



## Artery Research

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### **P2.51: PRECLINICAL ATHEROSCLEROTIC DISEASE AND METABOLIC SYNDROME: A PREDIABETES STAGE?**

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**Aim:** The relationship between carotid pathology and risk factors (RF) in hypertensive patients for cerebrovascular disease (CVD).

**Methods:** Color duplex sonography of carotid arteries was performed in 924 hypertensive patients: 368 with RF for CVD, 126 with transient ischemic attacks (TIA), 287 with chronic unilateral infarction (CUI) and 143 with multiple infarctions. The intima media thickness (IMT) was measured in B- and M- mode. No modifiable (age, sex) and some modifiable (hypertension, diabetes, atrial fibrillation, dyslipidemia, carotid artery stenosis, obesity, hemorheological variables FR) were evaluated. In 368 subjects with RF, 57 with CVD (31 with TIAs and 26 with CUI) and 16 healthy correlative clinical, neurosonographic and echocardiographic studies were performed.

**Results:** Arterial hypertension was the most common RF in all patients. An asymmetrical hypertrophy of the left ventricle and a decrease contractility was found as a typical diastolic dysfunction in most of them. Mild stenosis of ICA predominated in all groups while moderate or severe carotid stenoses were relatively rare. Symptomatic thromboses of ICA were seen in 4, 5 % in patients with CUI. IMT of the ICA on the site of infarction correlated positively with the arterial blood pressure ( $r = +0.60$ ,  $p < 0.05$ ). A positive fraction in patients with TIAs and CUI.

**Conclusion:** The study confirms clinical impact of carotid pathology alone or its association with other RF is under consideration. The changes of variables of hemorheology, lipids, blood pressure are related to other RF for CVD.

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#### P2.48

##### ARTERIAL HYPERTENSION AS A PROGNOSTIC FACTOR IN THE EARLY EVALUATION OF PATIENTS AFTER MYOCARDIAL REVASCLARIZATION SURGERY

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**Objetives:** to see the prevalence and clinical evolution of hypertensive patients after myocardial revascularization surgery (MRS) in the Coronary Unit.

**Methods:** a retrospective study for the evaluation of the characteristics and the evolution, in the Coronary Unit, of 72 patients (pts) that underwent MRS.

**Results:** the prevalence of AHT before surgery was 88.8%, (61% treated with beta blockers, 51% ACEI, 12% received calcium antagonists and 15% diuretics). From the hypertensive ptes, 60.6% presented AHT during the stay in the ICCU (75.6 % of men and 37.5% of women) ( $p = 0.004$ ). In the ICCU the pts with AHT were treated with nitroglycerin (NTG) in the 95.6% of the cases. The most frequent cause of early postoperative complications were the taquiarrhythmias and mayor bleedings but we did not find a relation between these complications and AHT in the early postoperative. Bleeding was found in 24 % of the pts that developed AHT postoperative vs. 12 % of the pts that did not develop AHT (NS). 32 % of the pts that developed AHT presented taquiarrhythmias vs. 12% of the pts that did not developed AHT (NS). Patients were sent home with Beta Blockers in the 95.4 of the cases, with ACEI in the 64% and only the 14 was sent home with CA.

**Conclusions:** 1. AHT has a very high prevalence among pts that has received MRS. 2. AHT was more frequent in previously hypertensive men than in women in the early postoperative of MRS. 3. AHT was not significantly associated with bleeding or taquiarrhythmias. 4. Beta Blockers and ACEI were the drugs prescribed to the pts after the acute phase of MRS in the majority of the cases.

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#### P2.49

##### THE ASSOCIATION OF ARTERIAL STIFFNESS WITH ERECTILE DYSFUNCTION IN MIDDLE-AGED MEN WITH METABOLIC SYNDROME

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**Background:** Erectile dysfunction (ED) has been considered as a clinical manifestation of a generalized arterial disease. Aortic stiffness and wave reflections are early markers of vascular changes associated with metabolic syndrome (MetS). We evaluated the possible association between aortic stiffness, wave reflections and ED in middle-aged patients with MetS.

