

Continuous Noninvasive Measurement of Hemoglobin via Pulse CO-Oximetry During Rapid Intra-Operative Fluid Shifts, a Dual Case Report. Noone M., Macknet M., Applegate R. *Proceedings of WARC 2010*: 191.

Background

Previous reports from prototype CO-Oximeter Hemoglobin (SpHb) sensors, prior to FDA approval and release of the Masimo Rainbow SET Pulse CO-Oximeter (Radical-7 model), indicate “good correlation during times of rapidly changing Hb concentration related to surgical blood loss and transfusion.”¹ However, user adjustment of averaging mode (short, medium or long), may affect accuracy of SpHb, particularly during rapid fluid shifts. The following two cases compare measurements of hemoglobin during rapid fluid shifts.

Methods

Hemoglobin values from two patients undergoing infrarenal abdominal aortic aneurysm repair were collected using SpHb (Masimo Radical-7) and simultaneous laboratory hemoglobin (Hb; blood gas analysis, Radiometer ABL-800 FLEX). Patients were operated on by the same surgeon for both procedures. Routine anesthetic care of patients was carried out based on laboratory blood gas results.

Results

Case A: 70 year old female with AAA, Type II diabetes, aortic stenosis, and COPD. SpHb averaging mode: medium (default). Ten pairs of data were collected with average SpHb 9.6 vs. Hb 11.0 g/dL, mean difference of 1.36 (min 0.5, max 2.9), see Table 1. Estimated blood loss 10.8 liters, total fluid administered was 11.5 liters during 4.5 hour operation.

Case B: 63 year old female with AAA, hypertension and hypothyroidism. SpHb averaging mode: short. Five pairs of data were collected with average SpHb 10.0 vs. Hb 11.0 g/dL, mean difference of 1.0 g/dL (min 0.1, max 2.5), see Table 2. Estimated blood loss was 1.3 liters, total fluid administered was 4.8 liters during five hour operation.

Conclusion

The difference between SpHb and Hb was less using a short averaging time than with a medium averaging time. This suggests that SpHb may be affected by averaging time as well as rapid fluid shifts. Changing to a short SpHb averaging time may improve accuracy of readings, particularly during rapid fluid shifts.

References: Macknet, M et al. *Resp Care* 2007; 52.