

Pleth variability index and respiratory system compliance to direct PEEP settings in mechanically ventilated patients, an exploratory study.

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OBJECTIVES: To analyze the ability of pleth variability index (PVI) and respiratory system compliance (RSC) on evaluating the hemodynamic and respiratory effects of positive end expiratory pressure (PEEP), then to direct PEEP settings in mechanically ventilated critical patients.

METHODS: We studied 22 mechanically ventilated critical patients in the intensive care unit. Patients were monitored with classical monitor and a pulse co-oximeter, with pulse sensors attached to patients' index fingers. Hemodynamic data [heart rate (HR), perfusion index (PI), PVI, central venous pressure (CVP), mean arterial pressure (MAP), peripheral blood oxygen saturation (SPO₂), peripheral blood oxygen content (SPOC) and peripheral blood hemoglobin (SPHB)] as well as the respiratory data [respiratory rate (RR), tidal volume (VT), RSC and controlled airway pressure] were recorded for 15 min each at 3 different levels of PEEP (0, 5 and 10 cmH₂O).

RESULTS: Different levels of PEEP (0, 5 and 10 cmH₂O) had no obvious effect on RR, HR, MAP, SPO₂ and SPOC. However, 10 cmH₂O PEEP induced significant hemodynamic disturbances, including decreases of PI, and increases of both PVI and CVP. Meanwhile, 5 cmH₂O PEEP induced no significant changes on hemodynamics such as CVP, PI and PVI, but improved the RSC.

CONCLUSIONS: RSC and PVI may be useful in detecting the hemodynamic and respiratory effects of PEEP, thus may help clinicians individualize PEEP settings in mechanically ventilated patients.