PROTOCOLS

This manual is divided into the following sections: Introduction, Adult, Pediatric, Procedures, and a Medication reference. Each treatment protocol defines the required assessments, required treatments, and any available treatment options the In Charge Paramedic (ICP) will use in handling each particular situation.

GENERAL STATEMENT

The following protocols are meant to serve as general guidelines in patient care. It is impossible to outline treatment sequences for every situation you will run across. Each patient should be treated individually and appropriately, utilizing sound judgment, along with the protocols as general guidelines. The receiving hospital should be notified as soon as possible; however, this should not interfere with patient care. Each patient chart should be thoroughly documented.

GENERAL RULES FOR FOLLOWING PROTOCOL

1. If a dysrhythmia is to be treated, do so in the following order:
   - First: Treat Rate
   - Second: Treat Rhythm
   - Third: Treat Blood Pressure
   
   **NOTE:** If low blood pressure and dysrhythmia are due to low intravascular volume without uncontrollable hemorrhage, Normal Saline infusion (rapid) may be used first.

2. If a patient converts to another treatable rhythm after an intervention, refer to that appropriate protocol.

3. The antiarrhythmic medication that initially converts a lethal dysrhythmia is the medication you should start with if the patient converts back to that lethal dysrhythmia.

4. Protocols may overlap with one another.

5. When a patient changes from one algorithm to another algorithm, do not administer more than the maximum total dose of a medication.

6. Some protocols and drug dosage ranges are taught as absolutes. However, sound medical judgement, based on the individual patient, must also be used.
STANDARD OF CARE STATEMENT

Clinical competence and high standards are vital functions in providing quality prehospital emergency medical care to the customers who rely on our services. The treatment protocols represent the minimum level of patient care that is to be provided upon request for service. Cypress Creek EMS will always provide the highest quality of care that has come to be expected by the people to which we provide service.

CCEMS embraces, as fundamental components of its standard of care, the following concepts:

♦ The emergent patient benefits from early medical interventions, especially the early and aggressive application of airway establishment and maintenance, early administration of oxygen, early protection of the cervical spine, and early initiation of definitive therapies.

♦ The patient defines the emergency. As EMS personnel, we are often called upon to assist with social or psychological problems and we must respond as professionally and thoroughly to these as we do for medical or surgical problems.

♦ Our role as EMS personnel is to act as the eyes, ears, and hands of the physician. To successfully do so requires that we educate ourselves beyond first aid procedures and dedicate ourselves to being an integral part of the total health care team.
As a physician licensed to practice medicine in the State of Texas, and as the physician Medical Director for Cypress Creek EMS, I hereby authorize the following:

**Emergency Care Attendant:**
Those Members of Cypress Creek EMS that are certified as an Emergency Care Attendant by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, First Responder National Standard Curriculum, as adopted by the Texas Department of State Health Services. These providers may also use an impedance threshold device during CPR.

**EMT-Basic:**
Those Members of Cypress Creek EMS that are certified as an EMT-Basic by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, EMT-Basic National Standard Curriculum, as adopted by the Texas Department of State Health Services. These providers may also use an impedance threshold device during CPR. EMT-Basic first responders may also administer aspirin according to the Acute Coronary Syndromes Protocol. Furthermore, these EMT-Basic providers may, under the direction and direct supervision of a PII, PIII, or Field Supervisor, as credentialed by me, may perform the following:
- Application of electrodes for ECG or 12-lead acquisition
- Administer Nitronox
- Blood glucose determination
- Nebulized albuterol / ipratropium administration
- Oral acetaminophen administration
- Oral dextrose preparation administration
- Oral Ibuprofen administration
- Oral nitroglycerin administration
- Those designated as Basic In-Charge’s may provide patient care en route to receiving facility providing an ECG or 12-lead was not performed, and no medication was administered, providing a PII, PIII, or Field Supervisor is on board

**EMT-Intermediate:**
Those Members of Cypress Creek EMS that are certified as an EMT-Intermediate by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive, and invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, EMT-Intermediate/85 National Standard Curriculum, as adopted by the Texas Department of State Health Services. Furthermore, these EMT-Intermediate providers may, under the direction and direct supervision of a PII, PIII, or Field Supervisor, as credentialed by me, may perform the following:
- All procedures listed above
- Adult and pediatric EZ/IO intraosseous insertion/infusion
- Combitube insertion
- IV/IM/IO medication administration
- Those designated as Basic In-Charge’s may provide patient care en route to receiving facility providing an ECG or 12-lead was not performed, and no medication was administered, providing a PII, PIII, or Field Supervisor is on board

(Continued)
DELEGATION OF MEDICAL PRACTICE
(Continued)

EMT-Paramedic I:
Those Members of Cypress Creek EMS that are certified or licensed as an EMT-Paramedic by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive, and invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, EMT-Paramedic National Standard Curriculum, as adopted by the Texas Department of State Health Services. Furthermore, these EMT-Paramedic providers may, under the direction and direct supervision of a PII, PIII, or Field Supervisor, as credentialed by me, may perform the following:
- All procedures listed above
- May provide patient care en route to receiving facility, providing a PII, PIII, or Field Supervisor is on board

EMT-Paramedic II:
Those Members of Cypress Creek EMS that are certified or licensed as an EMT-Paramedic by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive, and invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, EMT-Paramedic National Standard Curriculum, as adopted by the Texas Department of State Health Services. Furthermore, these EMT-Paramedic II providers, as credentialed by me, henceforth the In-Charge Paramedic, may perform the following:
- All procedures listed above
- May provide and direct patient care as set forth in these patient care protocols, with the exception of the Rapid Sequence Induction Procedure

EMT-Paramedic III:
Those Members of Cypress Creek EMS that are certified or licensed as an EMT-Paramedic by the Texas Department of State Health Services, and while operating as a Member in good standing with Cypress Creek EMS, may provide basic, non-invasive, and invasive care for our patients as set forth by the United States Department of Transportation, National Highway Traffic Safety Administration, EMT-Paramedic National Standard Curriculum, as adopted by the Texas Department of State Health Services. Furthermore, these EMT-Paramedic III providers, as credentialed by me, may perform the following:
- All procedures listed above
- May provide and direct patient care as set forth in these patient care protocols in its entirety including the Rapid Sequence Induction Procedure
DEFINITION OF TERMS

ABC’s
Establishment and maintenance of an open and patent airway, including the use of oral/nasal airways, suctioning, and endotracheal intubation.

Establishment and maintenance of adequate respiratory rate and volume including the use of artificial ventilation, ventilatory assistance, bag-valve mask device, endotracheal intubation, and the demand valve device.

Assessment of perfusion and hemorrhage, and circulatory support through external chest compression and control of major external bleeding.

Advanced Life Support (ALS)
Therapies and procedures beyond basic life support, including: IV's, IO, medication administration by any route other than nebulizer, intubation of the trachea and esophagus, ECG monitoring, defibrillation/cardioversion, surgical airway, chest decompression, external cardiac pacing, NO₂ administration, endotracheal suctioning.

AFIB
Atrial Fibrillation

APAP
Acetaminophen

Approved Paramedic Protocol designation by the Medical Director allowing practice as indicated by the individual Paramedic's delegation of practice letter

b/p
Blood pressure

Basic Life Support
Therapies and procedures including: vital signs, oxygen administration, airway maintenance, oral/nasal suctioning, bleeding control, bandaging, fracture care and splinting, spinal immobilization, patient assessment, semi-automatic defibrillation, CPR, nebulized bronchodilator treatments, and PASG application.

BSA
Body Surface Area

COPD
Chronic Obstructive Pulmonary Disease

CR
Capillary refill time

Critical Burns
Any patient with one or more of the following:
- Second degree > 30% BSA
- Third degree > 10% BSA
- Burns with associated significant injuries
- Burns with associated inhalation injury
- Any burns of the face, feet, hands, or genitalia

C-Spine
Immobilization and protection of the spinal column/cord including manual techniques, cervical collars, extrication techniques and devices, backboards, cervical immobilization devices, and strapping.

DOS
Death on scene

D-Stick
Blood glucose level determination

ECG
Electrocardiogram

G
Grams

GCS
Glasgow Coma Scale

Hyperglycemia
Blood-sugar > 500 mg/dl
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypertensive Crisis</strong></td>
<td>Systolic &gt; 200 mmHg OR diastolic &gt; 110 mmHg with end-organ compromise</td>
</tr>
<tr>
<td><strong>Hypoglycemia</strong></td>
<td>Blood-sugar &lt; 60 mg/dl</td>
</tr>
<tr>
<td><strong>ICP</strong></td>
<td>In-Charge Paramedic - Protocol designation by the Medical Director allowing practice up to that designated for approved Paramedics</td>
</tr>
<tr>
<td><strong>IM</strong></td>
<td>Intramuscular administration of medication</td>
</tr>
<tr>
<td><strong>IO</strong></td>
<td>Intraosseous fluid/medication administration route</td>
</tr>
<tr>
<td><strong>IV</strong></td>
<td>Intravenous fluid/medication administration route</td>
</tr>
<tr>
<td><strong>IVP</strong></td>
<td>IV push administration of medication</td>
</tr>
<tr>
<td><strong>J or j</strong></td>
<td>Joule</td>
</tr>
<tr>
<td><strong>kg</strong></td>
<td>Kilograms</td>
</tr>
<tr>
<td><strong>Major Burns</strong></td>
<td>2\textsuperscript{nd} and/or 3\textsuperscript{rd} degree burns greater than 10% total body surface area</td>
</tr>
<tr>
<td><strong>mcg</strong> or (\mu g)</td>
<td>Micrograms</td>
</tr>
<tr>
<td><strong>mEq</strong></td>
<td>Milliequivalent</td>
</tr>
<tr>
<td><strong>mg</strong></td>
<td>Milligrams</td>
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<tr>
<td><strong>min. or mins</strong></td>
<td>Minutes</td>
</tr>
<tr>
<td><strong>N/V</strong></td>
<td>Nausea and/or vomiting</td>
</tr>
<tr>
<td><strong>Neonate</strong></td>
<td>Any patient &lt; 30 days old</td>
</tr>
<tr>
<td><strong>NTG</strong></td>
<td>Nitroglycerin</td>
</tr>
<tr>
<td><strong>O\textsubscript{2}</strong></td>
<td>Administration of supplemental oxygen</td>
</tr>
<tr>
<td><strong>OOH-DNR</strong></td>
<td>Out-of-hospital do not resuscitate order</td>
</tr>
<tr>
<td><strong>Pediatric Patient</strong></td>
<td>A patient &lt; 16 years of age OR weighing &lt; 60 kg</td>
</tr>
<tr>
<td><strong>PR</strong></td>
<td>Rectal administration of medication</td>
</tr>
<tr>
<td><strong>Pre-term Delivery</strong></td>
<td>A delivery occurring prior to the end of the 37\textsuperscript{th} week of gestation</td>
</tr>
<tr>
<td><strong>prn</strong></td>
<td>As needed</td>
</tr>
<tr>
<td><strong>q</strong></td>
<td>Every</td>
</tr>
<tr>
<td><strong>RVR</strong></td>
<td>Rapid ventricular response</td>
</tr>
<tr>
<td><strong>SL</strong></td>
<td>Sublingual medication administration</td>
</tr>
<tr>
<td><strong>SLOW IVP</strong></td>
<td>Administration of a medication over the span of 60 seconds</td>
</tr>
<tr>
<td><strong>SQ</strong></td>
<td>Subcutaneous medication administration</td>
</tr>
<tr>
<td><strong>VF or VFIB</strong></td>
<td>Ventricular fibrillation</td>
</tr>
<tr>
<td><strong>Vital Signs or V/S</strong></td>
<td>Respiratory rate, blood pressure, pulse rate, pulse oximetry, temperature, and breath sounds</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>VT or VTach</strong></td>
<td>Ventricular Tachycardia</td>
</tr>
<tr>
<td><strong>Δ</strong></td>
<td>Change</td>
</tr>
</tbody>
</table>
PRIMARY SURVEY (ABC’s)

PURPOSE

• The primary survey is a rapid assessment performed on every patient to evaluate the presence or absence of life-sustaining bodily functions. The rapid assessment is performed in the following order: AIRWAY, BREATHING, CIRCULATION, and DELICATE CNS. Intervention becomes a part of the primary survey if abnormalities and/or potential problems are found.

PROCEDURE

Airway
• EVALUATION: Open or Obstructed
• ASSESSMENT: Inspect
• TREATMENT: Suction, Reposition, Remove foreign body

Breathing
• EVALUATION: Quality, Rate
• ASSESSMENT: Inspection, Auscultation
• TREATMENT: Oxygen, Airway management

Circulation
• EVALUATION: Pulse Rate & Quality, Hemorrhage
• ASSESSMENT: Palpation, Auscultation
• TREATMENT: CPR, Control bleeding, Shock management

CNS
• EVALUATION: Brain function, Spinal cord
• ASSESSMENT: LOC, Glasgow coma scale, Inspection, Palpation
• TREATMENT: Oxygen, Hyperventilation, Immobilization
SECONDARY SURVEY

The secondary survey is a systematic head to toe examination that is pertinent to the patient’s chief complaint, physical findings, and significant history. It is performed after the primary survey and after necessary patient stabilization has been completed. The amount of time expended on the secondary survey is directly dependent on the patient’s condition. All remarkable findings elicited from the secondary survey are to be documented. On all patients it is necessary to check for and record any medical alert identification.

A. TRAUMA SURVEY

1. SCALP
   - Lacerations
   - Contusions
   - Hematomas - Battle’s Sign
2. SKULL
   - Deformities
   - Depressions
3. NECK
   - Point tenderness
   - Alignment
   - Neck veins: Flat or Distended
   - Trachea: Midline or Deviated
4. EYES
   - Reaction to light
   - Equal responses
   - Size
   - Extraocular motions
   - Raccoon’s eyes
   - Blink reflex
   - Contacts or Glasses
5. FACE
   - Symmetry
   - Fractures
   - Discharge from ears, nose
6. MOUTH
   - Odors
   - Loose teeth, Dentures
   - Secretions
7. CHEST
   - Paradoxical motion
   - Breath/heart sounds
   - Sternal inspection
   - Crepitus
   - Retractions with respirations
   - Contusions, Abrasions, Hematomas
   - Sucking chest wound phenomenon
8. ABDOMEN
   - Localized tenderness
   - Rebound pain/referred pain
   - Pulsatile mass
   - Distention
   - Rigidity
   - Bowel sounds
   - Ecchymosis
9. PELVIC REGION
   - Deformities
   - Pain on palpation
   - Contusions, Abrasions, Hematomas, Ecchymosis
   - Genitalia
10. BACK
    - Pain
    - Deformities
    - Contusions, Abrasions, Hematomas
11. EXTREMITIES
    - Distal circulation
    - Range of motion
    - Motor/Sensory response
    - Abnormalities / Deformities
    - Contusions, Abrasions, Hematomas
    - Skin turgor
    - Skin color

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B. MEDICAL/CARDIAC SURVEY

1. EYES
   - Pupillary reaction
   - Eye movement
   - Conjunctiva - color
   - Extraocular motions

2. FACE
   - Symmetry
   - Color

3. MOUTH
   - Unusual odors
   - Drooling
   - Mucous membrane

4. NECK
   - Vein distention
   - Carotid Artery pulses / bruits
   - Nuchal rigidity

5. CHEST
   - Symmetry
   - Breath sounds
   - Heart sounds
   - Accessory muscle usage

6. ABDOMEN
   - Pulsatile mass
   - Rigidity
   - Generalized pain, Localized pain, Rebound tenderness
   - Bowel sounds
   - Ecchymosis

7. EXTREMITIES
   - Distal circulation
   - Clubbing/Cyanosis/Edema
   - Skin turgor
   - Skin color
   - Motor/Sensory response
   - Range of motion

8. MISCELLANEOUS
   - Skin temperature
   - Diaphoresis
   - Skin color
   - Responsiveness
GENERAL THERAPIES

The following procedures, therapies, and medications are authorized beyond those noted in the specific protocols for use at the EMS provider's discretion.

Thiamine
Thiamine may be administered to any adult patient in whom the ICP has any reason to suspect malnutrition or alcohol abuse. Thiamine should be given as 50 mg IM and 50 mg IV. However, in the patient with inadequate muscle mass to receive IM injections, the entire dose may be given IV. Conversely, if an IV cannot be established, the provider may administer the entire dose IM.

Dextrose 50%
Dextrose may be administered to any patient if the ICP suspects hypoglycemia. In the hypoglycemic (or suspected hypoglycemic) patient with an intact gag reflex in whom an IV cannot be established, dextrose may be given orally. Oral dextrose may be administered as PO D$_{50}$ or glucose paste.

IV Starts
Unless specifically limited or prohibited by the particular protocol, ICP's may initiate an IV/IO on any patient at their discretion. (See Procedures section of this manual)

Endotracheal Intubation/Esophageal Obturation
In-Charge personnel may secure the airway of any patient who is at risk for airway compromise or who requires positive pressure ventilation. The airway may be secured through endotracheal intubation (the preferred method) or via the Combitube, so long as these procedures are not contraindicated.

Acetaminophen
May be administered to any febrile patient (without contraindication to the medication) as 15 mg/kg PO

Ibuprofen
May be administered to any febrile patient (without contraindication to the medication) as 10 mg/kg PO

Promethazine
May be administered to any patient (without contraindication to the medication) complaining of nausea or who is actively vomiting at 12.5 mg IVP or 25 mg IM (PEDI: 0.25 mg/kg IVP or 0.5 mg/kg IM)
TRANSPORT DESTINATION DETERMINATION

PURPOSE

All patients requesting ambulance transport should be transported by the responding ambulance. The following are the procedures for transporting critical and non-critical patients.

PROCEDURE

• The medical needs of the any patient will always be the primary consideration in determining transport destination.

• Excluding multi-patient situations, transport of the non-urgent patient shall be to the hospital of the patient’s choice, with consideration made to the system status at the time of transport. Should the system be at level 3 or below at the time of transport, the patient shall be offered transport to a hospital within the service area or a private transfer ambulance can be requested to transport the patient to their hospital of choice. If the patient refuses transport to a local hospital, or there is no private transfer ambulance available, the Field Supervisor should be contacted for further direction. The Field Supervisor should consider the patient’s needs and the system status in determining further actions, while also relying on the judgment of the In-Charge on the scene. All reasonable attempts should be made to comply with the patient’s desires.

• Urgent/critical medicine patients should be transported to the nearest facility. Exceptions to this can be made if the patient requires specialized care not available at the nearest facility or it is in the patient’s best interest to be transported to a hospital other than the nearest hospital.

• Patients requiring surgical and/or neurosurgical intervention shall be transported to the closest hospital capable of handling their particular situation. Determination of whether to transport these patients to a local hospital or to a Level I Trauma Center should be based on:
  1. The patient’s immediate condition
  2. Use of air medical transport to a Level I Trauma Center should be considered only when air transport is anticipated to save time as opposed to ground transport to a level I trauma center.

• Transport destination of the urgent/critical medicine or surgical patient shall be the decision of the In-Charge caring for the patient. This decision can only be changed by a Field Supervisor or the Medical Director present at the scene.

EMERGENCY TRANSPORT

• Use of lights and sirens (Emergency Transport) should only be utilized when all of the following conditions are met:
  • Emergency Transport would save time
  • The patient requires emergent treatment at the hospital that is not available in the ambulance
  • The time saved and hospital treatment are anticipated to positively effect the patients outcome
NON-TRANSPORTATION OF PATIENTS

Purpose

To establish clear guidelines for Cypress Creek EMS personnel for the management of situations where patient contact is made and the patient (or legal patient representative) either declines/refuses EMS transportation to a hospital or, based on EMS evaluation, does not require EMS transportation to a hospital.

General Statements

1) If a patient (or legal patient representative) requests evaluation, treatment, and/or transport from Cypress Creek EMS, they will be actively encouraged to seek medical care from a physician regardless of the nature of that request.

2) Under no circumstances will Cypress Creek EMS personnel refuse or deny treatment or EMS transportation to any patient (or legal patient representative) who requests medical assistance, through any means, from the agency.

3) Cypress Creek EMS personnel shall not discourage any patient (or legal patient representative) from seeking medical care from a physician or from accepting EMS transport to a hospital.

Patient Refusals

1) Minor patients shall not be permitted to decline/refuse medical care or EMS transportation. Consent or a refusal must be obtained from the parent or legal guardian. A parent or legal guardian can not refuse emergent life saving medical care for their children.

2) Any patient (or legal patient representative) who is impaired (by alcohol, illicit drug, prescribed medication, or any other reason) or who has altered mental status should not be permitted to decline/refuse medical care or EMS transportation. When competence is questionable due to impairment by drugs or alcohol, always err on the side of providing medical care for the patient by treating and transporting him/her.

3) Any patient (or legal patient representative) should not be permitted to decline/refuse EMS transportation if invasive treatment was rendered by Cypress Creek EMS personnel.

4) At any time, Cypress Creek EMS personnel may enlist the assistance of the Field Supervisor or law enforcement officials to encourage a patient to accept EMS transport to the hospital.

5) Patients who present with the following signs/symptoms shall be strongly discouraged from declining/refusing EMS transport:

- chest pain or other symptoms suspicious of cardiac ischemia
- shortness of breath / respiratory distress
- hypertension (systolic b/p ≥ 200 mmHg and/or diastolic b/p ≥ 110 mmHg)
- abdominal pain with significant findings (orthostasis, guarding, rigidity, hematemesis, rebound tenderness, abdominal surgery within last year)
- overdose
- seizure
- altered mental status or neurological deficit

(Continued)
NON-TRANSPORTATION OF PATIENTS
(Continued)

- Any complaint or abnormal finding that could be related to a known or suspected pregnancy including abdominal pain of unknown etiology in a female of childbearing potential.
- Evidence of possible injury to the head, spine, chest, abdomen, or pelvis
- Known or suspected abuse victims

Documentation

In all cases where patient contact is established and the patient (or legal patient representative) refuses EMS transport, the following shall be thoroughly documented:

1) Patient’s complaint and why EMS was activated
2) Level of consciousness (oriented to person, place, time, & situation)
3) Physical findings
4) Vital Signs (b/p, pulse, respiratory rate & quality) - preferably 2 complete sets
5) Other diagnostic findings (ECG, D-Stick, Pulse Oximetry)
6) Attempts at encouraging and offering EMS transportation including law enforcement involvement.
7) Condition of patient upon arrival and departure.
8) Reason patient is refusing and understanding the risks of such a refusal
9) Patient’s plans for seeking physician evaluation (hospital, emergency clinic, personal physician, etc.)
10) Names of other people present who witnessed patient’s refusal and attempts at encouraging patient to seek further care.
RESUSCITATION & DNAR

It is acceptable, under the following circumstances, for Cypress Creek EMS personnel to elect to withhold resuscitative measures from an apneic/pulseless patient or discontinue any attempts initiated by lay people:

1) Decapitation
2) Rigor Mortis
3) Total incineration
4) Decomposition
5) Dependent lividity
6) Visible trauma to the head or trunk clearly incompatible with life
7) Mass casualty incident where triage principles preclude CPR from being initiated on every victim
8) Valid Do Not Resuscitate directive executed by the patient’s physician through the following mechanism:
   • Direct phone contact with the patient’s physician
   • Current (within one month), written, original (not a photocopy) “DNAR” order signed by the patient’s physician
   • A valid State of Texas OOH-DNR
9) Family members are against any attempts to resuscitate, and they appear to be of sound mind. This should especially be considered if the patient has signed a “Directive to Physicians” and that document is present.
VENTRICULAR FIBRILLATION -
PULSELESS VENTRICULAR TACHYCARDIA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- ECG monitor

REQUIRED TREATMENTS

- CPR with ITD per Cardiac Arrest Procedure
- Defibrillation at 200 J biphasic (360 J monophasic). Repeat as needed after 2 minutes of CPR.
- Perform 1 to 2 minutes of CPR after each drug administration and prior to each defibrillation.
- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access
- Administer vasopressors:
  - Epinephrine 1 mg IV/IO; in 3-5 minutes, follow with,
  - Vasopressin 40 Units IV/IO; in 3-5 minutes, follow with,
  - Epinephrine 1 mg IV/IO every 3-5 minutes for duration of arrest or until ROSC is achieved.
- Amiodarone 300 mg IV/O, repeated at 150 mg, once after 5 to 10 minutes
- Amiodarone Infusion 150 mg in 100 ml, delivered over 10 minutes following conversion

AVAILABLE TREATMENT OPTIONS

- Magnesium Sulfate 1-2 G IV/IO for refractory state and/or for torsades-de-pointes, may repeat once
- Lidocaine 1.5 mg/kg IV, may repeat once if needed
- Lidocaine Infusion 2-4 mg/min upon conversion
- Dopamine Infusion to maintain blood pressure post arrest
- Epinephrine Infusion 1 mg in 100 ml, titrate to effect to maintain blood pressure post arrest

(Continued)
VENTRICULAR FIBRILLATION - PULSELESS VENTRICULAR TACHYCARDIA

(Continued)

- **Sodium Bicarbonate** 1 mEq/kg IV/IO, then at 0.5 mEq/kg q 10 min - only if ET tube placement is confirmed and adequate ventilation is being performed. Sodium Bicarbonate should be considered for prolonged down-time, prolonged arrest interval, return of ROSC following prolonged arrest, suspected tricyclic antidepressant overdose, DKA, or suspected hyperkalemia.

