**Noninvasive Monitoring of Hemoglobin (SpHb) During Preoperative Stepwise Infusion of Ringer's Acetate: Accuracy for the Evaluation of Arterial Plasma Dilution.**

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**Background and Goal of Study**

In goal directed fluid therapy, intravenous fluid administration is targeted to maximize cardiovascular performance. This can be done by infusing consecutive fluid boluses targeting plasma dilution. Noninvasive monitoring of plasma dilution is available using a SpHb monitor Radical-7 (Masimo Corp., Irvine, USA). Correlation between noninvasive and invasive estimation of plasma dilution has not been reported. The objective of this study was to evaluate the accuracy of SpHb for the evaluation of plasma dilution during 3 consecutive crystalloid fluid challenges.

**Materials and Methods**

A prospective clinical trial was conducted with 36 ASA -II patients scheduled for elective orthopaedic surgery. The patients received three 5 ml kg-1 boluses of acetated Ringer's solution separated by periods of 5 minutes without fluid. Radial arterial blood samples (aHb) were analyzed and SpHb measurements were recorded simultaneously - before the 1st bolus, and after each 5 minute period following the 3 boluses. Blood was analyzed in a laboratory (COULTER® LH750; Beckman Coulter, Inc. USA). Arterial and capillary plasma dilutions (aPD and cPD) were calculated from fractional changes of aHb and SpHb, respectively. Agreements between aHb and SpHb and also aPD and cPD were evaluated by linear regression and Bland-Altman analysis.

**Results and Discussion**

The 108 arterial and capillary estimates of stepwise plasma dilution in 36 patients were calculated from 144 simultaneous measurements of SpHb and arterial Hb. There was no difference between the pooled means of 108 arterial and 108 capillary plasma dilution estimates, also between 108 paired estimates. Bland-Altman analysis showed 0.009 ±0.012 bias and linear regression analysis found weak correlation ($r = 0.21$, $p = 0.025$). Clinical interpretation of SpHb may need revision. Are we really looking at arterial/venous Hb?

**Conclusion**

Noninvasive monitoring of hemoglobin (SpHb) is not sufficiently accurate for evaluation of arterial plasma dilution during stepwise plasma dilution.