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P1.15: HIGHER DAY TIME RATE OF SYSTOLIC BLOOD PRESSURE VARIATION IS ASSOCIATED WITH REDUCED RETINAL ARTERIOLAR DIAMETER IN NON-DIABETIC, BUT NOT IN DIABETIC, INDIVIDUALS

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Conclusion: MA has a major effect on BP lowering, differences between SNB and RB being observed in pts with OMA, not in patients with LMA. Combined methods for assessing MA allow determining the true efficacy of AHT strategies in RH pts.

P1.12

PREDICTIVE COMBINED ROLE OF CALCIUM SCORE AND CAROTIDIMT IN CORONARY ARTERY DISEASE

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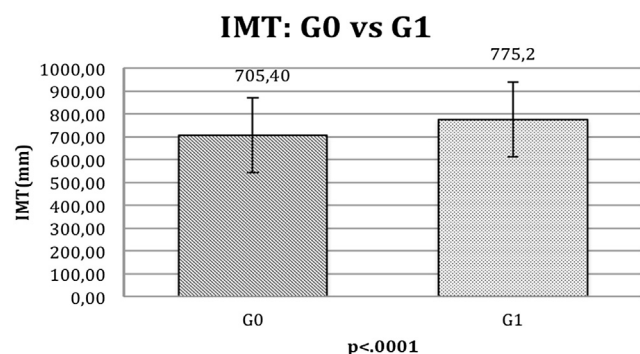
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Objectives: up to date the assessment of coronary artery disease (CAD) risk is based mainly on the presence of CV risk factors. However, many markers of subclinical atherosclerosis has been demonstrated as powerful predictors of CV events. Aim of our study was to evaluate if non invasive US parameters, such as carotid properties and heart calcifications, are able to add information to the prediction of CAD.

Methods: In 405 in-patients with a clinical indication (overt angina and/or positive exercise test) for coronary angiography (CA), we measured blood pressures (BP), carotid intima-media thickness (IMT), local PWV and distensibility and quantified cardiac calcification by means of Calcium Score (CaS). After CA we divided the group in G1 (N=240) (patients with at least one coronary stenosis >50%), and G0 (N=165) (unaffected coronaries).

Results: G0 and G1 patients differed in age (67 ± 10 vs 64 ± 11 yrs, $p=0,01$), but not in BMI ($26\pm 3,5$ vs 28 ± 16 kg/m², $p=0,03$); G1 had higher BP ($130\pm 21/74\pm 10$ vs $136\pm 18/77\pm 11$ mmHg, $p<0,02$), carotid-IMT ($705,4\pm 155$ vs $775,2\pm 164$ mcm, $p<0,0001$), local PWV ($8,9\pm 2,8$ vs $9,5\pm 2,7$ m/s, $p<0,01$) and CaS ($1,51\pm 1,45$ vs $2,56\pm 1,86$, $p?$). Among the considered US parameters, IMT and CaS were the best predictors of CAD, after adjusting for Framingham Risk Score (CaS: OD = 1, $p<,001$; IMT: OD = 1, $p=0,06$).

Conclusions: Integrated US of heart and carotid artery can be very useful to detect subclinical ATS in medium-high risk patients, predicting significant CAD and adding qualitative information for better stratify the CV risk and improve clinical management.



P1.13

THE ASSESSMENT OF VASCULAR AGE IS A USEFUL TOOL TO DEMONSTRATE SUBCLINICAL ARTERIAL DISEASE IN TREATED HYPERTENSIVE PATIENTS

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Background: Vascular age may be a more reasonable conception to the patient than the information about the percentage of risk.

Objective: To compare degrees of correlation between biological and vascular age with subclinical evidence of arterial disease in treated hypertensive patients.

Methods: Subjects in anti-hypertensive treatment, aged 30 to 75 years, were evaluated. Carotid intima-media thickness (cIMT), carotid-femoral pulse wave velocity (cf-PWV), and central parameters were assessed. Vascular age was calculated by the Framingham risk score for general cardiovascular disease. All the patients (n=165) were initially divided in tertiles (T1,T2,T3) according to biological age, and then in relation to vascular age.

