

Serial hemodynamic TEE for monitoring of LVAD patients*

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Hemodynamic transesophageal echocardiography (hTEE) with a miniaturized, disposable monoplane probe approved for 72 hours of use allows for serial, direct cardiac assessments in postoperative cardiac ICU patients. A prior hTEE study at our institution established criteria for use and demonstrated management changes in 47% of patients. We hypothesized that hTEE would help guide the clinical management of patients undergoing left ventricular device (LVAD) implantation.

From 6/2009 to 11/2011, 6 patients underwent implantation of a long-term LVAD with postoperative hTEE monitoring. The mean patient age was 55 (range 47-64). Ischemic etiologies accounted for 50% of the patients and 5 patients (83%) were on intravenous inotropes. Three patients (50%) had preoperative intraaortic balloon pumps and 1 patient (17%) was supported with a short-term percutaneous device. One patient (17%) presented in cardiogenic shock while 5

patients (83%) underwent elective operations. hTEE assessments were made when the clinicians deemed it appropriate.

Four (67%) patients had clinical decisions guided by hTEE, of which LVAD rpm changes and fluid management were most common. One patient was promptly re-explored for tamponade and later underwent guided resuscitation and RV monitoring for sepsis. Another patient was managed for new onset right ventricular (RV) failure. The figure below shows management changes guided by hTEE post LVAD.

TEE is the intraoperative standard of care for patients undergoing LVAD implantation. Postoperative assessment with hTEE in this case series provided valuable information in this challenging population to effectively treat conditions that were not fully appreciated with standard hemodynamic monitoring.

Date/Time	MAP	CVP	PAP	CI	rpm/flow	RV/septum	Events/hTEE -guided management
POD#0 1946	85	18	44/28	3.0	8800/-	Normal/midline	Bleeding → good function + filling
POD#1 0410	58	31	44/38	1.4	8800/-	Not seen/Not seen	Hypotension → reexploration for tamponade
POD #1 0710	82	14	40/29	1.8	9400/4.7	Normal/Toward RV	Full LV → rpm↑
POD #1 0900	73	14	43/29	1.7	8600/-	Small/Midline	Hypotension +EKG changes → rpm↓+fluid
POD#1 1715	74	20	44/29	1.8	8600/3.4	Normal/Midline	Nitric off → good RV function

POD=post operative day, MAP=mean arterial pressure (mmHg), CVP=central venous pressure (mmHg), PAP=pulmonary artery pressure (mmHg), CI=cardiac index (L/min/m²), flow=L/min, RV=right ventricle, LV=Left ventricle

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