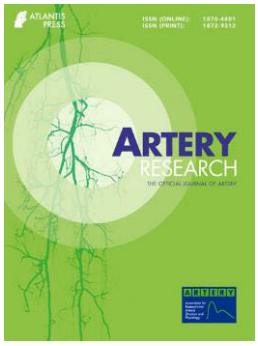

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# P175: AN ACUTE BOUT OF PROLONGED SITTING IMPAIRS ENDOTHELIAL FUNCTION AND INCREASES PLASMA CONCENTRATIONS OF ENDOTHELIN-1 IN OVERWEIGHT/OBESE ADULTS: IMPLICATIONS FOR GLUCOSE AND INSULIN METABOLISM

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## P172
## VOLUNTARY LIQUORICE INGESTION INCREASES BLOOD PRESSURE VIA MULTIPLE MECHANISMS: INCREASED VOLUME LOAD, PERIPHERAL ARTERIAL RESISTANCE, AND DECREASED AORTIC COMPLIANCE

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**Objectives:** Liquorice consumption elevates blood pressure [1-3], but the liquorice-induced haemodynamic changes in the upright position are unknown. We investigated haemodynamics after liquorice exposure in healthy volunteers during orthostatic challenge.
**Methods:** Haemodynamics were recorded from 22 normotensive subjects during passive 10- minute head-up tilt before and after two weeks of liquorice consumption (glycyrrhizin dose 290−370 mg/day) using radial pulse wave analysis, whole-body impedance cardiography, and spectral analysis of heart rate variability. Thirty age-matched healthy subjects maintaining their habitual diet served as controls.
**Results:** Liquorice ingestion elevated radial systolic ($p < 0.001$) and diastolic ($p = 0.018$) blood pressure and systemic vascular resistance ($p = 0.037$). During orthostatic challenge, heart rate increased less after the liquorice versus control diet ($p = 0.003$) and low frequency power of heart rate variability decreased within the liquorice group ($p = 0.034$). Liquorice intake increased central pulse pressure ($p < 0.001$) and augmentation index ($p = 0.002$) supine and upright, but in the upright position the elevation of augmentation index was accentuated ($p = 0.007$). Liquorice diet also increased extracellular fluid volume ($p = 0.024$) and aortic to popliteal pulse wave velocity ($p = 0.027$), and aortic characteristic impedance in the upright position ($p = 0.002$).
**Conclusions:** In addition to increased extracellular fluid volume and large arterial stiffness, two weeks of liquorice ingestion elevated systemic vascular resistance and augmentation index. Measurements performed at rest may underestimate the haemodynamic effects of liquorice ingestion, as enhanced central wave reflection and reduced chronotropic response were especially observed in the upright position.
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## P173
## COUPLED NITROSO-SULFIDE SIGNALIZATION TRIGGERS SPECIFIC VASOACTIVE EFFECTS IN INTRARENAL ARTERIES OF PATIENTS WITH ARTERIAL HYPERTENSION

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In normotensive conditions, it has been confirmed that S-nitrosothiols, as a source of NO, interact with hydrogen sulfide ($H_2S$) and create new substance/s with specific vasoactive effects. This interaction could represent new regulator pathway also in hypertension. The aim of the study was to investigate the vasoactive effects of $H_2S$, GSNO, and products of $H_2S$/GSNO interaction in lobar arteries isolated from kidney after nephrectomy of patients suffering from arterial hypertension.
Changes in isometric tension after pre-contraction were evaluated. Acetylcholine- induced vasorelaxation was significantly reduced compared to the effect induced by exogenous NO donor, sodium nitroprusside, probably suggesting an endothelium dysfunction. While 1 μmol/l $Na_2S$ had a minimal effect on the vascular tone, 20 μmol/l evoked a slight vasorelaxation. GSNO at 0.1 μmol/l induced vasorelaxation which was significantly smaller compared to the effect induced by 1μmol/l. The mixture of GSNO (0.1 μmol/l) and $Na_2S$ (1 μmol/l) induced significantly higher vasorelaxation compared to GSNO (0.1 μmol/l) alone only in 5$^{th}$ minute without the differences in the speed.
On the other hand, the mixture prepared from higher concentrations of GSNO (1 μmol/l) and $Na_2S$ (10 μmol/l) induced a significantly higher (in 1st, 2nd, 5th, 10th minute) and faster vasorelaxation compared to the effect induced by GSNO (1 μmol/l) alone.
In conditions of arterial hypertension $H_2S$ in interaction with GSNO regulated a vasoconstrictor-increased arterial tone towards of more pronounced vasorelaxation compared to GSNO alone. We confirmed for the first time that specific vasoactive effects of coupled nitroso-sulfide signalization were triggered also in human arterial tissue.