Results: When divided by biological age, the difference between T3 and T1 was not significant for cIMT ($0,91\pm 0,14$ vs $0,88\pm 0,38$ mm) and aortic systolic blood pressure (aSBP; 136 ± 20 vs 129 ± 17 mmHg) although cf-PWV ($11,1\pm 2,0$ vs $9,7\pm 1,5$ m/s, $p<0,001$) and augmentation pressure (AP; 19 ± 9 vs 13 ± 5 mmHg, $p<0,01$) were significantly higher in T3. When separated by vascular age, the difference between T3 and T1 was significant for all the vascular parameters such as cf-PWV ($11,9\pm 2,0$ vs $9,6\pm 1,2$ m/s), cIMT ($1,10\pm 0,38$ vs $0,76\pm 0,13$ mm, $p<0,01$), aSBP (150 ± 18 vs 123 ± 15 mmHg, $p<0,001$) and AP (21 ± 9 vs 13 ± 6 mmHg, $p<0,001$). The correlation was stronger to vascular age than to biological age for AP ($r=0,46$ vs $r=0,29$), aSBP ($r=0,57$ vs $r=0,14$) and cIMT ($r=0,59$ vs $r=0,39$) although similar for cf-PWV ($r=0,44$ vs $r=0,40$).

Conclusion: The assessment of vascular age may be a useful tool to demonstrate the individual cardiovascular risk in treated hypertensive patients.

P1.14

PULSE WAVE VELOCITY AND KIDNEY DISEASE

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Increased arterial stiffness is one of the major alterations in arterial wall. It can be evaluated in non-invasively way by measuring the pulse wave velocity PWV in large arteries. Increased PWV is an independent predictor factor of cardiovascular complications in patients with hypertension and chronic kidney disease.

We conduct a 2 years prospective study between January 2003 and December 2004. In 161 patients we measured the PWV using an automatic device, the Complior (Colson, Paris). Patients were divided in 4 groups: 43 with polycystic kidney disease (PKD), 38 with primary chronic glomerulonephritis (PCGN), 40 patients with diabetes mellitus (DM) and 40 controls. The 4 groups were matched for age, sex and serum creatinine.

Results: we found a positive relationship between age and PWV in the different groups. There was a negative correlation between PWV and creatinine clearance. Among patients with chronic renal failure, PWV were correlated to serum phosphate level ($p<0,02$) and the product calcium X phosphate ($p<0,006$). In patients with DM, PWV was positively correlated to the level of hypertension and to the chronic renal failure (CRF). In patients with PCGN, PWV was positively correlated to the presence of vascular lesions on the kidney biopsy ($p<0,004$), to the level of hypertension and to the CRF. In the PKD group, PWV was correlated to the level of hypertension and to the CRF.

Conclusion: PWV is rather related to age, blood pressure and renal function than to type of nephropathy

P1.15

HIGHER DAY TIME RATE OF SYSTOLIC BLOOD PRESSURE VARIATION IS ASSOCIATED WITH REDUCED RETINAL ARTERIOLAR DIAMETER IN NON-DIABETIC, BUT NOT IN DIABETIC, INDIVIDUALS

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Background: Although Type 2 diabetes (T2DM) is associated with retinal vascular disease, the underlying pathophysiological mechanisms are unclear. Reduced retinal arteriolar diameter has been linked to high clinic blood pressure (BP) but the role of more sensitive measures of BP control have never been assessed. This study aimed to determine the relationship between retinal arteriolar diameter and 24 hour ambulatory BP (including BP variability) in people with and without T2DM.

Methods: Digitized retinal photographs were analysed to quantify retinal arteriolar diameters in 37 non-diabetic (aged 53 ± 10 years; 48.2% male)

and 29 T2DM (aged 60±9 years; 48.6% male) participants. Daytime rate of systolic BP variation (BPV) was derived from 24 hour ambulatory BP as the 3-hour moving average for the slope of the change in systolic BP between each systolic BP reading over time.

