Validation of Continuous and Noninvasive Hemoglobin Monitoring by Pulse CO-Oximetry in Japanese Surgical Patients.

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We evaluated the accuracy of noninvasive and continuous total hemoglobin (SpHb) monitoring with the Radical-7(®) Pulse CO-Oximeter in Japanese surgical patients before and after an in vivo adjustment of the first SpHb value to match the first reference value from a satellite laboratory CO-Oximeter.

Twenty patients undergoing surgical procedures with general anesthesia were monitored with Pulse CO-Oximetry for SpHb. Laboratory CO-Oximeter values (tHb) were compared to SpHb at the time of the blood draws. Bias, precision, limits of agreement and correlation coefficient of SpHb compared to tHb were calculated before and after SpHb values were adjusted by subtracting the difference between the first SpHb and tHb value from all subsequent SpHb values. Trending of SpHb to tHb and the effect of perfusion index (PI) on the agreement of SpHb to tHb were also analyzed.

Ninety-two tHb values were compared to the SpHb. Bias ± 1SD was 0.2 ± 1.5 g/dL before in vivo adjustment and -0.7 ± 1.0 g/dL after in vivo adjustment. Bland-Altman analysis showed limits of agreement of -2.8 to 3.1 g/dL before in vivo adjustment and -2.8 to 1.4 g/dL after in vivo adjustment. The correlation coefficient was 0.76 prior to in vivo adjustment and 0.87 after in vivo adjustment. In patients with adequate perfusion (PI ≥1.4) the correlation coefficient was 0.89.

In vivo adjustment of SpHb significantly improved the accuracy in our cohort of Japanese surgical patients. The strongest correlation between SpHb and tHb values was observed in patients with adequate peripheral perfusion suggesting that low perfusion may affect the accuracy of SpHb monitoring.