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P6.5: ANTI-INFECTIVE PERIODONTAL THERAPY IS ASSOCIATED WITH IMPROVEMENT OF ARTERIAL STIFNESS AND PULSE WAVE REFLECTION

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Results: As expected, eGFR fell from 85 ± 18 ml/min at baseline to 59 ± 12 ml/min, 12 months post-donation ($P < 0.001$). Clinic BP was $123 \pm 15/79 \pm 9$ mmHg at baseline and $126 \pm 14/75 \pm 9$ mmHg, 12 months post-donation ($P = 0.09$ and $P < 0.001$ for systolic and diastolic BP, respectively). There was no change in aPWV from baseline, 12 months following donation (7.33 ± 1.53 m/s versus $7.35 \pm 1.1.58$ m/s, $P = 0.8$).

Conclusion: These data demonstrate that it is feasible to recruit patients undergoing living-donor nephrectomy and to examine the effects on aortic stiffness up to 12 months following donation. Moreover, the results provide important data on which to base larger studies aimed at investigating longer-term effects of kidney donation on aortic stiffness and cardiovascular health.

P6.1 EVALUATION OF ARTERIAL STIFFNESS INDICES AND CENTRAL HEMODYNAMICS IN HEALTHY NORMOTENSIVE VOLUNTEERS AND IN TREATED OR UNTREATED HYPERTENSIVE PATIENTS IN AMBULATORY CONDITIONS

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Central blood pressure (BP) and various vascular indices estimated non-invasively over a 24-hour period were compared between normotensive volunteers and hypertensive patients by an innovative technology of pulse wave analysis, integrated in a BPLab ambulatory blood pressure monitoring (ABPM) system. Digitalized waveforms obtained during each brachial oscillometric BP measurement were stored in the device memory and then post-processed using software with Vasotens technology running on a personal computer. Averages for the whole 24-hour period and for the awake and asleep subperiods were computed. A total of 142 normotensive healthy subjects and 661 hypertensive patients were analyzed. 24-hour central BP, aortic pulse wave velocity (PWV) and augmentation indices (AI) were significantly higher in the hypertensive than in the healthy subject group (119.3 vs. 105.6 mmHg for systolic BP, 75.6 vs. 72.3 mmHg for diastolic BP, 9.8 vs. 9.2 m/sec for PWV, -9.7 vs. -40.7 for peripheral AI and 24.7 vs. 11.0 for aortic AI), whereas reflected wave transit time (RWTT) was significantly lower in patients with high BP (126.6 vs. 139.0 ms). After adjusting for age, gender, body mass index and 24-hour BP levels, a statistically significant between-group difference was still observed for 24-hour RWTT (127.5 ms hypertensives vs. 134.5 ms normotensives, $p = 0.0001$) and 24-hour peripheral AI (-14.1 vs. -20.0 , $p = 0.005$). All estimates of vascular health displayed a typical circadian rhythm. Thus the estimation of arterial stiffness and central hemodynamics by the BPLab device represents an effective tool for an evaluation of vascular damage in hypertensive patients in dynamic condition.

P6.2 SYSTEMATIC REVIEW OF RESULTS OF KISSING STENTS IN THE TREATMENT OF AORTOILIAC OCCLUSIVE DISEASE

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Introduction: Severe stenosis or occlusion of the aortoiliac bifurcation is typically treated with open surgery. Patency results of aorto-bifemoral bypass are up to 90% at 5 years. However, the number and severity of complications seem to have reached a plateau level. A less invasive technique, the kissing stent (KS) is available nowadays. The goal of this review was to give an overview of the current results and status of the kissing stent technique.

Method: The Scopus® search engine was used to retrieve articles concerning KS, this retrieved 78 abstracts, 60 were rejected and 4 more were rejected after full text screening. One article was included after cross referencing. After a quality check, data was extracted for further analysis.

Results: 810 patients (72.8% Rutherford classification of 1/2/3) were included. The most prevalent risk factor was hypertension (37.5-96%) and 50% of patients were treated for TASC C & D lesions. Overall the technical success rate was 98.2%. Procedural protocols greatly differed on applying protrusion and pre or post dilatation. Clinical improvement at 30 days was achieved in 89.9%. Primary patency at 12, 24, and 36 months was 88.8%, 78.9 and 68.5, respectively. A complication rate of 11% was reported, of which most are minor. No detailed analysis could be performed because individual patient data are lacking.

