

The Effect of Near Infrared Spectroscopy Monitoring on the Treatment of Patients Presenting to the Emergency Department in Shock

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Introduction: Near Infrared Spectroscopy (StO₂) represents a measure of perfusion. It has been shown to correlate with a patient's lactate and acid/base status. It is not known if using information from this monitor to guide resuscitation will result in improved patient outcomes.

Hypothesis: The goal of this study was to compare the resuscitation of patients in shock when the StO₂ monitor is or is not used to guide resuscitation.

Methods: This was a prospective observational study of patients undergoing resuscitation in the Emergency Department for shock from any cause. Adult patients (age >17) with a shock index (SI) of >0.9 (SI=heart rate/systolic blood pressure) or a blood pressure <80 systolic who underwent resuscitation were enrolled. Patients were monitored for oxygen saturation, blood pressure, and heart rate. Patients also had an StO₂ monitor placed on the thenar eminence of their least injured hand. Data from the StO₂ monitor was recorded continuously and noted every minute along with blood pressure, heart rate, and oxygen saturation. During the first phase of the study, physicians were blinded to the data from the monitor. During the second phase of the study, physicians were able to see the information from the StO₂ monitor. All treatments were recorded. Patient's charts were reviewed to determine the diagnosis, ICU length of stay (LOS), inpatient LOS, and 28 day mortality. Data were compared using descriptive statistics, Wilcoxon rank sum and chi square tests.

Results: Two hundred and twenty-two patients were enrolled, 102 in phase 1 and 120 in phase 2. The median presenting shock index was 1.12 (range 0.4 to 1.95) for phase 1 and 1.11 (0.39 - 2.1) for phase 2 (p=0.84). The median initial StO₂ was 76 (range 54 – 91) for phase 1 and 75 (range 35 – 95) for phase 2 (p=0.44). The median hospital LOS was 11.4 days (range 0 – 44) for phase 1, and 8.9 days (range 0 – 81) in phase 2 (p=0.04). The 28 day mortality was 19% for phase 1 and 22% for phase 2 (p=0.61).

Conclusions: Patients who underwent resuscitation guided by data from the StO₂ monitor demonstrated shorter hospital LOS. This indicates data from the StO₂ monitor may improve resuscitation outcomes.