P10.6: ARTERIAL WAVEFORM MEASURES IN THE VITAMIN D ASSESSMENT (VIDA) STUDY: RELATIONSHIPS WITH LIFESTYLE AND CARDIOVASCULAR FACTORS

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in several population-based studies participating in the MARE (Metabolic syndrome and Arteries REsearch) Consortium the occurrence of specific clusters of MetS differed markedly across Europe and the US. The aim of the present study was to investigate whether specific clusters of MetS are consistently associated with stiffer arteries in different populations. We studied 20,570 subjects from 9 cohorts representing 8 different European countries and the US participating in the MARE Consortium. MetS was defined in accordance with NCEP ATPIII criteria as the simultaneous alteration in ≥3 of the 5 components: abdominal obesity (W), high triglycerides (T), low HDL cholesterol (H), elevated blood pressure (B), and elevated fasting glucose (G). PWV measured in each cohort was "normalized" to account for different acquisition methods. MetS had an overall prevalence of 24.2% (4985 subjects). MetS accelerated the age-associated increase in PWV levels at any age, and similarly in men and women. MetS clusters TBW, GBW, and GTBW are consistently associated with significantly stiffer arteries to an extent similar or greater than observed in subjects with alteration in all the five MetS components–even after controlling for age, sex, smoking, cholesterol levels, and diabetes mellitus–in all the MARE cohorts. In conclusion, different component clusters of MetS showed varying associations with arterial stiffness (PWV)

P10.2
ARE INTERMEDIATE ANKLE-BRACHIAL INDEX VALUES IMPORTANT IN HYPERTENSION? INSIGHTS FROM A LARGE COHORT OF NEVER-TREATED HYPERTENSIVES

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Objective: Ankle brachial index (ABI) is a diagnostic tool for peripheral arterial disease; moreover it has a prognostic value for future events. However, the role of intermediate ABI values (0.9 to 1.3) is still unclear. We investigated the interplay of intermediate ABI values with indices of subclinical organ damage in a large cohort of newly diagnosed, never treated hypertensives.
Design and Method: 1,127 newly diagnosed, never-treated hypertensives were recruited. ABI was measured with the oscillometric method and subjects with ABI <0.9 or >1.3 were not included. cfPWV, central BPs, AIx, left ventricular mass index (LVMI), CRP and eGFR were measured. The 10-year risk was calculated using the Framingham Risk Score.
Results: The cohort was young (age: 53±12 years old), with mild-moderate hypertension (systolic BP: 151±18 mmHg, diastolic BP: 90±11 mmHg) and mean ABI value 1.15±0.08. 57.7% were men, 41.3% smoked and 5.9% were diabetics. Left ventricular hypertrophy was detected in 42.2% and the 10-year CVD risk was 15.9±9.6%. ABI correlated with cfPWV, central systolic BP, AIx, LVMI and CRP (r: -0.182, -0.268, -0.195, -0.075, -0.152 respectively, p<0.01 for all). The 10-year risk increased with lower ABI values (r=-0.077, p<0.01). After adjusting for confounders, patients with LVH had higher ABI levels; lower ABI values were observed with worsening eGFR (Figure).
Conclusion: Intermediate ABI values carry prognostic information; they are related to large artery stiffness, impaired central hemodynamic indices, LVH, renal function impairment and 10-year risk of CVD. ABI measurements should be part of an integrated approach to hypertensive patients for both diagnostic and prognostic reasons.

P10.3
ARTERIAL STIFFNESS IS A BETTER PREDICTOR OF LEFT VENTRICULAR HYPERTROPHY THAN THE FRAMINGHAM RISK SCORE AND CENTRAL HEMODYNAMICS: INSIGHTS FROM 1,141 NEVER-TREATED HYPERTENSIVES

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Objective: Left ventricular hypertrophy (LVH) heralds target organ damage and calls for aggressive therapeutic approaches. We investigated the predictive ability of arterial stiffness, central hemodynamic indices and the Framingham Risk Score (FRS) for detecting LVH.
Design and Method: 1,141 newly diagnosed, never-treated hypertensives were recruited. cfPWV, aortic BPs and AIx were measured. Left ventricular mass index (LVMI) was calculated according to the Devereux formula. LVH was defined as LVMI >95 g/m^2 (women) and >115 g/m^2 (men). The 10-year risk for CVD was calculated using the FRS.

