

To ALL EMS Providers  
**Protocol Clarification Document**

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February 14, 2007

Educators and EMS providers have requested a formal clarification on certain protocols. This protocol clarification document is designed to interpret variations in protocols and to remove inconsistent dosing, route, or joules settings. This is the formal notification that needs to be distributed to every EMS provider; thus MIEMSS is asking to have this document posted in all EMS stations and to have EMS educators review this document in each protocol class and in other educational settings. The topics are listed as they would appear in the *Maryland Medical Protocols for EMS Providers*. **Please make the changes (indicated in shaded blocks) in your own protocol manuals.**

1. **Oxygen administration on page 27 (GPC) when compared to page 117 (Stroke: Neurological Emergencies).** (The lower NC oxygen delivery dose is intentional for Stroke patients.)
  - General Patient Care section states: Administer oxygen at 12-15 lpm NRB to all priority 1 patients (including COPD) and to all priority 2 patients (including COPD) experiencing cardiovascular, respiratory, or neurological compromise.
  - Stroke: Neurological Emergencies. Administer oxygen at 2-6 liters via nasal cannula (unless hypoxic or in respiratory distress).
  - The reason that Stroke patients have a lower oxygen concentration administration is that there is concern that there will be increased oxygen free radical formation which can cause damage to ischemic or injured brain cells. Use 2-6 liters via NC for suspected Stroke patients.
  
2. **Cardiac Emergencies, page 60**
  - Add medication name "Calcium Chloride" to line 3. m).
  
3. **AED Total Number of Shocks before Medical Consultation, pages 76, 138, and 182**

Clarification:

  - The most important question is when do you make the decision whether to stay at the scene and shock the patient while waiting for ALS or to transport the patient (either for ALS rendezvous or to the hospital emergency department). The key is time determined by whether you are using an old AED device or a new AED device. The "old" AED protocol states three stacked shocks, then one minute of CPR; then an additional three stacked shocks and a minute of CPR; then another three stacked shocks if indicated, resulting in a total of 9 shocks, then the required medical consultation. These actions take between 7 and 10 minutes, usually enough time for ALS to arrive and begin the transition of patient

care. But in certain areas of the state where ALS response could be more than 10 minutes, it may be better to transport the patient to an ALS rendezvous point or to the hospital ED. The new AHA guidelines call for single shock sequences that will vary, depending on whether the arrest was witnessed or not witnessed (for example, with unwitnessed arrest, you start with 5 cycles of CPR (about 2 minutes) and then start single shocks. Around the third or fourth shock with this “new” AHA sequence, you should be making the decision whether it is better to stay at the scene and shock the patient while waiting for ALS or to transport the patient to an ALS rendezvous point or to the hospital ED.

#### 4. Pain Management, page 102

- Delete: “or subcutaneously” from line 3. f).
- Clarification: in the moderately to severely ill patient, certain medications are more effectively absorbed through IM administration than through the subcutaneous route, since there is peripheral vasoconstriction which reduces the absorption of the medication. (This explains the multiple corrections below.)

#### 5. Allergic Reaction/ Anaphylaxis, pages 103 & 104

- Add to line 3. d)(1); “maximum single dose 0.5 mg”
- Change line 3. f)(1) to read:  
“OR Consider epinephrine 1:1000, 0.01 mg/kg IM;  
maximum single dose 0.5 mg”
- Delete: 3. f) (1) “SC”

#### 6. Respiratory Distress, page 106

- Change lines 3. i) & 3. j): replace “SC” with “IM” (explained above).
- Change dosage on line 3. i): replace “0.3 mg ” with “0.01 mg/kg IM;  
maximum single dose 0.5 mg”

#### 7. Asthma/ COPD, page 107

- Change line 3. q): replace “0.01 mg/kg SC, Maximum single dose 0.3 mg” with “0.01 mg/kg IM, maximum single dose 0.5 mg”

#### 8. Croup, page 109

- Change line 3. f): replace “1:1,000 SC (max dose of 0.3 mg)” with “1:1,000 IM (maximum single dose 0.5 mg)”

#### 9. Pulmonary Edema/ Congestive Heart Failure, page 111

- There are actually two paths with different Nitroglycerin ceiling doses that are not well defined in the protocol.
  1. EMS Operational Programs that have the optional supplemental Continuous Positive Airway Pressure (CPAP)
  2. The EMS Operational Programs that do not have CPAP

- **For CPAP Nitroglycerin Dose** (monitoring BP after each dose):
  - i. give 1 dose of 0.4 mg Nitro (Preparing CPAP)
  - ii. give 1 dose of 0.8 mg Nitro (Patient education CPAP)
  - iii. give 1 dose of 0.8 mg Nitro (CPAP acclimatized patient)
  - iv. complete dose = 2.0 mg
  - v. Then follow with Captopril (SBP is equal to or greater than 110); then attach CPAP; and then apply Nitroglycerine paste.
  
