



LVAD

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Overview

- Two most common LVAD implants are Heartware HVAD and Abbott Heart Mate 3
 - Both are centrifugal pumps that are placed intrapericardially
 - No intraperitoneal incision required

High Yield Checklist

- Redo Sternotomy?
- Pre-existing Lines
- Vasoactive therapy
- AICD present
- Pacer dependent
- Intracardiac shunts
- RV Dysfunction, Dilation, TR
- AI > Mild
- Left sided thrombus
- Mitral Stenosis
- Anticoagulation status
- Inflow cannula position
- Outflow cannula velocities

Comprehensive Checklist

Preoperative

Pre-Op Assessment/Review

- Right Ventricular Function (PVR)
- Intracardiac shunts (ASD, PFO, VSD)
- Aortic Valve abnormalities (History of Replacement, Presence of AI)
- LAA or LV Thrombus (evacuate)
- Tricuspid Regurgitation (>moderate)
- Automatic Internal Defibrillator (Brand, Settings, etc)

- Planned Incision (Sternotomy, Redo Sternotomy, Thoracotomy)
- Lines present (MAC/Introducer, PAC, A-line?)
- Pressor requirements pre-operatively

Room Setup

- MSMAIDS
- Infusions: Carrier, Norepinephrine, Epinephrine at a minimum
- Consider Vasopressin and Flolan/Nitric Oxide
- Consider Cerebral Oximetry
- Second single arterial line transducer
- Direct transfer from ICU likely (transport equipment)

Intraoperative

Pre CPB

- Pre-Oxygenate & Monitors (+ Zoll pads with Defibrillator on)
- Continue pre-existing vasoactive therapy
- Induce → Intubate → Consider early Flolan/Nitric Oxide
- TEE probe placement
- Consider replacing radial arterial catheter with brachial arterial catheter
- Deactivate tachytherapies if AICD present
- Reprogram pacemaker if patient pacer dependent
- Obtain central access if not already present
- If redo sternotomy, have 4 units pRBCs in a cooler in the OR at incision
- Have full heparin dose drawn up in syringe prior to incision

Comprehensive TEE Exam PRE

- Intracardiac Shunts

- Aortic Insufficiency
- Tricuspid Insufficiency
- Left ventricular or Left Atrial Appendage thrombus
- Mechanical Aortic Valve
- ▼ Information



2015 ASE Guidelines recommends calculating regurgitation fraction with mean systemic pressure of 60-85 mmHg to help quantify aortic insufficiency. Mitral regurgitation is often significantly improved after LVAD placement. Bubble study is recommended to rule out intracardiac shunt.

During CPB

- TEE guidance to mark left ventricular apex for inflow cannula placement
- Likely no cross clamp or cardioplegia unless repairs are needed prior to LVAD placement
- Send platelet count and fibrinogen about 30-45 minutes prior to separating from CPB
- Consider heparinase TEG

Post CPB

- Initiate vasoactive therapy +/- Flolan/Nitric Oxide

Comprehensive TEE Exam POST

- Annotate device name and pump speed (RPMs)
- Guide de-airing of left ventricle
- Midesophageal 4 chamber view during separation from CPB
- ▼ Information



Allows for the simultaneous evaluation of the RV and septal shift while increasing the LVAD speeds to separate from CPB

Adjust volume, SVR, inotropes, and LVAD speeds to balance RV output and LVAD output

Reassess for intracardiac shunt and valvular abnormalities

▼ Information



Mitral insufficiency is usually markedly improved after LVAD placement. However, some lesions can be exacerbated by LVAD physiology such as intracardiac shunt (ASD, PFO, VSD), aortic insufficiency, and tricuspid insufficiency.



The continuous supra-avalvular aortic flow of LVAD physiology makes pressure halftime and pulsed doppler interrogation of aortic insufficiency unreliable.

Vena Contracta width of 0.3 cm or greater or a jet width to LVOT width of 46% or greater should be considered at least moderate aortic insufficiency.

Inflow cannula should be aligned with the LV long axis

Outflow cannula should have laminar flow with peak velocity < 2 m/sec (annotate VAD RPMs)

Re-evaluate inflow & outflow cannulae after sternal closure