- **Calcium Chloride** 500 – 1000 mg IV/IO repeated once in 10 minutes if known renal patient, or if hyperkalemia is suspected.

PEARLS

- ♦ **Amiodarone**, when administered with Vaughan Williams Class I antiarrhythmics (i.e. **Lidocaine** and **Procainamide**) has been shown to precipitate torsades-de-pointes, and/or post-arrest hypotension. However, if the patient remains refractory to **Amiodarone**, **Lidocaine** should be administered.

- ♦ **Magnesium Sulfate** is the first-line antiarrhythmic medication for suspected torsades-de-pointes.

- ♦ Post arrest hypotension should be managed with Normal Saline fluid boluses and vasopressors.

- ♦ If unable to determine if rhythm is **Ventricular Fibrillation** or **Asystole** – treat as **Asystole**.
**ASYSTOLE**

**ASSESSMENT REQUIREMENTS**

- ABC’s, physical exam
- ECG monitor – (Confirm lead placement and check in second lead)

**REQUIRED TREATMENTS**

- CPR with ITD per Cardiac Arrest Procedure
- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access
- Administer vasopressors:
  - **Epinephrine** 1 mg IV/IO; in 3-5 minutes, follow with,
  - **Vasopressin** 40 Units IV/IO; in 3-5 minutes, follow with,
  - **Epinephrine** 1 mg IV/IO every 3-5 minutes for duration of arrest or until ROSC is achieved.
- **Atropine** 1 mg IV/IO q 3-5 minutes - Max: 3 mg IV/IO
- Identify treatable causes

**AVAILABLE TREATMENT OPTIONS**

- Transcutaneous Pacing
- **Sodium Bicarbonate** 1 mEq/kg IV/IO, then at 0.5 mEq/kg q 10 min - only if ET tube placement is confirmed and adequate ventilation is being performed. Sodium Bicarbonate should be considered for prolonged down-time, prolonged arrest interval, return of ROSC following prolonged arrest, suspected tricyclic antidepressant overdose, DKA, or suspected hyperkalemia.
- **Calcium Chloride** 500 – 1000 mg IV/IO repeated once in 10 minutes if known renal patient, or if hyperkalemia is suspected.
- **Dopamine** Infusion to maintain blood pressure post arrest
- **Epinephrine** Infusion 1 mg in 100 ml, titrate to effect to maintain blood pressure post arrest

**PEARLS**

- If transcutaneous pacing is going to be effective, it must be applied early in the resuscitation effort especially if the arrest is witnessed by the provider
- Treatable causes may include the 6 H’s and 6 T’s
  - Hypovolemia, hypoxia, hydrogen ion (acidosis), hypo-/hyper-electrolytes, hypo-/hyper-glycemia, hypo-/hyper-thermia
  - Tablets (overdose), trauma, tamponade (cardiac), tension pneumothorax, thrombosis (heart), thrombosis (lungs)
- Consider Termination of Resuscitation
ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Pulse oximetry
- ECG monitor

REQUIRED TREATMENTS

- CPR with ITD per Cardiac Arrest Procedure
- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access
- Administer vasopressors:
  - Epinephrine 1 mg IV/IO; in 3-5 minutes, follow with,
  - Vasopressin 40 Units IV/IO; in 3-5 minutes, follow with,
  - Epinephrine 1 mg IV/IO every 3-5 minutes for duration of arrest or until ROSC is achieved.
- Atropine 1 mg IV/IO if rate < 60/min., q 3-5 minutes - Max: 3 mg IV/IO
- Identify treatable causes

AVAILABLE TREATMENT OPTIONS

- Normal Saline fluid challenge up to 20 ml/kg without signs of pulmonary edema
- Dopamine Infusion to maintain blood pressure post arrest
- Epinephrine Infusion 1 mg in 100 ml, titrate to effect to maintain blood pressure
- Sodium Bicarbonate 1 mEq/kg IV/IO, then at 0.5 mEq/kg q 10 min - only if ET tube placement is confirmed and adequate ventilation is being performed. Sodium Bicarbonate should be considered for prolonged down-time, prolonged arrest interval, return of ROSC following prolonged arrest, suspected tricyclic antidepressant overdose, DKA, or suspected hyperkalemia.
- Calcium Chloride 500 – 1000 mg IV/IO repeated once in 10 minutes if known renal patient, or if hyperkalemia is suspected.
- Chest decompression if tension pneumothorax suspected

PEARLS

- Treatable causes may include the 6 H’s and 6 T’s
  - Hypovolemia, hypoxia, hydrogen ion (acidosis), hypo-/hyper-electrolytes, hypo-/hyper-glycemia, hypo-/hyper-thermia
  - Tablets (overdose), trauma, tamponade (cardiac), tension pneumothorax, thrombosis (heart), thrombosis (lungs)
BRADYCARDIA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood Pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12-Lead ECG

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access
- Support heart rate in the unstable, symptomatic patient
- Any patient who presents with 2° AVB II or 3° AVB with wide QRS complexes should have the transcutaneous pacing on standby

AVAILABLE TREATMENT OPTIONS

- **Atropine** 0.5 mg IV q 3-5 minutes - MAX: 3 mg IV
- Transcutaneous pacing
- Sedation with transcutaneous pacing
- **Epinephrine** Infusion 1.0 mg in 100 ml, titrate to effect to maintain adequate heart rate and/or blood pressure
- **Dopamine** Infusion titrate to effect to maintain adequate heart rate and/or blood pressure

PEARLS

- Any patient whose presenting ECG is 2° AVB II or 3° AVB (especially wide-complex) with evidence of hypoperfusion or end-organ compromise shall receive **external pacing** prior to administration of any medications, as **Atropine** may actually worsen the heart block.
NARROW COMPLEX TACHYCARDIA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, and respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12-Lead ECG

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Vagal maneuver, may repeat once with duration no longer than 10 seconds
- Adenosine 6 mg RAPID IV; if no change 12 mg RAPID IV, up to 2 doses
- Diltiazem 20-25 mg SLOW IV if refractory to Adenosine, or, for confirmed atrial fibrillation with RVR (>130/min)
- Amiodarone 150 mg SLOW IV, especially if in doubt as to origin (atrial vs. ventricular)
- Normal Saline fluid challenge up to 20 ml/kg
- Synchronized Cardioversion 30 J biphasic (50 J monophasic), if no change 50 J biphasic (75 J monophasic), if no change 75 J biphasic (100 J monophasic)
- Consider Sedation Protocol with cardioversion

PEARLS

♦ In atrial fibrillation with rapid ventricular response, rule out any other treatable causes (fever, dehydration, etc.) before administering Diltiazem

♦ Without evidence of hypoperfusion or end organ compromise, cardioversion should not be performed.
**ASSESSMENT REQUIREMENTS**

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG

**REQUIRED TREATMENTS**

- If pulseless, proceed to **V-Fib/Pulseless V-Tach** protocol
- **Airway management** and oxygen therapy appropriate to patient condition
- **IV access**

**AVAILABLE TREATMENT OPTIONS**

- **Amiodarone** 150 mg SLOW IV for symptomatic ventricular tachycardia followed by 150 mg infusion over 10 minutes. May repeat bolus if refractory to first dose.
- **Adenosine** 6 mg RAPID IV; if no change 12 mg RAPID IV/IO to Max: 30 mg
- **Lidocaine** 1-1.5 mg/kg IV, may repeat at 0.5-0.75 mg/kg - Max: 3.0 mg/kg
- **Magnesium Sulfate** 1-2 G SLOW IV for polymorphic ventricular tachycardia
- Synchronized Cardioversion: 75 J biphasic (or 100 J monophasic) , if no change 120 J biphasic (or 200 J monophasic) , if no change 150 J biphasic (or 300 J monophasic) , if no change 200 J biphasic (or 360 J monophasic)
- **Consider Sedation Protocol** with cardioversion

**PEARLS**

- ALL wide-complex tachycardias should be considered ventricular in origin until proven otherwise by a 12-lead ECG

- Cardioversion is the preferred treatment if there is evidence of hypoperfusion or end organ compromise. Without such evidence, cardioversion should not be performed in the prehospital setting.
VENTRICULAR ECTOPY

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12-Lead ECG

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- **Amiodarone** 150 mg SLOW IV, followed by **Amiodarone** Infusion 150 mg in 100 ml, delivered over 10 minutes
  
  OR,

- **Lidocaine** 1-1.5 mg/kg IV, then 0.5-0.75 mg/kg prn - Max: 3 mg/kg
- **Lidocaine** Infusion 2-4 mg/minute if conversion with **Lidocaine** bolus

PEARLS

- If heart rate < 60/min, do not administer **Lidocaine** or **Amiodarone**

- In the absence of **cardiac ischemia**, PVC’s do not routinely require treatment

- Treat PVC’s only if patient is **symptomatic**: i.e., R-on-T phenomena, multifocal PVC’s, couplets, or runs of ventricular tachycardia, combined with chest pain, shortness of breath, altered mental status, and/or hypotension
ABDOMINAL PAIN

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- NPO

AVAILABLE TREATMENT OPTIONS

- IV Access, with 10-20 ml/kg NS if clinical condition indicates; and, no contraindications are present (i.e. renal failure, CHF, etc…)

The following treatment options can only be utilized when the patient’s history and physical exam suggests renal colic:

- Ketorolac 30 mg IV or 60 mg IM
- Morphine 2-5 mg IV, titrated to pain relief, and repeated PRN
- Fentanyl 0.5 – 1 mcg/kg slow IV, titrated to pain relief PRN to Max: 3 mcg/kg
- Promethazine 12.5 mg IV or 25 mg IM for control of nausea and vomiting

PEARLS

♦ Medications should be withheld from the patient with undiagnosed abdominal pain

♦ Suggestive of renal colic: Acute onset flank pain with/without radiation to the groin. May also be associated with urinary symptoms of urgency, hesitancy, retention, and hematuria. Also, if patient has no other similar symptoms previously diagnosed.

♦ Administration of Morphine and/or Fentanyl along with Promethazine to the same patient can cause a profound reduction in mental status and respiratory drive. Use caution when using them together, and closely monitor the patient for these effects.
ACUTE CORONARY SYNDROMES
(NON-TRAUMATIC CHEST PAIN)

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG, with right-sided view if inferior wall infarction is identified
- Thrombolytic Checklist
- Assess for phosphodiesterase inhibitor usage within past 24 hours (Viagra, Cialis, Levitra, etc…)

REQUIRED TREATMENTS

- Airway management and Oxygen Therapy appropriate to patient condition
- IV access
- Chewable Aspirin administer 4 @ 81 mg each
- Notify emergency department for patients who are candidates for acute reperfusion therapy

AVAILABLE TREATMENT OPTIONS

- Nitroglycerin 1 metered dose SL PRN q 5 minutes as long as systolic B/P > 100 mmHg and patient continues to show signs of cardiac ischemia up to 5 doses total
- Morphine 2 to 5 mg IV titrated to pain relief and anxiety PRN
- Fentanyl 0.5 – 1 mcg/kg slow IV, titrated to pain relief and anxiety PRN to MAX of 3 mcg/kg
- Normal Saline up to 20 ml/kg if right ventricular infarct is identified
- Follow Cath Lab Alert procedure if AMI is identified

PEARLS

- May withhold advanced treatment if cardiac ischemia is not suspected based on history, examination, and ECG findings.
- Oral anticoagulant therapy is not a contraindication to Aspirin administration
- Nitroglycerin is the drug of choice for relieving ischemic chest pain, and should be administered prior to opiates.
- Nitroglycerin should be used with extreme caution in a patient having a right ventricular infarction, and may be administered prior to an IV being established only when a 12-lead ECG shows no indication of possible right ventricular infarction.
- Nitroglycerin must be used with extreme caution in the patient who has taken a phosphodiesterase inhibitor (Viagra, Cialis, Levitra, etc…) within 24 hours.

(Continued)
New (or presumably new) left bundle branch block (LBBB) is to be treated like ST Elevation, and makes the patient a candidate for acute reperfusion therapy.

If a patient has recurring symptoms, the time of onset is considered to be when the symptoms became constant.

Patients who are candidates for acute reperfusion therapy and have no contraindications for thrombolysis should be taken to the closest emergency room. Patients who are candidates for acute reperfusion therapy who have contraindications to thrombolysis should be taken to the closest facility capable of interventional catheterization.
ALLERGIC REACTION

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- Cold packs applied indirectly to site
- Elevate affected region if applicable
- For generalized reaction or anaphylaxis - **IV access**
- For anaphylaxis - **Normal Saline** infusion as needed to maintain perfusion
- **Epinephrine** (for anaphylaxis)
  - 0.3-0.5 mg 1:1,000 SQ if adequate perfusion
  - 0.3-0.5 mg 1:10,000 SLOW IV for inadequate perfusion repeated PRN

AVAILABLE TREATMENT OPTIONS

- **Diphenhydramine** 25-50 mg IV or IM
- **Methylprednisolone** 125 mg SLOW IV or IM
- **Albuterol** 1 unit dose may repeat prn for wheezing
- **Epinephrine** Infusion (1 mg in 100ml) titrate to desired effect only in the critical anaphylaxis patient whose symptoms are refractory to primary treatments

PEARLS

<table>
<thead>
<tr>
<th>Degrees of Allergic Reactions</th>
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</thead>
<tbody>
<tr>
<td><strong>Mild</strong></td>
</tr>
<tr>
<td>- Contact dermatitis and/ or urticaria</td>
</tr>
<tr>
<td>- Dermal itching</td>
</tr>
<tr>
<td>- <strong>WITHOUT</strong> dyspnea or hypotension</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
</tr>
<tr>
<td>- Urticaria</td>
</tr>
<tr>
<td>- Dermal itching</td>
</tr>
<tr>
<td>- Localized or generalized peripheral edema</td>
</tr>
<tr>
<td>- Shortness of breath</td>
</tr>
<tr>
<td>- <strong>WITHOUT</strong> hypotension</td>
</tr>
<tr>
<td><strong>Anaphylaxis</strong></td>
</tr>
<tr>
<td>- Urticaria</td>
</tr>
<tr>
<td>- Generalized edema</td>
</tr>
<tr>
<td>- Shortness of breath</td>
</tr>
<tr>
<td>- Hypotension: BP &lt; 100 mm Hg</td>
</tr>
<tr>
<td>- <strong>WITHOUT</strong> hypotension</td>
</tr>
</tbody>
</table>

- Intravenous administration of **Epinephrine** should be reserved for the unconscious patient with hemodynamic compromise.
ASTHMA / COPD

ASSESSMENT REQUIREMENTS

- ABC's, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- **Albuterol** 1 unit dose repeated PRN
- **Methylprednisolone** 125 mg SLOW IV or IM
- **Albuterol / Ipratropium** combination 1:1 unit dose if refractory to **Albuterol** alone
- **Normal Saline** fluid challenge up to 20 ml/kg if no other contraindications

PEARLS

- If patient has used **Albuterol** at home without relief, proceed with combination therapy as the initial nebulizer treatment
- Monitor all patients carefully for signs of tachycardia, hypertension, or chest pain, especially those patients with history of coronary artery disease
- Nebulization should be continued post intubation with BVM and nebulizer attachment
CARDIOGENIC SHOCK

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Normal Saline fluid challenge up 20 ml/kg if right ventricular infarct is identified
- Dopamine infusion to maintain blood pressure
- Epinephrine infusion (1 mg in 100 ml) titrate to effect to maintain blood pressure
CONGESTIVE HEART FAILURE

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG
- Assess for phosphodiesterase inhibitor usage within past 24 hours (Viagra, Cialis, Levitra, etc…)

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Consider Continuous Positive Airway Pressure (CPAP) procedure
- Nitroglycerin 1 metered dose SL spray prn q 5 minutes, up to a total of 5 doses (do not administer if systolic blood pressure is, or drops to less than 100 mmHg)
- Furosemide 0.5 - 1 mg/kg IV (maximum 120mg IVP)
- Albuterol 1 unit dose may repeat once for wheezing

PEARLS

- Nitroglycerin must be used with extreme caution in the patient who has taken a phosphodiesterase inhibitor (Viagra, Cialis, Levitra, etc…) within 24 hours
- If the patient is currently taking PO Furosemide, consider giving IV Furosemide at double the patients’ total daily dose up to a maximum dose of 120mg IV.
DIABETIC COMPLICATIONS

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

HYPOGLYCEMIA

- Glucose paste, orange juice, or some other palatable form of glucose if the patient is conscious and has both an intact gag and swallow reflex
- Thiamine 100 mg IV prior to Dextrose 50% if patient appears malnourished
- Dextrose 50% 25 G IV, if patient is symptomatic
- Glucagon 1-2 mg IM only if unable to obtain IV access

HYPERGLYCEMIA

- Normal Saline challenge up to 20 ml/kg – Use caution in patients with a history of congestive heart failure or renal disease

PEARLS

- Perform blood glucose assessment before and after administering Glucose Paste, Dextrose 50%, or Glucagon
- It is imperative to allow enough time for Glucagon to have an effect on the patient. This is typically 15-20 minutes following an IM injection
HEAT EXPOSURE

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- Skin condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- Cool patient
  1. Remove clothing
  2. Pour cool fluids over patient
  3. Promote convection and evaporation if possible with unit a/c or fan
  4. Apply ice or cold packs to axilla, groin, neck or other appropriate areas

AVAILABLE TREATMENT OPTIONS

- IV access
- Normal Saline up to 20ml/kg, repeat prn; Use with caution in patients with renal disease and CHF
- Oral fluids are acceptable in patients suffering heat cramps without signs of distress

PEARLS

<table>
<thead>
<tr>
<th>Degrees of Heat Exposure</th>
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</thead>
<tbody>
<tr>
<td><strong>Heat Cramps</strong></td>
</tr>
<tr>
<td>- Environmental evidence of heat cramps (hot, humid), <strong>AND</strong>,</td>
</tr>
<tr>
<td>- Cramps in extremities, <strong>AND</strong>,</td>
</tr>
<tr>
<td>- <strong>WITHOUT</strong> signs or symptoms of heat exhaustion</td>
</tr>
<tr>
<td><strong>Heat Exhaustion</strong></td>
</tr>
<tr>
<td>- Environmental evidence of heat exhaustion (hot, humid), <strong>AND</strong></td>
</tr>
<tr>
<td>- Weakness, headache, nausea or syncope</td>
</tr>
<tr>
<td>- Profuse sweating, tachycardia</td>
</tr>
<tr>
<td>- Temperature normal or 1-2 degrees elevated</td>
</tr>
<tr>
<td><strong>Heat Stroke</strong></td>
</tr>
<tr>
<td>- Temperature of 105°F (40.6°C) or greater, <strong>AND</strong></td>
</tr>
<tr>
<td>- Altered mentation, <strong>OR</strong></td>
</tr>
<tr>
<td>- Seizure</td>
</tr>
</tbody>
</table>
HYPERTENSIVE CRISIS

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- ECG monitor appropriate to patient condition
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- 12 lead ECG
- Assess for phosphodiesterase inhibitor usage within past 24 hours (Viagra, Cialis, Levitra, etc…)

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Nitroglycerin 1 metered dose SL prn q 5 minutes up to a maximum of 5 doses
- Diltiazem 20-25 mg IV only if Nitroglycerin is contraindicated

PEARLS

- Treat only if blood pressure > 200 mmHg systolic and/or 110 mmHg diastolic and the patient is exhibiting signs of end-organ compromise
- Do not attempt to reduce blood pressure more than 20% of beginning systolic pressure.
- Nitroglycerin must be used with extreme caution in the patient who has taken a phosphodiesterase inhibitor (Viagra, Cialis, Levitra, etc…) within 24 hours
- It is a rare occasion that a patient needs emergent blood pressure management
- Do not administer Nitroglycerin or Diltiazem if the crisis is associated with a Stroke
OBSTETRICAL EMERGENCIES

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Visualize the perineum to assess for presentation

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- **IV access**
- Patient transport in left uterine displacement position if possible

IMMINENT UNCOMPLICATED DELIVERY:

1. Remain on scene and perform delivery of the newborn
2. Assess and document APGAR score at one minute and five minutes
3. Keep baby warm and dry, cover baby’s head
4. Transport to the hospital may be done prior to delivery of the placenta
5. Apply a perineal pad, be alert for post-partum hemorrhage

POST-PARTUM HEMORRHAGE:

1. Immediate transport and notification of hospital
2. Continue to massage uterine fundus
3. Evacuate all visible clots
4. **Oxytocin** 10-20 units in 1000 ml normal saline and run it wide open after delivery of the placenta

PROLAPSED UMBILICAL CORD

1. Immediate transport and notification of hospital
2. Elevate hips, place patient in a knee-chest position
3. Insert a gloved hand into the vagina to alleviate pressure from presenting part on cord

LIMB PRESENTATION

1. Immediate transport and notification of hospital
2. Place patient in left uterine displacement position

BREECH PRESENTATION

1. Immediate transport and notification of hospital
2. If delivery of the body alone occurs, support the presenting part; place a gloved hand in the vagina, and form a “V” around the mouth & nose to maintain the airway

(Continued)
AVAILABLE TREATMENT OPTIONS

TOXEMIA OF PREGNANCY:
1. Keep patient calm
2. Magnesium Sulfate 2-4 G SLOW IV if seizure activity occurs, may repeat once
3. Follow Seizure protocol for seizures refractory to Magnesium Sulfate
4. Monitor respirations closely and provide rapid transport

PLACENTA PREVIA/ABRUPTIO PLACENTA/UTERINE RUPTURE
1. Immediate transport and notification of hospital
2. If hypovolemic state, follow hypovolemia protocol
3. Rapid transport

SPONTANEOUS ABORTION:
1. If hypovolemic state, follow hypovolemia protocol
2. If presentation of tissue, retain for hospital evaluation

SUPINE HYPOTENSIVE CRISIS: (systolic blood pressure < 100 mmHg)
1. Place patient in left uterine displacement position
2. Normal Saline up to 20 ml/kg to maintain perfusion
3. Calm and reassure patient if necessary
ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment
- Obtain history of events regarding exposure

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Organophosphate Poisoning
  - Atropine 2-5 mg IV for organophosphate poisoning prn until heart rate is greater than 100 per minute and lung sounds are clear

- Phenothiazone Overdose / Dystonic Reaction
  - Diphenhydramine 50 mg IV or 25 mg IV / 25mg IM for the treatment of dystonia associated with phenothiazone ingestion

- Cocaine Overdose
  - Diazepam 2-10 mg IV (over 2-5 min) prn for confirmed cocaine overdose with anxiety, tremors, restlessness, and tachycardia
  - Consider Normal Saline infusion up to 20 ml/kg in the symptomatic patient only
  - Associated chest pain should be treated using the Acute Coronary Syndrome protocol

- Tricyclic Antidepressant Overdose
  - Sodium Bicarbonate 0.5-1 mEq/kg SLOW IV with confirmed tricyclic overdose, intubation with hyperventilation should be established prior to administration
  - Sodium Bicarbonate Infusion 50 mEq in 1000 ml NaCl with confirmed tricyclic overdose
  - Epinephrine Infusion to maintain blood pressure with confirmed tricyclic overdose

- Beta Blocker Overdose
  - Epinephrine Infusion to maintain blood pressure with confirmed beta blocker overdose
  - Glucagon 2 mg IV, repeated PRN, for symptomatic beta blocker overdose with bradycardia and / or hypotension.

