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### **P100: TRIAL OF EXERCISE TO PREVENT HYPERTENSION IN YOUNG ADULTS (TEPHRA): RATIONALE AND PROTOCOL**

Afifah Mohamed, Odaro Huckstep, Wilby Williamson, Charlotte Herdman, Yvonne Kenworthy, Konstantina Spagou, Linda Arnold, Polly Whitworth, Ashley Verburg, Holger Burchert, Adam J. Lewandowski, Paul Leeson

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young. In the older adults, neither FMD (SALS:  $3.5 \pm 1.4$  to  $4.6 \pm 1.2\%$ ; PLAC:  $3.4 \pm 1.2$  to  $2.5 \pm 1.3\%$ , ANOVA  $P = 0.98$ ) nor CFPWV (SALS:  $8.1 \pm 0.5$  to  $8.4 \pm 0.6$  m/sec; PLAC:  $7.6 \pm 0.5$  to  $7.6 \pm 0.4$  m/sec, ANOVA  $P = 0.41$ ) was altered after 4 weeks of salsalate vs. placebo.

These data fail to demonstrate that chronic salsalate improves age-associated aortic stiffness or endothelial dysfunction in older adults. Future studies should test longer duration therapy or more selective inflammatory inhibitors on vascular aging in humans.

#### P96

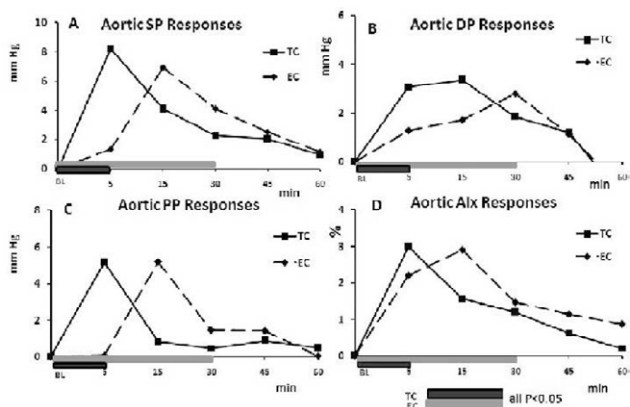
##### ACUTE EFFECT OF ELECTRONIC CIGARETTE SMOKING ON PULSE PRESSURE AMPLIFICATION IN YOUNG SMOKERS

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**Purpose/Background/Objectives:** We investigated the acute effect of electronic cigarette (EC) smoking on the aortic pressure waveform amplification. We also sought to compare the effect of EC and combustible cigarette (TC) smoking on central haemodynamics.

**Methods:** We studied 24 smokers (age:  $30 \pm 8$  years) on 3 separate occasions: a) tobacco cigarette (nicotine content, 1.2 mg) over 5 minutes, b) EC (18 mg E-liquid) for a period of 30 minutes, and c) nothing (sham procedure) for 60 minutes. Smoking EC for 30 min (15 puffs) was chosen to mimic the common pattern of EC smoking.

**Results:** Both TC and EC smoking caused a significant increase in brachial pressures and heart rate (HR), and the differences in blood pressure (BP) and HR responses between the two smoking forms were not significant. The aortic pressures also increased significantly after smoking both TC and EC, with the greatest changes seen in the first 5 minutes after TC smoking and 15 minutes EC smoking (figures 1A-C, all  $P < 0.05$ ). Although Alx, decreased in both two smoking forms, by applying a correction factor for changes in HR, the Alx increased significantly after TC (by 3.0% at 5 minutes,  $P < 0.05$ ) and EC (by 2.9% at 15 minutes,  $P < 0.05$ ) (figure 1D).



**Conclusions:** Electronic cigarette smoking exerts an unfavourable and comparable to that of TC smoking acute effect on aortic pressure waveform amplification. Given the prognostic role of central haemodynamics on cardiovascular disease risk, EC may still be considered a hazardous smoking method.

#### P98

##### EFFECT OF LONG-TERM ANDROGENIC TREATMENT ON THE STRUCTURAL AND FUNCTIONAL PROPERTIES OF THE GREAT ARTERIES OF FEMALE TRANSEXUALS

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**Background:** Androgens act directly on the vasculature through your connection to the androgen receptor in the vascular wall, and can promote changes in structural and functional vascular properties.

