

Pleth variability index and fluid responsiveness of hemodynamically stable patients after cardiothoracic surgery.

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BACKGROUND: Fluid responsiveness is a measure of preload dependence and is defined as an increase in cardiac output due to volume expansion. Recent publications have suggested that variation in amplitude of the pulse oximetry waveform may be predictive of fluid responsiveness. The pleth variability index (PVI) was developed as a noninvasive bedside measurement of this variation in the pulse oximetry waveform.

OBJECTIVES: To measure the discriminatory value of PVI for predicting fluid responsiveness as measured by pulmonary artery catheter thermodilution in patients after cardiothoracic surgery.

METHODS: A prospective observational study of hemodynamically stable postoperative cardiac surgery patients with pulmonary artery catheters. A fingertip sensor was used to measure PVI. Vital signs, PVI, and cardiac index were measured before, during, and after passive leg raise. Fluid responsiveness was defined by increase in cardiac index of greater than 15% during passive leg raise. The discriminatory value of PVI was assessed by using the Wilcoxon method to measure the area under the receiver operating curve.

RESULTS: In 13 months, 47 patients (24 receiving mechanical ventilation, 23 spontaneously breathing) were enrolled. Fluid responsiveness was noted in 42% of intubated patients and 48% of spontaneously breathing patients. PVI was not adequate to discriminate fluid responsiveness in intubated patients (area under curve, 0.63; $P = .16$) or spontaneously breathing patients (area under curve, 0.41; $P = .75$).

CONCLUSIONS: Among postoperative cardiac surgery patients, PVI is not reliable for predicting fluid responsiveness as measured by pulmonary artery catheter thermodilution, regardless of ventilatory status.