Fluid responsiveness

Fluid responsiveness (FR) is defined as the ability of the left ventricle to increase its stroke volume (SV) in response to fluid administration.

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”.

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).

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 [1)]

1)
Liu YF, Song LL, Ma W, Wang DX. Dynamic variables to predict fluid responsiveness in young children. Pediatr Int. 2023 Jan 18:e15477. doi: 10.1111/ped.15477. Epub ahead of print. PMID: 36652421.