

A Pilot Study of the Pleth Variability Index as an Indicator of Volume-Responsive Hypotension in Newborn Infants during Surgery

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Purpose

The aim of this pilot study was to evaluate the diagnostic value of pleth variability index (PVI) to predict fluid responsiveness in newborn infants during surgery.

Methods

PVI was continuously recorded in 29 mechanically ventilated newborn infants during surgery, and episodes of clinically indicated volume expansion (VE) (≥ 10 ml/kg in ≤ 15 min) administration were evaluated. The upper limit of the reference range for PVI in mechanically ventilated newborns was defined by the 95th percentile of all PVI values from hemodynamically stable infants.

Results

The upper limit of the reference range of PVI was 18 %. One hundred and three VEs were evaluated in 58 sufficient VE size (SVES) episodes and 16 insufficient initial VE size (IVES) episodes requiring repeated VE; all but one fulfilled criteria of volume-responsive hypotension (VRH). The median (interquartile range) PVI value during arterial hypotension in the 73 episodes with VRH was 23 % (20-25 %); postvolume PVI was 16 % (13-18 %). In 63 of 73 VRH episodes, during-hypotension PVI values were >18 % (86 % sensitivity for VRH). The median intermediate PVI, measured between VE in IVES episodes, was significantly higher than post-VE PVI in SVES episodes [18 % (16-21 % vs. 16 % (13-18 %)].

Conclusion

This preliminary evaluation shows that PVI may indicate VRH in newborn infants during surgery.