Accuracy and trending ability of hemoglobin measurement by the Pulse CO-Oximeter during vascular surgery.

J Clin Monit Comput. 2020 Jun;34(3):501-508. doi: 10.1007/s10877-019-00337-5.

Epub 2019 Jun 10.

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Real time information of Hb concentration can guide a tailored patient blood management. The study investigates the accuracy, precision and trending ability of the Pulse CO-Oximeter (SpHb) and blood gas analyzer in measuring the Hb concentration, compared to hematological analysis, in surgery at high risk of hemorrhage. We performed an observational study, involving 48 patients undergoing abdominal aortic open surgery. The primary endpoints of the study were to compare the accuracy in measuring the Hb concentration using non-invasive method (Masimo rainbow SET® Radical 7 Pulse CO-Oximetry™) compared to the values provided by invasive conventional blood gas analyzer and hematological analysis. The secondary endpoint was to compare the differences between the baseline and the final value of the Hb after surgery (Δ-values), as well as the trending ability. Bias (precision) for the SpHb was 1.63 g/dL (± 0.05) with 95% limits of agreement between 0.85 and + 2.4 g/dL, while for the blood gas analyzer was 0.69 g/dL (± 0.04) with 95% limits of agreement between 0.07 and 1.3 g/dL. Δ-values values were not statistically different from the reference values of ΔHb obtained with

the hematological analysis. Trending ability was good for both Pulse CO-Oximeter and blood gas analysis. Our results have shown that the SpHb is not precise enough to replace an invasive approach, but the trending ability of SpHb is accurate and may provide important information on the changes in hemoglobin concentration to guide blood management.