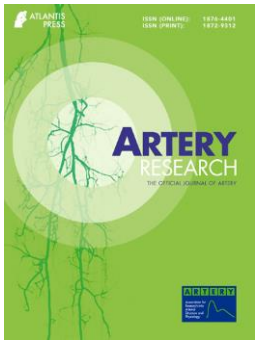

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P145: ARTERIAL STIFFNESS AND LEFT VENTRICULAR DIASTOLIC FUNCTION IN PATIENTS WITH METABOLIC SYNDROME: LONGITUDINAL STUDY

Svetlana Solovjova, Ligita Ryliskyte, Roma Puronaite, Jelena Celutkiene, Aleksandras Laucevicius, Jolita Badariene, Ieva Slivovskaja, Egidija Rinkuniene

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	Non-T2DM-subjects (n=54)	Patients with T2DM (n= 111)	Unadjusted p-value	Age-gender-adjusted p-value	Adjusted p-value (potential confounders)
Retinal parameters					
ICD (μm)	20.8 ± 3.5	23.9 ± 5.1	<0.001	<0.001	0.001
RCF (AU)	310.4 ± 55.1	297.8 ± 72.9	0.15	0.35	0.72
WLR (-)	0.35 ± 0.08	0.38 ± 0.11	0.04	0.67	0.90
Renal parameters					
eGFR (ml/min/1.73m²)	95.9 ± 17.3	91.7 ± 9.9	0.10	<0.001	<0.001
UACR (mg/g)	7.9 ± 7.5	21.3 ± 86.6	<0.001	0.55	0.91
Vascular stiffness parameters of large arteries					
cSBP (mmHg)	106.7 ± 12.4	119.5 ± 12.9	<0.001	0.37	0.81
cPP (mmHg)	34.8 ± 10.6	41.8 ± 11.7	0.001	0.31	<0.001

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REDUCED LEVELS OF ANTI-AGEING HORMONE KLOTHO ARE ASSOCIATED WITH INCREASED AORTIC STIFFNESS IN PATIENTS WITH TYPE 2 DIABETES

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Background: Aortic Pulse Wave Velocity (Ao-PWV) predicts cardiovascular disease and renal dysfunction in Type 2 Diabetes (T2DM). Klotho is a circulating anti-ageing hormone that has direct cardio-renal protective effects in animal studies. We have previously demonstrated that circulating levels of Klotho are increased by Renin-angiotensin System inhibition (RASi), inversely associated with albuminuria and predict renal function decline in T2DM. The relationship between Klotho and Ao-PWV in diabetes is unknown.
Methods: We investigated the correlation of serum Klotho levels and Ao-PWV in 92 patients with T2DM (61% male) all on RASi with preserved renal function in a cross-sectional study. Klotho levels were measured using a validated immunoassay and Ao-PWV by applanation tonometry (Sphygmocor system).
Results: The mean age (range) of our cohort was 60.4 (40—82) years with an estimated GFR (using CKD-EPI equation) of 89.2 (46—143) ml/min. Median (interquartile range) Ao-PWV and circulating Klotho levels were 11.8 (10.3—13.6) m/s and 201.46 (154.64—280.17) pg/μl respectively. Patients with an Ao-PWV above the median were older (62.8 ± 9.9 vs 58.1 ± 8.2 years), had a higher SBP (160.9 ± 10.01 vs. 155.04 ± 11.7 mmHg) and lower Klotho levels (192.59 [120.27—255.45] pg/μl vs 219.92 [171.06—311.56] pg/μl), compared to those below the median (p = 0.05 for all).A 10% increase in circulating Klotho levels significantly reduced the odds of a patient being above the Ao-PWV median by 11% in a multivariable logistic regression analysis.
Conclusion: There is an inverse association between Ao-PWV and circulating Klotho levels in T2DM. Treatments and strategies that that increase Klotho may attenuate aortic stiffness in diabetes.

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IMPACT OF ANTI-HYPERTENSIVE DRUGS ON AORTIC STIFFNESS INDUCED BY CHRONIC KIDNEY DISEASE AND MINERAL BONE DISORDER IN RATS

