



- UCH/ENTERPRISE
- UCMC
- WCH
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- DRAKE - OUTPATIENT
- AMBULATORY/UCPC
- LEGAL/COMPLIANCE
- MEDICAL STAFF
- MEDICATION MGMT
- OTHER

STANDARD OPERATING PROCEDURE

SOP # UCMC-LVAD-SOP-012-02

SOP NAME LVAD Emergencies: Defibrillation/CPR/Hazard Alarm Guide

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SPONSORED BY Signature on File DATE 11/20/2017
Tiffany Chastang, RN/BSN
LVAD Coordinator

ADMINISTRATIVE APPROVAL Signature on File DATE 11/20/2017
Jenifer Harris, BSN, RN/BC/ CCPC
Interim Transplant Administrator and
Clinical Director of Solid Organ
Transplant

Signature on File DATE 11/20/2017
Juliane Vierecke, MD

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I. STANDARD OPERATING PROCEDURE

Administrative Interdepartmental Departmental Unit Specific

This document details the process for Defibrillation at UCMC.

II. PURPOSE

To ensure staff are following the proper procedures for conducting defibrillation.

III. DEFINITIONS

None

IV. PROCEDURE

A. In-hospital Emergencies

1. Check Mentation (Consciousness, Neuro Exam)

- a. **Is the pump running?** Assess LVAD function by auscultating for presence of LVAD HUM and ensuring green arrows on the system controller are lit up green (Please see Fig 4 below).

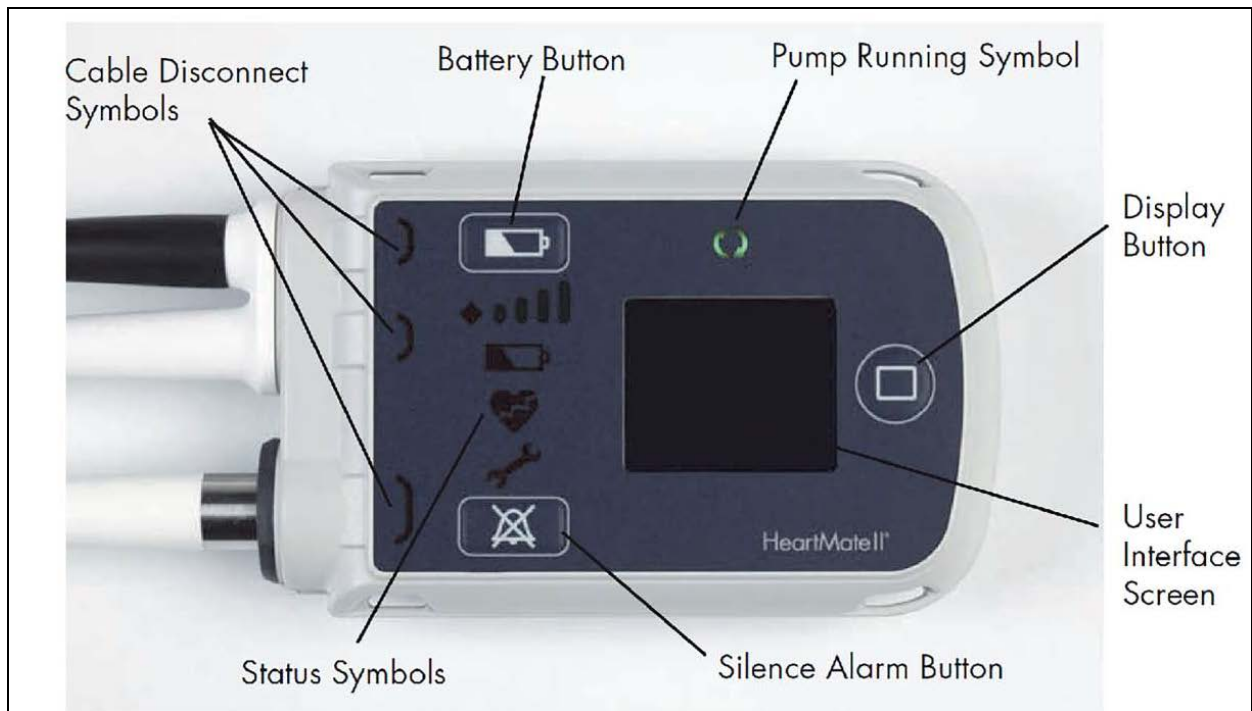


Figure 4

b. LVAD not working:

1. Check if system controller cable is connected to the LVAD via driveline and re-insert the driveline if necessary
2. Check if both batteries are properly inserted into the battery clips and if the controller is connected to at least one battery or the power module.
3. Consider battery exchange or connecting to power module
4. Consider controller exchange
5. Evaluate hemodynamics, breathing, and BP (measured with manual BP cuff and Doppler). **If no circulation, initiate BLS/ACLS guidelines including chest compressions (no device disconnection is necessary).** *NOTE: Performing external chest compression may result in disruption of the aortic anastomosis or dislodgement of the LVAD inflow tract.*
6. Consider Echo
7. Consider Chest Xray (ap/lat) if suspicion of cable damage
8. Consider CT scan (cannula position, thrombus formation).

