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P6.9: MEASURING ARTERIAL STIFFNESS USING POPMETRE® IN THE AFRICAN HETEROZYGOUS AND HOMOZYGOUS SICKLE CELL DISEASE

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P6.5 EFFECTIVENESS OF FACEBOOK FOR PARTICIPANT RECRUITMENT INTO A BLOOD PRESSURE RANDOMISED CONTROLLED CLINICAL TRIAL

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Background: The cost of conventional advertising to recruit participants for clinical trials is expensive and can be ineffective. Social media may be a useful tool to improve participant recruitment. This study evaluated the use of Facebook advertising to recruit participants into a clinical trial.

Methods: Conventional advertisements (newspaper, radio, posters in doctors clinics) were employed for the first 20 months of a clinical trial conducted in the Australian capital cities of Hobart, Brisbane and Canberra. With dwindling participant recruitment, a Facebook advertising campaign, targeting 18 to 69 year olds currently taking blood pressure medication was employed in each city. Campaigns were broadcast intermittently over a four month period, with recruitment results compared to those using conventional methods in the previous 20 months.

Results: Facebook advertisement resulted in a significant increase in the number of participants recruited per month among the Canberra and Hobart sites (from 4.1/month to 7.0/month; $p < 0.05$). However, participant recruitment remained unchanged (and low) at the Brisbane site (2.4/month to 2.6/month; $p = 0.89$). Despite a greater population reach in Brisbane ($n = 91,828$) compared with Canberra ($n = 71,343$) and Hobart ($n = 52,647$), the number of clicks onto the advertisement in Brisbane was equal to other sites ($n = 2757$, $n = 2521$, $n = 2991$ respectively). Several attempts were made to improve the Facebook advertising strategy in Brisbane, but with no effect.

Conclusion: Facebook advertisement can be a successful tool to increase participant recruitment into a blood pressure clinical trial, but effectiveness appears to be location-dependent.

P6.6 NITROGLYCERIN IMPROVES SYSTOLIC MYOCARDIAL EFFICIENCY

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Introduction: Nitroglycerin (NTG) has a particularly marked action to reduce augmentation pressure (cAP), attributed to a reduction in timing or amplitude of pressure wave reflection. However, a recent study suggests that cAP is determined in large part by ventricular contraction/relaxation dynamics. We examined whether the reduction in cAP induced by NTG is associated with a change in left ventricular (LV) systolic function.

Methods: We estimated myocardial wall stress from transthoracic echocardiographic imaging of the LV and LV pressure estimated from carotid tonometry during systole. Eighteen subjects aged 43.0 ± 11.9 (mean \pm SD) years were studied before and 7-12 min after NTG (400 μ g sublingually). Carotid pressure calibrated by mean and diastolic blood pressure was used to calculate time-varying LV wall stress from endocardial and epicardial volumes obtained from wall tracking analysis. Tissue Doppler Imaging (TDI) S wave (a measure of LV systolic function) was measured at the basal mitral annulus from an echocardiographic 4-chamber view.

Results: NTG decreased cAP from 16.3 ± 3.6 to 4.5 ± 2.9 mmHg (means \pm SEM, $P < 0.0001$) and central systolic blood pressure decreased by a similar amount. Time to peak MWS decreased from 115.9 ± 10.9 to 86.8 ± 4.6 ms ($P = 0.024$). This difference persisted after adjustment for change in heart rate and blood pressure ($P = 0.017$). TDI S wave increased from 3.1 ± 0.3 to 4.0 ± 0.4 cm/s ($P = 0.017$). By contrast, NTG had no significant effect on ejection fraction or stroke volume.

Conclusion: NTG reduces cAP and improves the efficiency of myocardial contraction with a reduction in time to peak MWS.

P6.7 DETERMINANTS FOR DIFFERENCES IN CENTRAL SYSTOLIC BLOOD PRESSURE CAUSED BY DIFFERENT CALIBRATION METHODS

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Introduction: There are known issues and ongoing discussions regarding calibration methods using peripheral mean and diastolic or peripheral systolic

and diastolic pressure for the determination of central systolic blood pressure. The aim of this cross-sectional study is an analysis of determinants for the differences in central systolic blood pressure between the two calibration methods.

