

## **Invasive validation of a new oscillometric device (Arteriograph) for measuring augmentation index, central blood pressure and aortic pulse wave velocity**

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### **Abstract**

**Background:** The importance of measuring aortic pulse wave velocity (PWV<sub>ao</sub>), aortic augmentation index (Aix) and central systolic blood pressure (SBP<sub>ao</sub>) has been shown under different clinical conditions; however, information on these parameters is hard to obtain. The aim of this study was to evaluate the accuracy of a new, easily applicable oscillometric device (Arteriograph), determining these parameters simultaneously, against invasive measurements.

**Methods:** Aortic Aix, SBP<sub>ao</sub> and PWV<sub>ao</sub> were measured invasively during cardiac catheterization in 16, 55 and 22 cases, respectively, and compared with the values measured by the Arteriograph.

**Results:** We found strong correlation between the invasively measured aortic Aix and the oscillometrically measured brachial Aix on either beat-to-beat or mean value per patient basis ( $r = 0.9$ ,  $P < 0.001$ ;  $r = 0.94$ ,  $P < 0.001$ ), which allowed the noninvasive calculation of the aortic Aix without using generalized transfer function. Similarly strong correlation ( $r = 0.95$ ,  $P < 0.001$ ) was found between the invasively measured and the noninvasively calculated central SBP<sub>ao</sub>; furthermore, the BHS assessment of the paired differences fulfilled the 'B' grading. The PWV<sub>ao</sub> values measured invasively and by Arteriograph were  $9.41 \pm 1.8$  m/s and  $9.46 \pm 1.8$  m/s, respectively (mean  $\pm$  SD); furthermore, the Pearson's correlation was 0.91 ( $P < 0.001$ ). The limits of agreement were 11.4% for aortic Aix and 1.59 m/s for PWV<sub>ao</sub>.

**Conclusion:** Aix, SBP<sub>ao</sub> and PWV<sub>ao</sub>, measured oscillometrically, showed strong correlation with the invasively obtained values. The observed limits of agreement are encouragingly low for accepting the method for clinical use. Our results suggest that the PWV<sub>ao</sub> values, measured by Arteriograph, are close to the true aortic PWV, determined invasively.