

The Peripheral Perfusion Index and Transcutaneous Oxygen Challenge Test are Predictive of Mortality in Septic Shock Patients

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Introduction

Non-invasive monitoring of peripheral perfusion can be performed easily using current technologies, such as the peripheral perfusion index (PI) and the degree of transcutaneous partial pressure of oxygen (PtcO₂) response to FiO₂ of 1.0 (identified as the transcutaneous oxygen challenge test, OCT). The PI is derived from the plethysmographic signal of pulse oximetry. The noninvasive peripheral perfusion potential value to predict outcome remain to be established in septic shock patients. Moreover, no one has quantified the PI to outcome in septic shock patients. *Hypothesis*: The PI and OCT are related to outcome in septic shock patients after resuscitation.

Methods

55 septic patients who requiring PiCCO-Plus cardiac output monitoring for hemodynamic resuscitation were enrolled as the study group. 20 stable patients who were ventilated were studied as a control group. Global hemodynamic variables, traditional metabolic, OCT and PI were measured simultaneously following the first 24 hours of resuscitation. Pre-OCT and post-OCT values for arterial partial pressure of oxygen (PaO₂) were examined. We obtained the 10min-OCT [(PtcO₂ after 10min on inspired 1.0 O₂) - (basic PtcO₂)], and the oxygen challenge index [(10min-OCT)/(PaO₂ on inspired 1.0 O₂ - baseline PaO₂)] during the OCT.

Results

The PI was significantly correlated with basic PtcO₂, 10min-OCT and OCI in all the patients. The control group has a higher basic PaO₂, basic PtcO₂, 10min-OCT and PI than the septic shock group. In 55 septic shock patients, the macro hemodynamic parameters and ScvO₂ showed no differences between survivors and nonsurvivors. The nonsurvivors had a significantly lower PI, 10min-OCT and oxygen challenge index (OCI), and higher arterial lactate level and central venous to arterial PCO₂ gradient [P(v-a)CO₂]. The PI, 10min-OCT and OCI predicted the ICU mortality with an accuracy that was similar to arterial lactate level, and the PI was significantly better than P(v-a)CO₂.

Conclusions

The PI and OCT are related to outcome in septic shock patients after resuscitation, comparable to arterial blood lactate.