Methods: All measurements were obtained with the Mobil-O-Graph 24h PWA monitor calibrated with both calibration methods within the ISAR hemodialysis study. Measurement started after a short dialysis interval prior to dialysis and lasted for 24-hours. Peripheral and central systolic blood pressures were averaged. 345 patients (231 male / 114 female; 65 ± 15 years) were included and grouped according to peripheral systolic blood pressure and one of the following factors: age, sex, body-mass-index, diabetes mellitus, length of dialysis and coronary artery disease.

Results: There is a significant influence of age, diabetes mellitus, and coronary artery disease, but not of sex, body-mass-index and length of dialysis. Exemplarily, significant differences in central systolic blood pressure were 12.5 ± 7.3 (pSBP ≤ 130 mmHg, no diabetes mellitus), 17.0 ± 9.9 mmHg (pSBP ≤ 130 mmHg, diabetes mellitus), 18.6 ± 11.3 mmHg (pSBP > 130 mmHg, no diabetes mellitus) and 26.1 ± 16.2 (pSBP > 130 mmHg, diabetes mellitus).

Conclusions: These findings enhance our understanding of the differences in the two calibration methods. These results are generally assumed to play a role in future risk classification. It is suggested that the association of these factors is investigated in future studies.

P6.8 COMPARISON OF CENTRAL BLOOD PRESSURE ESTIMATED BY UPPER-ARM CUFF-BASED DEVICE WITH RADIAL TONOMOMETRY

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Background: New techniques that measure central blood pressure (BP) using an upper arm cuff-based approach require assessment for performance. The aim of this study was to compare a cuff-based device (Cuff_{CBP}) to estimate central BP indices [systolic BP, diastolic BP, pulse pressure (PP), augmentation pressure (AP), augmentation index (AIx)] with the non-invasive reference standard of radial tonometry (Ton_{CBP}).

Methods: Consecutive Cuff_{CBP} (SphygmoCor XCEL) and Ton_{CBP} (SphygmoCor 8.1) duplicate recordings were measured at seated rest in 182 people with treated hypertension (aged 61 ± 7 years, 48% male). Agreement of estimated central BP indices between methods was assessed using standard calibration of brachial (Cuff_{CBP}) and radial (Ton_{CBP}) waveforms with brachial systolic BP and diastolic BP (measured with the XCEL device), as well as by re-calibration with brachial mean arterial pressure (MAP) and diastolic BP.

Results: The mean difference \pm SD for systolic BP, diastolic BP, and PP between Cuff_{CBP} and those derived from Ton_{CBP} were -0.89 ± 3.48 mmHg (intra-class correlation [ICC] = 0.98, $p < 0.001$), -0.50 ± 1.54 mmHg (ICC = 0.99, $p < 0.001$), and -0.42 ± 3.57 mmHg (ICC = 0.97, $p < 0.001$), indicating good agreement. Wider limits of agreement were observed for AP and AIx (0.91 ± 5.31 mmHg, ICC = 0.75, $p < 0.001$; -0.99 ± 10.91 , ICC = 0.75, $p < 0.001$). Re-calibration with MAP and diastolic BP resulted in an overestimation of systolic BP with Cuff_{CBP} compared with Ton_{CBP} (8.58 ± 19.06 mmHg, ICC = 0.14, $p = 0.045$).

Conclusion: Central systolic BP, diastolic BP and PP derived from Cuff_{CBP} are substantially equivalent to Ton_{CBP}, although the level of agreement is dependent on calibration method. Further validity testing of Cuff_{CBP} by comparison with invasive central BP will be required.

