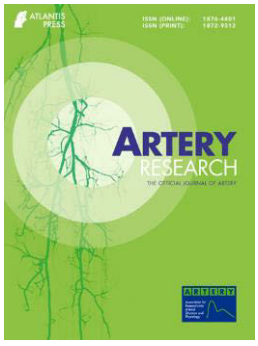

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1.3: PREDICTION OF CARDIOVASCULAR MORTALITY AND MORBIDITY IN THE MALMö DIET-CANCER COHORT FOR THE IDENTIFICATION OF HEALTHY VASCULAR AGEING, USING MARKERS OF VASCULAR STATUS

Benjamin Nilsson Wadström, Peter Nilsson, Abd Al-Hakim Fatehali, Gunnar Engstrom

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ARTERY 18, Guimaraes Oral Presentation abstracts

Oral Session I – Epidemiology + Special Populations

1.1
PROMOTION OF ARTERIAL STIFFNESS BY CHILDHOOD CANCER AND ITS CHARACTERISTICS IN ADULT LONG-TERM SURVIVORS

Natalie Arnold [1], Hiltrud Merzenich [2], Arthur Wingerter [3], Andreas Schluz [4], Astrid Schneider [2], Jürgen H. Prochaska [5], Sebastian Göbel [6], Marie-Astrid Neu [3], Nicole Henninger [3], Marina Panova-Noeva [5], Susan Eckerle [3], Claudia Spix [2], Irene Schidtmann [2], Karl J. Lackner [7], Manfred E. Beutel [8], Norbert Pfeiffer [9], Thomas Münzel [6], Jörg Faber [3], Philipp S. Wild [4]

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Background: Vascular alterations induced by antineoplastic treatment might be considered as a possible underlying mechanism of increased cardiovascular (CV) sequelae in childhood cancer survivors (CCS). Therefore, we thought to evaluate the changes in arterial stiffness (AS) among long-term CCS compared to the general population.
Methods: AS was assessed by digital photoplethysmography (Stiffness Index (SI); m/s) among 1,002 participant of "Cardiac and Vascular late Sequelae in long-term Survivors of childhood cancer" study, diagnosed with neoplasia prior to an age of 15 years (1980–1990). A population-based subsample from the Gutenberg Health Study (GHS) ($n = 5,252$) was used for comparison. All subjects underwent a comprehensive, standardized clinical examination in the same study center.
Results: Compared to the population subsample with similar age range, CCS had higher SI in multivariable linear regression analysis with adjustment for cardiovascular risk factor and comorbidities ($\beta = 0.66[0.51/0.80]$; $p < 0.0001$). Moreover, SI was varying according to tumor entity with highest values in bone tumors. Interestingly, CCS demonstrated stiffer vessels than individuals from the population even in absence of a history of chemo- or radiotherapy ($\beta = 0.56[0.16/0.96]$; $p = 0.0066$) or prevalent hypertension ($\beta = 0.66[0.50/0.81]$; $p < 0.0001$) in fully-adjusted models. Finally, a 5.2-fold [3.9; 7.0] higher prevalence of SI values exceeding age-specific, population-based reference limits was observed among CCS compared to individuals from the population.
Conclusions: This is the first study demonstrating increased AS among long-term CCS. The data suggest that AS promotion might differ in individuals with childhood cancer: Cancer development and antineoplastic treatment might be relevant determinants.

1.2
ASSOCIATIONS BETWEEN INDICATORS OF CARDIOVASCULAR DISEASE AND PULSE WAVE ANALYSIS AND VELOCITY: A COMPARISON OF DEVICES

Elizabeth Ellins [1], Lucy Lennon [2], Olia Papacosta [2], Goya Wannamethee [2], Peter Whincup [3], Julian Halcox [4]

