

Continuous monitoring of haemoglobin concentration after in-vivo adjustment in patients undergoing surgery with blood loss.

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Non-invasive monitoring of haemoglobin concentration provides real-time measurement of haemoglobin concentration (SpHb) using multi-wavelength pulse co-oximetry. We hypothesised that in-vivo adjustment using the mean of three haemoglobinometer (HemoCue[®]) measurements from an arterial blood sample at the first SpHb measurement (HCueART) would increase the accuracy of the monitor. The study included 41 adults for a total of 173 measurements of haemoglobin concentration. In-vivo adjusted SpHb was automatically calculated by the following formula: $\text{in-vivo adjusted SpHb} = \text{unadjusted SpHb} - (\text{SpHb} - \text{HCueART})$. The accuracy of in-vivo adjusted SpHb was compared with SpHb retrospectively adjusted using the same formula, except for haemoglobin level which was assessed at the central laboratory and then compared with all other available invasive methods of haemoglobin measurement (co-oximetry, HbSAT; arterial HemoCue, HCueART; capillary HemoCue, HCueCAP). Compared with laboratory measurement of haemoglobin concentration, bias (precision) for unadjusted SpHb, in-vivo adjusted SpHb, retrospectively adjusted SpHb, HbSAT, HCueART and HCueCAP were -0.4 (1.4), -0.3 (1.1), -0.3 (1.1), -0.6 (0.7), 0.0 (0.4) and -0.5 (1.2) g.dl(-1), respectively. In-vivo adjustment of SpHb values using the mean of three arterial HemoCue measurements improved the accuracy of the device similar to those observed after a retrospective adjustment using central laboratory haemoglobin level.