P6.9 MEASURING ARTERIAL STIFFNESS USING POPMETRE® IN THE AFRICAN HETEROZYGOUS AND HOMOZYGOUS SICKLE CELL DISEASE

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Aim: The sickle cell trait (SCT) is the heterozygous and benign form of the homozygous SC disease (SCD). Although SCT exhibits hemorheological disturbances and increased oxidative stress, its exact role in the development of

cardiovascular disease in SCT remains to be determined. The present study sought to determine the arterial stiffness, an independent marker of sub-clinical atherosclerosis, between SCT and trained SCD.

Materials and methods: Twelve SCT (43±11yrs, 6 males) were compared to 14 trained younger SCD (29±9yrs, 2 males) and 26 controls with normal hemoglobin (36±11rs, 13 males). Aortic (AoStiff-Physioflow) and peripheral arterial stiffness (pOpmetre-Axelle-France) assessed by foot-to-toe pulse wave velocity (ft-PWV), blood pressure (BP) and Framingham-Laurier cardiovascular risk score (CVR in %) were measured in each group.

Results: SCT exhibited stiffer arteries (AoStiff: 5.8±0.71 m/s, ft-PWV: 10.9±6.2 m/s) than controls (AoStiff = 4.8±0.5 m/s, ft-PWV: 7.7±2.6 m/s) and SCD (AoStiff = 4.9±0.6 m/s, p=0.001, ft-PWV: 6.1±0.9 m/s p=0.003). SCT were older (p=0.001) than controls and SCD. The systolic and mean AP were lower in SCD than controls and SCT. In the whole group, the CVR score was the major contributor to PerStiff ($r^2=0.402$, $p<0.0001$) while AoStiff was mainly associated to the hemoglobin abnormalities ($r^2=0.291$, $p<0.0001$).

Conclusion: Both central and peripheral arterial stiffness are increased in SCT compared to SCD. Our data suggest that hemoglobin abnormalities and CVR play a differential role in the observed changes.

P6.10

ALCOHOL INTAKE IS ASSOCIATED WITH 24-HOUR AORTIC BLOOD PRESSURE IN A YOUNG HEALTHY STUDENT COHORT

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Objective: Increased brachial (bBP) and aortic blood pressure (aBP) have been linked to increased arterial stiffness and cardiovascular risk in older individuals. Literature suggests that increased alcohol intake is associated with increased BP both acutely and long term in older adults and heavy alcohol drinkers. However, the effects of alcohol intake on 24-hour BP and aBP in young healthy adults remains unclear. The purpose of this study was to explore the relationship between weekly alcohol intake and 24-hour BP in a young healthy student cohort.

Methods: Forty-three (11 male, aged 24±5 yrs) healthy students were recruited. Age, height and weight were recorded and weekly alcohol intake reported via self-assessment questionnaire. 24-hour bBP and aBP were measured using the Mobil-O-Graph (IEM, Germany). Aortic BP was calculated using two calibration methods: brachial systolic and diastolic pressures (syst-cal) and mean and diastolic pressures (MAP-cal).

Results: 24-hour aSBP was associated with weekly alcohol consumption, using both calibration methods ($r = 0.411$, syst-cal; $r = 0.54$, MAP-cal; both $P < 0.05$). In addition, 24-hour night-time aSBP (MAP-cal) was associated with weekly alcohol consumption ($r = 0.39$; $P < 0.05$).

Conclusion: Increased alcohol intake in young healthy students is associated with increased 24 hour and night-time aSBP. These data suggest that excessive alcohol intake at an early age could potentially increase cardiovascular risk via detrimental effects on the vascular system. Larger, longitudinal data are needed to investigate these associations further.

P6.11

THE FRAMINGHAM RISK SCORE IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Background: Patients with chronic obstructive pulmonary disease (COPD) have increased risk of cardiovascular (CV) events and mortality beyond that attributable to smoking. Increased arterial stiffness has been identified in COPD, however its prognostic value has not been established. The Framingham risk score provides a validated estimate of an individual's future CV risk. We hypothesised that patients with COPD would have greater Framingham risk score and aPWV than controls and that aPWV would relate to the Framingham risk score.

