Dynamic variables to predict fluid responsiveness in young children


Background: The evidence that dynamic variables predict fluid responsiveness in young children is limited by conflicting results.

Methods: Sixty patients 1-3 years of age undergoing major neurosurgery received 10 ml/kg of Ringer's solution over 10 min after anesthesia induction. Aortic blood flow peak velocity (ΔVpeak), plethysmographic variability index (PVI), FloTrac/Vigileo-derived stroke volume variation (SVV), and dynamic arterial elastance (Eadyn), and pulse pressure variation (PPV) were measured before and following fluid loading. An increase in cardiac index (CI) of ≥10% following fluid loading identified fluid "responders".

Results: Twenty-six (43.3%) patients were fluid responders. Baseline ΔVpeak was an excellent predictor of a CI increase following fluid loading with an area under the receiver operating characteristic curve (AUROC) of 0.982 (P < 0.001). PVI showed fair diagnostic accuracy for CI-fluid responsiveness (AUROC 0.775, P < 0.001). Baseline ΔVpeak and PVI cutoff values were 9.6% and 15%, respectively. PPV, SVV, and Eadyn were not or poor predictors for CI-fluid responsiveness (AUROC 0.669, 0.653, and 0.533, respectively).

Conclusion: Volume-based PVI and ΔVpeak showed acceptable reliabilities for fluid responsiveness prediction in young children undergoing major neurosurgery, while pressure-based SVV using FloTrac/Vigileo, Eadyn, and PPV not.