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### 12.3: 24 HOUR AMBULATORY BLOOD PRESSURE MONITORING AND PULSE WAVE VELOCITY PATTERNS IN KENYAN ADOLESCENTS

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## 12.1

## EVALUATION OF ACUTE EFFECTS OF COFFEE CONSUMPTION ON ARTERIAL STIFFNESS IN HEALTHY ADULT PEOPLE USING AN OSCILLOMETRIC DEVICE

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**Environment/Objectives:** Several studies in different populations and conditions shown contradictory results about the effect of coffee on arterial stiffness (AS). Coffee consumption is high around the world and it is very important to define its CV effects.

To evaluate the acute effects on haemodynamic parameters and AS, after consumption of regular coffee or, decaffeinated coffee.

**Methods:** In a prospective, self controlled cohort study we included 32 healthy p. (46.2±10.4y.o., 16 men (53.5±18) and 16 women (43.0±21)(p=0,186)). Fourteen regular coffee consumers (87.5%) (p=NS). Haemodynamic parameters and AS were assessed non invasively using oscillometric Arteriograph® (TensioMed Budapest, Hungary Ltd.). Each subject received 14 gr. of excelso coffee (151.2 mg caffeine) and two weeks apart, 14 gr of decaf coffee (3.92 mg) in random order. Baseline, 30 and 60 min parameters are reported.

**Results:** SBP increased at 30 and 60 min 3.9 mmHg (p=0.013) y 3.8 mmHg (p=0.002) respectively, la DBP increased 4.1 mmHg (p=0.001) y 3.2 mmHg (p=0.003), MAP 4.0 mmHg (p<0.001) y 3.3 mmHg (p=0.001), Heart rate decreased 3.2 (p=0.002) and 5 latidos/minuto (p<0.001) and aortic SBP increased 5.8 mmHg (p=0.002) and 7.6 mmHg (p=0.003) only with caffeine. Brachial Aix increased 19.9% at 30 (p<0.001) and 20.0% at 60 minutes (p<0.001). Aortic Aix increased 10.05% (p<0.001) y 10.2% (p<0.001) only with caffeine. PWV was not affected by caffeine (p=0.861). The shift of these parameters was mainly driven by changes in women.

**Conclusions:** Caffeine at usual doses (two expresos) increased peripheral AS but not aortic PWV, specially in women.

## 12.2

## HIGH PULSE WAVE VELOCITY IS ASSOCIATED WITH INCREASED VISIT-TO-VISIT SYSTOLIC BLOOD PRESSURE VARIABILITY IN CONTROLLED ARTERIAL HYPERTENSION

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**Background:** Visit-to-visit blood pressure variability (BPV) is associated with adverse cardiovascular outcomes in different patients' populations<sup>1,2</sup>. Arterial stiffness is a potential mechanism of increased visit-to-visit BPV<sup>3</sup>. Carotid-femoral PWV has become increasingly important for total cardiovascular risk estimation.

**Materials and methods:** 52 pts (20 men, age 58.9±9.0 yrs 4 smokers 6 diabetics) were treated to target BP<140/90mmHg with a RAAS-inhibitor/amlodipine combination for 14 months. Baseline brachial BP was 163.4±8.1/100.9±4.2mmHg achieved-123.7±9.7/76.8±6.7mmHg. Central BP and PWV were measured at baseline and after 14 months. Individual values of PWV were assessed according to age and BP categories<sup>4</sup>. BPV was calculated as SD for 5 visits during 8 months after target BP achievement.p<0.05 was considered significant.

**Results:** Baseline central BP was 137.8±17.3/86.6±12.0mmHg, achieved 125.2±13.5/80.3±6.6mmHg (p<0.05). Baseline PWV varied from 7.6 to 19.2 m/s (median 12.2 m/s), achieved – from 9.9 to 17.4 m/s (median 13.4 m/s),p>0.05. Normal values of PWV according to individual reference values were observed in 25.5% of patients (group1, mean PWV 10.0±1.5 m/s), increased – in 74.5% (group2, mean PWV 13.8±2.4 m/s). Groups were similar by age, gender, metabolic risk factors, baseline and achieved BP and visit-to-visit BPV. SBPV range was 1.79-16.79 mmHg (tertile I<5.38 II 5.38 – 7.78 III>7.78 mmHg). Increased PWV value was more often observed in the III tertile of visit-to-visit SBPV (90.3% comparing to 58.8% in tertile I and 73.3% in tertile II, Pearson ( $\chi^2$ )=5.9,p<0.05).

**Conclusion:** Elevation of PWV above individual reference values in patients with uncomplicated AH is associated with higher visit-to-visit SBPV. This finding confirms role of arterial stiffness in visit-to-visit BPV increase.

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## 12.3

## 24 HOUR AMBULATORY BLOOD PRESSURE MONITORING AND PULSE WAVE VELOCITY PATTERNS IN KENYAN ADOLESCENTS

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**Background:** There are no data on ambulatory blood pressure monitoring (ABPM) and arterial stiffness parameters in sub-Saharan African children. We performed 24-hour ABPM and pulse wave velocity (PWV) measurements in adolescents living in 2 slums in Nairobi, Kenya.

**Methods:** We selected 1,100 11-17 year olds who from birth had been continuous residents of the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) to participate in the study. Participants underwent anthropometric measurements (weight, height, mid-upper arm circumference [MUAC]) and answered questions on their socioeconomic status (SES). A clinic BP measurement was then taken using an automated Omron™ M10-IT monitor (mean of 2 from 3 readings). Participants then underwent 24-hr ABPM and PWV measurement using an Arteriograph™24 monitor.

**Results:** 500 (90%) of 558 children recruited between December 2015 and June 2016 had acceptable ABPM readings ( $\geq 20$  daytime and  $\geq 7$  nighttime readings). Mean (SD) clinic BP, and 24 hour-ABPM values were 98(11) and 117(12) systolic and 63(8) and 64(7) mmHg diastolic respectively. Mean clinic PWV and 24 hour-PWV were 7.3(1.5) ms<sup>-1</sup> and 7(0.8) ms<sup>-1</sup> respectively. In multivariate regression analyses age (p=0.004), BMI (p=0.033) and PWV (p<0.001) were strong independent predictors of 24-hour BP values. Blood indices (hemoglobin, white cell and platelet count), gender, MUAC and SES had no independent influence on 24hr BP and PWV.

**Conclusions:** These are to our knowledge the first 24hr ABPM and PWV data generated from sSA adolescents. Long-term cardiovascular outcome studies are needed to determine the predictive ability of ABPM and PWV measurements.

## 12.5

## IMPAIRED REGULATION OF ARTERIAL WALL VISCOSITY DURING CHANGES IN BLOOD FLOW IN ESSENTIAL HYPERTENSIVE PATIENTS

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**Background:** Arterial wall viscosity (AWV) is a major source of cardiac energy dissipation along the arterial tree. Evolution of AWV during increase in blood flow and the impact of essential hypertension on this evolution have never been studied.

**Methods:** Radial artery diameter, wall thickness and arterial pressure were simultaneously measured in 18 untreated essential hypertensive (HT) subjects and 14 frequency matched normotensive (NT) controls at baseline and during a sustained blood flow increase induced by hand skin heating. AWV was estimated by the ratio of the area of the hysteresis loop of the pressure-diameter relationship (viscous energy dissipated, W<sub>v</sub>) to the area under