(Continued)
OVERDOSE/POISONING
(Continued)

- **Calcium Channel Blocker Overdose**
  - **Calcium Chloride** 500-1000 mg IV for confirmed calcium channel blocker overdose
  - **Epinephrine** Infusion to maintain blood pressure with confirmed calcium channel blocker overdose
- **Opiate Overdose**
  - **Naloxone** 0.4-2 mg SLOW IV or IM prn with narcotic overdose and patient is experiencing respiratory depression, titrated to respiratory effort

**PEARLS**

- In a true organophosphate poisoning, large quantities of **Atropine** may be required to counteract the toxic effects of the substance.
- **Naloxone** should not be used in the conscious patient. **Naloxone** should only be used to stimulate respiratory efforts and/or improve hemodynamics in the unconscious patient in which an opiate overdose is known or suspected. If the patient is intubated and hemodynamically stable, do not administer **Naloxone**.
SEIZURES

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access
- Diazepam 2-10 mg IV (over 2-5 min) PRN for active seizures
- If Diazepam is not available, or IV Access cannot be established, Midazolam 1-2 mg IM q 5 min PRN
- Dextrose 50% 25 G IV if hypoglycemic or etiology is unknown
- Thiamine 100 mg IV if patient appears malnourished
- Midazolam 1-2 mg IV or IM q 5 min PRN for seizures refractory to Diazepam

PEARLS

- Non-status seizures usually do not require medication
SICKLE CELL CRISIS

ASSESSMENT REQUIREMENTS

• ABC's, physical exam
• Blood pressure, pulse, respirations, temperature
• Pulse oximetry
• ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

• Airway management and oxygen therapy appropriate to patient condition
• IV access

AVAILABLE TREATMENT OPTIONS

• Normal Saline fluid challenge up to 20 ml/kg if no contraindications
• Morphine 2-5 mg IV PRN for pain relief
• Fentanyl 0.5 – 1 mcg/kg slow IV, titrated to pain relief PRN to Max. of 3 mcg/kg
• Ketorolac 30 mg IV or 60 mg IM

PEARLS

♦ Inquire about / assess for congestive heart failure prior to giving fluid bolus
♦ High flow Oxygen by mask is treatment of choice, unless not tolerated by patient
Stroke

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- Pulse oximetry
- ECG monitor appropriate to patient condition
- **Stroke Assessment**
  - 12 lead ECG
  - Blood glucose assessment

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- IV access
- Elevate head of stretcher and keep head in midline position

PEARLS

- If intubation is necessary action must be taken to reduce the stimulation associated with laryngoscopy
- Do not administer aspirin or attempt blood pressure control
- Use only the amount of **Oxygen** required to achieve adequate oxygenation
UNCONSCIOUSNESS WITH UNKNOWN ETIOLOGY

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG
- Blood glucose assessment

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Thiamine 100 mg IV prior to Dextrose 50% if patient appears malnourished
- Dextrose 50% 25 G IV
- Naloxone 0.4-2 mg SLOW IV or IM PRN if narcotic ingestion suspected and if patient is experiencing respiratory depression. Titrate to respiratory effort.

PEARLS

- Rapid administration of Naloxone can precipitate combative behavior and/or withdrawal in the narcotic overdose patient - administer slowly.
- Thiamine should be considered with the administration of Dextrose 50%, especially for malnourished patients or those with a chronic history of alcohol use.
AMPUTATION

ASSESSMENT REQUIREMENTS

- Control exanguinating hemorrhage
- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- IV access
- Follow **Pain Management** procedure
- If possible, rinse amputated part with sterile saline, cover lightly with moist sterile dressings, place in a plastic bag and transport to the hospital; If major limb amputation transport to Level I trauma center
- If amputated part is a tooth, transport in milk if possible

PEARLS

- Amputated parts should not be:
  - Soaked or placed in water
  - Covered with wet gauze or towels
  - Placed directly on ice or ice packs, as this can result in frost bite
BURNS

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry (required for major burns only)
- ECG monitoring (required for major burns only)

REQUIRED TREATMENTS

- Stop the burning process
- Airway management and oxygen therapy appropriate to patient condition
- Remove restricting items
- Apply sterile dressing
  - Wet for minor burns
  - Dry for major burns
- IV Access (required for major burns only)
- Avoid hypothermia

AVAILABLE TREATMENT OPTIONS

- Normal Saline fluid challenge up to 20 ml/kg
- Morphine 2-5 mg IV prn
- Fentanyl 0.5-1 mcg/kg slow IV, titrated to pain relief PRN to MAX of 3 mcg/kg
- Water-Jel for minor thermal burns

PEARLS

- Burns requiring a burn facility are as follows:
  - Partial thickness burns > 10% BSA
  - Burns that involve the face, hands, feet, genitalia, perineum, or major joints
  - Circumferential burns of any extremity
  - Third degree burns in any age group
  - Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
  - Any patient with burns and concomitant trauma (such as fractures)
ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Visual acuity

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- If laceration, impaled object, or other open trauma
  Bandage and dress appropriately without applying pressure; cover both eyes
- If burns, corneal abrasions, or superficially impaled foreign body
  **Tetracaine 0.5%** 1-2 drops of ophthalmic solution to affected eye(s)
  Irrigate continuously throughout transport using Morgan Lens if available, attached to 1000 cc bag NS and run wide open into affected eyes
HEAD TRAUMA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Normal Saline up to 20ml/kg for hypotension

PEARLS

- If intubation is necessary, action must be taken to reduce the stimulation associated with intubation.
HYPOVOLEMIC SHOCK

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Identify any exsanguinating hemorrhage

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access
- Control exsanguinating hemorrhage

AVAILABLE TREATMENT OPTIONS

- **BLEEDING CONTROLLED**
  - Normal Saline fluid challenge up to 20 ml/kg
- **BLEEDING NOT CONTROLLED**
  - Normal Saline 250 ml bolus prn if systolic blood pressure < 70 mmHg, maximum 20ml/kg

PEARLS

- If uncontrollable bleeding exists, rapid transport to the appropriate hospital is necessary after immobilization of spine and airway management has been accomplished
- No attempt at establishing IV Access should be done while on scene unless transport is delayed or it is required for airway management
- Intubation should be performed on scene only if the patient is unable to protect their airway or if the patient is hypoxic and does not respond to oxygen
- In the absence of head injury, altered mental status can be used as an indication for fluid bolus instead of systolic blood pressure < 70 mmHg.
INSECT STINGS AND SPIDER BITES

These patients have been envenomated by:

- Hymenoptera (wasps, bees, etc…)
- Brown recluse spider
- Black widow spider

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access
- Follow Pain Management procedure
- If allergic reaction, follow Allergic Reaction protocol
- If seizures are present, follow Seizure protocol
NEAR DROWNING

These patients are not in cardiac arrest

ASSESSMENT REQUIREMENTS

- Remove from water with C-spine precautions if indicated
- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- CPAP if widespread crackles and hypoxia noted (SpO2 < 92%)
NEUROGENIC SHOCK

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Epinephrine Infusion 1.0 mg in 100 ml, titrate to effect to maintain blood pressure
- Dopamine Infusion titrate to effect to maintain blood pressure
- Atropine 0.5 - 1 mg IV repeat q 5 min - Max: .04 mg/kg
- Normal Saline fluid challenge up to 20 ml/kg
SNAKE BITES

These patients have been envenomated by:

- A known or suspected venomous snake, with
- Pain, fang marks, or swelling at area of envenomation

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition
- Attempt to identify snake and take dead snake to hospital

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- Keep patient calm, and immobilize limb below level of the heart
- IV access
- Follow Pain Management procedure
- If coral snake envenomations can be identified, irrigate wound with copious amounts of water
- If allergic reaction, follow Allergic Reaction protocol
- If seizures are present, follow Seizure protocol

PEARLS

- Do not apply tourniquet, ice, or cold packs to affected area
- Indigenous venomous snakes include:
  - Coral snake
  - Water moccasin
  - Rattlesnake
  - Copperhead

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ASYSTOLE

ASSESSMENT REQUIREMENTS

- ABC's, physical exam
- ECG monitor - (confirm lead placement and check in second lead)
- Obtain an approximate weight utilizing the Broselow Pediatric Tape.

REQUIRED TREATMENTS

- CPR with ITD (if patient is > 1 y/o)
- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access
- Epinephrine 0.01-0.03 mg/kg (0.1-0.3 ml/kg of 1:10,000) IV q 3-5 min
- Atropine 0.02 mg/kg IVP, q 3-5 minutes (see PEARLS for minimum and maximum dosing guidelines)
- Identify treatable causes
  - If Tri-Cyclic overdose, pre-existing hyperkalemia, or DKA - Sodium Bicarbonate 1 mEq/kg IVP repeat q 10 min at 0.5 mEq/kg - only if ET tube placement is confirmed and adequate ventilation is being performed
  - If known renal patient, or if hyperkalemia is suspected – Calcium Chloride 20mg/kg (0.2ml/kg) SLOW IVP push. May repeat in 10 minutes

AVAILABLE TREATMENT OPTIONS

- Sodium Bicarbonate 1 mEq/kg IVP then at 0.5 mEq/kg q 10 min - only if ET tube placement is confirmed and adequate ventilation is being performed
- Dopamine Infusion at 2 to 20 mcg/kg/min titrated to maintain b/p post arrest
- Epinephrine Infusion at 0.1 to 1 mcg/kg/min titrated to maintain b/p post arrest

PEARLS

- Treatable causes may include the 6 H’s and 6 T’s
  - Hypovolemia, hypoxia, hydrogen ion (acidosis), hypo-/hyper-electrolytes, hypo-/hyper-glycemia, hypo-/hyper-thermia
  - Tablets (overdose), trauma, tamponade (cardiac), tension pneumothorax, thrombosis (heart), thrombosis (lungs)

(Continued)
ASYSTOLE
(Continued)

♦ **Sodium Bicarbonate** 4.2% should be used for patients < 1 y/o

♦ **Atropine Sulfate** dosing:
  ♦ Minimum single dose both child & adolescent: 0.1 mg
  ♦ Maximum single dose - child: 0.5 mg
  ♦ Maximum single dose - adolescent: 1 mg
  ♦ Maximum total dose - child: 1 mg
  ♦ Maximum total dose - adolescent: 2 mg
BRADYCARDIA

ASSESSMENT REQUIREMENTS

- ABC's, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- 12 lead ECG
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- **Start CPR** if:
  - Evidence of hypoperfusion, hypotension, or respiratory distress and
  - INFANT/CHILD heart rate < 60/min
- **IV/IO access**

AVAILABLE TREATMENT OPTIONS

- **Epinephrine** 0.01-0.03 mg/kg (0.1-0.3 ml/kg of 1:10,000) IV q 3-5 min
- **Atropine Sulfate** 0.02 mg/kg IV/IO q 3-5 minutes
- **Transcutaneous pacing**
- **Sedation** with transcutaneous pacing
- **Dopamine HCl** Infusion at 2-20 mcg/kg/min titrated to maintain b/p post arrest
- **Epinephrine HCl** Infusion at 0.1-0.2 mcg/kg/min titrated to maintain b/p post arrest

PEARLS

♦ Pediatric bradycardia is almost exclusively the result of hypoxia. Therefore, bradycardia may be relieved by aggressive **airway management**, 100% oxygen, and hyperventilation.

♦ Identify treatable causes: Hypoxemia, hypothermia, head injury, heart block, heart transplant, toxins/poisons/drugs

♦ **Atropine Sulfate** dosing:
  - Minimum single dose both child & adolescent: 0.1 mg
  - Maximum single dose - child: 0.5 mg
  - Maximum single dose - adolescent: 1 mg
  - Maximum total dose - child: 1 mg
  - Maximum total dose - adolescent: 2 mg

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VENTRICULAR FIBRILLATION -
PULSELESS VENTRICULAR TACHYCARDIA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- ECG monitor

REQUIRED TREATMENTS

- **CPR with ITD** if no contraindications for 2 minutes if arrest is unwitnessed, or greater than 4 minute down-time. Provide immediate defibrillation if arrest is witnessed, or if quality bystander or first responder CPR can be confirmed.
- **Defibrillation** at 2j/kg for the first attempt and each subsequent defibrillation should be at 4j/kg.
- Perform 1 to 2 minutes of CPR after each drug administration and prior to each defibrillation.
- **Airway management** and oxygen therapy appropriate to patient condition
- **IV/IO access**
- **Epinephrine** 0.01-0.03 mg/kg (0.1-0.3 ml/kg of 1:10,000) IV q 3-5 min
- **Amiodarone** 5mg/kg (max 300mg) IV/IO, repeat at 5mg/kg with a maximum dose of 150mg.
  Total dose should not exceed 25mg/kg or 2.2g in 24 hours.

AVAILABLE TREATMENT OPTIONS

- **Magnesium Sulfate** 25-50mg/kg: max 2g for refractory state and/or for torsades-de-pointes, may repeat
- **Lidocaine** 1mg/kg IV/IO
- **Lidocaine Infusion** 2.0-4.0mg/min upon conversion
- **Dopamine** Infusion at 2 to 20mcg/kg/min titrated to maintain b/p post arrest
- **Epinephrine** Infusion at 0.1 to 1mcg/kg/min titrated to maintain b/p post arrest
- **Sodium Bicarbonate** 1.0mEq/kg IVP, then repeat at 0.5mEq/kg q 10 min - only if ET tube placement is confirmed and adequate ventilation is being performed

PEARLS

- **Amiodarone**, when administered with Vaughan Williams Class I antiarrhythmics (i.e. **Lidocaine** and **Procainamide**) has been shown to precipitate torsades-de-pointes, and/or post-arrest hypotension. However, if the patient remains refractory to **Amiodarone, Lidocaine** should be administered.

(Continued)
Ventricular Fibrillation -
Pulseless Ventricular Tachycardia
(Continued)

- **Magnesium Sulfate** is the first-line antiarrhythmic medication for suspected torsades-de-pointes.
- Post arrest hypotension should be managed with Normal Saline fluid boluses and vasopressors.
- If unable to determine if rhythm is Ventricular Fibrillation or Asystole – treat as Asystole.
PULSELESS ELECTRICAL ACTIVITY

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- CPR with ITD (if patient is > 1 y/o)
- Airway management and oxygen therapy appropriate to patients condition.
- IV/IO access
- Epinephrine 0.01-0.03 mg/kg (0.1-0.3 ml/kg of 1:10,000) IV q 3-5 min
- Atropine Sulfate 0.02 mg/kg IVP push, q 3-5 minutes for bradycardic rhythms (see PEARLS for minimum and maximum dosing guidelines)
- Identify treatable causes
- If Tri-Cyclic overdose, pre-existing hyperkalemia, or DKA - Sodium Bicarbonate 1.0 mEq/kg IVP repeat q 10 min at 0.5 mEq/kg - only if ET tube placement is confirmed and adequate ventilation is being performed
- If known renal patient, or if hyperkalemia is suspected – Calcium Chloride 20mg/kg SLOW IVP push. May repeat in 10 minutes

AVAILABLE TREATMENT OPTIONS

- Normal Saline fluid challenge up to 20 ml/kg (10 ml/kg for a neonate)
- Dopamine HCl Infusion at 2-20 mcg/kg/min titrated to maintain b/p post arrest
- Epinephrine HCl Infusion at 0.1 to 1 mcg/kg/min titrated to maintain b/p post arrest
- Chest decompression if tension pneumothorax suspected

PEARLS

- Treatable causes may include the 6 H’s and 6 T’s
  - Hypovolemia, hypoxia, hydrogen ion (acidosis), hypo-/hyper-electrolytes, hypo-/hyper-glycemia, hypo-/hyper-thermia
  - Tablets (overdose), trauma, tamponade (cardiac), tension pneumothorax, thrombosis (heart), thrombosis (lungs)

(Continued)
PULSELESS ELECTRICAL ACTIVITY
(Continued)

♦ **Sodium Bicarbonate** 4.2% should be used for patients < 1 y/o.

♦ **Atropine Sulfate** dosing:
  ♦ Minimum single dose both child & adolescent: 0.1 mg
  ♦ Maximum single dose - child: 0.5 mg
  ♦ Maximum single dose - adolescent: 1 mg
  ♦ Maximum total dose - child: 1 mg
  ♦ Maximum total dose - adolescent: 2 mg
NARROW COMPLEX TACHYCARDIA

ASSESSMENT REQUIREMENTS

• ABC’s, physical exam
• Blood pressure, pulse, and respirations, temperature
• Pulse oximetry
• ECG monitor appropriate to patient condition
• 12-Lead ECG

REQUIRED TREATMENTS

• Airway management and oxygen therapy appropriate to patient condition
• IV/IO Access

AVAILABLE TREATMENT OPTIONS

• Vagal maneuver, may repeat once with duration no longer than 10 seconds
• Adenosine 0.1 mg/kg RAPID IVP (max 1st dose 6mg); if no change 0.2 mg/kg RAPID IVP (max 2nd dose 12mg)
• Amiodarone 5mg/kg in 100cc over 10-20 minutes (max 150 mg), may repeat x3 to a max dose of 20mg/kg or 600 mg
• Normal Saline fluid challenge up to 20 ml/kg, if < 1 y/o 10ml/kg
• Synchronized Cardioversion 1j/kg, if not effective repeat at 2j/kg
• Sedation with cardioversion

PEARLS

♦ Without evidence of hypoperfusion or end organ compromise, cardioversion should not be performed.
♦ PSVT heart rate guideline: Infants heart rate ≥ 220 BPM and childrens heart rate ≥ 180 BPM
♦ When attempting vagal stimulation on an infant apply ice to the face w/o causing airway compromise/occlusion
WIDE-COMPLEX TACHYCARDIA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition
- 12 lead ECG
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- If pulseless, proceed to V-Fib/Pulseless V-Tach protocol
- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access

AVAILABLE TREATMENT OPTIONS

- **Amiodarone** 5mg/kg in 100cc over 10 to 20 minutes (max 150mg), may repeat x3 to a max dose of 20ml/kg or 600mg
- **Lidocaine HCl** 1 mg/kg IVP q 5 minutes at 0.5 mg/kg IVP - Max: 3 mg/kg
- **Lidocaine HCl** Infusion 20-50 mcg/kg/min IV infusion upon termination of dysrhythmia
- Synchronized cardioversion: 1 j/kg, if no Δ → 2 j/kg, repeat prn
- Sedation for cardioversion

PEARLS

- Treatment is only necessary if the patient is symptomatic.
- ALL wide-complex tachycardias should be considered ventricular in origin until proven otherwise by a 12-lead ECG
- Cardioversion is the preferred treatment if there is evidence of hypoperfusion or end organ compromise. Without such evidence, cardioversion should not be performed in the prehospital setting.
- Ventricular rate ranges from 120 to 200 beats per minute

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ALLERGIC REACTION

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- Cold packs applied indirectly to site
- Elevate affected region if applicable
- For generalized reaction or anaphylaxis - **IV access**
- For anaphylaxis - **Normal Saline** infusion as needed to maintain perfusion
- **Epinephrine** (for anaphylaxis):
  - 0.01 mg/kg (0.01ml/kg) 1:1,000 SQ if adequate perfusion
  - 0.005 mg/kg (0.1 ml/kg) 1:10,000 SLOW IVP repeat every 15 minutes as needed if inadequate perfusion PRN

AVAILABLE TREATMENT OPTIONS

- **Methylprednisolone** 2 mg/kg SLOW IVP or IM (max dose 125 mg)
- **Albuterol Sulfate** 1 unit dose may repeat prn for wheezing
- **Diphenhydramine HCl** 1-2mg/kg SLOW IVP or IM (maximum dose 50mg)

PEARLS

- **Degrees of Allergic Reactions**
  - **Mild**
    - Contact dermatitis and/or urticaria
    - Dermal itching
    - **WITHOUT** dyspnea or hypotension
  - **Moderate**
    - Urticaria
    - Dermal itching
    - Localized or generalized peripheral edema
    - Shortness of breath
    - **WITHOUT** hypotension
  - **Anaphylaxis**
    - Urticaria
    - Generalized edema
    - Shortness of breath
    - **WITHOUT** hypotension
    - Hypotension: BP < 100 mm Hg
    - Altered mentation

- Intravenous administration of **Epinephrine** should be reserved for the unconscious patient with hemodynamic compromise.

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APPARENT LIFE-THREATENING EVENT

DEFINITION

Sudden event that is frightening to the observer and characterized by a combination of apnea (respiratory pause > 15 seconds), decreased mental status, color change (pallor or cyanosis), alteration in muscle tone (rigidity or limpness), or choking.

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- Obtain a thorough history and physical exam (determine nature, duration, and severity of incident)

AVAILABLE TREATMENT OPTIONS

- Patients meeting this criteria require transport
- Consider supervisor consult if responsible party is refusing care

PEARLS

- Witnesses should be thoroughly questioned about the details of the ALTE.
- The majority of children will have a normal presentation.
- Most commonly occurs in children between the ages of 2-3 months, but have been seen up to 1 year.
- A probable cause for an ALTE can be found in 50 percent of patients, leaving the remaining 50 percent with an unexplained ALTE.

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ASTHMA / RESPIRATORY DISTRESS

ASSESSMENT REQUIREMENTS

- ABC's, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Albuterol Sulfate 1 unit dose may repeat prn for wheezing
- Albuterol / Ipratropium combination 1:1 unit dose if refractory to Albuterol alone
- Methylprednisolone 2 mg/kg SLOW IVP or IM (maximum dose 125mg)
- Normal Saline fluid challenge up to 20 ml/kg

PEARLS

- **Epiglottitis**: If patient appears toxic, is drooling with respiratory stridor, rapid transport to nearest emergency facility is mandated with as little stimulation of child as possible. Do not attempt IV access, and do not attempt to put anything in child’s mouth. If possible, administer humidified oxygen and have the parent / family hold the mask near the patient’s face. Allow child to assume an upright position.
DIABETIC COMPLICATIONS

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- Blood glucose assessment
- ECG monitor appropriate to patient condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

HYPOGLYCEMIA

- Glucose paste, orange juice, or some other palatable form of glucose if the patient is conscious and has both an intact gag and swallow reflex
- Dextrose 50% 0.5 gm/kg (1-2ml/kg) IVP, if patient is symptomatic
- Glucagon 0.3 mg/kg IM only if unable to obtain IV access

HYPERGLYCEMIA

- Normal Saline challenge 20 ml/kg to rehydrate patient (10ml/kg in the neonate)

PEARLS

- Use Dextrose 25% for patients < 1 y/o (2-4 ml/kg)
- Perform blood glucose assessment before and after administering Glucose Paste, Dextrose 50%, or Glucagon
- It is imperative to allow enough time for Glucagon to have an effect on the patient. This is typically 15-20 minutes following an IM injection
FEBRILE SEIZURES

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- Temperature reduction

AVAILABLE TREATMENT OPTIONS

- Acetaminophen 15mg/kg PO if child is awake and responsive
- Ibuprofen 10mg/kg PO if child is awake and responsive
- IV access
- Normal Saline up to 20 ml/kg to rehydrate patient (10ml/kg in the neonate)

PEARLS

♦ Make every effort to transport for further evaluation
HEAT EXPOSURE

ASSESSMENT REQUIREMENTS

- ABC's, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- Skin condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient's condition
- Cool patient
  1. Remove clothing
  2. Pour cool fluids over patient
  3. Promote convection and evaporation if possible with unit a/c or fan
  4. Apply ice or cold packs to axilla, groin, neck, or other appropriate areas

AVAILABLE TREATMENT OPTIONS

- IV access
- **Normal Saline** up to 20 ml/kg to rehydrate the patient (10ml/kg in the neonate)
- Oral fluids are acceptable in patients suffering heat cramps without signs of distress

PEARLS

<table>
<thead>
<tr>
<th>Degrees of Heat Exposure</th>
<th>Heat Cramps</th>
<th>Heat Exhaustion</th>
<th>Heat Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heat Cramps</strong></td>
<td>Environmental evidence of heat cramps (hot, humid), <strong>AND</strong>, Cramps in extremities, <strong>AND</strong>, <strong>WITHOUT</strong> signs or symptoms of heat exhaustion</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heat Exhaustion</strong></td>
<td>Environmental evidence of heat exhaustion (hot, humid), <strong>AND</strong> Weakness, headache, nausea or syncope</td>
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<tr>
<td></td>
<td>Profuse sweating, tachycardia</td>
<td></td>
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<tr>
<td></td>
<td>Temperature normal or 1-2 degrees elevated</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Heat Stroke</strong></td>
<td>Temperature of 105° F (40.6° C) or greater, <strong>AND</strong> Altered mentation, <strong>OR</strong> Seizure</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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NEWBORN RESUSCITATION

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Pulse, respirations, temperature
- APGAR assessment at 1 min & 5 min
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition
- Suction oral then nasal pharynx to stimulate breathing (exception: meconium staining)
- Dry newborn vigorously and maintain warm environment
- Provide “blow-by” Oxygen. Be careful with the newborn’s eyes
- If amniotic fluid is meconium stained
  - As soon as the head delivers, have the mother stop pushing and suction mouth/nose, AND
  - perform laryngoscopy and suction below the vocal cords prior to any efforts that may stimulate breathing
- Mechanical ventilation with BVM should begin if any of the following conditions exist: apnea, bradycardia (HR < 100/min), or central cyanosis unresponsive to tactile stimulation and supplemental O2.
- CPR & intubation if heart rate < 60/min after 15-30 seconds of positive pressure ventilation and heart rate is not increasing

AVAILABLE TREATMENT OPTIONS

- IV access
- Treat patient appropriately according to patient condition following the proper protocol

PEARLS

- Determine pulse rate by palpation at the base of the umbilical cord or auscultate an apical pulse.
- If suction is used pressures should not exceed 100mm/Hg and application of suction should last no longer than 5 seconds, deep suctioning can cause laryngospasm and bradycardia
OVERDOSE/POISONING

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Obtain history of events or exposure
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Organophosphate Poisoning
  - Atropine 0.02 mg/kg IVP for organophosphate poisoning prn until heart rate is greater than 100 per minute and lung sounds are clear

- Phentothiazine Overdose / Dystonic Reaction
  - Diphenhydramine 1.0-2.0 mg/kg IVP or deep IM (maximum dose 50 mg) for the treatment of dystonia associated with phenothazine ingestion

- Cocaine Overdose
  - Diazepam 0.25 mg/kg IV (over 2-5 min) prn for confirmed cocaine overdose with anxiety, tremors, restlessness, and tachycardia
  - Consider Normal Saline infusion up to 20 ml/kg (10ml/kg in the neonate) in the symptomatic patient only
  - Associated chest pain should be treated using the Acute Coronary Syndrome protocol

- Tricyclic Antidepressant Overdose
  - Sodium Bicarbonate 1-2 mEq/kg SLOW IVP with confirmed tricyclic overdose, intubation with hyperventilation should be established prior to administration
  - Sodium Bicarbonate Infusion. Mix 1 mEq/kg in 100 cc NaCl and deliver over 20 minutes with confirmed tricyclic overdose
  - Epinephrine Infusion at 0.1-0.2 mcg/kg/min to maintain b/p with confirmed tricyclic overdose
OVERDOSE/POISONING
(Continued)

- **Beta Blocker Overdose**
  - **Epinephrine** Infusion at 0.1-0.2 mcg/kg/min titrated to maintain b/p with confirmed beta blocker overdose
  - **Glucagon** 0.3mg/kg IVP (maximum dose 2mg), repeated PRN, for symptomatic beta blocker overdose with bradycardia and/or hypotension.

