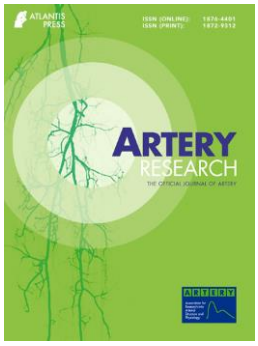

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PO-24: RELATIONSHIP BETWEEN STEP COUNTS AND CAROTID FEMORAL PULSE WAVE VELOCITY IN ADULTS TREATED FOR HYPERTENSION AND DIABETES

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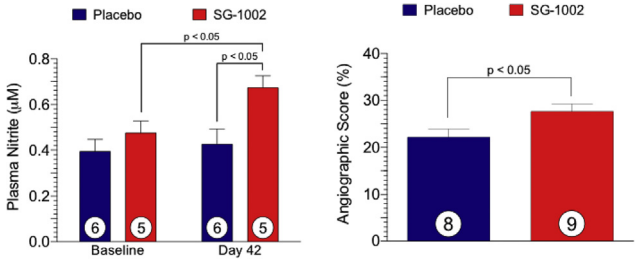
and nitric oxide (NO), are endogenous gasotransmitters which exert potent vasodilatory and proangiogenic effects. Recent experimental evidence suggest that the proangiogenic effects of H_2S are medicated in part through the NO pathway. We sought to determine whether a novel H_2S prodrug, SG-1002 (Sulfagenix, Inc. Cleveland OH), increases NO production and promotes peripheral revascularization.

Methods: CLI was generated in Yucatan miniswine (n=17) via carotid cutdown and placement of an Amplatzer vascular plug deployed within a Viabahn stent positioned proximally in the external iliac artery. At day 7 post-CLI pigs, received daily placebo or SG-1002 (1600 mg PO). Cuff-pressures were measured weekly by ankle/brachial index (ABI). Plasma H_2S, H_2S metabolite sulfane sulfur (SS), and NO metabolite, nitrite (NO_2) were measured. At day 42 post-CLI, digital subtraction angiography (DSA) was performed and opacified vessels quantitated.

Results: ABI was reduced to 0 following CLI induction. ABI improved in both groups but continued to demonstrate persistent ischemia with values below 0.25 at day 42 and showed no difference between groups. Circulating H_2S levels were similar between groups. SS levels were increased from baseline to day 42 in SG-1002 treated pigs ($p < 0.001$) but remained unchanged in placebo treated animals. At day 42, SG-1002 treatment increase circulating NO_2 levels ($p < 0.05$) compared to placebo. There was an increase in NO_2 levels from baseline to day 42 in SG-1002 treated pigs ($p < 0.05$). DSA revealed an increase of CLI limb vessel number in SG-1002 treated pigs compared to placebo ($p < 0.05$).

Conclusions: Treatment with the H_2S prodrug, SG-1002, results in increased metabolites of H_2S and NO signaling. H_2S treatment increased vascular density in the setting of severe CLI in a clinical relevant swine model.



PO-22
BODY MASS INDEX AS AN INDEPENDENT PREDICTOR OF CHANGE IN ARTERIAL STIFFNESS PARAMETERS WITH CHANGE IN BODY POSITION

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Changing from supine to a seated position creates an orthostatic challenge due to the effects of gravity on the distribution of blood. This redistribution of volume unloads baroreceptors and may evoke sympathetic activation. The sympathetic activation may lead to increases in arterial stiffness, but it is unknown as to how different demographic variables may impact these changes.

Objective: To investigate whether the change in arterial stiffness parameters between two positions is influenced by factors such as age, sex, or body mass index (BMI).

Methods: Thirty healthy, young adults (24±4 years) were randomly positioned supine or semi-supine, at two different angles (0°,72°) on an adjustable table. After 5 minutes rest, arterial stiffness parameters of the common carotid artery were obtained via ultrasound: beta stiffness index, elastic modulus (Ep), arterial compliance (AC), and distensibility, as well as cardio-ankle vascular index (CAVI) from the VaSera (Fukuda Denshi, Tokyo, Japan). Linear regression was used on the change value for each arterial stiffness parameter adjusting for age, sex, BMI, and baseline values of each outcome measure.

Results: BMI was a significant independent predictor of changes in each measured arterial stiffness parameter after controlling for age and sex. Increasing BMI is related to greater changes in beta stiffness (β=0.55,p=0.001) and Ep (β=0.58,p=0.001) with change in position. Concomitantly, increasing BMI is associated with smaller changes in AC (β=-0.31,p=0.03), distensibility (β=-0.54,p=0.001), and CAVI (β=-0.48,p=0.001). Sex was only a significant independent predictor when assessing change in CAVI (β=-0.44,p=0.001).

Conclusion: When measuring arterial stiffness parameters in different positions, it is important to account for the effect of BMI in the analyses. Although obesity is associated with increased baseline sympathetic activity and reduced baroreceptor sensitivity, the change in position creates a larger change in arterial stiffness which may relate to the greater displacement of blood volume with a larger body size.

