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P1.52: REGULATION AND ACTIONS OF CARDIOTROPHIN-1 IN CULTURED RAT VASCULAR SMOOTH MUSCLE CELLS

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(TOD) may increase the number of patients classified at high CV risk. The aim of our study was to assess the effect of the evaluation of different forms of TOD, in addition to "routine" work-up, on CV risk (CVR) stratification in a general population.

Methods: In 385 untreated subjects (age 57 ± 10 years, 44% males, 64% hypertensives (HT), 32% treated) left ventricular and carotid artery structure and carotid-femoral PWV were measured. All subjects underwent laboratory examinations. Subjects were divided into risk categories according to ESH/ESC guidelines before and after TOD evaluation.

Results: After routine work up patients were classified as follows: 7% at average CVR, 35% at low CVR, 26% at moderate CVR, 31 at high CVR and 1% at very high CVR. The proportion of patients at low or moderate CVR reclassified at high CVR were 6%, 12%, 14% and 32% after echocardiography, albuminuria, PWV and carotid ultrasound (CUS) respectively (X^2 $p < 0.001$ for all vs routine). Assessment of PWV in addition to echocardiography led to an increase of the proportion of patients at high CVR (from 6% to 17%, $p < 0.001$), as for PWV in addition to albuminuria (from 12 to 22%, $p < 0.01$) but did not affect risk stratification in addition to CUS (from 32% to 35%, p ns).

Conclusion: Measurement of PWV may significantly change CVR stratification in addition to echocardiography and to detection of albuminuria, but not after CUS; our results confirm that evaluation of different forms of TOD is useful for a more accurate assessment of global CVR.

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P1.50

IS AORTIC PULSE WAVE VELOCITY A STRONGER MARKER OF CARDIOVASCULAR RISK THAN CALCULATED RISK SCORES IN YOUNGER WOMEN?

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Introduction: Younger women are considered to have low cardiovascular (CV) risk. Predictive scoring systems aim to assess overall CV risk from multiple risk factors to guide treatment decisions. Aortic pulse wave velocity (aPWV) may be a more efficient, 'integrated' CV index providing a more effective treatment target than risk factors alone. We examined the relationship of CV risk scores to aPWV in younger women.

Patients and Methods: 193 pre-menopausal women (age 36.2 years, 95% CI 35.1-37.2) underwent anthropometric, biochemical and aPWV measures. 10 year CV risk score was estimated using the Joint British Guidelines, similar to the Europe-wide 'HeartScore' initiative. BMI, waist & bio-impedance estimates of adiposity (fat mass index) were tested.

Results: CV risk scores were significantly higher in women who had gestational diabetes (2.35%) than in those without (1.34%), $p = 0.004$, but surprisingly were not for previous gestational hypertension (1.21 vs. 1.27%). After adjusting for other CV risk modulators not included in risk scores, (social deprivation (Townsend's index), hsCRP, heart rate), residual independent influences on aPWV were:

	Beta	95% CI of beta	p
Fat mass index (kg/m ²) (or BMI or Waist)	-0.09	-0.172 to -0.008	0.031
Calculated 10 year absolute CV risk	0.122	0.023 to 0.221	0.016

Conclusion: In young women, even without overt diabetes or hypertension, adjusting for other factors, current adiposity and calculated CV risk were independently related to aPWV. This suggests aPWV reflects the 'load' of CV risk at this age better than CV scores alone (which omit obesity indices).

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P1.51

EFFECTS OF ELECTRICAL BARORECEPTOR STIMULATION ON CENTRAL ARTERIAL HEMODYNAMICS ASSESSED IN A LARGE ANIMAL MODEL

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Electrical stimulation of the carotid baroreceptor has been shown to be an effective therapy for patients with (resistant) hypertension. However, the exact mechanism leading to blood pressure reduction is not fully elucidated. We measured left ventricular pressure and volume, ascending and abdominal