Conclusion: KS treatment of aortoiliac disease is related with only minor complications and acceptable midterm patency results, this can however not surpass the results seen with open surgery.

P6.3 MODERATE INTENSITY EXERCISE AORTIC RESERVOIR PRESSURE INDEPENDENTLY PREDICTS LEFT-VENTRICULAR MASS INDEX: ONE-YEAR PROSPECTIVE STUDY IN PATIENTS WITH TREATED HYPERTENSION

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Background. Moderate intensity exercise blood pressure (BP) is associated with adverse cardiovascular outcomes. The mechanisms of this association are unknown but may be due to central haemodynamic factors. This study sought to determine the relation between moderate-exercise central haemodynamics (including aortic reservoir characteristics) and end organ disease assessed by left ventricular mass index (LVMI).

Methods. Resting and moderate cycle exercise (60-70% heart rate maximum) haemodynamics were recorded in 119 participants with treated hypertension (mean age 65±7 years, 47% male) at baseline and one-year. Brachial BP was recorded by auscultation and central haemodynamics (aortic reservoir pressure, augmentation index, systolic BP, pulse pressure) via radial tonometry. LVMI mass was recorded using real-time 3-dimensional echocardiography.

Results. Baseline to one-year change in LVMI was not related to change in any resting brachial or central haemodynamic variable, or exercise brachial BP ($P > 0.05$ all). However, change in exercise aortic reservoir pressure (integral) was significantly associated with change in LVMI ($r = 0.244$, $p = 0.006$). This relationship was maintained on multiple regression analysis adjusting for age, sex, body-mass index, aortic stiffness and 24-hour ambulatory systolic BP ($\beta = 0.001$, 95% CI = 0.000-0.001, $p = 0.035$).

Conclusions. Moderate exercise aortic reservoir pressure independently predicts changes in LV mass over time. Technology to measure 24-hour ambulatory central haemodynamics (including aortic reservoir characteristics) is now available and should provide additional prognostic information beyond peripheral BP measures.

P6.4 THE DIFFERENTIAL EFFECTS OF RESISTANCE TRAINING AND ENDURANCE TRAINING ON AUGMENTATION INDEX: A PILOT STUDY

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Background: Current literature suggests that increased exercise is associated with decreased cardiovascular risk and improvements in vascular health. However, there is some conflict as to which modality of exercise has the most beneficial effect on vascular health and cardiovascular risk [1-3]. Therefore, the aim of our study was to investigate the influence of two different training modalities on augmentation index (AIx). This was carried out in a group of tightly matched, young, healthy male athletes who were either resistance (RT) or endurance trained (ET).

Methods: 17 male athletes (9 RT + 8 ET) aged 18-25 years were assessed for height, weight, BMI, mean arterial pressure (MAP) and AIx. AIx, which has been shown to be the most sensitive marker of systemic vascular stiffness in young individuals, was determined using the Mobil-o-Graph device (IEM).

Results: No significant differences in height, weight or MAP ($p > 0.05$) were observed between the RT and ET groups. However, both BMI and HR were found to be significantly higher in the RT compared to the ET group ($P < 0.05$). Interestingly, the RT group also had significantly higher AIx at heart rate 75 compared to the ET group ($14.4 \pm 9.6\%$ vs $0.3 \pm 12.3\%$, $P < 0.05$).

Conclusion: These results demonstrate that AIx was significantly higher in the RT compared to the ET group. Therefore, different modalities of exercise may elicit differential effects on vascular health. However, as this is a pilot study, larger and longitudinal studies are needed to support these findings.

P6.5 ANTI-INFECTIVE PERIODONTAL THERAPY IS ASSOCIATED WITH IMPROVEMENT OF ARTERIAL STIFFNESS AND PULSE WAVE REFLECTION

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Aim: This parallel-group double blind prospective placebo-controlled clinical trial evaluated the impact of anti-infective periodontal therapy on the expression of surrogate parameters of cardiovascular health including arterial stiffness, pulse wave reflection, and blood pressure.

