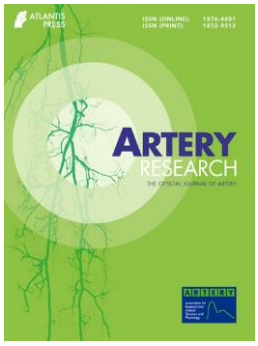

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14.9: INCREASED ARTERIAL STIFFNESS PREDICTS LESS RECOVERY OF LEFT VENTRICULAR SYSTOLIC FUNCTION AFTER MYOCARDIAL INFARCTION

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Results: After 3 months of KTx, angptl2 levels decreased from 71 ng/mL (IQR: 53-95) to 11 ng/mL (IQR: 9-15) P<0.001). In multivariate analysis, age, CVD, lower renal function and mean blood pressure were independently associated with higher angptl2 levels. There was a positive relationship between cf-PWV and angptl2 after KTx (r=0.260 P=0.024). After a median follow-up of 89 months, 13 deaths occurred. The group with higher angptl2 levels had a higher mortality rate (HR= 0.249 95% CI: 0.068-0.912, P=0.036).
Conclusion: There is a significant reduction in serum angptl2 levels after KTx however, our data demonstrate that after KTx, there is a positive association between angptl2, aortic stiffness and mortality, suggesting that angptl2 may play a biological role in CKD- related CVD.
References
1. Kadomatsu T, Endo M, Miyata K, Oike Y. Diverse roles of ANGPTL2 in physiology and pathophysiology. Trends Endocrinol Metab. 2014; 25: 245-54
2. Fortier C, Mac-Way F, Desmeules S, Marquis K, De Serres S, Lebel M, Boutouyrie P, Agharazii M. Aortic-Brachial Stiffness Mismatch and Mortality in Dialysis Population. Hypertension. 2015; 65:378-384.

14.6
RELATIONSHIP BETWEEN 24-HOUR BLOOD PRESSURE VARIABILITY AND 24-HOUR CENTRAL ARTERIAL PRESSURE, PULSE WAVE REFLECTION AND STIFFNESS IN HYPERTENSIVE PATIENTS

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Objective: Twenty-four-hour blood pressure variability (BPV) predicts cardiovascular complications in hypertension, but its association with pulse wave indices (central arterial systolic pressure or CASP, pulse wave velocity or PWV, and augmentation index or AIx) is poorly understood. In the present study we assessed the degree of the impact of 24-hour BPV on 24-hour pulse wave indices.
Methods: Brachial BP was measured non-invasively over the 24-hours by an electronic, oscillometric, automated device (BPLab) in 661 uncomplicated, treated or untreated, hypertensive patients. Digitalized oscillometric waveforms were analyzed by a validated algorithm in order to obtain pulse wave indices. Twenty-four-hour BPV was calculated as unweighted (SDu) or weighted standard deviation (SDw) of the mean blood pressure, or as average real variability (ARV). Patients were classified in two groups according to whether the 24-hour BPV was below or above the median of the whole group.
Results: Twenty-four-hour systolic blood pressure variability (SBPV) showed a direct and significant relation with CASP (r=0.28 SDu, r=0.40 SDw, r=0.34 ARV), aortic PWV (r=0.10 SDu, r=0.21 SDw, r=0.19 ARV) and AIx (r=0.17 SDu, r=0.27 SDw, r=0.23 ARV). After adjustment for age, gender, body mass index, antihypertensive treatment and 24-hour SBP, the relationship was attenuated, but was still significant for all measures, X for AIx. Pulse wave indices were larger in patients with high than in those with low BPV: after adjustment these differences were abolished for AIx. Diastolic BPV showed a weak association with pulse wave indices.
Conclusions: In hypertensive patients 24-hour SBPV is moderately and independently associated with 24-hour CASP, wave reflection and stiffness.

