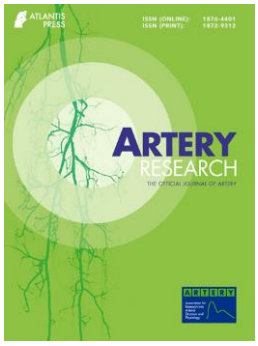


Artery Research

ISSN (Online): 1876-4401 **ISSN (Print): 1872-9312**
Journal Home Page: https://www.atlantis-press.com/journals/artres

12.03: VALIDATION OF A BRACHIAL CUFF-BASED METHOD FOR ASSESSING CENTRAL BLOOD PRESSURE AT REST AND DURING LIGHT EXERCISE

L.M. Day, D.M. Nicholson-Thomas, K.M. Maki-Petaja, C.M. McEniery, I.B. Wilkinson

To cite this article: L.M. Day, D.M. Nicholson-Thomas, K.M. Maki-Petaja, C.M. McEniery, I.B. Wilkinson (2011) 12.03: VALIDATION OF A BRACHIAL CUFF-BASED METHOD FOR ASSESSING CENTRAL BLOOD PRESSURE AT REST AND DURING LIGHT EXERCISE, Artery Research 5:4, 201–201, DOI: https://doi.org/10.1016/j.artres.2011.10.188

To link to this article: https://doi.org/10.1016/j.artres.2011.10.188

Published online: 14 December 2019

P12.02
VARIATIONS OF WAVE REFLECTION INDEXES INDUCED BY ACUTE BLOOD PRESSURE CHANGES AT DIFFERENT ARM HEIGHTS

G. Pucci [1], B. Gavish [2], F. Battista [1], L. Settimi [1], E. Mannarino [1], G. Schillaci [1]
[1]*Department of Clinical and Experimental Medicine, University of Perugia, Perugia, Italy*
[2]*Intercure Ltd, Lod, Israel*

Acute blood pressure (BP) changes might influence augmentation index (AIx), an integrated dimensionless measure of reflected wave timing and amplitude. In 30 healthy subjects (49±16 years, 43% men), supine brachial BP and radial-artery waveform (applanation tonometry, SphygmoCor) were obtained with the right arm supported in 3 different positions: at the heart level (0°), raised by 30° (+30°), and lowered by 30° (-30°). BP and tonometric measures were also obtained on the contralateral arm, which was held at the heart level during the examination.
Brachial systolic/diastolic BP was 121/67±18/8 mmHg. Radial AIx was 84±19%, and estimated central AIx 27±14%. As expected, changes in arm position modified substantially mean BP (96±12 mmHg at -30°, 85±11 mmHg at 0°, 74±11 mmHg at +30°, all $p<0.001$).
Radial and central AIx were both reduced at -30° (71±22% and 17±17%), and increased at +30° (97±21% and 30±14%, all $p<0.001$) vs corresponding values at 0°. Heart rate and contralateral BP and AIx did not change. Changes in radial and aortic AIx were strongly related each other ($r=0.76$, $p<0.001$). Percent variation in radial AIx (highest minus lowest, divided by AIx at heart level) had a strong inverse relationship with age ($r=-0.43$, $p<0.001$) and systolic BP ($r=-0.37$, $p<0.001$).
In conclusion, acute gravitational upper-limb BP changes generate opposite changes in radial AIx. Acute changes in radial Aix decrease with age and BP levels, and might represent a novel index of vascular aging. Artifactual changes in aortic AIx may arise in the presence of radial-aortic distending pressure gradient.

P12.03
VALIDATION OF A BRACHIAL CUFF-BASED METHOD FOR ASSESSING CENTRAL BLOOD PRESSURE AT REST AND DURING LIGHT EXERCISE

L. M. Day, D. M. Nicholson-Thomas, K. M. Maki-Petaja, C. M. McEniery, I. B. Wilkinson
University of Cambridge, Cambridge, United Kingdom

Background: Central blood pressure (BP) may be more predictive of cardiovascular events than brachial BP. A cuff-based ambulatory central BP monitor is now available; the aim of this study was to compare values of central BP between this device and the SphygmoCor device.
Methods: Two studies were conducted. Study 1: We compared seated central systolic BP (cSBP) and pulse pressure (cPP) between the Mobil-o-graph and SphygmoCor devices. Study 2: We compared cSBP and cPP between the Mobil-o-graph and SphygmoCor devices at rest and during light bicycle exercise, corresponding to approximately 12 and 25 watts.
Results: Study 1 contained 51 healthy subjects (mean age 51±20yrs, 31 females) and study 2 contained 20 subjects (mean age 43±11yrs, 9 females). Study 1:The mean difference between devices was 1±5mmHg, $P=0.18$ (cSBP) and 0±4mmHg, $P=0.54$ (cPP). There was a strong correlation between devices for cSBP ($r=0.94$, $P<0.0001$) and cPP ($r=0.92$,$P<0.0001$). Study 2:The mean difference in cSBP between devices was 1±3mmHg at rest and 1±6mmHg at the highest workload. The mean difference in cPP between devices was 0±3mmHg at rest and 0±6mmHg at the highest workload. The devices were strongly correlated at rest ($r=1.00$, $P<0.0001$, cSBP) and ($r=0.87$, $P<0.0001$, CPP) and at the highest workload for ($r=0.94$, $P<0.0001$, cSBP) and ($r=0.85$, $P<0.0001$, cPP).
Conclusion: Non-invasive measurement of central BP by the mobilograph device is in good agreement and highly correlated with the widely used SphygmoCor device, both at rest, and in response to light exercise simulating everyday activities during which ambulatory BP measurements might be made.

