P47: TETRAHYDROBIOPTERIN AND MARKERS OF OXIDATIVE STRESS IN A YOUNG BI-ETHNIC POPULATION: THE AFRICAN-PREDICT STUDY

Hugo Huisman, Carina Mels, Johannes Van Rooyen, Ruan Kruger, Carla Fourie, Lebo Gafane, Wayne Smith, Alta Schutte


To link to this article: https://doi.org/10.1016/j.artres.2017.10.075

Published online: 7 December 2019
Conclusions: In hypertensive patients age appears to be the major determinant of TOD, with central SBP, and marginally peripheral SBP, PWV and AIX, also playing a significant role. Our results suggest that estimation of 24-hour central hemodynamics and arterial stiffness in ambulatory conditions may help improve the individualized assessment of the BP-associated TOD.

References

P45 REIN IN DIFFERENT PHYSICAL ACTIVITY LEVELS IN A BI-ETHNIC POPULATION: THE AFRICAN-PREDICT STUDY
Johannes van Rooyen, Hugo Huismann, Leené Malan, Catharina Mels, Ruan Kruger, Lebo Gaﬁane-Matemane, Shani Botha, and Alta Schutte
1Hypertension in Africa Research Team (HART) and South African Medical Research Council (SamRC) Unit for Hypertension and Cardiovascular Disease, South Africa
2Hypertension in Africa Research Team (HART) and South African Medical Research Council (SamRC), South Africa

Background and objectives: It is widely accepted that regular physical exercise reduces the BP, particularly in hypertensive individuals. It is recommended in the prevention of hypertension to assist in BP control. The BP lowering mechanisms of exercise remain largely elusive, we therefore evaluated the RAAS as a regulator of arterial BP.

Methods: The sub-study was embedded in the African Prospective study on the Early Detection and Identiﬁcation of Cardiovascular disease and Hypertension (African-PREDICT) and included 111 white and 99 black participants aged 20–30 years. Office- and central blood pressure as well as other cardiovascular variables were measured. Renin was analysed with an ELISA- and aldosterone with a RIA kit. Only in white participants high physical activity levels were associated with birthweight.

Results: Analyses included 235 participants 44% male, with mean ± SD age 29.8 ± 0.7 years, birthweight 3.1 ± 0.0 kg, PWV 6.3 ± 0.1 m/s and CAVI 6.3 ± 0.1. Bivariate models showed men had higher arterial stiffness (p < 0.001). Maternal height (p = 0.031), waist/hip ratio (p = 0.019), BMI (p = 0.001) and blood pressure (systolic and diastolic) (p < 0.001) were associated with PWV, but only BMI (p < 0.001) was associated with CAVI. There was no association between birthweight and PW or CAVI, p = 0.38 and p = 0.41 respectively. In multivariable models, associations between birthweight and PW and CAVI did not change after controlling for gender, BMI, and SBP. Positive associations (coef ± SE) between PW and BMI (0.03 ± 0.01 p = 0.01) and SBP (0.03 ± 0.01 p = 0.001) remained signiﬁcant; as did the negative associations for BMI and CAVI (−0.04 ± 0.01 p < 0.001).

Conclusion: Men had higher arterial stiffness even when controlling for blood pressure and the associations of blood pressure and BMI with PWV were positive whereas and BMI with CAVI was negative. Neither arterial stiffness measure was associated with birthweight.

P47 TETRAHYDROBIOPTERIN AND MARKERS OF OXIDATIVE STRESS IN A YOUNG BI-ETHNIC POPULATION: THE AFRICAN-PREDICT STUDY
Hugo Huismann, Carina Mels, Johannes Van Rooyen, Ruan Kruger, Carla Fourie, Lebo Gaﬁane, Wayne Smith, Alta Schutte
1Hypertension in Africa Research Team, North West University, South Africa
2Hypertension in Africa Research Team, North-West University, South Africa
3Hypertension in Africa Research Team (HART), North-West University, Potchefstroom, South Africa

Background/Objectives: Tetrahydrobiopterin (BH4) is a cofactor for nitric oxide synthase (NOS). Oxidative stress, reported in black populations (1), may lead to the oxidation of BH4, the uncoupling of eNOS, decreased NO and increased superoxide levels (2,3). We compared BH4 and markers of oxidative stress and their association, between black and white cohorts.

Methods: In the African-PREDICT study, we included black (n = 300) and white (n = 297) participants (aged 20–30 years). We measured blood pressure, and determined serum levels of BH4 and markers of oxidative stress.

Results: Blacks had higher blood pressure (p < 0.001). In blacks the following serum levels were lower: BH4 (p < 0.0001), total antioxidant status (TAS) (p < 0.0001), glutathione peroxidase (GPx), while reactive oxygen species (ROS) (p < 0.03) was higher. In blacks BH4 related positively with GPx in single, partial (adjusted for socio-economic status, sex, age, BMI, GGT and cotinine) and multiple regression (R2 = 0.16, p = 0.17, p = 0.02) and glutathione reductase (GR) (R2 = 0.16, p = 0.15, p = 0.05). We found a negative correlation between BH4 and GPx (R2 = 0.07, p = 0.26, p = 0.006) in whites.

Conclusions: Higher oxidative stress levels in young blacks (increased ROS, lower TAS and GPx) could explain the low concentrations of BH4, the possible uncoupling of eNOS, resulting in higher blood pressure. The uncoupling of eNOS may explain the production of ROS and peroxinitrite and may be linked to the positive correlation of BH4 with GPx and GR found in blacks, that may lead to early vascular changes.

Reference

Poster Session I — Hypertension
P54 SEX DIFFERENCES IN AMBULATORY CENTRAL BLOOD PRESSURE AND PULSE WAVE REFLECTIONS IN UNTREATED PATIENTS
Berndham Hametner, Christopher Cimens Mayer, Katy Whitley, Thomas Weber, Peter Fitsch, Siegfried Wassertheuer
1Center for Health & Bioreources, AIT Austrian Institute of Technology, Vienna, Austria