



## Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

Journal Home Page: <https://www.atlantis-press.com/journals/artres>

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### **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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**To cite this article:** C. Mills, F. Iqbal, H. Crickmore, V. Govoni, A. Webb, J.K. Cruickshank (2014) 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, Artery Research 8:4, 147–147, DOI: <https://doi.org/10.1016/j.artres.2014.09.157>

**To link to this article:** <https://doi.org/10.1016/j.artres.2014.09.157>

Published online: 7 December 2019

**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 ( $\leq 50$ mg) or doxazosin ( $\leq 16$ mg), to control for BP change, with a nitrate donor ( $\leq 0.4$ 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  $59.7 \pm 12.1$  years and  $32.8 \pm 5.5$  kg/m<sup>2</sup>, respectively; 40% female.

No differences in CAVI or PWV were observed between screening and randomisation ( $8.30 \pm 1.4$  to  $7.97 \pm 1.3$  units and  $9.30 \pm 2.0$  to  $9.17 \pm 1.8$  m/s, respectively). Systolic (S) and diastolic (D) BP dropped between these visits ( $138 \pm 17$  to  $133 \pm 17$  mmHg,  $p < 0.005$  and  $81 \pm 12$  to  $71 \pm 12$  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;  $-0.13 \pm 2.12$ ,  $-0.32 \pm 1.85$ ,  $-5 \pm 26$  and  $-4 \pm 19$ , 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 ( $130.8 \pm 26$  at baseline vs.  $110.4 \pm 18.4$  mmHg after NTG,  $P < 0.01$ ) and mean ( $92.5 \pm 18.4$  vs.  $85.4 \pm 14.3$ ) blood pressure. Global systemic effects included a decrease in systemic vascular resistance ( $1.00 \pm 0.32$  vs.  $0.88 \pm 0.28$  mmHg.ml<sup>-1</sup>.s,  $P < 0.05$ ), characteristic impedance ( $0.133 \pm 0.089$  vs.  $0.089 \pm 0.034$  mmHg.ml<sup>-1</sup>.s,  $P < 0.05$ ) and

an increase in total arterial compliance ( $1.20 \pm 0.58$  vs.  $1.52 \pm 0.53$  ml.mmHg<sup>-1</sup>,  $P < 0.01$ ). NTG had a major impact on the amplitude of the forward pressure wave ( $58 \pm 24.3$  vs.  $40.6 \pm 13.3$  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  $40.7 \pm 13.8$  ml/min. Three patients had a hypertensive nephropathy, 2 diabetic nephropathy and 7 seven patients had a combined hypertensive/diabetic nephropathy.