

Prehospital  
Patient Care Protocols

# Section IV

# Clinical Procedures



Old Dominion EMS Alliance  
1463 Johnston-Willis Drive  
Richmond, VA 23235

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# Prehospital Patient Care Protocols

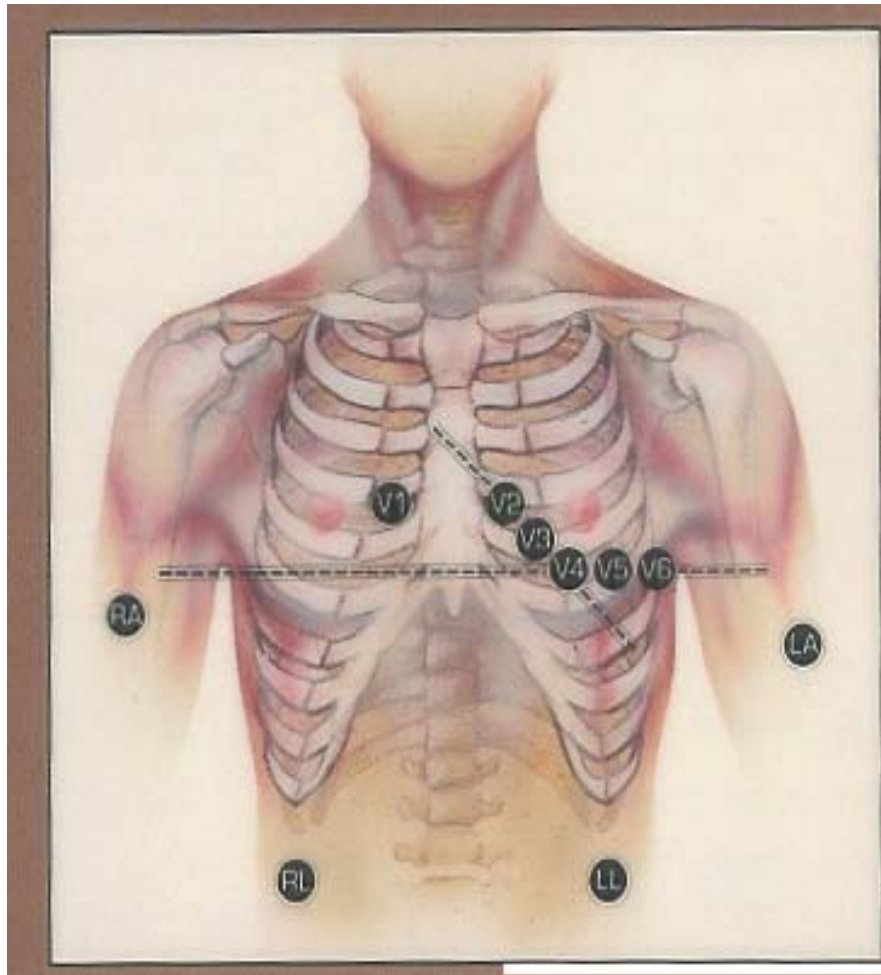
## IV. Clinical Procedures

1.	12 Lead EKG	Page 5
2.	Capnography	Page 7
3.	Chest Decompression	Page 9
4.	Combitube	Page 11
5.	Pulse Oximetry	Page 13
6.	Patient Restraint	Page 15
7.	Adult Sternal IO	Page 19
8.	Surgical Cricothyrotomy	Page 21
9.	Temperature Measurement	Page 23
10.	Synchronized Cardioversion	Page 25

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## 1. 12 Lead EKG

**Overview:** The 12-lead ECG is used to support the clinical diagnosis of Acute Myocardial Infarction (AMI). It is imperative that lead placement is correct.



### **Lead**

- V1** Fourth intercostal space at the right border of the sternum.
- V2** Fourth inter costal space at left border of the sternum.
- V3** Midway between locations V2 and V4.
- V4** At the mid-clavicular line in the fifth intercostal space.
- V5** At the anterior axillary line on the same horizontal level as V4.
- V6** At the mid-axillary line on the same horizontal level as V4 and V5.

