P4.3: INFLUENCE OF GENDER ON AORTIC STIFFNESS IN COPD

A. Albarrati, N. Gale, I. Munnery, M. Munnery, S. Saikia, S. Enright, D. Shale, J. Cockcroft

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CAROTID INTIMA-MEDIA THICKNESS IS POSITIVELY ASSOCIATED WITH SUBCHRONIC PERSONAL EXPOSURE TO BLACK CARBON: A STUDY IN A PANEL OF HEALTHY ADULTS

E. Provost a,h, T. Louwies a,k, J. Roodt a, E. Dons b, J. Penders a, L. Panis a,h, P. De Boever a,h, T. Nawrot a,h

aHasselt University, Diepenbeek, Belgium
bFlemish Institute for Technological Research (VITO), Mol, Belgium
cZiekenhuis Oost-Limburg (ZOL), Genk, Belgium

Background: Research shows an association between particulate air pollution exposure and cardiovascular morbidity and mortality, with atherosclerosis as an implied underlying mechanism. The accurate assessment of personal exposure is a major challenge in epidemiological research since it is strongly related to time-activity patterns. We investigated carotid intima-media thickness (CIMT) in association with subchronic personal exposure to black carbon (BC) in a panel of healthy adults.

Methods: Personal BC exposure of 54 participants (92.3% female; mean age 40.7 years) was measured during one average workweek as a proxy for subchronic exposure. Within this week, the CIMT of each participant was measured ultrasonographically on two separate days. The effect of personal BC exposure on CIMT was estimated using mixed models adjusted for covariates including gender, age, exposure to secondhand smoke and general health indicators.

Results: The analyses showed a strong positive association between CIMT and personally measured BC. An interquartile range (320.8 ng/m³) higher personal BC exposure was associated with a 0.47 mm (95% CI: 0.24 to 0.69, p<0.001) thicker CIMT, suggesting an IQR higher personal BC exposure is equivalent to 8 years of ageing.

Conclusion: Based on individually measured BC exposures in a relatively young cohort of healthy nurses, our results suggest a larger impact of BC on CIMT than reported so far for other measures of pollution, including particulate matter.

BLOOD PRESSURE CHANGES IN ASSOCIATION WITH PERSONAL BLACK CARBON EXPOSURE ARE NOT MEDIATED THROUGH MICROCEJULATORY RESPONSES

T. Louwies a,k,d, P. De Boever b,k,d, B. Cox k,l, J. Penders i,k,d, L. Panis a,k,d, T. Nawrot b,k,d

bFlemish Institute for Technological Research (VITO), Mol, Belgium
cZiekenhuis Oost-Limburg, Genk, Belgium
dLeuven University (KU Leuven), Leuven, Belgium

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IMPACT OF AGE AND GENDER ON THE DETERMINANTS OF PULSE PRESSURE AND ISOLATED SYSTOLIC HYPERTENSION

C. McEnery a, A. Cocks b, B. McDonnell c, Y. Yasmin c, J. Cockcroft c, I. Wilkinson d

eaUniversity of Cambridge, Cambridge, UK
bCardiff University, Cardiff, UK
cCardiff Metropolitan University, Cardiff, UK

dHasselt University, Diepenbeek, Belgium

Objective: This cross-sectional study was conducted to examine whether the risk profile for cardiovascular disease (CVD) and central hemodynamics, an independent marker for CVD, are not worsened in cancer survivors (CanS), who have annual health check-up, as compared to age-adjusted subjects without cancer (SWC).

Design: A cross-sectional cohort study.

Setting: Japan

Participants: From June 1, 2006, through November 30, 2007, Japanese sub-
jects (4813 men and 3500 women) who had annual health check-up at the Health Care Center of Tokyo Medical University.

Main Outcomes and Measures: The prevalence rate of subjects quit smoking, hypertension, diabetes mellitus, hypercholesterolemia, and metabolic syndrome. Radial augmentation index (rAI) and the second peak of radial pressure wave form (SP2), marker of central hemodynamics

Results: In both genders, the age-adjusted prevalence rate of hypertension and that of metabolic syndrome were lower in the CanS (127 men and 127 women) than in the SWC (p < 0.05). These variables were significant determinants for the elevation of SP2. Then, age-adjusted SP2 was also lower in the CanS (109.2 mmHg) than in the SWC (110.4 mmHg)(p < 0.05).

