Section: Adult Medical
Subject: CARDIAC STEMI (ST ELEVATION MI)
Section #: 340.16
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Approved By: Michael Lozano, Jr., M.D., FACEP HCFR Medical Director

1. Basic ALS Treatment must include a 12 lead EKG
    a. Evaluate for STEMI Alert criteria.
        i. Patient MUST HAVE cardiac symptoms (e.g. chest pain/pressure, angina, dyspnea alone, weakness, nausea/vomiting, or palpitations[1]) lasting for greater than 15 minutes and less than 12 hours, or a significant event (i.e. syncope or cardiac arrest) and AT LEAST ONE of the following:
            1. Machine interpretation reports ***Meets ST Elevation Criteria*** or ***Acute MI Suspected***
                a. The presence of LBBB negates this finding.
            2. Paramedic interpretation of new ST elevation at the J point of ≥1 mm (0.1 mV) in at least two contiguous chest or limb after mimics are ruled out.
    b. If the patient fulfils the above criteria, notify the receiving hospital as soon as possible using the specific words, "STEMI Alert."
    c. If you suspect that the patient's symptoms are cardiac in origin, but the above very specific "STEMI Alert" criteria are not met, continue with HCFR CHEST PAIN OF SUSPECTED CARDIAC ORIGIN protocol and DO NOT call a STEMI Alert.
    d. When available, transmit the 12 Lead to the receiving facility as soon as possible.
    e. For patients with STEMI, the goal scene time is <15 minutes from arrival to departure.

2. Transport:
    a. All STEMI patients are to be transported to a PCI capable facility
        i. If the patient refuses transport to a PCI center, an informed refusal shall be obtained.
        ii. The closest PCI capable facility is recommended but ultimately destination is at the patient's final discretion.
            1. Reason for deviation from the closest PCI capable facility shall be documented in the ePCR.
            2. An informed refusal to closest (appropriate) hospital shall be completed when, in the Rescue Officer's evaluation, conditions warrant (i.e. 20 minute deviation to a more distant facility.)
        iii. A list of approved PCI centers is maintained by the Rescue Division and will be updated in the event of a change.

3. Pharmacological Therapy:
    a. Oxygen
        i. If the oxygen saturation is less than 94%, start with oxygen at 2 L/min via nasal cannula and titrate to maintain SpO_2 between 94% and 96%[2] [3] [4]

[1] Pope, J. Hector, et al. "Missed Diagnoses of Acute Coronary Ischemia in the Emergency Department." The New England Journal of Medicine, no. 16, 2000, p. 1163.

[2] McNulty P.H., King N., Scott S., et al; Effects of supplemental oxygen administration on coronary blood flow in patients undergoing cardiac catheterization. Am J Physiol Heart Circ Physiol. 2005; 288:H1057-H1062.

[3] Stub D. A randomized controlled trial of oxygen therapy in acute ST-segment elevation myocardial infarction: the Air Versus Oxygen in Myocardial Infarction (AVOID) study. Presented at: American Heart Association Scientific Sessions; November 19, 2014; Chicago, IL.

[4] Cabello J.B., Burls A., Emparanza J.I., et al; Oxygen therapy for acute myocardial infarction. Cochrane Database Syst Rev. 2010:CD007160

b. Nitroglycerin (NTG)
   i. Determine if there is a contraindication to the use of NTG (see QA points below and Section 348 – Drug Reference)
   ii. The patient's systolic blood pressure (SBP) must remain > 100 mmHg during treatment
   iii. Administer **nitroglycerin** 0.4 mg SL q5 minutes.
      1. If SBP remains >120 mmHg after 1.2 mg of NTG SL, then proceed to intravenous NTG (**Tridil®**) when available, regardless of pain level.
         a. Titrate Tridil to maintain a SBP between 100 mmHg and 120 mmHg regardless of pain level.
            i. Increase Tridil in increments of 10mcg/min as long as SBP remains ≥ 120mmHg.
            ii. Once SBP drops below 120 mmHg, maintain current infusion rate.
         b. If **Tridil®** is not available, then continue with NTG SL as above until the SBP drops below 120 mmHg.
         c. **Intravenous Nitroglycerin (Tridil®)** The starting dose is 10 mcg/min IV/IO by infusion
         d. Use of an IV pump is required for administration of **Tridil®**
         e. It is highly recommended that two paramedics accompany the patient in the back of the rescue when infusing **Tridil®**
         f. There is no maximum dose assuming the patient's SBP can tolerate it
         g. If the SBP drops below 100 mmHg pause the infusion and administer normal saline 200 mL IV/IO bolus once.

c. Aspirin
   i. Confirm allergy status prior to administration
   ii. Administer **aspirin** 324 mg PO if it has not been taken within the past 24 hours
      1. As part of the pre-arrival instructions EDC may have instructed the patient to take ASA prior to our arrival – confirm with the patient that they did or did not take ASA prior to your arrival and document findings.

d. Nausea and vomiting
   i. **Ondansetron hydrochloride** 4 mg IV/IM PRN for severe nausea/vomiting
   ii. May repeat the dose one time in 10 minutes, if needed

e. For STEMI precipitated by cocaine or other sympathomimetics
   i. Administer **nitroglycerin** as above[5]
   ii. In addition, administer **diazepam** 5 mg IV/IO q15 minutes PRN discomfort or **midazolam** 2.5mg IV/IN/IO q15 minutes PRN discomfort[6].

[5] Baumann BM, Perrone J, Hornig SE, et at. Randomized, double-blind, placebo-controlled trial of diazepam, nitroglycerin, or both for treatment of patients with potential cocaine-associated acute coronary syndromes. Acad Emerg Med. 2000; 7: 878–885.

[6] Honderick T, Williams D, Seaberg D, Wears R. A prospective, randomized, controlled trial of benzodiazepines and nitroglycerin or nitroglycerin alone in the treatment of cocaine-associated acute coronary syndromes. *Am J Emerg Med*. 2003;21(1):39–42

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4. QA Points
    a. Most cases of LBBB at time of presentation are "not known to be old" because the prior electrocardiogram (ECG) is not available for comparison. New or presumably new LBBB at presentation occurs infrequently, may interfere with ST-elevation analysis, and should not be considered diagnostic of acute myocardial infarction (AMI) without associated cardiac related symptoms.[7]
    b. Administer nitrates with caution in patients with an inferior or posterior wall AMI as both can have right ventricular involvement. In those cases, nitrates can cause a precipitous blood pressure drop and should be monitored closely.
    c. Whereas in the past it was allowable with direct Medic-1 approval, **nitroglycerin** in <u>all forms</u> is now *contraindicated* in HCFR patients who have recently taken medications for erectile dysfunction. Because of their respective half-lives and duration of action, "recently" is defined for this protocol as being 24 hours for **sildenafil** (Viagra®), and 48 hours for **vardenafil** (Lavitra®) or **tadalafil** (Cialis®).

[7] Jain S., Ting H.T., Bell M., et al; Utility of left bundle branch block as a diagnostic criterion for acute myocardial infarction. Am J Cardiol. 2011; 107:1111-1116.