**Objective:** To evaluate the structural and functional properties of large arteries in TF in prolonged use of testosterone esters and compare them with those of a control group men and women.

**Patients and methods:** 42 patients with diagnosis of TF ( $42 \pm 10$  years) in treatment with testosterone esters for at least 1 year (1–38 years) and 147 healthy controls matched for age and BMI were submitted to evaluation of carotid parameters by radiofrequency ultrasound (WTS®): intima media thickness (IMT), diameter and relative distension. The carotid-femoral pulse wave velocity (PWVcf) was measured by Complior® device.

**Results:** The TF showed higher ( $p < 0.01$ ) PWVcf ( $7.2 \pm 0.8$  m/s) than the male controls ( $6.6 \pm 0.9$  m/s), but not than female controls ( $7 \pm 1$  m/s). When categorized by age, considering median values of age,  $TF \geq 42$  years showed higher PWVcf than male and female controls, independently of BP values. There is no differences in carotid parameters between TF and control groups, but obese TF presented higher carotid diameter ( $6944 \pm 527$  vs.  $6438 \pm 555$   $\mu$ m and IMT ( $691 \pm 72$  vs.  $601 \pm 126$   $\mu$ m), and lower carotid distension ( $4,8 \pm 1,5$  vs.  $6,5 \pm 2,1\%$ ) than lean TF. The PWVcf was significantly correlated to age ( $r = 0.63$ ), time of androgenic treatment ( $r = 0.37$ ) and waist-hip ratio (0.39) in TF.

**Conclusion:** Older TF subjects and TF with prolonged treatment had higher aortic stiffness. Obese TF presented worst carotid structural and functional markers

#### P99

##### THE EFFECT OF L-ARGININE ON THE VASCULAR FUNCTION IN HEALTHY TRAINED AND SEDENTARY SUBJECTS

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**Background:** The aim of our study was to determine whether the use of food supplement L-arginine improves vascular function, which could be beneficial in preventing the formation and development of cardiovascular diseases. We investigated differences between trained and sedentary subjects.

**Method:** Measurements were performed in healthy normotensive men, divided into four groups, according to age and physical activity: 12 young sedentary (YS) (mean age  $23,5 \pm 2,4$ ) and age matched trained (YT) ( $N = 18$ ); 11 elder sedentary (ES) (mean age  $45,7 \pm 7,5$ ) and age matched trained (ET) ( $N = 12$ ) subjects. Parameters were measured at rest with the Task Force Monitor device (CNSystems Medizintechnik, Austria) before and after administration of 0.9 g L-arginine.

**Results:** After ingestion of L-arginine the heart rate in all groups statistically significantly decreased (YS  $70.4 \pm 4.2$  vs.  $66.3 \pm 3.3$ ; YT  $62.1 \pm 2.7$  vs.  $58.3 \pm 2.0$ ; ES  $69.6 \pm 3.2$  vs.  $62.7 \pm 2.7$ ; ET  $58.0 \pm 1.8$  vs.  $53.6 \pm 1.2$  beats/min) (paired t-test,  $p < 0.05$ ). The cardiac output decreased in three groups (YT  $7.04 \pm 0.4$  vs.  $6.32 \pm 0.3$ ; ES  $6.95 \pm 0.5$  vs.  $5.9 \pm 0.4$ ; ET  $7.08 \pm 0.6$  vs.  $6.58 \pm 0.4$  L/min) (paired t-test,  $p < 0.05$ ). The systolic ( $126.3 \pm 4.1$  vs.  $120.0 \pm 3.2$  mmHg) and diastolic pressure ( $77.6 \pm 2.5$  vs.  $74.3 \pm 1.9$  mmHg) (paired t-test,  $p < 0.05$ ) decreased in the ES group.

**Conclusions:** The systemic effect of L-arginine was observed. Improved cardiovascular function in response to L-arginine could justify the use of dietary L-arginine supplementation.

