:* 0.1 mg/kg IV/IM.

Duration of action *Onset:* 30 minutes. *Peak effect:* 2 hours. *Duration:* 3–6 hours.

Special considerations Pregnancy safety: Category B.

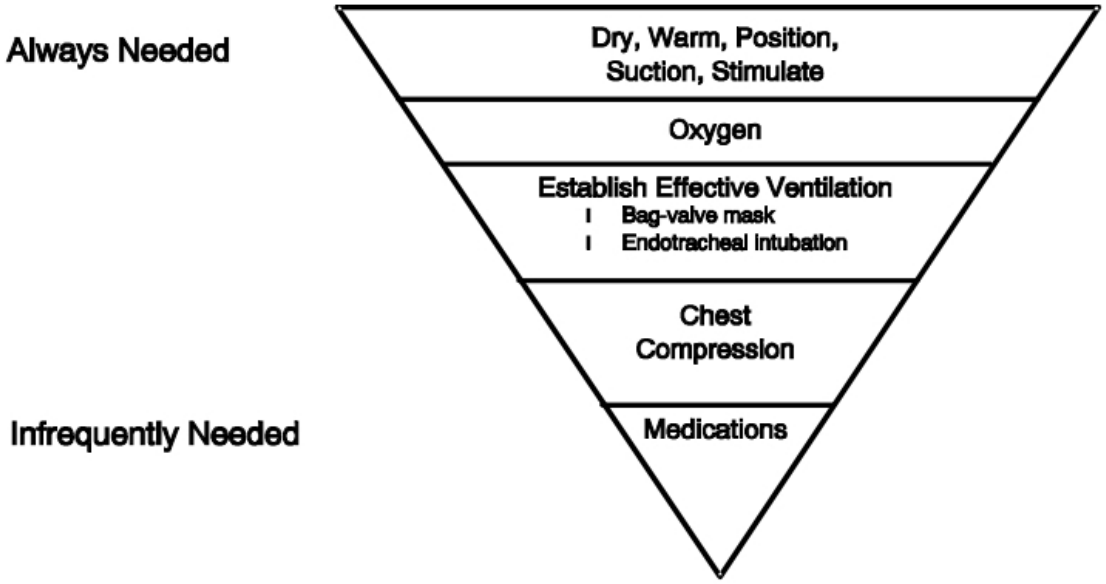
SECTION FIVE

APPENDICES

APPENDICES
APGAR

Sign	0	1	2
Appearance	Pale / Blue	Pink body, blue extremities	Pink body, pink extremities
Pulse	Absent	Less than 100	100 or greater
Grimace	No response	Grimace	Cough, sneeze
Activity	Limp	Some flexion	Action
Respiratory effort	Absent	Slow, irregular	Strong cry

Assess and Support: Temperature (warm and dry)
Airway (position and suction)
Breathing (stimulate to cry)
Circulation (heart rate and color)



Inverted pyramid reflecting relative frequencies of neonatal resuscitation efforts for the newborn who does not have meconium-stained amniotic fluid. Note that a majority of newborns reaopnd to simple measures.

APPENDICES

DOPAMINE DRIP CHART

- **Dopamine drip: 400mg in 250ml D5W: 1600mcg/ml solution.**

Weight Kg / (lbs.)	5mcg/kg/min	10mcg/kg/min	15mcg/kg/min	20mcg/kg/min
2.5 / (5.5)	-	1	1	2
2.7 / (6)	-	1	2	2
3.2 / (7)	-	1	2	2
3.6 / (8)	-	1	2	3
4 / (9)	-	1	2	3
4.5 / (10)	-	2	3	3
5 / (11)	1	2	3	4
10 / (22)	2	4	6	8
20 / (44)	4	8	11	15
30 / (66)	6	11	17	23
40 / (88)	8	15	23	30
50 / (110)	9	19	28	38
60 / (132)	11	23	34	45
70 / (154)	13	26	39	53
80 / (176)	15	30	45	60
90 / (198)	17	34	51	68
100 / (220)	19	39	56	75
110 / (242)	21	41	62	83
120 / (264)	23	45	68	90

GLASGOW COMA SCALE

ADULT					
Motor Response		**Eye Opening**		**Verbal Response**	
Obeys Commands	6	Spontaneous	4	Oriented	5
Localizes	5	To voice	3	Confused	4
Withdrawal	4	To pain	2	Inappropriate	3
Flexion	3	None	1	Incomprehensible	2
Extension	2			None	1
None	1				

CHILD					
Recommended for ages 4 year to adult					
Motor Response		**Eye Opening**		**Verbal Response**	
Obeys Commands	6	Spontaneous	4	Oriented and converses	5
Localizes	5	Verbal command	3	Disoriented and converses	4
Withdrawal	4	To pain	2	Inappropriate	3
Flexion - Withdrawal	3	No response	1	Incomprehensible	2
Flexion - Abnormal	2			None	1
None	1				

INFANT					
Recommended for birth to age 4					
Motor Response		**Eye Opening**		**Verbal Response**	
Spontaneous	6	Spontaneous	4	Smiles, oriented to sound	5
				Interacts: Appropriate	
Localized pain	5	Reaction to speech	3	Crying: Consolable	4
				Interacts: Inappropriate	
Withdrawals in response	4	Reaction to pain	2	Crying: Inconsistently consolable	3
To pain				Interacts: Restless	
Abnormal Flexion in	3	No response	1	Crying: Inconsolable	2
Response to pain				Interacts: Restless	
Abnormal extension in	2			Crying: No response	1
Response to pain				Interacts: No response	
No response	1				

APPENDICES
LEMON – Difficult Airway Evaluation

Evaluating for the difficult airway

Between 1 – 3% of patients who require endotracheal intubation have airways that make intubation difficult. Recognizing those patients who may have a difficult airway allows the Paramedic to proceed with caution and to keep as many options open as possible. It also allows the Paramedic to prepare additional equipment (such as a cricothyrotomy kit) that may not ordinarily be part of a standard airway kit. The pneumonic LEMON is useful in evaluating patients for signs that may be consistent with a difficult airway and should raise the Paramedic's index of suspicion.

Look externally

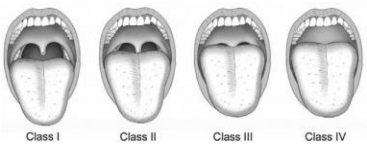
External indicators of either difficult intubation or difficult ventilation include: presence of a beard or moustache, abnormal facial shape, extreme cachexia, edentulous mouth, facial trauma, obesity, large front teeth or "buck teeth", high arching palate, receding mandible, short bull neck.

Evaluate 3-3-2 Rule

3 fingers between the patient's teeth (patient's mouth should open adequately to permit three fingers to be placed between the upper and lower teeth)
3 fingers between the tip of the jaw and the beginning of the neck (under the chin)
2 fingers between the thyroid notch and the floor of the mandible (top of the neck)

Mallampati

This scoring system is based on the work of Mallampati et al published in the Canadian Anesthesia Society Journal in 1985. The system takes into account the anatomy of the mouth and the view of various anatomical structures when the patient opens his mouth as wide as possible. This test is performed with the patient in the sitting position, the head held in a neutral position, the mouth wide open, and the tongue protruding to the maximum. Inappropriate scoring may occur if the patient is in the supine position (instead of sitting), if the patient phonates or if the patient arches his or her tongue.



Class I (easy) = visualization of the soft palate, fauces, uvula, anterior and posterior pillars.
Class II = visualization of the soft palate, fauces and uvula.
Class III = visualization of the soft palate and the base of the uvula.
Class IV (difficult) = soft palate is not visible at all.

Obstruction?

Besides the obvious difficulty if the airway is obstructed with a foreign body, the Paramedic should also consider other obstructers such as tumor, abscess, epiglottis, or expanding hematoma.

Neck Mobility

Ask the patient to place their chin on their chest and to tilt their head backward as far as possible. Obviously, this will not be possible in the immobilized trauma patient.

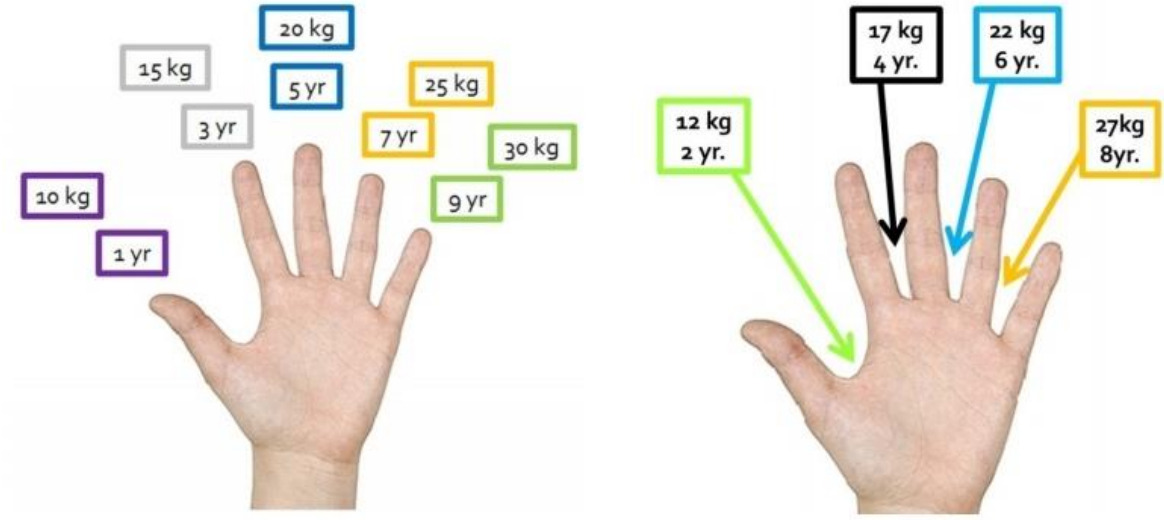
APPENDICES

PEDIATRIC / CHILDREN VITAL SIGNS

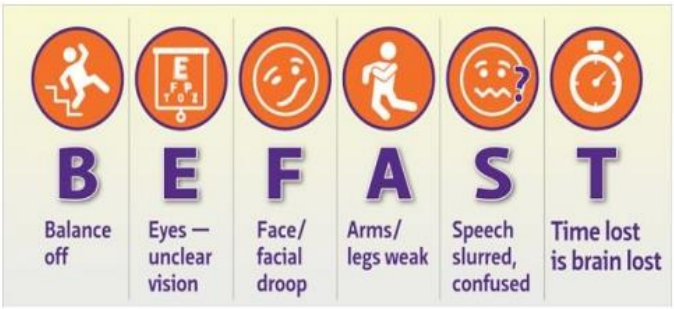
Age	Respiratory	Pulse	Weight (kg)
Preemie	40-70	120-170	2
4 months	30-60	105-160	6
6 months	24-38	110-160	8
1 year	22-30	90-150	10
2 years	22-30	85-140	12
3 years	22-30	85-140	15
4 years	22-26	75-120	17
5 years	20-24	70-115	20
6 years	20-24	70-115	22
7 years	16-22	70-110	25

APPENDICES
HANDTEVY METHOD

The 7 Handtevy Method Rules *(To determine volume to be administered)*



1. **Epinephrine (1:1000)**
   Take weight in kg, move decimal 2 places to the left
   20 kg = 0.20 mL
2. **Epinephrine (1:10,000)**
   Take weight in kg; move decimal 1 place to the left
   20 kg = 2.0 mL
3. **Amiodarone**
   Take weight in kg; move decimal 1 place to the left (Same rule as Epinephrine 1:10,000)
   20 kg = 2.0 mL
4. **Sodium Bicarbonate**
   Take weight in kg; administer exact amount in mL
   20 kg = 20 mL
5. **Dextrose 10% (max dose is 10g=100mL)**
   Take weight in kg; divide by 2. Multiply by 10 and administer amount in mL.
   10kg=50mL
6. **Fluids (NS & LR)**
   Take weight in kg; multiply by 2, then add a 0 to the end
   20 kg = 400 mL
7. **Valium**
   Uses rule based on age; administer 0.4 mL, administer for each additional year add 0.1 mL
   1 year old = 0.4 mL (this is a constant)
   4 years old = 0.7 mL (0.4 + 0.1 + 0.1 + 0.1 = 0.7) [Age + 3 x 0.1]



1. If one or more is positive, consider Stroke
2. If signs/symptoms of SAH, refer to SAH Protocol

Los Angeles Motor Scale (LAMS)

Facial Droop	Absent	0
	Present	1
Arm Drift	Absent	0
	Drifts Down	1
	Falls Rapidly	2
Grip Strength	Normal	0
	Weak Grip	1
	No Grip	2
	Total:	

3. Perform LAMS and note score

4. If patient has one sided arm weakness, perform VAN score:

Vision-blurry or field cut: **Yes: 1 No: 0** Aphasia: **Yes: 1 No: 0** Neglect-forced gaze, inability to feel bilateral or ignores one side: **Yes: 1 No: 0**

5. Add VANS score to LAMS: _____ 6. Document Time Last Seen Normal _____: _____

7. Document Rankin Score: ☐ 1-3 ☐ >3 Check Box: ☐ 0-3 hours ☐ ≥3-24 hours

If the patient is permanently bed or wheelchair confined **OR** they require constant care **OR** assistance is essential for activities of daily living ***PRIOR to today's event*** then Rankin Score is > 3. **Transport to PSC**

8. If Pt meets any exclusion criteria listed below transport to **PSC** as "Possible CVA with exclusion"

- ☐ Time last seen normal > 24 hours (excluding wake up)
- ☐ Resolution of signs and symptoms (TIA)
- ☐ Rankin Score > 3
- ☐ DNR or present terminal illness
- ☐ Unstable vital signs not readily controlled
- ☐ Dementia Patient

V-LAMS 0-5 with exclusions or no tPA contraindications:

Transport to PSC

NO TPA contraindications

V-LAMS 0-5 with no exclusions

Consider TPA Contraindications

1. S&S of hemorrhagic stroke
2. Stroke onset > 3 hours
3. Specific anticoagulants: Xarelto/Pradaxa/Coumadin/Eliquis
4. Active internal bleeding
5. Significant head injury/ Spinal or intra-cranial surgery within 3 months

V-LAMS = 6+

Transport to CSC

YES TPA contraindications

Wake up Strokes- all new acute strokes upon wakening from sleep will be transported by ground to the closest APSC or CSC. If east of Highway 27: Osceola Regional, if west of Highway 27: Lakeland Regional.

