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P3.9: PROGRESSION OF ARTERIAL STIFFNESS AND VASCULAR LESIONS ACCORDING TO THE DEGREE OF GLYCEMIC ABNORMALITIES. A WARNING IN PATIENTS WITH METABOLIC SYNDROME

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unfavourably alters both IM-GSM and cfPWV in middle-aged and older individuals, and that impaired glycaemic control (HbA1c) only accounts for the difference in cfPWV. These findings suggest the presence of an additional factor(s) together with glycaemic control that influence IM-GSM in DM.

P3.6

EVALUATION OF DIFFERENT METHODS FOR DETERMINING THE TIME DELAY OF THE ARTERIAL PULSE WAVE: APPLICATION TO THE POPMETRE[®]

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Objective: Pulse Wave Velocity (PWV) can be measured between different sites. Here we used two different aspects to assess the PWV; the standard method Carotid-Femoral (CF) Sphygmocor (AtCorMedical – Australia) and the pOpmetre[®] (Axelife SAS – France) which uses the Finger to Toe (FT) signals. The aim of this study was to evaluate the agreement between FT-PWV and CF-PWV and to test the robustness of pOpmetre[®] build-in algorithm.

Design and method: CF and FT PWV was measured in 150 subjects. MatLab was used to calculate FT-PWV from pOpmetre[®] waveforms using four methods: maximum of second derivative (used by pOpmetre[®]), intersecting tangents, 10% threshold and the cross correlation method.

Results: Using built in algorithms, the comparisons of the PWVs and transit times showed a good agreement between the two methods. FT-PWV correlated with CF-PWV ($r^2=0.51$; $p<0.001$) and transit time ($r^2=0.62$; $p<0.001$). The best correlation between FT and CF was observed with the maximum of the second derivative algorithm (PWV: $r^2=0.56$; $p<0.001$), transit time ($r^2=0.61$; $p<0.001$). Other algorithms showed weaker correlations: for PWV, intersecting tangents, $r^2=0.37$, 10% upstroke, $r^2=0.35$, cross-correlation, $r^2=0.22$.

Conclusions: This study showed that pOpmetre[®] is well correlated with reference methods and the wave foot detection algorithm used by popmetre[®] gave the best correlation comparing to other algorithms. The FT-PWV technique has correct agreement with the reference technique, however further studies are needed to validate FT-PWV method in larger populations. Compared to CF-PWV, FT-PWV is faster, simpler to perform and more acceptable to patients.

P3.7

ARTERIAL STIFFNESS IS ASSOCIATED WITH LOWER PERFORMANCE ON THE COGNITIVE TESTS AT DIFFERENT DOMAINS IN HYPERTENSIVE PATIENTS

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Background: Cognitive impairment and elevated arterial stiffness are described in patients with arterial hypertension (AH), but its correlations are not well studied.

Objectives: To study the cognitive function at different domains and arterial properties in patients with AH stage 1 to 3 compared to normotensives and to evaluate the correlations between these variables.

Methods: We evaluated 162 subjects, 42 normotensives (44.7±11yrs, 69% male, 88% white) and 120 patients with stage 1-3 AH (51±11yrs, 46% male, 69% white) under treatment. The global cognitive function was assessed by Mini Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). was done A validated comprehensive battery of neuropsychological tests assessed the following main cognitive areas: memory, language, visuo-perceptual and visuospatial, praxia, gnosis, executive function, attention, judgment. Pulse wave velocity (PWV) was measured by Complior[®] device. Carotid properties were assessed by radiofrequency ultrasound (WTS[®]). Central arterial pressure and augmentation index (Aix) were obtained using applanation tonometry (Sphygmocor[®]).

