

Low Tidal Volume Does Not Affect the Dynamic Indicators of Fluid Responsiveness

Bouchacourt J.P. BJA 108 (S2): paper no. 1094.0

Introduction

The magnitude of dynamic preload indicators is affected by the tidal volume (VT). Pulse pressure variation (PPV) might less accurately predict fluid responsiveness in patients mechanically ventilated with protective strategy (VT as low as 6 ml/kg). We analyze the effects of VT on different invasive and non-invasive dynamic preload responsiveness indicators in a hemorrhage animal model.

Methods

Ten rabbits were anesthetized and mechanically ventilated using a VT of 6 ml/kg and 12 ml/kg. Peep was set at 5 cmH₂O. Central venous pressure, infra-diaphragmatic aortic blood flow (Transonic) and pressure (Statham) were measured and pulse oximetry (LNOP newborn, Masimo Corp) was recorded. PPV and stroke volume variation (SVV) were obtained by the variation of beat-to-beat PP and SV respectively. Non-invasive plethysmographic waveform variations (DPOP) and pleth variability index (PVI) were also obtained. SV was estimated by the integral of aortic flow. Animals were studied during normovolemia (BL), after blood progressive withdrawal (20% of volemia, BW) and after fluid loading with 6% hydroxyl-ethyl-starch (FL). Data are expressed as mean±SD and presented in the table. Pearson product moment correlation, unpaired t test and ANOVA were used (P, 0.05).

Results

All dynamic preload indicators were significantly correlated with PPV during the different experimental conditions (R^2 between 0.5 and 0.75).

Discussion

Dynamic indicators of fluid responsiveness increase with hypovolemia during both, high and low VT in this hemorrhage animal model. The lower transmission of respiratory pressure to the cardiovascular system and not the low VT in patients with acute lung injury would explain the absence to predict fluid responsiveness of dynamic indicators during protective ventilation.

References 1. De Backer D, Heenen S, Piagnerelli M, et al. Pulse pressure variations to predict fluid responsiveness: influence of tidal volume. *Intensive Care Med* 2005; 31: 517–23. 2. Huang Ch Fu, J-Y Hu, et al. Prediction of fluid responsiveness in acute respiratory distress syndrome patients ventilated with low