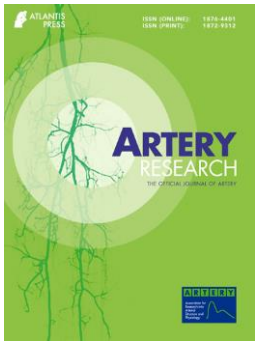

Artery Research

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

P4.04: INCREASED AORTIC PULSE WAVE VELOCITY (PWVAO) AND AORTIC AUGMENTATION INDEX (AIXAO) IN CHILDREN TREATED WITH ANTHRACYCLINES FOR MALIGNANT DISEASE

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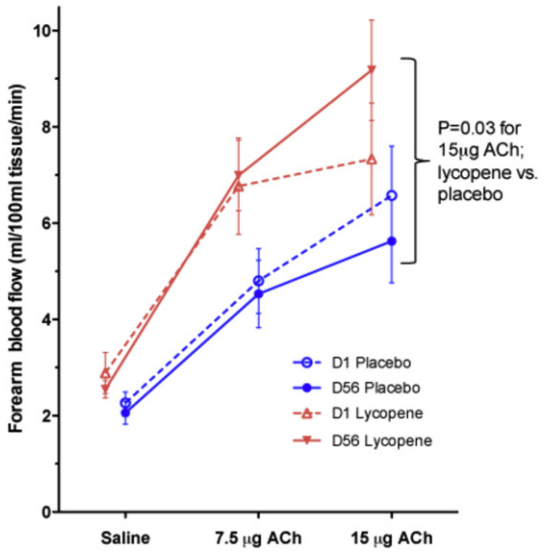
To cite this article: V. Herceg-Cavrak, V. Ahel, J. Roganovic (2012) P4.04: INCREASED AORTIC PULSE WAVE VELOCITY (PWVAO) AND AORTIC AUGMENTATION INDEX (AIXAO) IN CHILDREN TREATED WITH ANTHRACYCLINES FOR MALIGNANT DISEASE, Artery Research6:4, 184–184, DOI: https://doi.org/10.1016/j.artres.2012.09.152

To link to this article: https://doi.org/10.1016/j.artres.2012.09.152

Published online: 21 December 2019



P4.04
INCREASED AORTIC PULSE WAVE VELOCITY (PWVAO) AND AORTIC AUGMENTATION INDEX (AIXAO) IN CHILDREN TREATED WITH ANTHRACYCLINES FOR MALIGNANT DISEASE

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Survivors of childhood malignancy have a significantly higher cardiovascular morbidity and mortality later in life. Anthracyclines are associated with marked cardiovascular toxicity and are therefore the major cause of cardiovascular events in this population group.
The aim of the study was to determine whether anthracyclines used for the treatment of malignant disease in childhood could increase arterial stiffness measured as the aortic pulse wave velocity (PWVao) and aortic augmentation index (AIxao).
A total of 119 children and adolescents aged 7-20 years were examined, 69 of them (mean age 13.69±4.45 years) having completed anthracycline therapy for malignant disease according to various protocols at least a year before. Study patients were free from clinical and laboratory signs of malignant or cardiac disease. Control group included 50 healthy children, mean age 12.68±3.22 years. Arterial stiffness was determined by measuring PWVao and AIxao using oscillometric method on an Arteriograph TensioMed device.
PWVao was higher (6.25±1.31 m/s *vs.* 5.64±0.66 m/s; $P<0.001$) and AIxao was higher (8.7±9.69% *vs.* 5.64±5.15%; $P=0.044$) in subjects with a history of anthracycline treatment as compared with control group.
PWVao and AIxao are significantly higher in patients treated a year or more before with anthracyclines as compared to healthy children. The effect of anthracyclines on late mortality in individuals treated for malignant disease in childhood may not be exclusively due to their cardiotoxicity, but also to the increased arterial stiffness

P4.05
AN EXAMINATION OF THE CARDIAC MECHANICS AND PULSE PRESSURE WAVEFORMS THAT UNDERPIN VENTRICULAR-ARTERIAL INTERACTION AT REST AND DURING EXERCISE