14.7
HYALURONAN IS ASSOCIATED WITH AORTIC STIFFENING IN HEALTHY SUBJECTS

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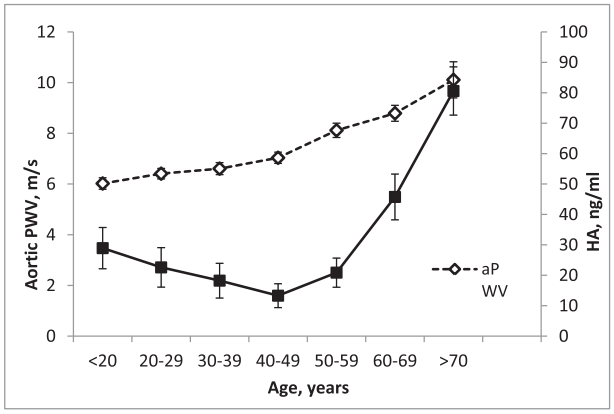
Background: Over-expression of hyaluronan (HA), glycosaminoglycan found in the extracellular matrix, results in the stiffening of the arterial wall by thinning of elastic lamellae in animal models. However, the effect in human arteries is more contentious. We aimed to study the relationship between serum HA and aortic stiffness in a cohort of healthy subjects.
Methods: Subjects were randomly selected from the Anglo-Cardiff Collaborative Trial (ACCT) database. Subjects underwent detailed haemodynamic assessment, including measurements of blood pressure (BP) and aortic pulse wave velocity (aPWV) (SphygmoCor, AtCor, Australia). Serum HA levels were measured by commercially available ELISA kit (DY3614, R&D Systems, U.K).
Results: 155 individuals (73 females and 82 males), with a mean age of 44±19 years, and a mean of BP of 134±16/86±11 mmHg were studied. HA and aPWV both increased with aging (P<0.0001 for both see the figure). Subjects were then split into tertiles of serum HA. aPWV was positively associated with HA tertile (7.03±1.42 v. 7.57±1.69 v. 8.10±2.00 m/s P=0.002). In multiple regression analysis, we found that HA remained independently associated with aPWV after adjusting for mean arterial pressure, BMI and gender (model R^2=0.233,P<0.001).



Conclusions: Our data suggests that hyaluronan may be one of the factors behind age-related aortic stiffening. However, further studies are needed to establish whether this association is causal and to understand the mechanism behind it.

14.8
VASCULAR ABNORMALITIES RELATED WITH OBESITY

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Environment and Objectives: Obesity is linked to a higher prevalence of risk factors, metabolic and inflamatory pathways conducting to increased vascular disease and CV risk.
To assess vascular disarrangements using non invasive methods in obese subjects (O) compared with matched lean (L) controls.
Methods: From the database of our Non Invasive Vascular Lab with 3964 first evaluated patients, we performed a case control study with 363 subjects, 268 obese and 95 lean age and sex matched controls. We measured IMT, Plaque analysis, PWV, Endothelial Function (EF) and arterial stiffness (CAP and Aix) (AS) using an oscillometric device (Arteriograph, Tendiomed. Hungary).
Results: Age (O 42.5+5 L 43.5+11) and sex % (O 80.6% L 78%) were similar. BMI (O 33.5+3.3 L 25+1.1Kg/m2), waist (O110.4+7.5 L 91.2+6.1cm) and BP (SBP O 139.8+16.8 L119+8.8 and DBP O 89+3.9 L 74.3+8 mmHg) were higher in O (p<0.001).CV Risk Factors in O: HTN 68% DLP 59.7% SMKG 24.2% DBT2 7.8% SED 72.4%. The proportion of abnormalities in IMT (O/L : 65.8/25.3%), Plaques (75.6/38.9%), EF (57.5/33.7%)and PWV (41.4/17.9%) were higher in O (p<0.001).Central and Peripheral PP were higher in O but not Aix.
Conclusion: Obese patients present a higher prevalence of vascular disarrangements although structural and functional explaining the role of this condition as a CV risk factor .

