VAD Guideline

CVICU Post-Operative Care Guidelines

Effective Date	October 2019
Approval Date	October 2019
Supersedes	November 2018

I. Purpose:

To outline nursing management of the patient with a HeartMate II (HMII), HeartWare (HVAD), or HeartMate 3 (HM3) left ventricular assist device (LVAD) for patients in the Cardiovascular Intensive Care Unit (CVICU/5N).

II. Considerations:

The initial speed of the LVAD is set in the operating room with TEE observation. The LVAD function is optimized as clinically indicated for each patient within the devices recommended operating speed range.

The cardiac surgeons, physicians, VAD coordinators, and nurse practitioners will implement any changes on VAD settings and alarms based on the patient's clinical status and as agreed upon with a multidisciplinary team (including intensivists, VAD physicians, VAD nurse practitioners, VAD coordinators, and CVICU staff). Any changes made to VAD settings will be documented in the patient's electronic chart.

VAD patients can move from the CVICU to 7N when they meet unit discharge criteria.

III. Nursing Assessment and Care:

A. Upon arrival to the CVICU, staff should account for all VAD equipment and document in EPIC. Ensure back-up controller is programmed and present at the bedside at all times.

B. Monitoring

1. Arterial line, PA line, and urinary catheter until deemed unnecessary by multidisciplinary team
    a. Goal hemodynamics:
        i. Cardiac index by thermodilution ≥2.2 L/min/m²
        ii. HMII and HVAD goal doppler or MAP pressure: 60-80 mmHg unless ordered otherwise
        iii. HM3 goal doppler or MAP pressure: 60-90 mmHg, pulse pressure (SBP-DBP) ≤20 mmHg as clinically indicated, unless ordered otherwise
        iv. Notify multidisciplinary team when blood pressure is out of range.
2. Vital signs to include invasive hemodynamic assessment, doppler pressure when arterial line is not in place or reliable, respiratory

assessment, urine output, drain output, and heart rate should be obtained every two hours and as needed unless ordered otherwise

3. Titration of inotropes and vasopressors within ordered parameters to goal hemodynamics as outlined above. Notify multidisciplinary team if patient is unstable requiring frequent titration
4. Monitor LVAD parameters
    a. Record pump speed, flow, power, and pulsatility index (PI) hourly
    b. Monitor cardiac output and index by thermodilution at a minimum of every 4 hours and PRN unless ordered otherwise
5. A paired doppler and cuff pressure is measured once per shift if an arterial line is present
6. Following arterial line removal, doppler pressures are measured a minimum of every two hours and PRN unless ordered otherwise. Automatic cuff pressure measurement is paired with the doppler measurement twice each shift. Doppler pressures are used for trending and treatment unless otherwise ordered. Differences of 10mmHg or greater between the doppler mean and the cuff systolic are reported in multidisciplinary rounds.
7. For HM II and HVAD – maintain doppler BP 60-80 mmHg, unless ordered otherwise. For HM3 maintain a doppler BP 60-90 mmHg, unless ordered otherwise. Notify multidisciplinary team when BP is out of this range. Frequency of BP monitoring may be decreased depending on patient stability and at multidisciplinary team discretion
8. Arterial line will be placed if there is any concern for non-invasive BP reading accuracy
9. Patients traveling off the CVICU will have a doppler with them at all times as well as their backup controller and backup batteries
10. Daily labs as ordered, including but not limited to: BMP, CBC, INR & LDH
11. Daily chest x-ray for the first seven days, and then as ordered
12. Postoperative ECG and then as ordered
13. Ancef and Vancomycin as ordered for 48 hours following chest closure. If the chest is left open, continue antibiotics until chest is closed. If patient has cephalosporin allergy, then Vancomycin and Levaquin should be used

IV. Ongoing Nursing Care:

A. Ensure VAD backup controller settings correlate with primary controller settings when appropriate. Notify VAD Coordinator if the multidisciplinary team makes changes to the primary controller settings, so that when appropriate (HVAD, HMII) settings on backup controller can be adjusted

B. Maintain CVVHD (if indicated) within ordered parameters per nephrology service

C. Assess and report to multidisciplinary team signs/symptoms for potential complications:
   1. Hemodynamic instability
   2. Bleeding
   3. Respiratory distress
   4. Signs or symptoms of infection
   5. Arrhythmias
   6. Renal failure
   7. New neurologic abnormalities
   8. Unstable or concerning VAD parameters

D. Check and replace potassium and magnesium levels per unit protocol

E. Treat with medication and/or cardioversion for ventricular arrhythmias, as ordered. NOTE: Defibrillation or cardioversion will not harm the VAD console.

F. Airway management per CVICU respiratory care protocol

G. CPR management
   1. In the event of cardiac arrest:
      a. Auscultate for VAD hum
      b. Confirm power supply
      c. Confirm system controller is operational
      d. Defibrillate and use medications per ACLS protocol
      e. Do not perform chest compressions unless directed by a VAD attending and/or intensivist

H. De-escalation of Care
   1. The necessity of all lines (including drains, chest tubes, central venous catheters, PICC lines, arterial lines, and Foley catheters should be evaluated daily and discontinued as soon as possible to reduce risk of infection
   2. Mechanical ventilation should be re-evaluated daily and be discontinued as soon as possible to reduce risk for infection

I. Driveline Care
   1. Dressings will be changed according to the Driveline Care Protocols (Centurion/Gauze). Starting on POD 3, the driveline dressing will be changed daily using the gauze dressing until POD 8. On POD 8 if no drainage present, the patient can be changed to the VAD Centurion driveline management tray, which is changed every 3 days unless otherwise ordered. Split gauze may be used under the Centurion for comfort or minimal drainage. If the drainage increases or the patient develops a driveline infection the dressing should be changed back to the gauze dressing daily or as ordered. If at any time the dressing becomes non-occlusive or saturated it should be changed immediately.
   2. Abdominal binder should be in place to secure the driveline

J. Exercise
   1. Progressive activity will be initiated as per MD/NP order or as tolerated by patient

2. Recommendations:

Acute Support (2-24hr post op)	Passive range of motion Turn every 2 hours
Intermediate Support (24hr-5 days post op)	Sit in chair Active range of motion Begin physical therapy Ambulate in hallway Stair stepping
Extended Support	Cardiac rehabilitation when cleared Ambulate in hallway Stair stepping Treadmill
Long Term Support	Cardiac Rehabilitation Resistive range of motion Light weights

K. Patient education

1. Assess patient and caregivers understanding of ventricular assist device therapy
    a. Include education on all components of VAD equipment
    b. Include education on how to change power sources safely
    c. Explain purpose/indication for ventricular assist device
    d. Describe environment of care for patient
        i. Frequency of assessment
        ii. Continuous monitoring
        iii. Alarms
        iv. Doppler and automatic cuff blood pressure
        v. Other equipment in room
        vi. Dressing changes
        vii. Mobility and exercise plan
    e. Educate patients on the importance of avoiding stress or trauma to the driveline
    f. Explain the unit's visitation policy
    g. Discuss interdisciplinary approach to patient care
    h. Explain pain management – as ordered
    i. Document patient/caregiver education and comprehension

V. Approval:

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VI. References:

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