Material and Methods: 80 patients with severe untreated periodontitis were subjected to anti-infective periodontal therapy, comprising bacterial biofilm removal by scaling and root planning either with or without administration of systemic antibiotics. The following parameters were assessed at baseline and 12 month post-therapy: periodontal bleeding on probing, representing a clinical parameter for active inflammation (BoP), pulse wave velocity (PWV), augmentation index (Alx), central systolic pressure (SBPao) and central pulse pressure (PPao) using an oscillometric device (Arteriograph).

Results: Preliminary data evaluation demonstrated, that 12 months post therapy reduction of periodontal bleeding on probing correlated significantly with decreased values of PWV, SBPao, PPao, Alx, and AugP ($p < 0.05$, respectively) whereas peripheral blood pressure remained unchanged.

Conclusions: Successful reduction of periodontal inflammation is associated with improved markers of arterial dysfunction.

P6.6

A DOUBLE BLIND, RANDOMISED TRIAL INVESTIGATING IF ARTERIAL STIFFNESS CAN BE REDUCED INDEPENDENTLY OF BLOOD PRESSURE IN PARTICIPANTS WITH OR AT RISK OF TYPE 2 DIABETES

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Background: Arterial stiffness (AS) as pulse wave velocity (PWV), is a powerful independent predictor of cardiovascular events, and commonly complicates Type 2 diabetes (T2D). The VaSera machine measures cardiac (by 2nd sound phonogram)-ankle PWV, expressed as a cardio-ankle vascular index (CAVI), aimed to be independent of blood pressure (BP). Our factorial trial tests whether separately randomised dietary nitrate or placebo, and an aldosterone antagonist reduce CAVI and PWV in those at risk of or diagnosed with T2D.

Method: Double-blind, randomised trial assessing AS at baseline, 3 and 6 months. Target recruitment is 120 patients, 18-90 years, excluding those with serious illness or eGFR < 45 mL/min. Daily interventions are spironolactone (≤ 50 mg) or doxazosin (≤ 16 mg), to control for BP change, with a nitrate donor (≤ 0.4 g nitrate) or an identical nitrate-free juice.

Results: 74 participants are screened, 54 randomised and 34 completed. Mean \pm SD baseline age and body mass index were 59.7 ± 12.1 years and 32.8 ± 5.5 kg/m², respectively; 40% female.

No differences in CAVI or PWV were observed between screening and randomisation (8.30 ± 1.4 to 7.97 ± 1.3 units and 9.30 ± 2.0 to 9.17 ± 1.8 m/s, respectively). Systolic (S) and diastolic (D) BP dropped between these visits (138 ± 17 to 133 ± 17 mmHg, $p < 0.005$ and 81 ± 12 to 71 ± 12 mmHg, $p < 0.001$, respectively). Bland-Altman analysis between screening and randomisation for CAVI, PWV, SBP and DBP shows $< 6\%$ of mean differences fall outside of the 95% limits; mean difference \pm limits of agreement; -0.13 ± 2.12 , -0.32 ± 1.85 , -5 ± 26 and -4 ± 19 , respectively.

Conclusion: A trial focused on PWV is practical and effective within our target population, with simple recruitment and a low drop-out rate.

P6.7

SUBLINGUAL NITROGLYCERIN IN PATIENTS WITH HEART FAILURE AND PRESERVED EJECTION FRACTION: IMPACT ON CENTRAL AND REGIONAL CAROTID AND RADIAL INPUT IMPEDANCE AND HEMODYNAMICS

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Background: The systolic blood pressure lowering effect of sublingual nitroglycerin (NTG) administration is thought to primarily arise from its action on wave reflection, although recent invasive data indicate that at least part of the blood pressure reduction can be ascribed to an effect on left ventricular dynamics.

Methods: Carotid and radial pressure waveforms and aortic, carotid and radial flow were measured in 19 HFpEF patients using applanation tonometry and pulsed Doppler ultrasound, respectively. Signals were time-aligned and global systemic as well as regional impedance and wave reflection analysis was applied.