**Methods:** Two groups of subjects with MetS (mean age: 48 years) were investigated: 75 men with ED of vascular origin and 55 men with normal erectile function matched for age, body mass index (BMI), systolic and diastolic blood pressure, heart rate and smoking habits. MetS was defined according to the ATP III criteria. ED diagnosis and score were evaluated according to the International Index of Erectile Function (IIEF) questionnaire. Carotid-femoral Pulse Wave Velocity (PWV) was measured as an index of aortic stiffness and radial Augmentation Index (Alx) as a measure of wave reflections.

**Results:** PWV was higher in patients with ED than in the control group ( $8.3 \pm 1.1$  vs  $7.9 \pm 0.8$  m/s,  $P < 0.05$ ); Alx did not differ ( $24.3 \pm 10$  vs  $23.9 \pm 11\%$ ,  $P = NS$ ). To analyze the independent predictors of IIEF score, a stepwise linear regression analysis was performed using age, BMI, blood pressure, waist circumference, lipid profile, hsCRP and fibrinogen as independent variables. IIEF was independently associated only with PWV ( $\beta = -0.273$ ,  $t = -1.363$ ,  $P = 0.02$ ).

**Conclusion:** In middle-aged subjects with MetS, the presence of ED is associated with a selective alteration of central PWV. This finding suggests that this group of patients may be at greater cardiovascular risk.

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#### P2.50

##### ENDOTHELIUM DYSFUNCTION IS THE RISK FACTOR FOR CARDIOVASCULAR EVENTS IN METABOLIC SYNDROME PATIENTS WITHOUT EVIDENCE OF CORONARY HEART DISEASE

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**Background:** Impaired function of endothelium has been reported to be the initial step in atherosclerosis and thus may be seen as either independent cardiovascular risk factor or a marker of a present underlying abnormality.

**Materials:** 302 metabolic syndrome patients were examined (aged  $36.4 \pm 2.1$  years, 55% males). Baseline examination included routine clinical examination, laboratory tests, cardiac ultrasound, ECG- and blood pressure monitoring. As endothelium-dependent vasoreactivity is advocated as a measure of vascular health, using a high-resolution ultrasound, the diameter of the brachial artery at rest and during reactive hyperaemia (endothelial-dependent flow-mediated dilatation,  $\Delta FMD\%$ ) was measured. Study group comprised 104 participants ( $37.0 \pm 3.6$  years, 54% males), with endothelium dysfunction (ED) at baseline,  $\Delta FMD$   $189.2 \pm 19.7\%$ . Control group included 198 patients without ED ( $35.8 \pm 2.6$  years, 56% males),  $\Delta FMD$   $143.5 \pm 10.3\%$ . Coronary heart disease (CHD) was excluded using coronary angiography or stress echocardiography. Follow-up assessments were performed at two and seven years (including stress echocardiography).

**Results:** at two years follow-up 36.5% of study group patients developed CHD comparing to 13.1% among the controls ( $RR = 2.78$ ,  $\chi^2_{(1)} = 22.37$ ); at seven years follow-up total CHD incidence was 0.865 for study group and 0.353 for controls ( $RR = 2.45$ ,  $\chi^2_{(1)} = 71.71$ ), fatal cardiovascular events were registered in 7.69% and 3.03% respectively ( $RR = 2.57$ ,  $\chi^2_{(1)} = 3.325$ ).

**Conclusion:** In patients with metabolic syndrome not having CHD endothelium dysfunction should be regarded as an independent risk factor.

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#### P2.51

##### PRECLINICAL ATHEROSCLEROTIC DISEASE AND METABOLIC SYNDROME: A PREDIABETES STAGE?

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**Aim:** In ESH/ESC 07 Guidelines, Metabolic Syndrome (MS) and subclinical vascular disease (VD) are stressed as important markers of high risk in asymptomatic subjects. We compared the severity of VD by ultrasonography in patients (p.) with MS and Diabetes Mellitus (DM) and control (C) p. to analyze the relationship between the metabolic condition and the severity of VD.