FLY or GROUND Transport to Comprehensive Stroke Center?

FLY – Only if patient is intubated with suspected ischemic stroke; otherwise ground transport.

STROKE ALERT

Date _____ Time: _____ Unit #: _____ Age: _____ Sex: ☐ Male ☐ Female

Patient's Name: _____ Incident Number: _____

Event Witness Name: _____ Cell#: _____ Home #: _____

Battalion Chief Name _____ Cell #: _____ Unit #: _____

APPENDICES
MODIFIED RANKIN SCALE (MRS)

Definition: The Modified Rankin Scale is use to measure the degree of disability or dependence in the daily activities of someone who has suffered a **previous** stroke or other cause of neurological disability. This should be used to obtain a baseline of the Pt's degree of disability or dependence **before** we were called for an acute event.

Score	Description
0	No symptoms at all
1	No significant disability despite symptoms; able to carry out all usual duties and activities
2	Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance
3	Moderate disability; requiring some help, but able to walk without assistance
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Severe disability; bedridden, incontinent and requiring constant nursing care and attention
6	Dead

TOTAL (0–6): _____

VAN Stroke Assessment Scale

Category	Description	Score
Vision	Field Cut: peripheral vision. Hold up two fingers on the left side and one on right Cross-eyed/double vision- evaluates for uneven eyes	YES: 1 NO: 0
Aphasia	Expressive: inability to speak, do not count slurring of words Receptive: not following commands: Ask pt to close eyes and make a fist.	YES: 1 NO: 0
Neglect	Forced gaze, inability to track to one side Unable to feel both sides at the same time Ignoring one side (will only look at people on right or left)	YES: 1 NO: 0

SEPSIS ALERT

Date: Unit #: Age: Sex: ☐ Male ☐ Female

Patient's Name: Incident Number:

CHECK "YES" OR "NO" FOR THE FOLLOWING

☐ YES	☐ NO	**Blood Pressure: SBP < 90 mm or DBP < 60** **OR** **Respiratory Rate: < 10 or > 20 breaths per minute** **OR** **Pulse rate : < 60 or > 90 beats per minute** **OR** **Temperature: < 97.8 or > 99.1 degrees Fahrenheit**
☐ YES	☐ NO	**The patient has 2 or more of the following SIRS variables:** _____: Temperature of > 38 C (100.4 F) or < 36 C (96.8F) _____: HR of > 90/min _____: Respiratory rate > 20/min or PaCO2 < 32 **_____: Is there currently a documented infection such as: *Pneumonia, UTI, MRSA, or is the patient at high risk such as Nursing home or Cancer patients, indwelling catheters, immune compromised, etc.***
☐ YES	☐ NO	**The patient has a Shock Index of > 1** ▪ *Shock Index = Heart Rate / Systolic BP* **---- *OR* ----** **The patient has a Modified Shock Index of < 0.7 or > 1.3** ▪ *Modified Shock Index = Heart Rate / MAP*

If any of the above is "NO" the patient is NOT a Sepsis Alert

APPENDICES

IDEAL BODY WEIGHT CHART

Height	Weight in lbs.	Weight in kg
4’10’’	119	54
4’11’’	124	56
5’0’’	128	58
5’1’’	132	60
5’2’’	137	62
5’3’’	141	64
5’4’’	146	66
5’5’’	150	68
5’6’’	155	70
5’7’’	160	72
5’8’’	164	74
5’9’’	169	76
5’10’’	174	79
5’11’’	179	81
6’0’’	184	83
6’1’’	189	85
6’2’’	195	88
6’3’’	200	90
6’4’’	205	93
6’5’’	211	95
6’6’’	216	98
6’7’’	222	100
6’8’’	230	104
6’9’’	238	108
6’10’’	246	111
6’11’’	254	115
7’0’’	262	119

APPENDICES

TOXINS AND ANTIDOTE CHART

Note: The following list is for informational purposes only and is not inclusive of all toxins. Always contact Poison Control for definitive treatment instructions.

Toxins or Overdose Indications	**Antidote**
Acetaminophen (Tylenol)	Acetylcysteine (Mucomyst™, Acetadote™)
Alpha$_2$ agonist	Atropine Sulfate
Anticoagulants, anticoagulant rodenticides, warfarin	Phytonadione (Vitamin K$_1$)
Arsenic, copper, gold, lead, and mercury	Dimercaprol
Salicylates, Aspirin (ASA)	Activated charcoal, Alkaline diuresis, Sodium Bicarbonate
Barbiturates	Alkaline diuresis
Benzodiazepine poisoning	Flumazenil (Romazicon™)
Beta blockers (Propranolol, Metoprolol, Atenolol)	3mg IVP of Glucagon and 4mg IVP Zofran
Black Widow Spiders	Latrodectus mactans antivenom
Calcium Channel Blockers (Verapamil, Diltiazem)	3mg IVP of Glucagon and 4mg IVP Zofran
Chloroquine and related antimalarial drugs	Diazepam
Chlorine gas	Sodium Bicarbonate (nebulized)
Cocaine, PCP, methamphetamine	5mg Diazepam

Toxins or Overdose Indications	Antidote
Coral Snake	Pan-American serum
Cyanide	Cyanide Antidote Kit or Cyanokit (Amyl nitrite, sodium nitrite and sodium thiosulfate), Hyperbaric oxygen
Digoxin	Digoxin Immune Fab (Digibind, Digifab)
Phenothiazine induced Extrapyramidal symptoms/dystonic reactions	50mg Diphenhydramine HCL
Ethanol, Ethylene glycol, Wernicke-Korsakoff syndrome	Thiamine
Confirmed Hyperkalemia	50mEq Sodium Bicarbonate
Heparin	Protamine
Insecticides (i.e. dichlorvos, malathion and parathion)	Atropine Sulfate
Malignant hyperthermia, neuroleptic malignant syndrome	Dantrolene (Dantrium™)
Nerve agents (i.e. Sarin, Soman, Tabun, and VX)	Atropine Sulfate, Pralidoxime chloride (2-PAM chloride)
Opiates and Clonidine	Naloxone
Organophosphates	Atropine sulfate
Pit Vipers	Cro-Fab
Serotonin Syndrome	Diazepam, Cyproheptadine HCI (Periactin)
Tricyclic antidepressants with QRS > 100ms	50mEq Sodium Bicarbonate

EMS Guide
January 2013

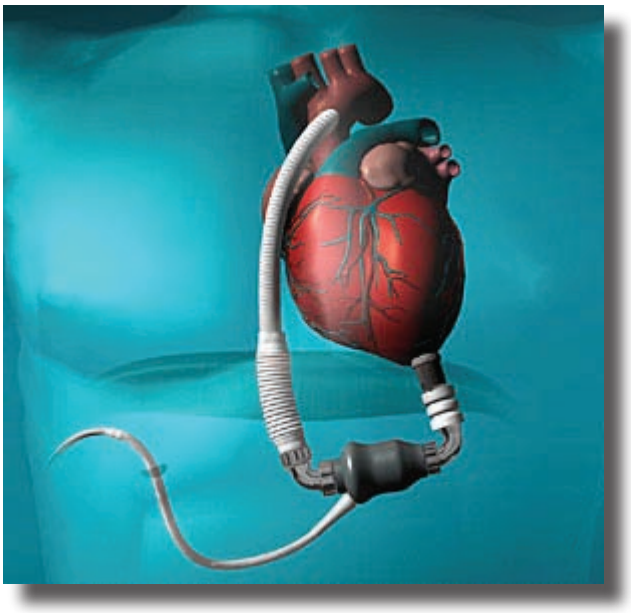
MECHANICAL
CIRCULATORY
SUPPORT
ORGANIZATION

This guide is produce by MCSO –
The Mechanical Circulatory Support Organization
It is produced by VAD Coordinators from some of the largest and most successful VAD implantation hospitals in the US. It has been vetted by experts on VADS in Air Medical Transport and EMS. It should not replace the operator manual as the primary source of information.

Questions and Answers

What is a Ventricular Assist Device (VAD)?

A ventricular assist device (VAD) is a mechanical pump that's used to support heart function and blood flow in people who have weakened hearts.



How does a VAD work?

The device takes blood from a lower chamber of the heart and helps pump it to the body and vital organs, just as a healthy heart would.

What are the parts of a VAD?

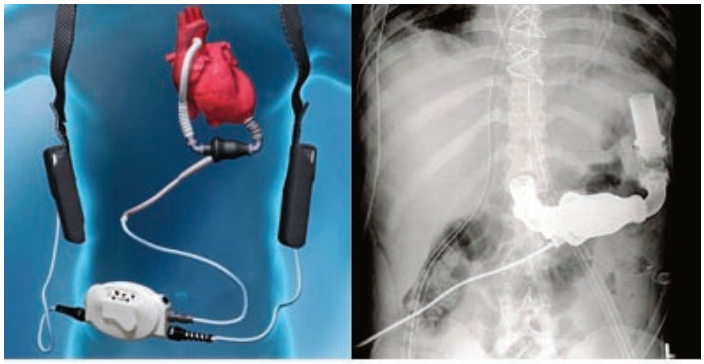
The basic parts of a VAD include: a small tube that carries blood out of your heart into a pump; another tube that carries blood from the pump to your blood vessels, which deliver the blood to your body; and a power source.

What is the power source?

The power source is either batteries or AC power. The power source is connected to a control unit that monitors the VAD's functions. The batteries are carried in a case usually located in a holster in a vest wrapped around the patients shoulders.

What does the control unit or controller do?

The control unit gives warnings, or alarms, if the power is low or if it senses that the device isn't working right. It is a computer.



The portability of the HeartMate II enables patients to resume many of their normal daily activities.

Color Coding System

MOST patients have a tag located on the controller around their waist that says what type of device it is, what institution put it in and a number to call. Most importantly is the color of the tag – it matches this EMS Field Guide and allows you to quickly locate the device you are caring for.

HEARTMATE II

HEARTWARE

JARVIK 2000

HEARTMATE XVE

THORATEC PVAD/IVAD

FREEDOM DRIVER
Total Artificial Heart

DURAHEART

1. Assess the patients airway and intervene per your protocol.

2. Auscultate Heart Sounds to determine if the device is functioning and what type of device it is. If it is continuous flow device, you should hear a "whirling sound".

3. Assess the device for any alarms.

4. Look on controller usually found around the waist of the patient and to see what color tag and device it is.

5. Match the color on the device tag to the EMS Guide.

6. Intervene appropriately based on the type of alarm, tag (device) and EMS Guide.

7. Start Large Bore IV.

8. Assess vital signs – Use Mean BP with Doppler – with the first sound you hear is the Mean Arterial Pressure (MAP).

9. If no Doppler, use the Mean on the non invasive blood pressure machine.

10. Transport to closest VAD center. Call the number on the device to get advice.

11. Bring all of the patients equipment.

12. Bring the significant other if possible to act as a expert on the device in the absence of consciousness in the patient.

HeartMate II®

1. **Can I do external CPR?**
   Only if absolutely necessary
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 2.5 lmp. Can give a bolus of normal saline and transport to an LVAD center.
4. **How can I speed up the rate of the device?**
   No, it is a fixed speed.
5. **Do I need to heparinize the patient if it slows down?**
   Usually no, but you will need to check with implanting center.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   May have weak pulse or lack of palpable pulse.
9. **What are acceptable vital sign parameters?**
   MAP 70 - 90 mm Hg with a narrow pulse pressure
10. **Can this patient be externally paced?**
    Yes.

