P.052: BLOOD PRESSURE AND LARGE ARTERIAL ELASTIC PROPERTIES. BENEFIT OF BETAXOLOL IN HYPERTENSION

F.T. Ageev, Y.A.A. Orlova*, B.D. Kulev, O.N. Baldina

To cite this article: F.T. Ageev, Y.A.A. Orlova*, B.D. Kulev, O.N. Baldina (2006) P.052: BLOOD PRESSURE AND LARGE ARTERIAL ELASTIC PROPERTIES. BENEFIT OF BETAXOLOL IN HYPERTENSION, Artery Research 1:S1, S39–S40, DOI: https://doi.org/10.1016/S1872-9312(07)70075-3

To link to this article: https://doi.org/10.1016/S1872-9312(07)70075-3

Published online: 21 December 2019
waveform. We investigated this during cardiac catheterisation, examining the effects of pacing and nitroglycerin (NTG) on estimation of central systolic pressure from the peripheral pulse.

**Methods:** Patients undergoing coronary angioplasty (n = 11, aged 48 to 72 years) participated. A Millar SPC-454D or fluid filled catheter was placed in the aortic root and a pacing wire in the right atrium. Peripheral digital arterial waveforms (Finometer) and aortic waveforms were obtained at baseline, during pacing at 20 bpm above resting heart rate and during adenosine infusion (10 and 100 mg/min, i.v.).

**Results:** Pacing and NTG produced marked changes in central and peripheral waveforms, reducing central augmentation index from 40.4±6.2 to 22.6±6.8% and from 40.4±6.2 to 12.7±7.7% for pacing and NTG 100 mg/min respectively (each P<0.01). At baseline and during all interventions, there was a close correlation between central systolic blood pressure and absolute finger systolic pressure at the point of late systolic augmentation (r = 0.95, P<0.0001). The mean difference measured between central aortic systolic BP and that estimated from digital pressure was 2.2 mmHg/6.2 mmHg.

**Conclusions:** These data suggest that central systolic blood pressure can be estimated directly from non-invasive finger pressure waveforms even during interventions such as pacing and NTG that produce a marked change in pressure waveforms.

**P.049**

**EFFECTS OF INHIBITION OF NITRIC OXIDE SYNTHASE ON THE PERIPHERAL ARTERIAL WAVEFORM RESPONSE TO EXERCISE**


**Cardiovascular Division, King’s College School of Medicine, London, United Kingdom**

**Introduction:** Exercise reduces systolic augmentation in the peripheral pulse wave, an effect similar to that produced by the nitric oxide (NO) donor nitroglycerin (NTG). The changes produced by exercise persist into the recovery period for 30 min. The aim of this study was to investigate if the exercise induced changes are dependent on endothelium-derived NO. We used the NO synthease inhibitor Nω-monomethyl-L-arginine (L-NMMA) to test this.

**Methods:** Healthy volunteers (n=10, 5 female, aged 19 to 33 years) participated in a 2-phase randomised controlled cross-over study. L-NMMA (6 mg/kg i.v. over 5 min) and saline placebo were given immediately before exercise on two occasions separated by at least 5 days. Mean arterial blood pressure (MAP by Finapress), pulse wave velocity (PWV, m/s) and augmentation index (Aix, %) were measured every minute for 30 min. At the end of exercise, radial augmentation index (RAIx by SphymoCor) and cardiac output (innocor) measurements were made at baseline, during infusion of L-NMMA/saline immediately before exercise, during exercise (except for radial artery measurements) and during recovery. Peripheral vascular resistance (PVR) was calculated from MAP and cardiac output. During exercise, workload increased from 25 W to 150 W by 25 W at 2 min intervals.

**Results:** Before exercise, L-NMMA increased mean arterial blood pressure (85.1±3.8 vs 101.2±4.3 mmHg, P<0.01), peripheral vascular resistance (16.4±0.7 vs 24.7±1.7 mmHg/ml/min, P<0.001) and RAIx (50.2±4.5 vs 70.2±6.5%, P<0.001) and decreased heart rate (65.6±5.7 vs 49.1±2.8 bpm, P<0.001). After exercise, heart rate, RAIx and PVR were similar in both groups, while after L-NMMA and saline, however, L-NMMA attenuated the exercise induced fall in RAIx so that RAIx was higher after L-NMMA compared to saline at 15 min in recovery (49.5±5.3 vs 36.0±4.4%, P<0.02).

**Conclusion:** These data suggest that, although endothelium derived NO has little effect in regulating PVR during and after exercise, it may have a role in mediating exercise induced changes in the pulse waveform.

