The Use of Pulse Oximetry to Assess the Accuracy of Chest Compressions

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Background

The use of the pulse oximeter in the NICU has been well established. As the "fifth vital sign", oxygen saturation has come to be embodied as the de facto standard of care. With the advent of motion sensitive, low perfusion enabled, artifact resistant oximeters, neonatal oximetry has seen a dramatic improvement in terms of reliability over the previous generation of conventional pulse oximeters. *Objective:* While numerous studies now demonstrate the effectiveness of oximetry in measuring during low perfusion, we are not aware of studies of oximetry being utilized to monitor the effectiveness of chest compressions during resuscitation.

Methods

Patients were monitored with both the Nellcor 595 and Masimo SET pulse oximeters on different post ductal extremities as part of a comparative device trial. Data each device was carefully tabulated with respect to accuracy, reliability, and appropriateness to level of care. The index patient was an 8-month-old former 26 weeks gestation 486-gram female infant. She was managed on nasal synchronized intermittent mandatory ventilation (NSIMV) for chronic lung disease with severe reactive elements at the time of her initiation into the trial. Bronchospasm with desaturation led to an episode of profound vasovagal stimulation and bradycardia. Saturations dropped from the 90’s to the 30’s initially on both oximeters. Bradycardia noted on the ECG monitor (HR<<80 bpm) matched the oximeter readout. In accordance with AAP resuscitation guidelines, the patient received handbag ventilation and chest compressions.

Results

During the duration of chest compressions (~ 5 minutes) on the Masimo SET oximeter, pulse rate matched the rate of administration of compressions and could be used to qualify and quantify the resuscitative efforts; no readout was available for the duration of the resuscitation on the Nellcor 595. With resumption of a normal sinus rhythm, chest compressions were discontinued, and oximeter pulse rate and saturation returned to baseline on both devices. No other resuscitative efforts occurred during study on this patient or other patients enrolled in the trial.

Conclusions

Although the oximetry devices were not used to guide resuscitation, the use in this setting is intriguing. If the Masimo SET technology can be used to assess the effectiveness of resuscitative efforts, it can dictate a standard of care.