FAQs

- May not be able to obtain cuff pressure (continuos flow pump).
- Pump connected to electric line exiting patient's abdominal area and is attached to computer which runs the pump.
- Pump does not affect EKG
- All ACLS drugs may be given.
- No hand pump is available.
- A set of black batteries last approximately 3 hours, gray batteries last 8-10 hours.
- Any emergency mode of transportation is ok. These patients are permitted to fly.
- Be sure to bring **ALL** of the patient's equipment with them.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

Trouble Shooting HeartMate II®

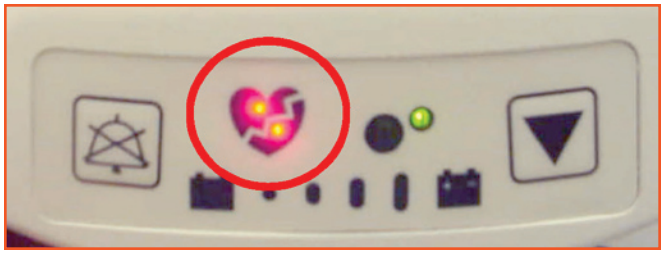
When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see changing batteries section on next page)*
- If pump does not restart, change controllers. *(see changing controllers section on next page)*

Alarms: Emergency Procedures

Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.



Trouble Shooting HeartMate II®

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 3 and 4)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 1)
- Controller will start beeping and flashing green signals.
- Replace with new battery by lining up **RED** arrows on battery and clip. (Figure 2)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.

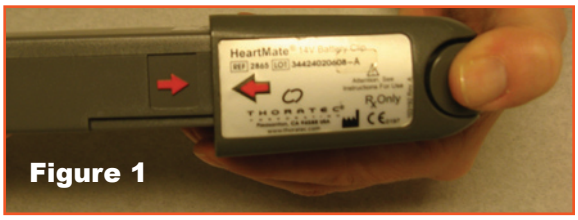


Figure 1


Figure 2

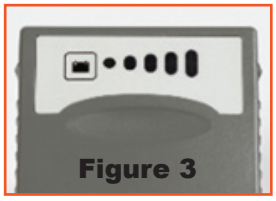


Figure 3

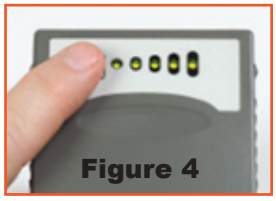
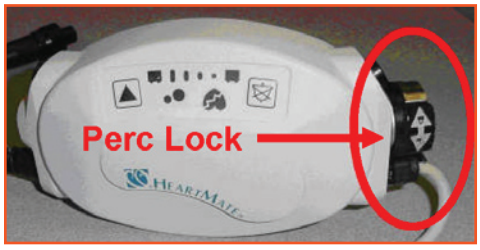


Figure 4

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the **RED** arrows. **ALARMS WILL SOUND-THIS IS OK.**

- Depress the silence alarm button (upside-down bell with circle) until the alarm is silenced on the new, replacement Controller.
- Rotate the perc lock on the replacement controller in the direction of the "unlocked" icon until the perc lock clicks into the fully- unlocked position. Repeat this same step for the original Controller until the perc lock clicks into the unlocked position.



- Disconnect the perc lead/driveline from the original controller by pressing the metal release tab on the connector socket. The pump will stop and an alarm will sound.

Note: The alarm will continue until power is removed from the original Controller. ***Getting the replacement Controller connected and the pump restarted is the first priority.***

- Connect the replacement Controller by aligning the BLACK LINES on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the powersource to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate the perc lock on the new controller in the direction of the "locked" icon until the perc lock clicks into the fully-locked position. If unable to engage perc lock to the locked position, gently push the driveline into the controller to assure a proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.

HeartWare® Ventricular Assist System

1. **Can I do external CPR?**

   Chest compressions may pose a risk of dislodgment – use clinical judgment. If chest compressions are administered, confirm function and positioning of the pump.

2. **If not, is there a "hand pump" or external device to use?**

   No.

3. **If the device slows down (low flow state), what alarms will go off?**

   The device runs at a fixed speed. If a low flow state occurs, an alarm will be heard, and the controller display will show a yellow triangle and "Low Flow – Call" message.

4. **How can I speed up the rate of the device?**

   It is not possible to adjust the pump speed in the prehospital setting. Okay to give IV fluids.

5. **Do I need to heparinize the patient if it slows down?**

   Call the accepting VAD facility for guidance.

6. **Can the patient be defibrillated while connected to the device?**

   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**

   No, defibrillate per protocol.

8. **Does the patient have a pulse with this device?**

   The patient may not have a palpable pulse. Depending on the patient's own heart function, you may be able to feel a thready pulse.

9. **What are acceptable vital sign parameters?**

   Goal Mean Arterial Pressure (MAP) is 75 to 90 mmHg. Use a Doppler as the first option to assess blood pressure. If that is not available, use a non-invasive BP (NIBP). If you are using a doppler, place the blood pressure cuff on the patient arm. As you release the pressure in the blood pressure cuff, the first sound you hear with the Doppler is the MAP.

10. **Can this patient be externally paced?**

    Yes

FAQs

- May not be able to obtain cuff pressure (continuous flow pump)
- Pump connected to electric line (driveline) exiting patient's abdominal area and is attached to computer (controller) which runs the pump.
- Pump does not affect EKG
- All ACLS drugs may be given.
- No hand pump is available. This is a rotary (continuous flow) pump with typical speed ranges of 2400 – 3200 RPMs.
- The controller draws power from one battery at a time. A fully charged battery will provide 4-6 hours of power. Both the battery and controller have status lights to indicate the amount of power remaining.
- Transport by ground to implanting facility if possible.
- Be sure to bring **ALL** of the patient's equipment with them.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

HeartWare® Ventricular Assist System Emergency Operation

CONTROLLER

BATTERY

ALARM ADAPTER

- **Used to silence the internal NO POWER ALARM.**
- **Should only be used on a controller that is NOT connected to a patient's pump.**
- **Must be inserted into the blue connector of the original controller after a controller exchange BUT before the power sources are disconnected or the NO Power alarm will sound for up to two hours.**

DRIVELINE CONNECTION

To Connect to Controller:

- Align the two red marks and push together. An audible click will be heard confirming proper connection. (Figure A)
- The Driveline Cover must completely cover the Controller's silver driveline connector to protect against static discharge. (Figure B)
- NOTE: an audible click should be heard when connecting the Driveline or Driveline extension to the controller. Failure to use the Driveline Cover may cause an Electrical Fault Alarm.

Figure A

Figure B

CONNECTING POWER TO CONTROLLER

To Connect a Charged Battery:

- Grasp the cable of the charged battery at the back end of the connector (leaving front end of connector free to rotate)
- Line up the solid white arrow on the connector with the white dot on the Controller.
- Gently push (but DO NOT twist) the battery cable into the Controller until it naturally locks into place; you should hear an audible click.
- Confirm that the battery cable is properly locked on the controller by gently pulling the cable near the controller power connector.
- DO NOT force the battery cable into the controller connector without correct alignment as it may result in damaged connectors .

TO DISCONNECT A DEPLETED BATTERY

- Make sure there is a fully charged battery available to replace the depleted one.
- Disconnect the depleted battery by turning the connector sleeve counterclockwise until it stops.
- Pull the connector straight out from the controller.

HeartWare® Ventricular Assist System Emergency Operation

STEPS TO EXCHANGE THE CONTROLLER

Step 1: Have the patient sit or lie down.

Step 2: Place the new controller within easy reach.

Step 3: Connect back-up power sources (batteries or AC Power) to the new controller.

- Confirm that the power cables are properly locked on the controller by gently pulling on the cable near the connector.
- A “Power Disconnect” alarm will activate if a second power source is not connected to the new controller within 20 seconds of controller power up
- A “VAD Stopped” alarm will activate if the pump driveline is not connected to the new controller within 10 seconds - this alarm will resolve once the pump driveline is connected

Step 4: Pull back the white driveline cover from the original controller’s silver connector.

Step 5: Disconnect the driveline from the original controller by pulling the silver connector away from the controller. Do not disconnect by pulling on the driveline cable. A “VAD Stopped” alarm may activate. Don’t panic. You can silence the alarm after restarting the pump, which is the priority.

Step 6: Connect the driveline to the new controller (align the two red marks and push together). If the “VAD Stopped” alarm was active on the new controller, it will now resolve.

Step 7: The pump should restart. Verify the pump is working (RPM, L/min, Watts).

Step 8: **IF THE PUMP DOES NOT RESTART, CALL FOR MEDICAL ASSISTANCE IMMEDIATELY.**

Step 9: Insert the Alarm Adapter into the blue connector on the original controller.

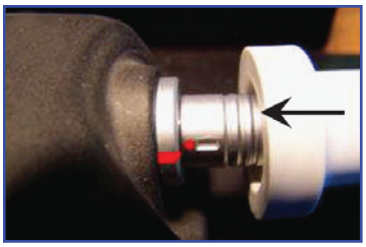
- Disconnect both power sources from the original controller.
- The controller will be turned off and all alarms silenced.

Step 10: Slide the white driveline cover up to cover new controller’s silver connector.

Step 11: Contact the VAD Center or Implanting hospital for a new backup controller.

Step 3

Step 4



Step 6

Step 9

Step 10

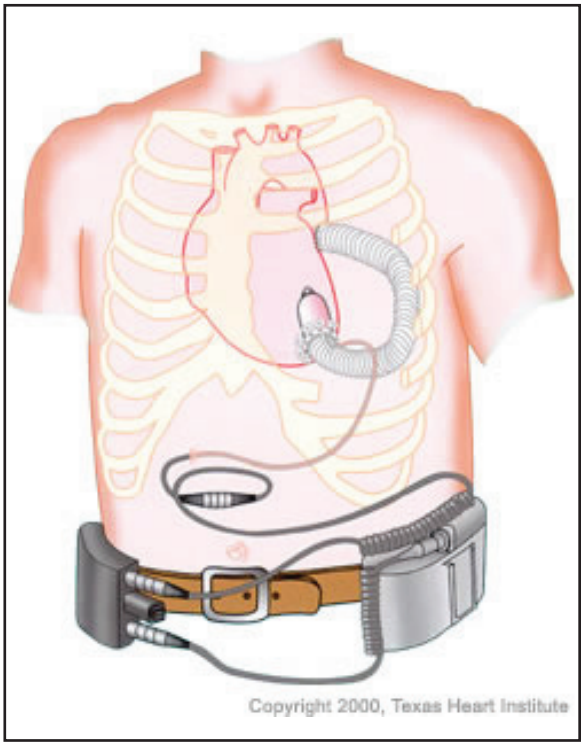
HeartWare® Ventricular Assist System Troubleshooting

ALARM TYPE	ALARM DISPLAY (Line 1)	ACTION (Line 2)
High - Critical (FLASHING RED)	VAD STOPPED	CONNECT DRIVELINE
	VAD STOPPED	CHANGE CONTROLLER
	CRITICAL BATTERY 1	REPLACE BATTERY 1
	CRITICAL BATTERY 2	REPLACE BATTERY 2
	CONTROLLER FAILED	CHANGE CONTROLLER
MEDIUM (FLASHING YELLOW)	CONTROLLER FAULT	CALL ACCEPTING VAD HOSPITAL
	CONTROLLER FAULT	CALL: ALARMS OFF
	HIGH WATTS	CALL ACCEPTING VAD HOSPITAL
	ELECTRICAL FAULT	CALL ACCEPTING VAD HOSPITAL
	LOW FLOW	CALL ACCEPTING VAD HOSPITAL
	SUCTION	CALL ACCEPTING VAD HOSPITAL
LOW (SOLID YELLOW)	LOW BATTERY 1	REPLACE BATTERY 1
	LOW BATTERY 2	REPLACE BATTERY 2
	POWER DISCONNECT	RECONNECT POWER 1
	POWER DISCONNECT	RECONNECT POWER 2

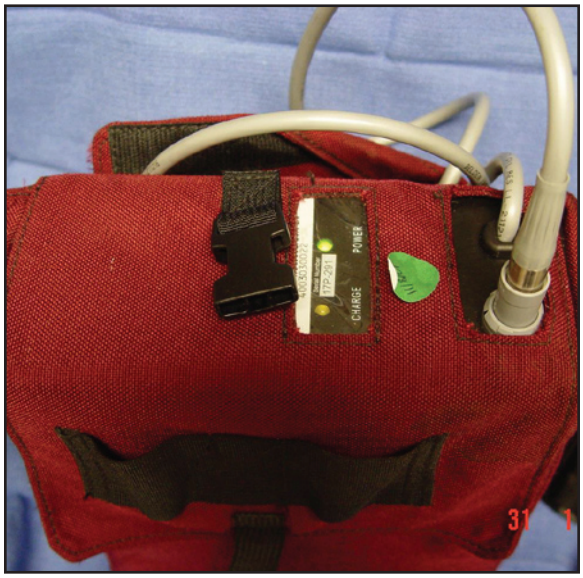
Jarvik 2000 FlowMaker®

1. **Can I do external CPR?**
   Yes.
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   The Underspeed indicator light. If the pump is stopped you will hear a steady alarm and the pump stopped symbol will light up red. This symbol is shaped like a stop sign with a bell in it.. See next page for symbols and locations. Change to a fully charged battery or change from the reserve battery to the L-ion battery.
4. **How can I speed up the rate of the device?**
   Jarvik has an indicator dial usually at a speed set at 3.
5. **Do I need to heparinize the patient if it slows down?**
   No.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   Yes. Palpable pulse depends on ventricular contractility, preload and afterload.
9. **What are acceptable vital sign parameters?**
   Jarvik suggest MAP 65 - 75mm Hg.
10. **Can this patient be externally paced?**
    Yes.

