Accuracy of a Continuous Noninvasive Hemoglobin Monitor in Intensive Care Unit Patients.

Frasca D., Dahyot-Fizelier C., Catherine K., Levrat Q., Debaene B., Mimoz O. *Crit Care Med.* 2011 Oct;39(10):2277-82.

Objective

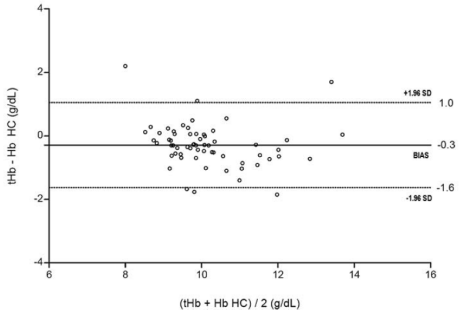
To determine whether noninvasive hemoglobin measurement by Pulse CO- Oximetry could provide clinically acceptable absolute and trend accuracy in critically ill patients, compared to other invasive methods of hemoglobin assessment available at bedside and the gold standard, the laboratory analyzer.

Methods

Design: Prospective study. *Setting:* Surgical intensive care unit of a university teaching hospital. *Patients:* Sixty-two patients continuously monitored with Pulse CO-Oximetry (Masimo Radical-7). *Interventions:* None.

Results

Four hundred seventy-one blood samples were analyzed by a point-of-care device (HemoCue 301), a satellite lab CO-Oximeter (Siemens RapidPoint 405), and a laboratory hematology analyzer (Sysmex XT-2000i), which was considered the reference device. Hemoglobin values reported from the invasive methods were compared to the values reported by the Pulse CO-Oximeter at the time of blood draw. When the case-to-case variation was assessed, the bias and limits of agreement were 0.0 ± 1.0 g/dL for the Pulse CO-Oximeter, 0.3 ± 1.3g/dL for the point-of-care device, and 0.9 ± 0.6 g/dL for the satellite lab CO-Oximeter compared to the reference method. Pulse CO-Oximetry showed similar trend accuracy as satellite lab CO-Oximetry, whereas the point-of-care device did not appear to follow the trend of the laboratory analyzer as well as the other test devices.



Bland Altman plot with limits of agreement for SpHb vs laboratory hematology analyzer.

Conclusion

When compared to laboratory reference values, hemoglobin measurement with Pulse CO-Oximetry has absolute accuracy and trending accuracy similar to widely used, invasive methods of hemoglobin measurement at bedside. Hemoglobin measurement with pulse CO-Oximetry has the additional advantages of providing continuous measurements, noninvasively, which may facilitate hemoglobin monitoring in the intensive care unit.