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P11.02: BRAIN WHITE MATTER LESIONS AND ARTERIAL WALL PARAMETERS IN MIGRAINE PATIENTS

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echocardiographic findings. Distensibility (D) of forearm large arteries was calculated as a ratio between volume pulse amplitude and pulse pressure. Forearm vascular resistance (FVR) was calculated from data on mean arterial pressure and forearm blood flow measured by venous occlusion plethysmography.

Results: It was stated that Verapamil significantly reduces systolic (-18,8±1,9 mmHg), diastolic (-8,7±1,2 mmHg), mean (-13,7±1,6 mmHg) and pulse (-12,5±1,5 mmHg) pressure. D of forearm large arteries in all investigated patients increases by 53±4%, whereas FVR did not change uniformly. In the case when hypotensive effect was caused by a decrease in CO, FVR did not change, but in the case when hypotensive effect was ensured by a decrease in SVR, the inverse relationship existed between changes in SVR and FVR ($r = -0,6$).

Conclusions: During effective treatment of essential hypertensives with Verapamil contractile activity of forearm large arteries always decreases, whereas precapillary vessels obviously are involved in counterregulation and this masks direct vasodilator effect of Verapamil on arterial smooth muscles.

P10.10

EFFECT OF THE TREATMENT OF RHEUMATOID ARTHRITIS WITH ANTI-TNF- α INFILIXIMAB ON ARTERIAL WALL STIFFNESS PARAMETERS

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Background: Rheumatoid arthritis (RA) is a chronic inflammatory, autoimmune disease, which may lead to arterial dysfunction. Treatment with anti-TNF- α infliximab can influence not only inflammation, disease activity, but can also greatly impact arterial wall function.

Aim of the study was to assess whether aortic augmentation index (Alx) and regional carotid-radial pulse wave velocity (PWV) were altered in RA patients treated with infliximab.

Methods: We examined 75 RA patients (age 42.03±10.69 years) with high disease activity (DAS28 5.40±0.93), 16 of them were treated with infliximab. Alx and PWV were assessed non-invasively by applanation tonometry (Sphygmocor v.7.01, AtCor Medical).

Results: By multiple regression analysis we have found that carotid-radial PWV depends only on mean blood pressure (MBP) and infliximab therapy. To test the influence of infliximab on arterial wall parameters, binary variable indicating the intake of infliximab was added to the list of independent predictors. The same forward analysis was applied after that. It has been established that infliximab reduced the values of PWV as compare with patients not treated with infliximab (7.69±0.69 vs. 8.61±1.02; $p=0.001$). However, no similar trend was observed for Alx (18.38±12.48 vs. 24.56±11.44; $p=0.094$). The estimated regression coefficient have implied that given fixed MBP, the mean PWV can be reduced approximately to 0.886 m/s in patients treated with infliximab.

Conclusions: The treatment with anti-TNF- α infliximab can influence the conduit arteries. Carotid-radial PWV may serve as a good marker to decide upon infliximab.

Pathophysiology 5

P11.01

AMBULATORY ARTERIAL STIFFNESS INDEX (AASI) IS CORRELATED TO EA/EMAX, NOT PULSE WAVE VELOCITY IN PATIENTS WITH RESISTANT HYPERTENSION (RH) AND TYPE-II-DIABETES MELLITUS

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Objective: To examine if AASI is correlated to arterial stiffness in patients with RH and type-II-diabetes mellitus.

Characteristic	Controlled hypertension	Resistant hypertension	P	Adjusted P
Sex (male/female)	15/9	27/7		
Age (years)	62±10	64±9	0.49	
Body mass index (kg/m ²)	34±7	35±5	0.31	0.21
Length of disease (years)	10.4±6.3	14±7	0.02	0.02
Pulse pressure (mmHg)	50±8	66±9	<0.0001	<0.0001
Mean arterial pressure (mmHg)	88±4	98±7	<0.0001	<0.0001
Ambulatory arterial stiffness index	0.55±0.14	0.57±0.13	0.564	0.56
Heart rate (bpm)	74±11	71±13	0.312	0.24
Pulse wave velocity (m/s)	9.7±3	12.1±5	0.042	0.39
Characteristic impedance	0.07±0.03	0.1±0.1	0.031	0.05
E _A (mmHg/ml)	1.63±0.5	1.86±0.6	0.12	0.06
E _{MAX} (mmHg/ml)	2.7±1	2.1±0.9	0.023	0.08
E _A /E _{MAX}	0.7±0.3	1.1±0.5	0.003	0.005
Ejection fraction (%)	55±10	45±11	<0.0001	0.001

Ambulatory arterial stiffness index (AASI) is correlated to E_A/E_{MAX}, not pulse wave velocity in patients with resistant hypertension (RH) and type-II-diabetes mellitus P 11.01

Methods: We included 87 patients. RH was defined according to guidelines from the American Heart Association.