•• All ACLS medications can be administered.
•• The Li-Ion battery can provide up to 10 hours of power when fully charged.
•• When switching to the reserve battery be sure to follow the color coding of the cables



Jarvik 2000 FlowMaker® system

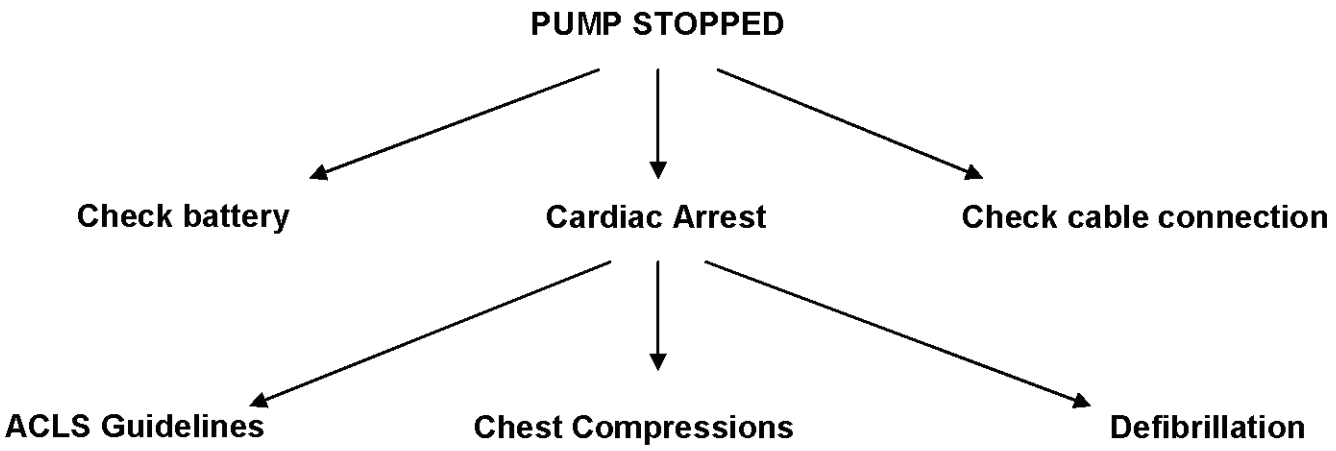


Reserve Battery Pack

Controller attached to the protable Li-ion battery.

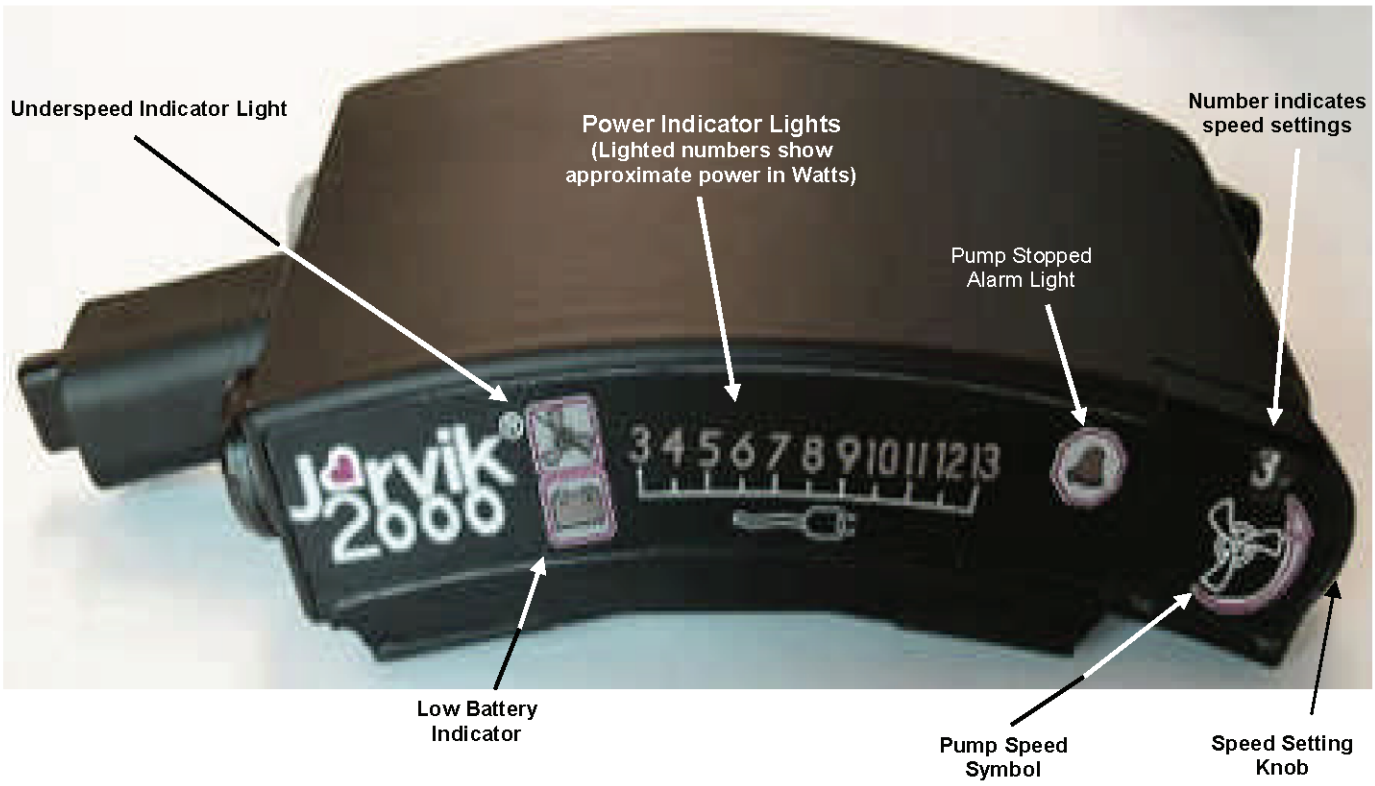
Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press. This guide does not supersede manufacturer instructions. Copy with permission only. March 2009 Jarvik 2000 FlowMaker®

Jarvik 2000 FlowMaker® Emergency Response Algorithm



If a patient does present with V-tach / V-fib, they are often conscious, but very weak and upon assessment have the classic low output signs.

Jarvik 2000 FlowMaker Controller Indicators and Troubleshooting



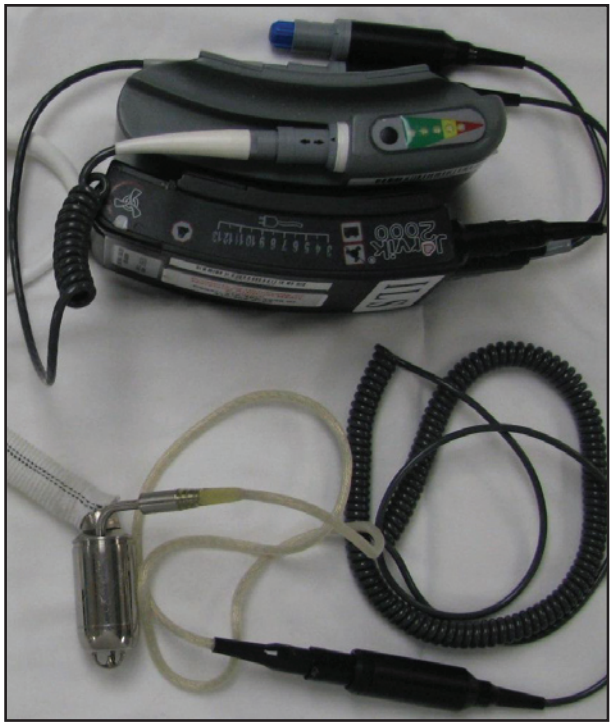
Jarvik 2000 FlowMaker®

The Jarvik 2000 runs ONLY on battery power (no AC adapter or console). Except during battery changes, only one battery is connected to the controller.

The only monitored parameters are pump power (in Watts) and pump speed (setting 1-5). Both are displayed on the controller. Normal ranges by speed are in the table to the left. Power > 1-2W above normal is concerning for pump thrombosis. (*see chart to the left*)

Dial Setting	Speed Rpm	Flow L/min	Power Watts
1	8,000	1-2	3-4
2	9,000	2-4	4-5
3	10,000	3-5	5-6-7
4	11,000	4-6	7-8-9
5	12,000	5-7	8-9-10

Two different battery types are used. The large Reserve battery will power the pump for at least 24 hrs; its charge status cannot be checked. The small Li-Ion battery will power it for 8-12 hrs; its charge status can be checked by pressing the black button on the top (1-5 lights indicate 20-100% charge; *see photo to the left*)



Controller attached to the protable Li-ion battery.

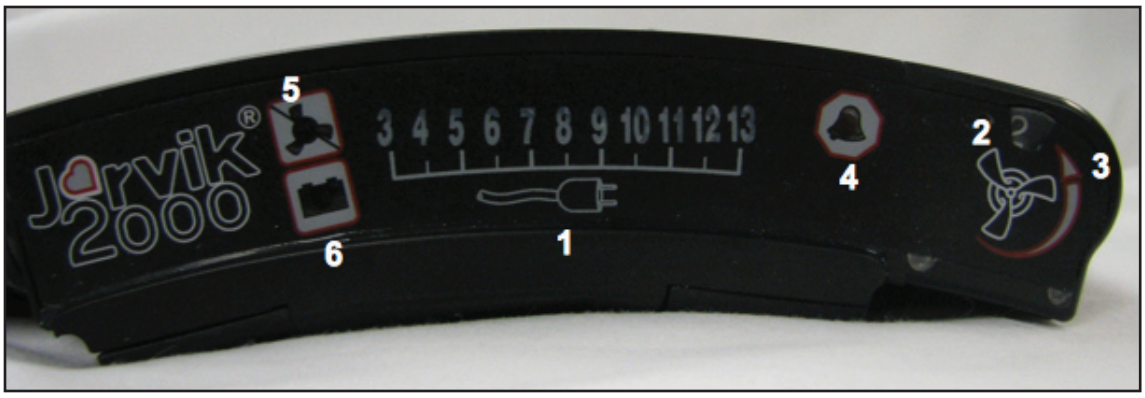
Cables are uniquely color-coded and keyed so that they cannot be mis-connected. Abdominal cable (driveline) connectors are black; power connections are gray or white.

Jarvik 2000 speed is manually adjustable via a dial on the controller. The dial reads from 1 to 5, which corresponds to 8,000 (setting 1) to 12,000 (setting 5) RPM. Most patients are on setting 3 or 4.

The ILS Controller has a white “ILS” sticker on the front. On the ILS controller, the pump speed will decrease to 7,500 RPM for 8 secs every minute. During this period the pulse pressure may widen with a decreased MAP, and the pump power will decrease to 3-4 W.

Jarvik 2000 FlowMaker Controller:

1. Pump power display
2. Speed setting display
3. Speed adjustment dial (on side of controller)
4. Pump-stop alarm indicator
5. Underspeed alert indicator
6. Low battery alarm indicator.



Jarvik 2000 FlowMaker® Controller

Jarvik 2000 FlowMaker® Troubleshooting

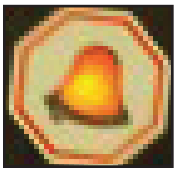
If unsure whether pump is working, listen near apex with stethoscope (should hear high-pitched buzz/hum).

A. Low Battery Alarm *(intermittent beep): 5-10 min on Li-Ion; >=15 min on Reserve.*

To change battery, remove blue/gray cap from unused Y-cable port.

Insert end of new battery cable into open port on Y-cable.

Disconnect old battery & put blue cap on open port.



B. Pump Stopped Alarm *(continuous alarm): Pump not connected or running < 5,000 RPM.*

1. Change to a fresh, fully charged battery;

2. If not resolved, check all cables for proper connection & for damage, including the portion of the abdominal cable that connects to the percutaneous lead at the patient's abdomen. If damaged cable, replace with backup (usually attached to patient's spare contoller);

3. If not resolved, change controller & all cables. Spare controller should have back-up Y-cable & abdominal cable attached to it. If not attached & pt symptomatic, do not worry about finding them.

4. Disconnect old abdominal cable (black) from percutaneous lead at patient's abdomen. Set old system, including battery, aside. It will continue to alarm.

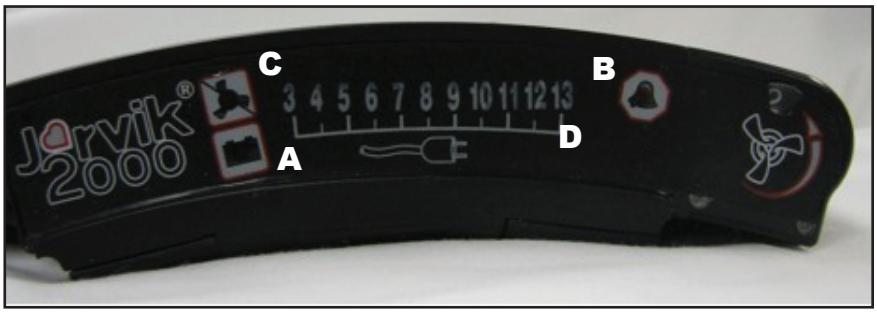
5. Connect new battery to Y-cable (gray to gray; or connect battery directly to gray port on spare controller if unable to locate spare Y-cable). New controller will begin to alarm.

