

Respiratory variations in the photoplethysmographic waveform amplitude depend on type of pulse oximetry device.

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Respiratory variations in the photoplethysmographic waveform amplitude predict fluid responsiveness under certain conditions. Processing of the photoplethysmographic signal may vary between different devices, and may affect respiratory amplitude variations calculated by the standard formula. The aim of the present analysis was to explore agreement between respiratory amplitude variations calculated using photoplethysmographic waveforms available from two different pulse oximeters. Analysis of registrations before and after fluid loads performed before and after open-heart surgery (aortic valve replacement and/or coronary artery bypass grafting) with patients on controlled mechanical ventilation. Photoplethysmographic (Nellcor and Masimo pulse oximeters) and arterial pressure waveforms were recorded. Amplitude variations induced by ventilation were calculated and averaged over ten respiratory cycles. Agreements for absolute values are presented in scatterplots (with least median square regression through the origin, LMSO) and Bland-Altman plots. Agreement for trending presented in a four-quadrant plot. Agreement between respiratory photoplethysmographic amplitude variations from the two pulse oximeters was poor with LMSO $\Delta\text{POP}_{\text{Nellc}} = 1.5 \times \Delta\text{POP}_{\text{Mas}}$ and bias \pm limits of agreement 7.4 ± 23 %. Concordance rate with a fluid load was 91 %. Agreement between respiratory variations in the photoplethysmographic waveform amplitude calculated from the available signals output by two different pulse oximeters was poor, both evaluated by LMSO and Bland-Altman plot. Respiratory amplitude variations from the available signals output by these two pulse oximeters are not interchangeable.