Results: Mean BP of the normotensive group (121.9±7/76.1±7 mmHg) was significantly lower than hypertensive patients (141.4±23/87.2±13 mmHg). Hypertensive group had worse performance in cognitive evaluation either by MMSE (27±2 vs. 28.6±1, $p<0.05$) or MoCA test (23.8±3 vs. 26.7±2, $p<0.05$). On the neuropsychological tests hypertensive patients had worse performance mainly in visuo-perceptual and visuospatial capacities and executive function. On the multivariate regression analysis, the following independent associations were observed: PWV-memory, executive function and attention parameters; IMT-memory and executive function; Aix-all neuropsychological domains except memory.

Conclusions: Cognitive impairment at different domains was more frequent in patients with different stages of AH. Arterial functional and structural properties were diversely associated with cognitive performance at different domains.

P3.8

ARTERIAL STIFFNESS AND LEFT ATRIAL VOLUME IN HYPERTENSIVE AND NORMOTENSIVE SUBJECTS

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Aim: Investigation of relationship between arterial stiffness indices and LAVI in hypertensive and normotensive subjects.

Material and methods: Patients were recruited among Morawica town inhabitants. Study group (AH) consisted of 41 untreated hypertensives (20 men). Control group (NonAH) consisted of 60 normotensives (32 men). Anthropometric and demographic data were collected via questionnaire. Following examinations were performed: office blood pressure measurement (SBP, DBP) using Omron M5-I; arterial stiffness measurements i.e. carotid-femoral pulse wave velocity (PWV) and central blood pressure (cSBP, cDBP) using SphygmoCor[®] device; echocardiographic left atrium volume determination (LAV) using VIVID-7 GE device followed by LAVI calculation (LAVI = LAV/body surface area).

Results: AH group was older (56,9±6,9 vs 50,2±7,9 yrs, $p=0,0002$) exhibiting higher BMI (28,2±9,0 vs 26,3±5,9 kg/m², $p=0,03$) and higher office SBP (149,5±15,7 vs 138,6±20,1 mmHg, $p=0,04$) and DBP (91,1±8,4 vs 85,7±12,8, $p=0,02$). PWV did not differ in investigated groups, while cSBP (136,3±15,0 vs 126,8±20,0 mmHg, $p=0,02$) and cDBP (90,8±7,0 vs 84,9±12,3 mmHg, $p=0,01$) were higher in AH group. LAVI was significantly higher in AH group than in NonAH group (27,8±9,5 vs 24,3±6,6 ml/m², $p=0,003$). Among AH group LAVI correlated positively only with cSBP ($r=0,33$, $p=0,04$). Among NonAH group, LAVI correlated positively with age ($r=0,27$, $p=0,03$), BMI ($r=0,39$, $p=0,02$) and cSBP ($r=0,27$, $p=0,35$). **Conclusions:** Hypertensive subjects represent higher values of LAVI. In this group LAVI depends mainly on central systolic blood pressure, while in the group of normotensives LAVI is additionally determined by age and body mass index.

P3.9

PROGRESSION OF ARTERIAL STIFFNESS AND VASCULAR LESIONS ACCORDING TO THE DEGREE OF GLYCEMIC ABNORMALITIES. A WARNING IN PATIENTS WITH METABOLIC SYNDROME

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Introduction: Metabolic Syndrome (MS), is postulated as intermediate stage in this way to overt DBT, and probably the degree of vascular compromise in this stage could explain the higher proportion of CV complications in diabetics. If so, it should deserve an intensive prevention in MS to reduce DBT complications.

Objective: To compare the vascular patterns in MS and DBT patients (p.).

Methods: From our Vascular Lab database (2007–2012) we selected 3297 p. in primary prevention, first evaluated with data of central BP (Arteriograph), IMT, plaques in carotid and femoral arteries (P), PWV (Complior) and forearm endothelial test. We compared 215 control (C) p. (normal BP, NO risk factors, evident CV disease or drugs), 91 p. with MS according to IDF (2014) and 193 type 2 diabetic p. (DBT2).

