Accuracy of Noninvasive and Invasive Point-Of-Care Total Blood Hemoglobin Measurement in an Outpatient Setting.

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Objective

The purpose of this study was to determine the accuracy of noninvasive hemoglobin measurement using pulse CO-oximetry (Pronto® SpHb®, Masimo Corp.) and a commonly used, invasive, point-of-care, automated spectrophotometer (HemoCue 201+®, HemoCue, Inc.), in comparison with hemoglobin measurements obtained from a laboratory hematology analyzer (measuring total blood hemoglobin) in the outpatient setting.

Methods

Adult patients presenting to an outpatient research clinic were tested for total blood hemoglobin measurement by 3 methods: noninvasive pulse CO-oximetry (SpHb®), finger-stick blood sample on a point-of-care device, and venous sample on a laboratory hematology analyzer (reference device). Bias and standard deviation (SD) of SpHb® and HemoCue 201+® compared with the values obtained with the laboratory hematology analyzer were calculated and Bland-Altman graphs were generated.

Results

Samples from 152 subjects were assessed (average age, 46 years; 69% female). The bias ± SD compared with the reference method was -0.5 ± 1.0 g/dL for SpHb® and 0.3 ±1.0 g/dL for HemoCue 201+®. The Bland-Altman plots assessing agreement of the test methods to the reference method had limits of agreement of -2.5 to 1.5 g/dL for SpHb® and -1.7 to 2.3 g/dL for HemoCue 201+®. A noninvasive measurement could not be obtained in 4 subjects after 2 attempts (2.5% failure rate), whereas the HemoCue 201+® measurements were obtained for all subjects.

Conclusion

Noninvasive SpHb® testing had bias and SD similar to those of HemoCue 201+®. Because SpHb® measurement is noninvasive, it may offer additional patient and provider benefits.