**P.050**

**THE INSULIN SENSITIZER ROSIGLITAZONE IMPROVES ENDOTHELIAL FUNCTION IN PATIENTS WITH TYPE 2 DIABETES ON INSULIN**

K. Papathanasiou *, K.K. Nakagawa, N. Kazakos, K. Papas1, K. Liveris1, D. Makrylivanis2, A. Tsatsoulis1, L.K. Michaelis1, 1Michailoud Cardiac Center, University of Ioannina, Ioannina, Greece, 2Department of Endocrinology, Hatzikostas General Hospital, Ioannina, Greece, 3Department of Endocrinology, University Hospital of Ioannina, Ioannina, Greece

**Aim:** Thiazolidinediones (TZDs) are insulin sensitizers used to improve glycaemic control in diabetic patients. TZDs have also been reported to improve endothelial function in obese patients with insulin resistance and in diabetic patients on oral treatment. However, little is known about the vascular effects of TZDs in patients with type 2 diabetes treated with insulin. The aim of our study was to assess the effects of rosiglitazone on endothelial function in type 2 diabetic patients treated with insulin.

**Methods:** Thirty-one diabetic patients without known coronary artery, cerebrovascular or peripheral arterial disease, who were already on an insulin regime, were randomized into 2 groups; no treatment was added in group A (n = 14), while rosiglitazone (4 mg od) was added in group B (n = 17) for 6 months. Flow-mediated dilation (FMD) in the brachial artery was assessed in all patients, at baseline and at follow-up.

**Results:** At baseline, the 2 groups did not differ in age (mean±SD: 67.3±6.4 vs 64.7±6.7, years respectively, p=ns), or any measured variable. In group A there were no significant changes at 6 months in any variable except for diastolic blood pressure that dropped from 79.7±7 to 72.1±12 mmHg (p<0.05). In group B there was significant reduction in glycated haemoglobin (HbA1c) from 8.8±0.1 to 7.8±0.1 % (p<0.0005) and fasting plasma glucose from 186±164 to 144±81 mg/dl (p<0.05) was observed at 6 months, while FMD significantly improved (from 1.43±1.6 to 2.98±1.80%, p<0.005).

**Conclusions:** In insulin-treated type 2 diabetic patients, treatment with rosiglitazone for 6 months has a beneficial effect on glycaemic control and endothelial function.
in the levels of cholesterol, triglycerides, glucose. Betaxolol has been well tolerated in most patients.

Conclusion: These results demonstrate that betaxolol increases arterial distensibility. This effect of betaxolol should be attributed to BP lowering and endothelial function improvement.

P.053
PROGNOSTIC SIGNIFICANCE OF FLOW MEDIATED DILATATION OF THE BRACHIAL ARTERY IN HYPERTENSIVE PATIENTS.
M. Salvetti*, M.L. Mulesan, A. Paini, E. Belotti, G. Galbassini, V. Paderno, C. Agabiti-Rosei, C. Aggusti, E. Agabiti-Rosei. Internal Medicine, Brescia, Italy

Background: In uncomplicated hypertensive patients the prognostic role of endothelial dysfunction, as evaluated by flow-mediated vasodilatation of the brachial artery, has not been investigated.

Methods: A total of 175 prospectively identified uncomplicated hypertensives (age 53 ± 5 years, 42% women, 48 with diabetes mellitus type 2) were studied. At baseline all subjects were untreated and underwent a baseline standard laboratory examinations. A standard echocardiogram was performed for the evaluation of LV anatomy and function and patients with systolic dysfunction or LV wall motion abnormalities were excluded. Endothelial function was measured as flow-mediated dilatation of the brachial artery using high-resolution ultrasound.

Results: Patients were followed for 86 ± 4 months (range 11-123 months). A first non fatal or fatal cardiovascular event occurred in 28 patients. The incidence of cardiovascular events was 1.4 and 3.1 per 100 patient-years in patients with a FMD above (n = 87) and below (n = 88) the median value, respectively (p = 0.003) but not between WS and CF-PWV. A total of 22 patients developed left ventricular hypertrophy (LVH). LVH was more frequent in patients with a FMD below the median value (n = 18) compared to patients with a FMD above the median value (n = 4) (p = 0.003). LVH was associated with an increased risk of cardiovascular events (odds ratio 2.27, 95% confidence interval [CI] 1.01–5.15, p < 0.05). LVH was associated with a higher prevalence of diabetes mellitus (n = 12) (p < 0.05) and systolic BP at baseline, a low FMD conferred an increased risk of cardiovascular events (p < 0.05) but not with diabetes mellitus (p = 0.2).

Conclusions: The presence of endothelial dysfunction, as evaluated by flow-mediated vasodilatation of the brachial artery, identifies hypertensive patients at increased risk of non fatal and fatal cardiovascular events.

P.054
LOCAL ARTERIAL WAVE SPEED AT CAROTID ARTERY LEVEL IS REPRESENTATIVE OF CAROTIDO-FEMORAL PULSE WAVE VELOCITY AND AORTIC STIFFNESS: EVIDENCE BY A NEW ECHO-TRACKING APPROACH
E. Maishl1*, C. Morzio1, M. Florescu1, M. Kozakova2, D. Vinereanu2, C. Palombo2, 1University of Pisa, Department of Internal Medicine, Pisa, Italy, 2University Hospital, Department of Cardiology, Bucharest, Romania

Carotido-femoral (CF) pulse wave velocity (PWV) is a marker of aortic stiffness. Recently a new ultrasound technique capable to provide real-time arterial waveform analysis ("E-track", Aloka) has been developed. When calibrated for blood pressure (BP), arterial stiffness parameters and a single point local wave speed (WS) are obtained.