Results: The cohort was young (age: 53±12 years), with mild-moderate hypertension (BP: 151±18/ 90±11 mmHg). LVH was detected in 43% of patients and 10-year CVD risk was 16.1±9.7%. LVMI had a stronger correlation with cfPWV (r=0.39, p<0.001) compared to aortic SBP (r=0.33, p<0.001), pulse pressure (r=0.306, p<0.001) and AIx (r=0.121, p<0.001). After adjusting for diabetes mellitus presence, eGFR, aortic SBP, cholesterol and 10-year CVD risk, cfPWV remained an independent predictor of LVMI (R^2=0.243, B=1.60, p<0.001). In ROC analysis, cfPWV emerged as a better predictor of LVH (AUC: 0.735, p<0.001) compared to the FRS (AUC: 0.727, p<0.001), aortic SBP (AUC: 0.687, p<0.001), aortic pulse pressure (AUC: 0.705, p<0.001) and AIx (AUC: 0.649, p<0.001).
Conclusion: In newly diagnosed, never-treated hypertensives, cfPWV is associated with LVMI and is a better predictor of LVH than the FRS, aortic BPs and AIx. High cfPWV values signify target organ damage, which extends beyond large artery stiffness and herald LVH. This has implications for risk stratification and choice of antihypertensive therapy.

P10.4
EARLY LIFE PREDICTORS OF BLOOD PRESSURE IN AFRO-CARIBBEAN YOUNG ADULTS: THE JAMAICA 1986 BIRTH COHORT STUDY

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Objective: In this study we examined the effects of birth weight (BWT) and early life socioeconomic circumstances (SEC) on systolic and diastolic blood pressure (SBP, DBP) among Jamaican young adults.
Study Design and Setting: Longitudinal study of 364 men and 430 women from the Jamaica 1986 Birth Cohort Study. Information on maternal SEC at birth and BWT were linked to information collected at 18-20 years old. Sex-specific multilevel linear regression models were used to examine whether adult SBP and DBP were associated with BWT and maternal SEC.
Results: In unadjusted models, SBP was inversely related to BWT z-score in both men and women (beta = -0.82 and -1.18, respectively) but achieved statistical significance for women only. After adjustments for current age, current BMI, current height, maternal age and mother's occupation at child's birth, a one standard deviation (SD) unit increase in BWT was associated with 1.16 mmHg reduction in SBP among men (95%CI -2.15, -0.17; p=0.021) and a 1.34 mmHg reduction in SBP among women (95%CI -2.21, -0.47; p=0.003). High maternal occupational SEC at birth was consistently associated with lowest SBP across the standardized BWT distribution. SBP was 2-4 mmHg lower among those with high SEC mothers at birth than among those whose mothers were unemployed at birth.
Conclusion: SBP at 18-20 years-old was lowest among those whose mothers had high SEC at birth and was inversely related to BWT.

P10.5

WITHDRAWN

P10.6
ARTERIAL WAVEFORM MEASURES IN THE VITAMIN D ASSESSMENT (VIDA) STUDY: RELATIONSHIPS WITH LIFESTYLE AND CARDIOVASCULAR FACTORS

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Objectives: Identifying determinants of aortic waveform measures may help to define suitable strategies for improving arterial function. Our aim was to examine associations between lifestyle/cardiovascular risk factors variables and waveform measures as little is known about these.
Methods: Cross-sectional (baseline) analysis of 4830 adults aged 50-84 years participating in a vitamin D trial. Demographic and lifestyle variables were collected from questionnaires. Body mass index (BMI), cholesterol and brachial blood pressure (BP) were measured. Aortic systolic

BP (SBP), augmentation index (AIx), pressure waves (forward- and backward-travelling), and reservoir and excess pressures were calculated from aortic pressure waveforms derived from suprasystolic brachial measurement.