Results: DBT2 were older, less men and closer with MS p. in terms of BP, HR, PP, CAoP and Aix. Vascular patterns were quite similar between MS and DBT2 and significantly different from C. MS and DBT2 showed a higher proportion of P,

atherosclerotic burden and PWV than (C) and also the clinical score of risk (FRS) and the severity of vascular disease score. DBT2 and MS were almost similar.
Conclusion: The progression of vascular disease from the early MS to DBT2 could explain the higher degree of complications in DBT2. These findings suggest the usefulness of vascular evaluation of MS patients to guide and intensify preventive measures to improve the prognosis of DBT2 patients.

P3.10

REGIONAL CAROTID MECHANICS IS SIGNIFICANTLY IMPAIRED IN PATIENTS ON HEMODIALYSIS

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Objective: To study the correlation between carotid mechanics, carotid stiffness and cardiac parameters in patients on hemodialysis (kidney failure) and healthy subjects.

Methods: Study population consisted of 12 patients on hemodialysis (aged 24-73, median=48) and 24 healthy controls of the same age and gender. All subjects underwent comprehensive transthoracic echocardiography and ultrasound carotid exams. Peak carotid longitudinal, circumferential strains and longitudinal and radial displacement were measured using two-dimensional Speckle-Tracking Imaging. Carotid stiffness was calculated using wall-tracking software.

Results: Univariate analysis revealed direct correlations between carotid strains and displacement and parameters of LV diastolic function and carotid stiffness ($r=0.44$ between longitudinal strain (ST_L) and e' (interventricular septum), $r=-0.27$ between ST_L and carotid_PWV, $r=-0.47$ between ST_L and Intima_Media_Thickness, $p<0.05$) and correlations between LV diastolic function and carotid stiffness ($r=-0.51$ between carotid_PWV and e'). These correlations were confirmed by multiple linear regression after adjusting for potential confounders (age, blood pressure, gender, weight, etc.). Analysis showed significant decrease in carotid strains and displacements and increase in carotid stiffness in patients on hemodialysis (carotid PWV=8.9 and 6.9 m/s, ST_L=4.6 and 6.7 in dialysis patients and healthy subjects accordingly, $p<0.05$). Multivariate modeling confirmed that hemodialysis is an independent determinant of regional carotid mechanics.

Conclusions: This study demonstrated that regional carotid mechanics is related to heart diastolic function and carotid stiffness. Development of atherosclerosis impairs carotid mechanics. Key parameters of carotid mechanics are significantly decreased in patients on hemodialysis. Measurement of these parameters is important because their diversions may serve as an early marker of cardiovascular disease.

P3.12

URINARY LIVER-TYPE FATTY ACID-BINDING PROTEIN IS ASSOCIATED WITH AORTIC STIFFNESS IN MALE CORONARY ARTERY DISEASE PATIENTS

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Background: Urinary liver-type fatty acid-binding protein (L-FABP) is a promising diagnostic and prognostic biomarker for both acute and chronic kidney injury. Furthermore, this protein has been shown to possess antioxidant properties and appears to provide a prognostic value for cardiovascular morbidity and mortality in different clinical settings. The aim of the current study was to evaluate its relationship to inflammation and arterial stiffness in coronary artery disease (CAD) patients without reduced kidney function and in healthy controls.

Methods: We studied 52 patients with CAD (age 63.2 ± 9.2 years) and 41 clinically healthy controls (age 60.1 ± 7.2). Urinary L-FABP, serum adiponectin and resistin levels were measured using the enzyme-linked immunosorbent assay method. The technique of applanation tonometry was used for non-invasive pulse wave analysis and pulse wave velocity assessments.

