

Ability of the Masimo Pulse CO-Oximeter to Detect Changes in Hemoglobin.

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The decision to administer blood products is complex and multifactorial. Accurate assessment of the concentration of hemoglobin [Hgb] is a key component of this evaluation. Recently a noninvasive method of continuously measuring hemoglobin (SpHb) has become available with multi-wavelength Pulse CO-Oximetry. The accuracy of this device is well documented, but the trending ability of this monitor has not been previously described.

Twenty patients undergoing major thoracic and lumbar spine surgery were recruited. All patients received radial arterial lines. On the contralateral index finger, a R1 25 sensor (Rev E) was applied and connected to a Radical-7 Pulse CO-Oximeter (both Masimo Corp, Irvine, CA). Blood samples were drawn intermittently at the anesthesia provider's discretion and were analyzed by the operating room satellite laboratory CO-Oximeter. The value of Hgb and SpHb at that time point was compared. Trend analysis was performed by the four quadrant plot technique, testing directionality of change, and Critchley's polar plot method testing both directionality and magnitude of the change in values.

Eighty-eight samples recorded at times of sufficient signal quality were available for analysis. Four quadrant plot analysis revealed 94% of data within the quadrants associated with the correct direction change, and 90% of data points lay within the analysis bounds proposed by Critchley.

Pulse CO-Oximetry offers an acceptable trend monitor in patients undergoing major spine surgery. Future work should explore the ability of this device to detect large changes in hemoglobin, as well as its applicability in additional surgical and non-surgical patient populations