Methods: At baseline 524 patients with COPD and 143 controls (free from lung disease) were assessed for; lung function (forced expiratory volume

(FEV₁), forced vital capacity (FVC) and their ratio), BMI, blood pressure (BP) and aPWV. In addition, medical and smoking history were recorded and used to calculate the Framingham risk score and vascular age.

Results: Patients and controls were similar in age, gender and BMI, but patients had greater aPWV, Framingham risk score and vascular age which remained after adjustment for age, and MAP. In COPD, Framingham risk related to age $r=0.295$, aPWV $r=0.234$, SBP $r=0.194$ and FEV₁% predicted $r=0.112$, (all $p<0.01$). In controls, Framingham risk score related only to age $r=0.383$, aPWV $r=0.189$ and systolic BP $r=0.195$ $p<0.05$.

Conclusions: The association between the Framingham risk score and aPWV suggests that either may be useful to identify individuals with COPD at risk of future CV events. Further follow-up of this cohort will evaluate the prognostic utility of these measures of CV risk.

P6.12

AORTIC AND LOCAL CAROTID STIFFNESS: RELATIONSHIP WITH CARDIAC AND VASCULAR ORGAN DAMAGE IN A GENERAL POPULATION SAMPLE IN NORTHERN ITALY

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Background: Carotid-femoral pulse wave velocity (aoPWV), the gold-standard measurement of arterial stiffness, has been found associated with cardiac and vascular organ damage. Less information is available with regard to the correlation between local carotid stiffness (CS) and cardiac and vascular preclinical damage.

Aim: of the study was to analyse the correlation between aoPWV and CS and cardiac and vascular preclinical organ damage in a middle age general population in Northern Italy (Vobarno Study).

Methods: 245 subjects (57%female, age 56±4 years) underwent laboratory examinations, clinic and 24 hours BP measurement, cardiac and carotid ultrasound, aoPWV measurement (Complior-system). CS was determined from the relative stroke change in diameter (measured with a high-resolution echotracking system) and carotid pulse pressure (measured with applanation tonometry) and was expressed in the same dimensions as pulse wave velocity (m/s).

Results: Both aoPWV and CS were significantly related with age ($r=0.29$, $p<0.001$ and $r=0.23$, $p<0.001$, respectively). A positive correlation was observed with clinic and 24 hours blood pressure parameters and both aoPWV and CS. AoPWV was significantly related to left ventricular mass index (LVMI, $r=0.20$, $p<0.05$), and was significantly higher in subjects with LV hypertrophy (LVMI>115 g/m² in men and >95 g/m² in women) as compared to subjects without LVH (9.1±1.5 vs 8.5±1.4 m/s, $p<0.05$). On the contrary, CS was not related with LVMI and no difference in CS was observed between subjects with or without LVH (6.5±1.5 vs 6.3±1.2, $p=ns$). AoPWV was also significantly related to vascular organ damage (carotid IMT Meanmax: $r=0.16$, $p<0.05$; CBMmax: $r=0.16$, $p<0.05$; Tmax: $r=0.19$, $p<0.005$), while CS was not.

Conclusion: Although carotid-femoral pulse wave velocity (AoPWV) and carotid stiffness provided similar information on the impact of aging and blood pressure on large artery stiffness, only AoPWV, and not CS, is related to cardiac (LVM) and vascular (IMT) damage in a general population sample.

P6.13

AMBULATORY AND OFFICE CENTRAL SYSTOLIC BLOOD PRESSURE IS MORE CLOSELY ASSOCIATED WITH LEFT VENTRICULAR MASS THAN AMBULATORY AND OFFICE PERIPHERAL SYSTOLIC BLOOD PRESSURE IN A YOUNG NORMOTENSIVE POPULATION

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Background: High blood pressure (BP) at a young age and increased left ventricular mass (LVM) are associated with increased risk of future cardiovascular mortality. In addition, ambulatory 24-hour central systolic BP (24cSBP) is more closely associated with LVM than either 24-hour peripheral SBP (24pSBP) or office measurements of pSBP and cSBP. However these associations have only been observed in older hypertensive patients. The purpose of this study was to determine (1) if BP was associated with LVM, and (2) which