

Validation of a Non-Invasive Pulse CO-Oximetry Based Hemoglobin Estimation in Normal Blood Donors.

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Introduction

Non-invasive hemoglobin estimation may increase the recruitment of blood donors. CO-oximetry hemoglobin estimation is a non-invasive method used to estimate the hemoglobin level. The primary objective of this study is to validate the pulse CO-oximetry based hemoglobin estimation in normal blood donors.

Methods

We conducted a prospective observational study on 106 in a tertiary care hospital blood bank over a period of 4 weeks. We performed a Spot Hemoglobin concentration (Sp Hb) using Masimo Pronto-7 Pulse CO-oximetry, and compared it to a venous sample Hb concentration (Reference Hemoglobin; Ref Hb) measured using Abbott CELL-DYN Sapphire hematology analyzer. Age, gender, weight, height, blood pressure and reference hemoglobin were used in the multivariable linear regression model of the difference in measurement.

Results

Total of 106 donors (98 males, 8 females) were enrolled with a mean age and Ref Hb of 27 years (SD 6.2; 18-49) and 14.2 g/dL (SD 1.2; 11.5-17) respectively. The mean Sp Hb was 14.4 g/dL (SD 1.2; 11.3-16.7). The mean difference between the Sp Hb and Ref Hb was 0.2 g/dL (SD 1.2; -4.5 to 3) with a correlation coefficient of 0.46 ($R^2=21\%$). In the multivariable model, height ($p=0.015$) and Hb level ($p<0.001$) were statistically significant predictors. A strong correlation was found between the two CO-oximetry Hb measurements (coefficient 0.78, $R^2=60\%$).

Conclusions

Our study validated the use of the CO-oximetry in blood donors. Larger prospective studies are needed to confirm our results.