Rappahannock EMS Council STEMI Triage Plan

General

The following ST Elevation Myocardial Infarction (STEMI) plan is provided for use throughout the Rappahannock EMS Council region. This plan is issued as part of the Virginia OEMS State Strategic and Operational Plan, Strategic Initiative 4.1.4.3, Development of Regional STEMI Committees, and Regional STEMI Triage Plans, as a Regional EMS Council contract deliverable.

This Regional STEMI Triage Plan provides a uniform strategy for best practices for STEMI care by pre-hospital personnel, based on current American Heart Association and Virginia Heart Attack Coalition guidance. It is applicable to both BLS and ALS personnel.

The principal goal of this plan is to provide pre-hospital care to suspected STEMI patients that should result in a decrease of cardiac mortality and morbidity within the region. Sub-goals include:

1. Educate pre-hospital personnel – both BLS and ALS – to identify STEMI patients;
2. Provide care to STEMI patients in the field;
3. Alert regional STEMI capable hospitals at First Medical Contact (FMC);
4. Transport STEMI patients to a PCI capable hospital;
5. Participate in a Quality Assurance program, to the extent possible, to provide field providers feedback on the outcome of their STEMI patient.

The 2013 AHA STEMI guidelines and the 2015 STEMI update specify that a STEMI patient undergo PCI within **120 minutes of First Medical Contact (FMC)**, which is when EMS reaches the patient. The hospital target for PCI is 90 minutes beginning when the patient enters the ER door (known as door-to-balloon time). Therefore time is of the essence.

Consider the use of **air transport**, when air transport is significantly faster than ground transport. Time factors in considering air transport include:

- Helo notification, start up and lift, flight time, scene size up, LZ size up and landing, patient handoff and take-off, landing at the hospital LZ, and patient movement to ER. A conservative estimate would be ~15 minutes of overhead + flight time.
- 0.5 minutes for every nautical mile flown from the air transport base to the scene LZ, and then from the scene LZ to the PCI capable hospital LZ.

**BLS personnel** should be trained in the placement and transmission of a 12 Lead EKG to a PCI capable hospital for interpretation on patient destination, and if warranted STEMI activation. This step is critical when BLS arrives on the scene prior to ALS, and the BLS personnel have access to a 12 Lead EKG that can be transmitted to a hospital. BLS personnel will not interpret these EKGS.
Definitions

First Medical Contact (FMC). For patients who call 9-1-1, direct care begins with FMC, defined as the time at which the EMS provider arrives at the patient’s side.

Left Bundle Branch Block (LBBB). A condition in which ventricular contraction is not completely synchronized due to a block in conduction of an electrical impulse to the ventricles; in LBBB, right ventricular endocardial activation begins before, and is often completed before, initiation of left ventricular endocardial activation; benign LBBB is rare; preexisting LBBB in absence of clinical evidence of heart disease is rare

Percutaneous Coronary Intervention (PCI). The family of medical procedures that uses a "mechanical" means to treat patients with partially or completely restricted blood flow through an artery of the heart. Examples include balloon angioplasty and stents. (American Heart Association)

PCI Capable Hospital. A hospital that has the equipment, expertise and facilities to administer percutaneous coronary intervention (PCI), a mechanical means of treating heart attack patients. Although PCI is the preferred means of treating STEMI patients, only 25% of hospitals in the U.S. are equipped to do so. These PCI-capable hospitals are called STEMI-receiving hospitals because they are well equipped to receive and treat STEMI patients. (American Heart Association)

ST Elevation Myocardial Infarction (STEMI). A severe heart attack caused by a prolonged period of blocked blood supply that affects a large area of the heart. These attacks carry a substantial risk of death and disability and call for a quick response by many individuals and systems. ST elevation must be present in two or more contiguous leads (2 leads of the same color shown below) using a 12 lead EKG monitor, as indicated below:

<table>
<thead>
<tr>
<th>I (Lateral)</th>
<th>aVR</th>
<th>V1 (Septal)</th>
<th>V4 (Anterior)</th>
</tr>
</thead>
<tbody>
<tr>
<td>II (Inferior)</td>
<td>aVL (Lateral)</td>
<td>V2 (Septal)</td>
<td>V5 (Lateral)</td>
</tr>
<tr>
<td>III (Inferior)</td>
<td>aVF (Inferior)</td>
<td>V3 (Anterior)</td>
<td>V6 (Lateral)</td>
</tr>
</tbody>
</table>
EMS STEMI Triage Guidelines

1. Patient c/o cardiac symptoms (e.g., chest, jaw, arm, back pain, etc., consistent with an MI); and,
2. A suspected STEMI is in progress based on EKG interpretation by:
   - ALS providers; or,
   - EKG monitor automated interpretation; or,
   - Hospital personnel (mainly when BLS providers transmit a 12 Lead).

A STEMI is defined as a 12 Lead EKG indicating ST elevation in any two contiguous leads as follows:
   - 1mm or more of elevation in all leads except V2 and V3; and/or
   - 2mm or more of elevation in men and 1.5 mm or more in women in leads V2 and V3.

Additional Guidance:
   - While there are new criteria for identifying a STEMI in the presence of a LBBB, for simplicity EMS should treat any LBBB as a STEMI until proven otherwise.
   - If you see ST elevation in Lead III or V1, check for Right Ventricular Infarct (RVI) by moving V4 to V4R; if RVI is suspected, be cautious with administering Nitroglycerine.
   - If you see ST depression in V1 through V3, check for Posterior Infarct by moving V4-V6 to the patient’s back and check in what are now leads V7-V9.
   - The goal with a STEMI patient is to have them in Cath lab within 120 minutes of FMC. (EMS Time + ED Time + start of PCI intervention < 120 minutes).

EMS STEMI Pre-Alert. A pre-alert by EMS to a receiving PCI capable hospital – from the patient’s bedside during First Medical Contact – is critical, and should immediately follow the bedside transmission of a 12 lead EKG. This report does not replace the standard patient report given en route, but gives the ED physician enough information and time to determine if the Cath Lab needs to be alerted and/or activated, and to check the patient’s medical history, if available. The following information should be provided to the ED upon 12 Lead EKG transmission from the bedside:
   - Name of patient (this allows the ED staff to look up patient’s history and previous EKGs);
   - Age of patient;
   - Duration of current cardiac-related signs and symptoms;
   - Duration of current chest pain, pressure, etc.; and,
   - Name of cardiologist, if possible and/or available.

The name is requested when the patient has been to that hospital before for a cardiac complaint. While some jurisdictions and teaching texts state you cannot give a patient’s name over the air, HIPAA actually permits the use of a patients name over an unencrypted radio if needed for patient care.
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EMS STEMI Flowchart

12 Lead EKG indicative of STEMI

EMS transmits 12-Lead EKG and pre-alerts PCI capable hospital from the bedside (See EMS STEMI Pre-Alert)

Transport to PCI capable Hospital with standard patient report en route. Treat per appropriate EMS protocols.

Consalt with and transport to non-PCI capable hospital when transport to a PCI capable hospital cannot be met within 120 minutes.2

Regional PCI Capable Hospitals
Mary Washington Hospital
Spotsylvania Regional MC

Other PCI Capable Hospitals
VCU (Richmond)
Henrico (Richmond)
UVA (Charlottesville)
Martha Jefferson (Charlottesville)

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2 The goal with reperfusion is to attempt some type of reperfusion therapy in <120 minutes. If arrival at a PCI-capable hospital in <120 minutes is not possible, consider transport to a non-PCI capable hospital able to perform fibrinolytic therapy in eligible patients. When possible, consult with a PCI capable hospital when making this transport decision.

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