PO-08: EFFECTS OF ACUTE DIETARY NITRATE SUPPLEMENTATION ON AORTIC WAVE REFLECTION IN YOUNG ADULTS

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PO-08 EFFECTS OF ACUTE DIETARY NITRATE SUPPLEMENTATION ON AORTIC WAVE REFLECTION IN YOUNG ADULTS

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Objective: Evidence suggests that dietary nitrate supplementation (i.e. beetroot juice) decreases measures of peripheral blood pressure. However, the effects of acute dietary nitrates on central aortic pressures are unclear. Thus, the objective of this study was to investigate the effects of beetroot juice consumption on central aortic pressures and indices of aortic wave reflection.

Methods: 13 healthy, normotensive, non-smoking, untrained young adults (25±1 year) consumed 500ml of beetroot juice (BR), High-fidelity radial arterial pressure waveforms using applanation tonometry and venous blood samples were taken at baseline, 60, 90, 120, 150 and 180 minutes post BR consumption (Study 1). Indices of aortic wave reflection (Augmentation Index; Aix and Aix normalized for heart rate; Aix@75bpm) were analyzed using the generated central aortic blood pressure waveforms (SphygmoCor). To control for the potential confound of fluid ingestion on blood pressure, 7 of the subjects came back for an additional study visit which consisted of drinking 500ml of water (Study 2; control trial). Applanation tonometry measurements were performed at the same time points as Study 1.

Results: Study 1: Central systolic pressures were reduced after 90 min following BR (P<0.05). Additionally, Aix and Aix@75bpm were reduced at all-time points following BR (P<0.05; Figure 1). Study 2: Compared to the control trial, Aix was lower at all-time points following BR (P<0.05). However, Aix@75bpm was only reduced relative to the control condition at 150 and 180 min post consumption (P<0.05; Figure 2).

Conclusion: Our data provide evidence that in addition to the beneficial effects on peripheral blood pressures, acute dietary nitrate supplementation (via beetroot juice) also decreases central aortic pressures and wave reflection in young healthy adults. These effects on central aortic hemodynamics appear to be greatest 2.5-3 hours after BR consumption and are likely mediated by an increase in NO bioavailability via nitrate-nitrite-NO pathways.

Figure 1 Beetroot juice (n=13) lowered Aix@75bpm over three hours (A; Study 1). When compared to water (control trial; n=7), BR decreased Aix@75bpm at 150 and 180 minutes post consumption (B; Study 2).

PO-09 SPIRONOLACTONE AS ADD-ON THERAPY TO CHLORTHALIDONE IMPROVES ENDOThelial FUNCTION, ARTERIAL STIFFNESS AND INSULIN RESISTANCE IN EUROPEAN AND AFRICAN AMERICAN PATIENTS WITH ESSENTIAL HYPERTENSION – A DOUBLE-BLIND PLACEBO-CONTROLLED RANDOMIZED STUDY

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diuretics have been shown to have a neutral effect on cardiovascular (CV) biomarkers like arterial stiffness and endothelial function despite their blood pressure (BP) lowering effect. Thiazide diuretics generally have harmful effects on glucose metabolism, however, the effect of mineralocorticoid receptor antagonists on insulin resistance in essential hypertension (eHTN) is only partially elucidated. We hypothesized that chlorthalidone (CHT) in combination with spironolactone (SPL) results in better arterial compliance then CHT therapy alone through additional improvement of glucose metabolism parameters.

Methods: This double-blind placebo-controlled randomized single center study aimed to identify SPL add-on therapy to CHT treatment alone on CV risk markers such as BP, 24-h ambulatory blood pressure monitoring (24-H ABPM), aortic BP (abP), augmentation index (AIx), pulse wave velocity (cPWV), flow-mediated dilation (FMD), fasting glucose, plasma insulin levels and insulin sensitivity (by homeostasis model assessment: HOMA-IR).

A total of 34 patients (21.7% male, 40% white) were randomized to either CHT 25 mg + Placebo or CHT 25 mg + SPL 25 mg once daily. At baseline and after 3 months office BP, 24-H ABPM, markers of arterial stiffness, FMD, fasting glucose, plasma insulin levels and HOMA-IR.

Results: The study showed statistically significant improvements after three months in patients treated with CHT+ SPL in clinic BP, 24-hour ABPM, FMD, markers of arterial stiffness, and glucose metabolism. In detail, clinic SBP (131.5±14.6 to 119.1±14.3 mmHg (p = 0.034), aortic SBP (122.6±13 vs 113.0±13.7 mmHg, p = 0.048), 24-H ABPM SBP (151.2±15.1 to 131.7±10.4 mm Hg, p = 0.0049, 24-H ABPM DBP 83.2±6.1 vs 74.9±9.3 mm Hg, p = 0.032, 24-H ABPM. Fasting plasma glucose, plasma insulin levels decreased and insulin sensitivity (by homeostasis model assessment: HOMA-IR) improved with SPL as compared to CHT alone (p<0.001), Aix (28.9±6 versus 25.4±6.9 %) and cPWV (9.2±5.7 vs 1.8 mm/ s) in the CHT+SPL group. Endothelial function improved significantly in the CHT+SPL group as compared to the control group (5.5±1.7 to 8.8±2.7 (p = 0.004)).

Conclusion: These results suggest that SPL as add-on therapy to CHT improves BP, markers of arterial compliance, and glucose metabolism in patients with eHTN, while CHT only therapy may have unfavorable effects. Treatment with SPL additional to CHT may represent a novel approach to improve unfavorable metabolic disturbances and CV risk markers.