- **For Non-CPAP Nitroglycerin Dose** (monitoring BP after each dose)
  - i. give 1 dose of 0.4 mg Nitro
  - ii. give 1 dose of 0.8 mg Nitro
  - iii. give 1 dose of 0.8 mg Nitro
  - iv. give 1 dose of 0.8 mg Nitro
  - v. give 1 dose of 0.8 mg Nitro
  - vi. give 1 dose of 0.8 mg Nitro
  - vii. complete dose = 4.4 mg
  - viii. Then follow with Captopril (SBP is equal to or greater than 110); administer **Albuterol** (medical consult if there is cardiac history); and apply Nitroglycerine paste.
  
- **Captopril Tablet** administration challenges:
 

The literature recommended crushing the tablet and placing the granules under the tongue; this promotes more rapid absorption than oral ingestion of the uncrushed tablet. To facilitate administration, the ALS provider may break up the tablet, place it under the tongue, and moisten the tablet with a few drops of LR or saline once it is placed under the tongue. Although the method of delivery for this medication is challenging, it is beneficial to the patient.
  
- **Removal of Morphine:** There is solid evidence that patients with Acute Pulmonary Edema who receive Morphine Sulfate have a significantly worse outcome compared to patients who do not receive morphine. This is a dramatic paradigm shift from the method previously taught.
  
- **Medical Consultation Required for Furosemide:** The initial effects of IV Furosemide may cause adverse hemodynamic consequences (eg, elevations of pulmonary capillary wedge pressure, left ventricular filling pressure, heart rate, and systemic vascular resistance) and cause diuresis which may cause dehydration and electrolyte imbalance; this will worsen the condition of the Acute Pulmonary Edema patient who may not be volume overloaded. Many patients are on furosemide for congestive heart failure and may benefit from emergent administration of furosemide, thus the requirement for Medical Consultation before administration.
  
- **Albuterol:** Current Albuterol pharmacology states: “Medical direction required before administering to pregnant patient or patient having a cardiac history.” (*page 213*) Patients who present with Acute Pulmonary Edema may or may not have a cardiac history. Albuterol has a potential benefit and should be used in the Non-CPAP pathway. In the CPAP pathway, the patient will not have time for the nebulized treatment before

the CPAP mask is sealed. With that premise, it is wise to still get medical consultation with a patient who has a cardiac history. The addition of Atrovent is allowed with medical consultation.

- **Pediatric Pulmonary Edema/ Congestive Heart Failure:** With Medical Consultation, the new pediatric section allows for Albuterol, Furosemide, Morphine, and Dopamine.

#### **10. Trauma Protocol: Trauma Arrest, pages 130 and 131**

- Change line h) and line p): replace “If traumatic arrest is suspected, bilateral needle decompression should be performed.” with “If traumatic arrest is suspected due to multi-system blunt trauma or due to penetrating neck, chest, or abdominal trauma, bilateral needle decompressions should be performed.”

#### **11. Procedures, page 146, Furosemide**

- Delete **SO** for the EMT-P under Furosemide (requires MC always).

#### **12. Airway Management: Combitube, page 170**

- Change line c)(1)(a): replace “Combitube SA: patients 4 ft – 5 ½ ft tall” with “Combitube SA: patients 4 ft – 6 ft tall” (new parameters from the manufacturer)

#### **13. Accessing Central Venous Catheters and Devices, page 165**

Clarification:

- Non-Life Threatening Emergency: No one is allowed to access the central venous catheter or device unless he/she is a CRT-I or EMT-P with MEDICAL CONSULTATION.

#### **14. Automated External Defibrillation, page 183**

- Change line (4)(a): replace “Perform CPR for 1 minute” with “Perform 5 cycles of CPR.”
- AED joules setting are not defined in protocol. (Read explanation in #15 below.)
  1. The old non-programmable AED with stair-step stacked shocks will remain 200 j, 300 j, 360 j.
  2. The joule programmable old stacked AED should be set at 360 joules monophasic for all shocks or 200 joules for biphasic.
  3. The joule programmable and single shock units should be set at 360 joules monophasic for all shocks or 200 joules for biphasic.