14.9
INCREASED ARTERIAL STIFFNESS PREDICTS LESS RECOVERY OF LEFT VENTRICULAR SYSTOLIC FUNCTION AFTER MYOCARDIAL INFARCTION

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Objective: Left ventricular (LV) remodeling may occur following myocardial infarction. Estimate the likelihood of remodeling from the state of the infarcted may with speckle tracking echocardiography (STE). Research

powerful predictors of outcomes in patients after myocardial infarction (MI) continue now. Increased pulse wave velocity (PWV), a non-invasive index of arterial stiffness, predicts cardiovascular event in different clinical conditions, but no study on the relationship between PWV and improvement of LV ejection function (EF) in patients with acute MI.
Methods: 97 patients with acute MI and primary percutaneous coronary intervention (PCI) (67% male, age 61.5±9.8 years (M±SD), 57 (58.7%) with ST-elevation myocardial infarction (STEMI), smokers 29%, arterial hypertension 80%, blood pressure 129±8/79±8 mmHg, left ventricular ejection fraction (LVEF) 50.6±3.4%. Arterial stiffness was assessed using applanation tonometry. Global longitudinal peak strain (GLPS) by STE was calculated in a 16-segment LV model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if $p<0.05$.
Results: Baseline GLPS >18% was not detected in any patient. GLPS increased from 14.3±2.3 to 15.6±2.4%, $p<0.04$ in 4 weeks after PCI. GLPS normalized (>18%) in 24 (25%) patients. Achieved GLPS differed significantly in patients without vs with normalization (14.5±1.8 vs 18.6±0.3%, $p<0.02$). Mean carotid-femoral pulse wave velocity (PWV) decreased from 11.5±1.9 to 10.1±2.3%, $p<0.05$. Patients without vs with GLPS normalization were older (63.2±9.1 vs 56.6±11.4 years, $p<0.04$), more frequent male (71 vs 33%, $\chi^2=7.8$; $p<0.01$), smokers (83 vs 50%, $\chi^2=6.5$; $p<0.05$), STEMI (60 vs 67%, $\chi^2=4.6$; $p<0.03$), had higher diastolic BP (84±7 vs 80±8 mmHg, $p<0.02$), higher baseline PWV (12.9±6.9 vs 9.9±2.1 m/s, $p<0.03$). EF increased non-significant between groups. A significant correlation was found between decreased Δ speckle tracking and higher PWV ($r=-0.21$, $p<0.05$).
Conclusions: Arterial stiffening may result in a less effective recovery of LV function after acute MI. Measuring PWV values after acute MI important information could be obtained about LV function recovery.

14.10
INCREASED CENTRAL PRESSURE AUGMENTATION IS ASSOCIATED WITH REDUCED SLEEP DURATION IN INDIVIDUALS EXPOSED TO AIRCRAFT NOISE POLLUTION: THE SERA-CV STUDY

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Background: Exposure to environmental noise might exert negative effects on cardiovascular function (1). Aim of the study is to explore whether sleep loss associated with exposure to aircraft noise has a detrimental effect on vascular function.
Methods: 22 individuals, heavily exposed (E) to aircraft noise (>50 DbA) were recruited and matched with a group of non-exposed individuals (NE). Pulse wave velocity (PWV), central blood pressure (BP), augmented pressure (AP) and augmentation index (Aix) were performed. 7-day actigraphy was performed for the assessment of total sleep time (TST) and wake after sleep onset (WASO).
Results: E showed similar TST (7.2±1.8 vs 7.1±1.3h, $p=0.77$) and WASO (50±46 vs 47±30 min, $p=0.49$) compared to NE. E showed higher Aix (26±12 vs 14±16, $p=0.006$) and AP (11±7 vs 7±8, $p=0.03$) than NE, in the presence of similar PWV, mean BP and heart rate (HR).
In E group, Aix was related with height ($r=-0.56$, $p=0,009$), TST ($r=-0.65$, $p=0.002$), while was not related with age, mean BP, PWV and HR. The association remained significant in a multiple regression model (beta = -2.92, $p=0.01$), with TST accounting for 12.9% of Aix variance (r2 full model 0.84).
In NE Aix was related with age ($r=-0.82$, $p<0.001$), HR ($r=0.76$, $p<0.001$), TST ($r=-0.49$, $p=0.01$), mean BP ($r=0.61$, $p=0.01$), PWV ($r=0.57$, $p=0.004$). The only independent determinants of Aix in NE were age (beta=0.64, $p=0.02$) and HR (beta=-0.37, $p=0.03$).
Conclusions: Central pressure augmentation is independently affected by sleep duration in individuals exposed to high levels of environmental aircraft noise.
References
1. Münzel T, Gori T, Babisch W, Basner M. Cardiovascular effects of environmental noise exposure. Eur Heart J. 2014 Apr35(13):829-36.

