**Decreased Accuracy of Pulse Oximetry Measurements during Low Perfusion Caused by Sepsis: Is the Perfusion Index of Any Value?**

Hummler H.D., Engelmann A., Pohlandt F., Högel J., Franz A.R. *Intensive Care Med*. 2006 Sep;32(9):1428-31.

**Objective**

To evaluate the effects of deteriorating perfusion caused by sepsis on the accuracy of pulse oximetry measurements using two more recently available techniques (Nellcor N-395 and Masimo Radical) and to evaluate the perfusion index as a marker of impaired peripheral perfusion to indicate that accuracy of pulse oximetry readings may be affected.

**Methods**

*Design And Setting*: Interventional cohort study in a university animal research facility. *Subjects:* Thirty-seven adult anesthetized, ventilated rabbits. *Interventions:* Pneumonia/sepsis was induced by tracheal instillation of Escherichia coli.

**Results**

Oxygen saturation and perfusion index as a marker of peripheral perfusion were measured by pulse oximetry (SpO2) and recorded continuously for 8 h. Arterial oxygen saturation (SaO2) was measured every 30 min by CO oximetry, and bias (SpO2 - SaO2) was calculated at each time point for each device to assess time-dependent changes in bias. Bias increased significantly across time for both devices tested comparing the first with the second half of the experimental period. Bias measurements during the second half of the experimental time were beyond the +/-3% error limit in 21.4% of cases with Nellcor and in 22.6% with Masimo. A lower perfusion index was associated with increased bias, but sensitivity, specificity, and positive and negative predictive values of this marker for increased bias was very limited.

**Conclusions**

We conclude that accuracy of pulse oximetry measurements was considerably affected with both devices with progressively deteriorating hemodynamics in this animal model of severe sepsis. Perfusion index as a marker for increased risk of bias was not a useful tool.