Echocardiography was performed using GE Vivid 7 and pulse wave analysis using Sphygmocor. All examinations were performed under standardized conditions. All analyses were done blinded offline using Echopac and customized software.

Ambulatory blood pressure (BP) measurement was done using Kivex TM 2430 and Spacelab 90217. All parameters were adjusted for sex, age, length of disease and heart rate using multiple linear regression. Spearman's rank correlation was used to estimate correlation between groups.

Results: 34 patients had RH and 24 had controlled hypertension (CH) leaving 29 with uncontrolled hypertension. See table 1 for patient characteristics. Patients were comparable with regards to age and body mass index. AASI did not differ significantly between groups. Pulse pressure, mean arterial pressure and length of disease varied significantly between groups. AASI and PWV was not correlated (Spearman's rho = 0.08, P = 0.57). Neither was AASI and characteristic impedance (Spearman's rho = 0.1, P = 0.44) However when comparing AASI and E_A/E_{MAX} we found positive correlation (Spearman's rho 0.36, P = 0.006) and when comparing AASI and ejection fraction (Spearman's rho = -0.29, P = 0.02) negative correlation.

Conclusion: AASI is not correlated to PWV or characteristic impedance, which are measures of arterial stiffness, but to E_A/E_{MAX} and ejection fraction, which might suggest that AASI does not reflect arterial stiffness, but ventriculo-vascular coupling.

P11.02

BRAIN WHITE MATTER LESIONS AND ARTERIAL WALL PARAMETERS IN MIGRAINE PATIENTS

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Background: Migraine is a benign neurological disease, however, some migraineurs develop asymptomatic lesions in the deep white matter (DWMLs) whose origins still need to be clarified.

Objective: To evaluate relationship between DWMLs and traditional cardiovascular risk factors, arterial wall parameters (carotid intima-media thickness, distensibility and stiffness (CS), augmentation index (Alx) and aortic pulse wave velocity) and right-to-left shunts (RLS) in migraine patients.

Methods: 114 active migraineurs (mean age 35.9±9.6 years, 22 (19.3%) males, 50 (43.9%) with aura) participated in the study. Magnetic resonance imaging was performed with a 1.5-T scanner. DWMLs load was assessed

with Scheltens' visual rating scale. Arterial wall parameters were measured by echo-tracking and applanation tonometry. RLS was assessed by contrast transcranial Doppler sonography with agitated saline. In order to explore the relationship between presence and load of DWMLs and possible risk factors logistic and linear regressions were applied.

Results: 29 (25.4%) migraineurs had DWMLs. They were significantly older ($p < 0.001$), had more cardiovascular risk factors, thicker carotid intima-media ($p = 0.006$), higher CS ($p = 0.004$) and Alx (0.001) compared to migraineurs without DWMLs. The prevalence of large RLS was higher in patients with DWMLs, but not significant. The predictors of DWMLs were age (OR 1.11, $p < 0.001$) and hypertension (OR 6.57, $p = 0.001$). Higher DWMLs load was predicted by age, obesity, hypertension, and decreased HDL cholesterol. We established no relationship between presence and load of DWMLs and arterial wall parameters or RLS.

Conclusions: Age and traditional cardiovascular risk factors, but not arterial wall parameters, are predictors of DWMLs in patients with migraine.

P11.03

PULSE PRESSURE PARTIALLY EXPLAINS THE INCREASED INCIDENT CARDIOVASCULAR DISEASE ASSOCIATED WITH INFLAMMATION IN TYPE 1 DIABETES: A 12-YR FOLLOW-UP STUDY

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Objective: To investigate, in a prospective cohort of individuals with type 1 diabetes: 1) the association between an aggregated z-score of low-grade inflammation markers (CRP, IL-6, sPLA2 and sICAM-1) and pulse pressure (PP), as a marker of arterial stiffness, and 2) the association of low-grade inflammation with incident fatal and non-fatal cardiovascular disease (CVD) and the potential mediating role of PP herein.

Methods: We prospectively followed 339 individuals with type 1 diabetes who were free of CVD at study entry and in whom brachial PP and markers of low-grade inflammation were measured at baseline. Data were analysed with linear and Cox-regression models, and all results presented are adjusted for age, sex, duration of diabetes, eGFR, UAE, MAP, BMI, total cholesterol, smoking, endothelial dysfunction and the use of antihypertensive medication.

Results: PP increased with 3.2 mmHg (95%CI: 0.4-6.0, $p = 0.025$) per SD increase in the inflammation score. During the course of follow-up [median duration: 12.3 yrs (IQR: 7.6-12.5)], 85 individuals suffered a fatal ($n = 48$) and/or non-fatal ($n = 53$) CVD event. Low-grade inflammation was associated with higher incidence of CVD [HR = 1.56 (1.02-2.40), $p = 0.042$], as was PP (per 10 mmHg increase): HR = 1.27 (1.08-1.48), $p = 0.007$. Additional adjustment for PP attenuated the association between inflammation and incident CVD with ~20% to HR = 1.45 (0.96-2.21), $p = 0.106$.

