



Artery Research

ISSN (Online): 1876-4401

ISSN (Print): 1872-9312

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

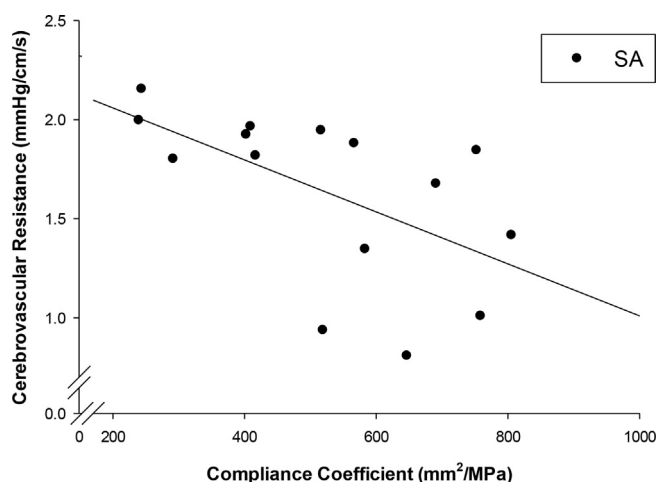
PO-16: REDUCED CARDIAC BAROREFLEX SENSITIVITY IS ASSOCIATED WITH GREATER AORTIC STIFFNESS IN MIDDLE-AGED/OLDER HUMANS: BENEFICIAL EFFECT OF HABITUAL AEROBIC EXERCISE

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To cite this article: Stephen A. Harris, Harald M. Stauss, Douglas R. Seals, Gary L. Pierce (2014) PO-16: REDUCED CARDIAC BAROREFLEX SENSITIVITY IS ASSOCIATED WITH GREATER AORTIC STIFFNESS IN MIDDLE-AGED/OLDER HUMANS: BENEFICIAL EFFECT OF HABITUAL AEROBIC EXERCISE, Artery Research 8:4, 172–172, DOI: <https://doi.org/10.1016/j.artres.2014.09.022>

To link to this article: <https://doi.org/10.1016/j.artres.2014.09.022>

Published online: 7 December 2019



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 51 yrs (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 (MHNW, less than one metabolic abnormality with BMI <25 kg/m²), metabolically unhealthy normal weight (MUNW, more than one metabolic abnormality with BMI <25 kg/m²), metabolically healthy obesity (MHO, less than one metabolic abnormality with BMI ≥25 kg/m²), metabolically unhealthy obesity (MUO, more than one metabolic abnormality with BMI ≥25 kg/m²). 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.