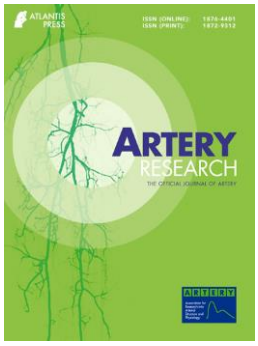

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PO-14: RELATIONSHIP BETWEEN CAROTID ARTERY STIFFNESS AND ALTERED CEREBROVASCULAR HEMODYNAMICS IN SOUTH ASIAN INDIAN OLDER ADULTS

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Results: As Figure 1 shows, at control condition, there was no difference in the eNOS protein expression between AA and CA HUVECs. The incubation of CRP significantly reduced the expression levels of eNOS on both AA and CA HUVECs in a dose-dependent manner. The reductions of eNOS protein expression in AA HUVECs at all three different concentrations were significantly greater than those in CA HUVECs.
Conclusion: AA HUVECs respond differently to CRP compared to CA HUVECs. CRP incubation causes greater reduction of eNOS expression on AA than CA HUVECs. The results suggest a possible mechanism for the racial differences in endothelial dysfunction.

PO-13
ARTERIAL HEMODYNAMICS IN OVERWEIGHT YOUNG ADULT MALES FOLLOWING MAXIMAL EXERCISE

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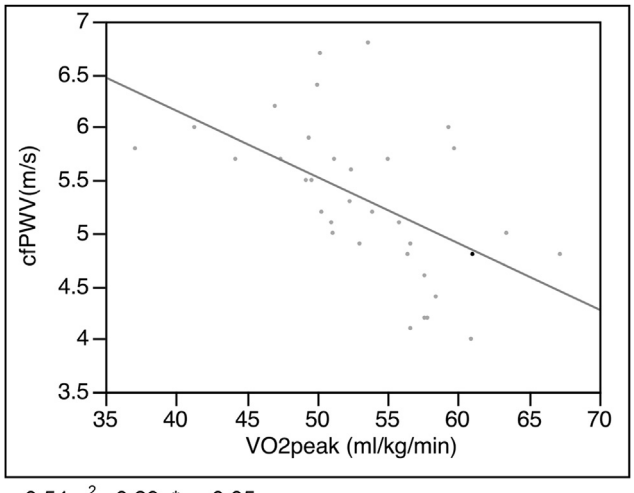
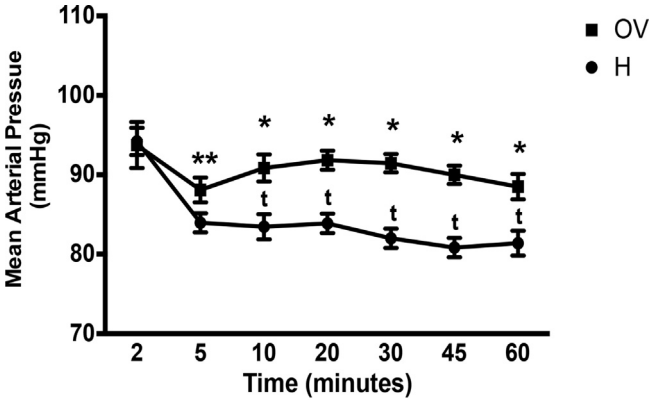
Objective: Overweight (OV), defined by body mass index (BMI), is related to increased cardiovascular risk and greater aortic stiffening. In contrast, enhanced cardiorespiratory fitness (CRF) is associated with reduced cardiovascular risk, and lower aortic stiffness. It is unknown whether CRF is related to aortic stiffness in young OV adult males. We hypothesized CRF would be inversely associated with aortic stiffness, and the post-exercise hemodynamic response would be impaired in OV males.
Methods: Thirty-four apparently healthy, young adult males (22.12 $\pm$ 0.09 years) were categorized based on BMI as healthy weight (H, $\leq$24.9 kg/m^2), or OV (24.9-29.9 kg/m^2). Resting measures of arterial stiffness (carotid-femoral pulse wave velocity, cfPWV), heart rate (HR), blood pressure (BP), pulse pressure (PP), mean arterial pressure (MAP), percent body fat (BF%), waist (WC) and hip circumference (HC), and waist-to-hip ratio (W:H) were obtained. Peak oxygen consumption (VO_{2peak}), a measure of CRF, was assessed with a maximal exercise treadmill test (EX). cfPWV and BP were obtained at 2, 5, 10, 20, 30, 45 and 60 minutes following EX.
Results: Compared with H at rest, OV had greater cfPWV, BMI, BF%, systolic BP (SBP), PP, MAP, WC, HC, and W:H ($p<0.05$, all). VO_{2peak} was greater in H compared with OV ($p<0.05$). A positive association was observed between resting cfPWV and SBP, whereas cfPWV was inversely related to VO_{2peak} ($p<0.05$, both). Compared with H, post EX MAP was increased in OV at 10, 20, 30, 45 and 60 minutes ($p<0.05$). A main effect of weight was observed for cfPWV, SBP and DBP, and a main effect of time for PP, SBP and DBP ($p<0.05$, all).
Conclusion: Increased resting aortic stiffness in young OV adult males is, in part, attributable to lower levels of CRF and increased SBP. In addition, post EX arterial hemodynamics is impaired in young adult OV males.