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Background: Both the Sphygmocor (S) and Vicorder (V) devices can be used for Pulse Wave Analysis (PWA) and Velocity (PWV). We investigated if there were differences in the associations between markers of Cardiovascular Disease (CVD) and PWA and PWV variables as assessed by the two devices.
Methods: 1,722 men (78.5 ± 4.7 yrs) from the British Regional Heart Study underwent PWA and PWV with the Sphygmocor and Vicorder devices. Carotid artery Intima-media Thickness (cIMT), NT-proBNP and Left Ventricle Hypertrophy (LVH) detected by ECG were also assessed. Multiple regression was used to investigate the associations between cIMT, NT-proBNP and LVH with each of the following measures, central Augmentation Pressure (cAP) Augmentation Index (cAIx) Blood Pressure (cBP) and carotid to femoral PWV.
Results: Men with data obtained from both devices were included (PWA $n = 1,373$, PWV $n = 1,122$). Following adjustment for CVD risk factors, Sphygmocor cAP, cAIx and cBP were all positively associated with LVH ($p < 0.05$), the relationship between Sphygmocor PWV and LVH was negative (OR 0.87 95% CI 0.78–0.97). There were no associations between LVH and Vicorder variables. cAP measured by both devices and cAIx by Vicorder were predictors of NT-proBNP levels (ScAP Beta 0.097 $p < 0.05$, VcAP Beta 0.153 $p < 0.001$ & VcAIx Beta 0.129 $p < 0.001$). Vicorder cBP was the only predictor of cIMT (Beta 0.057 $p < 0.05$).
Conclusion: The same measures from two devices were predictors of different indicators of CVD. Further exploration is needed to understand these differences, but device used needs to be taken into consideration when comparing findings of these variables with other published results.

1.3
PREDICTION OF CARDIOVASCULAR MORTALITY AND MORBIDITY IN THE MALMÖ DIET-CANCER COHORT FOR THE IDENTIFICATION OF HEALTHY VASCULAR AGEING, USING MARKERS OF VASCULAR STATUS

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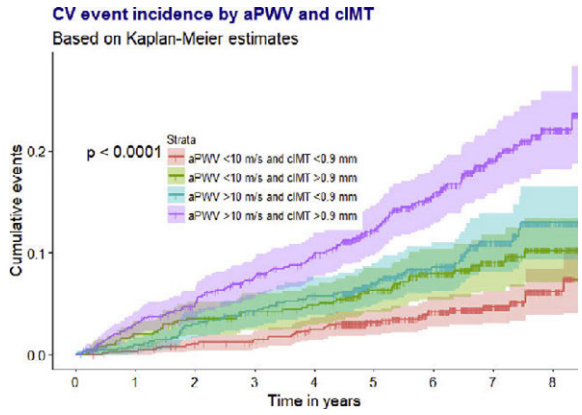
Background: This study aims to translate two arterial measurements, aortic Pulse Wave Velocity (aPWV) and carotid Intima-Media Thickness (cIMT), into a combined Vascular Ageing Index (VAI), to evaluate the predictive power of VAI and utilize it to identify a sub-group with Healthy Vascular Ageing (HVA).
Methods: In all, 2718 subjects were included from the CV arm of the Malmö Diet Cancer study (median age 72 years, 62.2% females). Median follow-up for CV events (N = 269) was 6.5 years. VAI was created by a function that combined aPWV and cIMT. Cox regressions for aPWV, cIMT and VAI, adjusted for conventional CV risk factors, were carried out. aPWV and cIMT were mutually adjusted for while VAI was analyzed separately. Model improvements for a model of conventional CV risk factors were assessed using Harrell's c-statistic and continuous Net Reclassification Index (NRI).
Results: Cox regression Results: (fully adjusted model): 1 SD of log-(aPWV), HR: 1.22 (95% CI: 1.03—1.42, P = 0.010), 1 SD of log (cIMT), HR: 1.29 (95% CI: 1.13—1.47, P < 0.001), 1 SD of log-VAI, HR: 1.43 (95% CI: 1.22—1.68, P < 0.001) (Figure1). C-statistics: 0.715 (conventional risk factor model), 0.721 (+aPWV), 0.734 (+aPWV and cIMT) and 0.732 (+VAI). NRI showed a significant (P < 0.001) improvement for classification of event-free subjects when adding aPWV and cIMT or VAI.
Conclusion: VAI added marginally to prediction of CV events. However, the classification of subjects who remained free from CV events was significantly improved.