**Methods:** We did in the same procedure 1) CIMT 2) Plaques characterization, 3) PWV and 4) FMD with a strict quality control. We set a score (VS) from 0 to 5 according to the severity of the VD. The CV Risk using Framingham score (FS) was also obtained from medical records.

**Results:** We performed a cross sectional, observational study on 292 matched p., 125 C without dyslipemia or overweight, 138 with MS (according ATP III criteria) and 29 with DM..

Parameter	C (n= 125)	MS (n= 138)	DBT (n= 29)	p
Age	54 ± 12	54 ± 11	51 ± 10	NS
Sex (% males)	70	64	52	NS
SBP (mmHg)	141 ± 18	141 ± 16	142 ± 10	NS
DBP (mmHg)	85 ± 11	86 ± 9	87 ± 10	NS
HR (bpm)	69 ± 9	71 ± 10	74 ± 10	NS
% abnormal IMT	19	33	41	.012
% Plaques	22	54	55	< .001
%Abnormal FMD	33	39	45	NS
%Abnormal PWV	30	38	65	.002
FS (mean)	10 ± 8	10 ± 6	25 ± 12	< .001
VS (mean)	2,1 ± 1,4	2,5 ± 1,4	3,0 ± 1,7	.004

**Conclusions:** 1- In a selected population of matched p. according to age, sex and BP, there seems to be an increase in the degree of VD when MS is present. 2- The pattern of VD in MS p. was close to that in DM p. consistent with the described increase in CV risk in MS. 3-A VS may be useful in the clinical practice.

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#### P2.52 ASSOCIATION BETWEEN PWV AND DIFFERENT DEFINITIONS OF THE METABOLIC SYNDROME

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**Objectives:** To explore 1. the presence of arterial stiffness, as measured with pulse wave velocity (PWV) in subjects with the Metabolic Syndrome (MetS) and 2. the contribution of PWV and the MetS in the prediction of prevalent CVD in a 50-70-year-old Dutch population-based cohort.

**Background:** Inconsistent results have been published about 1. the relations between arterial stiffness and the MetS and 2. the role of both in the prediction of CVD. Most studies have been performed in selected high-risk populations.

**Method:** We measured arterial stiffness by PWV using tonometry in 1510 participants of the Nijmegen Biomedical Study and determined its associations with different definitions of the MetS (according to the NCEP, IDF and WHO). Multiple regression analysis was performed to determine the role of PWV and MetS in CVD risk prediction.

**Results:** Both men and women with the MetS had a significantly higher PWV than those without the MetS, independent of the definition used (for IDF: men: +MetS:9.5(2.3)vs -MetS11.1(3.1)m/s, women: +MetS:9.1(2)vs -MetS 10.9(3)m/s). Age and gender were the main contributors to PWV, explaining 18.7% of the variance in PWV. Adding any definition of the MetS to the model increased the percentage explained variance of PWV to only 24% whereas adding all traditional CV risk factors predicted 43.1%. In regression analysis of prevalent CVD, the CV risk factors predicted 26.3% and adding PWV or the MetS did not improve the prediction of prevalent CVD.

**Conclusion:** Our results question the additive value of 1. using the definition of the MetS in the prediction of arterial stiffness and 2. measuring PWV and using the MetS in the prediction of prevalent CVD. Prospective studies have to determine the additive contribution of PWV and the MetS in CVD risk-prediction in general population.

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#### P2.54 INFLUENCE OF CENTRAL OBESITY ON EARLY CAROTID INTIMA-MEDIA THICKENING IS INDEPENDENT OF THAT FROM OTHER RISK FACTORS

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Its unknown if obesity or its associated risk factors influence early vascular change.