Results: After adjustment for covariates, BMI and total cholesterol had positive relationships with various arterial function measures, including peak reservoir pressure and aortic SBP (all P<0.0001). In a dose-dependent manner, frequency of heavy alcohol consumption (≥6 drinks/occasion) was positively associated with several waveform parameter levels, including excess pressure integral (P=0.0046), backward pressure amplitude (P=0.030), peak reservoir pressure (P=0.0009) and aortic SBP (P=0.0001). Smoking was associated with higher levels of various arterial function measures, including excess pressure integral (P=0.0008), AIx (P=0.0012) and aortic SBP (P=0.027). All of these risk factors were positively related to brachial SBP (P=0.046 to <0.0001).

Conclusions: New lifestyle/cardiovascular risk factor variations in arterial function measures were identified. Our findings indicate that BMI, smoking, cholesterol and heavy alcohol consumption may contribute to higher central BP, elevated wave reflections and increased pressure associated with excess ventricular work. Implementing lifestyle interventions to reduce these factors may improve arterial function.

P10.7
CHARACTERISTICS OF CENTRAL HAEMODYNAMICS AMONG NIGERIANS: RESULT OF A PILOT STUDY

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Introduction: Central haemodynamics measured as central pulse pressure (CPP), augmentation pressure (AP) and augmentation index (Aix) have independent predictive value for cardiovascular events and mortality. There is no previous report on the properties of central arteries of healthy Nigerians.
Objectives: To determine the clinical characteristics of central haemodynamics among Nigerians.
Methodology: In the framework of the ongoing Nigerian Population Research on Environment, Gene and Health (NIPREGH), we measured CPP, AP and Augmentation index adjusted to a heart rate of 75 beats /min (Aix@ 75) by applanation tonometry of the radial artery using SphygmoCor device.
Result: NIPREGH pilot population included 295 participants (47.1% women, mean age 40.6 years).Women as compared to men had higher AP(6.92 vs 4.35mmHg; p<0.0001), higher Aix@ 75(18.96 vs 10.04; p<0.0001) but similar CPP(30.65 vs 29.97mmHg; p>0.05).All arterial measurements increases with age. After adjustment for cofounding variables, AP increases less with age in men (p<0.05) than women whereas the relation of CPP (p >0.87) and Aix@75 (p> 0.07) were similar in both sexes.
Conclusion: Obtained parameters provide preliminary insights into the properties of aorta in a healthy population of Black Africans of Nigerian origin.

P10.8
CENTRAL BUT NOT BRACHIAL PRESSURE LINKED TO RBCS IN YOUNG NORMOTENSIVE INDIVIDUALS

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Background: Large epidemiological studies confirm that brachial BP is positively related to red blood cell (RBC) count, hematocrit and hemoglobin. Despite several mechanisms being put forward, there are not yet a clear understanding on the interactions between erythrocytes and the arterial wall. Recent studies suggest BP lowering functions of RBCs by demonstrating that erythrocytes carry endothelial NO synthase, and that RBCs release ATP that triggers NO release. We assessed how central and brachial pressures, as well as arterial stiffness relate to RBC indices in healthy conditions within a young normotensive bi-ethnic population.
Methods: We included 328 black and white men and women aged 20-30 yrs. We performed full blood counts and assessed brachial (bSBP, DBP, Dinamap Procare 100) and central pressure (cSBP) and pulse wave velocity (PWV; Sphygmocor XCEL).
Results: Black participants (N=121) aged 25.2 yrs had higher bSBP (117/80 mmHg vs 113/77 mmHg) and cSBP (110 vs 105 mmHg) than white participants (N=207) aged 26.1 (all p≤0.001), with similar RBC counts (p=0.40). In