Conclusions and Relevance: In Japanese male and female CanS who have annual health check-up, the risk profiles for CVD were not worsened and might be rather preferable as compared to SWC. Such preferable profiles might provide beneficial effects on central hemodynamics especially in male survivors. Thus, in Japan, CanS with the mind and condition to have annual health check-up may have rather preferable pathophysiological profiles with the prevention of CVD.
Aortic stiffness is an independent predictor of adverse CV outcomes and elevated in COPD. However, the influence of gender on aortic stiffness in COPD has not been established. We hypothesized that males with COPD would have greater aortic stiffness than females.

**Methods:** As part of the ARCADE study, we assessed 500 patients with COPD confirmed by spirometry and 150 comparators. Aortic pulse wave velocity (PWV) was evaluated using the sphygmoCor device. Other assessments included body composition, blood pressure, heart rate, number of exacerbations, smoking history and C-reactive protein and fibrinogen.

**Results:** Patients and comparators were similar in age, BMI and gender. Males with COPD (225) had greater aortic PWV mean (SD) 10.2 (2.7) than females, 9.5 (2.4), p = 0.003. However, they were similar in age, FEV₁, BMI, peripheral and central blood pressure indices and heart rate, number of exacerbations, smoking history and inflammatory biomarkers, p > 0.05. The difference remained after controlling for age and peripheral mean arterial pressure (Adjusted R² = 26%, F = 6.15, p = 0.014). The gender difference was not evident in the comparator group.

**Conclusion:** Males with COPD had greater aortic stiffness compared to the females, independent of traditional cardiovascular risk factors. The increased aortic stiffness may explain the high incidence of fatal and non-fatal cardiac events in the male patients, which may offer a therapeutic target.


**P4.5 CHARACTERISTICS AND DETERMINANTS OF THE SUBLINGUAL MICROCIRCULATION IN A FLEMISH POPULATION**

Y. M. Gu a, L. Thijs d, Y.-P. Liu a, T. Petit a, Z. Zhang a, H. Vink a, T. Kuznetsova b, P. Verhamme a, J. Staessen a,b

**University of Leuven, Leuven, Belgium**

**Maastricht University, Maastricht, The Netherlands**

**Background:** Endothelial glyocalyx (EG) acts as a protective barrier. Decrease of sublingual perfused boundary region (SPBR) reflects EG loss. We aimed to assess reproducibility of SPBR and to determine its determinants in a general population.

**Methods:** In 281 subjects randomly recruited in a Flemish population, we measured SPBR using GlycoCheck software. SPBR is the distance between the median red blood cell column width and the estimated outer edge of the red blood cell perfused lumen. We standardized SPBR to medians of haematocrit and density of perfused capillaries. In 42 participants, we computed repeatability coefficients (RC) expressing bias as percentage of maximal biological variation. We searched for significant (p < 0.05) correlates of SPBR using stepwise regression.

**Results:** In 281 subjects (mean age, 51.2y; 53.0% women), SPBR averaged 1.80µm. RCs for intra- and inter-observer variability were >53.4%. Of 14 potential covariables, only age and mean arterial pressure (MAP) and use of diuretics correlated with SPBR (p < 0.049). Changes in SPBR associated with a 1-SD increments in age (+16.6y) and MAP (+11.3mmHg) were -58.2mm and -35.5mm, while SPBR was 97.7mm wider in diuretic users. Disregarding 140 patients with albuminuria, hypertension, diabetes, and cardiovascular disease, the 5th and 95th percentiles of SPBR across age (-30y to +50y) ranged from 1.54µm to 1.43µm and from 2.52µm to 2.28µm, respectively.

**Conclusion:** SPBR variability is high probably because of physiological factors, because imaging is software controlled. The inverse association of SPBR with age and MAP might reflect a defense mechanism in the presence of these cardiovascular risk factors.

