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## The Hemodynamic and Respiratory Effects of Continuous Negative and Control-Mode Cuirass Ventilation in Recently Extubated Cardiac Surgery Patients: Part 2.

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### Abstract

**OBJECTIVE:** Negative-pressure ventilation (NPV) by external cuirass (RTX; Deminax Medical Instruments Limited, London, UK) in intubated patients after cardiac surgery improves hemodynamics measured by pulmonary artery catheter (PAC)-based methods with increased cardiac output (CO) and stroke volume (SV) without changing the heart rate (HR). The less-invasive pressure recording analytical method (PRAM) (MostCare; Vytech Health srl, Padova, Italy) allows radial artery monitoring of CO, SV, SV variation, and cardiac cycle efficiency (CCE). The authors investigated the hypothesis that NPV improves PRAM-based hemodynamics and arterial blood gas analysis in extubated cardiac surgery patients.

**DESIGN:** A clinical investigation.

**SETTING:** A teaching hospital.

**PARTICIPANTS:** Twenty recently extubated cardiac surgery patients.

**INTERVENTIONS:** Five consecutive experimental ventilation modalities lasted 5 minutes: (1) baseline (no cuirass ventilation), (2) mode 1 (cuirass ventilation with a continuous negative pressure of -20 cmH<sub>2</sub>O), (3) rest 1 (no cuirass ventilation), (4) mode 2 (cuirass ventilation in the control mode of 12 breaths/min at -20 cmH<sub>2</sub>O, and (5) rest 2.

**MEASUREMENTS AND MAIN RESULTS:** PRAM parameters were analyzed throughout the final minute of each experimental modality, concluding with arterial blood gas sampling. NPV was well tolerated. HR was unchanged. Mode 2 SV was higher than baseline and rest 2. Mode 2 CO was higher than rest 2. Rest 2 systolic blood pressure was lower than rest 1 and mode 2. Increased CCE with NPV was not significant ( $p = 0.0696$ ). Oxygenation and PCO<sub>2</sub> were unchanged although mode 2 pH increased.

**CONCLUSIONS:** Extubated sedated cardiac surgery patients comfortably tolerated NPV with unchanged HR. SV and pH increased.

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