

Masimo SET has Major Advantages for Testing of Infant Apnea

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Introduction


Apneic episodes in preterm infants demand investigation, most commonly done by reviewing recordings from an Apnea Monitoring System (AMS). Pulse oximetry is a common AMS parameter with documented shortcomings in this setting: “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. Pulse oximetry sensors were placed on opposing feet and optically shielded from cross-talk. The performance of a Masimo SET pulse oximetry and the Nellcor pulse oximetry (Oxismart) channel of the EdenTrace II Plus AMS was assessed. The tracings were evaluated for “true” desaturations ($SpO_2 < 85\%$) and zero-out data (a zero SpO_2 or PR value or both). Suspect SpO_2 data lasting > 10 seconds were compared (i.e., clinical observations versus the EdenTrace “motion annotation” and the Masimo SET data loss).

Results

Six preterm infants at risk for Apnea of Prematurity (AOP) were randomly selected for study: three were on caffeine citrate and one on supplemental oxygen. There were 73.1 hours of AMS tracings. Masimo SET pulse oximetry captured 35% more true desaturations and gave near continuous pulse oximetry for all subjects (99.4% versus 45.7% of the time for Nellcor Oxismart). Whereas, the EdenTrace II Plus displayed “sensors OK” and “recording data” in spite of $> 1,200$ epochs for 39.7 hours of “invalid” pulse oximetry data. Indeed, observers were unaware of suspicious EdenTrace pulse oximetry data until recordings were played back. This study corroborated the findings of Fletcher et al¹ that the majority of conventional pulse oximetry data is corrupt in apnea study recordings of infants.

	 Masimo SET	Nellcor Oxismart (EdenTrace II+)	Significance
Invalid Data			
% of total time	0.6%	54.3%	$p < 0.001$
events	34	1,208	$p < 0.001$
hours	0.4	40	$p < 0.001$
Desat Events			
True Desat. Events	121	79	$p < 0.02$
Invalid Desat. Events	8	994	$p < 0.001$
Zero-Out Events	21	396	$p < 0.001$

Authors' Discussion and Conclusions

The authors found “that more reliable, real-time and continuous SpO_2 monitoring can be accomplished with Masimo SET in preterm infants undergoing apnea testing. 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 retesting of subjects prone to motion during sleep.”

1. Fletcher J, Page M, Jeffery H. Sleep states and neonatal pulse oximetry. *Sleep* 1998;21(3):305-310.