multivariable-adjusted regression analyses cSBP related positively to RBC count in both groups (black: β=0.24; p=0.045; white: β=0.24; p=0.006) - not seen for bSBP (black: β=0.09; p=0.36; white: β=0.03; p=0.68). Only the black group showed independent associations of DBP with RBC count and hematocrit (p≤0.002), whereas PWV did not relate to RBC indices in any group.
Conclusions: We found that cSBP, but not bSBP, is positively associated with RBC count in a young normotensive bi-ethnic sample, suggesting that central haemodynamics may be more affected by increasing RBCs.

P10.9
INTERACTION BETWEEN STROKE VOLUME AND PERIPHERAL VASCULAR RESISTANCE IN DEFINING SYSTOLIC BLOOD PRESSURE IN YOUNG ADULTS

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Background: Isolated systolic hypertension (ISH) is the most common form of high blood pressure (BP) in young adults and is associated with elevated stroke volume (SV), especially in males. However, not all young adults with high SV have high systolic BP (SBP). We sought to examine the haemodynamic factors that distinguish between levels of SBP in individuals with high SV.
Methods: Detailed haemodynamic measurements including brachial BP, SV and peripheral vascular resistance (PVR) were available in 2671 individuals (1303 males) aged 18-40 years. Data were stratified by gender and tertile of SV. In a subset of 89 individuals (51 males), haemodynamic measurements were repeated prior to, during and after low-level exercise on a cycle ergometer.
Results: In males and females with in the highest tertile of SV, a higher PVR was associated with increased SBP (P<0.001, males; P=0.003, females). In addition, multivariable regression analyses showed a significant, positive association between SBP and the interaction between SV and PVR (P<0.001), after adjustment for age and gender. A higher resting PVR was also associated with higher SBP during low-level exercise (r=0.3, P=0.05) and at 5 mins post-exercise (r=0.3, P=0.02) in males.
Conclusion: For a given level of SV, PVR distinguishes between different levels of SBP in young adults. PVR also appears to influence the SBP response to low-level exercise in males. The underlying mechanisms require further investigation.

P10.10
RISK FACTORS ACCELERATE VASCULAR AGING: RESULTS FROM THE CARDIOVASCULAR RISK FACTORS AFFECTING VASCULAR AGE (CRAVE) STUDY

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Objectives: Vascular aging, as assessed by structural and functional properties of the arteries, is an independent indicator of cardiovascular risk. We investigated the effect of cardiovascular risk factors (RFs) on the progression of vascular aging.
Methods: 142 subjects (mean age 51.9±10.8 years, 94 men) with no established cardiovascular disease were investigated in 2 examinations over a 2-year period. Subjects were classified at baseline according to their number of cardiovascular RFs (from zero to two and more). The RFs were hypertension, dyslipidemia, smoking and diabetes. Subjects had at the beginning and end of the study determinations of carotid-femoral pulse wave velocity (cfPWV), aortic augmentation index corrected for heart rate (AIx75), brachial flow-mediated dilatation (FMD) and carotid intima-media thickness (cIMT). Based on these measurements the annual absolute changes were calculated.
Results: Subjects with more RFs had a gradual higher annual progression of cfPWV (0.089 m/s/year for no RF, 0.141 m/s/year for 1 RF and 0.334 m/s/year for more than 2 RFs; p=0.009) after adjusting for relevant confounders. Annual progression of AIx75 was statistically different between groups when only subjects ≤55 years where considered (1.17%/year for no RF, 1.52%/year for 1 RF and 3.15%/year for more than 2 RFs, p=0.045). Subjects with more RFs did not show an association with a gradual higher annual deterioration of FMD or cIMT. There was also a trend for a statistical association between the annual rate of PWV and FMD (P=0.07)