P175: AN ACUTE BOUT OF PROLONGED SITTING IMPAIRS ENDOTHELIAL FUNCTION AND INCREASES PLASMA CONCENTRATIONS OF ENDOTHELIN-1 IN OVERWEIGHT/OBSESE 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 290–310mg/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.

References
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P174 HEMODYNAMIC AND AUTONOMIC EFFECTS OF LOW-DOSE GLYCERYL TRINITRATE USED TO TEST ENDOTHELIN-DEPENDENT 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 vasodilatation 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 endothelin-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 ± 3.3%) as compared to healthy controls (6.9 ± 2.2%). The response to GTN 25 μg also tended to be lower (HT 7.2 ± 3.3%; NT 7.9 ± 2.9%; p = 0.06), whereas response to GTN 400 μg was similar (HT 14.3 ± 4.8%, NT 14.5 ± 5.4%, p = ns). In the whole population, changes in blood pressure (BP) induced by GTN 400 μg (systolic BP – 3.2 ± 7.7, diastolic BP – 4.7 ± 5.0 mmHg) were significantly higher (p < 0.001) compared to GTN 25 μg (systolic BP – 0.7 ± 5.8, diastolic BP – 0.7 ± 4.4 mmHg). Changes in heart rate were also higher with GTN 400 μg than with 25 μg (+5.6 ± 6.4 versus –0.2 ± 5.4 bpm, p = 0.001). This behavior was similar in HT and NT subgroups. MSNA was significantly increased by GTN 400 μg (31 ± 7 to 41 ± 6 bursts/min, p < 0.001) but not by 25 μg (32 ± 7 to 37 ± 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.

References
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 on those at heightened risk of cardiometabolic disease have not been investigated.

Methods: Overweight/obese (BMI > 25 kg/m²) adults (n = 25–75y) 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.

Preliminary results: In the current sample (n = 7), SIT impaired FMD (Z = 2.6; p < 0.05) and shear rate (IAUC (Z = 39 ± 14; p < 0.05), compared to SRA. There was an increase in glucose (40 ± 28%; p = 0.18) and insulin (46 ± 25%; p = 0.16) IAUC, and mean endothelin-1 plasma concentration (0.28 ± 0.09 pg/ml; p < 0.05) in SIT, compared to SRA. MSNA (n = 4) was reduced in SIT compared to SRA (Z = 2; 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 estesatos, and arterial stiffening.

Objective: To assess the association of frequency between liver estesatos 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 ± 11.2, 67% male, SBP 137 ± 17, DBP 87 ± 10 PP 50.3 ± 11 mmHg, BMI 29.4 ± CVRF: HTN 74%, DLP 69%, DBT 7%, TBQ 28%, OBS 42%, OWTVT 28%, SED 71%. Drugs were 63%. Nine (21%) presented abnormal PWV and estesatos 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 c ≤ 0.05). 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 significant association between the presence or not of liver estesatos 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 (ePP; ‘diastolic stiffness’), and a ‘stiffening’ part (stPP; ‘stiffness change during systole’). We investigated associations of ePP, stPP and PP with brain MRI measures.

Methods: A community-based sample of 542 individuals (59 ± 6y) with 24hABPM and brain MRI, including hippocampal volume (HPCMV), severity of White Matter Hyperintensities (WMH_SVR), and number of brain infarcts (N_INFRACT). ‘High’/‘low’ (HI/LO) marked variables status (by medians).

Results: ePP and stPP were weakly correlated (r = 0.15); stPP-to-PP ratio was 0.21 ± 0.08. Adjusted HPCMV calculated at age quartiles for the HI_PP cohort correlated better with values from HI_stPP than from HI_ePP. For HI_PP and HP_stPP HPCMV reduction between age quartiles 1 & 4 was similar, but 20% larger than for HI_ePP. In hypertensives at highest age quartile HPCMV correlated negatively with stPP (P < 0.05: adjusted for age, diabetes, and robust) and not with PP and ePP. Adjusted WMH_SVR was greater in HI_ePP, HI_PP and HI_ePP comparing diabetics with non-diabetics by 0.38 (P = 0.001), 0.29 (P = 0.008) and 0.13 (P = 0.25), respectively.

Conclusion: We found preliminary evidence supporting the association of arterial stiffness with brain MRI measures.