

The Effects of Motion on the Performance of Pulse Oximeters in Volunteers

Barker SJ, Shah NK. *Anesthesiology* 1997;86(1):101-108

Introduction

Pulse oximetry is considered a standard of care in both operating rooms and postanesthetic care units. It is also widely used in critical care settings. Pulse oximeters may fail to provide valid SpO₂ data in various situations. Motion artifact is a common cause of oximeter failure and loss of accuracy. This study compares the accuracy and data dropout rates of two current conventional pulse oximeters and one oximeter using the new Masimo SET[®] pulse oximetry technology.

Methods

The Nellcor N-200 and N-3000 utilizing conventional pulse oximetry technology and a Masimo SET prototype pulse oximeter were compared to themselves as controls and arterial blood gas data during motion and desaturation in 10 healthy volunteers. One hand was instrumented with all 3 oximeters and attached to a mechanical motion table. The opposite, stationary control hand was instrumented with all 3 oximeters and cannulated with an arterial line. Volunteers breathed varying oxygen gas concentrations resulting in oxygen hemoglobin saturations in the 75-100% range.

Results

Monitor		Nellcor N 3000 OXISMART	Nellcor N-200
False Alarms	0%	36%	30%
True Hypoxemias Detected	100%	84%	99%

Authors' Discussion and Conclusion

“The error and dropout rate performance of the Masimo was superior to that of the other two instruments during all test conditions. Masimo uses a new paradigm for oximeter signal processing, which appears to represent a significant advance in low signal-to-noise performance.” **“These results suggest that the Masimo SET prototype pulse oximeter yields a significant improvement in pulse oximeter performance during patient motion.”**