Conclusions: Arterial stiffness, as expressed by PP, can partially explain the increased CVD associated with a higher low-grade inflammatory status in patients with type 1 diabetes. Treating inflammation may be a means to reduce the accelerated arterial stiffening that characterize these patients.

P11.04

VASCULAR STIFFNESS IS INCREASED IN ANTIPHOSPHOLIPID SYNDROME: SIGNIFICANCE AND CLINICAL ASSOCIATIONS

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Vascular stiffness is an independent risk factor of cardiovascular events in the general population. While it is established that vascular stiffness is increased in patients with systemic lupus (SLE), studies investigating vascular stiffness in patients with antiphospholipid antibodies yielded conflicting results. In order to determine whether arterial stiffness was increased in patients with antiphospholipid antibodies we studied 53 patients with antiphospholipid antibodies and 109 controls matched for age and sex.

Patients were: 46.0 ± 2.3 years-old, 40 female and 13 male. Twenty-six had primary antiphospholipid syndrome, 16 antiphospholipid syndrome associated with SLE. Clinical manifestations included arterial thromboembolic events $n = 14$, venous thromboembolism $n = 28$, obstetrical manifestations of APS $n = 9$ and 11 patients were asymptomatic. Pulse wave velocity (PWV) was used to investigate arterial stiffness and was determined by applanation

tonometry. PWV was increased in patients: 8.14 ± 0.40 m/s and 7.24 ± 0.20 m/s in controls ($p = 0.036$). PWV was correlated with age ($r = 0.75$; $p = 0.0001$) and systolic blood pressure ($r = 0.62$; $p = 0.0001$). PWV was significantly increased in patients with arterial thrombosis than in controls (9.54 ± 1.20 m/s and 7.23 ± 0.20 m/s, respectively) or patients without arterial thrombosis (7.63 ± 0.40 m/s; $p = 0.0416$). PWV was not significantly different among various antiphospholipid profiles.

In summary patients with antiphospholipid syndrome have increased arterial stiffness, in particular patients with arterial thrombotic events. Arterial stiffness is significantly correlated with age and blood pressure but does not differ according to different antiphospholipid antibodies profiles.

P11.05

ASSESSING VENTRICULAR-VASCULAR INTERACTIONS AFTER STENTED COARCTATION

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Introduction: Stented coarctation is associated with increased ventricular and aortic stiffness. This study compared non-invasively determined ventricular-vascular interactions in patients after stented coarctation with healthy age/sex-matched controls.

Methods: Ventricular assessment included M-mode, B-mode, pulse and tissue Doppler echocardiography. Vascular assessment included carotid ultrasound, applanation tonometry and echo-Doppler assessment of the biophysical properties of the aorta. Ventricular-arterial coupling assessed as the ratio between arterial elastance (Ea) and end-systolic ventricular elastance (Ees), was calculated using SBP, DBP, echo-derived stroke volume and the ratio between aortic pre-ejection time and total systolic time. Between groups comparisons were performed using parametric methods with p -values > 0.05 considered significant.

Results: Thirty patients after stented coarctation (4 females; median age 17.2 [range 8.1-28.2] years; 11 after initial surgical repair) were studied. Stented patients were slightly older, but of similar height and BMI to controls. Peripheral and centrally derived SBP and radial augmentation index were lower and CIMT higher in stented patients. Carotid, ascending and abdominal aorta distensibility, pulse wave velocities and biophysical properties of the aorta were all similar, except for input impedance which was lower in stented patients. LV mass was higher and diastolic parameters suggested abnormal relaxation in stented patients. Ea and Ees were both reduced in stented patients, but ventricular-arterial coupling ratio Ea/Ees was similar.

Conclusion: After stented coarctation, elevated central systolic and augmentation pressures can be shown in association with abnormal ventricular relaxation. Although arterial and end-systolic ventricular elastance are reduced the ratio is similar to controls, suggesting an adaptive response of the ventricular-arterial coupling.

P11.06

FIBRONECTIN, BUT NOT LAMININ CONTENT IS INCREASED IN THE TUNICA MEDIA OF SUBCUTANEOUS SMALL RESISTANCE ARTERIES OF PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: It was suggested that, in the development of hypertensive microvascular remodeling, a relevant role may be played by laminin and fibronectin vascular content. Aim of this study was to evaluate the amount of fibronectin and laminin within the tunica media of subcutaneous small arteries of normotensive subjects and essential hypertensive patients.

Design and Methods: We have investigated 6 normotensive control subjects and 10 essential hypertensive patients. All subjects were submitted to a biopsy of subcutaneous fat from the gluteal or the anterior abdominal region. Subcutaneous small resistance arteries were dissected and mounted on an isometric myograph, and the tunica media to internal lumen ratio was measured. In addition, the fibronectin and laminin content within the tunica media was evaluated by immunohistochemistry, with image analysis (% of area stained).