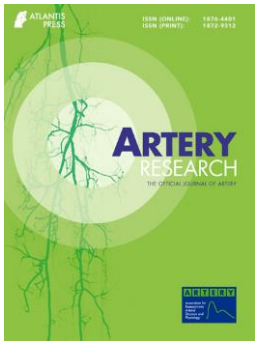

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P3.03: IMPACT OF SMOKING ON ERECTILE FUNCTION AND ARTERIAL STIFFNESS IN MIDDLE-AGED SMOKERS WITHOUT OTHER MAJOR CARDIOVASCULAR RISK FACTORS

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P2.12
THE ROLE OF INSULIN ON FUNCTION OF RESISTANCE ARTERIES FROM OBESE YOUNG WOMEN AT RISK OF 'DIABETES' AND CONTROLS

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Objectives: Vascular dysfunction is common in type 2 diabetes and obesity. The functional role of hyperinsulinaemia on human blood vessels in obese individuals remains unclear. We hypothesised that in young women, change in vessel function in a hyperinsulinaemic milieu would be influenced more by adiposity than plasma glucose.
Methods and Results: Women in a pregnancy cohort were stratified into upper & lower quartiles of fasting plasma glucose (FPG) when seen at follow-up 20 months after delivery. After subcutaneous biopsy, small arteries were tested ex-vivo by wire myography for vasoconstrictor [Noradrenaline (NA)] and vasodilator [carbachol and sodium nitroprusside (SNP)] responses before and after incubation with 100 mU/ml human insulin.
Results: Women with higher FPG had attenuated NA-contractile responses [0.8 (0.4-1.39) vs. 0.6 (-0.5 to 1.7) mN/mm, $p = 0.011$), but differences in maximum response to carbachol (ΔEDD_{max}) before and after insulin incubation did not increase [26.8 (4.8-48.7) vs. 18.5 (-3.3 to 30.2) %, $p = 0.55$) compared with those with lower FPG. Insulin reduced NA-induced contraction in those with higher [3.5 (2.4-4.6) vs. 2.4 (1.4-3.4) mN/mm: $p = 0.004$] but not in those with lower BMI [4.1 (2.8-5.3) vs. 3.7 (2.5-5.0) mN/mm: $p = 0.33$]. ΔEDD_{max} was greater in the high than low BMI group [37.7 (18.0 to 57.3) % vs.6.3 (-6.5 to 19.1) %, $p = 0.007$].
Conclusions: Small arteries from women with greater adiposity and fasting glucose, exhibited reduced contraction with NA but only the former showed improved EDD, when tested in a hyperinsulinaemic milieu. Hyperinsulinaemia may be important in maintaining endothelial function in obesity.

Epidemiology 2

P3.01
CAROTID ARTERY INTIMA-MEDIA COMPLEX INCREASE IN PATIENTS WITH METABOLIC SYNDROME AND DIFFERENT BRACHIAL ARTERY REACTIVITY DURING REACTIVE HYPERAEMIA TEST: 2 YEARS FOLLOW-UP RESULTS

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Patients having different risk factors for coronary heart disease (CHD), as well as those with metabolic syndrome, are known to have increased carotid artery (CA) intima-media complex thickness (IMT) index, comparing to healthy subjects. Recently, the significant correlation between IMT, changes in flow-mediated dilatation (FMD) of the brachial artery (BA), different CHD risk factors and such important components of metabolic syndrome (MS), as insulin resistance and hyperglycaemia was shown. Nevertheless, the relationship between IMT and FMD and their role in atherogenesis are still ill defined.
Our aim was to investigate the dynamics of IMT and number of newly found CA atherosclerotic plaques (ASP) in patients with normal and lowered FMD.
Study group comprised of 89 men with lowered FMD (less then 5%) and 92 men with normal FMD (more, then 5%), 31-52 years of age. All the participants have undergone clinical examination according to standardized protocol, including physical examination. Blood samples for lipid profile and glucose levels were taken. Using high definition ultrasound IMT was measured and CA ultrasound scan was performed.
Results: at two-years follow-up in patients with initially lowered FMD the IMT increase was significantly higher, then in those with normal FMD at baseline (delta S = 5.39% vs 1.12%, $p = 0.0001$, respectively). In the group with initially lowered FMD number of newly found ASP was 31 (34.8%), whereas in group with initially normal FMD there were only twelve new cases (13%).
Conclusions: there is a positive correlation between initially impaired (lowered) FMD and increased IMT and higher number of new ASPs in the CA after two years follow-up.

