Pulse Oximetry during Low Perfusion Caused By Emerging Pneumonia and Sepsis in Rabbits.

Hummler H.D., Pohlandt F., Franz A.R. *Crit Care Med*. 2002 Nov;30(11):2501-8.

Objective

This study tested the effects of low perfusion caused by emerging sepsis on the reliability of a new pulse oximetry technology (Masimo SET; IVY 405T) compared with a standard pulse oximeter (Nellcor N-200).

Methods

Design: Randomized trial. *Setting:* University animal research facility. *Subjects:* Twenty-six anesthetized, ventilated (FiO, 1.0), adult rabbits. *Interventions:* Pneumonia/sepsis was induced by tracheal instillation of Escherichia coli. Oxygen saturation was measured by pulse oximetry (SpO2) and recorded continuously until death. Arterial oxygen saturation (Sao2) was measured hourly by oximetry and whenever SpO2 dropped to </=95%, or whenever a difference of >/=5% between devices occurred. SpO2 sensors were positioned at both forelegs and switched hourly.

Results

The total time of signal loss was longer with the N-200 vs. the IVY: 65 (4-299) min vs. 7 (0-97) min [median (range)], $p < 0.001$. Signal loss was more prevalent during the first 80% of the experimental time with the N-200 compared with the IVY. Nineteen of 26 animals had a total of 62 episodes of a falsely low SpO2 value with either one of the two devices associated with hemodynamic deterioration. Median bias (SpO2 - SaO2) was small, but variability of bias values increased toward the end of the experimental time with both devices.

Conclusions

The pulse oximeter equipped with Masimo SET was less prone to signal loss than the standard pulse oximeter in this sepsis model. Episodes of falsely low Spo2 readings may occur, and deviation of SpO2 from SaO2 may be increased with deteriorating hemodynamics with both devices.