r=0.54, r^2= 0.29. *p <0.05.

Figure 1 Peak Volume of Oxygen Consumption (VO_2) vs. carotid-Femoral Pulse Wave Velocity (cfPWV) (n=34).



*** P< 0.05, H vs. OV at 10, 20, 30, 45, 60 minutes**
**** P<0.05, H and OV at 5 vs. 2 minutes**
t P<0.05, H at 10, 20, 30, 45, 60 vs. 2minutes

Figure 2 Post EX MAP.

PO-14
RELATIONSHIP BETWEEN CAROTID ARTERY STIFFNESS AND ALTERED CEREBROVASCULAR HEMODYNAMICS IN SOUTH ASIAN INDIAN OLDER ADULTS

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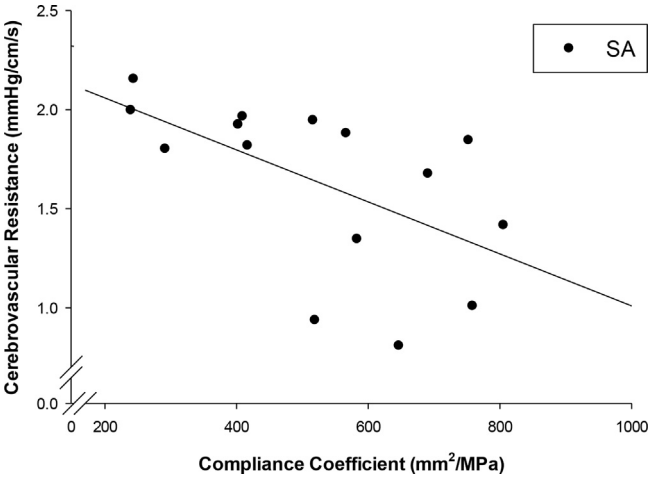
Objectives: To investigate whether differences exist in common carotid artery (CCA) stiffness between South Asian (SA) and white Caucasian (CA) older adults, and its association with cerebrovascular hemodynamic properties.
Methods: Carotid artery stiffness indicators, including pulse pressure (PP), distensibility coefficient (DC), and compliance coefficient (CC), were measured by applanation tonometry and ultrasound imaging. Continuous blood pressure (MAP), heart rate, and middle cerebral artery blood flow velocity (MFV) using non-invasive transcranial Doppler ultrasound, were monitored in 44 age- and gender-matched SA and CA community-dwelling older adults free of cardio- and cerebrovascular diseases (22 CAs/SAs: 11 M/F in each group, aged 64-82 years). Cerebrovascular resistance index (CVRi) and pulsatility index (PI) were also calculated for evaluation of cerebrovascular hemodynamics.
Results: Carotid artery stiffness was higher in SA compared to CA group, as evidenced by lower arterial compliance (CC=601$\pm$282 vs. 789$\pm$323 mm^2/MPa, respectively, p=0.048), and greater PP (59$\pm$18 vs. 46$\pm$10 mmHg, respectively, p=0.005). A significant interaction effect between ethnic group and arterial compliance on PP was observed (r^2=0.562, $p<0.001$), indicating that less compliant arteries resulted in higher PP amplitudes in SA compared to CA group. Furthermore, a moderate negative relationship between arterial compliance and CVRi was found only in the SA group (r=-0.574, p=0.025). Correspondingly, CVRi was strongly associated with lower MFV (r=-0.925, $p<0.001$).
Conclusions: SA group presented greater stiffness and less compliant arteries compared to CA group independent of age and gender. SA older adults appear to have impaired dampening capacity of central arteries to the changes in arterial pressure, thereby increasing the risk of hemodynamic pulsatility transmission into the brain. Consequently, an increase in CVRi might be a compensatory mechanism to protect the cerebral microcirculation, or reflect prior damage, resulting in lower CBF. These findings may aid in understanding the increased risk of cardio- and cerebrovascular diseases in people of SA origin.