P3.02
GLUCOSE METABOLISM IMPAIRMENT IN METABOLIC SYNDROME IS LINKED WITH INCREASED PULSE WAVE VELOCITY

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Introduction: Metabolic syndrome (MetS) is a cluster of cardiovascular risk factors. The specificity of each component of metabolic syndrome improves its management.
Objective: Do patients with MetS have arterial modifications? Which MetS components are they most closely linked to?
Materials and methods: Our population recorded 348 patients (185 men and 163 women). These patients entered the day hospital in order to have a cardiovascular check-up. We measured brachial and central blood pressure, augmentation index, and pulse wave velocity (PWV).
Results: 150 patients did have a metabolic syndrome (MetS+) and 198 did not (MetS-). PWV is higher in MetS+ patients, but it does not sustain after adjustment with confounding factors. Within this population, 93 have diabetes mellitus and *multiple parameter correlation of PWV with each of MetS components in this population show a significant association with glucose metabolism impairment only.*

	MetS+	no diabetes	diabetes	p
	(n = 150)	(n = 57)	(n = 93)	
PWV (m/s)	13.74 ± 3.66	12.71 ± 3.49	14.35 ± 3.65	**0.0027**
PWV (m/s) (*)		12.94 ± 3.06	14.11 ± 2.99	**0.0259**
PWV (m/s) (*) & MetS_HDL		12.96 ± 3.15	14.15 ± 3.02	**0.0261**
PWV (m/s) (*) & MetS_WC		13.07 ± 3.50	14.22 ± 3.55	**0.0283**
PWV (m/s) (*) & MetS_TG		12.96 ± 3.07	14.08 ± 3.11	**0.0371**
PWV (m/s) (*) & MetS_HTA		13.79 ± 11.34	15.00 ± 15.06	**0.0227**
PWV (m/s) (*) & MetS_Glyc		12.93 ± 3.07	13.88 ± 4.98	*0.1484*

Conclusion:
MetS+ patients have a higher PWV than MetS- patients but this difference disappears after adjustment to classic factors.
Diabetic patients have a significantly higher PWV even after adjustment.
When performing multiple parameter relationship with different components of MetS, we find that only glucose metabolism impairment is independently and positively correlated to PWV.

P3.03
IMPACT OF SMOKING ON ERECTILE FUNCTION AND ARTERIAL STIFFNESS IN MIDDLE-AGED SMOKERS WITHOUT OTHER MAJOR CARDIOVASCULAR RISK FACTORS