**RA & LA** Traditionally placed anywhere on the arm, alternate placement to reduce muscle artifact is midway between the elbow and the shoulder.

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## 2. Capnography

### **A. INDICATIONS:**

Capnography (PETCO<sub>2</sub> monitoring) is a non-invasive method that measures CO<sub>2</sub> in exhaled gases, thus providing an evaluation of ventilatory status. Capnography is to be used as an additional tool to compliment sound clinical skills and patient assessment and is to be used on intubated patients.

**Capnography is strongly recommended on all intubated patients. For any agency with capnography technology, 100% compliance is expected.**

### **PROTOCOL FOR MANAGEMENT:**

#### FOR PATIENTS WHO ARE INTUBATED:

1. Provide ventilatory assistance to maintain CO<sub>2</sub> readings at 35 – 45 (3.5% to 5.5%).
2. Confirm tube placement by auscultating breath sounds.
3. Attach the sensor to the endotracheal tube.
4. As soon as tube placement is verified, make a note of the CO<sub>2</sub> reading and time. Be sure to record these times for documentation.
5. Once tube placement is verified record the time, waveform and CO<sub>2</sub> number on your PPCR.
6. If ROSC record the time correlating with ROSC. Note any change in your CO<sub>2</sub> and record the reading.

### **C. IMPORTANT POINTS:**

1. Not affected by administering drugs down the ET tube.
2. Water or secretions accumulating in the sensor can cause inaccurate readings.
3. The sensor is very easily damaged and should be replaced if inaccurate readings occur.
4. Capnography is a good clinical indicator of successful ROSC and/or effective CPR, because readings within the normal values show organ Perfusion.
5. Causes of increased ETCO<sub>2</sub>:

Fever  
Sepsis  
Sodium bicarbonate administration  
Increased metabolic rate  
Seizures  
Respiratory Depression

Hypoventilation  
COPD  
Rebreathing  
Leak in vent circuit  
Muscular paralysis

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### 3. Chest Decompression

#### A. INDICATIONS:

Patients who are 8 years of age and older and are suspected of having a tension pneumothorax. Contact Medical Control if the pediatric patient is less than 8 or pounds.

**Note: Any patient in cardiac arrest after massive chest trauma should be considered a candidate for prophylactic bilateral chest decompression.**

#### B. PROTOCOL FOR MANAGEMENT:

1. Ensure that the patient has a secured airway.
2. Provide 100% oxygen via non-rebreather mask or BVM.
3. Perform chest decompression at the second intercostals space in the mid-clavicular line on the affected side. An alternate location is the fourth intercostal space mid-axillary line.
4. Use a large-bore needle of appropriate gauge and length. Adult (16yo and older): 14 gauge 1 ¾" – 2 ½". Child (8-15yo): 18 gauge 1 ¾"
5. Insert needle at a 90-degree angle, "hugging" the top of the lower rib. Remove needle and leave catheter in place.
6. Attach an appropriate valve; flutter valve, or syringe, if available.
7. Secure the catheter and valve in place.
8. Continue to monitor conditions for development of a second tension pneumothorax.
9. Transport the patient promptly to the nearest appropriate medical facility.

**Note: If the provider's assessment is incorrect, performing chest decompression can cause a simple pneumothorax.**

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## 4. Combitube

### INDICATIONS:

For use as a primary or alternate (rescue) airway device utilized for airway control in the unconscious patient.

**Note: A failed intubation attempt shall be defined as follows: An ET tube cannot be confirmed to be in the trachea after at least three (3) attempts per patient.**

### CONTRAINDICATIONS:

1. An Intact gag reflex.
2. The patient is less than five (5) feet tall.
3. Patient has known or suspected underlying esophageal and/or laryngeal disease.
4. Significant damage to the cricoid cartilage or larynx (fractured larynx).
5. Transection of the patient's trachea.
6. Known or suspected foreign body airway obstruction.
7. Significant damage to the maxillofacial region
8. Known ingestion of a caustic substance.

