

Comparison of Two Types of Pulse-Oximeters during Low Perfusion and Increased Motion Artifact in Pediatric Patients.

Downs B., Willis R., Heulitt M. *Crit Care Med.* 2006; 34(12):A89.

Introduction

The Masimo oximeter utilizes SET (Signal Extraction Technology) to provide more accurate reading during non-invasive monitoring. Theoretically SET is superior by improving signal-reliability in patients who exhibit low perfusion and performance in the presence of motion.

Hypothesis: SET enabled monitors will reflect fewer drop-outs and false alarms in the presence of low perfusion and/or motion, when compared to the oximeter with Nellcor 595 technology.

Methods

First, we examined the accuracy of both devices in low birth weight/low perfusion patients. These patients had scheduled arterial blood gas draws. Nineteen patients were connected to both oximeters for simultaneous readings. Pre-ductal probe sites were avoided. SpO₂ readings were recorded from each pulse-oximeter immediately before, during and immediately after each draw. After each draw, probe sites were switched. The three SpO₂ readings were then averaged. Forty two arterial blood samples were collected and 126 SpO₂ readings were recorded. Secondly, we compared the accuracy of the NT/SET in the presence of motion in chronic ventilated patients. Two patients were monitored continuously each day during two one-hour periods with probes switched between hours.

Results

For the low perfusion arm, there was no statistically significant difference in the mean pulse oximeter readings of oxygen in the blood among SET, NT, and the CO-Oximeter. Bias and precision for the SET as compared to the co-oximeter were 0.55, 10 versus NT 0.54, 10.

However, there was a significant difference in the ability of each pulse-oximeter to read through motion. There were a total of 217 nuisance alarms. The NT (with Sat Seconds set at 50) had 49 signal dropouts, 119 false alarms and 168 total alarms (77%), The SET had 20 signal dropouts, 32 false alarms and 52 total alarms(23%).

Conclusions

SET technology should be considered in patients where excessive motion may lead to artifact with false readings.