- **Calcium Channel Blocker Overdose**
  - **Calcium Chloride** 20 mg (0.2ml/kg) SLOW IVP for confirmed calcium channel blocker overdose
  - **Epinephrine** Infusion at 0.1-0.2 mcg/kg/min titrated to maintain blood pressure with confirmed calcium channel blocker overdose

- **Opiate Overdose**
  - **Naloxone** 0.1mg/kg SLOW IVP or IM prn with narcotic overdose and patient is experiencing respiratory depression, titrated to adequate respiratory effort (maximum single dose 2mg)

**PEARLS**

- In a true organophosphate poisoning, large quantities of **Atropine** may be required to counteract the toxic effects of the substance.
- **Naloxone** should not be used in the conscious patient. **Naloxone** should only be used to stimulate respiratory efforts and/or improve hemodynamics in the unconscious patient in which an opiate overdose is known or suspected. If the patient is intubated and hemodynamically stable, do not administer **Naloxone**.
SEIZURES

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitoring appropriate to patient condition
- Blood glucose assessment
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access
- If patient is febrile, refer to Febrile Seizures protocol
- Diazepam 0.25 mg/kg SLOW IV/IO to control active seizures, repeat prn
- If Diazepam is not available, or IV Access cannot be established, Midazolam 0.05-0.1 mg/kg IV or IM q 5 min prn
- Dextrose 50% 0.5 G/kg (1-2 ml/kg) IV/IO or if hypoglycemia is suspected or etiology is unknown
- Midazolam 0.05-0.1 mg/kg IV/IO or IM q 5 min prn for seizures refractory to Diazepam

PEARLS

- Dextrose 25% solution should be utilized in infants < 1 y/o
- Perform blood glucose assessment before and after administering D_{50}
UNCONSCIOUS w/ UNKNOWN ETIOLOGY

ASSESSMENT REQUIREMENTS
- ABC's, physical exam
- Blood pressure, pulse, respirations, temperature
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS
- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS
- Dextrose 50% - 0.5 G/kg (1-2ml/kg) IV/IO or PR if hypoglycemia is suspected or etiology is unknown
- Naloxone 0.01 mg/kg IV/IO prn if narcotic ingestion suspected and the patient is experiencing respiratory depression, titrate to adequate respiratory effort - Max: 2.0 mg

PEARLS
- Dextrose 25% solution should be utilized in infants < 1 y/o
- Perform blood glucose assessment before and after administering $D_{50}$
BURNS

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- **Pulse oximetry** (major burns only)
- **ECG monitoring** (major burns only)
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Stop the burning process
- **Airway management** and oxygen therapy appropriate to patient condition
- Remove restricting items
- Apply sterile dressing
  - wet for minor burns
  - dry for major burns
- **IV access** (major burns only)

AVAILABLE TREATMENT OPTIONS

- Fluid Administration – consider 10-20 ml/kg IV/IO for hypovolemia
- **Pain relief**
- Water-Jel for minor thermal burns

PEARLS

- Burns requiring a burn facility are as follows:
  - Partial thickness burns > 10% BSA
  - Burns that involve the face, hands, feet, genitalia, perineum, or major joints
  - Circumferential burns of any extremity
  - Third degree burns in any age group
  - Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
  - Any patient with burns and concomitant trauma (such as fractures)
EYE EMERGENCIES

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- Visual acuity (using Snellen eye chart)

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition.
- If laceration, impaled object or other open trauma
  - Bandage and dress appropriately without applying pressure; cover both eyes
- If burns, corneal abrasions, or superficially impaled foreign body
  - **Tetracaine 0.5%** - 1-2 drops of ophthalmic solution to affected eye(s)
  - Irrigate continuously throughout transport with Morgan irrigation lens
- If patient wears contacts they must be removed
- If patient normally wears glasses assure acuity assessment is performed with them on
HEAD TRAUMA

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- Pulse Oximetry
- ECG monitor appropriate to patient condition
- Blood glucose assessment
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV access

AVAILABLE TREATMENT OPTIONS

- Lidocaine HCl - 1.5 mg/kg IVP 1-2 minutes prior to RSI for approved paramedics only

PEARLS

- If intubation is necessary, action must be taken to reduce the stimulation associated with intubation.
HYPOVOLEMIC SHOCK

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- Pulse oximetry
- ECG monitor appropriate to patient condition
- Identify exsanguinating hemorrhage

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access
- Control exsanguinating hemorrhage

AVAILABLE TREATMENT OPTIONS

- BLEEDING CONTROLLED
  - Normal Saline fluid challenge up to 20 ml/kg (10ml/kg in the neonate)
- BLEEDING NOT CONTROLLED
  - Normal Saline 10ml/kg bolus prn if systolic B/P <70, maximum 20ml/kg

PEARLS

♦ If uncontrollable bleeding exists, rapid transport to the appropriate hospital is necessary after immobilization of spine and airway management has been accomplished
♦ No attempt at establishing IV lines should be done while on scene unless transport is delayed or it is required for airway management
♦ Intubation should be performed on scene only if the patient is unable to protect their airway or if the patient is hypoxemic and does not respond to oxygen
♦ In the absence of head injury, altered mental status can be used as an indication for fluid bolus instead of systolic b/p <70
NEUROGENIC SHOCK

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respirations
- Pulse oximetry
- ECG monitoring appropriate to patient condition
- Obtain an approximate weight utilizing the Broselow Pediatric Tape

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- IV/IO access

AVAILABLE TREATMENT OPTIONS

- Atropine Sulfate 0.02 mg/kg IVP prn if bradycardia exists
- Epinephrine HCl Infusion to maintain b/p
- Dopamine HCl Infusion to maintain b/p
- Normal Saline fluid challenge up to 20 ml/kg (10 ml/kg in the neonate)

PEARLS

- **Atropine Sulfate** dosing:
  - Minimum single dose both child & adolescent: 0.1 mg
  - Maximum single dose - child: 0.5 mg
  - Maximum single dose - adolescent: 1.0 mg
  - Maximum total dose - child: 1.0 mg
  - Maximum total dose - adolescent: 2.0 mg
12 LEAD ECG

PURPOSE

- To acquire a diagnostic quality electrocardiogram in the patient who may be suffering from a primary cardiac event or a secondary event due to other illness or injury.
- To monitor patient who may receive therapy that is potentially cardiotoxic.

PROCEDURE

1) Place limb leads on respective limbs.
2) The precordial leads are placed as follows:
   - V1 - 4th intercostal space just to the right of the sternum
   - V2 - 4th intercostal space just to the left of the sternum
   - V4 - 5th intercostal space at the midclavicular line
   - V3 - 5th intercostal space midway between V2 and V4
   - V5 - 5th intercostal space at the anterior axillary line
   - V6 - 5th intercostal space at the midaxillary line
3) In the female patient, the precordial leads must be positioned under the breast, against the chest wall. Using the posterior aspect of a gloved hand to displace the breast for electrode placement is the least threatening means for application.
4) Prepare the skin by wiping with alcohol and abrading the skin with a 4x4.
5) Position the patient to minimize movement and muscle tension. Supine is preferred if the patient will tolerate it.
6) Leave a copy (or second printing) of all rhythm strips and 12-leads at the destination facility along with the patient report.
7) Obtain a copy (or second printing) of all rhythm strips and 12-leads for the patient record. Label this copy with the Incident Number.
8) A patient who presents with evidence of inferior wall AMI (S-T segment elevation in leads II, III, or aVF; reciprocal changes in leads I or aVL) or a right ventricular infarct is suspected, acquire V4R and label accordingly. Simply move V4 to the same location on the right side of the chest (5th intercostal space) and acquire another 12-lead.
9) Obtain the 12-lead ECG at the earliest opportunity without interfering with the urgent needs of the patient.
10) Occasionally, situations may arise where waiver of a 12-lead ECG is necessary. Reasonable judgment should guide this decision and thorough documentation to that effect is required.
ADULT INTRAOSSEOUS ACCESS

PURPOSE

To provide an alternate route in the adult patient who is difficult to access via the intravenous or central venous access points of the body.

INDICATIONS

Intraosseous access may be employed in the adult patient who is >40 kg and whom you are unable to obtain peripheral IV access after 2 attempts or 90 seconds, and they present with one or more of the following conditions:

- Cardiac arrest
- Hypovolemia with profound AMS
- Altered mentation with a GCS <8
- Hemodynamic instability
- Severe respiratory compromise
- Emergent need for medicinal therapy or volume replacement in the critical patient
- Status epilepticus
- Severe burns

CONTRAINDICATIONS

- Suspected fracture of the tibia or femur, if using the secondary site fracture of the humerus
- Previous orthopedic procedures (knee replacement, etc.)
- Infection over the insertion site
- Excessive tissue over the insertion site
- Inability to locate the anatomical landmarks
- Compromised extremity due to a preexisting medical condition (tumor or peripheral vascular disease)
- Patients at risk for non-transport
- Recent IO insertion in the same bone (within the last 24 hours)

PROCEDURE

1) Select the appropriate site for insertion:
   a. **Primary access site:** Tibia
      i. Locate the patella
      ii. Identify the tibial tuberosity (2 finger widths inferior to the patella)
      iii. Move 1-2 finger width’s medially from the tibial tuberosity to locate the appropriate insertion site on the proximal tibia.
b. **Secondary access site: Humeral Head (Paramedic III only)**
   
i. Expose shoulder and adduct humerus (place arm against patients body)
   
ii. Identify the greater tubercle insertion site (while pinching the anterior and posterior aspects of the humeral head, palpate the mid-shaft of the humerus then gradually move your fingers toward the proximal aspect of the humeral head and confirm identification of the greater tubercle).
   
iii. Confirm site a second time: identify the coracoid process and acromion by moving your index and middle finger along the clavicle to the shoulders lateral end. Identify the greater tubercle insertion site which is approximately two finger widths inferior to the coracoid process and the acromion along the humeral midline.

2) Cleanse the site with “Chloraprep” prior to any insertion attempts.
3) Prepare the EZ/IO driver and needle set.
4) Stabilize the extremity and insert the EZ/IO needle set into the appropriate site *(stop when you feel a pop or slight decrease in resistance)*.
5) Remove driver from the needle set.
6) Remove the stylet from the catheter.
ADULT INTRAOSSEOUS ACCESS
(Continued)

7) Confirm proper placement:
   a. IO catheter standing at 90 degrees and firmly seated in the bone.
   b. Blood at the tip of the stylet.
   c. Aspiration of bone marrow.
   d. A free flow of fluid without evidence of extravasation.

8) Attach IV tubing.

9) Flush the IO space with 10cc of NaCl (Failure to flush may result in a limited flow or no-flow situation).

10) Initiate the infusion.

11) Secure the catheter with a dressing.

PEARLS

♦ The conscious patient may experience a visceral type pain during infusion. To reduce the patient’s discomfort administer 20-50 mg of 2% lidocaine slowly into the IO space, and then immediately follow with a 10cc NaCl flush. Start with the lowest dose and titrate as needed, pain relief should last for approximately one hour.

♦ After insertion of the device if a no flow situation occurs gently back the catheter out approx. 1mm while twisting slightly. Once the catheter has been backed out, flush the IO space with another 10cc’s of NaCl.

♦ A pressure bag, or BP cuff, may be applied as needed to infuse the solution at the desired flow rate.

♦ If the initial IO insertion fails do not attempt a second insertion into the same bone. If a second attempt is required utilize the patients opposite bone or the alternate insertion site.

♦ Watch for extravasation and potential complications associated with interstitial fluid accumulation leading to compartment syndrome.

♦ When administering medications always utilize the extension set provided with the device. Attaching a syringe directly to the catheter increases the potential for dislodgement and extravasation.

♦ During transfer of care the receiving facilities staff must be informed about the placement of the IO device, and the necessity for it to be removed no later than 24 hours after initiation.
ADVANCED AIRWAY MANAGEMENT

PURPOSE

- To improve the oxygenation and ventilation status of the patient
- To protect and secure the patient’s airway

GENERAL CONSIDERATIONS

- The procedures for maintaining the airway shall include, but not be limited to, the following: bag-valve-mask ventilation with or without an oropharyngeal airway, oral endotracheal intubation, nasotracheal intubation, insertion of the esophageal tracheal combitube, needle cricothyrotomy with or without jet ventilation, and surgical cricothyrotomy.

- Surgical cricothyrotomy, the Rusch QuickTrach, and the Melker Emergency Cricothyrotomy Kit may be used when all other means of airway control have failed.

- Prior to the administration of any medication that may alter the patient’s respiratory status, complete monitoring should be instituted to include blood pressure, ECG, and pulse oximetry. If indicated patients should be oxygenated/ventilated with 100% Oxygen.

- Nasotracheal intubation should be reserved for those patients in whom oral endotracheal intubation would prove to be overly distressing to the patient and relaxation is not indicated or not available.

- The Combitube should be utilized after a failed intubation

- The Eschmann Tracheal Tube Introducer may be used to facilitate a difficult intubation

CRICOID PRESSURE

- Every patient who is unable to protect their own airway will receive cricoid pressure as early as possible and be maintained until the trachea has been successfully intubated and the endotracheal tube cuff is inflated and endotracheal tube placement has been confirmed.

- Cricoid Pressure shall not be applied to patients who are actively vomiting as damage to the esophagus may occur. Patients who are actively vomiting and have lost their airway reflexes should be placed in a head down position, the oropharynx suctioned, and have a cuffed endotracheal tube placed as soon as possible.

(Continued)
ADVANCED AIRWAY MANAGEMENT
(Continued)

BAG-VALVE-MASK VENTILATION

- The initial rate for BVM ventilation should be 10-12 ventilations per minute.

- The best method for determining BVM rate is with capnography. The target ETCO₂ reading should be 35-40 mmHg.

- The optimal tidal volume for patients with normal perfusion is 8-10 ml/kg.

ENDOTRACHEAL TUBE VERIFICATION

- Following placement of an endotracheal tube, placement must be verified. The following items must be checked and documented on the patient record. Repeat all verification steps every 5 minutes, and after every patient move. If available a recording patient monitoring device (i.e. Zoll M-Series) will be used continuously and the data transferred to the electronic patient record.

  - If tube was visualized passing the vocal cords
  - ETCO₂ readings (primary method)
  - Absence of air movement during auscultation of the abdomen
  - Presence of air movement during auscultation of the chest
  - Visible rise and fall of the chest
  - Pulse Oximeter readings (in the patient with a pulse)

- If proper tube placement cannot be confirmed with absolute certainty the tube should be removed immediately and the airway managed by other means.

- After confirming proper placement, the endotracheal tube should be secured in place, and the depth should be noted and monitored

- The use of a cervical collar to restrict movement of the head and neck to assist in preventing tube displacement is recommended.
CAPNOGRAPHY (ETCO₂ MONITORING)

PURPOSE

- To measure and monitor the patient’s end-tidal carbon dioxide levels, as well as waveform capnography to determine ventilatory status and optimal ventilatory rates.
- Normal ETCO₂ values are between 35–45 mmHg.

PROCEDURE

- End-tidal CO₂ monitoring should be performed on all of the following patients:
  - All intubated patients
  - All patients in cardiac arrest
  - All patients suffering from an inhaled poison or toxin
  - Any patient exhibiting signs or symptoms of respiratory distress or difficulty breathing
  - Any patient the paramedic deems necessary
- For the non-intubated patient:
  1) The face masks can be used to deliver oxygen and measure ETCO₂.
  2) Attach the oxygen tubing to an oxygen source and deliver at the desired rate.
  3) Attach the ETCO₂ cable to the face mask.
  4) Monitor ETCO₂ and waveform capnography.
- For the intubated patient:
  1) The 15-22 mm adapter is used for patients that are intubated.
  2) After intubation is accomplished attach the ETCO₂ adapter to the endotracheal tube.
  3) Attach the bag valve device to the ETCO₂ adapter.
  4) Monitor ETCO₂ values and waveform capnography and adjust for optimal ventilation.

PEARLS

- Factors that influence ETCO₂ are:
  - Metabolism – production of CO₂
  - Perfusion – delivery of blood to the tissues and alveoli
  - Ventilation – elimination of CO₂

(Continued)
CAPNOGRAPHY (ETCO₂ MONITORING)
(Continued)

♦ Assessed ETCO₂ values combined with ETCO₂ waveform assessment can help detect life-threatening conditions and provide an accurate assessment of the patient’s ventilatory status, including but not limited to:
  - Esophageal intubation or a dislodged endotracheal tube
  - Frank or impending ventilatory failure
  - Frank or impending circulatory failure
  - ETCO₂ remaining < 10 mm Hg in cardiac arrest patients predicts 0% survival
  - Changes in ETCO₂ values and waveforms in a patient with an obstructive airway disease (COPD, asthma can help determine if bronchodilator therapy is effective, or if the patient requires endotracheal intubation
  - ETCO₂ levels and waveform shapes can help make a rapid differential diagnosis and identify problems which may lead to hypoxia

SAMPLE ETCO₂ WAVEFORMS

Normal Tracing:

- A to B is baseline
- B to C is expiratory upstroke
- C to D is expiratory plateau
- D is end-tidal CO₂ value
- D to E inspiration begins

Hyperventilation:

- Increased respiratory rate
- Increased tidal volume
- Decreased metabolic rate
- Fall in body temperature

Hypoventilation:

- Decreased respiratory rate
- Decreased tidal volume
- Increased metabolic rate
- Rapid rise in body temperature (hyperthermia)

(Continued)
Esophageal Intubation:

- Missed or dislodged intubation
- Normal ETCO₂ waveform is best evidence of proper placement
- Little or no CO₂ is present if tube is in esophagus

Inadequate Seal:

- Leaky or deflated endotracheal tube cuff
- Endotracheal tube is too small for patient

Bronchospasm:

- Partially kinked or occluded endotracheal tube
- Presence of foreign body in airway
- Bronchospasm / bronchoconstriction

Rebreathing:

- Inadequate inspiratory flow
- Insufficient expiratory time
- Faulty expiratory valve

Muscle Relaxants (curare cleft):

- Appear when muscle relaxants (paralytics) begin to subside
- Depth of cleft is inversely proportional to degree of drug activity
CARDIAC ARREST

ASSESSMENT REQUIREMENTS

• ABC’s

REQUIRED TREATMENTS

• If arrest is witnessed and VF/VT is discovered, deliver one biphasic 200J defibrillation immediately
  • Immediately follow with CPR at a compression to ventilation ratio of 30:2 for 1-2 minutes
  • Analyze rhythm. If VF/VT, deliver one biphasic 200J defibrillation followed immediately by CPR at a compression to ventilation ratio of 30:2
  • Continue, performing 1 to 2 minutes of CPR between each analysis/defibrillation
• If arrest is not witnessed perform 200 uninterrupted chest compressions prior to rhythm analysis
  • Deliver 2 ventilations with BVM, ResQPod if no contraindications, and 100% oxygen
  • Analyze rhythm. If VF/VT, deliver one biphasic 200J defibrillation followed immediately by CPR at a compression to ventilation ratio of 30:2
  • Continue, performing 1 to 2 minutes of CPR between each analysis/defibrillation
• If VF/VT not found (i.e. PEA or asystole) perform CPR using compression to ventilation ratio of 30:2
  • Utilize the ITD, or ResQPod if no contraindications are present
  • Ventilations should be performed using three-rescuer technique and 100% oxygen delivery
  • Ventilations should be delivered in less than 6 seconds
  • Perform compressions at a rate of 100 per minute
  • Rescuers performing chest compressions should be rotated at least every 5 minutes

AVAILABLE TREATMENT OPTIONS

• If response time is 2 minutes or less or if effective compressions are being performed on arrival consider defibrillation prior to compressions

(Continued)
PEARLS

♦ Do not apply an AED to those patient suffering from traumatic arrest
♦ The Zoll AED Plus is acceptable for use in pediatric patients from 1 to 8 years of age using the Zoll AED Plus pedipadz II
♦ It is imperative that compressions be interrupted only when absolutely necessary and that any interruptions are kept as short as possible
♦ Make every effort to keep the time from last compression to defibrillation as short as possible
♦ If a single rescuer is unwilling or unable to perform ventilations performing compressions only is acceptable
♦ Family members are allowed to be present during the resuscitation unless their presence interferes with patient care. If possible assign a responder as a liaison who is available to explain treatments and answer questions
CATH LAB ALERT

PURPOSE

To provide a means of early notification of the cardiac catheterization lab for those patients that are presenting with chest pain suggestive of ischemia, and with definite 12-lead ECG findings of an acute evolving myocardial infarction.

This is currently only available for patients being delivered to Houston Northwest Medical Center.

PROCEDURE

1) Follow Acute Coronary Syndromes Protocol.
2) Definitive findings of an acute myocardial infarction must be identified to continue this procedure. These findings include 2 mm or greater ST-segment elevation in two or more contiguous leads that show one or more of the following:
   i) Inferior wall MI – II, III, aVF
   ii) Anterior wall MI – V1, V2, V3, V4
   iii) Lateral wall MI – I, aVL, V5, V6
3) The above findings must be in the absence of LBBB, wide-complex, or paced rhythms. The ‘Cath Lab Alert’ may not be used in these settings.
4) Do not delay treatment for early notification of the ED for a ‘Cath Lab Alert,’ however, notify them as early as possible. Notify the Charge Nurse in the ED of the following:
   i) Patient's name, history, findings, DOB, and SS#
   ii) If the patient has a cardiologist give the ED their name
   iii) And, that you wish to call a 'Cath Lab Alert.'
5) In addition to following the Acute Coronary Syndromes Protocol, the following procedures need to be performed:
   i) Administer heparin sodium 5000 units IV without contraindications
   ii) Administer metoprolol (Lopressor) 5 mg slow IV without contraindications.
   iii) Administer second dose of metoprolol (Lopressor) 5 mg slow IV, 10 minutes after first dose without contraindications.
6) Once at Houston Northwest Medical Center, ask ED personnel if cath lab is ready.
7) Deliver the patient to the cath lab and help staff prepare the patient for the procedure.

(Continued)
PEARLS

♦ Withhold administration of heparin sodium if any of the following contraindications exist:
  o Known hypersensitivity to heparin
  o Recent, or known active bleeding
  o Known bleeding disorders
  o Known thrombocytopenia (low platelet count)
♦ It is imperative to administer metoprolol (Lopressor) slowly.
♦ Use Metoprolol (Lopressor) with extreme caution in those with bronchospastic diseases (asthma or COPD, and in those taking digitalis or diuretics.
♦ Withhold administration of metoprolol (Lopressor) if any of the following contraindications exist:
  o Heart rate less than 70
  o Systolic blood pressure less than 100 mm Hg
  o Presence of AV heart block
  o Pulmonary edema as evidenced by crackles
CHEST DECOMPRESSION
Cook Emergency Pneumothorax Set

PURPOSE

To relieve the existence of a tension pneumothorax by reducing pressure from the build-up of air within the pleural space. This should be suspected when there is increasing respiratory distress or difficulty ventilating a patient with a bag-valve-device; there is markedly decreased or absent breath sounds on the same side of a blunt or penetrating chest injury; or, hemodynamic compromise which is manifested by hypotension and/or evidence of diminished perfusion is present.