P12.04
HOW MUCH DOES PRESSURE WAVE REFLECTION CONTRIBUTE TO AUGMENTATION INDEX?

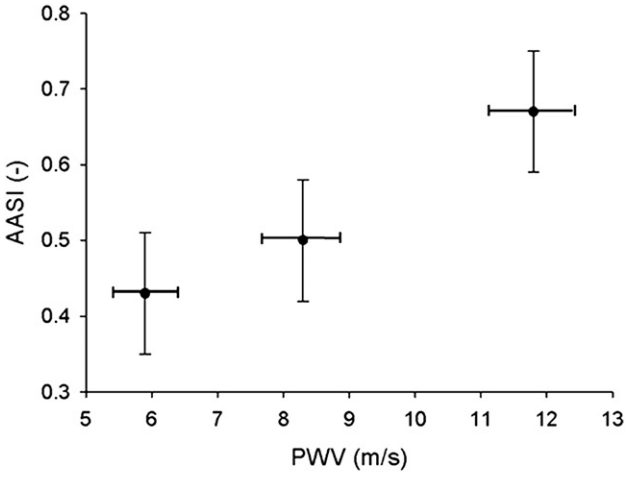
A. Guilcher, S. Brett, B. Clapp, P. Chowienczyk
King's College London BHF Centre, Department of Clinical Pharmacology, St Thomas' Hospital, London, United Kingdom

Background: Aortic pulse pressure can be partitioned into the height of the first systolic shoulder (P1) and augmentation pressure AP. P1 is thought to be determined by an outgoing pressure wave generated by ventricular contraction and AP by a backward wave "reflected" from the distal circulation. Augmentation index (AIx = AP / cPP) is commonly used to quantify wave reflection. Nitroglycerin (NTG) has a powerful effect to reduce AIx which has been attributed to a reduction in wave reflection. The objectives of this study were to examine the contribution of forward and backward waves to AIx at rest and after administration of NTG.
Methods: A ComboWire 9500 catheter (VolcanoCorp, USA) with a Doppler probe and a pressure sensor at the tip was placed in the aortic root in 21 subjects (11 men, aged 45-81). Simultaneous measurements of aortic blood flow velocity and blood pressure were made at baseline and after the admission of sublingual NTG (400 μg). Using wave decomposition, AIx was expressed as the summation of forward and backward components, F_{AIx} and B_{AIx} respectively.
Results: AIx decreased by 17.3% (from 39.5±3.6 to 22.2±5.0%, $P<0.001$) after NTG. The decrease in AIx was attributable to a similar decrease in both forward and backward components (decreases in F_{AIx} and B_{AIx} by 8.7% and 8.6% respectively ($P<0.05$).
Conclusions: These results suggest the forward wave is a major determinant of AIx and that the role of reflection in mediating effects of NTG may be less than previously thought.

P12.05
AMBULATORY ARTERIAL STIFFNESS INDEX: ANOTHER AMBIGUOUS STIFFNESS INDEX?

J. G. Kips [1,2], S. J. Vermeersch [1,2], P. Reymond [3], P. Boutouyrie [4,5,6], N. Stergiopulos [3], S. Laurent [4,5,6], L. Van Bortel [1], P. Segers [2]
[1]*Heymans Institute of Pharmacology, Ghent University, Ghent, Belgium*
[2]*IBiTech-bioMMeda, Ghent University, Ghent, Belgium*
[3]*Hemodynamics and Cardiovascular Technology, Swiss Federal Institute of Technology, Lausanne, Switzerland*
[4]*Assistance Publique, Hôpitaux de Paris, Hôpital Européen Georges Pompidou, Paris, France*
[5]*INSERM U970, Paris, France*
[6]*Université Paris, Descartes, Paris, France*

Introduction: The Ambulatory Arterial Stiffness Index (AASI), derived from ambulatory blood pressure (ABPM) recordings, has been proposed as a surrogate marker of arterial stiffness. However, there is controversy to which extent it reflects stiffness or is affected by other parameters. Using a computer model of the arterial circulation, the relative importance of the different determinants of the AASI was explored.
Methods: Arterial distensibility (inverse of stiffness), peripheral resistance, heart rate, maximal cardiac elastance and venous filling pressure were varied from 80 to 120% of their initial value in steps of 10% to generate 3125 BP-values, mimicking the daily fluctuations in one theoretical subject. From this dataset, we assessed the confidence with which AASI can be derived in this subject, as well as the influence of different individual parameters on AASI. To assess the ability of AASI to detect large changes in arterial stiffness, two additional subjects were simulated with a distensibility of 50% and 25% of the default distensibility, respectively.



Range of AASI- and PWV-values associated with each of the three theoretical subjects