PO-15
THE TEMPORAL RELATIONSHIP BETWEEN METABOLICALLY HEALTHY OBESITY AND CAROTID ATHEROSCLEROSIS IN MEN

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There is conflicting evidence regarding the relationship between metabolically healthy obesity and the burden of carotid atherosclerosis, but whether metabolically healthy obesity is related to the progression of atherosclerosis remains unclear.
Purpose: We investigated the cross-sectional and follow-up associations between metabolically healthy obesity and carotid atherosclerosis.
Methods: Cardiometabolic risk factors and carotid artery intima-media thickness (CIMT) in 556 men, mean aged 51yrs (36-76 yrs), were measured at baseline and one year later. All participants were free of hypertension and type 2 diabetes at baseline. Participants were divided into four groups based on cross-classifications of body mass index (BMI) and metabolic health status using the ATP-III criteria: metabolically healthy normal weight (NHNW, less than one metabolic abnormality with BMI <25 kg/m^2), metabolically unhealthy normal weight (NUNW, more than one metabolic abnormality with BMI <25 kg/m^2), metabolically healthy obesity (MHO, less than one metabolic abnormality with BMI ≥ 25 kg/m^2), metabolically unhealthy obesity (MUO, more than one metabolic abnormality with BMI ≥ 25 kg/m^2). Carotid atherosclerosis was defined as >75 percentiles of CIMT. The changes in CIMT were calculated as the difference between the first and second examinations (median interval 367 days).
Results: At baseline, mean CIMT was not significantly different between the MHNW and the MHO (0.58±0.12mm vs. 0.62±0.13mm, $P=0.13$), but was different between the MHNW and the MUO (0.64±0.13mm, $P=0.01$) after adjusting for age. The prevalence of carotid atherosclerosis tended to be higher in the MHO as compared to the MHNW after adjusting for age, heart rate, CRP, and VO_{2peak}, but this was not statistically significant (Odds Ratio (OR) 1.80 95% Confidence Interval (CI) 0.93-3.52). There was an increase in the OR for carotid atherosclerosis in the MUO (OR 2.08 95% 1.16-3.73). After one year, the progression of mean CIMT was not significantly different between the MHO and the MHNW after adjusting for covariates (Δ 0.03±0.11mm vs. Δ 0.05±0.10mm, $P=0.52$). Furthermore, the MHO at baseline was not significantly associated with the prevalence of carotid atherosclerosis at the second examination (OR 0.85 95% 0.39-1.87) when compared with MHNW.
Conclusions: These results demonstrate that the burden of carotid atherosclerosis was not increased in the MHO when compared with the MHNW in both cross-sectional and longitudinal associations.