PROCEDURE

1) Airway management and oxygen therapy appropriate to patient condition.
2) Connect the syringe to the needle-catheter device.
3) Locate and prep the site with the chlorhexidine swab. The site for the catheter insertion is in the second or third intercostal space in the mid-clavicular line.
4) The catheter introducer-needle is inserted into the skin along the superior border of either the third or fourth rib. As one hand advances the device through the skin, subcutaneous tissue, muscle and parietal pleura, the second hand gently pulls suction on the device.
5) Once air is freely aspirated into the syringe, the needle should not be advanced any further. While the first hand stabilizes the needle and syringe, the second hand slowly advances the catheter into the pleural space. If any resistance is encountered the catheter should not be forced.
6) Once the catheter is inserted into the pleural space, the needle and syringe are withdrawn leaving the catheter in place.
7) The plastic skin flange should be placed around the catheter and secured using the self-locking tie. This flange provides a convenient place to secure the catheter to the skin with tape.
8) The stopcock in open position, connecting tubing, and Heimlich Valve should then be attached. Suction may be connected if desired.
9) Breath sounds and hemodynamic status should be reevaluated frequently after inserting and securing the device.
COMBITUBE
(Esophageal Tracheal Airway)

PURPOSE
To function as a “Rescue Airway”

INDICATION
Failed Intubation

CONTRAINDICATION
- Patients under 5 feet tall
- Intact gag reflex
- Known esophageal disease
- Caustic substance ingestion
- Upper airway obstruction secondary to foreign body aspiration, glottic edema, or epiglottis
- Severe oropharyngeal trauma

PROCEDURE
- Prepare all equipment
- Attach syringes to appropriate connections
- Position patient’s head and neck in a neutral position
- Insert Combitube blindly in a curved downward movement while maintaining tongue-jaw-lift. Do not force.
- Insert until printed ring marks lie between the teeth or alveolar ridges
- Inflate oropharyngeal cuff with 100cc of air
- Inflate distal cuff with 15cc of air
- Test ventilation in the blue (No. 1) tube
- If auscultation over the lungs is positive and epigastric insufflation is negative, continue ventilation
- If no auscultation can be heard, test ventilation in the clear (No. 2) tube
- If auscultation over the lungs is positive and epigastric insufflation is negative, continue ventilation
- If ventilation does not work via either tube, pull the Combitube back 2-3 cm and attempt ventilation again
- If unable to ventilate at this point, proceed according to the failed intubation protocol

SPECIAL CONSIDERATIONS
- When facial trauma has resulted in broken teeth or dentures, remove the debris and use extreme caution when passing the Combitube to prevent the cuffs from tearing
- When inflating the esophageal balloon, the Combitube may move proximally a few centimeters – this is normal
CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

PURPOSE

- To decrease the work of breathing in the patient exhibiting signs and/or symptoms of cardiogenic pulmonary edema by increasing oxygenation and decreasing functional residual capacity.
- To provide for: relief from dyspnea and dyspnea-induced verbal impairment; improved chest wall excursion; a reduction in respiratory rate and heart rate; an increase in $\text{SpO}_2$; and, a stabilized blood pressure.

INDICATIONS

- The patient should be conscious, alert, oriented, and able to assist in his/her medical care
- Acute respiratory distress with pulmonary edema exhibited by basilar or widespread crackles and one or more of the following:
  - Retractions
  - Use of accessory muscles
  - Tachypnea (> 25 breaths per minute)
  - $\text{SpO}_2 < 92$

CONTRAINdications

- Respiratory or cardiac arrest
- B/P < 90 mm Hg
- Altered level of consciousness
- Inability of patient to maintain patent airway
- Major trauma, especially facial trauma or head injury and/or with signs of increased ICP
- Penetrating chest trauma
- Presence or suspension of pneumothorax
- Vomiting or active GI bleeding
- Obvious signs and/or symptoms of infection and/or sepsis (i.e. pneumonia)
- Gastric distention

(Continued)
PROCEDURE

• Assess patient, record vital signs every 3-5 minutes; monitor pulse oximetry, heart rate, and ECG continuously throughout procedure.
• Administer O₂ by non-rebreathing mask prior to using CPAP.
• Assemble the circuit by connecting the corrugated tubing and the CPAP valve (7.5 cm H₂O) to the appropriate ports on the mask.
• Assemble the head strap assembly by connecting the straps to the mask.
• Connect the filter to the CPAP generator.
• Connect the completed circuit to the CPAP generator and then connect the generator to an appropriate oxygen source.
• Ensure the oxygen source is turned on and position the mask on the patient and adjust head straps for seal and comfort. (See clinical PEARLS below.)
• It is imperative to achieve a mask to face seal for proper operation.
• When properly connected the CPAP generator will deliver an F,O₂ of 0.28-0.33 (28-33%).
• Continuously monitor the patient's:
  o Level of consciousness
  o Heart rate
  o Respiratory rate
  o Blood pressure
  o Pulse oximetry
  o ECG
• A second CPAP valve (10 cm H₂O) may be used to replace the primary CPAP valve (7.5 cm H₂O) if the patient does not show signs of improvement.
• Failure of the patient to improve to CPAP therapy may be evidenced by:
  o Decreasing level of consciousness
  o Increasing work of breathing
  o Increasing heart rate (bradycardia in late stages)
  o Increasing respiratory rate
  o Increasing blood pressure (hypotension in late stages)
  o Decreasing SpO₂
• Consider endotracheal intubation for the patients that do not respond within 5 minutes of beginning CPAP therapy.

(Continued)
PEARLS

♦ When beginning this procedure approach the patient with the mask slowly and hold it a few centimeters away from their face prior to application and securing the head straps. This will allow the patient to become accustomed to the mask.

♦ Providing emotional support is necessary, and should be offered with an explanation of this procedure when beginning treatment and, until the patient can tolerate the mask and the inspiratory pressures involved.

♦ CPAP has limited benefit in pulmonary edema from noncardiogenic causes (i.e. medication-induced, toxic inhalation, asthma, COPD, etc…) and is not indicated.

♦ The near drowning victim is an exception to the rule regarding noncardiogenic pulmonary edema. These patients can benefit from CPAP provided they meet the listed indications.

♦ Do not exceed 10 cm H₂O when administering CPAP.

♦ Under no circumstances should these two valves (7.5 cm H₂O and 10 cm H₂O) be “stacked.”
DISCRETIONARY IV ACCESS

PURPOSE

To establish an intravenous route for medications and fluid replacement.

PROCEDURE

- Intravenous access can be accomplished by a saline lock, peripheral venous infusion, port-a-cath access, or via the intraosseous route at the discretion of the paramedic in charge.

- Port-a-cath access should be reserved for those patients who require medication administration or fluid volume replacement; otherwise, port-a-cath access should not be attempted in the prehospital setting. Under these circumstances, it is unnecessary to attempt peripheral access first. See Implanted Catheter Access Procedure.

- In all pediatric patients receiving intravenous fluids, a microdrip administration set should be used and delivery of fluids should be carefully monitored. It is encouraged to use a 100 ml bag of Normal Saline, to minimize the risk of fluid overload. A macrodrip administration set may be used for hypovolemic pediatric patients.

- Aseptic technique shall be used at all times.
DONOR REFERRAL

PURPOSE

- To improve the long term health of our community.
- To make a positive situation from a death.

PROCEDURE

1) In the event CCEMS elects to withhold resuscitation or terminates resuscitation, the following procedure should occur.
2) The family members should be notified of the lack of resuscitation efforts (if they are present).
3) The In-Charge Paramedic (or Field Supervisor) should call Life Gift at 800.633.6562 and give them the following information:
   - The location of the incident
   - Patient Information – Name, Age, Sex, Race
   - Mechanism of Injury / History of Present Illness
   - Past Medical History
   - Next of Kin or responsible party – name and phone number
   - Any other relevant information
4) Give Life Gift your contact information (use 281.440.0079 for your call back).
5) It is recommended that you do not notify the family about the donor referral.
6) There is no situation where donor referral should not be done.
7) Life Gift will provide follow up by phone (within 24 hours) and by letter (within 30 days).
EJV CANNULATION

PURPOSE

For infusion of fluid or administration of medications when other peripheral IV attempts have been unsuccessful. EJV cannulation may be considered as first-line IV access in cardiac arrest or severe hypovolemic/hypotensive crisis.

PROCEDURE

1) Place patient in a supine, head-down position.
2) Turn patient’s head to side opposite the intended venipuncture site.
3) Locate the external jugular vein.
4) Align the cannula in the direction of the vein with the point aimed toward the shoulder on the side of the venipuncture site.
5) Using an aseptic technique, make venipuncture midway between the angle of the jaw and the mid-clavicular line. Stabilize the vein by placing one finger on the vein just above the clavicle.
6) When the vein has been penetrated, remove the needle and advance the cannula while compressing the vein at the end of the cannula.
7) Connect the IV tubing securely to the cannula hub and release compression. Use caution to not allow air to enter the catheter once it has been inserted.
8) Secure the catheter in place.
ESCHMANN TRACHEAL TUBE INTRODUCER
(Gum Elastic Bougie)

PURPOSE

The tracheal tube introducer is used to facilitate difficult intubation

INDICATION

- Difficult intubation with a restricted view of the glottic opening due to:
  - Short and/or thick neck
  - Pregnancy
  - Laryngeal edema
  - Normal anatomical variation
  - Tumors above the glottic opening
  - Inability to position patient appropriately

CONTRAINDICATION

- Patients under the age of 14

PROCEDURE

- The device should be clean prior to use but does not need to be sterile
- The device is inserted independently of the ET tube and is used as a guide
- Prepare the endotracheal tube introducer for use by curving the introducer and ensure the distal tip is formed into a J shape
- Perform a laryngoscopy, obtaining the best possible view of the glottic opening
- Advance the introducer continually observing its distal tip with the concavity facing anteriorly
- Visualize the tip of the introducer passing posteriorly to the epiglottis and (where possible) anterior to the arytenoid cartilages
- Once the tip of the introducer has passed the epiglottis, continue to advance it so that it passes behind the epiglottis but in an anterior direction
- As the tip of the introducer enters the glottic opening you will either feel ‘clicks’ as it passes over the tracheal rings or the tip will arrest against the wall of the airways. This suggests correct insertion, although cannot be relied upon to indicate correct positioning with 100% accuracy. (Failure to elicit clicks or hold up is indicative of esophageal placement)
- If hold-up is felt, the introducer should then be withdrawn approximately 5cm to avoid the ET tube impacting against the carina
- Hold the introducer firmly in place and maintain laryngoscopy
- Pass the endotracheal tube over the proximal end of the introducer
- As the proximal tip of the introducer is re-exposed, carefully grasp it and carefully advance the ET tube along the introducer taking care to avoid movement of the bougie
- Successful intubation may be enhanced by rotating the ET Tube 90º counter-clockwise so the bevel faces posteriorly
- Once the ET tube is fully in place hold it securely as you withdraw the introducer
- Withdraw the laryngoscope
- Inflate the cuff of the ET tube.
- Verify correct positioning of the ET tube
- Secure the ET tube

Note: This device may also be used as a tube-exchanger to replace a tube with a torn cuff.
EXTERNAL PACING

PURPOSE

To increase the heart rate when the intrinsic rate is not adequate to perfuse the patient.

PROCEDURE

1) Connect monitoring electrodes to patient cable and attach electrodes to patient.
2) Apply pacing pads to the patient. Anterior/posterior position is preferred, but apex/sternum may be utilized if anterior/posterior is difficult or possibly harmful.
3) Set rate initially at 80 per minute
4) To set the energy level at the minimum necessary current:
   a. Increase current by 20 mA until electrical capture is observed
   b. Decrease current by 5 mA until any loss of capture is observed
   c. Increase current by 5 mA
   d. Check for a pulse
   e. If no pulse is palpable, increase the pacing rate
5) Provide adequate sedation and pain control measures to ensure patient comfort.

PEARLS

♦ Monitoring must be done through 4 lead cables.
♦ Defibrillation may be performed as usual while pacing the patient.
♦ If transcutaneous pacing is going to be effective in asystole, it must be applied early in the resuscitation effort.
EYE IRRIGATION
(Morgan Lens)

PURPOSE

To provide a continuous means of irrigating the eyes.

PROCEDURE (Application)

1) Remove any contact lenses if present
2) Apply Tetracaine to affected eyes
3) Attach Morgan Lens delivery set to IV line and start flow
4) Have patient look down, insert lens under upper lid
5) Have patient look up and drop lens in place
6) Release lower lid over lens and adjust flow
7) Tape tubing to patient’s forehead to prevent accidental lens removal
8) Absorb outflow
9) Do not run dry

PROCEDURE (Removal)

1) Continue flow and have patient look up
2) Retract lower lid and hold position
3) Slide lens out and terminate flow
FAILED INTUBATION

DEFINITION

A failed intubation is any intubation where 3 successive ET tube placements or laryngoscopies have been attempted by an experienced provider and do not result in confirmed intubation of the trachea.

PURPOSE

To outline a sequence of actions that shall be undertaken following unsuccessful attempts at intubation.

PROCEDURE

1. No further attempts at intubation should be made unless a more experienced provider is available
2. Cricoid pressure should be maintained
3. Attempts should be made to ventilate and oxygenate the patient utilizing a bag-valve-mask with a tight fitting mask seal. An oropharyngeal airway should be placed. A nasopharyngeal airway may also be utilized.
4. The Combitube should be placed unless contraindicated
5. If ventilation with BVM is successful the patient should be oxygenated and ventilated and transported immediately to the closest hospital.
6. Should ventilation prove impossible with the use of a BVM and/or the Combitube, immediate surgical cricothyrotomy should be performed according to protocol. Cricoid pressure should be maintained until the airway is secured.
GENERAL TRAUMA ASSESSMENT AND MANAGEMENT

ASSESSMENT REQUIREMENTS

- ABC’s, physical exam
- Blood pressure, pulse, respiration’s
- Pulse oximetry
- Obtain history of event

REQUIRED TREATMENTS

- **Airway management** and oxygen therapy appropriate to patient condition.
- Control exsanguinating hemorrhage
- Spinal Motion Restriction
  - Spinal Motion Restriction is indicated for any trauma patient who has:
    - Fallen from height
    - Been in a motor vehicle accident
    - Received a high voltage electrical shock
    - Sustained blunt trauma to the head
    - Suffered a penetrating injury and is unconscious or has neurologic deficits
    - A complaint of neck pain or a neurologic deficit
  - Manual cervical spine motion restriction should be applied immediately to any patient where spinal motion restriction is indicated until the patient’s head is secured to a spinal motion restriction device or further assessment reveals no need for spinal motion restriction
  - A rigid cervical collar of the correct size should be applied as soon as possible
    - If a patient’s neck is angulated and the patient expresses pain or the neck does not easily straighten during attempts to move to a midline position the neck should be immobilized in the position found.
  - The patient should be placed on and immobilized to a backboard prior to movement / transport in a manner that is consistent with minimizing spinal motion.

- **PENETRATING INJURY:**
  1. Cover any sucking chest wounds with a 3 sided occlusive dressing.
  2. Cover any bowel evisceration with moist, sterile dressing and keep warm.
  3. Stabilize impaled objects.
  4. Splint any possible fractures appropriately.

(Continued)
TRAUMA
(Continued)

• HEAD INJURY:
  1. Check for CSF or blood in ears, nose, or mouth.
  2. If skull depression possible, cover with loose, sterile dressing.
  3. If laceration without depression, apply pressure dressing to control bleeding.
  4. Be alert for loose objects in mouth.

• FRACTURES:
  1. Assess distal circulation, movement, sensation, and range of motion. Reassess after splinting.
  2. Immobilize fracture above and below site.
  3. Do not apply pressure to fracture site.
  4. Elevate fractured extremities.
  5. Apply ice packs indirectly to fracture site.
  6. If open fracture, do not apply traction or replace protruding bones.
  7. If closed mid-shaft femur fracture and patient has no life threatening injury, apply traction splint.
  8. If angulated extremity fracture with no distal circulation, attempt to straighten using gentle traction only to the point necessary to restore circulation.

PEARLS

♦ Spinal Immobilization may be omitted at the direction of the on duty field supervisor on responses involving multiple ground transport units if the following conditions are met:
  ♦ No posterior midline cervical spine tenderness to palpation
  ♦ No evidence of alcohol / drug intoxication
  ♦ No altered mental status
  ♦ No focal neurologic deficit
  ♦ No painful distracting injury
  ♦ No communications difficulties
IMPEDANCE THRESHOLD DEVICE - (ResQPod)

PURPOSE

- Use of this impedance threshold device (ITD), the ResQPod is indicated in patients suffering from cardiac arrest to improve blood flow during CPR, over one (1) year of age.
- The ITD, or ResQPod, selectively impedes inspiratory gases from entering the lungs during the decompression phase (upstroke) of CPR. This generates a greater negative pressure in the thorax, allowing for an enhanced venous return to the heart. As a result of greater venous return, increased preload is accomplished, which generates a greater stroke volume during the subsequent compression phase (downstroke) of CPR, which leads to increased blood flow.
- When the ITD, or ResQPod is used with a BVM follow the 30:2 compression to ventilation ratio, pausing compressions for ventilations and do not use the timing light.
- The ventilation timing light should only be used on patients in cardiac arrest with a secured airway (e.g. endotracheal tube or Combitube). Ventilations may be performed asynchronous to chest compressions in this setting.

CONTRAINDICATIONS

- This device should not be used in the patients presenting with any of the following:
  - Dilated cardiomyopathy
  - Congestive heart failure
  - Pulmonary hypertension
  - Aortic stenosis
  - Flail chest

PROCEDURE

1) Select the airway adjunct (mask, endotracheal tube, Combitube, etc...)
2) Attach bag-valve device with ETCO2 detector affixed between the bag-valve and the ITD, or ResQPod.
3) Begin CPR, ensuring proper rate and depth, and allowing for complete chest recoil during the decompression phase of chest compressions.
4) Follow the timing light flash with one-second inspiratory phase ventilations on the intubated patient.

PEARLS

- Use of this device must be discontinued once ROSC has been achieved, or when CPR is no longer necessary.
IMPLANTABLE CENTRAL VENOUS PORT ACCESS

PURPOSE

To provide a means of venous access in those patients with an implantable central venous access port (Port-a-Cath)

This should be used as a last means of access.

PROCEDURE

1) This is a sterile procedure and use of an assistant is necessary.
2) Locate the venous access device and cleanse the area with a chlorhexidine swab.
3) Don sterile gloves and have an assistant open the Huber needle package and a 10 cc sterile saline syringe.
4) Connect the 10 cc syringe to the Huber needle and flush.
5) Stabilize the skin over the port taking care not to contaminate the area.
6) Grasping the wings of the Huber needle, gently but firmly insert the needle to its stopping point.
7) Aspirate for return of blood and flush with 10 ml normal saline.
8) Clamp port and exchange saline syringe for heparin flush
9) Connect heparin flush (100 units/ml) and flush with 5 ml (500 units).
10) Connect IV tubing and ensure proper infusion. Be certain the line continues to flow.
11) Insert sterile, slotted 2 x 2's under the wings of the Huber needle.
12) Secure in place with large transparent dressing.

PEARLS

♦ It is important not to remove this needle in the field, even if there is difficulty in the line flowing.
♦ Remember to use sterile procedures and precautions throughout.
NASOGASTRIC / OROGASTRIC TUBE INSERTION

PURPOSE

- Insertion of a nasogastric / orogastric tube should be performed on the intubated patient to provide a means for relieving gastric distention.

CONTRAINDICATIONS

- Signs of a basilar skull fracture
- Mid-face fractures
- Esophageal bleeding or disease

PROCEDURE

1) Examine the nostrils and select the most appropriate one for insertion. Orogastric insertion is acceptable as well.
2) Select appropriate sized tube
3) Measure from the tip of the nose to the earlobe, then to the xiphoid process to determine the appropriate length.
4) Lubricate the first four inches of the tube with a water-soluble lubricant.
5) Insert to the back of the throat and then caudally to the desired depth.
6) Check for proper placement by injecting 20-30 cc of air using a cath-tip syringe while listening over the epigastrum.
7) Secure in place by taping to the nose or to the endotracheal tube.
8) Suction may be applied to facilitate relieving distention.
NASOTRACHEAL INTUBATION

PURPOSE

To protect the airway and oxygenate/ventilate the patient when orotracheal intubation is not possible or not desirable

PROCEDURE

1) Ventilate with 100% oxygen
2) Select an appropriate endotracheal tube size that approximates patient’s nares
3) Intubate using right nasal passage if possible
4) Lubricate cuff and distal end of tube with water-soluble jelly or 2% Lidocaine Jelly
5) Apply BAAM™ whistle to assist in listening for inspiration
6) Place bevel against floor or septum of nasal cavity and advance tube until the tip reaches the posterior pharyngeal wall
7) Twist tube counterclockwise (clockwise if in the left nare) slightly as tube advances
8) Listen for breath sounds and advance tube through as the cords open (inspiration)
9) Tube should be placed at 27-28 cm mark at the nares in most adult patients
10) Listen for air escaping out of the tube upon exhalation after inflating the cuff and sealing the mouth & nose.
11) Confirm tube placement using ETCO2 and by auscultation of breath sounds
12) Secure tube and recheck placement frequently

PEARLS

♦ Do not perform if:
  1. Patient has major facial trauma
  2. Brain matter is present in the nose
  3. Excessive force is needed in order to pass the tube
  4. Patient is exhibiting signs and symptoms of vocal cord spasms
♦ Performance of a Sellick’s Maneuver may improve the chance of passage into the trachea
♦ Use of a directionally controlled tip ET tube is beneficial when performing nasal intubation
• Pain management should be considered for all patients in pain, including multi-systems trauma victims. Fentanyl is the drug of choice for these patients.

ASSESSMENT REQUIREMENTS
• ABC’s
• Blood pressure, pulse, respirations
• Pulse oximetry
• ECG monitor appropriate to patient condition
• Pain Level

REQUIRED TREATMENTS
• Airway management and oxygen therapy appropriate to patient condition

AVAILABLE TREATMENT OPTIONS
• IV access
• Nitrous Oxide - self administered 50% Nitrous Oxide / 50% Oxygen PRN
• Ketorolac
  • Adult 15-30mg IV or 30-60mg IM
  • Pediatric (>10 years) 10-15mg IM or IV
• Morphine
  • Adult - 2-5 mg IV – Repeat PRN
  • Pediatric - 0.05 – 0.1 mg/kg IV – Repeat PRN
• Fentanyl
  • Adult - 0.5 – 1 mcg/kg slow IV repeat PRN up to a maximum total dose of 3 mcg/kg
  • Pediatric - 0.5 mcg/kg slow IV repeat PRN at 0.25 mcg/kg up to a maximum total dose of 1 mcg/kg or 100 mcg
• Promethazine PRN for nausea and / or vomiting
  • Adult - 12.5 mg IV or 25 mg IM
  • Pediatric - 0.25 mg / kg IV or 0.5 mg/kg IM

PEARLS
• Rule out other possible causes of abdominal pain prior to treating any patient for kidney stones (see Abdominal Pain protocol)
• Beware of synergistic effect of combining Promethazine with Morphine or Fentanyl, causing profound decreases in level of consciousness, respiration, and blood pressure

(Continued)
PAIN MANAGEMENT

(Continued)

- **Nitrous Oxide** should be considered for all patients that have no cardiac / respiratory compromise
- **Morphine** is the treatment of choice for burns (when available)
- **Fentanyl** may be administered to patient’s that are allergic to **Morphine**, however you must remain prepared for a possible allergic reaction
- Do not administer **Ketorolac** to patient’s with potential bleeding
- Pain management may be indicated and provided in multiple system trauma
- Intubation equipment and **Naloxone** must be readily available when administering pain medications
PEDIATRIC INTUBATION

PURPOSE

To provide guidelines for pediatric advanced airway management that addresses the anatomical and physiological differences of the pediatric population.