Results: NTG lowered carotid systolic (130.8 ± 26 at baseline vs. 110.4 ± 18.4 mmHg after NTG, $P < 0.01$) and mean (92.5 ± 18.4 vs. 85.4 ± 14.3) blood pressure. Global systemic effects included a decrease in systemic vascular resistance (1.00 ± 0.32 vs. 0.88 ± 0.28 mmHg.ml⁻¹.s, $P < 0.05$), characteristic impedance (0.133 ± 0.089 vs. 0.089 ± 0.034 mmHg.ml⁻¹.s, $P < 0.05$) and

an increase in total arterial compliance (1.20 ± 0.58 vs. 1.52 ± 0.53 ml.mmHg⁻¹, $P < 0.01$). NTG had a major impact on the amplitude of the forward pressure wave (58 ± 24.3 vs. 40.6 ± 13.3 mmHg, $P < 0.01$), with no significant change in reflection magnitude. Regional analysis demonstrated a large effect of NTG on carotid input impedance, lowering impedance over the entire frequency spectrum, with radial artery input impedance did not demonstrate any significant changes (despite large effects on pressure and flow waveform morphology).

Conclusions: Our data in patients with HFpEF confirm the absence of impact of NTG on reflection magnitude, and demonstrate large effects of NTG on the input impedance of the cerebral vascular district, with little effect on the distal forearm circulation.

P6.8

EFFECT OF ORGANIC NITRATES ON INTRAVENTRICULAR PRESSURE GRADIENTS IN HEART FAILURE PATIENTS WITH PRESERVED EJECTION FRACTION

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Introduction: Heart Failure with preserved ejection fraction (HFpEF) is a highly prevalent condition for which no pharmacologic therapy is available. Diastolic dysfunction is thought to be central to its pathophysiology. Organic nitrates have pharmacologic effects on preload, afterload and myocardial contraction/relaxation that may favourably influence ventricular filling. However, the effect of sublingual nitro-glycerine (NTG) on diastolic parameters in this population has not been studied. We aimed to assess the effect of NTG on intraventricular pressure gradients (IVPG) and other measures of diastolic function.

Methods: Colour M-mode Doppler (CMM) is a non-invasive ultrasound technique used to obtain left ventricular (LV) blood flow velocities during early filling and to calculate IVPG. CMM recordings of 20 patients (HFpEF) at rest and after the administration of 0.4 mg of NTG were obtained and processed. Average values of the parameters were calculated and compared (Wilcoxon test) at rest and after NTG.

Results: NTG induced a non-significant increase in early diastolic IVPG ($p = 0.286$) due to a reduction in the early diastolic convective component ($p = 0.026$). Similarly, the early diastolic reversal convective component was reduced ($p = 0.009$). In contrast, the late diastolic IVPG was increased ($p = 0.017$), due to an increased inertial component ($p = 0.034$). There was a reduction in peak E wave velocity ($p = 0.004$), E wave acceleration ($p = 0.003$) and deceleration ($p = 0$), while the acceleration time ($p = 0.034$) and the heart rate (HR) ($p = 0.016$) increased.

Conclusion: Organic nitrates exert effects on diastolic filling in HFpEF: increased HR and myocardial contractility and decreased peak E-wave velocity possibly related to a preload reduction.

P6.9

DIETARY NITRATE BY BEETROOT JUICE CAN LOWER RENAL RESISTIVE INDEX IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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Introduction: Beetroot has a high concentration of nitrate. In circulation nitrate converts to nitrite. Nitrite-derived NO is a potent vasodilator. Increased renal resistive index (RI) are associated with higher mortality in patients with chronic kidney disease (CKD) and predict cardiovascular events in these patients. Here we investigated if the ingestion of beetroot juice can reduce RI-values.

Methods: Using a randomized cross-over study design 12 CKD patients were investigated within 4 hours (h) after one ingestion of dietary nitrate load (300 mg) by highly concentrated beetroot juice (30g beetroot powder dispersed in 200 ml water) versus 200 ml water. Plasma nitrite concentration as well as renal segmental arterial RI in duplex doppler ultrasonography was measured before and 4 hours after ingestion of beetroot or water. BP was measured every 15 minutes within the 4 hours.

Results: In 12 CKD patients (7 females) the eGFR was 40.7 ± 13.8 ml/min. Three patients had a hypertensive nephropathy, 2 diabetic nephropathy and 7 seven patients had a combined hypertensive/diabetic nephropathy.