PO-16
REDUCED CARDIAC BAROREFLEX SENSITIVITY IS ASSOCIATED WITH GREATER AORTIC STIFFNESS IN MIDDLE-AGED/OLDER HUMANS: BENEFICIAL EFFECT OF HABITUAL AEROBIC EXERCISE

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Introduction: Sedentary aging is characterized by reduced cardiac baroreflex sensitivity (BRS) and increased aortic stiffness, both independent predictors of higher cardiovascular disease (CVD) risk in middle-aged/older (MA/O) adults. However, MA/O adults who perform habitual endurance exercise demonstrate lower CVD risk perhaps in part from reduced aortic stiffness and enhanced cardiac BRS.
Objectives: We hypothesized that reduced BRS (sequence technique derived from intra-brachial artery BP waveforms) is associated with greater aortic stiffness (aortic pulse wave velocity, aPWV) among sedentary and endurance-trained MA/O adults, and that endurance exercise training initiated in previously sedentary MA/O adults enhances BRS and reduces aPWV.
Methods and results: In a cross-sectional study, MA/O sedentary (MA/O-S, n=24, age 62 ± 4 yrs, VO_2max 26 ± 1 ml/kg/min) adults demonstrated reduced BRS (11.7 ± 1.5 vs 40.7 ± 8.6 ms/mmHg, $P<0.05$) and greater aortic stiffness (aPWV 9.7 ± 0.8 vs. 6.4 ± 0.8 m/sec, $P<0.05$) compared with young sedentary (YS, n=6, age 22 ± 2 yrs; VO_2max 39 ± 2 ml/kg/min) adults. MA/O endurance-trained (MA/O-T, n=15, age 61± 2 yrs, VO_2max 46 ± 1 ml/kg/min, $P<0.05$) adults had greater BRS (24.3 ± 4.0 ms/mmHg) and smaller aPWV (8.0 ± 0.3 m/sec, $P<0.05$) than MA/O-S. In the entire cohort after adjustment for age and mean blood pressure, aPWV was inversely correlated with BRS (r=-0.55, $P<0.05$). In a subset of MA/O-S adults (n=18), 8 weeks of aerobic exercise training (n=12, 6-7 days/week, 40-45 min/day, 60-80% HRmax) improved BRS (11.7 ± 2.1 vs. 16.1 ± 2.7 ms/mmHg, $P<0.05$) but not aPWV (9.8 ± 0.8 vs. 9.2 ± 0.9 m/sec, P=0.08), while there was no change in sedentary time-controls (n=6, $P>0.05$).
Conclusions: Habitual aerobic exercise attenuates the age-related reduction in cardiac BRS and greater aortic stiffness in humans. However, short-term aerobic exercise training initiated in MA/O-S adults improves BRS but not aortic stiffness.

PO-17
A NEW ARTERIAL STIFFNESS INDEX PERMITTING ISOBARIC COMPARISONS

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Objectives: Arterial stiffness is pressure-dependent and comparisons among individuals and between groups should be made under isobaric conditions. Statistical methods are typically employed to adjust stiffness indices for pressure-dependence. In this ongoing study, we employ our new stiffness index, CPI, which allows for explicit evaluation at a reference pressure and stroke volume, to investigate its change with age and disease.
Methods: We studied twenty-three patients (n=23: 9 men and 14 women; mean age 70 years) that underwent diagnostic cardiac catheterization. Aortic pressure waveforms were used to evaluate CPI at a reference pressure of 80 mmHg and stroke volume of 100 mL. A closed-form expression of pressure-dependent compliance index, or CPI, was derived and computed for each subject. Linear regression was used to assess the trend of CPI with age.
Results: CPI values ranged from 1.08 to 3.03 mL/mmHg. A negative correlation was found between CPI and age (r=-0.57, $p<0.01$). End-stage renal disease patients had the lowest values within their respective decade of age. Patients without coronary artery disease had the higher values within their decade.
Conclusions: CPI is an index of pressure-dependent arterial compliance. Its decrease with age, further exaggerated by presence of disease, is consistent with studies using other stiffness indices. The allowance for explicit evaluation at a common pressure relieves the need for statistical adjustments for pressure-dependence and permits a more individualized measure of arterial stiffness. Moreover, this allows separation of active and passive changes in arterial stiffness when cardiac properties or blood pressure levels are altered. Continuing studies will provide better sampling of age and disease states.