6. Connect new controller's abdominal cable to percutaneous lead at abdomen, or connect percutaneous lead directly to black port on controller if unable to find spare abdo cable. New controller should cease alarming and pump power should be > 3W.

7. If controller continues to alarm, check all connections again. If unresolved, attempt to manipulate percutaneous lead & connector (may be lead damage). If still unresolved, transport emergently; contact implanting center to see if IV anticoagulation & inotropes are indicated.

C. Underspeed Alarm *(no audible alarm): pump running below set speed.*

If no other alarms are present, not an emergency. Change to a fully charged Li Ion battery. If unresolved, contact implanting center.



D. High Power Alarm

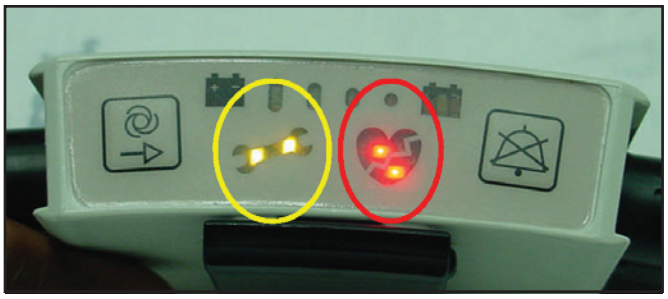
(13W light will be amber w/audible alarm): Power too high for any speed.Auscultate pump to check for operation.

Change all cables & controller as above. If unresolved, transport emergently. Contact implanting center to see if IV anticoagulation/inotropes are indicated. Most likely cause is pump thrombosis.

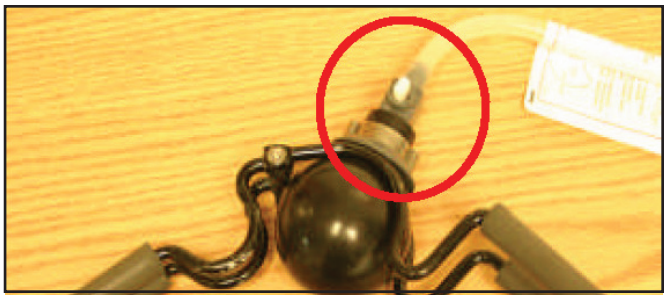
HeartMate® XVE

1. **Can I do external CPR?**
   No.
2. **If not, is there a "hand pump" or external device to use?**
   Yes. Pump at a rate of 60 -90 beats per minute.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 1.5 lpm. Check for hypovolemia or right heart failure and treat if red heart alarm persist after treatment consider performing a controller exchange.
4. **How can I speed up the rate of the device?**
   Give volume of IV fluids.
5. **Do I need to heparinize the patient if it slows down?**
   Please check with the accepting hospital.
6. **Can the patient be defibrillated while connected to the device?**
   No.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   Yes, disconnect from power/batteries first, initiate hand pumping, disconnect controller from driveline, defibrillate the patient, remove hand pump, reattach driveline to controller, and then reattach the power source.
8. **Does the patient have a pulse with this device?**
   Yes, the device produces a Pulsatile flow. Heart rate is independent of pump rate.
9. **What are acceptable vital sign parameters?**
   The BP will vary. 110/80 -140/80. If greater, call the accepting hospital.
10. **Can this patient be externally paced?**
    Yes, keep MA less than 40.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.



Heartmate XVE Controller showing Yellow Wrench & Red Heart indicator lights



Hand pump & white purge valve

HAND PUMPING PROCEDURE

Push in white purge valve

Press the black ball while holding down the white purge valve.

Release purge valve.

Count to 10, push white purge valve & black bulb should re-inflate.

HeartMate® XVE

Steps To Exchange Controller

Step 1: Place new System Controller within easy reach. Have Hand Pump nearby.

Step 2: Disconnect Power source (Batteries, PBU, or EPP) from System Controller. The System Controller will alarm and the pump will stop. (Figure 2A and Figure 2B)

Figure 2A

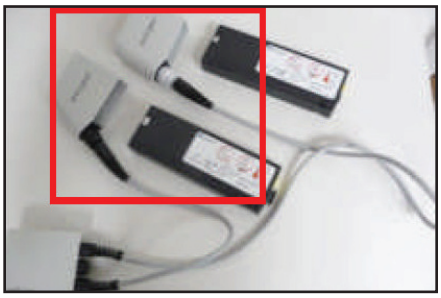


Figure 2B

Step 3: Disconnect the Driveline (coming from the patient) from the System Controller by pushing down on the black release button and gently pulling the Driveline connector out of the XVE System Controller socket. (Figure 3)

Figure 3

Step 4: Connect the Driveline to the new, replacement XVE System Controller by lining up the small black arrows on the Driveline connector and System Controller socket **FIGURE 4A.** Gently push the connector into the socket until it snaps into place **FIGURE 4B**. The new System Controller will alarm if the System Controller Battery Module is NOT in place. This is normal and should stop after the System Controller Battery Module is inserted. (Figure 4A, Figure 4B and Figure 4C)

Figure 4A

Figure 4B

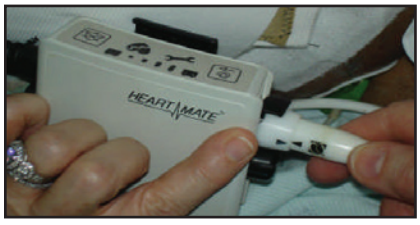


Figure 4C

Step 5: Connect the new System Controller to power source (Batteries, PBU, or EPP). Your pump will restart and alarm will stop.

Step 6: If the pump does not restart, disconnect System Controller from power source and call for medical assistance; then immediately begin hand pumping.

Figure 5

Air Transport Consideration: In rotor wing and fixed wing aircraft flying at heights lower than 10,000 feet-when using the hand pump for external CPR, you must re-purge the bulb every 2000 feet in ascent and 1000 feet in descent. This will assure you have consistent cardiac output.

Trouble Shooting HeartMate® XVE

Half Yellow Wrench
Once per second beep

- Controller inoperable
- Controller malfunction Rate control fault
- Current limit advisory

1. Check all XVE system controller connections.
2. Change vent filter, and check vent part for foreign matter.
3. Replace XVE system controller.
4. Replace the power base unit (PBU) cable.
5. Replace the PBU.
6. If the Yellow Wrench persists and the XVE LVAD remains operational, seek additional help.

Yellow Wrench
Once per second beep

- Power cable or battery is disconnected

Reconnect cable/battery or reinsert battery into battery clips

Flashing Yellow Battery
No audio tone

- XVE system controller battery module voltage low

1. Replace XVE system controller batter module.
2. Perform XVE system controller self-test to cleat alarm.

Yellow Battery
No audio tone

- Low voltage advisory **(less than 15 minutes of battery power remain)**

Change to alternate power source.

NOTE: If the XVE system controller is connected to the pecutaneous tube and all power is removed, the XVE system controller will elicit a continuous audio tone signalling the loss of power. This condition is not accompanied by a visual alarm.

Red Heart
Continuous Audio Tone

- NO OP or LOW BEAT RATE (less than 35 BPM)
- LOW STROKE VOLUME* (less than 25ML)
- LOW FLOW* (less than 1.5 LPM)

1. Check all XVE system controller connections.
2. Change vent filter, and check vent part for foreign matter.
3. Replace XVE system controller.
4. Replace the power base unit (PBU) cable.
5. Replace the PBU.
6. If the Yellow Wrench persists and the XVE LVAD remains operational, seek additional help.

Red Battery
Continuous Audio Tone

- LOW VOLTAGE **(less than 15 minutes of battery power remain)**

1. XVE LVAD will automatically to Power Saver mode (50BPM)
2. Immediately replace batteries or connect to power base unit (PBU) cable.
3. If AC or battery power is unavailable, use emergency power pack (EPP).
4. If AC power battery power and EPP are unavailable, disconnect power and initiate emergency hand pumping.

Flashing Yellow Battery, Red Heart, & Yellow Wrench
Continuous Audio Tone

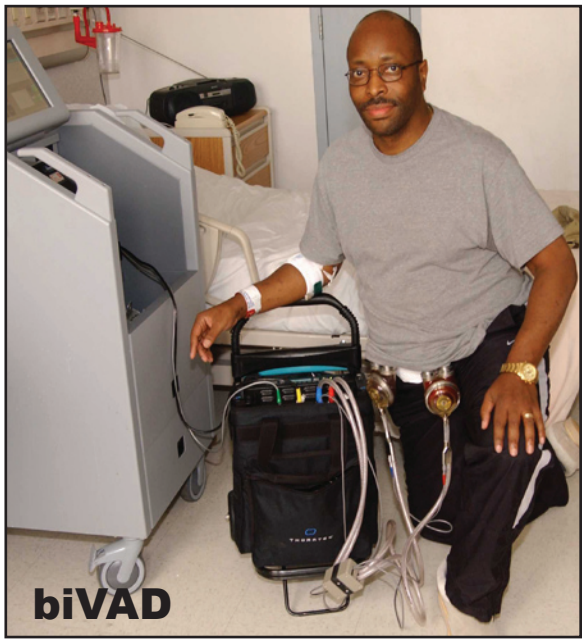
- XVE system controller disconnected from patient.

1. Check XVE system controller cable connection to XVE LVAD percutaneous tube.
2. Insure that both batteries are properly inserted into the battery clips; XVE system controller power cable are properly connected to the power base unit (PBU) Cable.
3. Ensure that PBU Cable is connected to back of PBU.
4. If condition persists, disconnect power and initiate hand pumping.
5. Seek additional help.

***NOTE: DO NOT HAND PUMP if there is blood in the vent port. Conditions that affect pump filling, such as hypertension, hypovolemia, or mechanical defects, may limit the restoration of normal pump flows until the conditions are resolved. Hand pumping may be ineffective under these conditions.**

Thoratec PVAD™ w/TLC II Driver

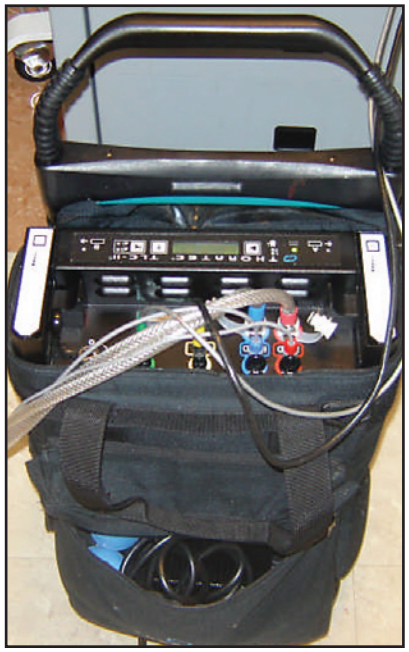
1. **Can I do external CPR?**
   No.
2. **If not, is there a "hand pump" or external device to use?**
   Yes, find the blue or red hand bulbs.
3. **If the device slows down (low flow state), what alarms will go off?**
   Low flow alarms: Loss of fill alarm will occur
4. **How can I speed up the rate of the device?**
   Give volume of IV fluids.
5. **Do I need to heparinize the patient if it slows down?**
   Only if it stops. Patient will be anticoagulated on Coumadin.
   Only hepariize if the pump stops.
6. **Can the patient be defibrillated while connected to the device?**
   Yes. Nothing needs to be disconnected. Patient should be placed on battery power BEFORE defibrillation.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No. If the defibrillation is unsuccessful, disconnect pump and continue to defibrillate.
8. **Does the patient have a pulse with this device?**
   Yes.
9. **What are acceptable vital sign parameters?**
   Normal blood pressure parameters.
10. **Can this patient be externally paced?**
    Usually in BiVAD configuration, if yes the ECG not important to treat. Because both sides of the heart are supported, there is little need to pace regardless of the rhythm seen on ECG.



IVAD is implanted inside the abd cavity and is attached to the same TLC II driver on the outside.

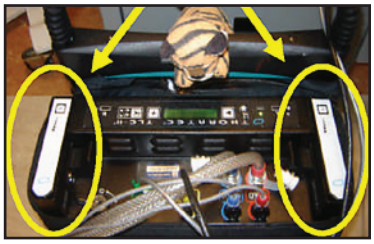
Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

- These patients have biventricular support through 2 pumps: right and left.
- EKG will NOT correlate with the patient's pulse.
- Patient may be in any arrhythmia, but because they have biventricular support — DO NOT TREAT arrhythmias. Only RVAD or LVAD patients should be treated for arrhythmias.
- Bring all extra batteries & electrical adaptor along during transport. This system is electrically driven.
- The pumps are driven by a compressor called the TLC II driver. The pneumatic hoses and cables plug into the top of the TLC II driver.
- If the Driver loses power, malfunctions, or stops, use the hand pump(s). (hand pump instructions on back of this page)
- Continue hand pumping and then, as soon as possible, replace the TLC II Driver with the backup Driver.