aortic pressure using high-fidelity transducers in 9 anaesthetized dogs (24.8 ± 2.9 kg) at baseline and during electrical stimulation of the carotid baroreceptors. Therapy significantly (all $P < 0.001$) lowered mean (from 81.1 ± 7.6 to 54.8 ± 5.5 mmHg), systolic (from 95.7 ± 7.8 to 78.6 ± 6.0 mmHg) and diastolic (from 66.6 ± 8.3 to 41.4 ± 6.2 mmHg) pressures. Cardiac output remained unchanged, but stroke volume tended to increase while heart rate decreased (83.5 ± 15.3 to 67.2 ± 19.3 beats/min, $P = 0.002$). Systemic vascular resistance decreased from 1.25 ± 0.50 to 0.92 ± 0.44 AU, $P = 0.002$). There was no change in central to abdominal pulse transit time, and we could not unequivocally demonstrate a change in total arterial compliance. Therapy had a drastic effect on the morphology of the pressure waveforms and on the relationship between abdominal and central aortic pressure. Pressure was amplified at baseline but damping of the pressure pulse along the aorta was observed during stimulation, suggesting a drastic impact of therapy on pressure wave reflection. This was confirmed by a decrease in the magnitude of wave reflection (from 0.54 ± 0.13 to 0.39 ± 0.08 , $P = 0.014$). We conclude that, in an acute animal model, carotid baroreceptor stimulation significantly lowers blood pressure through vasodilation, with important effects on patterns of wave reflection. Further research is mandatory in experimental (conscious) models of hypertension and in patients.

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P1.52

REGULATION AND ACTIONS OF CARDIOTROPHIN-1 IN CULTURED RAT VASCULAR SMOOTH MUSCLE CELLS

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Cardiotrophin-1 (CT-1) is a cytokine belonging to the interleukin-6 superfamily that exhibits trophic and survival properties in a number of cell types. CT-1 expression has recently been identified within the media of atherosclerotic arteries, but its role in the vessel remains unknown. The aim of this study is to characterize CT-1 actions and regulation in vascular smooth muscle cells (VSMC). Primary rat aorta VSMC were stimulated with CT-1 (10^{-11} - 10^{-9} M) for up to 48 hours, without and with antibodies against CT-1 receptors. Moreover, the effects of aldosterone (10^{-8} - 10^{-6} M) and angiotensin II (10^{-9} - 10^{-7} M) on CT-1 expression were evaluated. Cell proliferation was determined by MTT assay. The expression of CT-1, collagen type I, and fibronectin was quantified by Western blot. Matrix metalloproteinases (MMPs) activities were assessed by gelatin and casein zymographies. A 48-hour treatment with CT-1 induced VSMC proliferation in a dose-dependent manner ($p < 0.01$). A 24-hour incubation with CT-1 led to an increased expression of collagen type I ($p < 0.01$) and fibronectin ($p < 0.05$), with a parallel and dose-dependent increase in active MMP-2 ($p < 0.01$), MMP-3 ($p < 0.05$) and MMP-9 ($p < 0.01$), all of these effects being reversed in the presence of antibodies against CT-1 receptors. Whereas VSMC spontaneously expressed CT-1, both aldosterone and angiotensin II enhanced ($p < 0.01$) CT-1 expression in these cells in a dose- and time-dependent manner. CT-1 induces proliferation and a secretory phenotype in VSMC. Upregulation of CT-1 expression by angiotensin II and aldosterone in VSMC suggests a mediator role for this cytokine in alterations of these cells caused by the RAAS in vascular diseases.

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P1.53

INTRINSIC VERSUS EXTRINSIC OXIDATIVE STRESS AND THEIR IMPACT ON ARTERIAL ELASTIC PROPERTIES: THE ROLE OF NADPH OXIDASE AND SMOKING ON WAVE REFLECTIONS AND AORTIC PRESSURES

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Purpose: The NADPH oxidase system produces superoxide (intrinsic oxidative load) while smoking is a well-established extrinsic oxidative factor. Carriers of the G allele (AG or GG) at position -930 of the CYBA gene of NADPH oxidase produce increased amounts of superoxide. We investigated the effect of intrinsic (NADPH produced) versus extrinsic (smoking) oxidative stress on arterial elastic properties.