**P4.6 PULSATILE AND STEADY BLOOD PRESSURE COMPONENTS IN RELATION TO ENVIRONMENTAL LEAD EXPOSURE IN THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2003-2010**

A. Hara a, L. Thijs b, K. Asaya a, Y.-M. Gu a, L. Jacobs d, Z.-Y. Zhang a, Y.-P. Liu a, T. Nawrot c, J. Staessen a,b

aUniversity of Leuven, Leuven, Belgium
bTerkio University School of Medicine, Tokyo, Japan
cUniversity of Hasselt, Hasselt, Belgium
dMaastricht University, Maastricht, The Netherlands

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In view of the declining environmental lead exposure in the US, we analyzed the National Health and Nutrition Examination Survey (2003-2010) for association of pulsatile and steady BP components and hypertension (HT) with blood lead (BPb). The 12,725 participants included 21.2% Blacks, 20.5% Hispanics, 56.4% Whites, and 48.7% women. Blacks compared with non-Blacks had higher SBP, DBP, and mean arterial pressure (MAP) (126.5 vs. 123.9; 71.9 vs. 69.6; and 90.1 vs. 87.7mmHg, respectively) and higher HT prevalence (44.7 vs. 36.8%). SBP, DBP and MAP (123.3 vs. 125.5; 68.9 vs. 71.2; and 87.1 vs. 89.3mmHg) were lower in women than males with significant sex difference in PP and HT prevalence (p < 0.01). BPb was lower in Whites than non-Whites (1.46 vs. 1.57µg/dL) and in women than men (1.25 vs. 1.80µg/dL). In multivariable analyses of all participants, BPb doubling was associated with higher (p < 0.0007) SBP, DBP and MAP (0.76 [CI, 0.38-1.13]; 0.43 [0.18-0.68]); and 0.54 [0.29-0.79]mmHg, respectively) with no change in PP (p = 0.063) or the odds of HT (p = 0.11). Associations with BPb were nonsignificant (p > 0.09) for SBP in women and for DBP and MAP in non-Whites. Among men, SBP increased with BPb (p = 0.060) with effect sizes associated with BPb doubling ranging from -0.65µmHg to Whites to +1.61µmHg in Blacks. For SBP and PP, interactions of ethnicity and sex with BPb were all significant (p < 0.027). In conclusion, small and inconsistent effect sizes in the associations of BP with BPb likely exclude current environmental lead exposure as a major HT cause in the US.

**P4.7 RELATIONSHIP OF DIFFERENT CARDIOVASCULAR TISSUE BIOMARKERS WITH ESTABLISHED RISK FACTORS AND FRAMINGHAM RISK SCORE IN MIDDLE-AGE SUBJECTS WITHOUT CARDIOVASCULAR EVENTS**

C. Palombo a, C. Morizzo b, D. Guarino c, M. Kozakova d

aDepartment of Surgical, Medical, Molecular & Critical Area Pathology, University of Pisa, Pisa, Italy
bDepartment of Clinical and Experimental Medicine, University of Pisa, Pisa, Italy

cnrinology

The relations between emerging biomarkers of preclinical CV disease and established risk algorithms are not well defined. Aim: this study evaluated the relationships of various tissue CV biomarkers with Framingham risk score (FRS) and its individual determinants.

**Methods:** In 435 subjects without previous cardiovascular events (287 males, mean age 58 ± 11, 56% diabetics (DM), 48% treated for hypertension (HB), 51% with dyslipidemic treatment, 27% smokers), we measured radio-frequency indexes as the explanatory variables, we observed a significant and positive correlation of RRI only with cPP (P = 0.010). BPb was significantly and positively associated with RRI (mean, 0.60) and left ventricular blood flow, RRI was significantly and positively associated with BPb doubling ranging from +0.65mmHg in Whites to +1.80mmHg in non-Whites (1.46 vs. 1.57µg/dL) and in women than men (1.25 vs. 1.80µg/dL). In multivariable analyses of all participants, BPb doubling was associated with higher (p < 0.0007) SBP, DBP and MAP (0.76 [CI, 0.38-1.13]; 0.43 [0.18-0.68]); and 0.54 [0.29-0.79]mmHg, respectively) with no change in PP (p = 0.063) or the odds of HT (p = 0.11). Associations with BPb were nonsignificant (p > 0.09) for SBP in women and for DBP and MAP in non-Whites. Among men, SBP increased with BPb (p = 0.060) with effect sizes associated with BPb doubling ranging from -0.65µmHg to Whites to +1.61µmHg in Blacks. For SBP and PP, interactions of ethnicity and sex with BPb were all significant (p < 0.027). In conclusion, small and inconsistent effect sizes in the associations of BP with BPb likely exclude current environmental lead exposure as a major HT cause in the US.