

Differences in Pulse Oximetry Technology Can Affect Detection of Sleep Disorders in Children

Brouillette RT, Lavergne J, Leimanis A, Nixon GM, Laden S, McGregor CD. *Anesthesia and Analgesia* 2002;94(S1): S47-53.

Introduction

In spite of the frequency of motion-induced false desaturations, the Nellcor N-200, in its fastest averaging time, had been the preferred pulse oximeter in these researchers' sleep laboratory (The Montreal Children's Hospital). Ultimately, they desired to find a pulse oximeter that would more accurately diagnose sleep-disordered breathing in children.

Methods

The study consisted of a series of three tests, involving 24 patients and compared the Nellcor N-200 and N-395 with the Masimo SET v2 (Q-400™) and Masimo SET v3 (Radical) pulse oximeters. Up to 30 pulse oximetry desaturation events were randomly selected per subject. These desaturations were delineated as true, false or missed by use of the computerized polysomnograph or apnea parameters, which included a transcutaneous oxygen probe as a referee for true hypoxemia "events".

Results

The Masimo SET pulse oximeters captured 90% (v2) and 99% (v3) of the true desaturations, while the Nellcor devices captured 76% (N-200) and 45% (N-395). Notably, the Nellcor N-395 was 2.4 times more likely than the Masimo SET oximeter to report false desaturations during patient movement. The researchers offered a clinical caution. "On such abbreviated tests, clusters of movement-related artifactual desaturations could lead the physician to the mistaken impression of sleep-related desaturation events with the potential for unnecessary diagnostic testing or even inappropriate surgery."

	True Hypoxemia Detection
 Masimo SET v3	99%
 Masimo SET v2	90%
Nellcor N-200	76%
Nellcor N-395	45%

Authors' Discussion and Conclusions

The researchers completed their quest to find a replacement for the N-200 with the affirmation, "In a pediatric sleep laboratory, use of a Masimo oximeter with very short averaging time could significantly reduce workload and improve reliability of desaturation detection." More pointedly, they warned that, "The sensitivity and motion artifact rejection characteristics of the Nellcor N-395 are not adequate for a pediatric sleep laboratory setting."