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Conventional Pulse Oximetry Can Give Spurious Data in a Neonatal Population at Risk for Retinopathy of Prematurity (ROP)

Goldstein MR, Barnum PT, Vogt J, Gangitano ES, Stephenson CG, Liberman RL *Pediatric Research* 1998;43(4):216A

Introduction

“Tighter control of oxygen titration in ‘at risk’ premature neonates might reduce the incidence of complications associated with retinopathy of prematurity (STOP-ROP). A survey of > 100 NICUs reported that the majority set high SpO₂ (limit) alarms which could predispose an infant on supplemental oxygen to hyperoxemia.” (*Journal of Perinatal* 17:341-5, 1997). This study compares the Masimo SET pulse oximetry technology to a conventional pulse oximeter.

Methods

Ten sick newborns at risk for ROP were studied with two pulse oximeters: a conventional pulse oximeter (model N-200, Nellcor Puritan Bennett, Pleasanton, CA) and a prototype pulse oximeter from Masimo Corporation (Irvine, CA). Neonates were monitored for 3-4 hours with a sensor on each foot, then sensors were switched to the opposite foot and similarly monitored. ECG was interfaced from a Spacelabs monitor to distinguish false oximeter events. True desaturations were evident and could be attributed to infant motion or caregiver and parental interventions. These desaturation events were noted in the computerized data acquisition system. The SpO₂ values were verified as “true” by using an accepted method (Rusch TL, Sankar R, Scharf JE. “Signal processing methods for pulse oximetry.” *Computers in Biology and Medicine* 1996;26:143-59).

Results

The total duration of Nellcor false alarms was nearly 14 times greater than the Masimo SET pulse oximeter. On average, the Nellcor pulse oximeter alarmed falsely every 13.9 minutes for 36.6 seconds; whereas the Masimo SET pulse oximeter alarmed every 87.8 minutes for 16.9 seconds.

	 Masimo SET	Nellcor N-200
Zero Saturation	0 events/0 min.	188 events/106.1 min.
False Desaturation	41 events/11.6 min.	71 events/52.1 min.
Total False Alarms	41 events/11.6 min.	259 events/158.2 min.

Authors' Discussion and Conclusions

“The incidence of false alarms and spurious data found is so high with conventional pulse oximetry that its value as an oxygenation surveillance tool is questionable. The preponderance of false alarms in an NICU has been shown to numb the caregiver, resulting in delays to significant and even catastrophic events; and with oximetry, could predispose an infant on supplemental oxygen to hyperoxemia. **Masimo SET dramatically minimizes false alarms seen in the NICU when compared to a conventional pulse oximeter ... without a loss of sensitivity to true alarms.** Masimo SET could be the new ‘Standard of Care’ for pulse oximetry in the NICU in that it remains accurate through motion artifact and eliminates the associated false alarms, allowing the clinician to better concentrate on all aspects of infant care.”