**References**
Supported: VEGA 2/0074/14, APVV-15-0565, APVV-15-037

## P174
## HEMODYNAMIC AND AUTONOMIC EFFECTS OF LOW-DOSE GLYCERYL TRINITRATE USED TO TEST ENDOTHELIUM-INDEPENDENT VASODILATION OF THE BRACHIAL ARTERY

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**Background/Aim:** Smooth muscle function is explored by sublingual glyceryl trinitrate (GTN) administration in vascular function protocols, in order to compare with endothelium- dependent vasodilation of the brachial artery by flow-mediated dilation (FMD). The aim of this study is to evaluate the hemodynamic and autonomic effects of the two most often used GTN dosages.
**Methods:** In 80 essential hypertensive patients (HT) and 60 normotensive subjects (NT), we evaluated FMD of the brachial artery and endothelium-independent response to 25 and 400 mg of sublingual GTN by high-resolution ultrasound and automated image analysis. In a subgroup of 10 HT, muscle sympathetic nerve activity (MSNA) was also assessed by microneurography.
**Results:** NT showed significantly ($p < 0.01$) lower FMD ($5.5 \pm 3.3\%$) as compared to healthy controls ($6.9 \pm 2.2\%$). The response to GTN 25μg also tended to be lower (HT $7.2 \pm 3.3\%$; NT $7.9 \pm 2.9\%$; $p = 0.06$), whereas response to GTN 400μg was similar (HT $14.3 \pm 4.8\%$, NT $14.5 \pm 54.7\%$, $p =$ ns). In the whole population, changes in blood pressure (BP) induced by GTN 400μg (systolic BP $-3.2 \pm 7.7$, diastolic BP $-4.7 \pm 5.0$ mmHg) were significantly higher (<0.001) compared to GTN 25μg (systolic BP $-0.7 \pm 5.8$, diastolic BP $-0.7 \pm 4.4$ mmHg). Changes in heart rate were also higher with GTN 400μg than with 25μg ($+5.6 \pm 6.4$ versus $-0.2 \pm 5.4$ bpm, $p < 0.001$). This behavior was similar in HT and NT subgroups. MSNA was significantly increased by GTN 400μg ($31 \pm 7$ to $41 \pm 6$bursts/min, $p < 0.001$) but not by 25μg ($33 \pm 9$ to $37 \pm 11$bursts/min, $p = 0.19$)
**Conclusions:** The administration of GTN at the dose of 25 μg allows exploring endothelium- independent vasodilation in FMD protocols, inducing only modest hemodynamic and sympathetic responses.

## P175
## AN ACUTE BOUT OF PROLONGED SITTING IMPAIRS ENDOTHELIAL FUNCTION AND INCREASES PLASMA CONCENTRATIONS OF ENDOTHELIN-1 IN OVERWEIGHT/OBESE ADULTS: IMPLICATIONS FOR GLUCOSE AND INSULIN METABOLISM

