CASE STUDY

Data submitted by:
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Erroneous SpO_2 Values with Conventional Pulse Oximetry in Spite of Matched Heart and Pulse Rates could have Increased the Risk of ROP as well as Cost.

"A micro-preemie of 635 grams with respiratory distress syndrome, complicated by a yet undiagnosed patent ductus arteriosis was receiving high frequency oscillatory support, and 100% oxygen on the fourth day of life. The infant had received two doses of exogenous surfactant. Although it is fairly common for micro-preemies to have fluctuating oxygen requirements, this patient's clinical appearance did not suggest oxygen deprivation. The patient had weaned gradually from 100% oxygen during the previous two days to a low of 40% oxygen. However, the R.N. and R.T. reported that the $\%SpO_2$ on the Nellcor N-200 had many severe desaturation events which they considered accurate because the pulse rate on the N-200 had correlated with the bedside ECG monitor. Indeed, the $\%SpO_2$ was currently displaying 67% and the ECG rate was correlating with the Nellcor N-200 pulse rate. These events were beginning to set off a wave of concern and diagnostic tests that included ABGs, septic work-up, 2D echo, transillumination and chest x-rays. However, upon closer clinical evaluation, the patient's clinical appearance was not suggestive of a low $\%SpO_2$. Consent was obtained and a prototype Masimo SET® pulse oximeter was placed on the patient's left foot. The Masimo SET pulse oximeter displayed an $\%SpO_2$ of 98% compared to the Nellcor $\%SpO_2$ of 83% and the pulse rates from both oximeters matched the ECG rate. Arterial blood gases were drawn and $\%SpO_2$ on both oximeters were noted at the moment of blood gas acquisition. The pertinent results and a comparison of the two pulse oximeters follow:"

	Masimo SET	Nellcor	AVL CO-Oximetry Results
SpO_2	98%	84%	
SaO_2			94%
Pulse Rate	162	163	

DISCUSSION:

"Questions have risen concerning the accuracy of conventional pulse oximeters in the neonatal setting especially in regards to poorly perfused, hemodynamically unstable patients during varying degrees of motion artifact. In this case, The Masimo SET pulse oximeter prevented very expensive and unnecessary diagnostic testing which could have resulted had clinicians not scrutinized the erroneous Nellcor data. Interestingly, it also demonstrates that conventional pulse oximetry may be incorrect even when the pulse rate correlates with the ECG. Additionally, having a continuum of oxygenation status monitoring can reduce the degree and frequency of changes in supplemental oxygen therapy, a concern in infants at risk for retinopathy of prematurity (ROP)."

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