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

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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 ($\geq$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$\leq$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$\leq$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$\pm$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 $\leq$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)

Conclusions: The presence of more classical RFs is associated with accelerated progression of vascular aging.

P10.11
MEAN ARTERIAL PRESSURE IS A STRONGER PREDICTOR OF STROKE IN SOUTH ASIAN THAN EUROPEAN MEN, INDEPENDENT OF OTHER CARDIOMETABOLIC RISK FACTORS; THE SABRE STUDY

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Background: Stroke risk is greater in South Asians than Europeans. We sought to compare associations between blood pressure (BP) and stroke by ethnicity and determine how BP contributes to ethnic differences in disease.
Methods: Population sample of 1510 European and 1195 South Asian men recruited between 1988-1991, mean age 52 ± 7yrs. Incident fatal and non-fatal strokes were captured over 20 years of follow-up. Cox models demonstrated associations between mean arterial BP (MAP) and stroke.
Results: South Asians had more incident strokes than Europeans (5.6 (4.7,6.7) versus 4.7 (4.0,5.6) per 1000 person years, age-adjusted hazard ratio:1.40 (1.08,1.76), p=0.01) and higher MAPs than Europeans (97 ± 12 versus 93 ± 12mmHg, p<0.0001).
MAP was more strongly associated with stroke in South Asians than Europeans, (HR (95% CI): 1.59(1.35,1.86) versus 1.19(1.00,1.43) respectively, ethnicity interaction p=0.03), even accounting for receipt of anti-hypertensive medication (1.57(1.32,1.86 versus 1.10(0.91,1.32), interaction p=0.03). The ethnic difference in impact of MAP diminished after further adjustment for smoking, waist circumference, HDL, fasting glucose, HOMA2-IR, HbA_{1c} and heart rate (1.40(1.12,1.75) versus 1.15(0.92,1.42), interaction p=0.24). However, the greater effect of MAP on stroke in South Asians persisted when this latter model was restricted to people not receiving anti-hypertensive medications, (1.57(1.26,1.96) versus 1.08(0.85,1.37), interaction p=0.02).
Adjustment for MAP could not account for the excess stroke risk in South Asians (1.27 (1.00, 1.62) p=0.05), nor could other risk factors.
Conclusions: MAP had a greater impact on stroke risk in South Asians than Europeans, but could not account for their excess stroke risk, alone or in conjunction with additional risk factors.

P10.12
AORTIC STIFFNESS IS AN INDEPENDENT DETERMINANT OF LEFT VENTRICULAR DIASTOLIC DYSFUNCTION IN METABOLIC SYNDROME PATIENTS

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Aim: Of this study was to evaluate the relationship of arterial stiffness and left ventricular diastolic dysfunction(LVDD) in metabolic syndrome(MetS) patients.
Methods: A cross-sectional study was carried among 1208 MetS subjects (aged 54 ± 6, 65% women, 92% hypertensive). According to the heart ultrasound findings, patients were divided into three groups: with relaxation abnormalities (GR1, n=406, LV end-*diastolic diameter(LVdd)* 5.02 ± 0.49cm), with pseudonormalisation (GR2, n=713, LVdd 5.09 ± 0.5cm) and without LVDD (LVDD-, n=89, LVdd 4.95 ± 0.43cm). Arterial stiffness parameters (carotid to femoral pulse wave velocity (cfPW) and aortic augmentation index (AIxHR75) were assessed by applanation tonometry.
Results: In comparison to LVDD- patients, LVDD+ patients were older (55 ± 6vs 51 ± 6), had higher cfPWV (GR1 8.9 ± 1.66, GR2 8.77 ± 1.57vs 7.9 ± 1.34m/s), AIxHR75 (GR1 25.5 ± 10.42; GR2 24.7 ± 10.2vs $19,7\pm10$), mean arterial pressure(MAP) (GR1 108 ± 12.7; GR2 107.6 ± 12.2vs 101 ± 10mmHg), mean carotid intima-media thickness(IMTmean) (GR1 $0,651\pm0,098$; GR2 $0,656\pm0,107$vs. $0,619\pm0.09$mm), heart rate (LVDD+ 66 ± 10vs. 61 ± 9bpm), left ventricular mass index(LVMI) (LVDD+ 109 ± 24vs. $97,1\pm22$g/m^2), body mass index(BMI) (LVDD+ 32 ± 5vs 30 ± 4 kg/m^2, all p<0.05).
We found significant correlations between arterial stiffness and diastolic function parameters, such as ratio of early to late transmitral pulse Doppler velocities(E/A) (rcfPWV=-0.19, rAIxHR75=-0.15, p<0.05), early diastolic