### PROTOCOL FOR MANAGEMENT:

1. Gently bend the distal portion of the Combitube to aid insertion.
2. Using the thumb and forefinger of one hand, grasp the tongue and jaw and gently lift the jaw in an anterior and distal motion.
3. Lubrication of the tube is recommended.
4. Insert the tube following the natural curve of the oropharynx.
5. Insert until the printed ring marks at the proximal end of the Combitube lie between the patient's teeth.
6. **DO NOT FORCE THE TUBE INTO PLACE.**

7. Inflate the oropharyngeal balloon (Blue balloon) with 85-100cc of air, using the large syringe.

**NOTE: There may be an outward movement of the Combitube while inflating the balloon.**

8. Inflate the distal balloon (white balloon) with twelve (12) to fifteen (15) cc of air, using the small syringe.

**NOTE: There is a high probability of esophageal insertion. THIS IS NORMAL.**

9. Attempt ventilation through the BLUE TUBE.
10. Confirm esophageal placement:
  - a. Observe chest rise upon ventilation.
  - b. Auscultate abdomen for epigastric sounds.
  - c. If no epigastric sounds heard, continue ventilation.
  - d. **If Epigastric sounds are heard, you may have placed the Combitube in the trachea. Proceed to step 12.**
  - e. Auscultate for bilateral breath sounds.
  - f. Note condensation in the tube with expirations.
  - g. Attach end-tidal CO<sub>2</sub>.
  - h. Attach pulse-oximeter.
11. Secure the Combitube and reassess placement.
12. If tracheal intubation suspected, ventilate via the WHITE TUBE.
13. Confirm tracheal placement:
  - a. Observe chest rise upon ventilation.
  - b. Auscultate for bilateral breath sounds.
  - c. Auscultate abdomen for epigastric sounds.
  - d. Note condensation in the tube with expirations.
  - e. Attach end-tidal CO<sub>2</sub> from the LP-12 and monitor.
  - f. Attach pulse-oximeter from the LP-12 and monitor.
14. Secure the Combitube and reassess placement.
15. If absence of lung sounds, or bilateral lung sounds are not heard: deflate both cuffs completely and pull the tube back 1 to 3 cm. Re-inflate both cuffs; begin again at step 7.
16. If successful tube placement cannot be confirmed, remove the tube and ventilate using basic airway skills.

## **5. Pulse Oximetry**

### **A. INDICATIONS:**

Pulse Oximetry is a non-invasive method that measures hemoglobin saturation of arterial blood, thus providing an evaluation of oxygenation status. Pulse oximetry is to be used as an assessment tool to compliment sound clinical skills. Providers should always rely on their clinical assessment of the patient and follow appropriate protocols. Patients who would most likely benefit from pulse oximetry:

- Difficulty breathing/ shortness of breath
- Altered mental status
- Chest pain
- Hypoventilation or hyperventilation
- Intubated patients who are adequately perfusing
- In the opinion of the Attendant in charge, pulse oximetry is an adjunct to appropriate patient care.

### **B. PROTOCOL FOR MANAGEMENT:**

Obtain your reading and document this reading with the time on your PPCR. Record any changes with the reading and time on your PPCR as noted. It is recommended to record the pulse oximetry with your vital signs

### **C. IMPORTANT POINTS:**

Oxygen WILL NOT be withheld from any patient in need on the basis of pulse oximetry readings.

High oxygen concentration levels does not mean that the patient is stable. Other clinical signs and symptoms MUST be accessed in order to adequately treat the patient.

Oxygen should be administered to maintain saturation  $\geq 95\%$ .

The heart rate reading should be compared to the patient's palpable pulse.

Pulse oximetry does not work well in states of poor perfusion, (cardiac arrest, shock, hypovolemia, hypothermia, and certain drugs).

In the presence of carboxyhemoglobin, (house fires, carbon monoxide poisoning), pulse oximetry gives you a false high reading.

Other clinical considerations: motion, venous pulsation, optic shunting, light interference, nail polish, anemia, intravascular dyes, and dyshemoglobins may cause inaccurate readings.

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## 6. Patient Restraint

### A. INDICATIONS:

This procedure is indicated in patients when it is determined that the only way to have proper patient care is through the use of restraints.

