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Capnography for Detection of Return of Spontaneous Circulation Pseudo-Pea

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Abstract : Introduction: Pseudo-Pulseless Electrical Activity (p-PEA) is a lifeless form of profound cardiac shock characterized by measurable cardiac mechanical activity without clinically detectable pulses. Patients in pseudo-PEA carry different prognoses than those in true PEA and may require different therapies. End-tidal carbon dioxide (ET-CO2) is a reliable indicator of the return of spontaneous circulation (ROSC) in ventricular fibrillation and true-PEA but has not been studied p-PEA. Hypothesis: ET-CO2 can be used as an independent indicator of ROSC in p-PEA resuscitation. Methods: 30kg female swine (N = 14) under intravenous anesthesia were instrumented with aortic and right atrial micromanometer pressure. ECG and ET-CO2 were measured continuously. p-PEA was induced by ventilation with 6% oxygen in 94% nitrogen and was defined as a systolic Ao less than 40 mmHg. The statistical relationships between ET-CO2 and ROSC are reported. Results: ET-CO2 during resuscitation strongly correlated with ROSC (Figure 1). Mean ET-CO2 during p-PEA was 28.4 ± 8.4, while mean ET-CO2 in ROSC for 100% O2 cohort was 42.2 ± 12.6 ($p < 0.0001$), mean ET-CO2 in ROSC for 100% O2 + CPR was 33.0 ± 15.4 ($p < 0.0001$). Analysis of slope was limited to one minute of resuscitation data to capture local linearity; assessment began 10 seconds after resuscitation started to allow the ventilator to mix 100% O2. Pigs who would recover with 100% O2 had a slope of 0.023 ± 0.001, oxygen + CPR had a slope of 0.018 ± 0.002, and oxygen + CPR + epinephrine had a slope of 0.0050 ± 0.0009. Conclusions: During resuscitation from porcine hypoxic p-PEA, a rise in ET-CO2 is indicative of ROSC.

Keywords : ET-CO2, resuscitation, capnography, pseudo-PEA
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