**G-17 Thematic Poster - Vascular Function**

Saturday, June 3, 2017, 9:00 AM - 11:00 AM

**Room:** 404

3517 **Chair:** Bryan Taylor. *University of Leeds, Leeds, United Kingdom.*

(No relationships reported)

Current continuous flow left ventricular assist devices (LVAD) decrease peripheral vascular pulsatility, which may contribute to side effects such as bleeding, thrombotic events and orthostatic intolerance.

**PURPOSE:** To investigate the impact of manipulating LVAD pump speed, documented as revolutions per minute (RPM), on peripheral (brachial artery) pulsatility index (PI) in 20 heart failure patients implanted with a HeartWare (HVAD, n = 10) or HeartMate (HMII, n = 10) LVAD.

**METHODS:** Doppler ultrasound blood velocity in the brachial artery was recorded at baseline and 3 minutes after altering RPM, at three different RPM settings above and below baseline (60 RPM increments for HVAD and 200 for HMII). Brachial PI was calculated for each cardiac cycle by dividing the difference between minimum and maximum blood velocity by the time averaged mean blood velocity. LVAD device pulsatility indices that are used clinically were also recorded: maximal blood velocity (Vmax) and minimum blood velocity (Vmin) (HVAD) and vascPI (HMII). Relationships were evaluated using multilevel linear modeling with random intercepts and data are reported as mean±SE.

**RESULTS:** Baseline RPMs were 250±44 (HVAD) and 920±75 (HMII). Brachial PI changed significantly across the range of LVAD speeds tested (HVAD: 360; HMII: 1200), from 2.3±0.6 to 4.1±0.9 with the HVAD and from 1.8±0.6 to 3.6±1.0 with the HMII, with no differences in brachial PI between device across relative pump speed stages. Specifically, a 180 RPM decrease of the HVAD resulted in a 0.9±0.1 (37±4%) increase in brachial PI and a 800 RPM decrease in the HMII resulted in a 0.8±0.1 (38±3%) increase. These reductions in pump speed resulted in an ~20.0% fall in LVAD power consumption and a reduction in device reported blood flow of ~9%. Brachial PI correlated with HVAD Vmax and hmVmin (r = 0.45 and r = −0.31, respectively), and HMII device vascPI (r = 0.73), suggesting device derived indices of PI provide a fair to good linear prediction of peripheral vascular pulsatility.

**CONCLUSION:** Reducing HVAD or HMII LVAD pump speed within a clinically acceptable outpatient range yields a measurable and potentially clinically and physiologically meaningful change in peripheral vascular pulsatility, accompanied by substantial power savings.

3518 **Board #1 June 3 9:00 AM - 11:00 AM**

**Peripheral Vascular Pulsatility in Heart Failure Patients with Continuous Flow Centrifuge and Axial Left Ventricular Assist Devices: The Effect of Pump Speed.**

Jay R. Hydren, Andrew C. Kithas, Soung Hun Park, Omar Wever-Pinzon, Craig H. Selzman, William H. Perry, Camila A.S. Vargas, Stavros G. Drakos, Russell S. Richardson. *University of Utah, Salt Lake City, UT.*

(No relationships reported)

Moving from a supine to a standing position typically reduces plasma volume (PV) and while this increases the concentration of some molecules in the blood, the effect on plasma nitrate ([NO₃]⁻) and nitrite ([NO₂]⁻) has not been reported.

**PURPOSE:** To determine the change (Δ) in PV, [NO₃]⁻ and [NO₂]⁻ while lying supine, sitting, standing, and following short-duration exercise.

**METHODS:** Fourteen participants (9 male, age 27 ± 4 yr, body mass 71 ± 11 kg) completed two trials. The first was conducted with no dietary intervention (control; CON) and the second was preceded by ingestion of 3 x 70 ml of NO donor mixture while lying supine, sitting, standing, and following short (2 min) of cycling at 60% of the age-predicted maximal heart rate. Repeated blood samples were collected to allow measurements of haemoglobin and haematocrit in whole blood and plasma [NO₂]⁻ and [NO₃]⁻ by chemiluminescence. The ΔPV was calculated using the Dill and Costill formula.