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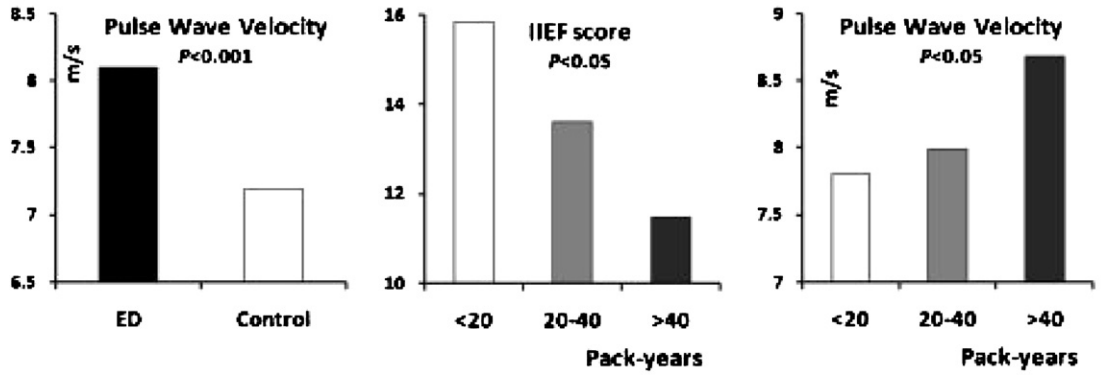
Purpose: Erectile dysfunction (ED) may be an early manifestation of generalized vascular disease. Cigarette smoking is an important modifiable cardiovascular risk factor and pathophysiological mechanisms may include a stiff vascular tree. The association of smoking with ED and functional changes in smokers without clinical atherosclerosis has not been defined yet.
Methods: 56 smokers without other major risk factors and with no clinical atherosclerosis who suffered from ED and 49 smokers without ED, matched for age, body mass index, systolic and diastolic blood pressure were studied. ED diagnosis and score were evaluated according to the International Index of Erectile Function (IIEF) questionnaire. Lower IIEF score indicates severe ED. Carotid-femoral Pulse Wave Velocity (PWV) was measured as an index of aortic stiffness and Augmentation Index (AIx) as a measure of wave reflections.
Results: PWV was higher in patients with ED than in the control group (left figure); AIx did not differ (26.7 vs 25.6%, p = NS). A linear inverse relationship between PWV and IIEF score was observed ($r = -0.39$, $p < 0.01$). In ED patients, smoking more than 40 pack years of cigarettes was associated



with a significant decrease in IIEF score and higher PWV values (middle and right figure). **Conclusions:** Aortic elastic properties but not wave reflections are impaired in current smokers with ED compared to men without ED. ED patients who reported smoking more than 40 pack years had a significant impairment of erectile function and aortic elastic properties. This finding suggests that this group of patients may be at greater cardiovascular risk.

P3.04
AORTIC STIFFNESS IS INDEPENDENTLY ASSOCIATED WITH WHITE COAT EFFECT

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Introduction: The difference between systolic blood pressure (SBP) measured in clinic and during the daytime phase of ambulatory BP measurement (ABPM) (Δclinic-day ABPM SBP) has been used as a measure of white-coat effect. We hypothesised that this was mediated through increased aortic stiffness resulting in greater increase in SBP from increased sympathetic activity in response to a hospital visit.
Methods: Patients enrolled in the Anglo-Cardiff Collaborative Trial between 2000-2009 underwent measurement of aortic stiffness by carotid-femoral pulse wave velocity (C-F PWV, Sphygmocor) and 24 h ABPM (Spacelabs-90207). Δclinic-day ABPM SBP was calculated. C-F PWV was adjusted for mean BP, and it was log-transformed for analysis due to non-parametric distribution.
Results: The total study population was 477 subjects, mean age 45 ± 20 years, 44.9% male, 1.6% diabetic and 33.3% current or ex-smokers. Mean clinic BP was $146 \pm 18/88 \pm 12$ and mean 24 h day ABPM was $137 \pm 13/83 \pm 1.1$ $_{Log}$C-F PWV correlated with Δ clinic-day ABPM SBP (rho = 0.13, $P < 0.01$) and there was a significant trend for increased $_{log}$C-F PWV with increased tertiles of increased Δclinic-day ABPM SBP ($P < 0.01$). In stepwise multivariate analysis, independent determinants of Δclinic-day ABPM SBP were $_{log}$C-F PWV, heart rate and age (total $R^2 = 0.11$, $P < 0.001$) while diabetes, gender, smoking and BMI were excluded.
Conclusion: Aortic stiffness is independently associated with the degree of rise of SBP between home and clinic in a population with a broad age range and low co-morbidity. This may have important implications for using clinic values of BP to guide antihypertensive treatment in patients with high aortic stiffness.

