

### **Determination of Blood Volume by Pulse CO-Oximetry.**

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The objective of this study was to determine whether changes in carboxyhaemoglobin (COHb) saturation following carbon monoxide (CO) rebreathing can be accurately detected by pulse CO-oximetry in order to determine blood volume.

Noninvasive measurements of carboxyhaemoglobin saturation (SpCO) were continuously monitored by pulse CO-oximetry before, during and following 2 min of CO rebreathing.

Reproducibility and accuracy of noninvasive blood volume measurements were determined in 16 healthy non-smoking individuals (15 males, age:  $28 \pm 2$  years, body mass index:  $25.4 \pm 0.6$  kg m<sup>-2</sup>) through comparison with blood volume measurements calculated from invasive measurements of COHb saturation. The coefficient of variation for noninvasive blood volume measurements performed on separate days was 15.1% which decreases to 9.1% when measurements were performed on the same day. Changes in COHb saturation and SpCO following CO rebreathing were strongly correlated ( $r = 0.90$ ,  $p < 0.01$ ), resulting in a significant correlation between invasive and noninvasive blood volume measurements ( $r = 0.83$ ,  $p = 0.02$ ).

Changes in SpCO following CO rebreathing can be accurately detected by pulse CO-Oximetry, which could potentially provide a simplified, convenient and reproducible method to rapidly determine blood volume in healthy individuals.