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P171: COMPLIANCE OF EXTREMELY DILATED MAIN PULMONARY ARTERIES IN PULMONARY ARTERIAL HYPERTENSION

Joanne Groeneveldt, Tijmen van der Wel, Tim Marcus, Frances De Man, Anton Vonk Noordegraaf, Nicolaas Westerhof, Berend Westerhof

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NT during hand skin heating with saline, L-NMMA, fluconazole, or both inhibitors infusion. AWV was estimated by the ratio of the area of the hysteresis loop of the pressure-diameter relationship (W_v , viscous energy dissipated) to the area under the loading phase (W_e , elastic energy stored).

Results: During saline infusion, W_v , W_e and W_v/W_e were not modified after heating in NT whereas W_v/W_e increased in HT ($39.3 \pm 12.0\%$ to $49.9 \pm 7.7\%$, $p < 0.05$) due to a larger increase in W_v than W_e (ΔW_v : $+41.5 \pm 27.6\%$ vs. ΔW_e : $+25.1 \pm 28.4\%$, $p < 0.05$). With all inhibition sequences, W_v/W_e increased after heating in NT ($p < 0.05$) due to a larger increase in W_v than W_e ($p < 0.05$). In HT with fluconazole, L-NMMA and L-NMMA + fluconazole, W_v/W_e increased after heating ($p < 0.05$) due to a larger increase in W_v than W_e ($p < 0.05$), similarly to saline infusion. In all conditions, increase in shear stress was similar between NT and HT.

Conclusion: NO and EETs maintain stable AWV during change in flow in NT, and this regulation is lost in HT resulting in an increased AWV after heating.

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SHORT-TERM EFFECTS OF TRANSCATHETER AORTIC VALVE IMPLANTATION ON AORTIC FUNCTION AND HEMODYNAMICS

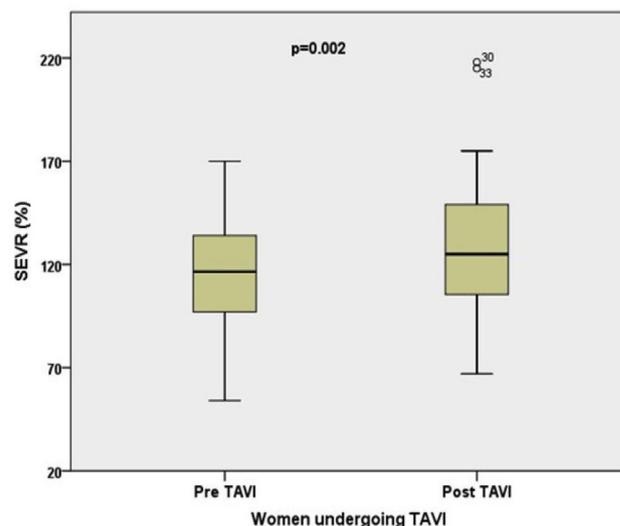
Dimitrios Terentes-Printzios, Charalambos Vlachopoulos, Konstantinos Toutouzas, Georgios Latsios, Andreas Synetos, Georgios Trantalis, Fani Mitropoulou, Maria Drakopoulou, Konstantinos Stathogiannis, Vicky Penesopoulou, Konstantinos Kalogeris, Konstantinos Aznaouridis, Manolis Vavuranakis, Dimitrios Tousoulis
Peripheral Vessels Unit, First Department of Cardiology, Hippokraton Hospital, Medical School, National and Kapodistrian University of Athens, Athens, Greece

Purpose/Background/Objectives: Aortic stiffness and hemodynamics are independent predictors of adverse cardiovascular events. Transcatheter aortic valve implantation (TAVI) is growingly used in elderly patients with aortic stenosis. We sought to investigate the effect of TAVI upon aortic vascular function and hemodynamics as well as the interplay between genders.

Methods: Twenty high-risk patients (mean age 82.2 ± 5.3 years, 13 female) with severe symptomatic aortic stenosis undergoing TAVI were included. Aortic stiffness was estimated through carotid-femoral pulse wave velocity (PWV). Aortic hemodynamics (aortic pressures, aortic augmentation index [AIx]) and subendocardial viability ratio (SEVR) were measured with Sphygmocor. Measurements were conducted prior to the implantation and at discharge.

Results: PWV prior to the implantation was 8.6 ± 1.5 m/s and aortic AIx = $33.0 \pm 14.0\%$ for the overall population. There was no statistically significant change in peripheral or aortic pressures as well as on aortic stiffness after implantation of TAVI. However, there was a marginally non-significant trend for an increase in SEVR (116 ± 28 vs $131 \pm 40\%$, $p = 0.067$). Results to the male population were similar to the overall population.

Conversely, in the female population, there was a significant increase in PWV after TAVI (8.4 ± 1.2 m/s vs 8.9 ± 1.3 with $p = 0.034$, respectively). Furthermore, there was a significant increase in SEVR after TAVI (107 ± 28 vs $125 \pm 24\%$ with $p = 0.002$, respectively). All other variables did not change significantly in the female population.



Conclusion: Our study shows that shortly after TAVI female subjects experience an increase in aortic stiffness with an improvement of myocardial perfusion. These findings further elucidate the short-term hemodynamic consequences of aortic valve repair.

