

# Hemodynamic TEE management estimates fluid responsiveness in a post cardiac surgery patient

Chad E. Wagner M.D., and Will Costello M.D.  
Vanderbilt University Medical Center, Nashville, TN, USA

## Abstract

This case report describes the use of a miniaturized, disposable transesophageal echo probe (ClariTEE®, ImaCor Inc., Garden City, NY) to diagnose and monitor hemodynamic instability in a patient following surgery for aortic valve replacement and CABG X 3. Hemodynamic TEE (hTEE™) management allowed the physician to gauge fluid responsiveness in this patient with a moderately reduced EF of 30-35% preoperatively, CAD and COPD. hTEE also allowed the physician to follow the formation of a thrombus. This thrombus eventually became hemodynamically significant and the high chest tube output led to a return to the OR with removal of the clot accomplished and bleeding addressed.

## Case Report

Attending ICU physician ordered a transthoracic echo (TTE) and a transesophageal echo (TEE) with the ClariTEE probe. Both studies were performed at the bedside simultaneously in the ICU.

## Results

A 66-year-old female S/P AVR and CABG X 3 arrived in the CICU on Levophed at 6 mcg/min. OR reported EF post op of 35%. She had 200 ml of chest tube output in the first post-op hour. The cardiac index was 1.9. The B/P 107/57, CVP 9. The SVo<sub>2</sub> 60%. PAP 45/26. A ClariTEE probe revealed a poorly functioning left ventricle with inferior and septal wall motion abnormalities. The LV showed increased size when a volume response assessment (bilateral leg lift) was performed and a total of 2.5 liters of PRBC, FFP and platelets were administered over the next three hours and milrinone was started at .25 mcg/kg/min. Chest tube output was

100-300 cc per hour during the next three hours.

A second imaging session was performed three hours later. Cardiac index was 1.6. B/P is now 95/52, CVP 14. SVo<sub>2</sub> is 45%. PAP is 44/28. Levophed has been reduced to three mcg/min. A volume response assessment was again performed with no change in LV size indicating the patient is now euvolemic. Milrinone is increased back to .5 mcg/kg/min due to low mixed venous and continuing poor LV function. Chest tube output was still 100 cc per hour at minimum.

A third imaging session was performed approximately three hours later. Hemodynamics had not changed significantly and the patient had received another 3 units of PRBC and 3 units of FFP. During imaging at the mid-esophageal level a non-hemodynamically significant thrombus appeared to be forming adjacent to the left atrium. LV function and size remained the same. Chest tube output continued to be a concern amounting to at least 100 cc per hour.

The fourth imaging session three hours later revealed a significant change. Hemodynamics had become somewhat less stable with the cardiac index at 1.6 and B/P 107/62, CVP is 20 and PAP 56/36. Levophed has been increased to 10 mcg/min and the Milrinone is still at 5 mcg/kg/min. During this time period the chest tube output has reached almost 1 liter in three hours. The thrombus now appears to be causing obstruction to LV inflow and the decision is made to return to the OR.

The next morning the hTEE is repeated. Hemodynamics are much improved with the cardiac index 2.6 B/P 116/54, CVP is now 10 and the PAP is 38/26. Meds are also changed with Epinephrine at 2 mcg/min, Milrinone at .5mcg/kg/min and Nipride at .4. LV function appears improved with increased

## Hemodynamic TEE management estimates fluid responsiveness in a post cardiac surgery patient

fractional area change at the transgastric level.

### **Discussion**

hTEE management gave us the ability to accurately gauge fluid responsiveness in this patient with a moderately reduced EF. Fluid management was accomplished more confidently than with a PAC with the added benefit of visualizing a thrombus

and monitoring its progress before it became hemodynamically significant. Hemodynamic TEE management in the ICU with a miniaturized probe provides a dynamic evaluation of myocardial filling and function beneficial in the rapidly changing cardiac surgery patient.