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Efficacy of miniaturized imacor trans-esophageal echocardiografm (TEE) prove in mechanical circulatory support.

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Application of the Miniaturized ImaCor Trans-Esophageal (TEE) Probe in Heart Transplant/Mechanical Cardiac Support Patients

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Introduction

In the surgical cardiac intensive care unit (ICU), therapeutic interventions often need to be done at the bedside, necessitating the need for a rapidly employable diagnostic tool for the cardiac intensivist. Cardiac function and volume status are critical components to patient care. Intravascular volume status is difficult to establish. Current modalities use indirect methods to gather data which can misdirect patient care. Conventional TTE and TEE are unsuitable for continuous and effective hemodynamic assessment.

ImaCor hTEE Probe

- A miniaturized TEE probe
- FDA approved
- Real time monitoring, able to use for 72 hours continuously.
- Allows direct visualization of intravascular volume and cardiac function
- No need of anesthesia or sedation.

Methods

IRB approved retrospective review of mechanical circulatory support patients and post heart transplant patients who had ImaCor TEE (hTEE) monitoring in ICU.

3 categories of intervention based on hTEE

Major: Tamponade, ECMO wean

Moderate: Device wean, inotrope management, fluid and hemodynamic management

Minor: ECMO cannula placement, other data

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Results

N = 34 patients with hTEE monitoring

N = 21 post MCS or HTX

- Age: 28-73, Median : 49, Sex: M: 14 F: 7
- Devices employed:6
  - ECMO: 13
  - Post LVAD: 9
  - Impella: 3
  - Post HTX: 4
  - Pts with multiple: 6

		Pre-hTEE Dx	Post-hTEE Dx	Intervention
Major (n=4, 19%)	Post Heart TX	Hemodynamic Instability (n=1)	Tamponade (n=1)	Operative Evacuation
	MCS (ECMO/VAD)	ECMO Wean (n=3)	Biventricular failure (n=3)	Contraindication of LVAD, Withdraw of Care
Moderate (n=13, 62%)	Post Heart TX	Hemodynamic Instability (n=6)	RV Failure (n=4)	Increased Fluids, Inotrope management
			No Tamponade (n=2)	Medical management
	MCS (ECMO/VAD)	ECMO Wean (n=3)	Recoverable RV function (n=3)	LVAD
		Hemodynamic Instability (n= 4)	Myocardial Hematoma without perforation (n=1)	Observation
			Inadequate VAD flow (n=1)	Increased VAD speed
			RV Failure post VAD (n=2)	Inotrope management
Minor (n=4, 19%)	MCS (ECMO/VAD)	Hemodynamic Instability (n=4)	No LV thrombus (n=1)	Observation
			ECMO venous cannula Clot (n=1)	Reposition
			ECMO cannula malposition (n=2)	Emergent Bedside Reposition

Financial

The cost difference between this new device and the traditional TEE is also significant ($900 USD vs $4600 USD). Our institution saved in excess of $150,000 USD with the use of this device instead of traditional TEE.

ImaCor hTEE

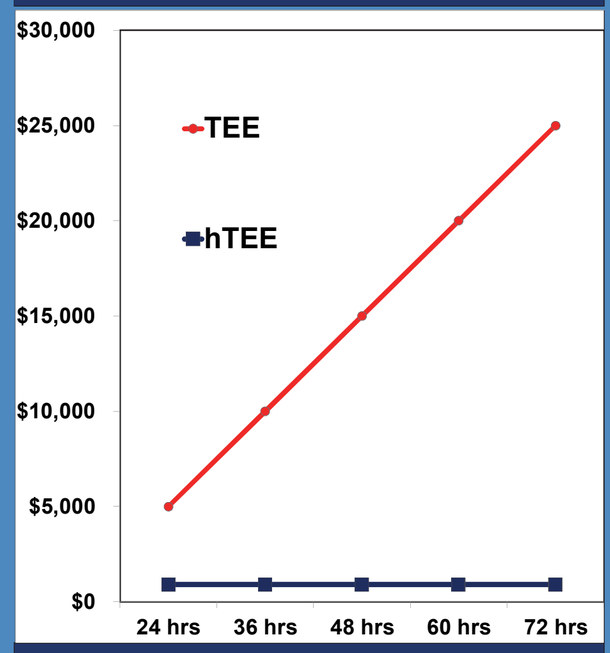
- Device : $65,000
- Probe : $900

TTE : Prof fee $185, Technical fee $2332

TEE : Prof fee $380, Technical fee $3906

Not including technician basic after hour call in charge of $225 per echo.

Comparative Cost of Conventional TEE vs. hTEE for 5 studies in 72 hours



Conclusions

This device has proven to be an invaluable new adjunct in the ICU by allowing previously unobtainable continuous real time monitoring of MCS/Post HTX.

The use of the ImaCor hTEE probe provides the intensivist with timely important clinical data that improves patient care and is economically advantageous. Using serial hTEE data, the clinician can reliably make accurate decisions in regards to operative interventions.