- a) Safe & Controlled access for medical procedures when involuntary patient-interference or resistance is reasonably anticipated.
- b) Evaluation or treatment of combative persons when illness or trauma is suspected to be the cause of the combativeness.
- c) Involuntary treatment of persons without capacity to refuse treatment.

### B. PROTOCOL FOR MANAGEMENT:

- a) Attempt to obtain verbal control of the situation.
- b) Determine if restraints will be needed by provider.
- c) Try to identify other causes for combativeness.
- d) Request Police response for assistance.
- e) **INFORM** Patient that you intend to restrain them and **WHY** (do not use this technique as a threat).
- f) The **MINIMUM** number of providers needed to restrain a patient is 3 with the **RECOMMENDATION** of 5 providers. Use of 5 people is recommended to control each extremity and 1 for the patient's head / airway.
- g) Apply restraints. **ALL** restraints used by EMS will be soft restraints. **If Police restrain the patient with hard restraints, a police officer MUST ride in the ambulance with the patient to the hospital.** Soft restraints should be applied so that the circulation of the extremity is not impaired. It is recommended that providers use doubled 6-ply roller gauze (3 inch). Sheets, triangular bandages and commercial soft restraint are acceptable alternatives.
- h) **ALL Patients will be transported in the Supine Position.**
  - i) Place patient onto backboard or stretcher.
  - ii) Apply chest belt first. This belt goes under the patient's arms not over. It should also be anchored above the patient shoulders and drawn as high as possible on the patient's chest. (See Figure 1)

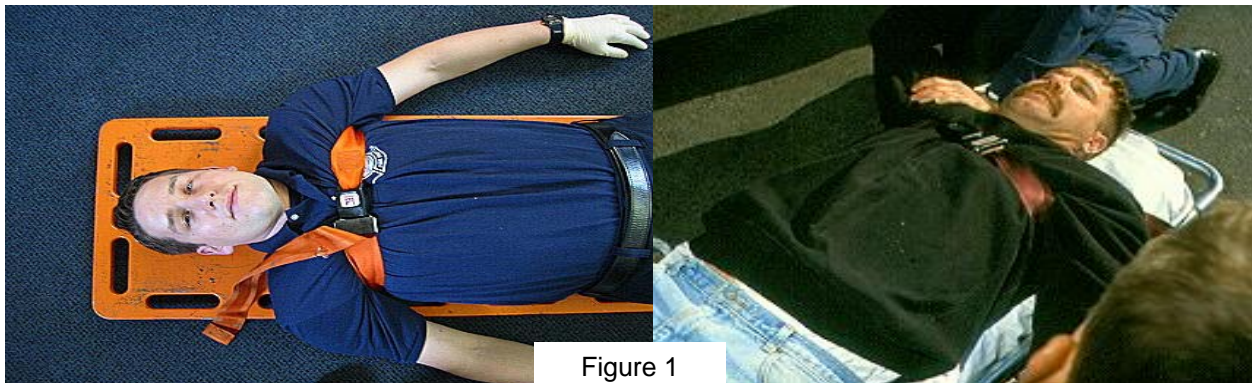


Figure 1



Figure 2

- iii) Apply thigh belt second. This belt should be anchored and engaged above the patients knee (See Figure 2).
- iv) Apply 4-point restraints last. (Each arm and leg as necessary) The 2-point restraint above (Figure 2) may be enough restraint to control patient. (Always use the minimum amount of restraint possible.)
- v) It is recommended to restrain the arms above the wrists and the legs above the ankles. (Figure 3 & 4)
- vi) It is recommended that the dominant arm of the patient be restrained above his head.
- vii) Tie all restraint to “T-Posts” so that the restraint cannot slide (Figure 5).
- viii) Placement of hard collars are optional (Figure 3).