PROCEDURE

• The size of the endotracheal tube should be based upon one of the following:

  1. The Broselow Tape

  2. For patients over the age of two years old, the following formula may be utilized:

      \[
      \text{TUBE SIZE} = \frac{\text{AGE IN YEARS} + 16}{4}
      \]

  3. For patients < 2 years old, the following chart may be used:

      - Premature Infant: 2.5 - 3.0 mm
      - 0 - 6 Months: 3.0 - 3.5 mm
      - 6 MO - 1 Yr.: 3.5 - 4.0 mm
      - 1 - 2 Years: 4.0 - 5.0 mm

• It is important to replace any endotracheal tube with a larger one if a leak is present that precludes adequate chest expansion.

• Because the infant and child's trachea is short, the best way to prevent right mainstem intubation while decreasing the risk of extubation (due to the tube being placed too close to the vocal cords, especially with uncuffed tubes) is to:

  1. intentionally place the tube into the right mainstem bronchus

  2. while listening to the left lung field, withdraw the tube slowly until good lung sounds are heard

  3. compare the two sides

  4. It is very important to adequately secure uncuffed endotracheal tubes.

• A cuffed endotracheal tube is acceptable in children greater than one month old.

• All children < 5 years of age shall be pre-medicated with Atropine Sulfate 0.02 mg/kg prior to Rapid-Sequence Induction.

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PEDiatric intraosSeous access

purpose
To provide an alternate route in the pediatric patient who is difficult to access via the intravenous or central venous access points of the body.

indications
Intraosseous access may be employed in the pediatric patient who is <40 kg and whom you are unable to obtain peripheral IV access after 2 attempts or 90 seconds, and they present with one of the following conditions:

- Cardiac arrest
- Hypovolemia with profound AMS
- Altered mentation with a GCS <8
- Hemodynamic instability
- Severe respiratory compromise
- Emergent need for medicinal therapy or volume replacement in the critical patient
- Status epilepticus
- Severe burns

contraINDICATIONS

- Suspected fracture of the tibia or femur
- Previous orthopedic procedures (knee replacement, etc.)
- Infection over the insertion site
- Excessive tissue over the insertion site
- Inability to locate the three anatomical landmarks
- Compromised extremity due to a preexisting medical condition (tumor or peripheral vascular disease)
- Patients at risk for non-transport
- Recent IO insertion in the same bone (within the last 24 hours)

procedure
1) Select the appropriate site for insertion:
   a. Locate the patella
   b. Identify the tibial tuberosity, just inferior to the patella
   c. Move 1 finger width below and then 1 finger width medially from the tibial tuberosity to locate the appropriate insertion site on the proximal tibia.
2) Cleanse the site with "Chloraprep" prior to any insertion attempts.
3) Prepare the EZ/IO driver and needle set.
4) Stabilize the leg and insert the EZ/IO needle set into the appropriate site on the proximal tibia (stop when you feel a pop or slight decrease in resistance).
5) Remove driver from the needle set.
6) Remove the stylet from the catheter.

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7) Confirm proper placement:
   a. IO catheter standing at 90 degrees and firmly seated in the tibia.
   b. Blood at the tip of the stylet.
   c. Aspiration of bone marrow.
   d. A free flow of fluid without evidence of extravasation.

8) Attach IV tubing.

9) Flush the IO space with 10cc of NaCl (Failure to flush may result in a limited flow or no-flow situation).

10) Initiate the infusion.

11) Secure the catheter with a dressing.

PEARLS

- The conscious patient may experience a visceral type pain during infusion. To reduce the patient’s discomfort administer 0.5 mg/kg of 2% lidocaine slowly into the IO space, and then immediately follow with a 10cc NaCl flush. Pain relief should last for approximately one hour.

- After insertion of the device if a no flow situation occurs gently back the catheter out approx. 1mm while twisting slightly. Once the catheter has been backed out, flush the IO space with 10cc's of NaCl.

- A pressure bag, or BP cuff, may be applied as needed to infuse the solution at the desired flow rate.

- If the initial IO insertion fails do not attempt a second insertion into the same leg. If a second attempt is required utilize the patient’s other leg.

- Watch for extravasation and potential complications associated with interstitial fluid accumulation leading to compartment syndrome.

- When administering medications always utilize the extension set provided with the device. Attaching a syringe directly to the catheter increases the potential for dislodgement and extravasation.

- During transfer of care the receiving facilities staff must be informed about the placement of the IO device, and the necessity for it to be removed no later than 24 hours after initiation.
POSITIVE END EXPIRATORY PRESSURE

PURPOSE

- To improve oxygenation in the intubated patient when hypoxemia is due to pulmonary edema or the presence of other fluids within the lungs (pneumonia) or hypoxemia due to atelectasis.
- May be utilized in the intubated, hypoxemic patient, as defined by an $S_pO_2 < 90\%$, when the hypoxemia is believed to be due to pulmonary edema, other pulmonary fluids, or atelectasis, and when the patient has not responded to endotracheal intubation and the delivery of 100% $O_2$.
- Should not be utilized when the patient has a systolic b/p < 90 mmHg, or in the presence of low cardiac output states.

PROCEDURE

1) The PEEP valve may be placed in-line, when indicated, while continuing to provide 100% $O_2$. The initial amount of PEEP should be 5 cm $H_2O$.
2) Monitor b/p closely and if the addition of PEEP significantly lowers the b/p, the amount of PEEP should be decreased.
3) Pulse oximetry should be continuously monitored and no further PEEP should be added if the $S_pO_2 > 90\%$
4) PEEP should be added in increments of 2.5 cm $H_2O$ and shouldn’t exceed 10 cm $H_2O$

PEARLS

- If transporting a patient from one medical facility to another (for instance, an outpatient surgery center to a hospital) and PEEP has already been established and the patient is tolerating it, continue at the previously established level. If PEEP has not been established and the transferring physician requests that it be established at a particular level, not following the above guidelines, the physician should accompany the patient to the receiving facility.
- PEEP can have drastic influences on the cardiovascular system. In the prehospital setting, it should only be used in case where hypoxemia is threatening the patient’s life. In the properly intubated patient receiving 100% $O_2$, the need to provide PEEP will be very rare. Do not attempt to improve oxygenation in the hypotensive patient by using PEEP.
PULSE OXIMETRY

PURPOSE

- To monitor the oxyhemoglobin saturation in the capillary circulation.

PROCEDURE

1) The probe should be applied to a finger or toe.
2) The LED side of the probe should be applied to the nailbed
3) Radial pulse should be taken to confirm pulse rate

PEARLS

- Application to pulseless or cold extremities will result in inaccurate determinations of hemoglobin saturation
- False readings may be indicated by extremely rapid changing or fluctuating readings, as well as, inability of the monitor to estimate the pulse accurately
- The heart rate may not accurately reflect the pulse rate in that it is possible to have a lower pulse rate than heart rate
- Oxygen saturation readings are unreliable in the patient suffering from carbon monoxide poisoning. The pulse oximeter can not distinguish carboxyhemoglobin from oxyhemoglobin.
RAPID SEQUENCE INDUCTION
(Requires on-duty Supervisor supplemental report to Clinical Manager)

PURPOSE
This procedure is authorized by the medical director to be performed by approved paramedics only. Those authorized as PI or PII paramedics may perform this procedure only under the direction of a PIII paramedic. It is designed to secure the airway in any patient requiring endotracheal intubation which cannot be performed without proper sedation and paralysis, by administering neuromuscular blocking agents in combination with sedative/hypnotic agents.

INDICATIONS
This procedure may be used when a critical need for endotracheal intubation exists. This includes, but is not limited to the following:

- Patients with airway and/or ventilatory compromise that cannot tolerate an awake intubation.
- Combative patients with airway compromise or the potential for airway compromise exists.
- Closed head injured patients or those with altered mental status with airway/ventilation compromise, or the potential for airway compromise exists.
- Patients with hypoxia refractory to 100% oxygen administration or CPAP.
- Multi-systems trauma patients that require a secure airway.
- Status epilepticus.
- Respiratory failure or impending respiratory failure.

CONTRAINDICATIONS
- Patients in whom a surgical airway would be difficult or impossible (i.e. massive swelling or significant neck injury).
- Patients that would be difficult, or impossible to intubate or ventilate after paralysis (i.e. unresolved upper airway obstruction or acute epiglottitis).

RELATIVE CONTRAINDICATIONS FOR SUCCINYLCHOLINE (ANECTINE)
If one of the following is present, paralysis must be reevaluated on a risks versus benefits basis.

- Pre-existing hyperkalemia or risk for hyperkalemia such as:
  - Renal failure patients
  - Crush injury > 1 week ago
  - Major burns > 24 hours ago
  - Spinal cord injury between 1 week to 6 months ago
- Neuromuscular disorders such as Multiple Sclerosis, Muscular Dystrophy, amyotrophic lateral sclerosis (a.k.a. ALS or Lou Gehrig’s Disease)
- History of malignant hyperthermia

PROCEDURE – The Seven “P’s” of Rapid Sequence Induction

Preparation: Paralysis minus ~5 minutes

1) Apply all monitoring devices (SpO₂, ECG, ETCO₂, NIBP); If available dedicate a single provider to monitor these parameters.
2) Assemble and check laryngoscope, blades, BVM, with suction on and readily available.
3) Prepare ET tube, check cuff for integrity, stylet, syringe, and lubricant.
4) Ensure patent IV access.
5) Draw up all medications into labeled syringes or prepare prefilled syringes.
6) Have gum elastic bougie, Combitube, and surgical airway kit (Rusch QuickTrach) within reach and ready for use.
7) Use L-E-M-O-N to assess for the potential difficult intubation.
8) Use intubation bagel(s) for head-elevated laryngoscopic position (HELP), if desired and no cervical spine injury is suspected.

(Continued)
Preoxygenation: Paralysis minus ~4 minutes

9) A pulse oximetry reading greater than 92% is desired prior to intubation, with 100% being the preferred starting point. *This may not be possible on all patients.*
10) Administer 100% oxygen and have them take 4-10 vital capacity breaths if possible.
11) Use cricoid pressure to prevent gastric insufflation if BVM ventilation is required and no gag reflex is present.
12) If SpO₂ persists at 92% or less with 100% oxygenation and BVM ventilation then a crash airway situation exists.
   • If believed to be uncomplicated, then proceed with intubation.
   • If believed to be complicated or if not successful within three attempts, proceed to Combitube insertion.

Pretreatment: Paralysis minus ~3 minutes

13) Consider **Lidocaine 1 mg/kg IV** if suspected increased ICP.
14) Consider **Atropine 0.02 mg/kg IV**
   • Maximum total adult dose: **3 mg/kg**
   • Minimum single dose both child & adolescent: **0.1 mg**
   • Maximum single dose - child: **0.5 mg**
   • Maximum single dose - adolescent: **1 mg**
15) Continue 100% oxygenation and ventilation if required.
16) *Position yourself for the best attempt at intubation.*

Paralysis:

17) Administer **Etomidate (Amidate) 0.3 mg/kg IV.**
18) Within 30 seconds the patient should become completely sedated.
19) Administer **Succinylcholine (Anectine) 1-1.5 mg/kg IV.** *Never administer this medication without ensuring sedation.*
20) Within 30 seconds the patient should become completely flaccid and paralyzed.

Protection: Paralysis plus ~15 seconds

21) Cricoid pressure must be applied and maintained until ET tube placement is assured and cuff is inflated.
22) Ventilate with 100% O₂ and BVM if indicated and if possible to increase SpO₂.
23) Position the patient for intubation. Ensure neutral cervical alignment and precautions if cervical spine precautions are indicated; and, the “sniffing” or HELP position otherwise.

Placement with Proof: Paralysis plus ~45 seconds

24) Use backward-rightward-upward-pressure (BURP maneuver; laryngeal manipulation) if needed or desired for full view of glottic anatomy and vocal cords.
25) Perform intubation and inflate cuff.
26) Confirm placement by visualization of the ET tube passing through cords, ETCO₂ detection and continuous capnography monitoring, epigastrum and chest auscultation, and SpO₂ monitoring.
27) If three attempts at intubation are made without success, then proceed to Combitube insertion.
28) If Combitube insertion cannot be accomplished and a “cannot ventilate, cannot intubate” situation exists then cricothyrotomy is indicated.

(Continued)
Post Intubation: Paralysis plus ~1 minute

29) Continue ventilation and 100% oxygenation with bag-valve device.
30) Continue to monitor SpO\textsubscript{2}, ETCO\textsubscript{2}, ECG, pulse, and BP.
31) Secure ET tube with commercial ET tube holder.
32) Consider Midazolam (Versed) 1-2 mg SIVP titrated prn for continued sedation if needed, and if systolic BP remains > 100 mm Hg, to a total maximum dosage of 0.1 mg/kg.
33) Consider Vecuronium (Norcuron) 0.05-0.1 mg/kg IV for continued paralysis if needed. *Never administer this medication without ensuring sedation.*

PEARLS

♦ Once a neuromuscular blocking agent is given, you assume complete responsibility to maintain the airway and adequate ventilations. With administration of these agents you have taken away the patients will and ability to breathe.
♦ In a patient with adequate oxygenation, ventilation, and normal pulmonary function, the paramedic should have several minutes of laryngoscopy time. This may not be the case with your patient. You must monitor SpO\textsubscript{2} continuously and initiate BVM ventilation if oxygen saturation falls below 92%.
♦ To ensure successful endotracheal tube placement it is imperative that the first, and subsequent attempts if needed, are the best attempts. Proper positioning of the patient, positioning yourself, and having all potential equipment readily available are paramount.
♦ Continually monitor SpO\textsubscript{2} and ETCO\textsubscript{2} after intubation and reconfirm tube placement each time the patient is moved.
♦ After paralysis and intubation are accomplished, continued paralysis may be necessary to manage the patient. Some sign of recovery from the initial dose of the induction agent (sedative) and paralyzing agent should be observed (i.e. skeletal muscle movement, increasing HR, increasing BP, or lacrimation) before administering Midazolam (Versed) or Vecuronium (Norcuron).
♦ If the initial effects of the induction agent dissipate and you re paralysis the patient they will still have cognizant awareness and sensory function. Additionally, further sedation may be all that is needed.
Between 1 and 3% of patients who require endotracheal intubation have airways that make intubation difficult. Recognizing those patients who may have a difficult airway allows you to proceed with greater caution and to keep as many options open as possible. The pneumonic LEMON is useful in evaluating patients for signs that may be consistent with a difficult airway and should further raise your 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 ("buck teeth")
  - High arching palate, receding mandible
  - Short bull neck

**Evaluate 3-3-2 Rule: Thyromental Anatomy**

- 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 system takes into account the anatomy of the mouth and the view of various anatomical structures when the patient opens their 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 their 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
Rapid Sequence Induction

(Continued)

L-E-M-O-N Difficult Airway Assessment

Obstruction ?:

- Besides the obvious difficulty if the airway is obstructed with a foreign body, you should also consider other obstructions such as tumor, abscess, epiglottitis, or expanding hematoma.

Neck Mobility:

- If the patient is able, ask them 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. Assess for neck rigidity secondary to disease process or disorder as obtained during physical exam or history.
RESTRAINT – PHYSICAL AND CHEMICAL
(Chemical restraint requires on-duty Supervisor supplemental report to Clinical Manager)

ASSESSMENT REQUIREMENTS

- ABC’s
- Blood pressure, pulse, respirations
- Pulse oximetry
- Blood glucose monitoring
- ECG monitor appropriate to patient condition
- Pulse, motor response, and sensation of all extremities
- Prior to restraint, and under the given circumstances, perform as detailed a history and physical exam as possible, to differentiate psychiatric from non-psychiatric (organic) causes of excited delirium

REQUIRED TREATMENTS

- Airway management and oxygen therapy appropriate to patient condition
- Apply soft restraints to all extremities and secure to stretcher (or backboard if spinal motion restriction is indicated)

AVAILABLE TREATMENT OPTIONS

- IV access
- Midazolam 0.05 – 0.1 mg/kg IM to achieve IV or a more manageable patient – Field Supervisor Authorization Only
- Following IM administration, Midazolam may be administered IV if needed, in 1-2 mg doses not to exceed 5 mg total via the IV route – Field Supervisor Authorization Only

PEARLS

- Restraint should only be used when necessary for patient care. Acceptable uses are:
  - To protect patient from harming themselves or others
  - Allow assessment and treatment of violent or uncooperative patients
  - Prevent elopement of patients that may pose a threat to themselves or others
  - It is never acceptable to apply restraint as an act of discipline or for convenience of the crew
- Intubation equipment must be readily available when administering any medications
- It is imperative to be cognizant of the patient with excited delirium syndrome and be vigilant against positional and restraint asphyxia.
- Continued monitoring of the patient's airway, ventilatory, and circulatory status are essential
- Never restrain a patient in the prone position
- Examples of organic causes of excited delirium include neurological diseases, drug intoxication or poisoning, withdrawal syndromes, hypoxia, etc…
SEDATION

ASSESSMENT REQUIREMENTS

• ABC’s
• Blood pressure, pulse, respiration’s
• Pulse oximetry
• ECG monitor appropriate to patient condition

REQUIRED TREATMENTS

• Airway management and oxygen therapy appropriate to patient condition
• IV access

AVAILABLE TREATMENT OPTIONS

To alleviate the discomfort associated with external pacing or cardioversion
For pain management during electrical therapy:
  • Fentanyl 0.5 - 1 mcg/kg slow IV repeat prn at 0.25 – 0.5 mcg/kg up to a maximum total dose of 3 mcg/kg (Fentanyl may be the preferred choice in this setting)
  OR,
  • Morphine 2 - 5mg IV – Repeat prn

For sedation during electrical therapy:
  • Midazolam 1 - 2 mg titrated prn not to exceed 5 mg IV

For sedation post-intubation:
  • Midazolam 1-2 mg IV titrated prn for continued sedation if needed, and if systolic BP remains > 100 mm Hg, to a total maximum dosage of 0.1 mg/kg

PEARLS

• Beware of synergistic effect of combining Promethazine with Morphine or Fentanyl, causing profound decreases in level of consciousness, respiration’s, and blood pressure
• Intubation equipment and Nalaxone must be readily available when administering any medications
• Sedation for airway management is only acceptable after intubation has been accomplished and proper tube placement has been verified by ETCO2. The patient must not have hypotension or bradycardia.
SURGICAL CRICOTHYROTOMY

PURPOSE

- To provide an emergency airway when other means have failed
- This is the method of last resort at establishing an airway

PROCEDURE

Shiley (preferred) or Endotracheal Tube

1) Cricoid pressure shall be applied and maintained continuously.
2) Prepare and assemble all equipment
   - #11 or #15 scalpel
   - Trousseau dilator
   - Tracheal hook
   - Chlorhexidine swab
   - Appropriate size endotracheal tube or Shiley tracheostomy tube
   - Stylet or Eschmann Tracheal Tube Introducer
   - 10 ml syringe
3) The cricothyroid membrane is the preferred site and should be identified by the attendant performing the skill. Careful dissection to the appropriate spot may be required in some patients.
4) Prepare the site with a chlorhexidine swab
5) Make a 1.5-2 cm **vertical incision** through the skin overlying the cricothyroid membrane.
6) Bluntly dissect the skin and fatty tissue overlying the trachea to visualize the cricothyroid membrane.
7) Make a **horizontal incision** through the cricothyroid membrane into the trachea.
8) Insert the Trousseau dilator and spread the cricoid ring and thyroid cartilage apart
9) Insert the tracheal hook and support the thyroid cartilage.
10) Insert the Shiley with obturator in place. Or insert endotracheal tube until cuff is fully inside the trachea.
11) Remove obturator from Shiley, insert inner cannula, and inflate cuff.
12) Check breath sounds, confirm placement, and secure in place.

(Continued)
SURGICAL CRICOTHYROTOMY
(Continued)

Rusch QuickTrach
1) Stabilize the larynx laterally between the thumb and forefinger. Locate the puncture site as above.
2) Prepare the site with a chlorhexidine swab
3) Firmly hold the device and puncture the cricothyroid membrane at a 90 degree angle.
4) Check the entry of the needle into the trachea by aspirating air through the syringe.
5) Change the angle of insertion to 60 degrees and advance the device forward into the trachea to the level of the stopper and remove the stopper.
6) Hold the needle and syringe firmly and slide only the plastic cannula along the needle into the trachea until the flange rests on the neck. Carefully remove the needle and syringe.
7) Secure the cannula with the neck strap, apply the connecting tubing to the 15 mm connection, and connect the other end to the bag-valve-device.
8) Check breath sounds and confirm placement

Melker Cricothyrotomy Catheter Set
1) Stabilize the larynx laterally between the thumb and forefinger. Locate the puncture site as above.
2) Prepare the site with a chlorhexidine swab
3) Make a 1.5-2 cm vertical incision through the skin overlying the cricothyroid membrane using the short #15 short handle scalpel blade.
4) With the supplied 6 cc syringe attached to the 18 gage TFE catheter introducer needle, advance it through the incision into the airway at a 45 degree angle to the frontal plane in the midline.
5) When advancing the needle forward, verification of entrance into the airway can be confirmed by aspiration on the syringe resulting in free air return.
6) Remove the syringe and needle, leaving the TFE catheter in place.
7) Advance the soft, flexible end of the wire guide through the TFE catheter and into the airway several centimeters.
8) Remove the TFE catheter, leaving wire guide in place.
9) Advance the handled dilator, tapered end first, into the connector end of the airway catheter until the handle stops against the connector.
10) Advance the assembly over the wire guide until the proximal stiff end of the wire guide is completely through and visible at the handle end of the dilator.
11) Maintaining the wire guide position, advance the assembly over the wire guide with a reciprocating motion, and completely into the trachea.
12) Remove the wire guide and dilator simultaneously.
13) Fix the catheter in place with the cloth tracheostomy tape strip in a standard fashion.

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14) Connect the catheter using the 15-22 mm adapter to a bag-valve-device.
15) Check breath sounds and confirm placement.
TERMINATION OF RESUSCITATION

PURPOSE
Termination of advanced life support efforts in the pre-hospital setting will apply to situations in which adult patients experience a primary cardiac arrest. The decision to implement the policy may be initiated by the Field Supervisor in accordance with the standing orders set forth in this policy by the CCEMS Medical Director.

PROCEDURE FOR MEDICAL ARRESTS
1) Resuscitation efforts will not be terminated in patients meeting the following criteria:
   - The patient whose cardiac arrest may be secondary to some other event
   - The patient who has persistent ventricular fibrillation or ventricular tachycardia
   - The patient who has had a return of a spontaneous pulse (even a transient pulse)
   - The patient who demonstrates any neurological signs
   - The patient who has suffered cardiac arrest while in the care of CCEMS personnel
   - The patient who does not have a secure endotracheal tube and IV in place
2) Resuscitation efforts may be terminated in patients meeting the following criteria:
   - The patient must be greater than 18 years of age
   - The patient must have experienced a primary cardiac arrest
3) Resuscitative efforts by CCEMS personnel shall be at least 20 minutes regardless of previous CPR time and arrest interval, with a documented ETCO2 < 10 mmHg.
4) If the patient meets criteria for termination the ICP or Field Supervisor should approach the family or responsible party about termination of the resuscitative efforts.
5) In the event that any family member or responsible party indicates their objection to the concept of termination of resuscitation efforts, the resuscitation efforts shall continue until care is assumed by the receiving emergency room physician.
6) Once the approval to terminate the resuscitation efforts is acknowledged by the family or responsible party, the EMS crew shall tie off all IV lines close to the insertion site and remove the IV fluid bag and any other supplies at the code site. The IV catheters and endotracheal tube shall remain in place.
7) Law enforcement should be notified
8) At all times, CCEMS personnel shall be attentive to the psychological needs of the “survivors” and provide support as needed
9) A supplemental report shall be completed
TRAUMATIC CARDIAC ARREST

PURPOSE

To provide a means of terminating resuscitation, or withholding resuscitative efforts on those patients suffering a cardiac arrest from a traumatic origin.

This procedure is reserved for those patients 18 years of age or older.

This procedure is also reserved for those patients that are not hypothermic.

PROCEDURE

1) Blunt, or penetrating traumatic cardiac arrest: Resuscitation may be terminated or withheld if the patient presents with the following:
   i) No spontaneous movement
   ii) Apnea
   iii) Pulselessness
   iv) No pupillary reflexes
   v) No organized ECG activity

2) Consider termination of resuscitation in those patients receiving resuscitative efforts from first responders when the above criteria are found.

3) Consider traumatic cardiac arrest patients with transport time of greater than 15 minutes to be non-salvageable.

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VISUAL ACUITY ASSESSMENT
(Snellen Eye Chart)

PURPOSE

To provide a means of assessing visual acuity in the patient with an eye injury.

PROCEDURE

1) Hold Snellen Eye Chart six (6) feet away from patient’s eyes
2) Check eyes separately by having patient cover each eye
3) Check both eyes together
1) Document right eye (OD), left eye (OS), and both eyes (OU) visual acuity by charting which smallest line was read correctly
Medication

Acetaminophen (Tylenol)

Medication

An analgesic / antipyretic that has weak anti-inflammatory activity and no effects on platelets or bleeding time.

