COMPARISON OF TWO CAPILLARY HAEMOGLOBIN-MEASUREMENT SYSTEMS WITH A VENOUS GOLD STANDARD

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Background

Predonation measurement of haemoglobin (Hb) is an important parameter for selection of eligible blood donors (BD) (1). The performance of the currently used system for capillary Hb measurement (Hemo_Speed, HS) was compared with an alternative device (CompoLab TM, CL). The accuracy of both systems was determined relative to the venous gold standard.

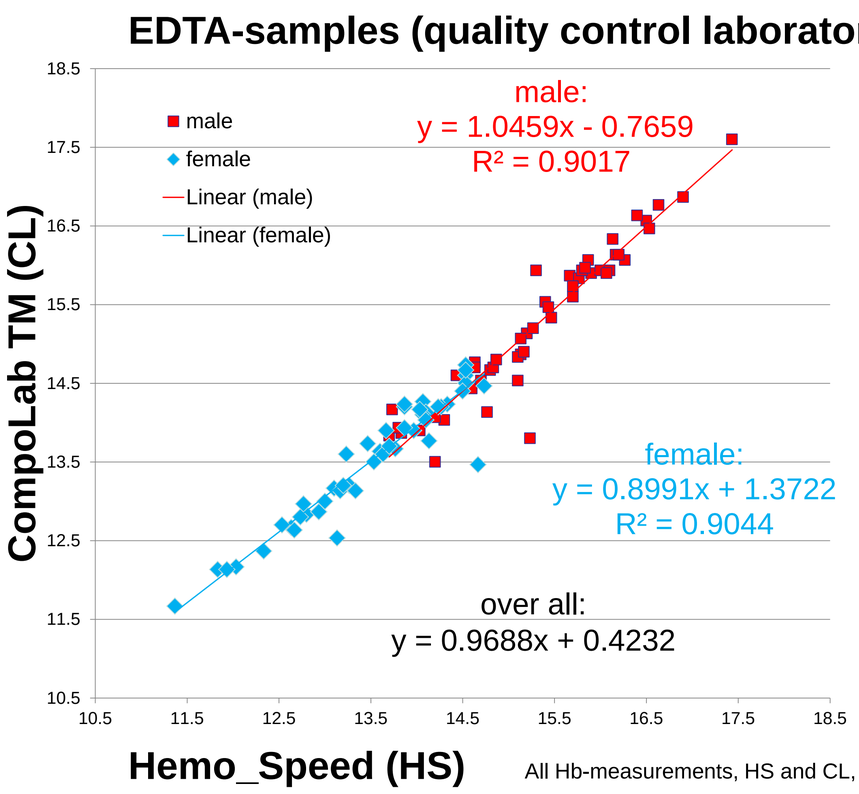
Materials and Methods

HS and CL use a fingerstick to collect the blood sample into the measurement cuvette. HS lyses the collected erythrocytes whereas CL leaves them intact for Hb measurement (2; 3). Using the same finger scratch, the first drop of blood was collected for HS and the second drop for CL. One hundred consecutive BD (51 ♂ / 49 ♀) participated in the study. At the drawing center (field condition, fc), one EDTA anticoagulated venous blood sample from each study subject was assessed by Sysmex KX-21 to investigate accuracy of HS and CL findings, respectively. In addition, HS and CL were evaluated by using the venous EDTA blood sample at the quality control laboratory (laboratory condition, lc) and therefore omitting the fingerstick bias of fc.

