

Masimo SET Has Major Advantages for Testing of Infant Apnea

Villareal D., Kukreja S. *Respir Care*. 2000;45(8):1009.

Background

Apneic episodes in pre-term infants demand investigation, most commonly done by reviewing recordings of multiple physiologic variables from an Apnea Monitoring System (AMS). Pulse oximetry (PO) is a common AMS parameter with shortcomings in this setting. Sleep study researchers' recently concluded, "A reliable and more accurate method of recording oxygen saturation in these young infants is needed, for use in both neonatal nurseries and sleep studies, to aid in accurate clinical decision-making."¹

Methods

Infants needing workup for clinically significant apnea were enrolled. The AMS montage included ECG heart rate, impedance pneumography, nasal thermistry, and SpO₂ percent and pulse rate (PR). The performance of a Masimo SET pulse oximeter (Masimo Corp., Irvine, CA) and the Nellcor PO channel of the EdenTrace II Plus AMS (Mallinckrodt, St. Louis, MO) was assessed. The tracings were evaluated for "true" desaturations (SpO₂ \leq 85%) and zero-out data (a zero SpO₂ or PR value or both). Suspect SpO₂ data lasting 10 seconds were compared (i.e., clinical observations versus the EdenTrace "motion annotation" and the Masimo SET data loss).

Results

Six infants were randomly selected for study: birth weight of 968 ± 272 gms. and gestational age of 27 ± 2 weeks with an equal gender mix. At time of study, babies weighed 1896 ± 127 gms., had an adjusted age of 35 ± 2 weeks, three were on caffeine citrate and one on supplemental oxygen. There were 73.1 hours of AMS tracings, 48.3 hours (66%) were deemed quiet sleep. Masimo PO captured more true desaturations and gave near continuous PO for all subjects ($p < 0.02$), whereas, the EdenTrace II Plus continuously displayed "sensors OK" and "recording data" in spite of $>1,200$ epochs for 39.7 hours of "invalid" PO data. Indeed, observers were unaware of suspicious EdenTrace PO data until recordings were played back. We confirmed the findings of Fletcher et al.,¹ that the majority of conventional PO data is corrupt in apnea study recordings of infants during wakefulness and active and quiet sleep.

Conclusions

Despite motion, Masimo SET pulse oximetry has been shown highly accurate in sick infants.² We have shown that more reliable, real-time and continuous SpO₂ monitoring can be accomplished with Masimo SET in pre-term infants undergoing apnea testing, whereas, the Nellcor component of the EdenTrace II Plus system missed many true desaturation events and, by their own admission, warned of "invalid" PO data (>124 times that of Masimo SET) which accounted for loss of over half the pulse oximetry data in our random sampling of pre-term infants. Use of Masimo SET should improve the confidence of pulse oximetry as a parameter in apnea testing systems, decrease interpreter's time for scoring of apnea tests and reduce re-testing of subjects prone to motion during sleep.

1. Fletcher et al., *Sleep* 1998;21(3):305-310.; 2. Liberman et al. *Respiratory Care* 1999;44(12):1499.