**RESULTS:** Following the supine phase, PV increased from baseline in both trials (CON Δ12.6 ± 10.3 %; BR Δ12.5 ± 7 %, both P<0.01) and then decreased upon standing (CON Δ−5.2 ± 3.8 %, P=0.01; BR Δ−4.0 ± 3.5%, P=0.02), setting (CON Δ−10.1 ± 3.7 %; BR Δ−6.4 ± 3.6 %, both P<0.001) and following exercise (CON Δ−18.1 ± 5 %; BR Δ−15.5 ± 3.4 %, both P<0.001). Plasma [NO₃]⁻ levels at baseline were 120 ± 49 nM and 357 ± 129 nM in CON and BR, respectively. Plasma [NO₂]⁻ decreased from baseline after lying supine in both trials (CON 77 ± 30 nM; BR 231 ± 92 nM, both P<0.05) before increasing during standing (CON 109 ± 42 nM; BR 297 ± 105 nM, both P<0.001) and sitting (CON 131 ± 43 nM; BR 385 ± 125 nM, both P<0.002). Plasma [NO₂]⁻ remained elevated following exercise in the CON trial (125 ± 61 nM, P<0.05) but was not different to the 30 min supine value in the BR trial. There were no statistical differences in [NO₂]⁻ between measurement points in either condition (all P>0.05).

**CONCLUSIONS:** Plasma [NO₂]⁻ changes in the opposite direction to PV during changes in posture, both in the presence and absence of prior dietary NO₂ supplementation. Given that [NO₂]⁻ offers the best approximation of nitric oxide bioavailability, researchers must be cognisant of these outcomes when designing and interpreting dietary NO₂ research.

3519 **Board #2 June 3 9:00 AM - 11:00 AM**

**Postural Induced Changes in Plasma Volume Inversely Influences Plasma Nitrite Concentration in Humans**

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(Sponsor: Professor Yannis Pitsiladis, FACSM)

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(No relationships reported)

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**PURPOSE:** To determine the change (Δ) in PV, [NO₃]⁻ and [NO₂]⁻ while lying supine, sitting, standing, and following short-duration exercise.

**METHODS:** Fourteen participants (9 male, age 27 ± 4 yr, body mass 71 ± 11 kg) completed two trials. The first was conducted with no dietary intervention (control; CON) and the second was preceded by ingestion of 3 x 70 ml of NO donor mixture while lying supine, sitting, standing, and following short (2 min) of cycling at 60% of the age-predicted maximal heart rate. Repeated blood samples were collected to allow measurements of haemoglobin and haematocrit in whole blood and plasma [NO₂]⁻ and [NO₃]⁻ by chemiluminescence. The ΔPV was calculated using the Dill and Costill formula.

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3520 **Board #3 June 3 9:00 AM - 11:00 AM**

**Effects of Prior Aerobic Exercise on Flow Mediated Dilation Responses to Prolonged Sitting in Healthy Men**

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(No relationships reported)

Prolonged sitting is common in modern society and has recently been shown to impair vascular endothelial function (VEF) in healthy men. Conversely, a single bout of aerobic exercise improves VEF.

**PURPOSE:** The objective of this study was to examine the acute effects of a single bout of aerobic exercise on VEF responses to prolonged sitting.

**METHODS:** Eleven healthy men [21.2 ± 0.6 y; BMI = 24.7 ± 1.0 kg/m²; maximal oxygen consumption (VO₂max) = 49.9 ± 5.1 ml/kg/min (mean ± SE)] participated in two randomized 3 hours sitting trials preceded by a single bout of continuous treadmill exercise (45 min at 85% VO₂max) (EX) or 45 min of quiet rest (REST). Exercise intensity...