Cephalic versus digital plethysmographic variability index measurement: a comparative pilot study in cardiac surgery patients.

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OBJECTIVES: Noninvasive measurement of digital plethysmographic variability index (PVIdigital) has been proposed to predict fluid responsiveness, with conflicting results. The authors tested the hypothesis that cephalic sites of PVI measurement (namely PVIear and PVIforehead) could be more discriminant than PVIdigital to predict fluid responsiveness after cardiac surgery.

DESIGN: A prospective observational study.
SETTING: A cardiac surgical intensive care unit of a university hospital.
PARTICIPANTS: Fifty adult patients.
INTERVENTIONS: Investigation before and after fluid challenge.

MEASUREMENT AND MAIN RESULTS: Patients were prospectively included within the first 6-hour postoperative period and investigated before and after fluid challenge. A positive response to fluid challenge was defined as a 15% increase in cardiac index. PVIdigital, PVIear, PVIforehead, and invasive arterial pulse-pressure variation (PPV) measurements were recorded simultaneously, and receiver operating characteristic (ROC) curves were built. Forty-one (82%) patients were responders and 9 (18%) patients were nonresponders to fluid challenge. ROCAUC were 0.74 (95% confidence interval [95% CI]: 0.60-0.86), 0.81 (95% CI: 0.68-0.91), 0.88 (95% CI: 0.75-0.95) and 0.87 (95% CI: 0.75-0.95) for PVIdigital, PVIear, PVIforehead, and PPV, respectively. Significant differences were observed between PVIforehead and PVIdigital (absolute difference in ROCAUC = 0.134 [95% CI: 0.003-0.265], p = 0.045) and between PPV and PVIdigital (absolute difference in ROCAUC = 0.129 [95% CI: 0.011-0.247], p = 0.033). The percentage of patients within the inconclusive class of response was 46%, 70%, 44%, and 26% for PVIdigital, PVIear, PVIforehead, and PPV, respectively.

CONCLUSIONS: PVIforehead was more discriminant than PVIdigital and could be a valuable alternative to arterial PPV in predicting fluid responsiveness.