Pleth variability index may predict preload responsiveness in patients treated with nasal high flow: a physiological study

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Abstract

The purpose of this study was to determine whether the plethysmographic variability index (PVi) can predict preload responsiveness in nasal high flow (NHF) patients (≥30 L/min) with any sign of hypoperfusion. Preload responsiveness was defined as a ≥10% increase in stroke volume (SV), measured by transthoracic echocardiography, after passive leg raising. SV and PVi were reassessed in preload responders after receiving a 250-mL fluid challenge. Twenty patients were included, and 12 patients (60%) were preload responders. Responders showed higher baseline mean PVi (24% vs. 13%; p=0.001) and higher mean PVi variation (ΔPVi) after passive leg raising (6.8% vs. -1.7%; p<0.001). No differences between mean ΔPVi after passive leg raising and mean ΔPVi after fluid challenge were observed (6.8 % vs. 7.4%; p=0.24), and both values were strongly correlated (r=0.84; p<0.001). Baseline PVi and ΔPVi after passive leg raising showed excellent diagnostic accuracy identifying preload responders (AUROC 0.92 and 1.00, respectively). Baseline PVi ≥16% had a sensitivity of 91.7% and a specificity of 87.5% for detecting preload responders. Similarly, ΔPVi after passive leg raising ≥2%, had a 100% of both sensitivity and specificity. Thus, PVi might predict preload responsiveness in patients treated with NHF, suggesting that it may guide fluid administration in these patients.