Results: Higher carotid-femoral pulse wave velocity (cf-PWV) was observed in the CAD patients as compared to the controls (9.7 ± 2.6 vs. 8.2 ± 1.7 m/s; $P=0.003$). The two groups also differed in adiponectin (5701 ± 2890 vs. 7081 ± 3612 ; $P=0.045$) and resistin (3.4 (2.6-4.5) vs. 2.8 (2.4-3.5); $P=0.043$) levels. There was a positive relationship between log-L-FABP and cf-PWV ($r=0.46$, $P=0.001$) in subjects with CAD, which remained significant after adjustment for potential confounders. Log-L-FABP also correlated with serum adiponectin levels in the patient group ($r=0.35$, $P=0.015$).

Conclusions: Our findings suggest that urinary L-FABP might be independently associated with aortic stiffness and adiponectin in individuals with CAD.

P3.13

ARTERIAL STIFFNESS ASSESSED BY ULTRAFAST IMAGING IN HEALTHY SUBJECTS

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Aim: To assess normal values on the common artery by using new methodology using shear wave methods in healthy subjects

Methods: Healthy subjects underwent aortic stiffness by using shear wave echography (Aixplorer) at the carotid artery. All subjects were free from cardiovascular disease and medication. PWV at the beginning of systole (BS) and the end systolic (ES) of the cardiac cycle.

Results: 32 healthy subjects (16 male and 16 female) were included. The mean age was 41y.o (23 to 61). BS PWV $4.35/0.32$ (3.18 to 5.37) and ES PWV was $5.96/0.45$ (4.58 to 9.8) m/s.

Both ES PWV and BS PWV have high correlation with age ($r_2: 0.64$ and 0.58 respectively, $p<0.0001$).

Conclusion: Arterial stiffness assessed by ultrafast imaging is a promising method for assessment of arterial stiffness, which can potentially be clinically useful.

P3.14

ASSOCIATION OF CAROTID INTIMA-MEDIA THICKNESS, ENDOTHELIAL FUNCTION AND AORTIC STIFFNESS WITH CARDIOVASCULAR EVENTS IN METABOLIC SYNDROME PATIENTS

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Objective: The objective of this study was to assess predictive value of various arterial markers for cardiovascular (CV) events in patients with metabolic syndrome (MS).

Design and methods: A follow-up study enrolled 2728 (53.95 ± 6.18 years old, 63% women) MS patients without overt CV disease. Patients were followed-up for 3.9 ± 1.7 years for CV events. Various CV risk factors and arterial markers, such as brachial flow-mediated dilatation (FMD), carotid intima-media thickness (cIMT), carotid stiffness index (CSI), aortic pulse wave velocity (aPWV) and cardio-ankle vascular index (CAVI) were assessed. **Results:** Over the follow-up period, 83 (3%) patients had at least one CV event. In a multivariate stepwise Cox proportional hazard regression analysis, an increase in aPWV [HR 1.21 (1.04-1.4), $p = 0.016$] and cIMT [HR 1.003 (1.001-1.003), $p = 0.036$] and decrease in FMD [HR 0.30 (0.16-0.56), $p < 0.001$] was independently associated with the occurrence of the CV event.

In a two-level survival trees analysis we established that patients with $cIMT > 793$ mcm had higher CV risk and their prognosis was further compromised with an $FMD \leq 0.23$ mm, whereas in patients with $cIMT \leq 793$ mcm, aPWV but not FMD was of greater predictive value. The lowest Kaplan-Meier cumulative proportion surviving was observed in patients with $cIMT > 793$ mcm and aPWV values above the cut-off point 10.5 m/s ($p < 0.001$).

Conclusions: In the middle-aged patients with MS and increased cIMT, aPWV was strongest independent CV event predictor, whereas in patients with relatively low cIMT values, CV risk was associated primarily with endothelial dysfunction.

P3.15

CARDIAC PERFORMANCE VASCULAR PHYSIOLOGY AND ERECTILE STATUS; A QUESTION OF A HEALTHY DIET

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Purpose: The Mediterranean diet (Med-Diet) assists cardiovascular disease prevention. Erectile dysfunction (ED) reflects functional damage of the small peripheral vessels. Our aim is to investigate whether left ventricular (LV)