Figure 3



Figure 4



Figure 5 – Side T-Post (Stryker) and Head T-Post (Ferno)



- ix) Once restrained ALWAYS Restrained.
- x) Circulatory checks distal to the restraints need to be done every 15 minutes.
- xi) If a patient begins to have a seizure **CUT / RELEASE THE RESTRAINTS IMMEDIATELY.**
- xii) Documentation must include the following
  - (1) Evidence of patients lack of capacity.
  - (2) Assistance from law enforcement if applicable.
  - (3) Reasons for the restraints.
  - (4) That the treatment and necessity of the restraints was in the patient's best interest.
  - (5) Type of restraint employed.
  - (6) Limbs restrained.
  - (7) Injuries that occurred during or after the restraint.
  - (8) Circulation checks every 15 minutes.

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## **7. Adult IO**

### **A. INDICATIONS:**

1. Patient is in critical need of vascular access for volume replacement or medication administration **and**
2. Delay in obtaining or unable to obtain vascular access via peripheral IV techniques **and**
3. Decreased level of consciousness (GCS < 6 with no purposeful movement) due to medical or traumatic insult or injury.

### **B. CONTRAINDICATIONS:**

**Suspected narcotic overdose and/or hypoglycemia are absolute contraindications for the use of a sternal IO.**

1. Weight less than manufacturer recommended weight.
2. Previous orthopedic surgery of the insertion site bone.
3. Suspected fracture or significant tissue/vascular damage at insertion site.
4. Severe osteoporosis or other bone softening conditions.

### **C: PROTOCOL FOR MANAGEMENT:**

1. Assemble and prepare all equipment.
2. Prep the site with Betadine and clean with alcohol using sterile procedure.
3. Locate landmarks for insertion site.
4. Insert per manufacturers recommendation.
5. Check for infiltration.
6. Secure access.
7. Document procedure on PPCR.

13. Insure Remover Package remains with the patient (unopened) and is forwarded to the ED along with removal instructions (it is recommended that the removal equipment and procedure are taped to the patients cloths or central part of the patients torso).
14. Accurately document the procedure on the PPCR, including justification for using the device.
15. Removal of the device is to be performed by a physician.

## **COMPLICATIONS**

1. Soft tissue infusion from penetration of the posterior wall.
2. Slow infusion from clotting of the marrow.
3. Fat embolism.

## **8. Surgical Cricothyrotomy**

### **A. INDICATIONS:**

This procedure is indicated in patients for whom intubation is indicated for definitive airway control, and **ONLY** when nasotracheal intubation cannot be performed or is contraindicated. If a patient can be effectively ventilated via basic airway management skills, surgical cricothyrotomy should not be performed.

### **B. PROTOCOL FOR MANAGEMENT:**

1. Identify the cricothyroid membrane, which is bounded superiorly by the thyroid cartilage and inferiorly by the cricoid cartilage.
2. Prep the area with betadine, if available. With a scalpel, make a 1cm horizontal incision over the membrane. Use the scalpel to puncture the membrane after the skin incision is made.
3. If landmarks are obscured by marked obesity or subcutaneous air, make a 2cm horizontal incision through the skin, and dissect bluntly down to identify the cricothyroid membrane. Then make a 1cm horizontal incision through the membrane when it is identified.
4. Enlarge the incision with the handle of the scalpel or other appropriate surgical instrument. **NEVER** enlarge the incision with the scalpel blade.
5. Maintain the opening with a "Hook" or other surgical instrument.
6. Insert the appropriate size tracheostomy tube.\* Remove the obturator, ventilate and confirm successful intubation:
  - A. Attach capnograph or end tidal CO<sub>2</sub> monitoring device or use esophageal intubation detector (EID).
  - B. Observe chest rise and fall.
  - C. Auscultate for bilateral breath sounds.
  - D. Look for condensation in the tube.
  - E. Auscultate abdomen for the absence of gurgling to rule out esophageal intubation.
7. Transport the patient promptly to the nearest appropriate hospital.

\* In the absence of a tracheostomy tube, an endotracheal tube may be used. Insert the tube only until the cuff enters the trachea, and then inflate it.