PO-23
A SYSTEMATIC REVIEW ON THE EFFECT OF ACUTE AEROBIC EXERCISE ON ARTERIAL STIFFNESS REVEALS A DIFFERENTIAL RESPONSE IN THE UPPER AND LOWER ARTERIAL SEGMENTS

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Objectives: The overall impact of resistance-type exercises and chronic physical activity on the modulation of arterial stiffness has been well characterized; however, the impact of acute aerobic exercise remains unclear. Therefore, we aimed to synthesize evidence pertaining to acute changes in arterial stiffness shortly following aerobic exercise in healthy individuals.

Methods: Electronic databases (MEDLine, EMBASE, Cochrane Library, Sport Discus, and Web of Science) were searched to identify articles assessing the effects of acute aerobic exercise on parameters of arterial stiffness. Eligible studies included arterial stiffness measurements before and after acute exercise in healthy adults, who were free of any cardiovascular risk factors, and were not taking cardioprotective medications.

Results: A total of 43 studies were included. The effect of acute aerobic exercise on arterial stiffness was found to be dependent on the anatomical segment assessed, and on the time at which the measurement was performed post-exercise. Arterial stiffness of the *central* and *upper body peripheral arterial segments* was found to be increased relative to resting values immediately post-exercise (0-5 minutes), while thereafter (>5 minutes) was decreased to a level at, or below resting values. In the *lower limbs*, proximal to the primary working muscles, arterial stiffness decreased immediately post-exercise (0-5 minutes), which persisted into the recovery period post-exercise (>5 minutes).

Conclusions: This systematic review reveals a differential response to acute exercise in the lower and upper/central arterial segments in healthy adult subjects. We further showed that the effect of acute exercise on arterial stiffness is dependent on the time at which the measurement is performed following acute aerobic exercise. Therefore, when assessing the overall impact of exercise on arterial stiffness it is important to consider the arterial segment being analysed and the measurement time point, as failure to contextualize the measurement can lead to conflicting results and misleading clinical inferences.

PO-24
RELATIONSHIP BETWEEN STEP COUNTS AND CAROTID FEMORAL PULSE WAVE VELOCITY IN ADULTS TREATED FOR HYPERTENSION AND DIABETES

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Objectives: 'Step counts' captured by wearable physical activity tracking devices are associated with reductions in cardiovascular disease. However, in individuals on cardioprotective medications the impact of step counts may not be captured by the measurement of traditional cardiometabolic

risk factors. To address this gap, we aimed to assess the relationship between pedometer-derived step counts and carotid-femoral pulse wave velocity (cfPWV), a summative measure of arterial health.
Methods: 369 adults (46% men, 60% White, mean age 59.6±11.2 years, BMI 31.3±4.5 kg/m^2) with hypertension and/or type 2 diabetes were recruited in Montreal, Canada (2011-2015). Step counts (Yamax SW-701 pedometer), moderate-to-vigorous physical activity (MVPA) (ActiGraph GT3x+), arterial stiffness (applanation tonometry; SphygmoCor), and cardiometabolic risk factors including blood pressure, haemoglobin AIc, and lipids were assessed.
Results: Blood pressure was well-controlled (mean 125/77±15/9 mmHg), low-density lipoprotein cholesterol (LDL-C) was close to target (mean 2.5±1.0 mmol/L), and A1c in diabetes was acceptable (mean 7.7±1.3%). Participants averaged 5,125±2,722 steps/day (low active) and mean cfPWV was 9.8±2.2 m/s. Step counts correlated with cfPWV, but not with any other cardiometabolic risk factors. A 1,000 step/day increment was associated with a 0.1m/s (95% CI -0.19, -0.02) decrement in cfPWV in a model adjusted for age, sex, BMI, ethnicity, immigration status, employment, education, diabetes, hypertension, medication classes, and MVPA.
Conclusion: In patients with hypertension and/or diabetes who were well-controlled on cardioprotective medications, cfPWV is responsive to step counts and may emerge as a useful health indicator to track the arterial health impact of physical activity strategies in clinical practice.

PO-25
HIGHER CENTRAL AND BRACHIAL SYSTOLIC BLOOD PRESSURE IS SELECTIVELY ASSOCIATED WITH WEAKER COGNTIVE PERFORMANCE IN POSTMENOPAUSAL WOMEN BUT NOT OLDER MEN