9. Log File Analysis
10. Labs: CBC+Diff, LDH, Plasma Free Hemoglobin, CMP, PT/INR

c. Hands-free Defibrillation

1. Attach monitor leads. Maintain power to LVAD. DO NOT TURN LVAD OFF!
2. Apply hands free defib pads to chest and attach to monitor cable. Left chest pad should be placed below the patients' Internal Cardiac Defibrillator (ICD) and above the LVAD or use anterior/posterior placement.
3. Turn on defibrillator.
4. Verify cardiac rhythm. Follow ACLS protocol.
5. If shock indicated, select energy level following ACLS guidelines.
6. Charge defibrillator. Continue to maintain power to LVAD.
7. Verbally "clear" everyone near the patient and bed or stretcher.
8. Press the shock button until discharge occurs.
9. Assess patient and repeat above procedure if necessary while maintaining continuous power to LVAD.

d. Manual Defibrillation

1. Attach monitor leads. Maintain power to LVAD. DO NOT TURN LVAD OFF!
2. Place defib pads on chest. Pad should be placed below the patients' Internal Cardiac Defibrillator (ICD) and above the LVAD
3. Turn on defibrillator.
4. Verify cardiac rhythm. Follow ACLS protocol.
5. If shock is indicated, select energy level following ACLS guidelines.
6. Place paddles on chest over defib pads and apply pressure.
7. Charge defibrillator. Maintain power to LVAD
8. Verbally "clear" everyone near the patient and bed or stretcher.
9. Press discharge button on both paddles simultaneously until discharge occurs.
10. Assess patient. Repeat above procedure if necessary while maintaining continuous power to the LVAD.

e. Open Chest Defibrillation

1. If open chest defibrillation is required, it is advised that the LVAS be disconnected from the System Controller due to proximity of the paddles to the device.

f. HAZARD ALARMS GUIDE

1. These alarms require immediate attention and should be acted upon immediately (Please see Fig 5 below).
2. Call LVAD Coordinator 513-264-3841 for assistance









Priority	System Controller Screen	Active Symbols	Alarm Means	To Resolve Alarm
H A Z A R D	Low Flow ☉ :03 + Call Hospital Contact ☉ :07		Pump is off. The Pump Running symbol (⌚) is black.	1. Immediately connect to a working power source (Power Module or two HeartMate 14 Volt Lithium-Ion batteries). 2. If connecting to power does not resolve the problem, press any button on the System Controller to attempt pump start and call your hospital contact immediately. For more information, see page 214.
	Connect Driveline ☉ :02	 + 	Driveline is disconnected. The Pump Running symbol (⌚) is black.	1. Immediately reconnect the driveline to the System Controller and move the driveline safety tab on the System Controller to the locked position. 2. If alarm persists after reconnecting the driveline, press any button on the System Controller to potentially resolve. 3. If driveline is connected and alarm persists, replace System Controller with a programmed backup System Controller. 4. If alarm persists, call your hospital contact immediately. For more information, see page 215.
	Connect Power Immediately ☉ :05 + Backup Battery ☉ :01	 +  + 	Both power cables are disconnected	1. Immediately connect to a working power source (Power Module or two fully-charged HeartMate 14 Volt Lithium-Ion batteries). 2. If alarm persists, call your hospital contact immediately. For more information, see page 216.
	Low Flow ☉ :03 + Call Hospital Contact ☉ :07		Low flow, flow is less than 2.5 lpm	Call your hospital contact immediately for diagnosis and instructions. For more information, see page 218.
	Replace Power Immediately ☉ :02 + Low Battery ☉ :06		Low Voltage, Power input is extremely low with less than 5 min. remaining	1. Immediately connect to a working power source (Power Module or two fully-charged HeartMate 14 Volt Lithium-Ion batteries). 2. If alarm persists, call your hospital contact immediately. For more information, see page 219.

Figure 5

V. RESPONSIBILITY

Tasks	Responsible Staff

VI. KEY WORDS

Defibrillation
Cardiac Arrest
Hands-free Defibrillation
Manual Defibrillation

VII. APPENDIX

None

VIII. RELATED FORMS

None

IX. REFERENCES / CITATIONS

Juliane Vierecke, Martin Schweiger, David Feldman, Evgenij Potapov, Friedrich Kaufmann, Lorenzo Germinario, Roland Hetzer, Volkmar Falk, Thomas Krabatsch. Et al. Emergency procedures for patients with a continuous flow left ventricular assist device. Emerg Med J 2016; 0:1–11.

