

The predictive value of the Pleth Variability Index on fluid responsiveness in spontaneously breathing anaesthetized children - a prospective observational study

Weber F, Rashmi BK, Karaoz-Bulut G, Dogger J, de Heer IJ, Prasser C.

[published online ahead of print, 2020 Aug 7]. *Paediatr Anaesth.* 2020;10.1111/pan.13991.

Abstract

Background: In children the preoperative hydration status is an important part of the overall clinical assessment. The assumed preoperative fluid deficit is often routinely replaced during induction without knowing the child's actual fluid status.

Aim: We investigated the predictive value of the Pleth Variability Index as a measure of fluid responsiveness in spontaneously breathing anesthetized children.

Methods: Pleth Variability Index, stroke volume and cardiac index, measured by electrovelocimetry, mean blood pressure and heart rate were recorded during anesthesia induction in 50 pediatric patients < 6 years. Baseline values were compared to values recorded after administration of 10 ml/kg of Ringer's lactate and during two passive leg raising tests (before and after fluid administration). Fluid responsiveness was defined as an increase of $\geq 10\%$ in stroke volume.

Results: Only in fluid responsive patients Pleth Variability Index values were higher before fluid administration than thereafter ($21.4 \pm 5.9\%$ vs. $15.0 \pm 9.4\%$, 95% CI of difference 1.1 to 11.8%, $p=0.02$). Pleth Variability Index values at baseline were higher in fluid responders ($21.4 \pm 5.9\%$) than in fluid non-responders ($15.3 \pm 7.7\%$), 95% CI of difference 1.6 to 10.6%, $p=0.009$. The area under the receiver operating curve indicating fluid responsiveness was 0.781 (95% CI 0.623 to 0.896, $p=0.0002$), with the highest sensitivity (82%) and specificity (70%) at a Pleth Variability Index of $>15\%$ (Positive predictive value 2.71 (95% CI 1.4 to 5.2)). Only in fluid responders the Pleth Variability Index decreased during passive leg raising, while stroke volume increased.

Conclusions: The Pleth Variability Index may be of additional value to predict fluid responsiveness in spontaneously breathing anesthetized children. A significant overlap in baseline Pleth Variability Index values between fluid responsive and non fluid responsive patients does not allow a reliable recommendation as to cut-off value.