

## **Accuracy of Two Pulse Oximetry Devices with Motion Artifact Reduction Technology on Very Small Birth Weight Infants in an Intensive Care Nursery.**

Slogic S. *Anesth Analg* 2002; 94(1S) S108.

### **Objective**

To evaluate the accuracy of Masimo Radical and the Nellcor N-395 pulse oximeters on Very Small Birth Weight infants (VSBW). Both machines employ motion artifact technology. Motion artifact interferes with accurate SpO<sub>2</sub> values, particularly in conditions of low peripheral blood flow when "... the motion-added signal tends to predominate over the pulse signal so that the (Red/Infrared) ratio transmitted to the photoreceptor produces a false SpO<sub>2</sub> value".<sup>1</sup> Motion and conditions of low perfusion are common in premature infants and are a continuous source of inaccurate SpO<sub>2</sub> measurement. Motion artifact reduction technology uses filters to separate non-arterial noise from the arterial signal and thus improve the accuracy of SpO<sub>2</sub> readings.

### **Methods**

Blood gas values from critically ill VSBW infants were compared with simultaneous SpO<sub>2</sub> readings. Infants were entered into the evaluation if they were critically ill with functioning arterial lines in place. Simultaneous SpO<sub>2</sub> was measured on post-ductal limbs to avoid potential pre-ductal admixture. Arterial blood gases (ABG) were drawn as ordered by the physician for clinical reasons; no ABGs were ordered for the sole purpose of comparing machine accuracy to ABGs. ABGs were measured in a Bayer 855 Blood Gas, Electrolyte and CO-Oximeter analyzer. Functional oxyhemoglobin saturation (SaO<sub>2</sub>) was computed by the following equation:  $SaO_2 = \frac{Fo_2Hb}{1 - (FCOHb - FmetHb)} \times 100$ . Two hundred and thirty eight paired test values were obtained. The difference between the SpO<sub>2</sub> and measured SaO<sub>2</sub> of the ABG were calculated for each pair and the mean difference (bias) and standard deviation (precision) was calculated. A paired t-test was performed on the means to determine if there was a statistically significant difference between the two instruments.

### **Results**

Two hundred thirty eight values were collected on 9 patients.

### **Conclusions:**

The Nellcor device was statistically more accurate than the Masimo device when compared to measured functional saturation on critically ill VSBW infants. The Masimo device consistently read lower SpO<sub>2</sub> values when compared with measured functional saturation.

|                                                              | <b>Masimo<br/>Radical</b> | <b>Nellcor<br/>N-395</b> |
|--------------------------------------------------------------|---------------------------|--------------------------|
| <b>Mean difference from ABG (bias)</b>                       | -2.614*                   | -0.484*                  |
| <b>Median difference from ABG</b>                            | -2.55*                    | -0.4*                    |
| <b>Standard deviation of the<br/>differences (precision)</b> | 2.197                     | 2.101                    |
| <b>Paired t test value</b>                                   | 7.2362 (* = P<0.001)      |                          |