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## **9. Temperature Measurement**

### **INDICATIONS:**

A temperature should be recorded when indicated. Normal body temperature is a range and can be influenced by many factors such as time of day, level of activity, medications, and gender. Normal ranges are as follows:

0 – 2 years	97.5°F – 99.1° F	36.4°C – 38.0°C
3 – 10 years	95.9°F – 99.5° F	36.1°C – 37.8°C
11 – 65 years	96.6°F – 99.7° F	35.9°C – 37.6°C
>65 years	96.4°F – 99.5° F	35.8°C – 37.5°C

### **CONTRAINDICATIONS:**

1. Do not use an ear thermometer if there is blood, drainage, or an obstruction in the external ear canal.
2. Ear thermometers should not be used if there are symptoms of an acute or chronic inflammatory condition of the external ear canal.
3. If the patient is wearing a hearing aid, it must be removed and 20 minutes should elapse prior to obtaining an ear temperature reading.
4. Deformities of the face and/or ear may hinder the ability to obtain an ear temperature.

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## 10. Synchronized Cardioversion

### **INDICATIONS:**

Synchronized cardioversion is indicated for any type of unstable tachycardia with serious signs and symptoms directly related to the tachycardia.

### **CONTRAINDICATIONS:**

1. Asystole, Ventricular Fibrillation, Torsades de Pointes (TdP).

### **PROTOCOL FOR MANAGEMENT:**

1. A brief trial of medications may be administered based on specific arrhythmias. Immediate cardioversion is generally not needed for rates < 150 beats/min.
2. If the situation permits, premedicate whenever possible (e.g. diazepam, lorazepam), with or without an analgesic agent (e.g., morphine).
3. Check oxygen saturation, suction device, IV line, and intubation equipment prior to attempting synchronized cardioversion.
4. Be sure to attach the patient to the monitor using ECG leads.
5. If you are using paddles to cardiovert, be sure to use a conductive medium (i.e. Defib-Gel, or 3M Defib-Pads) to avoid burns to the patient's skin. If you are using self-adhesive defib pads to cardiovert, be sure that they are placed in the appropriate position and make good contact with the patient's skin.
6. Be sure to press the "SYNC" button, and verify by observing a marker above each "R" wave.
7. Charge the defibrillator to the appropriate energy setting, verify no one is touching the patient, and deliver the shock.
8. If the shock is unsuccessful, increase the energy setting to the next appropriate setting, and repeat the above procedure from step 6.

**\*\*NOTE: The synchronized mode must be reset after each shock. Most defibrillators default back to unsynchronized mode to allow an immediate defibrillation in the event of ventricular fibrillation.**

## 10. Synchronized Cardioversion cont'd...

### IMPORTANT POINTS:

If for any reason the defibrillator will not “SYNC”, and the patient is unstable with serious signs and symptoms, DO NOT delay cardioversion. Administer an unsynchronized shock at the appropriate energy setting.

Torsades de Pointes (TdP) should not be cardioverted, as the synchronizer cannot always identify “R” waves, and the patient will usually have a pulse.

\*\*\*Consider Magnesium 1-2 grams IV Push for Torsades de Pointes (TdP).

If the patient is unstable, the patient should be defibrillated at the same settings as pulseless V-Tach/V-Fib.

### ENERGY SETTINGS:

Below is a list of energy settings recommended by various defibrillator manufacturers. We recommend you highlight the setting for your device.

#### Monophasic:

	1st Shock	2nd Shock	3rd Shock	4th Shock
All Devices:	100 J	200 J	300 J	360 J

#### Biphasic:

Device Manufacturer:		1st Shock	2nd Shock	3rd Shock	4th Shock
Physio-Control	<b>50-70 J**</b>	100 J	200 J	300 J	360 J
Zoll	<b>50-70 J**</b>	100 J	120 J	150 J	200 J
Philips	<b>50-70 J**</b>	100 J	150 J	200 J	200 J
Welch Allyn	<b>50-70 J**</b>	100 J	200 J	300 J	360J

NOTE: If you are uncertain of your device's settings, or if your device is not listed here, the AHA recommends a default selection of:

Biphasic Defibrillator of Unknown Type				
	1st Shock	2nd Shock	3rd Shock	4th Shock
<b>50-70 J**</b>	100 J	200 J	300 J	360 J

**\*\* 50-70 Joules (depending on device settings) may be used as the initial dose for PSVT/Atrial Flutter as these rhythms often respond to lower energy settings.**