P3.05
ARTERIAL STIFFNESS MAY BE GREATER IN SOUTH ASIAN THAN AGE-MATCHED AFRICAN-CARIBBEAN MEN DESPITE SIMILAR PERIPHERAL OR CENTRAL BLOOD PRESSURE

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For given levels of blood pressure (BP), people with 'stiffer' (less distensible) large arteries develop more cardiovascular (CVS) events, as is typical of diabetes. South Asians (SA) develop excess mortality from all CVS disease, African-Caribbeans (AfC) lower overall mortality despite more hypertension & consequent strokes, with excess diabetes in both groups. To unravel these ethnic differences in events, we compared brachial & central BP and indices of arterial stiffness, as integrated markers of general risk factors, in samples of such men.
SA & AfC men aged 40-79y sampled from the European Male Ageing Study had aortic pulse wave velocity (aPWV) measured by a validated method (Arteriograph), and augmentation index (AIx) and estimated central BP by SphygmoCor and Arteriograph.
Mean (±SD) aPWV and AIx were higher among SA (n = 42, age: 54 ± 10 yr) than in AfC (n = 53, 53 ± 10 yr): 8.1 ± 1.3 vs. 7.5 ± 1.6 m/s (p = 0.04) and 19 ± 7 vs. $13 \pm 10\%$ (p = 0.002), respectively, despite marginally *lower* brachial BP (124/77 vs. 130/80 mmHg) or central systolic BP by SphygmoCor (116 vs. 118mmHg) or Arteriograph (126 vs. 127mmHg). R^2 for the PWV/BP relationship was 20% for AfC, and 33% for SA.
In multivariate analysis, aPWV was 0.6 m/sec lower in AfC ($p < 0.007$) adjusting for age, BP, diabetes status, lipid levels and body mass index. SA ethnicity also predicted higher AIx adjusted for these factors plus height.
Conclusion: For given levels of BP, SA men had higher aPWV/AIx than AfC. Arterial stiffness indices may describe total CVS risk better than distending pressures together with other standard RFs.

P3.06
VASCULAR FUNCTION IN HIV-1 (SUBTYPE C) POSITIVE BLACK SOUTH AFRICANS WITH AND WITHOUT ARV TREATMENT: A THREE YEAR PROSPECTIVE STUDY

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The objective was to study the changes in vascular function of HIV-1 (subtype C) infected black Africans over three years.
In a longitudinal study (2005-2008) we compared the vascular function of 140 HIV+ (newly diagnosed) black Africans from the North-West province, South Africa. Seventy seven of the same HIV+ participants, received by choice no ARV treatment while 63 received treatment. Systolic (SBP), diastolic (DBP) blood pressure, heart rate (HR) (Omron HEM 757), and the pulse wave velocity (PWV) (Complior SP device) were determined. Sonar images were obtained with the MicroMaxx sonar device. Blood was analyzed with known methods to determine total cholesterol, high density lipoprotein (HDL-c), low density lipoprotein (LDL-c), triglycerides (TG), glucose and C-reactive protein (CRP).
Blood pressure increased significantly (dependent T-test) if the HIV+ (2005) were compared to the 2008 participants (received ARV's). The PWV showed no significant changes in both groups. Although the weight stayed constant over three years, the waist circumference increased significantly in the ARV treated group. The HDL-c decreased significantly from 1.37 to 0.83 mmol/L in the treatment naive group and the HDL-c showed no changes in the treatment group compared to the 2005 participants. The CRP was high in both groups.
To conclude: the ARV treatment group showed lipodystrophy, an increase in blood pressure and a lower plaque score (6.5% vs 10.5%). It seems that ARV treatment stabilizes the lipids and results in a higher blood pressure, whereas in the treatment naive group a significant decrease in HDL − cholesterol over three years were encountered.