Megan Grace [1,2], Rachel Climie [1], Michael Wheeler [1], Nina Eikelis [1,3], Joshua Carr [1,2], Francis Dillon [1], Neville Owen [1,3], Danny Green [4], Bronwyn Kingwell [1], David Dunstan [1,5,2]
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**Background:** Compared to regular active breaks, prolonged uninterrupted sitting amplifies postprandial glucose and insulin in overweight/obese adults with and without type 2 diabetes; and impairs lower limb endothelial function (a predictor of cardiovascular disease) in healthy adults. However, the effects of prolonged sitting on endothelial function in those at heightened risk of cardiometabolic disease have not been investigated.
**Methods:** Overweight/obese (BMI $>$ 25kg/m$^2$) adults (35–75y) completed two laboratory-based conditions in a random order: (i) 5h prolonged uninterrupted sitting (SIT); and (ii) 5h sitting interrupted with 3min of light-intensity simple resistance activities every 30min (SRA). Femoral artery endothelial function (flow mediated dilation; FMD) and shear rate was assessed at baseline, 1, 2 and 5h. Hourly plasma was collected for glucose, insulin and endothelin-1 measurement. Muscle sympathetic nervous activity (MSNA) was measured at 5h.
2**Preliminary results:** In the current sample (n = 7), SIT impaired FMD ($-2.6 \pm 0.9$%; $p < 0.05$) and shear rate iAUC ($-39 \pm 14$%; $p < 0.05$), compared to SRA. There was an increase in glucose ($40 \pm 28$%; $p = 0.18$) and insulin ($46 \pm 25$%; $p = 0.16$) iAUC, and mean endothelin-1 plasma concentration ($0.28 \pm 0.09$ pg/ml; $p < 0.05$) in SIT, compared to SRA. MSNA (n = 4) was reduced in SIT, compared to SRA ($-4 \pm 1$ bursts/min; $p < 0.05$). Testing and analysis (n = 20 participants) is expected to be complete by August, 2017.
**Conclusions:** These findings are consistent with a potential mechanistic link between sitting- induced endothelial dysfunction, vasoconstriction and insulin resistance, via reduced delivery of glucose and insulin to nutritive vascular beds in muscle. Endothelial dysfunction associated with prolonged sitting may be related to reduced shear rate, and impaired MSNA.

## P176
## ARTERIAL STIFFNESS AS A PART OF A GENERAL ABNORMALITY OF THE FIBROUS HEALING PROCESS

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**Environment**
There seems to be a common abnormality of the healing process in several diseases as COPD, liver esteatosis, and arterial stiffening.
**Objective:** To asses the association of frequency between liver esteatosis and aortic stiffness by means of c-f PWV in patients included in a CV prevention programme.
**Methods:** 43 patients underwent a simultaneous evaluation including antropometry, biochemistry, cardiac, vascular and abdominal ultrasonography.
**Results:** Mean age was 53,4 $\pm$ 11 y.o, 67% male, SBP 137 $\pm$ 17, DBP 87 $\pm$ 10 PP 50,3 $\pm$ 11 mmHg, BMi 29 $\pm$ 4. CVRF: HTN 74%, DLP 69%, DBT 7%, TBQ 28%, OBS 42%, OVWT 28%, SED 71%.CV Drugs: 63%.
Nine (21%) presented abnormal PWV and esteatosis and 17 (39,5%) none of them. Whereas 4 (9,5%) presented abnormal PWV with normal liver and 13 (30%) the opposite. (Fisher NS, Cochran's $<$.05). More information about LV mass and atherosclerotic burden is presented.
**Conclusion:** In a group of p. in a Primary CV prevention programme there is a trend to a significative association between the presence or not of liver esteatosis and aortic stiffness.
A wider investigation of fibrosis and the healing process in different tissues should be considered as a future research target.