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Background: In chronic kidney disease (CKD), anomalies of mineral bone disorder (MBD) play a central role in vascular calcification and increased aortic stiffness. The impact of antihypertensive drugs on MBD-induced vascular calcification remains uncertain. The aim of this study was to examine whether endothelin A receptor antagonist (ETAA), angiotensin type-1 receptor antagonist (AT1A) and the combination of hydralazine/hydrochlorothiazide (HDZ/HCT) can reduce vascular stiffness in a rat model of CKD-MBD.
Method: Using a remnant kidney model of CKD in rats, vascular calcification was induced by creating MBD through high a calcium-phosphate diet and vitamin D supplementation. Three antihypertensive treatments were investigated: atrasentan (ETA blocker), losartan (AT1 blocker) and HDZ/HCT. Blood pressures (BPs) were measured invasively after (6 weeks) and aortic stiffness was determined by the assessment of pulse wave velocity (PWV).
Results: PWV and mean BP increased in rats with CKD-MBD as compared to CKD (640 ± 130 vs. 390 ± 34 cm/s and 100 ± 17 vs. 92 ± 21 mmHg; p p < 0.05). Treatment of CKD-MBD rats with ETA_A and $AT1_A$, but not HDZ/HCT, reduced PWV (517 ± 94, 596 ± 134 and 761 ± 116 cm/s respectively) despite similar reduction of mean BP by the different treatments (73 ± 16, 75 ± 19 and 70 ± 20 mmHg, respectively). Creatinine clearance and mineral metabolism parameters were relatively similar among groups.
Conclusion: MBD-induced aortic stiffness in CKD rats was improved by atrasentan and losartan, but not the combination of HDZ/HCT, indicating blood pressure-independent protective effects of ETA_A and $AT1_A$.

P145

ARTERIAL STIFFNESS AND LEFT VENTRICULAR DIASTOLIC FUNCTION IN PATIENTS WITH METABOLIC SYNDROME: LONGITUDINAL STUDY

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Aim: To evaluate the relation between arterial stiffness and left ventricular diastolic dysfunction (LVDD) in metabolic syndrome (MetS) patients during more than 3 years observation period (average was 3,8 years).
Methods: This longitudinal study enrolled 573 subjects (aged 53,4 ± 6 years, 63% female, 76% hypertensive) from the Lithuanian High Cardiovascular Risk Primary Prevention Programme1, without overt atherosclerotic disease and systolic LV dysfunction. Arterial stiffness parameters (carotid-to-femoral pulse wave velocity(cfPWV), augmentation index (AIxHR75), mean aortic pressure(mAP), central pulse pressure(cPP) were assessed by applanation tonometry. Diastolic function (LVDF) was defined according to the 2016 ESC Guidelines for diagnosis and treatment of acute and chronic heart failure.
Results: In presented cohort most of study subjects had LVDD at first visit (n = 418, n = 325 impaired relaxation, n = 92 pseudonormalisation, n = 1 restrictive LVDD). During the observation LVDF didn't change in 337 (GR1), deteriorated in 110 (GR2), improved in 126 (GR0) participants. We found significant alterations of arterial and diastolic function parameters(mean): cfPWV 8,55 ± 1,4 vs 8,7 ± 1,6 m/s; AIxHR75 22,8 ± 10,4 vs 24,3 ± 10,8%; mAP 105,3 ± 10,4 vs 101,5±14,8 mmHg; cPP 42,6 ± 9,9 vs 43,3 ± 10,6 mmHg; E/A ratio 1 ± 0,3 vs 0,93 ± 0,2; E/e'mean ratio 10,4 ± 3,5 vs 9,4 ± 2,9; E/e'septal 11,9 ± 4,1 vs 10,9 ± 3,2; MMI 105 ± 22,7 vs 99 ± 24,1 (p < 0,05 for all). Significant correlations were found between initial arterial indices and alterations of LVDF: in GR1 with E/Aratio (rcfPWV = −0.176); in GR0 with E/e'mean

(rcfPWV = −0.163, r_{mAP} = −0.171). To clarify the relation between LVDD and arterial stiffness the conditional inference trees analysis was used. Only cfPWV, mAP, heart rate and BMI were significant for presence of LVDD.
Conclusion: Carotid-to-femoral PWV, the biomarker of vascular damage, is significant determinant of LV diastolic dysfunction in MetS patients. Arterial stiffness is a possible causal link to development of LV diastolic dysfunction.

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P146
ANALYSIS OF RENAL ARTERY REVASCULARIZATION IN A TERTIARY CARE CENTRE

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Renovascular hypertension is an uncommon cause of secondary hypertension. Percutaneous angioplasty is considered in selected patients. Retrospective study of patients undergoing renal artery revascularization, in a tertiary centre, in 2004–2017. Demographic, biometrical, radiological and clinical data were gathered. Sixty-one procedures were performed in 50 patients (42 adults). Most had Atherosclerotic Renal Artery Stenosis (ARAS) (n = 28, 56%), followed by Fibromuscular Dysplasia (FMD) (n = 14, 28%); 8 (16%) presented rare aetiologies. Patients were predominantly female (72%) irrespectively of the aetiology. Compared to FMD, patients with ARAS were older (63 ± 11 vs 35 ± 21 years, $p < 0.001$), and more often had dyslipidaemia (89.3% vs 42.9%, $p = 0.002$) and diabetes mellitus (39.3% vs 7.1%, $p = 0.04$). Most ARAS patients had stent placement (96.4%). Resistant hypertension (53.6%) and deteriorating renal function (32.1%) were the main causes for intervention. Concomitant peripheral artery disease and carotid atherosclerosis were reported in 39.3% and 46.4%, respectively. FMD was predominantly treated with balloon angioplasty (71.4%). Renovascular disease was multifocal in 71.1%. Supra-aortic and other abdominal aortic branches involvement was reported in 14.3% and 21.4%, respectively. Nine early complications (0.0% in ARAS, 25.0% FMD and 33.0% other aetiologies, $p = 0.008$) and 14 late complications (10.0% in ARAS, 31.3% FMD and 40.0% other aetiologies, $p = 0.05$) were reported, mainly residual stenosis and restenosis. Cure/improvement of hypertension occurred in 59.2% patients revascularized (66.7% in ARAS, 42.9% FMD and 62.5% other aetiologies, $p = 0.33$).
Our cohort was predominantly female. ARAS patients were older and had higher cardiovascular risk burden. There was a trend to less success in hypertension control improvement in FMD patients.