#### P100

##### TRIAL OF EXERCISE TO PREVENT HYPERTENSION IN YOUNG ADULTS (TEPHRA): RATIONALE AND PROTOCOL

Aifaf Mohamed, Odaro Huckstep, Wilby Williamson, Charlotte Herdman, Yvonne Kenworthy, Konstantina Spagou, Linda Arnold, Polly Whitworth, Ashley Verburg, Holger Burchert, Adam J. Lewandowski, Paul Leeson  
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**Background:** Hypertension or pre-hypertension in young adults is unusual and more often linked with an adverse family or pregnancy history, such

as preterm birth, than hypertension which develops later in life<sup>1-4</sup>. Surprisingly, no trials have investigated whether lifestyle advice developed for blood pressure control in older adults is effective in these young populations<sup>5</sup>.

**Methods:** TEPHRA is a randomised control trial of a 16 week physical activity intervention including behaviour change and structured exercise in young adults with pre- and stage 1 hypertension. On-line recruitment is used with targeting to ensure inclusion of a proportion born preterm. Primary outcome is 24 hr ambulatory blood pressure at 4 months. Subjects undergo additional multimodal assessments including vascular stiffness, blood sampling, microvascular assessment, echocardiography, remote activity monitoring and multi-organ magnetic resonance imaging to identify potential predictors of blood pressure change.

**Results:** Recruitment started in April 2016 and currently (June 2017) 344 potential participants have been screened with 103 progressing to a baseline visit, of which 91 have been randomized. Two participants have completed their 12 month follow up. Recruitment is predicted to be completed by February 2018 with data reporting of four months outcomes in late 2018.

**Conclusion:** TEPHRA aims to deliver the most in-depth investigation to date on the effects of physical exercise on the cardiovascular system and health of young adults at risk of early hypertension and cardiovascular disease.

#### References

1. Crump C, Winkleby MA, Sundquist K, Sundquist J. Risk of hypertension among young adults who were born preterm: a Swedish national study of 636,000 births. *American journal of epidemiology*. 2011;173(7):797-803.
2. Davis EF, Lazdam M, Lewandowski AJ, Worton SA, Kelly B, Kenworthy Y, et al. Cardiovascular risk factors in children and young adults born to pre-eclamptic pregnancies: a systematic review. *Pediatrics*. 2012; peds. 2011-3093.
3. de Jong F, Monuteaux MC, van Elburg RM, Gillman MW, Belfort MB. Systematic review and meta-analysis of preterm birth and later systolic blood pressure. *Hypertension*. 2011. 111.181784.
4. Kajantie E, Hovi P, editors. Is very preterm birth a risk factor for adult cardiometabolic disease? *Seminars in Fetal and Neonatal Medicine*; 2014: Elsevier.
5. Williamson W, Foster C, Reid H, Kelly P, Lewandowski AJ, Boardman H, et al. Will exercise advice be sufficient for treatment of young adults with prehypertension and hypertension? A systematic review and meta-analysis. *Hypertension*. 2016. 116.07431.

#### Poster Session II – Kidney P106

#### AORTIC STIFFNESS AND CENTRAL SYSTOLIC PRESSURE ARE ASSOCIATED WITH ORTHOSTATIC HYPOTENSION IN PATIENTS WITH CHRONIC KIDNEY DISEASE

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**Objective:** Orthostatic hypotension (OH) is common cardiovascular problem affecting older adults, and is associated with falls, stroke and chronic kidney disease (CKD). This postural drop (PD) in blood pressure (BP) has been independently associated with increased aortic stiffness in older adults. Aortic stiffness is a modifiable cardiovascular risk factor, and measurable non-invasively. We investigated the association between OH, aortic stiffness and central aortic systolic pressure (CSP) in CKD patients (ACADEMIC cohort).

**Design and method:** Postural BP changes were measured in one-hundred and forty-six patients (mean age 68.6 SD ± 11.4, 75% male, 21% diabetic) using 24-hour-ambulatory blood pressure monitoring with postural sensing (Diasys Integra II®, Novacor, France). Patients were divided into those with systolic postural drop (SPD, n = 23, mean standing systolic BP < mean lying systolic BP) versus those without (n = 123).