#### **15. Electrical Therapy, page 186**

- Change Line c) (1), replace:  
“Adult
  - (a) Initial delivered energy 200 J or biphasic
  - (b) Repeat delivered energy 300 J or biphasic
  - (c) Repeat delivered energy 360 J or biphasic”

With

“Adult

(a) Initial and subsequent delivered energy monophasic 360 J or 200 biphasic”

- Clarification on joules taken directly from 2005 AHA Guidelines:  
“The optimal energy for first-shock biphasic waveform defibrillation yielding the highest termination rate for VF has not been determined. Several randomized (LOE 2)17, 24, 27 and observational studies (LOE 5)26, 38 have shown that defibrillation with biphasic waveforms of relatively low energy (less than or equal 200 J) is safe and has equivalent or higher efficacy for termination of VF than monophasic waveform shocks of equivalent or higher energy (Class IIa)”

**16. Diltiazem (Cardizem) is no longer being manufactured in lyophilized (dry) form which has a shelf life of over a year. Diltiazem is only available in refrigerated liquid form which has an EMS Ambulance non-refrigerated shelf life of 30 days. The EMS Operational Program has the option of addressing this shortage in one of two ways.**

- Option one: Dr. Bass and EMS Board Chairman Don DeVries have approved the replacement drug Verapamil on an emergency basis for the Diltiazem indications. Deployment and implementation of Verapamil will be determined by the EMS Operational Program based on the remaining supply of Diltiazem. The EMS Programs will need to conduct critical, timely pharmacology education on Verapamil with emphasis on the increased risk of Verapamil-induced hypotension. (Verapamil pharmacology page is attached.)
- Option two: Those jurisdictions that have refrigeration units on their ambulances or are willing to exchange the liquid Diltiazem every 30 days may continue to use Diltiazem.
- Each EMS Operational Program will be polled at the next JAC meeting to determine which strategy has been implemented.

**17. ALS Pharmacology, page 231**

- Change line (3): replace “Anaphylactic Shock/Asthma” with “Allergic Reaction/ Anaphylactic Shock/Asthma”
- Change Line (3) (b): replace “Adult: 0.01 mg/kg IM (NEW '07)” with “Adult: epinephrine 1:1000, 0.01 mg/kg IM; maximum single dose 0.5 mg (NEW '07)”
- Change Line (3) (c): replace “Pediatric: 0.01 mg/kg SC (1:1,000); maximum single dose: 0.5 mg” with “Pediatric: epinephrine 1:1000, 0.01 mg/kg IM; maximum single dose 0.5 mg”

**18. ALS Pharmacology, page 241 (Morphine) g) (1) (b)**

- Delete: “Pulmonary edema: Administer 2-10 mg slow IVP depending on age and weight of patient”

**19. ALS Pharmacology, page 248**

- Change line g) (1): replace “SC” with “IM”

**Note:**

*I. TEMS and Wilderness protocols will still have subcutaneous (SC or SQ) routes of administration.*

*II. The Trauma Decision Tree is being modified, and there will be a global educational process for all EMS providers with the rollout.*

Attachment: Verapamil Pharmacology

**VERAPAMIL (Isoptin)**  
(CRT-(I) & EMT-P only)

**a) Pharmacology**

Calcium channel blocker

**b) Pharmacokinetics**

- (1) Inhibits the movement of calcium ions across cardiac muscle cells
- (2) Decreases conduction velocity and ventricular rate

**c) Indications**

- (1) Narrow complex symptomatic Atrial Fibrillation or Atrial Flutter

**d) Contraindications**

- (1) Hypotension below 90 mm Hg, second or third degree heart block, hypersensitivity to the drug
- (2) Patient with history of Wolf-Parkinson-White syndrome
- (3) Ventricular tachycardia
- (4) Patients less than 18 years of age

**e) Adverse effects**

- (1) Hypotension (see Treatment of Overdose or Other Adverse Reactions)
- (2) Bradycardia
- (3) Vomiting
- (4) Nausea
- (5) Headache

**f) Precautions**

Use cautiously in patients with renal failure, congestive heart failure, or on Beta Blockers.

**g) Significant interactions**

Congestive heart failure may result if used along with beta blockers.

**h)  Dosage**

- (1) Adult:
  - a) 2.5 – 10 mg slow IV over 2 minutes; if response is not adequate, repeat in 15 minutes with a dosage of 2.5-10 mg slow IV over 2 minutes with medical consultation
- (2) Pediatric:

Contraindicated for patients less than 18 years of age.

**i) Overdose or Toxicity Presentation**

Generally consists of exaggeration of side effects, including severe hypotension and symptomatic bradycardia

**j) Treatment of Overdose or Other Adverse Reactions**

- (1) Give general supportive measures, monitor vitals, administer oxygen.
- (2) Hypotension: Consider Calcium Chloride 250 mg SLOW IVP with medical consultation and IV fluid challenge with Lactated Ringer's; elevate legs.
- (3) Bradycardia: Consider Atropine (0.5 to 1 mg); if necessary, consider pacing.