Section: ALS Protocols
Subject: LEFT VENTRICULAR –ASSIST DEVICES (LVAD)
Section #: 345.13
Issue Date: April 1, 2015
Revision Date:
Approved By: Michael Lozano, Jr., M.D., FACEP HCFR Medical Director

1. Basic ALS Treatment If available, continuous wave capnography monitoring should be used to assess ventilation and perfusion

2. Oxygenation
    a. If the oxygen saturation is less than 94%, start with **oxygen** at 2 L/min via nasal cannula and titrate to maintain SaO_2 between 94% and 96%[1] [2] [3]

3. Treat non-LVAD associated conditions in accordance with standard HCFR protocols

4. Initial LVAD assessment
    a. Determine type of device
    b. Assess alarms
    c. Contact the patient's LVAD coordinator

5. Additional treatment depends upon the patient's level of responsiveness
    a. If responsive
        i. Transport to appropriate destination as directed by the LVAD coordinator
    b. If unresponsive
        i. Determine blood glucose level and treat per HCFR HYPOGLYCEMIA protocol if indicated
        ii. Change Batteries
        iii. Reconnect cables
        iv. Auscultate for pump sounds
        v. If there are signs of hypoperfusion, administer **normal saline** bolus 250 mL IV/IO
        vi. Monitor capnography and assist ventilation as indicated (HCFR AIRWAY protocol)
        vii. After the above assessments are completed, consider CPR if:
            1. Patient is completely unresponsive, apneic, and has blood glucose > 60 mg/dL
            2. Non-functioning LVAD (no pump sounds)
            3. All cables are connected and no alarms are sounding
            4. Follow HCFR cardiac arrest protocols
            5. The presence of an LVAD is NOT a contraindication for defibrillation or advanced life support medications.

6. Transport
    a. All LVAD patients are to be transported by ALS
    b. For any condition that is suspected to be related to the LVAD, transport to the patient's requested LVAD Center if it is in Hillsborough, Pinellas, Polk, Pasco or Manatee counties. If outside of the immediate area, transport to the closest LVAD center within our response area.

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[1] 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.

[2] 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.

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

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c. If the patient meets Trauma, STEMI or Stroke alert criteria, transport them to the appropriate receiving facility.
d. Always bring all available LVAD equipment to the destination emergency department with the transported patient.

7. QA Points:
   a. LVADs are surgically implanted circulatory support devices designed to assist the pumping action of the heart. Caring for these patients is complicated, and every effort should be made to contact the patient's primary care-giver (spouse, guardian etc.) and the LVAD coordinator early in your evaluation. If patient or caregiver does not have coordinator contact information, look on the device for a phone number.
   b. Patients with properly functioning LVAD devices, may NOT have a detectable pulse, normal blood pressure or oxygen saturation.