mitral annular velocity(E') (rcfPWV=-0.25, rAIxHR75=-0.18, p<0.05), and E/E' ratio (rcfPWV=0.17, rAIxHR75=0.14, p<0.05). In multiple regression analysis, gender, MAP, LVMI, heart rate and cfPWV remained significant determinants of E/E'parameter, explaining 18% of its variability(p<0.05).
Conclusion: Carotid to femoral pulse wave velocity, an index of aortic stiffness, is a significant and independent determinant of the LVDD in subjects with metabolic syndrome.

P10.13

WITHDRAWN

P10.14
AORTIC PULSE WAVE VELOCITY IS AN INDEPENDENT CARDIOVASCULAR EVENT PREDICTOR IN HIGH CARDIOMETABOLIC RISK GROUP

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Aims: The aim was to assess if arterial stiffness, indexed as aortic pulse wave velocity (PWV), is a viable CVD risk prediction variable in high cardiometabolic risk population.
Methods and results: We studied 4259 high-risk patients (36.2% male), on average having $3,49\pm1,05$ metabolic syndrome components(18% having 5), as per NCEP ATPIII criteria. Starting from 2007, patients were observed and investigated in a single specialized cardiology center. The outcome follow-up was performed using national death registry and national healthcare fund database. CVD events during the follow-up included fatal or non-fatal myocardial infarction (MI) or stroke. Mean age of the study population was $54,13\pm6,23$ with no significant difference between the event free group(EFG) vs. the event group(EG) with at least one CVD event(n= 129) during the follow-up, which was $1389,3\pm625,73$ days. Comparing the two groups, aortic PWV was $8,8\pm1,6$(EFG) vs. $9,41\pm2$(EG), p<0.001, mean aortic pulse pressure(Ao_PP)$43,28\pm11,02$(EFG) vs. $46,25\pm12,32$(EG), p=0.003, mean aortic blood pressure(MeanBP_Ao) $106,69\pm12,45$(EFG) vs. $111,07\pm16,6$(EG), p<0.001.
In logistic regression model, aortic PWV remained a strong independent CVD event predictor. Odds ratio (OR) for CV event is 1.387(95% CI 1,182; 1,627, p<0,001). Comparing cumulative proportion survival rate between the 3rd vs. 1st tertile(PWV <8m/s vs. PWV >=9.3m/s) of aortic PWV the OR for CVD event was 1,748 (95% CI 1,135; 2,691, p=0.011).
Conclusion: Aortic PWV remained a strong CVD event predictor in univariate as well as multivariate stepwise logistic regression models. Survival analysis confirmed it as a viable CVD prediction indicator, to be considered including it into widely used CVD risk assessment tools, especially for high CVD risk group.

P10.15
THE RELATION BETWEEN HYPERTENSION AND DIFFERENT DEMOGRAPHIC DATA AMONG HYPERTENSIVE SUDANESE PATIENTS

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According WHO data April 2011Hypertension Deaths in Sudan reached12,281of total deaths. The age adjusted Death Rate is 67.67per100,000of population and ranks Sudan#17 in the world.
Objective: aimed to detect the relation between hypertension and certain demographic data in Sudanese hypertensive patients.
Method: Data was collected from222 hypertensive patients via structured questionnaire and analyzed using SPSS.
Results: males are more than females(males 66.2%).The most affected age group was 41- 60(61.1%). The most affected geographical area North(62.3%) followed by the East(23.9%), and the least affected region was found to be the South(6.6 %). Married subjects were more than singles(89.2%)of the total study population, study doesn't denote whether the diagnosis of hypertension was made before or after marriage. 93.2% of the study sample lived with their families. The study revealed that only 71.6%of the study sample had good compliance to treatment, patients with negative family history (who constituted 28.4%)showed better compliance to treatment and scheduled follow up visits(78.04%of the patients with negative family history) than those with positive family history where 67.8% of them showed better compliance. The study shows