

Predicting stroke volume and arterial pressure fluid responsiveness in liver cirrhosis patients using dynamic preload variables: A prospective study of diagnostic accuracy.

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BACKGROUND: Predicting whether a fluid challenge will elicit 'fluid responsiveness' in stroke volume (SV) and arterial pressure is crucial for managing hypovolaemia and hypotension. Pulse pressure variation (PPV), SV variation (SVV) and the plethysmographic variability index (PVI) have been shown to predict SV fluid responsiveness, and the PPV/SVV ratio has been shown to predict arterial pressure fluid responsiveness under various conditions. However, these variables have not been investigated in liver cirrhosis patients.

OBJECTIVE: The objective was to evaluate SV and arterial pressure fluid responsiveness in liver cirrhosis patients by using dynamic preload and vascular tone variables.

DESIGN: A prospective study of diagnostic accuracy.

SETTINGS: A single-centre trial conducted from November 2013 to April 2015.

PATIENTS: Thirty-one adult patients, recipients of a living donor liver transplant.

INTERVENTION: An intraoperative fluid challenge with 10 ml/kg of 0.9% normal saline.

MAIN OUTCOME MEASURES: PPV, SVV, cardiac index and systemic vascular resistance index were measured using the Pulse index Continuous cardiac system. The PVI and perfusion index were measured using the Masimo Radical 7 co-oximeter. The PPV, SVV and PVI were measured to investigate SV fluid responsiveness, and the PPV/SVV ratio, perfusion index and systemic vascular resistance index were measured to investigate arterial pressure fluid responsiveness.

RESULTS: The areas under the receiver operating characteristic curves for PPV, SVV and PVI were 0.794, 0.754 and 0.800, respectively (all $P < 0.001$). The cut-off values for PPV, SVV and PVI were 10% (sensitivity 78.3%, specificity 79.5%), 12% (sensitivity 69.6%, specificity 71.8%) and 11% (sensitivity 95.7%, specificity 59.0%), respectively. However, all investigated vascular tone variables failed to predict arterial pressure and fluid responsiveness.

CONCLUSION: Dynamic preload variables predicted SV fluid responsiveness. Therefore, these variables can be used for fluid management in liver cirrhosis patients receiving mechanical ventilation. In contrast, vascular tone variables did not predict arterial pressure fluid responsiveness in liver cirrhosis patients.