Complior® (Artech Medical, France) measured aortic stiffness as carotid-femoral pulse wave velocity (cf-PWV) and peripheral arterial stiffness as carotid-radial PWV (cr-PWV). Sphygmocor® (Atcor, Australia) measured CSP and augmentation index (AI) from the radial artery.

**Results:** Cf-PWV and CSP were significantly higher in CKD patients with SPD versus those without (15.2m/s vs 12.7m/s, p < 0.001, 148 mmHg vs 136 mmHg, p = 0.012).

Multivariate logistic regression showed SBP remained significantly associated with aortic stiffness (p = 0.002, OR = 1.45 95%CI = 1.15–1.77) and CSP (p = 0.026, OR = 1.031, 95%CI = 1.00–1.06), independent of age, eGFR, diabetes, smoking pack-years, cholesterol, height and weight. RAI (32.1% vs 28.9%, p = 0.093) and cr-PWV (11.0m/s vs 11.2m/s, p = 0.62) were not significantly different between groups.

**Conclusion:** Increased aortic stiffness and CSP are independently associated with OH. Stiff central arteries, rather than peripheral, contribute more to OH.

#### P107

#### OSCILLOMETRIC MEASUREMENT OF 24-HOUR PULSE WAVE VELOCITY PREDICTS ALL- CAUSE MORTALITY IN PATIENTS WITH END-STAGE RENAL DISEASE: THE ISAR-STUDY

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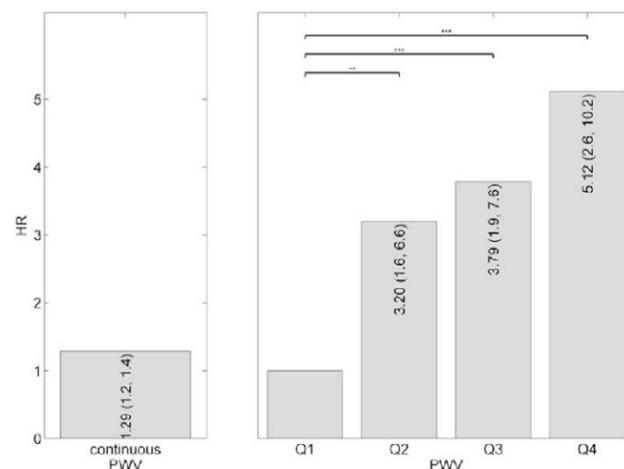
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**Objectives:** Mortality rate in end-stage renal disease (ESRD) are still at a high level. Sarafidis et al. showed the predictive value of 48h PWV in patients undergoing hemodialysis [1], although recent studies using office measurement showed controversial predictive results. Aim of the present study was to confirm the predictive value of a novel oscillometric measurement of pulse wave velocity on mortality in an elderly cohort of patients with ESRD.

**Methods:** The ISAR study is a prospective and longitudinal study targeting patients with ESRD undergoing hemodialysis. Oscillometric measurement of 24-hour PWV was performed at baseline. Survival analysis included Kaplan-Meier analysis, logrank test and Cox regression.

**Results:** A total of 350 patients had a median age of 69.3 [55.8; 77.3] years. Mean PWV was 9.6 (2.2) m/s and 120 patients died during the mean follow-up of 45 months. PWV was significantly higher in the deceased (10.6 +/- 1.9 m/s) than in surviving patients (9.0 +/- 2.2 m/s). Kaplan-Meier analysis showed differences in dichotomized PWV (cut-off 10 m/s [2]); Logrank test: p = 0.001). For results of univariate Cox regression, see Figure. Adjusted Cox regression analysis showed a significant risk prediction for all-cause mortality (HR 2.322; p = 0.011). Patients older than 50 years showed even higher predictive values (HR 2.442; p = 0.008) as well as patients with PWV values of at least 10 m/s (HR 3.300; p = 0.006).



**Figure.** Univariate hazard-ratios and their 95% confidence intervals for continuous PWV and PWV quartiles (Q1 as reference; \*\* p = 0.002; \*\*\* p < 0.001). Q1: <= 7.92 m/s; Q2: 7.92–9.83 m/s; Q3: 9.83–11.23 m/s; Q4: >11.23 m/s.