Results: There was a non-significant trend for patients with T2DM to have greater BPV compared with non-diabetics (35.9±7.1 versus 32.6±6.6; $p=0.08$). BPV was significantly and negatively associated with retinal arteriolar diameter in non-diabetics alone ($\beta=-0.006$, $p=0.03$), but not in people with T2DM ($\beta=0.004$, $p=0.402$), even after adjusting for age, body mass index and ambulatory systolic BP (either night time, day time or 24 hour systolic BP).

Conclusions: BPV was inversely related to retinal arteriolar diameter only in people without T2DM. This suggests that mechanisms underlying retinal vascular disease may differ between people with and without T2DM, with the rate of BP variation possibly being an important factor.

P1.16 CORRELATION BETWEEN WALL-TO-LUMEN RATIO OF RETINAL ARTERIOLES AND CLINIC AND 24 HOURS BLOOD PRESSURE

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Objective: Wall-to-lumen ratio of retinal arterioles might serve as an in-vivo parameter of vascular damage. Previous studies have shown a correlation between retinal arteriolar structure and blood pressure values, measured both in the clinic and during 24 hours ambulatory monitoring. We analyzed the impact of brachial clinic blood pressure (BP), of central BP and of 24 hours BP values on wall-to-lumen ratio of retinal arterioles.

Methods: In 267 subjects (129 males, age range 20-72 years; mean 54±7 years) wall-to-lumen ratio of retinal arterioles was assessed in vivo using scanning laser doppler flowmetry (Heidelberg retina flowmeter, Heidelberg Engineering). In addition clinic and 24 hours BP values were measured. Central hemodynamics and augmentation index (Ai) were assessed by pulse wave analysis.

Results: In never treated patients with essential hypertension ($n=56$) a higher wall-to-lumen ratio (0.37 ± 0.19 vs. 0.30 ± 0.13 , $P=0.05$) was observed in comparison with normotensive individuals ($n=115$); no significant differences were observed between treated ($n=96$) and untreated hypertensive patients.

Wall to lumen ratio and wall cross sectional area of retinal arterioles were significantly related to clinic systolic BP ($r=0.23$, $P=0.005$) and PP ($r=0.18$, $P=0.005$), to 24 hours systolic BP ($r=0.28$, $P=0.0001$) and PP ($r=0.19$, $P=0.003$) and to central systolic BP ($r=0.20$, $P=0.01$) and central PP ($r=0.21$, $P=0.001$). Multiple regression analysis including all BP indices revealed that only mean systolic 24 hours BP is independently associated with an increased wall-to-lumen ratio of retinal arterioles.

Conclusion: in this quite large group of hypertensive patients and normotensive individuals 24 hours systolic BP seems to be the strongest determinant of increased WLR of retinal arterioles.

P1.17 AUTONOMIC NERVOUS ACTIVITY IN REACTIVE HYPEREMIA AND CONDUIT/ RESISTANCE ARTERIAL ENDOTHELIAL FUNCTIONS IN PATIENTS WITH HYPERTENSION

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Aims: Flow-mediated vasodilatation of the brachial artery (FMD), a marker of conduit arterial endothelial function, and reactive hyperemia index (RHI), a marker of resistance arterial endothelial function, measured by peripheral arterial tonometry, are known to be weakly associated with each other, however, the mechanisms underlying this weak association remain to be fully clarified.

We examined whether the autonomic nervous activation induced by the 5 minutes' forearm clamping used to induce reactive hyperemia might exert any influence on the FMD and RHI in subjects with hypertension.

Methods and results: In 115 subjects with hypertension (age 61 ± 1 y/o), the FMD and RHI were measured simultaneously, and the heart rate variability (HRV), as a measure of the autonomic nervous activity, was calculated from the electrocardiographic recordings obtained before (5 minutes' recording) and after the start of forearm clamping (10 minutes' recording). The HRV parameters {low-frequency component (LF), high frequency component (HF), and the ratio (LF/HF) between the two} calculated from

the records (15 minutes' recording in total) were found to show no significant relationship with either the FMD or RHI. Then, the change in HRV induced by forearm clamping was measured as the percent change after the start of clamping relative to that before the start of clamping. A multivariate linear regression analysis with adjustments for confounding variables demonstrated that the RHI, but not FMD, was significantly associated with the percent change of the LF/HF associated with forearm clamping ($\beta = -0.222$, $p = 0.017$).