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COMPLIANCE OF EXTREMELY DILATED MAIN PULMONARY ARTERIES IN PULMONARY ARTERIAL HYPERTENSION

Joanne Groeneveldt¹, Tijmen van der Wel¹, Tim Marcus¹, Frances De Man¹, Anton Vonk Noordegraaf¹, Nicolaas Westerhof¹, Berend Westerhof^{1,2}

¹Department of Pulmonary Diseases, VU University Medical Center, Amsterdam, The Netherlands

²Department of Medical Biology, Section Systems Physiology, Laboratory for Clinical Cardiovascular Physiology, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands

Background: Main pulmonary artery (MPA) dilation is a radiological sign of pulmonary hypertension (PH) and is an independent risk factor of sudden death (Żyłkowska et al, *Chest* 2012). Extreme MPA dilation is a rare consequence of PH. We hypothesize that the main pulmonary artery compliance is larger and contributes more to total arterial compliance in PH patients with an extremely dilated MPA when compared to patients with a less dilated MPA.

Methods: Cardiac magnetic imaging (CMR) scans of idiopathic and hereditary pulmonary arterial hypertension (PAH) patients were retrospectively analyzed. Six PAH patients with extremely dilated MPAs (≥ 45 mm diameter on transverse plain CMR images of the MPA) and six PAH patients with MPA diameter < 45 mm were included. Total pulmonary arterial compliance (C_{tot}) was calculated by stroke volume (SV) over pulse pressure (PP) and MPA compliance (C_{MPA}) by $(\Delta \text{area} \cdot \text{length}) / \text{PP}$ (length was assumed 5 cm for all MPAs). C_{MPA} / C_{tot} ratio could therefore be calculated by CMR derived flow images alone: $C_{MPA} / C_{tot} = (\Delta \text{area} \cdot \text{length}) / \text{SV}$.

Results: Mean age in both groups was not different, mean pulmonary artery pressure was higher in patients with an extremely dilated MPA (73 ± 9.0 mmHg) compared to patients with non-extremely dilated MPA (48 ± 5.4 mmHg, $p = 0.02$). A trend toward a higher C_{MPA} / C_{tot} ratio was observed in patients with extremely dilated MPA ($p = 0.0534$).

Conclusion: In PAH the contribution of the MPA to total compliance tends to be higher in patients with a MPA diameter ≥ 45 mm than in patients with a diameter < 45 mm.

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

Elina J. Hautaniemi¹, Anna M. Tahvanainen^{1,2}, Jenni K. Koskela^{1,2}, Antti J. Tikkakoski^{1,3}, Mika Kähönen^{1,3}, Marko Uitto¹, Kalle Sipilä³, Onni Niemelä^{1,4}, Jukka Mustonen^{1,2}, Ilkka H. Pörsti^{1,2}

¹Faculty of Medicine and Life Sciences, University of Tampere, Tampere, Finland

²Department of Internal Medicine, Tampere University Hospital, Tampere, Finland

³Department of Clinical Physiology, Tampere University Hospital, Tampere, Finland

⁴Department of Laboratory Medicine and Medical Research Unit, Seinäjoki Central Hospital, Seinäjoki, Finland

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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COUPLED NITROSO-SULFIDE SIGNALIZATION TRIGGERS SPECIFIC VASOACTIVE EFFECTS IN INTRARENAL ARTERIES OF PATIENTS WITH ARTERIAL HYPERTENSION

Sona Cacanyiova¹, Andrea Berenyiova¹, Frantisek Kristek¹, Marian Grman², Karol Ondrias², Jan Breza³, Jan Breza³

¹Institute of Normal and Pathological Physiology, Slovak Academy of Sciences, Slovak Republic

²Institute of Clinical and Translational Research, Biomedical Research Centre, Slovak Academy of Sciences, Slovak Republic

³Department of Urology, Derrer's University Hospital, Slovak Republic

In normotensive conditions, it has been confirmed that S-nitrosothiols, as a source of NO, interact with hydrogen sulfide (H₂S) 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 H₂S, GSNO, and products of H₂S/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 Na₂S 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 1 μmol/L. The mixture of GSNO (0.1 μmol/L) and Na₂S (1 μmol/L) induced significantly higher vasorelaxation compared to GSNO (0.1 μmol/L) alone only in 5th minute without the differences in the speed.

On the other hand, the mixture prepared from higher concentrations of GSNO (1 μmol/L) and Na₂S (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 H₂S 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

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

Lorenzo Ghiadoni, Stefano Taddei, Rosa Maria Bruno
University of Pisa, Pisa, Italy

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 25 μg also tended to be lower (HT $7.2 \pm 3.3\%$; NT $7.9 \pm 2.9\%$; $p = 0.06$), whereas response to GTN 400 μg was similar (HT $14.3 \pm 4.8\%$, NT $14.5 \pm 5.4\%$, $p = ns$). 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 (< 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 ($+5.6 \pm 6.4$ 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 (33 ± 9 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.

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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 Climie¹, Michael Wheeler¹, Nina Eikelis^{1,3}, Joshua Carr^{1,2}, Francis Dillon¹, Neville Owen^{1,3}, Danny Green⁴, Bronwyn Kingwell¹, David Dunstan^{1,5,2}

¹Baker Heart and Diabetes Institute, Melbourne, Australia

²Monash University, Melbourne, Australia