1.4
PROGNOSTIC VALUE OF PROXIMAL AORTA LONGITUDINAL STRAIN IN MARFAN SYNDROME

Andrea Guala [1], Jose Rodríguez-Palomares [1], Aroa Ruiz-Muñoz [1], Minerva Gandara [1], Violeta Sanchez [2], Alberto Forteza [3], David Garcia-Dorado [4], Artur Evangelista [4], Gisela Teixido-Tura [1]
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Background: Aortic root dilation and type A aortic dissection are the most common cardiovascular complications of Marfan syndrome (MFS). Current clinical management of MFS patients relies on a close follow-up of aortic root diameter and preventive aortic root surgery in case of severe or fast-progressing dilation. However, as the capacity of aortic diameter to predict type A aortic dissection is limited, new non-invasive biomarkers to improve risk stratification are needed. We investigated the capacity of proximal aorta circumferential and longitudinal strain and ascending aorta distensibility to predict aortic root diameter dilation and occurrence of major cardiovascular events in Marfan patients.
Methods: Eighty-seven Marfan patients without previous cardiac/aortic surgery or dissection were prospectively included in a multicenter follow-up. Proximal aorta longitudinal and circumferential strain and distensibility were computed from baseline CMR.
Results: During a follow-up of 81.6 ± 17 months, 11 patients underwent elective aortic root replacement, and 2 experienced type A aortic dissections. Mean dilation rate was 0.65 ± 0.67 mm/year and z-score growth rate 0.07 ± 0.13 1/year. In multivariable analysis, proximal aorta longitudinal strain but not circumferential strain and distensibility were independent predictors of diameter growth-rate (p = 0.001, p = 0.385 and p = 0.381, respectively), z-score growth-rate (p = 0.018, p = 0.515 and p = 0.484, respectively) and major cardiovascular events (p = 0.018, p = 0.064 and p = 0.205, respectively) corrected for demographic and clinical characteristics and baseline aortic root diameter.
Conclusions: In Marfan syndrome, proximal aorta longitudinal strain is an independent predictor of aortic root dilation and major cardiovascular events beyond aortic root diameter and established risk factors.

1.5
DEEP VASCULAR PHENOTYPING IN PATIENTS WITH FIBROMUSCULAR DYSPLASIA

Rosa Maria Bruno [1,2], Louise Marais [2], Hakim Khettab [3], Aurélien Lorthioir [3], Xavier Jeunemaitre [4,2], Stèphane Laurent [3,2], Pierre Boutouyrie [3,2], Michel Azizi [3]
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Background: Fibromuscular dysplasia (FMD) is a non-atherosclerotic, non-inflammatory vascular disease involving medium-sized muscular arteries, whose pathophysiology is still unknown.
Objectives: We aimed at identifying systemic vascular alterations in usually non-affected arteries of patients with multifocal renal FMD by a deep imaging-based phenotyping.
Methods: This cross-sectional study included FMD patients (n = 50, 84% hypertensives), age-, sex and BP-matched patients with primary hypertension (PH, n = 50) and healthy normotensive subjects (HS, n = 50). Brachial artery (BA) endothelium-dependent flow-mediated dilation (EDD) and endothelium-independent vasodilation (EID) were studied. Aortic stiffness was assessed by carotid-to-femoral pulse wave velocity (PWV). We quantified abnormal echographic patterns in the common carotid wall by the triple signal score. Common carotid Young's incremental elastic modulus (Einc)/stress curves were also plotted.
Results: FMD patients had impaired EID compared to PH and HS (p = 0.008, after adjustment for confounders p = 0.002), smaller BA diameter but comparable EDD and PWV. The prevalence of triple signal score >6 was 56%, 40%, 24% in FMD, PH and HS respectively (p = 0.005). FMD, but not PH, was significantly associated with triple signal (beta = 0.143, p = 0.022, r2 = 0.058). Impaired EDD was only present in FMD patients with triple signal score>6 (p for interaction=0.047). For a given stress value of 80 kPa, Einc was higher in the presence of a triple signal score >6, especially in FMD patients.
Conclusions: Non-affected musculo-elastic and muscular arteries in patients with multifocal renal FMD exhibit a cluster of functional and structural abnormalities, while elastic arteries are preserved. Triple signal in FMD may identify a distinct vascular phenotype.

1.6
AORTIC PULSE WAVE VELOCITY IN PORTUGUESE CHILDREN AND ADOLESCENTS — RESULTS FROM THE PORTUGUESE VASCULAR PHENOTYPE IN CHILDREN AND ADOLESCENTS (PORT-VASPH) COHORT

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Introduction: The PORT-VASPh Cohort was designed to contribute to a better understanding of vascular function in children and adolescents, mostly focusing PWV and other complementary aspects of arterial hemodynamics.
Methods: The PORT-VASPh cohort is a prospective and observational study, with 953 children and adolescents enrolled, 40% females, age ranging from 5 to 17 years (mean age: 12.08 ± 2.92 years). The overall health profile for each participant was defined based on three clinical evaluations, in which blood pressure (BP) was measured under standard conditions over the