Results

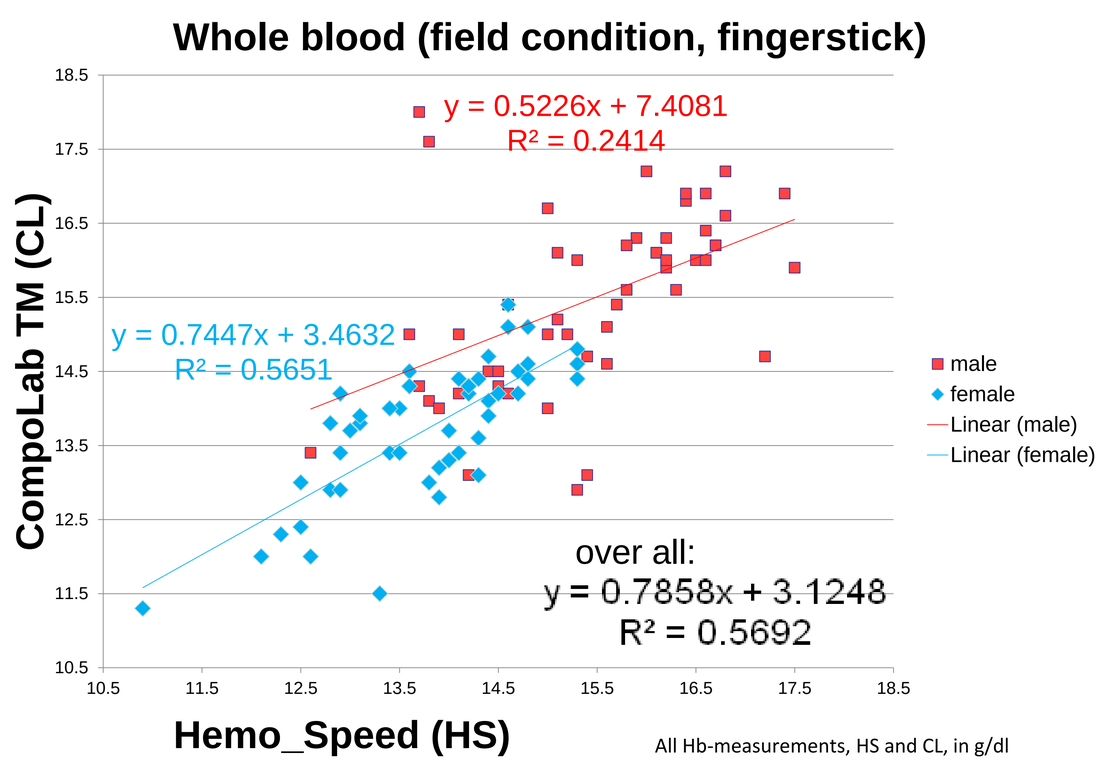
HS and CL provide congruent Hb results by using venous EDTA blood and applied lc (see figure 1).

figure 1



In comparison with the gold standard, there were no significant deviations of the mean Hb values in neither of the capillary systems (HS: 0.035 and CL: 0.062; p=0.34). In fc, the mean Hb of HS deviated by -0.151 g/dl and the mean Hb of CL by -0.145 g/dl (p=0.95) from Sysmex, leading to the same assertion. Under fc, Hb results of capillary methods are more scattering as compared to lc (see figure 2). Also, the assessment of Hb is systematically biased by both methods (HS and CL) which is reflected by skipping 0 in comparative regression analysis (see figure 2). We attribute this to the sample collection conditions by fingerstick (skin temperature, skin thickness, technical performance variability, etc). Similar findings were described by Tong and Ziemann (4; 1).

figure 2



Conclusion

HS and CL perform equally well in Hb measurement. Due to faster processing time, reagent-free cuvettes with extended shelf life and longevity of power supply, CL may be superior for routine BD selection. Not Hb-related affection of Hb measurement by capillary technology needs to be considered and might be different of other devices. However, selection accuracy of BD with borderline Hb concentration (lower limit of admittance ±0.5g/dl (♀ 12.0-13.0g/dl, ♂ 13.0-14.0g/dl)) remains to be assessed for the two capillary measuring systems.

References

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Swisstransfusion Jahreskongress 23. - 24. April 2015, Lugano, Switzerland; http://www.swisstransfusion.ch/