Conclusion: Sympathetic nervous activation induced by 5-minutes forearm clamping to induce reactive hyperemia may affect the RHI, but not the FMD in subjects with hypertension. This difference may be one of the mechanisms underlying the existence of only a weak association between FMD and RHI.

P1.18 FEASIBILITY OF 24-HOUR PULSE WAVE VELOCITY ANALYSIS IN THE MANAGEMENT OF PATIENTS WITH RENAL TRANSPLANTATION

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The aim of study was to assess the feasibility of 24-hour PWV analysis in management of patients with renal transplantation (RT). Overall, 41 patients were recruited from the transplant waiting list. All the measurements were performed before and at 1 and 20 weeks after RT. The Pulse Time Index of Norm (PTIN) defined as the percentage of 24-hour period during which the PWV does not exceed 10 m/second. Before RT, the mean PTIN was 56.3 (SD, 18.4). Then, a week after the RT, a decrease in PTIN was observed in most cases, going to 27.6 (SD, 11.1). After 20 weeks, the mean PTIN increased again to 52.0 (SD, 23.6). We found that the persistence of arterial stiffness disturbances after RT appears relatively predictable. We determined the cut-off value of PTIN that could predict the two states of PTIN: a state of improvement or a state of decline/without change. The cut-off value of PTIN at 45% had a sensitivity of 69%, specificity of 76%, and AUC of 0.65. The analysis of variance showed that in the group with initial PTIN of 45% or higher, the PTIN in the remote period after transplantation changed significantly ($P<0.05$), whereas in the group with an initial PTIN lower than 45%, there were no significant changes. Thus, the analysis of 24-hour pulse wave velocity in the management of patients with RT using PTIN is feasible. PTIN seems to give us an opportunity to optimize aggressive therapeutic approach to postoperative hypertension in patients with RT.

P1.19 ASSOCIATION OF AORTIC STIFFNESS AND LIPOPROTEIN APO-A1 WITH PERIPHERAL ARTERIAL DISEASE: RESULTS OF A NINE-YEAR FOLLOW-UP

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Background: We investigate whether peripheral arterial disease (PAD) detected by ankle brachial index (ABI) <0.9 is independently associated with aortic stiffness and lipoprotein (a) [Lp(a)] in elderly subjects free from PAD at baseline.

Methods: The present study included 96 lecture attendees ("Continuing Adult Education") who were examined at baseline and after a median follow-up of 9.5 years. We used multiple linear and logistic regression analyses to assess predictors of ABI change. As independent covariates we considered parameters with known effect on arterial stiffness or ABI and use of antihypertensive medication.

Results: At baseline, mean age was 67.2 ± 4.9 years, 79.2% were women, 33.3% of subjects had arterial hypertension and 5.2% diabetes mellitus, respectively. During the follow-up, the ABI decreased (1.15 ± 0.12 vs. 1.00 ± 0.19 ; $P<0.0001$) and there were 27 incident cases of PAD. While accounting for covariates, change in ABI was associated with Lp(a) ($\beta = 0.045\pm0.018$; $P=0.017$) and PWV ($\beta = -0.038\pm0.017$; $P=0.025$). Additional adjustment for antihypertensive treatment weakened the association between PWV and change in ABI ($P=0.091$). The incidence of PAD was associated only with Lp(a) (OR 0.55, 95%CI 0.32 – 0.97; $P=0.038$). PWV was not significant predictor of incident PAD neither in basic adjusted model nor in model adjusted also for antihypertensive treatment ($P\geq0.18$).

Conclusions: In elderly subjects without manifest PAD at baseline are lipoprotein (a) and aortic stiffness associated with change in ABI and incidence of peripheral arterial disease, however antihypertensive treatment started during follow-up modifies these observations.