Mechanism of Action

Reduces fever by acting directly on the heat regulating center of the hypothalamus.

Indications

Fever of any etiology.

Contraindications

None.

Side Effects

Rarely, gastric irritation.

Dosage & Administration

- 15 mg/kg PO, q 4-6 hours.

Special Considerations

- Do not administer if last administration was < 4 hours ago.
Adenosine  
(Adenocard)

MEDICATION
A naturally occurring, rapid acting, antiarrhythmic agent effective in the treatment of Paroxysmal Supraventricular Tachycardia (PSVT).

MECHANISM OF ACTION
• Slows electrical conduction and can interrupt the re-entry pathways through the A-V node
• Antagonized by methylxanthines (caffeine, Theophylline) and potentiated by dipyridamole
• Adenosine is not blocked by Atropine.

INDICATIONS
• Narrow-Complex Tachycardia (PSVT)
• Wide-Complex Tachycardia

CONTRAINDICATIONS
• 2° or 3° A-V block (except in patients with a full functioning artificial pacemaker).
• Sick Sinus Syndrome (except in patients with a full functioning artificial pacemaker).
• Hypersensitivity
• Should be used with caution in pregnant women.
• Should be used with caution in patients who are wheezing

SIDE EFFECTS
• May produce a short lasting 1°, 2°, or 3° AVB which should be treated following the appropriate protocol. Patients who develop high-grade block after administration of one dose of Adenosine should not be given additional doses.
• Due to the antagonistic effect of methylxanthines, larger doses of Adenosine may be necessary in the presence of methylxanthines.
• Due to the potentiation by dipyridamole, smaller doses of Adenosine may be effective in the presence of dipyridamole.
• facial flushing, headache, shortness of breath/dyspnea, lightheadedness, vertigo, and nausea.
• Due to the very short half-life of Adenosine (≈ 10 sec.), these side effects should be short lasting.
• May produce bronchoconstriction

DOSAGE & ADMINISTRATION
• Adenosine should be given as a RAPID bolus IVP (over 1-2 seconds). It should be given as proximal as possible and followed by a rapid fluid flush (at least 10 ml).
  - Initial: Adult - 6.0 mg, Pediatric - 0.1 mg/kg
  - Subsequent: Adult - 12.0 mg; may be repeated once more, Pediatric - 0.2 mg/kg
  - Maximum single dose: 12 mg
  - Maximum total dose: 30 mg

SPECIAL CONSIDERATIONS
♦ The medication should be inspected for particulate matter prior to administration.
♦ If crystallization occurs, dissolve crystals by warming to room temperature.
♦ Because the half-life of Adenosine is ≈ 10 seconds, adverse effects are generally rapidly self-limiting.
♦ Treatment of any prolonged adverse effects should be individualized and directed towards the specific event.

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Albuterol Sulfate
(Proventil)

**MEDICATION**

Albuterol is a relatively selective $\beta_2$ adrenergic bronchodilator. It is clear, colorless to light yellow, solution

**MECHANISM OF ACTION**

Albuterol produces bronchial smooth muscle relaxation and like other $\beta$ adrenergic agonists, it can produce significant cardiovascular effects in some patients, as measured by pulse rate, blood pressure, and/or ECG changes.

**INDICATIONS**

Albuterol may be administered for the relief of bronchospasm in adults and children with reversible obstructive airway disease and acute attacks of bronchospasm.

**CONTRAINDICATIONS**

Albuterol should not be administered to patients with known hypersensitivity to any of its components. It should be used with caution in patients with:
- cardiovascular disorders, especially coronary insufficiency
- cardiac arrhythmias and hypertension
- convulsive disorders
- hyperthyroidism
- diabetes

**SIDE EFFECTS**

The following are possible, but occur infrequently in patients given albuterol by inhalation:
- body tremors, headache, insomnia
- hypertension, arrhythmias
- bronchospasm
- urticaria, angioedema, rash

**DOSAGE & ADMINISTRATION**

Albuterol is supplied in single unit dose plastic “bullets” of 2.5 mg/3.0 ml and is administered via hand held or face mask nebulizer. Nebulization with albuterol may be continued until respiratory status improves.

**SPECIAL CONSIDERATIONS**

- Any $\beta_2$ adrenergic agonist may have a clinically significant cardiac effect
- Accurate documentation of pulse rate before, during, and after nebulization treatment must be noted
Amiodarone HCl
(Cordarone)

MEDICATION

Antiarrhythmic

MECHANISM OF ACTION

a) Sympatholytic
b) Blocks Na⁺ and K⁺ channels
c) Negative inotrope and chronotrope
d) Slows conduction/prolongs refractoriness
e) Vasodilation

INDICATIONS

VFIB/Pulseless VTACH
Wide Complex Tachycardia
Ventricular Ectopy

CONTRAINDICATIONS

a) Known hypersensitivity
b) Hypotension
c) Bradycardia or high-degree AVB

SIDE EFFECTS

a) Hypotension
b) Bradycardia & AVB
c) Liver enzyme elevations
d) N/V
e) Fever

DOSAGE & ADMINISTRATION

Adult:
Loading:  Ventricular Fibrillation 300 mg SLOW IV repeat after 5-10 minutes at 150 mg SLOW IV
  Ventricular Ectopy 150 mg / 10 min
  Wide Complex Tachycardia 150mg SLOW IV
Repeat  Ventricular Fibrillation 150 mg SLOW IV
Maintenance: 15mg/min Infusion (150 mg / 100 ml NaCl)

Pediatric:
  Ventricular Fibrillation 5 mg/kg (max 300mg) IV/IO, repeat at 5 mg/kg with a maximum dose of 150 mg. Total dose should not exceed 25 mg/kg or 2.2 g in 24 hours.
  Narrow / Wide Complex Tachycardia 5mg/kg in 100cc over 10-20 minutes (max 150 mg), may repeat x3 to a max dose of 20mg/kg or 600 mg

SPECIAL CONSIDERATIONS

a) Infusion needs to be started within 20-25 minutes after bolus administration
b) Do not administer Amiodarone at the same time or through the same IV line as Sodium Bicarbonate without flushing the line adequately
Aspirin

MEDICATION

Aspirin (Acetylsalicylic acid) is an analgesic, antipyretic, and anti-inflammatory. It also inhibits platelet aggregation thus making it a beneficial antithrombotic.

MECHANISM OF ACTION

Aspirin inhibits the synthesis of thromboxane A\textsubscript{2}, which induces platelet aggregation, by inhibiting a metabolic enzyme necessary for its production.

INDICATIONS

Acute Coronary Syndromes

CONTRAINDICATIONS

Hypersensitivity

SIDE EFFECTS

a) prolonged bleeding time
b) gastric irritation
c) N/V

DOSAGE & ADMINISTRATION

325 mg - (4) 81 mg chewable tablets PO (baby aspirin)

SPECIAL CONSIDERATIONS

None
Atropine Sulfate

**MEDICATION**

Atropine is a naturally occurring autonomic nervous system inhibitor extracted from the Atropa belladonna plant (deadly nightshade).

**MECHANISM OF ACTION**

a) Blocks parasympathetic (vagal) action of the heart.
b) Improves cardiac output by ↑ rate of sinus node discharge, enhance conduction through the A-V junction, and ↑ heart rate
c) By ↑ heart rate to normal range, Atropine ↓ the chance of ectopic activity in the ventricles.

**INDICATIONS**

a) Sinus bradycardia when accompanied by PVC’s or hypotension
b) 2° or 3° AVB when accompanied by bradycardia.
c) 2nd line medication in asystole
d) Neurogenic shock when the patient’s heart rate is < 60.
e) Organophosphate poisoning

**CONTRAINDICATIONS**

Atropine should not be used in patients presenting with atrial flutter or atrial fibrillation where there is rapid ventricular response. Patients with known history of glaucoma should not be given atropine.

**SIDE EFFECTS**

a) blurred vision, headache, pupillary dilation
b) dry mouth, thirst
c) dysuria

**DOSAGE & ADMINISTRATION**

**ADULT**

Atropine may be given IM or IV

a) Bradycardia/AVB: 0.5 mg IV q 5 min. until desired heart rate is achieved to a Max: 3 mg
b) Asystole: 1.0 mg IVP q 5 min. to a Max. of 3 mg
c) Organophosphate poisoning ( S/S - nausea, diaphoresis, epigastric & substernal tightness, abdominal cramps, profuse salivation, dyspnea, muscle twitching, weakness, paralysis, seizure-like activity ): 2.0 mg IM and/or 1.0 mg IV prn to maintain heart rate > 100/min. and/or clear lung sounds.

**PEDIATRIC**

0.02 mg/kg

Dosing other than organophosphate poisoning:

| Minimum single dose both child & adolescent: 0.1 mg |
| Maximum single dose - child: 0.5 mg |
| Maximum single dose - adolescent: 1.0 mg |
| Maximum total dose - child: 1.0 mg |
| Maximum total dose - adolescent: 2.0 mg |

**SPECIAL CONSIDERATIONS**

a) Atropine may precipitate VTACH or VFIB and therefore should be used with caution in the setting of an AMI.
b) Doses < 0.5 mg in an adult (0.1 mg in pediatrics), or a dose given too slowly, may ↓ rather than ↑ the heart rate.
Calcium Chloride

MEDICATION

A salt solution used to ↑ the calcium content of the blood in disorders resulting from a lack of sufficient calcium, such as hypocalcemic tetany. Calcium chloride is administered intravenously.

MECHANISM OF ACTION

In the past, calcium chloride was believed to be beneficial in resuscitation, stimulating the heart to beat in asystole and to strengthen cardiac contractions in PEA.

INDICATIONS

- Magnesium sulfate or calcium channel blocker overdose
- Cardiac arrest in a patient with a history or renal failure
- Pain/muscle spasms associated with a black widow spider bite

CONTRAINDICATIONS

Calcium chloride should be given with extreme caution, and in reduced dosage to patients taking digitalis; given too rapidly, calcium can cause sudden death from VFIB.

SIDE EFFECTS

Calcium chloride may cause irritability in the presence of digitalis and precipitates when mixed with sodium bicarbonate.

DOSAGE & ADMINISTRATION

- Adult: 0.5 - 1 gram SLOW IV
- Pediatric: 20mg/kg (0.2ml/kg) SLOW IV. May repeat in 10 minutes.

SPECIAL CONSIDERATIONS

a) Should not be administered IM or SQ
b) Causes tissue irritation and necrosis if infiltrated.
50% Dextrose

MEDICATION

A simple sugar of the monosacharose group, dextrose occurs naturally in plants and in the body fluids of animals. It is formed in the digestive tract by the action of enzymes on carbohydrates.

MECHANISM OF ACTION

The administration of 50% Dextrose raises circulating blood-sugar levels. It also acts transiently as a diuretic.

INDICATIONS

a) Hypoglycemia
b) Unconsciousness of unknown origin
c) Seizure of unknown origin

CONTRAINDICATIONS

Sugar should not be administered to any patient presenting with S/S of central nervous system pathology unless they are hypoglycemic.

SIDE EFFECTS

a) Must be administered through a patent IV line to prevent tissue necrosis due to infiltration
b) Administration of dextrose may precipitate severe neurologic symptoms in the alcoholic patient. Thiamine should be administered prior to $D_{50}$ in patients presenting with possible alcohol abuse or who appear malnourised.

DOSAGE & ADMINISTRATION

It is important that blood be drawn prior to the administration of $D_{50}$ and that patent IV access has been established.

Adult: 25 grams IVP (50 ml of $D_{50}$)
Children: 0.5 grams/kg; (dilute to 25% Dextrose for infants < 1 year old)

SPECIAL CONSIDERATIONS

50% Dextrose is a relatively thick solution and is more easily administered through a large bore catheter.
Diazepam  
(Valium)  

MEDICATION  
A tranquilizer derived from benzodiazepine, with muscle-relaxant and anticonvulsant properties, is used to relieve anxiety and tension and for the treatment of seizure disorders.

MECHANISM OF ACTION  
Induces calming effects by its action on the thalamus and hypothalamus, and has no demonstrable peripheral autonomic blocking action. Diazepam enhances the action of the inhibitory neurotransmitter GABA by acting at the GABA receptor.

INDICATIONS  
a) status epilepticus and severe, recurrent convulsive seizures  
b) sedation prior to cardioversion or external pacing  
c) airway management

CONTRAINDICATIONS  
a) alcohol or sedative ingestion  
b) glaucoma  
c) shock, coma, or acute alcoholic intoxication with ↓ V/S  
d) caution in pregnancy, especially the 1st trimester

SIDE EFFECTS  
a) drowsiness, confusion, stupor, fatigue  
b) ataxia  
c) hypotension  
d) in some patients, especially the elderly, the very ill, and those with pulmonary disease, may cause respiratory arrest and/or cardiac arrest.

DOSAGE & ADMINISTRATION  
The dosage should be individualized for maximum beneficial effect and injected slowly.

a) The usual total dosage for older children and adults ranges from 2-20 mg depending on the indication and its severity.  
b) Total dosages up to 40 mg may be necessary for control of seizure activity  
c) Lower doses (2-5 mg) and slow increase in dosage should be used for elderly or debilitated patients and when other sedative drugs are administered.  
d) Pediatric: in order to obtain maximal clinical effect with the minimum amount of medication, the drug should be given slowly in a dosage not to exceed 0.25 mg/kg

SPECIAL CONSIDERATIONS  
a) In order to reduce the possibility of venous thrombosis, phlebitis, local irritation, swelling, and rarely, vascular impairment, should be injected slowly and small veins, such as those on the dorsum of the hand or wrist, should not be used. Extreme care should be taken to avoid extravasation.  
b) Should not be mixed or diluted with other solutions or medications.  
c) Intravenous Diazepam should be injected slowly through the infusion tubing as proximal as possible to the catheter insertion point.  
d) Aspiration of blood into the IV tubing should be performed prior to injection to ensure patency of the IV line.
Diltiazem
(Cardizem)

MEDICATION
Calcium channel blocker

MECHANISM OF ACTION
a) Slows conduction through the A-V node
b) Vasodilation
c) ↓ rate of ventricular response
d) ↓ myocardial oxygen demand

INDICATIONS
a) Narrow-complex tachycardia refractory to Adenosine
b) AFIB w/ RVR (>130 min)
c) Hypertensive crisis where NTG is contraindicated

CONTRAINDICATIONS
a) Hypotension
b) Wide-complex tachycardia
c) Conduction system disturbances
d) Wolff-Parkinson-White Syndrome

SIDE EFFECTS
a) Nausea
b) Vomiting
c) Hypotension
d) Dizziness

DOSAGE & ADMINISTRATION
20-25 mg (0.25 mg/kg) SLOW IVP

SPECIAL CONSIDERATIONS
None
Diphenhydramine  
(Benadryl)

MEDICATION

An antihistaminic agent that is a crystalline powder, freely soluble in water and alcohol.

MECHANISM OF ACTION

Produces anticholinergic (drying) and sedative effects on patients. Its antihistamine characteristic appear to compete with histamines for cell receptor sites on effector cells.
   a) Blocks histamine effects that are caused by allergic reactions.
   b) It reverses the side effects of Phenothiazines, antipsychotic medications.
   c) Reduces or prevents motion sickness.

INDICATIONS

a) anaphylactic shock and severe allergic reaction
b) oculogyric crisis due to extrapyramidal symptoms (EPS, Parkinson-like movement disorders) caused by the use of Phenothiazines
   c) motion sickness

CONTRAINDICATIONS

a) pregnancy
b) asthma
c) glaucoma or prostate problems
d) known alcohol or depressant abuse

SIDE EFFECTS

a) drowsiness, confusion
b) blurred vision
c) dry mouth
d) dysuria
e) wheezing due to thickening of bronchial secretions
f) excitability in pediatric patients

DOSAGE & ADMINISTRATION

Adults: 50 mg IV or deep IM or 25 mg IV / 25 mg deep IM
Pediatric: 1-2 mg/kg, not to exceed 50 mg in a single dose IV or deep IM

SPECIAL CONSIDERATIONS

a) Should be used as an adjunct to epinephrine and other standard measures after the acute symptoms of anaphylaxis have been controlled.
b) Antihistamine overdosage reactions may vary from central nervous system depression to stimulation.
c) Vasopressors may be used to treat hypotension.
**Dopamine HCl**  
(Intropin)

**MEDICATION**

A catecholamine synthesized by the adrenal gland, is the immediate precursor in the synthesis of norepinephrine.

**MECHANISM OF ACTION**

Acts as a \( \beta \) sympathetic mediator causing an ↑ in the force and rate of cardiac contractions as well as dilatation of renal and mesenteric arteries.

a) exerts an inotropic effect on the myocardium resulting in an ↑ cardiac output
b) does not significantly ↑ myocardial O\( _2 \) consumption and its use is not usually associated with a tachyarrhythmia.
c) dilates renal vasculature( ↑ urinary output )
d) Action of this medication is dependent on the dosage level:
   i. low dosages (1-2 \( \mu g/kg/min. \)), \( \beta \) effects predominate - ↑ myocardial contractility, dilation of renal and mesenteric arteries
   ii. moderate dosages (5-10 \( \mu g/kg/min. \)), ↑ cardiac output
   iii. moderately high dosages (10-20 \( \mu g/kg/min. \)), peripheral vasoconstriction and ↑ b/p
   iv. high dosages (> 20 \( \mu g/kg/min. \)), \( \alpha \) effect reverses dilation of renal and mesenteric vessels and ↓ flow through these vessels.

**INDICATIONS**

For management of blood pressure control (↑ cardiac output ) in shock or shock-like states while maintaining good renal blood flow.

**CONTRAINDICATIONS**

a) Do not mix with sodium bicarbonate  
b) Uncorrected tachyarrhythmias or VFIB.  
c) Serious acute hypertension may develop in patients with pheochromocytoma

**SIDE EFFECTS**

a) ectopic beats, palpitations, tachycardia  
b) N/V  
c) dyspnea, angina  
d) headache

**DOSAGE & ADMINISTRATION**

May be given by titrated, IV infusion using a microdrip set. If pre-mix unavailable, add 200 mg of dopamine to 250 ml of D\( _5 \)W yielding a concentration of 800 \( \mu g/ml \).

Administer 5 \( \mu g/kg/min. \), titrating the infusion to effect on level of consciousness and b/p

**SPECIAL CONSIDERATIONS**

Increases contractility of the myocardium and may be detrimental in patients with severe myocardial ischemia.
Epinephrine HCl
(Adrenaline)

MEDICATION
An endogenous catecholamine with nonselective $\beta_1$, $\beta_2$, and $\alpha$ properties. It is an adrenergic agent and cardiac stimulant.

MECHANISM OF ACTION
a) Rapid intravenous injection produces a rapid rise in b/p, mainly systolic b/p.
b) Given slowly IV, usually produces a moderate rise in systolic and a fall in diastolic pressures. Although some ↑ in pulse pressure occurs, there is usually no great elevation in mean b/p.
c) The $\beta$ effect: ↑ myocardial contractility, ↓ the threshold for defibrillation, bronchodilation.
d) The $\alpha$ effects: causes vasoconstriction, thus ↑ the perfusion pressure.

INDICATIONS
a) Anaphylaxis / severe allergic reaction
b) Cardiac Arrest

CONTRAINDICATIONS
There are no contraindications for the use of epinephrine in cardiac arrest or anaphylactic shock. The medication should be used with caution:
a) Hypertension, angina, and hyperthyroidism.
b) Immediately following administration of sodium bicarbonate, which may inactivate epinephrine.
c) Patients receiving other medications that sensitize the myocardium to the actions of sympathomimetic drugs.

SIDE EFFECTS
a) palpitations
b) tachycardia
c) ectopy
d) hypertension
e) dysrhythmias
f) cerebral hemorrhage
g) hemiplegia
h) subarachnoid hemorrhage
i) anginal pain
j) anxiety/restlessness
k) throbbing headache
l) tremor
m) weakness
n) vertigo
o) pallor
p) respiratory distress

DOSAGE & ADMINISTRATION

<table>
<thead>
<tr>
<th></th>
<th>Adult</th>
<th>Pediatric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Arrest</td>
<td>Standard: 1-5 mg IV</td>
<td>Initial: 0.01-0.03 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Subsequent: 0.01-0.03 mg/kg</td>
<td></td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>0.3-0.5 mg SQ (1:1000)</td>
<td>0.01 mg/kg SQ (1:10,000)</td>
</tr>
<tr>
<td></td>
<td>0.3-0.5 mg IV (1:10,000)</td>
<td>0.005 mg/kg IV (1:10,000)</td>
</tr>
<tr>
<td>Infusion (1:1 mix)</td>
<td>1 mg in 100 ml of NaCl, titrate to maintain b/p</td>
<td></td>
</tr>
</tbody>
</table>

SPECIAL CONSIDERATIONS
a) Intravenous injection produces an immediate and intensified response. Following IV injection, disappears rapidly from the bloodstream.
b) In cases of anaphylaxis and asthma, if the patient presents with pale, cool, and diaphoretic skin (shock), should be administered via the intravenous route rather than the subcutaneous route.

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**Etomidate**  
(Amidate)

**MEDICATION**

A non-barbiturate hypnotic without analgesic properties. In therapeutic doses, has minimal effect on myocardial metabolism, cardiac output, and peripheral or pulmonary circulation. It may also reduce intracranial pressure.

**MECHANISM OF ACTION**

A sedative-hypnotic used to induce anesthesia that will last $\approx 3-10$ minutes.

**INDICATIONS**

Induction of anesthesia prior to administration of a neuromuscular blockade

**CONTRAINDICATIONS**

None when used as indicated

**SIDE EFFECTS**

a) Cardiovascular: hypotension, arrhythmias, hypertension  
b) Pulmonary: hyperventilation, hypoventilation, laryngospasm  
c) CNS: myoclonus, tonic movement, eye movements  
d) GI: N/V

**DOSAGE & ADMINISTRATION**

$0.3 \text{ mg/kg IV}$

**SPECIAL CONSIDERATIONS**

a) Use with caution in patients with focal epilepsy.  
b) Injection into small veins will likely cause pain.  
c) Myoclonus may be reduced by premedication with Valium.
**Fentanyl Citrate**  
(Sublimaze)

**MEDICATION**

Narcotic analgesic with rapid onset and short duration

**MECHANISM OF ACTION**

Therapeutic actions are analgesia and sedation

**INDICATIONS**

Pain associated with orthopedic injuries, renal colic, Acute Coronary Syndromes, and burns  
As an adjunct to Airway Management

**CONTRAINDICATIONS**

- Shock  
- Severe hemorrhage  
- Known hypersensitivity  
- Hypotension  
- Symptomatic Bradycardia

**SIDE EFFECTS**

1. Respiratory depression  
2. Altered mental status  
3. Dizziness

**DOSAGE & ADMINISTRATION**

- Adult - 0.5 – 1 mcg/kg slow IV repeat PRN up to a maximum total dose of 3 mcg/kg  
- Pediatric - 0.5 mcg/kg slow IV repeat PRN at 0.25 mcg/kg up to a maximum total dose of 1 mcg/kg or 100 mcg

**SPECIAL CONSIDERATIONS**

Alterations in respiratory rate and alveolar ventilation may last longer than the analgesic effect.  
Appears to have less emetic activity than other narcotics
Furosemide
(Lasix)

MEDICATION

A potent diuretic

MECHANISM OF ACTION

Inhibits sodium reabsorption in the kidneys promoting diuresis. It is also thought to cause venous dilation, decreasing venous return. Is a rapid acting diuretic with peak effects within 30-60 minutes of administration.

INDICATIONS

a) Pulmonary edema associated with congestive heart failure
b) Hypertension associated with pulmonary edema or SOB

CONTRAINDICATIONS

Because of the potency of this medication, blood pressure must be monitored carefully during administration
Should not be given to:
 a) Pregnant patients
b) Hypokalemia
c) Hypovolemia and/or dehydration

SIDE EFFECTS

d) N/V
e) Potassium depletion
f) Dehydration

DOSAGE & ADMINISTRATION

Adults: 0.5-1 mg/kg IV over 2 minutes – maximum 120mg IV
Pediatric: 0.5-1 mg/kg IV over 2 minutes

SPECIAL CONSIDERATIONS

If the patient is currently taking PO Furosemide, consider giving IV Furosemide at double the patients’ total daily dose up to a maximum dose of 120mg IV.
Glucagon
(Glucagen)

MEDICATION

Antihypoglycemic hormone

MECHANISM OF ACTION

Causes glycogen to breakdown into glucose
Inhibits glycogen synthesis
Elevates blood glucose level
Increases cardiac contractile force and heart rate by stimulating production of cyclic AMP

INDICATIONS

Hypoglycemia – only when IV access and Dextrose administration are not possible
Symptomatic beta-blocker overdose with bradycardia and / or hypotension

CONTRAINDICATIONS

Known hypersensitivity

SIDE EFFECTS

1. Respiratory depression
2. Altered mental status
3. Dizziness

DOSAGE & ADMINISTRATION

Hypoglycemia
Adult: 1 – 2 mg IM
Pediatric: 0.3 mg/kg IM

Beta-Blocker Overdose
Adult: 2 mg IV
Pediatric: 0.3 mg/kg IM, 2 mg maximum

SPECIAL CONSIDERATIONS

Only effective when there are sufficient stores of glycogen in the liver. Use with caution in patients with cardiovascular or renal disease.
Heparin

MEDICATION

Heparin sodium is an anticoagulant agent used in the ST-Elevation MI (STEMI) as a 5000 unit/ml solution. Heparin sodium flush is an anticoagulant agent used in flushing implanted central catheters as a 100 unit/ml solution.

