

Does the Pleth Variability Index Correlate with Stroke Volume Variation?

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Background

The Pleth Variability Index (PVI, Masimo Corp., Irvine, CA) is a new algorithm that allows continuous and automatic estimation of respiratory variations in the pulse oximeter waveform amplitude (Δ POP). This approach may allow accurate prediction of fluid responsiveness in mechanically ventilated patients. Stroke volume variation (SVV) derived from pulse contour analysis is also evaluated as a predictor of fluid responsiveness. However, the correlation of PVI with SVV is unclear and in this study we investigated this correlation.

Methods

A prospective clinical study was performed in 13 patients after induction of general anesthesia for thoracoscopic surgery. Catheters were placed in the lower part of the radial artery in the lateral position and connected to a FlowTrac sensor and Vigileo monitor (Edwards Lifesciences Corp., Irvine, CA). A Radical-7 pulse oximeter (Masimo Corp., Irvine CA) was attached to the forefinger on the same side. HR, MAP, PVI and SVV were recorded at five points (supine position, lateral position, start of one-lung ventilation (OLV), end of OLV and finally in the supine position again). Pearson's test was used to determine the significance of a linear correlation between PVI and SVV.

Results

There was a significant relationship between PVI and SVV ($r=0.75$; $p=0.017$).

Discussion

Our results suggest that an accurate prediction of fluid responsiveness can be obtained noninvasively using the PVI. However, there was a discrepancy between PVI and SVV in 3 cases, which suggests that there may be involvement of other factors and that further analysis is needed.