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Background: In healthy humans the left ventricle (LV) and the arterial system reciprocally interact to meet the circulatory demands of the body both at rest and during exercise. Ventricular-arterial interaction (VAI) can be quantified non-invasively using the ratio of arterial (E_a) and ventricular (E_{es}) elastances. However, E_{es} is a global measure of LV systolic function and E_a does not take into account the effect of wave reflections. Speckle tracking echocardiography (STE) and pulse wave analysis (PWA) allow for regional quantification of both cardiac and vascular functioning throughout the cardiac cycle. The purpose of this study was to characterise VAI using STE and PWA to explore the LV mechanics e.g. LV twist, and components of the pulse pressure waveform e.g. augmentation index (AIx), that underpin VAI at rest and during exercise.
Methods: 9 (7 male) healthy participants (43±7 years) underwent simultaneous STE and PWA at rest and during exercise.
Results: During exercise there was a decrease in E_a/E_{es} due to significant changes in E_{es} but not E_a. Whilst there were no significant changes in E_a during exercise both AIx and time to forward wave were significantly reduced. In contrast, the alteration in E_{es} was paralleled by significant changes in peak twist, time to peak twist, untwisting velocity and apical rotation.
Conclusions: The combined use of STE and PWA appears more sensitive to acute physiological changes induced by exercise than the classic VAI ratio: E_a/E_{es}. Future work will examine the sensitivity of combining STE and PWA to unmask subclinical cardiovascular pathology.

Variable	Rest: mean (SD)	Exercise: mean (SD)
E_a (mmHg/ml)	2.12 (0.56)	2.07 (0.56)
E_{es} (mmHg/ml)	2.92(1.13)	3.53 (1.25)*
E_a/E_{es} (mmHg/ml)	0.77 (0.22)	0.61(0.12)*
AIx (%)	12.67 (8.71)	5.44 (8.57)**
Time to forward wave (ms)	113.11 (10.3)	100.67 (14.97)*
Peak twist (°)	8.88 (2.99)	15.29 (5.27)*
Time to peak twist (ms)	387.54 (55.54)	307.08 (24.46)*
Untwisting velocity (°/sec-1)	-60.63 (13.30)	-128.13 (44.45)*
Apical rotation (°)	6.66 (3.65)	11.30 (5.52)*

*$p<0.05$; **$p<0.001$.

P4.06
AMBULATORY CARDIAC REHABILITATION IMPROVES PULSATILE ARTERIAL HEMODYNAMICS — A PILOT TRIAL

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Introduction: In patients with coronary artery disease (CAD), both arterial stiffness and wave reflections are increased and predict unfavourable cardiovascular events. Cardiac rehabilitation has the goal to reduce risk factors and slow the progression of the disease.
Aim: The aim of the study was to prospectively determine the impact of a 5-weeks ambulatory cardiac rehabilitation program on pulsatile hemodynamics.
Methods: Male patients following coronary interventions, bypass surgery or acute coronary syndromes underwent exercise training (35 minutes aerobic exercise at 50-70% of heart rate reserve 3x/week) and resistance training 2x/week. Before and after the program, carotid-femoral pulse wave velocity (cf-PWV) and wave reflections (Augmentation Index corrected for heart rate 75 — AIx@75) were measured, using applanation tonometry and a transfer function (SphygmoCor system). Exercise capacity was assessed with an incremental cycle ergometer protocol.
Results: 24 men (mean age 57 years) participated in the study. Following the intervention, brachial systolic blood pressure tended to decrease from 136.8 (SD 17.3) to 133.3 (SD 10.1) mm Hg ($p=0.328$). Brachial diastolic blood pressure changed from 82.7 (SD 8.3) to 79.2 (SD 6.9) mm Hg ($p=0.134$). Exercise capacity improved significantly from 154.2 (SD 31.1) to 168.5 (SD 31.9) Watt ($p<0.0001$). Cf-PWV decreased significantly from 8.7 (SD 1.7) to 7.9 (SD 1.9) m/sec ($p<0.05$) - Figure, and AIx@75 decreased significantly from 20.4 (SD 8.7) to 17.5 (SD 8.1) ($p<0.05$). Finally, exercise capacity was inversely and significantly related to cf-PWV ($r= -0.344$, $p<0.05$) and AIx@75 ($r = -0.603$, $p<0.0001$).