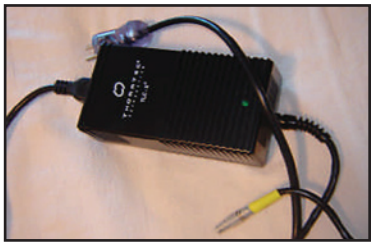


TCL-II Driver

Battery Charger



Batteries loaded into battery slots on TLC-II Driver



AC Power adapter – plug into yellow port on driver

- Backup Driver accompanies the patient at all times. (Driver replacement instructions on back of this page)
- **WARNING:** If the pump has stopped and blood is stagnant in the device for more than a few minutes (depending on the coagulation status of the patient), there is a risk of stroke or thromboembolism. BEFORE the device is restarted or hand pumping is initiated, contact the implanting center for anticoagulation direction.

PVAD/IVAD

Type of Device: pulsitile

What is an LVAD?

Left Ventricular Assist Devices are pumps surgically attached to patients' hearts to pump blood for the ventricle. There are three basic parts to all VAD systems. The pump, a computer with lamps and alarms, and a power source.

Why do patients get VADs?

Patient who have been treated for heart failure but in spite of optimal care continue to suffer from life limiting heart failure. Patients may be on the heart transplant list but the transplant team is worried the patient may die before a suitable donor is found, bridge to transplant. Pts who are not candidates for transplant but suffer from end stage heart failure may also be implanted as destination therapy.

How do VADs work?

Most vads implanted nationally create continuous flow. Blood comes from patients own ventricle into the pump then a turbine like spinning fan pushes the blood out into the aorta then the body. A cable connects the pump inside with the computer/controller and batteries outside the body. The pump needs a constant power supply.

biVAD

IVAD is implanted inside the abd cavity and is attached to the same TLC II driver on the outside.

Do's

1. Page the On Call Perfusionist. Call the Tower OR at 3316 to ask for the beeper number.
2. Give whatever medications you want. (no medication contraindication)
3. Defibrillate if indicated
4. Hand pump only if the devise has stopped pumping, left faster than right.

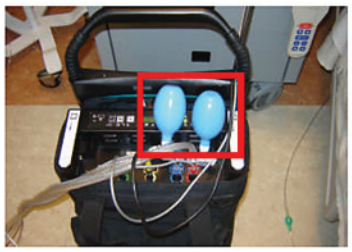
Don'ts

1. NO CHEST COMPRESSIONS.
2. NO MRI.
3. Don't panic if the ECG is at one rate. The LVAD rate is at another, and the RVAD rate is a third.

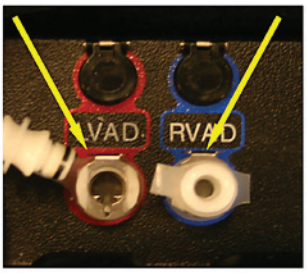
Questions:

1. CPR: NO
2. Hand pump: yes called hand bulbs
3. low flow alarms: Loss of Fill alarm
4. speed up device: fluids
5. heparin: only if it stops. Patient has to be on Coumadin
6. defib: yes
7. disconnect for defib: no
8. pulse: yes
9. Vital signs: Normal BP parameters
10. externally pace: Usually in Bi VAD configuration if yes the ECG not important to treat

Hand Pumping Instructions



Step 1: Obtain hand pump(s) from carrying case. Note: One (1) hand pump is needed for each VAD.



Step 2: Depress metal clip(s) to disconnect the pneumatic lead(s) from the TLC II Driver.

Step 3: Connect the hand pump(s) to the pneumatic lead(s).

Step 4: Squeeze hand pump(s) once per second. Use your foot if necessary.
Note: For 2 VADs (BiVADs), squeeze each hand pump at the same rate. Never hand pump the right VAD (RVAD) faster than the left VAD (LVAD), as this may cause pulmonary edema.

Switching to Backup TLC-II Driver

Step 1: Insert a fully-charged battery (stored in carrying case) into each battery slot of backup TLC-II driver.

Step 2: Turn on key switch

Step 3: Depress metal clip(s) to remove white occluder from pneumatic port(s) :

- LVAD port is **RED**.
- RVAD port is **BLUE**.
- Note: for BiVADS, switch LVAD first. Do NOT remove occluder caps from both ports at the same time (or from unused port during single VAD support), or system will depressurize.

Step 4: Disconnect pneumatic lead(s) from primary Driver (or hand pump) and connect to backup Driver.

Step 5: Disconnect electric lead(s) from primary Driver and connect to backup Driver.

Step 6: Place Driver in AUTO mode, if necessary.
Note: Backup Drivers are preprogrammed with a patient's unique settings.

Step 7: Verify full signal(s) is/are ejecting completely.

Step 8: Remove key and place in carrying case pocket.

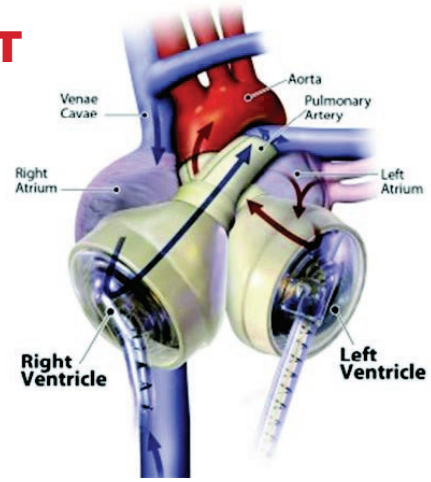
Step 9: Connect to external power, if available by using the AC power adapter cord.

All modes of emergency transport are acceptable for VAD patients.
Aviation electronics will NOT interfere with VAD operation (and vice versa).

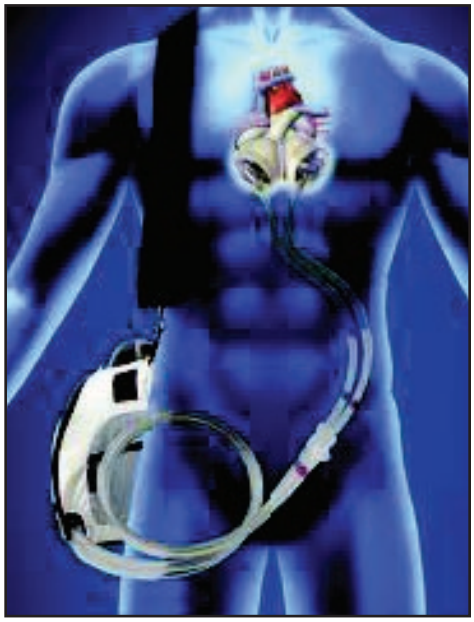
Air Transport Consideration: In rotor wing and fixed wing aircraft flying at heights lower than 10,000 feet-when using the hand pump for external CPR, you must re-purge the bulb every 2000 feet in ascent and 1000 feet in descent. This will assure you have consistent cardiac output.

Total Artificial Heart Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART
(not a left ventricular assist device-LVAD)



1. **Can I do external CPR?**
   No. Will need to rapidly exchange to the backup driver.
2. **Is there a "hand pump" or external backup device to use?**
   No.
3. **Can I give vasopressive IV drugs like epinephrine, dopamine or dobutimine?**
   Never give vasopressive drugs, especially epinephrine. These patients primarily have sysmptomatic hypertension and rarely have symptoms of hypotension. Most IV vasopressive drugs can be fatal to a TAH (Total Artificial Heart) patient.
4. **Can I speed up the rate of the device?**
   No. The device has a fixed rate between 120-140-BPM.
5. **What is the primary emergency intervention for a TAH (Total Artificial Heart)?**
   Nitroglycerin sublingual for symptomatic hypertension.
6. **Can the patient be defibrillated or externally paced while connected to the device?**
   No. There is no heart.
7. **What if the patient is symptomatic and the Freedom Driver is alarming with a continuous alarm and the red light ?**
   If the pump has failed or a line is disconnected or kinked, the patient may pass out within 30 seconds. Even when alarming, the device should continue to pump. When in doubt, immediately change out he Freedom™ Driver immediately. Then quickly check for loose or kinked connections.
8. **Does the patient have a pulse with this device?**
   Yes. The device produces Pulsatile flow. The device is pneumatically driven and is normally loud.
9. **What are acceptable vital sign parameters?**
   The BP will vary. Normal range 100-130 systolic and 60-90 diastolic.
10. **What kind of Cardiac rhythm should be displayed?**
    Asystole.

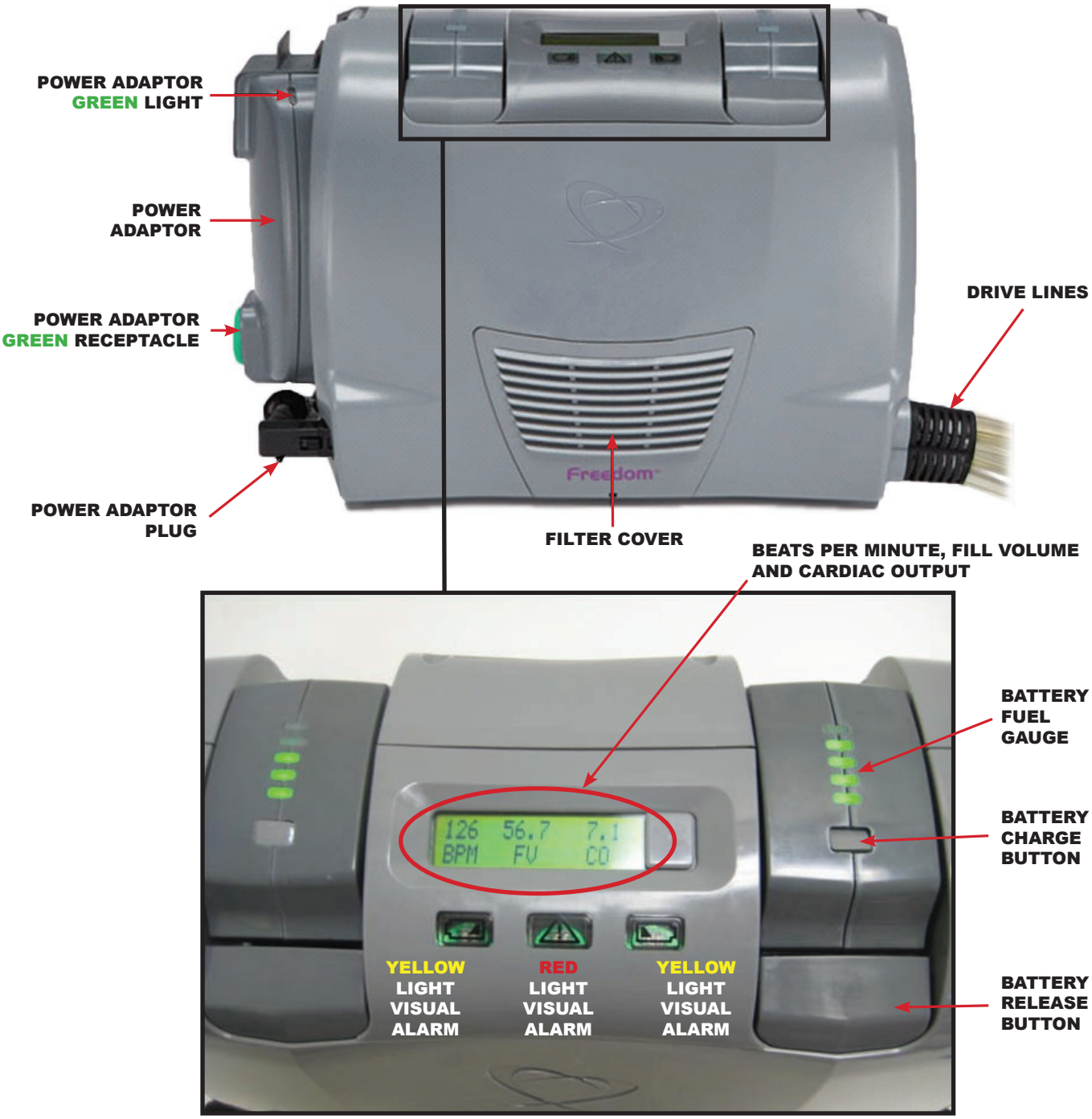


"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

Trouble Shooting Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART

(not a left ventricular assist device -LVAD)



Freedom™ Driver System

IN THE EVENT OF AN EMERGENCY

Immediately notify VAD coordinator listed on the medical alert bracelet or tag attached to the console - please identify the device as a total artificial heart.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

HOW TO RESPOND TO FREEDOM™ DRIVER ALARMS

There is no way to mute an Alarm.