## P177
## ASSOCIATIONS OF AMBULATORY PULSE PRESSURE COMPONENTS WITH HIPPOCAMPAL VOLUME, WHITE MATTER HYPERINTENSITIES AND BRAIN INFARCTS

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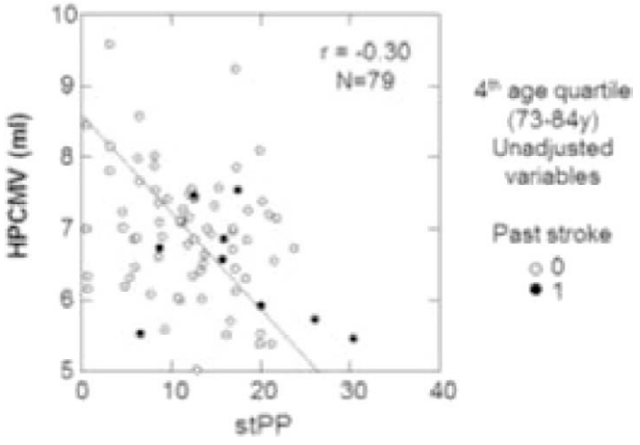
**Background:** Arterial stiffness is blood pressure (BP) dependent. Using 24-hour ambulatory BP monitoring (24hABPM) pulse pressure (PP) can be split into an 'elastic' part (elPP: 'diastolic stiffness'), and a 'stiffening' part (stPP: 'stiffness change during systole'). We investigated associations of elPP, stPP and PP with brain MRI measures.
**Methods:** A community-based sample of 542 individuals ($59 \pm 6$y) with 24hABPM and brain MRI, including hippocampal volume (HPCMV), severity of White Matter Hyperintensities (WMH_SVR), and number of brain infarcts (N_INFRCT). 'High'/'low' (HI/LO) marked variables status (by medians).
**Results:** elPP and stPP were weakly correlated (r = 0.15); stPP-to-PP ratio was $0.21 \pm 0.08$. Adjusted HPCMV calculated at age quartiles for the HI_PP cohort correlated better with values from HI_stPP than from HI_elPP. For HI_PP and HP_stPP HPCMV reduction between age quartiles 1&4 was similar, but 20% larger than for HI_elPP. In hypertensives at highest age quartile HPCMV correlated negatively with stPP ($P < 0.05$: adjusted for age, sex and diabetes), but not with PP and elPP.
Adjusted WMH_SVR was greater in HI_elPP, HI_PP and HI_elPP comparing diabetics with non-diabetics by 0.38($P = 0.001$), 0.29($P = 0.008$) and 0.13 ($P = 0.25$), respectively.
In hypertensives N_INFRCT was greater in past-stroke than no-stroke cohorts in HI&LO elPP, stPP and PP subgroups by 1.96&0.63, 1.48&1.26, and 1.53&1.18 ($P < 0.0001$ for all).




**Conclusion:** The association of elastic and stiffening components calculated from ambulatory PP differ for different MRI brain measures and may provide a practical tool for associating arterial properties with brain-related pathological changes. Associations with PP may be mainly explained by its relatively-small stiffening component during systole.

## Poster Session II — Interventions P89
## UPRIGHT POSTURE ENHANCES THE UNFAVOURABLE INFLUENCES OF BISOPROLOL ON CENTRAL BLOOD PRESSURE IN HYPERTENSIVE MIDDLE AGED MEN: A DOUBLE-BLINDED RANDOMIZED PLACEBO-CONTROLLED CROSS-OVER STUDY

Ilkka Pörsti [1], Lauri Suojanen [1], Antti Haring [1], Antti Tikkakoski [1], Arttu Eräranta [1], Heini Huhtala [2], Mika Kähönen [1], Kari Kivistö [1], Jukka Mustonen [1]
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**Objective:** Treatment with beta-blockers is characterised by inferior reduction of central versus peripheral blood pressure. We examined changes in central and peripheral blood pressure, cardiac function, and vascular resistance during beta-blockade.
**Methods:** Haemodynamics were investigated after 3 weeks of bisoprolol treatment (5 mg/d) in a double-blinded, randomized, placebo-controlled cross-over trial in never-treated 16 Caucasian males with grade I-II primary hypertension using continuous tonometric pulse wave analysis and whole-body impedance cardiography.
**Results:** Bisoprolol decreased blood pressure in the aorta ($\sim$8/10 mmHg) and radial artery ($\sim$10/9 mmHg), reduced heart rate and left cardiac