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Introduction: Higher aortic stiffness and central blood pressure (BP) are associated with reduced cognitive performance in older adults. Cognitive performance tends to be higher in older women compared with older men, unexplained by differences in years of formal education and/or presence of atherosclerotic vascular disease (AVD). However, whether gender-related differences in cognitive function are explained by alterations in aortic stiffness or central blood pressure (BP) is unclear. We hypothesized that higher aortic stiffness and central systolic BP would be associated with weaker cognitive performance in middle-aged/older (MA/O) men but not postmenopausal women.
Methods/Results: A total of 135 MA/O men and postmenopausal women (age 55-85 yrs) were recruited. Brachial systolic BP was higher in men, however, there were no differences in aortic stiffness (carotid-femoral pulse wave velocity, cfPWV), central systolic BP or pulse pressure (PP) (Table 1). Women scored higher than men on the RBANS Total Scale Score and Delayed Memory Index (both $P<0.05$) (Table 1). In the entire cohort, higher central and brachial systolic BP were associated with weaker Stroop Color Naming ($r=-0.24$, $P<0.05$, $r=-0.25$, $P<0.05$) and Stroop Interference ($r=-0.30$, $P<0.01$, $r=-0.32$, $P<0.01$) performance. Interestingly, years of education was associated with RBANS Total Scale Score ($r=0.64$, $P<0.001$) and WRAT-3 Reading ($r=0.63$, $P<0.001$) scores in men but not women ($P>0.05$). Adjusting for age, AVD status, BMI, insulin, estrogen therapy and medications, higher Stroop Interference scores were associated with lower central systolic ($r=-0.52$, $P=0.001$), brachial systolic ($r=-0.50$, $P=0.001$) BPs and central PP ($r=-0.31$, $P=0.05$) in women but not men. Lower WRAT-3 Reading scores were associated with higher central ($r=-0.44$, $P<0.01$) and brachial PP ($r=-0.50$, $P<0.01$) in women only.
Conclusion: Higher central and brachial systolic BP and PP is selectively associated with weaker cognitive performance in postmenopausal women but not MA/O men independent of aortic stiffness and AVD.

Table 1 Displays demographic, vascular rand cognitive performance data.

Mean ± SE	Men (n=68)	Women (n=67)	*p-value*
Demographics:			
Age (yrs)	66.3 ± 1.0	68.3 ± 1.0	0.14
Atherosclerosis Vascular Disease, no. (%)	46 (67.6)	27 (40.3)	**0.001**
Education (yrs)	15.1 ± 0.3	14.3 ± 0.3	0.08
Body Mass Index (kg/m^2)	29.9 ± 0.7	28.7 ± 0.8	0.25
Total cholesterol (mg/dL)	145 ± 3.8	177 ± 4.4	**<0.001**
HDL cholesterol (mg/dL)	47.5 ± 1.6	57.3 ± 2.2	**<0.001**
Triglycerides (mg/dL)	100 ± 5.7	117 ± 8.0	0.09
Glucose (mg/dL)	109 ± 3.3	95 ± 2.8	**0.002**
Total insulin uU/mL	10.9 ± 1.2	8.9 ± 1.0	0.22
Statins, no. (%)	38 (55.9)	29 (43.3)	0.15
Anti-hypertensives, no. (%)	48 (70.6)	38 (56.7)	0.10
Aspirin, no. (%)	46 (67.6)	39 (58.2)	0.12
Estrogen therapy at baseline, no (%)	-	7 (10.4)	**<0.001**
Vascular:			
Brachial systolic blood pressure (mmHg)	140 ± 2.1	133 ± 2.4	**0.032**
Brachial diastolic blood pressure (mmHg)	78 ± 1.2	68 ±1.4	**<0.001**
Brachial pulse pressure (mmHg)	62 ± 2.4	65 ± 2.1	0.37
Mean arterial pressure (mmHg)	98 ± 1.1	89 ± 1.5	**<0.001**
Aortic systolic blood pressure (mmHg)	129 ± 2.2	125 ± 2.3	0.16
Aortic pulse pressure (mmHg)	51 ± 2	56 ± 2	0.13
cfPWV (m/sec)	10.5 ± 0.3	10.3 ± 0.24	0.54
Cognitive:			
Global Cognitive Function:			
RBANS Total Scale Score	98.6 ± 1.6	104.7 ± 1.5	**0.007**
WRAT-3 Reading Standard Score	103.6 ± 9.5	110.8 ± 4.1	0.09
Memory:			
RBANS Immediate Memory	96.6 ± 1.7	101.6 ± 1.9	0.06
RBANS Delayed Memory	99.3 ± 1.6	106.0 ± 1.4	**0.002**
Processing speed:			
Stroop Color Naming	67.0 ± 1.3	69.5 ± 1.8	
Stroop Word Reading	87.4 ± 1.7	91.1 ± 2.1	0.26
Executive function/working memory:			
Stroop Interference	33.1 ± 0.9	35.2 ± 0.9	0.11

All data are presented as mean ± SE. HDL, High-density lipoprotein, cfPWV, carotid femoral pulse wave velocity; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status; WRAT, Wide Range Achievement Test.

PO-26
BILATERAL SYMMETRY OF BRACHIAL PULSE WAVEFORM ANALYSIS IN A CLINICAL POPULATION

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Background: Pulse waveforms are modified as they propagate along the arterial tree. Small differences in the arterial pathways from the heart to the left and right brachial artery may impact pulse waveform analysis (PWA) for the purpose of hemodynamic assessment. The VaSera VS-1500AU (Fukuda Denshi) is a cuff-based device that permits simultaneous acquisition of bilateral brachial pulse volume recordings. To determine if interchangeability between left and right brachial pulse waveforms is possible, we assessed whether there are significant differences in pulse waveform analysis variables between each arm.
Methods: In 20 subjects (mean age=67±11 years) from a clinical population, simultaneous pulse waveforms were acquired at both the left and right brachial