ALARM	HEAR	SEE	MEANING	WHAT YOU SHOULD DO
Battery Alarm	Loud Intermittent Tone	Yellow Battery LED Flashing	One or both of the Onboard Batteries have less than 35% remaining charge (only two green lights display on the Battery Fuel Gauge).	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power (NOTE: Once the batteries are charged above 35% the Battery Alarm will stop) .
			Onboard Battery is incorrectly installed.	Reinsert Onboard Battery until locked in place. If Battery Alarm continues, insert a new Onboard Battery.
			One Onboard Battery missing.	Insert charged Onboard Battery into Freedom™ Driver until locked in place.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The temperature of the Driver is too hot or too cold.	Remove any objects that are blocking the Filter Cover and/or Fan and check the filter.
			The internal temperature of the Driver is too hot.	Move the Freedom Driver to a cooler or warmer area.
Fault Alarm	Loud Continuous Tone	Red Alarm LED Solid	Valsalva Maneuver: Strenuous coughing or laughing, vomiting, straining during a bowel movement, or lifting a heavy weight.	Relax/interrupt Valsalva Maneuver.
			Kinked or disconnected drive lines.	Straighten or connect drive lines.
			Driver is connected to External Power without at least one correctly inserted Onboard Battery.	Insert a charged Onboard Battery into the Freedom™ Driver until locked into place.
			One or both of the Onboard Batteries have less than 30% remaining charge.	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power. (NOTE: the Fault Alarm will continue and will change into a Battery Alarm as the Onboard Batteries recharge. Once the Onboard Batteries are charged above 35%, the Battery Alarm will stop.)
			Malfunction of the Driver	If the steps above do not stop the Fault Alarm, switch to Backup Freedom Driver. Return to implant hospital.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The internal temperature of the Driver is too hot.	Remove any objects that are blocking the Filter Cover and / or Fan and check filter.
			The temperature of the Onboard Batteries is too hot or too cold.	Move the Freedom Driver to a cooler or warmer area.

You must immediately address the issue that caused the Alarm.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

Switching from Primary to Backup Freedom™ Driver

CAUTION: It is recommended to have TWO people exchange the primary Freedom Driver for the backup Freedom Driver. Make sure all items and accessories are closely available before attempting to exchange Drivers.

Setting up the Backup Freedom™ Driver

1. Remove the drive line caps from the ends of the Drive lines.
2. Insert one charged Onboard Battery. The driver will immediately start pumping. (*Figure 1*)
3. Remove the Orange Dummy Battery. (*Figure 1*)
4. Insert the second charged Onboard Battery. (*Figure 2*)
5. If possible, connect the backup Driver into a wall power outlet.
6. Your Freedom™ Driver is now ready to connec to the patient.

FIGURE 1

FIGURE 2

BEATS PER MINUTE, FILL VOLUME AND CARDIAC OUTPUT

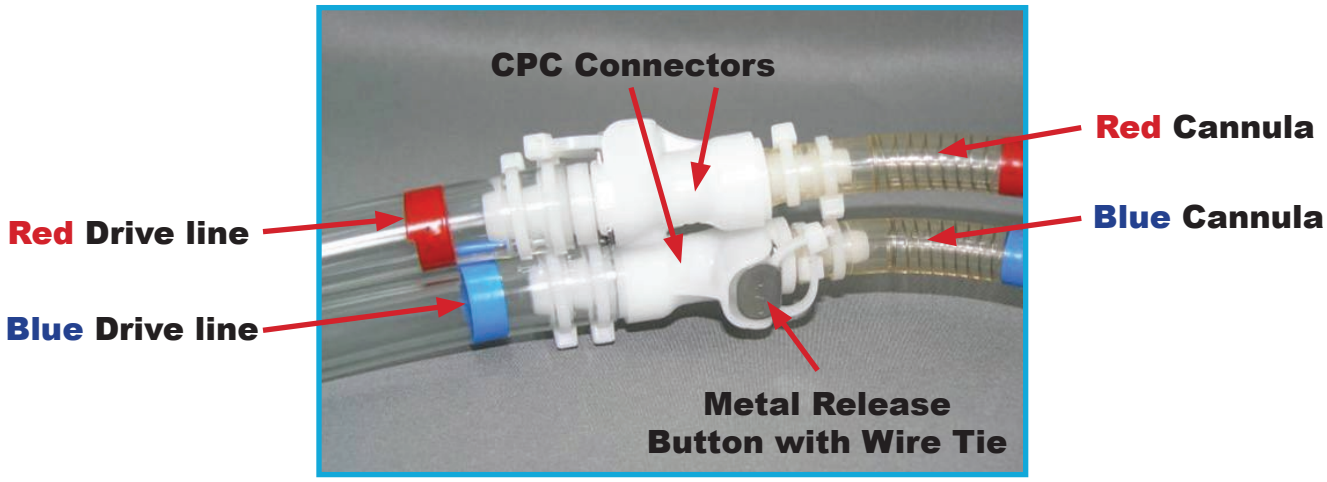
FIGURE 3

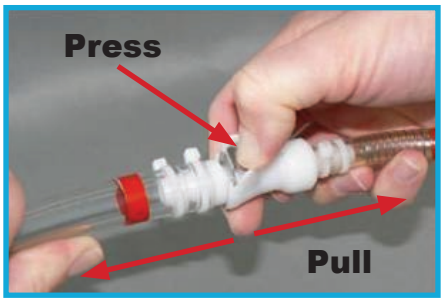
Continued on next page.

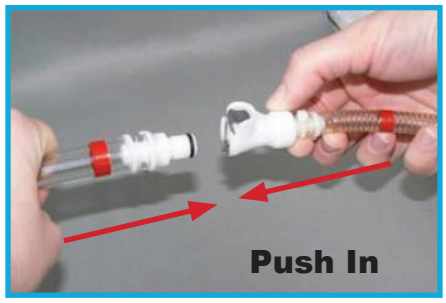
"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

Switching from Primary to Backup Freedom™ Driver

Continued on from previous page







1. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the RED TAH-t Cannula to the RED Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.
2. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the BLUE TAH-t Cannula to the BLUE Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.

CAUTION: Before disconnecting the Drive lines of the primary Freedom Driver, you must have the Drive lines of the backup Freedom Driver within reach. The backup Driver must be turned on. Perform steps 3 and 4 simultaneously.

3. Disconnect the RED Cannula from the RED Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the RED Cannula away from the RED Drive line.
   - Immediately insert the RED Cannula into the new RED Drive line from the backup Freedom Drive Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
4. Simultaneously disconnect the BLUE Cannula from the BLUE Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the BLUE Cannula away from the BLUE Drive line.
   - Immediately insert the BLUE Cannula into the new BLUE Drive line from the backup Freedom Driver.
   - Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
5. Slide a Wire Tie under the metal release button of each CPC connector. Create a loose loop in the tie, taking care not to depress and disconnect the connectors. Cut off the excess length of both Wire Ties.
6. Patient must notify Hospital Contact Person of the switch.
7. The Hospital should notify SynCardia Systems that the Driver has been switched and return the faulty Driver.

DuraHeart™ System®

1. **Can I do external CPR?**
   - Only if necessary; treat per physician discretion.
   - Closed chest CPR is contraindicated
   - May be performed as needed at the discretion of the attending physician
   - External chest compressions may cause the dislocation/damage of pump Inflow/Outflow conduits
   - External defibrillation any be performed on a patient with the DuraHeart™ System® without disconnecting any of the system components

2. **If not, is there a "hand pump" or external device to use?**
   No.

3. **If the device slows down (low flow state), what alarms will go off?**
   An emergency alarm will sound and the emergency alarm indicator (RED LIGHT) will light up.

4. **How can I speed up the rate of the device?**
   The rate of the device can only be modified in a hospital setting. For low flow rates, check for hypovolemia or RHF and treat accordingly.

5. **Do I need to heparinize the patient if it slows down?**
   Call the accepting VAD facility for guidance.

6. **Can the patient be defibrillated while connected to the device?**
   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No, defibrillate per protocol.

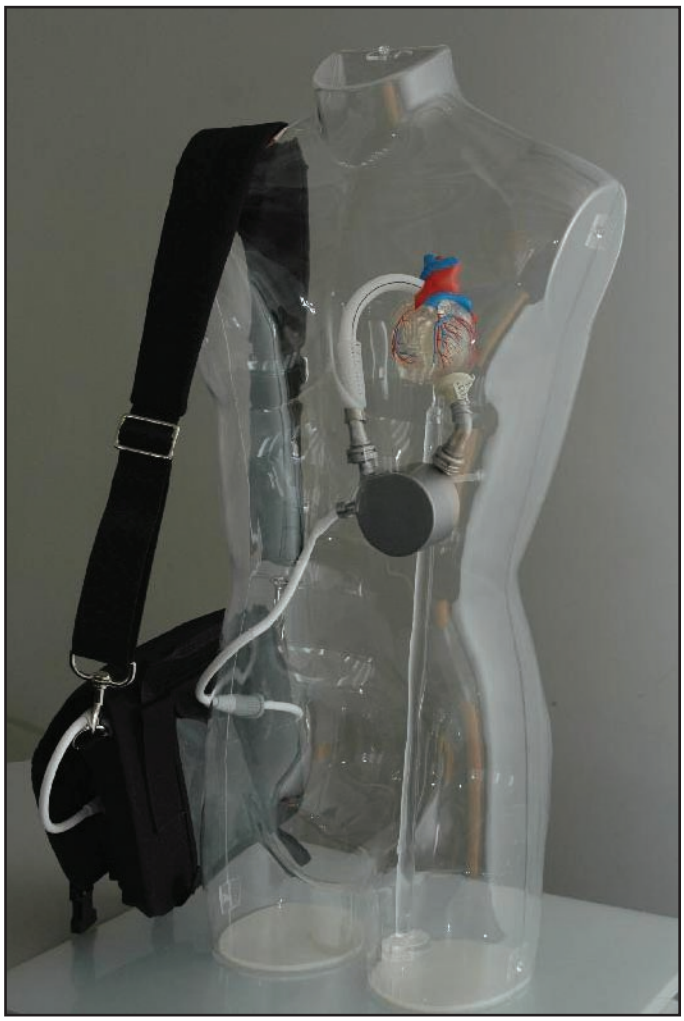
8. **Does the patient have a pulse with this device?**
   If the patient's own heart has some residual function, you may be able to feel a pulse.

9. **What are acceptable vital sign parameters?**
   Mean Arterial Pressure (MAP) 80-90 mm Hg.

10. **Can this patient be externally paced?**
    Yes, as needed.

DuraHeart™ System®

The DuraHeart™ LVAS is the latest-generation rotary blood pump designed for long-term patient support. The system incorporates a centrifugal flow rotary pump with an active magnetically levitated impeller featuring three position sensors and magnetic coils that optimize blood flow. The impeller's magnetic levitation is designed to eliminate friction by allowing a wide gap between blood contacting surface areas, enabling blood to flow through the pump unimpeded in a smooth non-turbulent fashion.



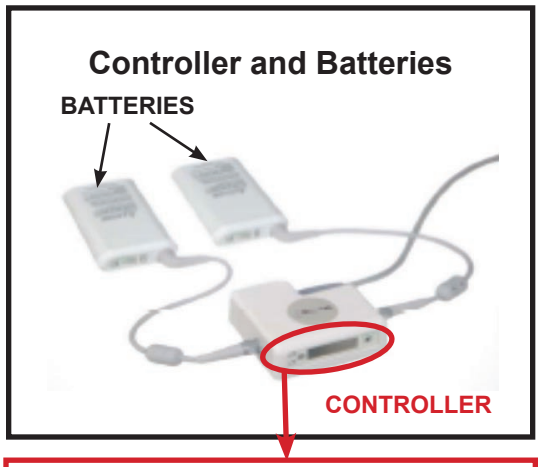
The DuraHeart™ System consists of an implantable Pump and several components that support the function of the Pump. The system is made up of seven main components (see photo below) which include:

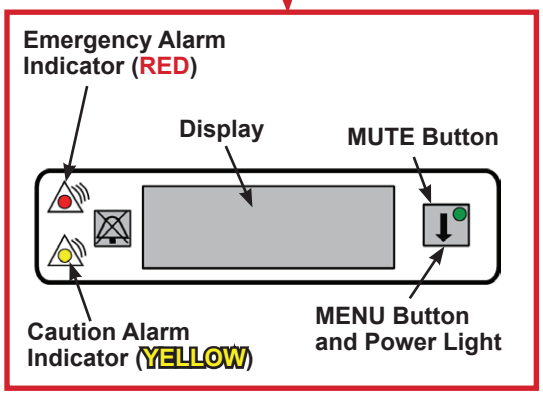
External Batteries
Li-ion batteries provide power tot the pum for untethered operation for up to 3-1/2 hours per battery. Each battery can be recharged up to 200 times.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010

DuraHeart™ System®

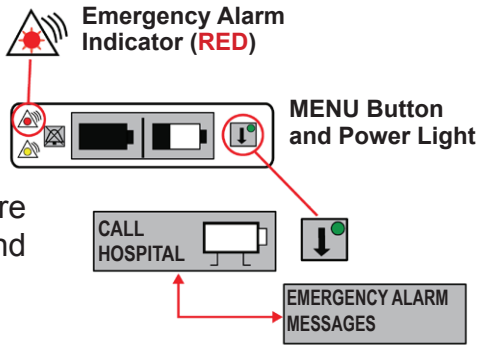
CONTROLLER





- Communicates with console for system set up, monitoring and troubleshooting
- Controls and monitors pump function, stores system data
- Interfaces with external power sources (Console, Batteries, Charger , Emergency Backup Battery)
- Displays system status – Pump Flow Rate
  – Pump Rate
  – Motor Current
  – System alarms and Alerts
  – Power Supply Status

- **Emergency Alarms**
  - High Priority.
  - Flashing **RED** light and continuous Emergency Alarm tone.
  - Requires immediate care by medical specialist and controller exchange.