**Methods:** We investigated if anthropometric measurements, body mass index [BMI], waist/hip ratio [WHR], waist circumference [Wc] and Waist/height ratio WHTR, or metabolic parameters (glucose, insulin, lipid, uric acid and blood pressure {BP}) correlated more with Carotid intima-media thickness (IMT), vascular stiffness [Augmentation Index] and brachial artery reactivity). 100 Subjects (71F, 29M) without vascular events, BP <140/90, LDL < 4 mmol/l, glucose < 6.2 mmol/l participated.

**Results:** BMI, WHR, WC, WHTR correlated significantly with triglyceride, HDL, LDL, insulin, glucose, uric acid and BP levels (p<0.001). IMT correlated with WHTR, BMI, WC, Glucose (p<0.001), Homeostasis Index (HOMA) and Cholesterol levels (p<0.05). Only Age, WHTR or BMI were significant correlates of IMT in a multivariate analysis (MVA) (p<0.01) including WHTR or BMI, with age, sex, SBP, HDLc and HOMA. Augmentation Index correlated with age (p<0.0001), WHTR and WC (p<0.0005) but with age only in a MVA. Vascular reactivity did not correlate with any anthropometric or metabolic parameters. Anthropometric cut off points, (BMI <25, WC <102cm M, <88cm F, WHR <0.9 M, <0.8 F, and WHTR < 0.5) significantly differentiated normal from abnormal metabolic and vascular measurements. The WHTR ratio < 0.5 was as reliable as the BMI cut-off < 25 in determining metabolic and vascular abnormalities. BMI and WHTR were strongly associated with 89% agreement (p<0.0001). These results demonstrated that anthropometric and metabolic parameters correlated, but anthropometric parameters were the significant correlates of vascular change. A waist/height ratio > 0.5 predicts both early vascular and metabolic changes. These data support a risk factor independent vasculotrophic effect of obesity.

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#### P2.55 CHANGES IN TRUNK FAT MASS AND PERIPHERAL LEAN MASS ARE ASSOCIATED WITH CHANGES IN CAROTID ARTERIAL STIFFNESS IN A HEALTHY POPULATION – A 6-YEAR FOLLOW-UP STUDY

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**Introduction:** In cross-sectional studies, total body fat mass and particularly central fat distribution are associated with greater arterial stiffness. How changes in body fat and body fat distribution impact on changes in large artery stiffness is unknown.

**Methods:** Data were derived from the Amsterdam Growth and Health Longitudinal Study (n=268; 126 male and 142 female). At age 36, body fat distribution was determined by dual-energy x-ray absorptiometry and arterial (carotid and femoral) properties were measured using ultrasound imaging. These measurements were repeated 6 years later. Data were analysed with multiple linear regression analyses.

**Results:** Increases in total body fat mass (standardized  $\beta$ : -0.14, 95%CI: -0.37; 0.08) and especially trunk fat mass ( $\beta$ : -0.25, 95%CI: -0.49; -0.02) were associated with decreases in the carotid distensibility coefficient. In contrast, increases in peripheral lean mass were inversely associated with carotid Young's elastic modulus ( $\beta$ : -0.27, 95%CI: -0.49; -0.05). These associations were independent of changes in other body composition compartments or riskfactors (i.e. gender, mean arterial pressure, total/HDL cholesterol ratio, triglycerides, glycated haemoglobin, heart rate). Changes in body fat distribution were not associated with changes in femoral artery stiffness.

**Conclusion:** Increases in trunk fat mass during adulthood have adverse effects on carotid stiffness, whereas increases in peripheral lean mass may counteract this.

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#### P2.56 EFFECTS OF LEAN AND FAT MASS ON BONE MINERAL DENSITY AND ARTERIAL STIFFNESS IN ELDERLY MEN

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**Introduction:** The aim of this study was to evaluate the influence of fat and lean mass on both arterial stiffness and bone mass density (BMD) in elderly men.

**Methods:** This study was performed in 169 French males over 60 years. Aortic stiffness was assessed by carotid/femoral pulse wave velocity (PWV) using a validated automated device (PulsePen®). BMD and body composition were determined with a dual-energy X-ray absorptiometry (DEXA) device in lumbar spine L1-L4, femoral neck and total body.