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ASSOCIATIONS BETWEEN RESERVOIR PRESSURE PARAMETERS AND KIDNEY FUNCTION ARE DEPENDENT ON THE ARTERIAL MEASUREMENT SITE

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Introduction: Reservoir pressure parameters derived from pressure waveforms captured at various arterial sites predict adverse kidney function independently of conventional cuff blood pressure (BP). However, there has never been an analysis directly comparing if associations with kidney function may differ depending on arterial site of measurement, which was the aim of this study.
Methods: Intra-arterial BP waveforms were measured via fluid filled catheter at the ascending aorta, brachial and radial arteries in 172 people undergoing coronary angiography (aged 60 ± 13 years, 67% male). Customised Matlab software was used to derive reservoir pressure and associated parameters of excess pressure, diastolic and systolic rate constants at each arterial site. Kidney function was determined by estimated glomerular filtration rate (eGFR).
Results: Reservoir and excess pressure derived from BP waveforms measured at the aorta were associated with eGFR ($r = -0.26$, and $r = -0.24$, $p < 0.01$, respectively), but not from brachial or radial BP waveforms ($r < -0.14$, $p > 0.07$ all). However, diastolic rate constants from BP waveforms at all arterial sites were significantly associated with eGFR. These associations remained following adjustment for aortic systolic BP, heart rate, sex, and body mass index ($\beta = -0.37$, $p = 0.001$; $\beta = -0.37$, $p = 0.003$; $\beta = -0.25$, $p = 0.02$ respectively). Systolic rate constants were not significantly associated with eGFR at any arterial site.
Conclusion: Associations between reservoir pressure parameters and kidney function are dependent on site of waveform measurement, with exception of the diastolic rate constant, which independently relates to kidney function irrespective of location. This is of clinical relevance since this variable can be derived from non-invasively recorded peripheral BP waveforms.

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ANTHROPOMETRIC MEASURES IN INTERMITTENT CLAUDICATION AND CRITICAL LIMB ISCHEMIA

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Purpose/Background/Objective: Peripheral arterial disease (PAD) is a common manifestation of atherosclerosis and obesity is one of its well-established risk factors 1–5. PAD is classified in intermittent claudication (IC) and critical limb ischemia (CLI), according to the its severity6. Therefore, we hypothesized that anthropometric measures of adiposity will be associated with the severity of PAD.
Methods: We studied prospectively 46 males who underwent aorto-bifemoral bypass from 2013 to 2016: The body mass index (BMI), the waist circumference, the waist-to-hip ratio and the ankle-brachial index (ABI) were determined.
Results: 17 IC: 60.69 ± 7.46 years old; 17.6% with diabetes; 70% with hypertension and 100% were smoker/ex-smoker. 29 CLI: 64.51 ± 8.42 years old; 44.82% with diabetes; 51.72% with hypertension and 86.2% were smoker/ex-smoker. All the anthropometric measures were higher in the IC group (BMI:25.10 ± 5.01 Kg/m^2 versus 23.52 ± 3.59 Kg/m^2, $p = 0.27$; weight: 72.74 ± 9.84 Kg versus 65.92 ± 10.89 Kg $p = 0.043$; waist circumference: 98.65 ± 8.19 cm versus 89.38 ± 15.91 cm $p = 0.017$; waist-to-hip ratio: 1.06 ± 0.06 versus 1.01 ± 0.06 $p = 0.038$). No relationship was found between ABI and the anthropometric measures.
Conclusion: This is the first study of anthropometric measures in IC and CLI patients undergoing aorto-bifemoral bypass. Adipose tissue was not directly determined in this study, but the measurements used have been shown to correlate well with adiposity. We found an inverse relationship between body fat content and the severity of PAD. Patients with CLI had a lower weight, waist circumference and waist-to-hip ratio, and these differences were statistically significant. Obesity is a risk factor for atherosclerosis, but as PAD progresses to CLI, there is an increase in tissue hypoxia, which causes an inflammatory environment promoting proteolysis and lipolysis.

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