EMERGENCY ALARMS

ALARM MESSAGE	PROBLEM
Replace Controller	The Pump may not be rotating
Connect Pump cable/Pump disconnected	The Pump cable is disconnected
Controller Error	Possible serious problem with the controller
Pump Failure	Pump motor may have serious problem
Mag-Failure	The impeller may not be levitated

SILENCING ALARMS

Emergency Alarms

- Mute button silences audible alarm for 2 minutes
- Audible alarm returns after 2 minutes

Caution Alerts

- Mute button silences audible alarm for 5

ANTICOAGULATION

Patients will be on Coumadin with this deviceTarget INR range should be between 2.0 to 3.0
Combination antiplatelet therapy of ASA 81mg daily and Persantine 25-75 mg TID

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

ZOLL LifeVest®

Questions & Answers

1. What is a LifeVest?
The LifeVest wearable defibrillator is worn by patients at risk for sudden cardiac arrest (SCA), providing protection during their changing condition and while permanent SCA risk has not been established.

2. What does the "Respond" message mean?
Before delivering a treatment shock, the LifeVest tests to see if a patient is conscious by providing the patient an opportunity to press and hold the response buttons to prevent a treatment shock. It is important that only the patient press and hold the response buttons.

3. What if the patient has Blue™ gel on their skin?
The LifeVest therapy pads release a Blue™ gel prior to a treatment shock to both improve shock conduction and mitigate burning. The gel should remain on the patient as long as the patient is wearing the LifeVest in case additional treatment shocks are required. If you choose to remove the LifeVest from the patient and monitor the patient with external equipment, the gel can be removed with water.

4. How long does it take for the LifeVest to treat a ventricular arrhythmia?
After the LifeVest detects a treatable arrhythmia, the time to treatment will be between 25 and 60 seconds depending on the type and rate of the arrhythmia and whether the patient presses the response buttons.

5. Can emergency personnel get shocked by the LifeVest?
Yes. No one should touch the patient while a shock is delivered. The LifeVest will warn bystanders with both a siren alert and a voice command stating "electrical shock possible, do not touch patient," or "bystanders do not interfere" before a shock is delivered.

6. Can emergency personnel use external defibrillation while the patient is wearing a LifeVest?
The monitor should be disconnected from the electrode belt prior to delivering an external defibrillation shock. The garment and belt do not need to be removed.

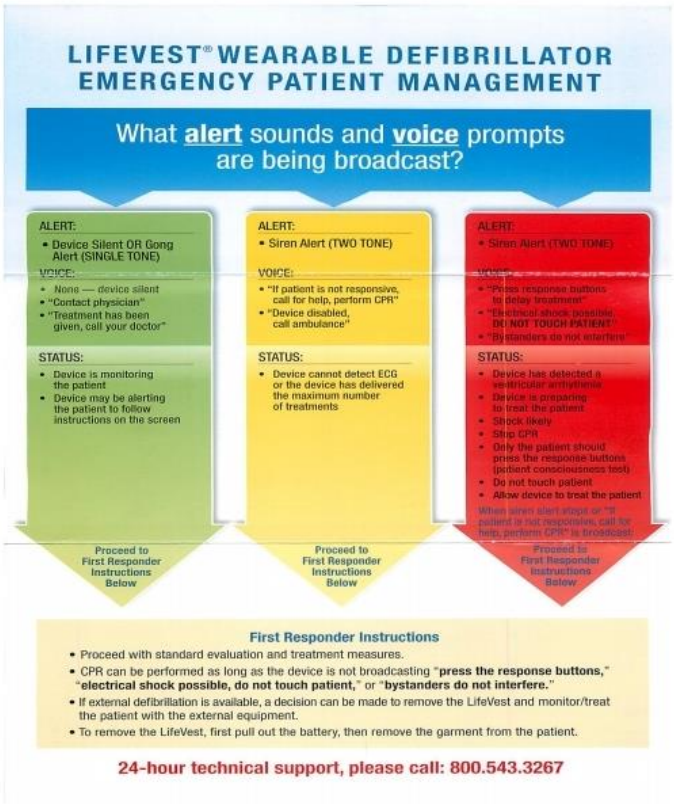
7. What if the patient describes or feels a vibration coming from the garment?
The vibrations, along with the alerts and voice prompts, are part of the LifeVest consciousness test, which requires the patient to press and hold the response buttons to avoid a shock. It is important that only the patient press and hold the response buttons.

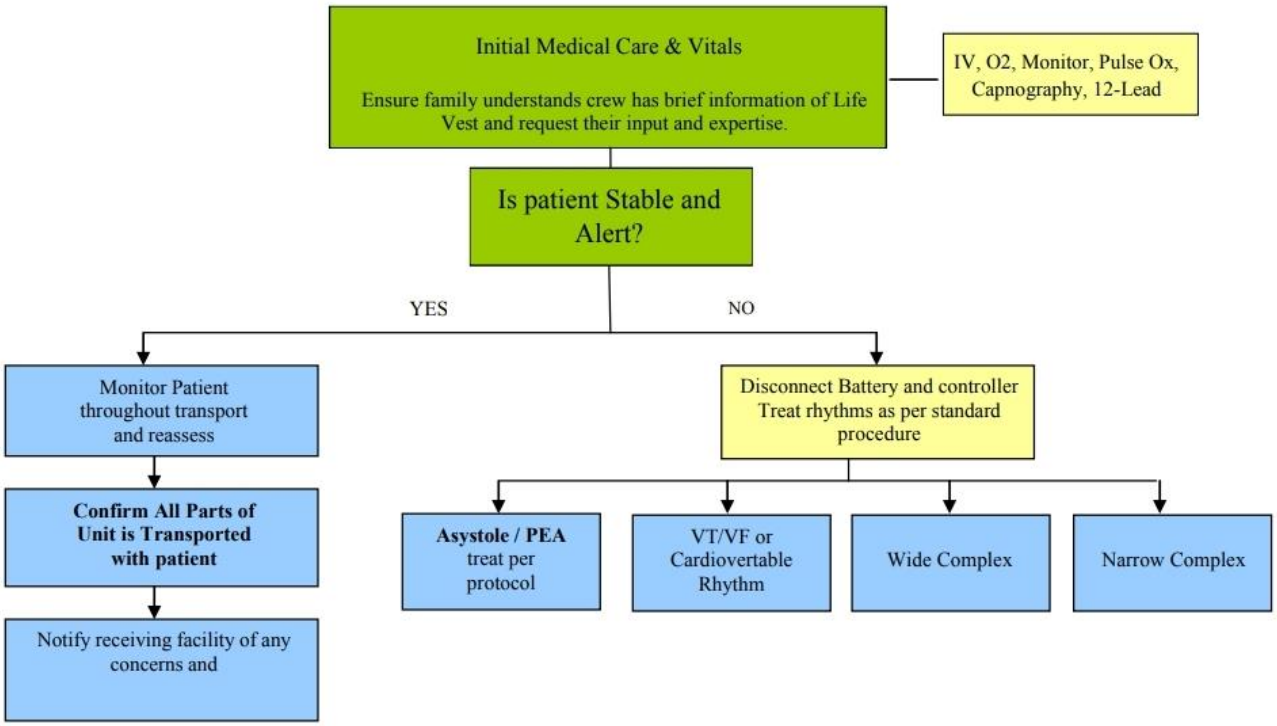
8. What LifeVest items should the patient bring with them to the hospital?
If possible, the patient should bring the LifeVest, modem, charger, and extra battery to the hospital. This will allow the patient to download any stored event data from the monitor and charge the battery as required.

24-hour technical support, please call: 800.543.3267

ZOLL • Pittsburgh, PA 15238
p 800.543.3267 • f 866.567.7615 • www.zoll.com

20C0062 Rev E


LIFEVEST® WEARABLE DEFIBRILLATOR
EMERGENCY PATIENT MANAGEMENT
What alert sounds and voice prompts are being broadcast?
ALERT:
• Device Silent OR Gong Alert (SINGLE TONE)
VOICE:
• None — device silent
• "Contact physician"
• "Treatment has been given, call your doctor"
STATUS:
• Device is monitoring the patient
• Device may be alerting the patient to follow instructions on the screen
Proceed to First Responder Instructions Below
ALERT:
• Siren Alert (TWO TONE)
VOICE:
• "If patient is not responsive, call for help, perform CPR"
• "Device disabled, call ambulance"
STATUS:
• Device cannot detect ECG or the device has delivered the maximum number of treatments
Proceed to First Responder Instructions Below
ALERT:
• Siren Alert (TWO TONE)
VOICE:
• "Press response buttons to delay treatment"
• "Electrical shock possible, DO NOT TOUCH PATIENT"
• "Bystanders do not interfere"
STATUS:
• Device has detected a ventricular arrhythmia
• Device is preparing to treat the patient
• Shock likely
• Stop CPR
• Only the patient should press the response buttons (patient consciousness test)
• Do not touch patient
• Allow device to treat the patient
When siren alert stops or "If patient is not responsive, call for help, perform CPR" is broadcast:
Proceed to First Responder Instructions Below
First Responder Instructions
• Proceed with standard evaluation and treatment measures.
• CPR can be performed as long as the device is not broadcasting "press the response buttons," "electrical shock possible, do not touch patient," or "bystanders do not interfere."
• If external defibrillation is available, a decision can be made to remove the LifeVest and monitor/treat the patient with the external equipment.
• To remove the LifeVest, first pull out the battery, then remove the garment from the patient.
24-hour technical support, please call: 800.543.3267


Initial Medical Care & Vitals
Ensure family understands crew has brief information of Life Vest and request their input and expertise.
IV, O2, Monitor, Pulse Ox, Capnography, 12-Lead
Is patient Stable and Alert?
YES
NO
Monitor Patient throughout transport and reassess
Confirm All Parts of Unit is Transported with patient
Notify receiving facility of any concerns and
Disconnect Battery and controller Treat rhythms as per standard procedure
Asystole / PEA treat per protocol
VT/VF or Cardiovertable Rhythm
Wide Complex
Narrow Complex

Cardiac Arrest Management

ALL CARDIAC ARREST PT'S SHOULD BE WORKED ON SCENE A MINIUMUM OF 10 MIN PRIOR TOTRANSPORT

- If arrest is > 4 min complete one cycle (2 min) of CPR prior to assessing rhythm. The Pt is most likely in the circulatory phase of arrest and will respond better to treatments once blood is circulated.
- If arrest is ≤ 4 min or witnessed by rescuer, assess rhythm prior to CPR and defibrillate (200J) if Pt is in shockable rhythm.
- Airway management for all cardiac arrest Pt's should begin with passive oxygen delivered via NRBM at 10 lpm with a nasal or oral adjunct.
- Compressions should be delivered at a rate of 120 per min and at a depth of at least 2 inches.
- If vascular access is apparent, one IV attempt is acceptable, otherwise initiate humeral IO.
- Reassess rhythm every 2 minutes. Remember that the rescuer performing compressions should be rotated every 4 minutes, and compressions should never stop for more than 10 seconds.

V-Tach / V-Fib	Asystole / PEA
Defibrillate at 200J when shockable rhythm is detected.	After IV/IO access has been obtained and first round of Epinephrine administered, place iGel without interrupting chest compressions and begin delivery of asynchronous ventilations 1 breath/10 seconds after confirming placement.
After IV/IO access has been obtained and first round of Epinephrine administered, place iGel without interrupting chest compressions and begin delivery of asynchronous ventilations 1 breath/10 seconds after confirming placement.	Administer Epinephrine every 3-5 minutes while these rhythms persist.
Administer Epinephrine every 3-5 minutes while these rhythms persist.	Consider all correctable causes and treat accordingly.
Antiarrhythmics such as Amiodarone and Magnesium Sulfate will be administered when appropriate according to protocol.	
Double Sequential Defibrillation is to be utilized for the fourth and subsequent shocks while these rhythms persist.	

IF trauma Pt deteriorates into cardiac arrest that is witnessed by EMS personnel: (1) Start CPR or apply mechanical chest compression device (if available). (2) Perform bilateral needle decompression of chest cavity and intubate. (3) Transport all traumatic cardiac arrest Pt's to closest IRF or terminate efforts upon EKG of Asystole and Capnography < 10 for greater than 20 min.

Common Anticoagulants, Antiplatelets, and Phosphodiesterase Inhibitors

Blood thinners:

Warfarin (Coumadin)
Dabigatran (Pradaxa)
Rivaroxaban (Xarelto)
Apixaban (Eliquis)
Edoxaban (Savaysa)
Enoxaparin (Lovenox)
Dalteparin (Fragmin)
Clopidogrel (Plavix)
Aspirin/Dipyridamole (Aggrenox)
Cilostazol (Pletal)
Dipyridamole (Persantine)
Ticagrelor (Brilinta)
Prasugrel (Effient)

Phosphodiesterase Inhibitors:

Sildenafil (Viagra, Revatio) -may be used for pulmonary hypertension
Tadalafil (Cialis, Adcirca) -may be used for pulmonary hypertension
Avanafil (Stendra)
Vardenafil (Levitra, Staxyn)
Flibanserin (Addyi) -prescribed to females