**Accuracy of CAPTESIA, an Android Pulse Pressure Variation Application**

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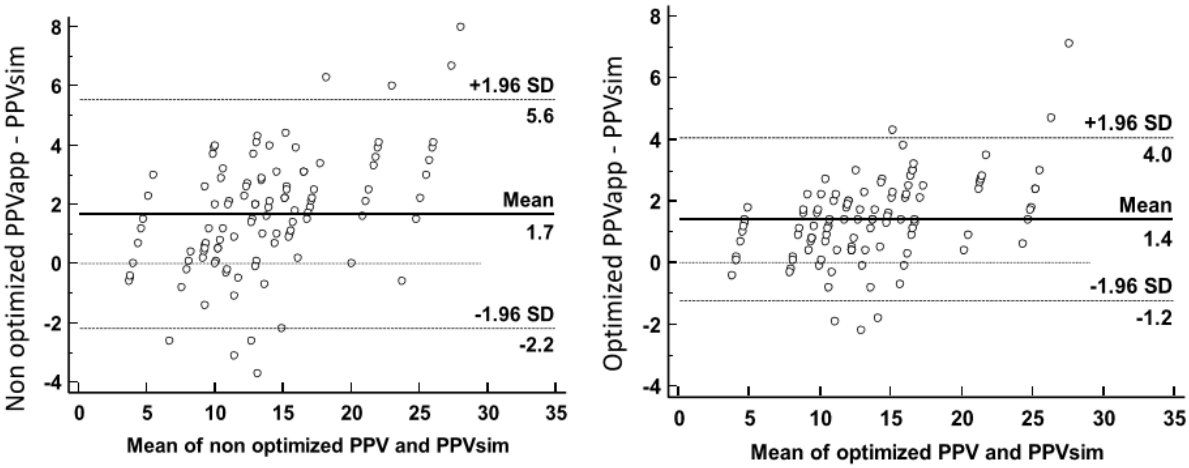
**Introduction:** Pulse pressure variation (PPV) remains a good predictor of fluid responsiveness in the OR. However, PPV can be time-consuming to calculate (manual determination), is not always displayed on monitoring screens nor reliable through visual assessment and needs additional devices to be displayed. A new Android application (Captesia) automatically calculates the PPV utilizing a digital photograph of the arterial waveform from the monitor. The application determines the PPVapp by selecting peaks and troughs of the arterial curve. The aim of this pilot study was to test its accuracy against a hemodynamic simulator.

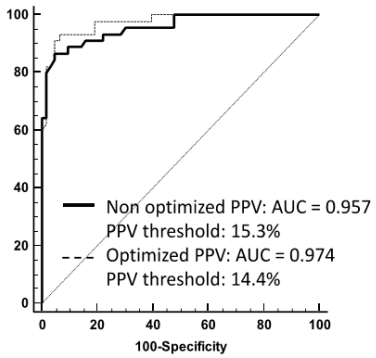
**Methods:** Capstesia™ was loaded on a Samsung Galaxy S4™ phone. The first phase was designed to evaluate the precision error of the PPVapp using the same screen to capture four sets of 50 photos by four observers. Secondly, PPVapp was compared to PPVsim by altering PPVsim (4-24%), pulse pressure (30-45-60 mmHg), heart rate (60-80/min) and respiratory rate (10-15-20/min). The second phase was repeated after optimizing the scale of the arterial waveform. We evaluated the reproducibility of PPV by calculating the precision error and the variability between observers by comparing the median values with a Kruskal Wallis test. Agreement between PPVsim and PPVapp was tested by a Bland-Altman analysis. A ROC curve analysis determined the ability of PPVapp to discriminate a PPVsim > 13%.

**Results:** The mean precision error of the PPV app was 8%, with significant inter-observers variability (p=0.003). 216 pairs of data were next obtained. Results are presented in figure 1 and 2. A PPVapp >15% could predict a PPVsim >13% with a sensitivity of 93% and a specificity of 94%. The amplitude of the pulse pressure and the heart/respiratory rate ratio had no impact on the accuracy of the PPVapp. Optimizing the arterial scale improved the agreement between PPVapp and PPVsim.

**Conclusion:** With a low Precision error and acceptable limits of agreement compared to a simulator, PPVapp could predict fluid responsiveness. Real conditions are warranted to test this application.

Agreement between PPVapp (%) and PPVsim (%)
according the optimization of the arterial waveform scale






receiver operator characteristics (ROC) curves representing the discriminative power of PPVapp to predict a PPVsim > 13%