Comparison of hTEE and Swan-Ganz Catheter for the evaluation of volume status in patients post AVR*

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Introduction

We compare traditional markers of measuring volume status with echocardiographic parameters using a miniaturized TEE probe (hTEE™, ImaCor, Garden City, NY) for reliably predicting adequate preload in patients following elective aortic valve replacement for aortic stenosis.

Hypothesis

We hypothesize that the hTEE can provide useful information on left ventricular (LV) function and volume status, that patients are often significantly under resuscitated after aortic valve surgery, and that pulmonary artery diastolic pressures (PADP) and central venous pressures (CVP) do not accurately indicate volume status in these patients.

Methods

This was a prospective observational study of 20 patients age 73 +/- 9 (57-89) years who underwent elective aortic valve replacement for aortic stenosis. All included patients had severe aortic stenosis with a peak gradient of greater than 50mm Hg, and left ventricular hypertrophy with a septal wall thickness of greater than 1.1 cm. Exclusion criteria included presence of multi-valvular disease greater than mild, ejection fraction less than 40%, right ventricular dysfunction, and contraindications to transesophageal echocardiography. Each hour post-operatively we measured LV end-diastolic area (LVEDA), LV end-systolic area (LVESA), systemic blood pressure, pulmonary artery pressure, central venous pressure, and cardiac index using the hTEE and our invasive monitoring (arterial line and pulmonary artery catheter). Patients were extubated when they met extubation criteria and were stable from a cardiovascular and respiratory standpoint.

Results

The LV was easily visualized and measured, yielding LV end-systolic and LV end-diastolic areas. Patients received 3,669 +/- 1,237 (1,781-7,164) mL of fluid, with no evidence of volume overload. LVEDA did not correlate with CVP and PADP.

Conclusions

In this population, LVEDA was very often low despite elevated CVP and PADP, indicating decreased intravascular volume. The data suggested that significant additional fluid could be administered to patients who would have been presumed to have adequate intravascular volume based on CVP and PADP.

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