MECHANISM OF ACTION

Heparin sodium is a glycosaminoglycan anticoagulant normally occurring in mast cells. It acts as a catalyst by increasing the rate at which antithrombin III neutralizes antithrombin and activated coagulation factor X.

INDICATIONS

ST-Elevation MI in the Cath Lab Procedure (5000 units/ml)
Flush for implanted central catheters (100 units/ml)

CONTRAINDICATIONS

Hypersensitivity
Recent, or known active bleeding
Known bleeding disorders
Known thrombocytopenia (low platelet count)

SIDE EFFECTS

- prolonged bleeding time
- increased bleeding
- rarely, allergic reaction

DOSAGE & ADMINISTRATION

- STEMI / Cath Lab Alert Procedure (5000 units/ml)
  5000 units IV
- Implanted Central Catheter Flush
  500 units IV through central catheter

SPECIAL CONSIDERATIONS

None
Ibuprofen
(Motrin)

**MEDICATION**
A non-steroidal anti-inflammatory (NSAID) agent that has antipyretic properties

**MECHANISM OF ACTION**
Reduces fever by inhibition of prostaglandins

**INDICATIONS**
Fever above 100.5 F

**CONTRAINDICATIONS**
Severe aspirin allergy
Severe reactive airway disease

**SIDE EFFECTS**
Gastric irritation

**DOSAGE & ADMINISTRATION**
10 mg/kg PO of a concentration of 100mg/5ml, q 6-8 hours

**SPECIAL CONSIDERATIONS**
♦ Do not administer if last administration was < 6 hours ago
**Ipratropium**  
(Atrovent)

**MEDICATION**
Anticholinergic

**MECHANISM OF ACTION**

a) Bronchodilation  
b) Dries respiratory tract secretions

**INDICATIONS**
Acute bronchospasm refractory to Albuterol Sulfate

**CONTRAINDICATIONS**
Hypersensitivity

**SIDE EFFECTS**

a) Palpitations  
b) Dizziness  
c) Anxiety  
d) Headache  
e) Nervousness

**DOSAGE & ADMINISTRATION**

500 μg / 3 ml administered concurrently with Albuterol Sulfate as a "combination" treatment

**SPECIAL CONSIDERATIONS**
None
Ketorolac
(Toradol)

MEDICATION
Non-steroidal anti-inflammatory agent

MECHANISM OF ACTION
a) Analgesia
b) Anti-inflammatory

INDICATIONS
Mild to moderate pain

CONTRAINDICATIONS
a) Hypersensitivity to the drug or aspirin
b) Active bleeding
c) History of peptic ulcer disease
d) Fractures where the potential for excessive bleeding exists

SIDE EFFECTS
a) Edema
b) Rash
c) Heartburn

DOSAGE & ADMINISTRATION

ADULT
15-30 mg IV
30-60 mg IM

PEDIATRIC (use only in children > 10 y/o)
10-15 mg IV or IM

SPECIAL CONSIDERATIONS
a) GI irritation can occur
b) Possible inhibition of platelet function (aggregation) similar to aspirin
**Lidocaine HCl**  
(Xylocaine, Lidocaine Jelly)

**MEDICATION**

A local anesthetic that is used intravenously to treat certain cardiac arrhythmias. Also used topically as an anesthetic.

**MECHANISM OF ACTION**

a) Suppresses ectopy  
b) ↓ the excitability in the myocardium and conduction system  
c) Does not significantly alter conduction or contractility on healthy tissue  
d) ↑ VFIB threshold  
e) Causes only minimal effects on atrial muscle.

**INDICATIONS**

a) PVC’s when they:
   ♦ occur in the context of myocardial ischemia (chest pain)  
   ♦ occur > 6/min.  
   ♦ occur in salvos (2 or more)  
   ♦ fall close to the T wave (R on T phenomenon)  
   ♦ multifocal. 

b) VFIB or VTACH 

c) To prevent the recurrence of VFIB or VTACH after conversion 

d) Prevention and control of the sympathetic response in procedures such as endotracheal intubation or nasogastric tube insertion.

**CONTRAINDICATIONS**

a) Known hypersensitivity  
b) 2° or 3° AVB  
c) Sinus bradycardia or sinus arrest  
d) Idioventricular rhythm

**SIDE EFFECTS**

Due to its mechanism of action, lidocaine may cause a fall in cardiac output and b/p and when given in high doses, especially to the elderly or patients in heart failure, may cause seizure-like activity

**DOSEAGE & ADMINISTRATION**

Initial Bolus: **1.0-1.5 mg/kg** IV  
Subsequent Bolus: **0.5-0.75 mg/kg** IV, MAX: **3 mg/kg**  
Adult Infusion: **2.0-4.0 mg/min.**  
Pediatric Infusion: 20-50 mcg/kg/min IV infusion upon termination of dysrhythmia  
Topical: 2% Jelly in 5 ml plastic tubes, max of 2 for adult usage, 1 for pediatric usage.

**SPECIAL CONSIDERATIONS**

Reduction of dosage should be considered in patients > 70 y/o, patients presenting with ↓ cardiac output (CHF, shock), or those with liver disease.
Magnesium Sulfate

MEDICATION
An electrolyte salt solution

MECHANISM OF ACTION
A cofactor in numerous enzymatic reactions and is essential for the function of the sodium-potassium ATPase pump, it acts as a physiological calcium channel blocker and blocks neuromuscular transmission. Magnesium sulfate is also a potent peripheral vasodilator.

INDICATIONS
a) Refractory VFIB or VTACH  
b) Torsade-de-Pointes  
c) Toxemia of pregnancy

CONTRAINDICATIONS
None when used as indicated

SIDE EFFECTS
a) Cardiovascular: hypotension, circulatory collapse, heart block  
b) Pulmonary: respiratory paralysis  
c) CNS: flaccid paralysis, depressed reflexes  
d) Metabolic: hypocalcemia  
e) Flushing, sweating, hypothermia

DOSAGE & ADMINISTRATION
Cardiac: **1.0-2.0 grams** IV  
Obstetric: **2.0-4.0 grams** SLOW IV  
Pediatric: 25-50mg/kg: max 2g for refractory state and/or for torsades-de-pointes, may repeat

SPECIAL CONSIDERATIONS
Side effects are usually from too rapid administration
MEDICATION

A glucocorticoid medication, used principally to treat severe allergic reaction or respiratory distress.

MECHANISM OF ACTION

Inhibits inflammatory response of tissues due to mechanical, chemical, infectious, inflammatory, or other causes, preserves the integrity of small blood vessels in shock states, increase cardiac output, and stabilizes cellular membranes.

INDICATIONS

a) Anaphylactic shock / allergic reaction
b) Asthma
c) COPD

CONTRAINDICATIONS

a) Known hypersensitivity
b) Closed head injury or cerebrovascular accident

SIDE EFFECTS

Neurological findings may be effected by the administration of Solu-Medrol.

DOSAGE & ADMINISTRATION

Adult: 125 mg SLOW IV or IM
Pediatric: 2.0 mg/kg SLOW IV or IM

SPECIAL CONSIDERATIONS

Documentation of neurological status is essential prior to administration.

Act-O-Vial use:
♦ Press down the plastic activator to force diluent into the lower compartment.
♦ Gently agitate to effect solution.
♦ Remove plastic tab covering center of stopper.
♦ Sterilize top of stopper with a suitable germicide.
♦ Insert needle squarely through the center of stopper until tip is just visible.
♦ Invert vial and withdraw dose.
**Medication**

Beta blocker

**Mechanism of Action**

Metoprolol works by blocking the beta adrenergic receptors thereby depressing the pumping function of the heart which results in a decreased blood pressure and heart rate.

**Indications**

ST-elevation myocardial infarction in those patients being taken directly to the cardiac catheterization lab

**Contraindications**

- Heart rate less than 70
- Systolic blood pressure less than 100 mm Hg
- Presence of AV heart block
- Pulmonary edema as evidenced by crackles

**Side Effects**

- Bradycardia
- Hypotension

**Dosage & Administration**

5 mg slow, repeat once without contraindications
Midazolam
(Versed)

MEDICATION

Potent benzodiazepine sedative/hypnotic, with significant CNS depressant, respiratory depressant, and amnestic properties.

MECHANISM OF ACTION

Midazolam enhances the action of the inhibitory neurotransmitter GABA by acting at the GABA receptor.

INDICATIONS

Post-intubation sedation
Chemical restraint

CONTRAINDICATIONS

Known hypersensitivity
Hypotension (SBP < 100 mmHg)

SIDE EFFECTS

Drowsiness / sedation / hypnosis
Hypotension
Respiratory depression

DOSAGE & ADMINISTRATION

1-2 mg increments, titrated to desired sedation, up to max total of 0.1 mg/kg or SBP < 100 mmHg.

SPECIAL CONSIDERATIONS

This medication is only for use post-rapid sequence induction and intubation.

Monitor vital signs closely and watch for clinically significant hypotension (i.e. SBP <100 mmHg).
Morphine Sulfate

MEDICATION
A naturally occurring narcotic analgesic, derived from the opium poppy, which affects the CNS and GI tract.

MECHANISM OF ACTION
a) Therapeutic actions are analgesia and sedation. The mechanisms involved are quite complex but it appears to increase the patient’s tolerance for pain and to decrease the perception of suffering.

INDICATIONS
a) Ischemic chest pain / anxiety
b) Pain associated with burns
c) Pain associated with orthopedic injuries
d) Sedation for airway management or external pacing if Valium is not sufficient or contraindicated

CONTRAINDICATIONS
a) Known hypersensitivity
b) Premature infants
c) Labor when delivery of a premature infant is anticipated
d) The respiratory depressant effects and its ability to ↑ CSF pressure may be markedly exaggerated in the presence of head injury, other intracranial lesions, or a pre-existing ↑ in intracranial pressure. Must be used with extreme caution and only if its use is absolutely necessary if possibility of CNS pathology exists.
e) Must be used with extreme caution in patients having an acute asthmatic attack, patients with COPD, and patients with pre-existing respiratory depression or hypoxia due to capacity to ↓ respiratory drive while simultaneously ↑ airway resistance to the point of apnea.
f) Should be used with caution and in reduced dosages in the presence of other CNS depressants including, but not limited to tricyclic antidepressants, tranquilizers, barbiturates, and alcohol.

SIDE EFFECTS
a) May produce severe hypotension in an individual whose ability to maintain b/p has already been compromised by depleted blood volume or concurrent administration of Phenothiazines or certain anesthetics.
b) Administration may produce orthostatic hypotension in ambulatory patients.
c) Decrease the cough reflex.
d) Constricts pupils.
e) May precipitate lightheadedness, vertigo, N/V, and sweating.
f) Cardiovascular reactions may include tachycardia, bradycardia, palpitations, faintness, syncope, and orthostatic hypotension.

DOSEAGE & ADMINISTRATION
Adult: 2.0-5.0 mg IV or IM prn
Pediatric: 0.05-0.1 mg/kg IV or IM prn

SPECIAL CONSIDERATIONS
Rapid infusion increases the incidence of adverse reactions. Should not be administered unless a narcotic antagonist and the facilities for resuscitation and controlled respirations are available. Patients should be lying down. Concurrent administration with Promethazine could produce respiratory depression or arrest. Careful monitoring of the patient's respiratory status is essential.

If Morphine is not available – use Fentanyl – see individual protocols for dosing

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Naloxone
(Narcan)

MEDICATION
A synthetic medication that is an opiate antagonist that prevents or reverses the action of morphine and other opioid drugs

MECHANISM OF ACTION
The mechanism of action is not understood but evidence suggests it antagonizes the opioid effects by competing for the same receptor sites. Naloxone will reverse stupor, coma, and respiratory depression when administered to patients having taken narcotics.

INDICATIONS
a) Known narcotic overdose
b) Unconsciousness of unknown etiology

CONTRAINDICATIONS
None

SIDE EFFECTS
Rapid administration may precipitate projectile vomiting and ventricular dysrhythmias and in rare cases, has been reported to cause pulmonary edema and sudden death.

DOSAGE & ADMINISTRATION
Adult: 0.4-2 mg IV, IM, SQ, prn titrated to an improvement in respiratory status
Pediatric: 0.01 mg/kg IV, IM, SQ, prn titrated to an improvement in respiratory status

SPECIAL CONSIDERATIONS
The patient who has satisfactorily responded to narcan should be kept under continued surveillance and repeated doses should be administered as necessary since the duration of action of some narcotics exceed that of narcan.
Nitroglycerin
(Nitrostat, Nitrolingual Spray)

MEDICATION

An organic nitrate; a vasodilating agent.

MECHANISM OF ACTION

a) Dilation of the post capillary vessels, including large veins, promotes peripheral pooling of blood and decreases venous return to the heart, decreases left ventricular end-diastolic pressure (preload).

b) Arteriolar relaxation reduces systemic vascular resistance and arterial pressure (afterload).

c) Myocardial O₂ consumption or demand is decreasing by both the arterial and venous effects, creating a more favorable supply-demand ratio.

INDICATION

a) Ischemic chest pain

b) Hypertensive crisis

c) Pulmonary edema

CONTRAINDICATIONS

Patients taking Viagra
Should be used with extreme caution (or not at all) in patients presenting with:

a) Increased ICP

b) Glaucoma

c) Hypotension

d) Severe anemia

e) Stroke / intracerebral hemorrhage

SIDE EFFECTS

a) Transient, throbbing headache

b) Vertigo

c) Hypotension / postural hypotension

d) Palpitations

e) Weakness

DOSAGE & ADMINISTRATION

0.4 mg SL metered-dose spray q 5 min prn up to 5 administrations

SPECIAL CONSIDERATIONS

Should be administered to patients sitting or semi-reclined

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**Nitrous Oxide**  
(Nitronox)

**MEDICATION**

A gas that, when mixed with oxygen, acts to relieve pain.

**MECHANISM OF ACTION**

Is absorbed through the alveoli by inhalation. It depresses the central nervous system and relieves pain.

**INDICATIONS**

Any pain, either alone or in conjunction with other agents

**CONTRAINDICATIONS**

a) Alcohol or drug intoxication  
b) Head injury with altered mental status  
c) Respiratory distress  
d) Pneumothorax

**SIDE EFFECTS**

a) Headache  
b) Dizziness  
c) N/V

**DOSAGE & ADMINISTRATION**

A self-administered inhalation consisting of 50% nitrous oxide/50% oxygen

**SPECIAL CONSIDERATIONS**

Use in well ventilated areas

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Oxytocin (Pitocin)

MEDICATION

Oxytocin, a naturally occurring hormone produced by the pituitary gland, is manufactured synthetically.

MECHANISM OF ACTION

Synthetic oxytocin acts on the smooth muscle of the uterus to stimulate contractions. It exerts a selective action on the smooth musculature of the uterus. The contracting uterus squeezes down on uterine blood vessels and thereby reduces postpartum bleeding.

INDICATIONS

Oxytocin may be administered after the 3rd stage of labor for the management of postpartum hemorrhage. In the field, oxytocin should be administered only after the placenta has been delivered.

CONTRAINDICATIONS

a) Obstetrical emergencies where the benefit-to-risk ratio for either the fetus or the mother favors surgical intervention.
b) Fetal distress where delivery is not imminent.
c) Where the uterus is already hyperactive or hypertonic.
d) Patients who are hypersensitive to the medication.
e) Situations where vaginal delivery is contraindicated.
   i) cord presentation or prolapse
   ii) placenta previa

SIDE EFFECTS

a) Anaphylactic reaction
b) Postpartum hemorrhage
c) Cardiac arrhythmia
d) Fatal afibrinogenemia
e) N/V
f) PVC’s
g) Pelvic hematoma

DOSAGE & ADMINISTRATION

20 units IV INFUSION

SPECIAL CONSIDERATIONS

Careful monitoring of the patient during administration is essential.
Promethazine
(Phenergan)

MEDICATION

Antihistamine (H₁ antagonist)

MECHANISM OF ACTION

a) Mild anticholinergic activity
b) Antiemetic
c) Potentiates action of analgesics

INDICATIONS

Profound nausea and/or vomiting

CONTRAINDICATIONS

a) Altered mental status
b) Evidence or history of a head injury
c) Alcohol or other respiratory depressant use

SIDE EFFECTS

a) Altered mental status (drowsiness)
b) Local venous irritation or phlebitis

DOSAGE & ADMINISTRATION

ADULTS
12.5 mg IV
25 mg IM

PEDIATRIC
0.25 mg/kg IV
0.5 mg/kg IM

SPECIAL CONSIDERATIONS

a) Concurrent administration with Morphine Sulfate could produce respiratory depression or arrest. Careful monitoring of the patient's respiratory status is essential.
b) Should be diluted in at least 5 ml NaCl before IV administration
MEDICATION

A hypertonic solution used as an electrolyte replenisher and systemic alkaliizer. In water, it dissociates to provide sodium (Na\(^+\)) and bicarbonate (HCO\(_3^-\)) ions.

MECHANISM OF ACTION

Corrects metabolic acidosis by neutralizing excess acid, helping return the blood towards a physiologic pH, in which normal metabolic processes and sympathomimetic agents work more efficiently. In tricyclic antidepressant overdose, alkalinization of serum pH increases protein binding of TCA’s, which significantly lessens the potential for drug toxicity because it reduces the amount of available free drug.

INDICATIONS

a) In cardiac arrest situations where the resuscitation time is prolonged (> 10 min.) and the patient is intubated.

b) Tricyclic antidepressant overdose where the patient is unconscious and the EKG shows QRS complex widening.

CONTRAINDICATIONS

a) Hypokalemia

b) Patients who cannot tolerate a salt load (e.g. CHF)

SIDE EFFECTS

Few when used in the emergency setting

DOSAGE & ADMINISTRATION

Adult & Pediatric

Initial: 1 mEq/kg IV of an 8.4% solution

Subsequent: 0.5 mEq/kg IV of an 8.4% solution

INFANT (< 1 y/o)

Dosage is the same but of a 4.2% solution

SPECIAL CONSIDERATIONS

Administration of sodium bicarbonate must be accompanied by controlled hyperventilation to blow off excess CO\(_2\).
Succinylcholine Chloride
(Anectine)

MEDICATION
A depolarizing neuromuscular blocking agent utilized specifically to facilitate endotracheal intubation by complete paralysis of muscular tone

MECHANISM OF ACTION
Produces complete neuromuscular paralysis by depolarizing the neuromuscular end plate and preventing repolarization. In doing so, it produces minute, but visible muscle movements called fasciculations. The length of effect depends on the dose and the patient’s ability to metabolize the drug. In general for therapeutic dosages, the onset time is ≈ 45 seconds and the effects last ≈ 5 minutes

INDICATIONS
To induce neuromuscular paralysis in order to facilitate endotracheal intubation in those patients requiring mechanical ventilation, improved oxygenation, protection of the airway, and in whom intubation would otherwise be impossible or very difficult.

CONTRAINDICATIONS
a) Patients with old burns (> 24 hrs) and spinal cord injury (> 24 hrs) are particularly susceptible to Succinylcholine and may release large amounts of potassium (K⁺) which could precipitate cardiac arrest.
b) Patients with neuromuscular diseases may be resistant or very sensitive to the effects of succinylcholine
c) If a difficult intubation is anticipated, a reduced dose should be administered (0.5 mg/kg)

SIDE EFFECTS
a) Cardiovascular: hypotension, bradycardia, arrhythmias, tachycardia, hypertension
b) Pulmonary: hypoventilation, apnea, bronchospasm
c) GI: ↑ salivation, ↑ intragastric & lower esophageal pressure
d) ↑ intraocular pressure, hyperkalemia, malignant hyperthermia, myoglobinemia

DOSAGE & ADMINISTRATION
Adult: 1.0-1.5 mg/kg IV or 1.5 – 2.0 mg/kg IM
Pediatric: 2.0 mg/kg IV or IM

SPECIAL CONSIDERATIONS
a) All monitors (ECG, b/p, pulse oximeter) and intubating equipment shall be in place prior to inducing the patient
b) Cricoid pressure shall be maintained until the cuff on the ET tube is inflated
c) Should the intubation be unsuccessful, the patient should be oxygenated and ventilated prior to any further attempts
d) Equipment to perform an emergency needle or surgical cricothyrotomy should be readily accessible

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Tetracaine Ophthalmic Solution

MEDICATION

A local anesthetic agent of the ester linkage type, related to procaine, used topically and by infiltration.

MECHANISM OF ACTION

Prevents initiation and transmission of nerve impulses thereby effecting local anesthesia. Onset of anesthesia usually begins within 30 seconds and lasts a relatively short period.

INDICATIONS

For situations in which a rapid and short acting topical ophthalmic anesthetic is indicated. It is most often used in the field treatment of burns to the eyes.

CONTRAINDICATIONS

Known hypersensitivity

SIDE EFFECTS

Transient reactions may occur, and include stinging, burning, and conjunctival redness. On very rare occasions, a severe, immediate, allergic corneal reaction may occur.

DOSAGE & ADMINISTRATION

1-2 drops prn in injured eye(s)

SPECIAL CONSIDERATIONS

a) Prolonged use results in diminished duration of anesthesia and retarded healing.
b) Patients should be advised not to touch or rub the eye(s) until the effect of the anesthetic has worn off.
c) Any unused portions should be discarded.
Thiamine

MEDICATION

A vitamin of the B complex, occurring naturally and produced synthetically. Widely distributed in various animal and plant foods, especially wheat germ, dry yeast, nuts, legumes, most vegetables, and some meats.

MECHANISM OF ACTION

Essential for the normal metabolism of carbohydrates and fats

INDICATIONS

Beneficial for patients presenting with S/S of alcohol toxicity, Wernicke’s syndrome or Korsakoff’s psychosis. It should be administered prior to D50 and narcan in the unconscious patient of unknown etiology.

CONTRAINDICATIONS

Known hypersensitivity

SIDE EFFECTS

None

DOSAGE & ADMINISTRATION

100 mg IV or IM prior to administering D50

SPECIAL CONSIDERATIONS

a) In alcoholics, thiamine deficiency causes Wernicke’s syndrome, an acute and reversible encephalopathy characterized by ataxia, eye muscle weakness, and mental derangements.
b) A more serious complication of thiamine deficiency is known as Korsakoff’s psychosis, a memory disorder that may be irreversible once it becomes established. Since thiamine is utilized in carbohydrate metabolism, these syndromes may be precipitated by the administration of dextrose to the alcoholic with preexisting thiamine deficiency.
Vasopressin

MEDICATION

Synthetic Pituitary Hormone

MECHANISM OF ACTION

Works by stimulating smooth muscles of the gut and vasculature to contract by stimulating V1 receptors. In addition to this, the kidneys are less able to remove water. Has no cardiac stimulatory properties.

INDICATIONS

Cardiac arrest where excessive cardiac stimulation is undesirable

CONTRAINDICATIONS

Known hypersensitivity

SIDE EFFECTS

1. Cardiac arrythmia
2. Decreased cardiac output
3. Angina
4. Tremor
5. Vertigo
6. Nausea/vomiting

DOSAGE & ADMINISTRATION

40 U IV – Do not repeat
Vecuronium  
(Norcuron)

MEDICATION

A non-depolarizing neuromuscular blocking agent

MECHANISM OF ACTION

Through competitive inhibition, blocks cholinergic receptors at the motor end plate initiating a neuromuscular paralysis within ≈ 3 minutes that lasts ≈ 25-30 minutes

INDICATIONS

To sustain neuromuscular paralysis after the patient has been intubated with an endotracheal tube

CONTRAINDICATIONS

Patient who is not intubated

SIDE EFFECTS

a) Cardiovascular: bradycardia  
b) Pulmonary: hypoventilation, apnea

DOSAGE & ADMINISTRATION

0.05-0.1 mg/kg IV post intubation for continued paralysis

SPECIAL CONSIDERATIONS

None