Aim of this study was to evaluate whether or not common carotid (CCA) local WS may be representative of CF-PWV. Thirty-one patients free of cardiovascular disease, with or without atherosclerotic risk factors (16 males; mean age 55 ± 12, age range 24-72; mean BP 137 ± 17/81 ± 21 mmHg), underwent right CCA scanning by high-resolution linear US probe (7.5 MHz, Aloka SSD-5500) for E-track evaluation. Single-point WS at CCA level was computed as WS = 0.6/√(Re). CF-PWV and carotido-radial PWV (CR-PWV) were assessed by Compiloop (Artech, Paris). For both methods, at least 5 consecutive beats were averaged.

Mean WS, CF-PWV and CR-PWV were 9.4 ± 0.4 m/s, 10.1 ± 2.2 m/s, 10.9 ± 1.1 m/s (p < 0.05). WS was directly related to CF-PWV (r = 0.60, p < 0.001) but not to CR-PWV (r = 0.22, p = 0.05). At Bland-Altman analysis, mean difference between WS and CF-PWV was 1.15 ± 3.58, with all measurements but one within ±2sd. Both “Beta” and “Epsilon” derived by E-track also correlated directly with CF-PWV (r = 0.50 and 0.55, respectively, p < 0.005) but not with CR-PWV. Finally, the known correlations with age and pulse pressure were confirmed for both CF-PWV and WS (r between 0.40 and 0.65). CCA stiffness and local WS appear representative of aortic stiffness as estimated by CF-PWV.

P.055
EXPERIMENTAL STUDY OF THE EFFECTS OF A NEW NON-CYLINDRIC "CURVED-EDGED" STENT ON FLOW CHARACTERISTICS IN A MODEL OF A MILD ARTERIAL STENOSIS
T.G. Papaioannou1*, C. Ch. Christofidis1, D.S. Mathioulakis1, C.I. Stefanadis2. 1Fluids Section, School of Mechanical Engineering, National Technical University of Athens, Athens, Greece, 2Unit of Biomedical Engineering, First Dept. of Cardiology, Hippokration Hospital, Medical School, National & Kapodistrian University of Athens, Athens, Greece

Background and Methods: Restenosis remains a major concern in vascular stenting, especially for ostial lesions. The purpose of this study was to investigate whether a non-cylindrical stent, with curved edges, implanted upstream of a mild arterial stenosis could be beneficial by increasing blood flow velocity and by limiting the flow recirculation zone in the vicinity of the stenosis. Steady and pulsatile flow fields were investigated in an axisymmetric model of an ostially stented arterial segment followed by a 50% stenosis, in an in-vitro model employing flow visualization technique. The stenosis was located close to the tube entrance a certain distance apart. Two different tube entrance geometries, modelling a stented arterial segment, were studied regarding their effect on flow pattern at various Reynolds numbers (Re = 300–800).

Results: A decrease 3–6% in flow recirculation region at the vicinity distally to a 50% stenosis was observed when the "curved-edged" stent was used in the models compared to the regular cylindric stent. Mean flow velocity was increased for both steady flow (especially at low resistance) and pulsatile flow (for higher resistance), when the curved-edged configuration was used instead of the regular stent (figure).

Conclusions: These effects induced by the new stent configuration could be important and may potentially contribute to the delay of restenosis processes, which remains to be clarified in vivo.

P.056
CAFFEINE CONSUMPTION ACUTEY INDUCES "CHAOSS" IN BLOOD PRESSURE VARIABILITY, AS ASSESSED BY APPLANATION TONOMETRY OF THE RADIAL ARTERY AND DETERMED FLUCTUATION ANALYSIS
T.G. Papaioannou1*, C. Vlachopoulos, N. Ioakeimidis, N. Alexopoulos, C. Stefanadis. First Dept. of Cardiology, Hippokration Hospital, Medical School, National & Kapodistrian University of Athens, Athens, Greece

The occurrence of continuous blood pressure (BP) fluctuations is an intrinsic feature of the cardiovascular system and is related to complex cardiovascular mechanisms and environmental stimulations or daily habits (i.e. coffee drinking). The aim of this study was to investigate the acute effect of caffeine on the blood pressure variability, observed by applanation tonometry of the radial artery at baseline and 30, 60, 90 and 120 min after ingestion of caffeine or placebo. The occurrence of continuous blood pressure fluctuations demonstrated high regularity and predictability in the measured variables over time.

Methods: Fourteen healthy subjects consumed 240 mg of caffeine or placebo according to a randomized, double-blind, crossover design. Radial pressure waveforms were recorded by applanation tonometry of the radial artery at baseline and 30, 60, 90 and 120 min after ingestion of caffeine or placebo. Detrended fluctuation analysis was used to quantify the fractal correlation properties of the BP data by estimating the scaling (self-similarity) exponent α. Approximate entropy (ApEn) was also determined to assess BP irregularity.

Results: Caffeine induced greater “randomness” in BP fluctuations. This caffeine effect might be considered to be beneficial but it should be further investigated.