14.11
TOTAL ARTERIAL COMPLIANCE AS A RISK FACTOR FOR ORGAN DAMAGE IN HYPERTENSION

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Purpose/Background/Objectives: Hypertension is associated with several markers of subclinical target organ damage (TOD). Total arterial compliance (TAC) is a prognostic factor for cardiovascular events. We hypothesized that there is a relationship between TAC and TOD in never-treated hypertensives.
Methods: We enrolled 990 consecutive essential hypertensives (mean age 52.6±12.2 years, 526 males). Markers of subclinical TOD [left ventricular mass index (LVMI), pulse wave velocity (PWV), ankle-brachial index (ABI) and estimated glomerular filtration rate (eGFR)] were evaluated in all patients. LVMI was assessed echocardiographically using the Devereux formula. Carotid-femoral PWV was estimated with the Complior. eGFR was calculated by the Cockcroft-Gault formula. ABI was calculated by dividing the highest ankle systolic blood pressure by the highest brachial systolic blood pressure. The ratio of stroke volume to pulse pressure was measured echocardiographically as a surrogate of TAC.
Results: In multivariable regression analysis, TAC exhibited significant association with LVMI ($p=0.004$, adjusted R2 of model=0.400), PWV ($p<0.001$, adjusted R2 of model=0.298) ABI ($p=0.002$, adjusted R2 of model=0.009) but not with eGFR. In further analysis, TAC was associated with the number of TOD markers ($p<0.001$) as suggested by the 2013 European Guidelines for Hypertension [left ventricular hypertrophy (LVMI>115 g/m2 in men and >95 g/m2 in women), increased PWV (PWV>10m/s), decreased ABI (ABI<0.9) and decreased renal function (eGFR<60ml/min)]. In logistic regression model increasing TAC was associated with a reduction in the likelihood of TOD, similarly to the multivariable regression model. ($P<0.05$ for all X eGFR).
Conclusions: Our findings support the relationship between TAC and TOD in hypertension.

15.1
ANALYSIS OF THREE STATISTICAL METHODS TO PREDICT THE PRESENCE OF CAROTID ATHEROMATOUS PLAQUES

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Background: At least 15-20% of all ischemic strokes are attributable to atherosclerosis [1]. We analyzed three statistical methods for 12 traditional risk factors (TRF) i.e. age, sex, arterial pressure, Intima Media Tickness (IMT), Pulse Wave Velocity (PWV) in order to predict the presence of carotid atherosclerotic plaques.
Methods: We studied 48 patients (27 men, mean age 52+/-10.9) after a vascular screening for atherosclerosis from a metabolic syndrome cohort in a retrospective way. Fourteen patients presented carotid atheromatous plaques confirmed by a trained operator using an ultrasound system. The sensitivity and specificity of the combination of the IMT and the PWV indices with other risk factors were considered using: multiple linear regressions (MLR), support vector machines (SVM) [2] and discriminant analysis (DA). The best combinations of variables were kept for each learning machine.
Results: The best sensibility and specificity were obtained using DA. This method reached a sensitivity of 95+/-7% and a specificity of 73+/-36% with an area under the ROC curve equal to 0.84+/-0.35. The other methods showed a sensitivity of 73+/-13% for the MLR method and 53+/-34% for the SVM method with an area under the ROC curve of 0.72+/-0.07 and 0.74+/-0.18 respectively.
Conclusion: This preliminary study shows that carotid atherosclerotic plaques could be reliably predicted using discriminant analysis method.