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

Goldstein M.R., Barnum P.T., Vogt J., Gangitano E.S., Stephenson C.G., Liberman R.L. *Pediatr Res.* 1998;43(4):216A.

Tighter control of oxygen titration in at risk premature neonates might reduce the incidence of complications associated with retinopathy of prematurity (STOP-ROP). Pulse oximetry (SpO2) has been used as a reference in determining oxygenation. SpO2 is determined by comparing absorbance of light (red and infrared) at two wavelengths during pulsatile blood flow. Motion, perfusion, and ambient light overwhelm the ability of a conventional oximeter to continuously transduce accurate readings in at risk premature infants. The Masimo Signal Extraction Technology (SET) calculates a noise reference and uses adaptive filters to attenuate artifact and amplify relevant signals. This study compares the Masimo SET to a conventional pulse oximeter (Nellcor) on ten sick newborns at risk for ROP.

The Masimo sensor (LNOP Neo Pt) was attached to a Masimo prototype oximeter and the Nellcor sensor (N-25) to a Nellcor N-200 oximeter. 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. Intrinsic motion, caregiver, and parental influenced desaturation were noted. The Masimo SET waveform was examined via a frequency analysis plot of SpO2. True desaturation occurred when a peak corresponding to the ECG frequency domain was identified and multiples of the waveform corroborated the finding (Comp. Biol. Med. 26:143-159, 1996).

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

False titration of oxygen may produce significant morbidity in the premature infant. A survey of >100 NICU's reported that the majority set high SpO2 alarms which could predispose an infant on supplemental oxygen to hyperoxemia(J. Perinatol. 17:341-5, 1997). The caregiver is numbed to a true alarm condition. Because of the high alarm rate, studies based upon a caregivers response to conventional oximetry are suspect at best.