
Dynamic and volumetric variables reliably predict fluid responsiveness in a porcine model with pleural effusion


Abstract

BACKGROUND:
The ability of stroke volume variation (SVV), pulse pressure variation (PPV) and global end-diastolic volume (GEDV) for prediction of fluid responsiveness in presence of pleural effusion is unknown. The aim of the present study was to challenge the ability of SVV, PPV and GEDV to predict fluid responsiveness in a porcine model with pleural effusions.

METHODS:
Pigs were studied at baseline and after fluid loading with 8 ml kg(-1) 6% hydroxyethyl starch. After withdrawal of 8 ml kg(-1) blood and induction of pleural effusion up to 50 ml kg(-1) on either side, measurements at baseline and after fluid loading were repeated. Cardiac output, stroke volume, central venous pressure (CVP) and pulmonary occlusion pressure (PAOP) were obtained by pulmonary thermodilution, whereas GEDV was determined by transpulmonary thermodilution. SVV and PPV were monitored continuously by pulse contour analysis.

RESULTS:
Pleural effusion was associated with significant changes in lung compliance, peak airway pressure and stroke volume in both responders and non-responders. At baseline, SVV, PPV and GEDV reliably predicted fluid responsiveness (area under the curve 0.85 (p<0.001), 0.88 (p<0.001), 0.77 (p = 0.007). After induction of pleural effusion the ability of SVV, PPV and GEDV to predict fluid responsiveness was well preserved and also PAOP was predictive. Threshold values for SVV and PPV increased in presence of pleural effusion.

CONCLUSIONS:
In this porcine model, bilateral pleural effusion did not affect the ability of SVV, PPV and GEDV to predict fluid responsiveness.