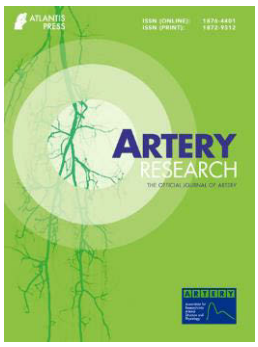

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P.034: ERECTILE DYSFUNCTION IS RELATED TO ARTERIAL STIFFNESS AND MARKERS OF SYSTEMIC VASCULAR INFLAMMATION AND ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH METABOLIC SYNDROME

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(left figure). Habitual and nonhabitual drinkers demonstrated similar changes with caffeine, whereas the effect of coffee (regular: middle figure; or decaffeinated: right figure) was more potent in nonhabitual compared to habitual drinkers. Pressures also increased, however the increase was more potent in nonhabitual drinkers after both regular ($p < 0.05$) or decaffeinated ($p < 0.01$) coffee intake.
Conclusions: Both coffee and caffeine increase WR, however drinking coffee leads to a more potent response in nonhabitual drinkers. These findings indicate that substances other than caffeine are partially responsible for the unfavourable effects of coffee on the cardiovascular system.

P.031
AORTIC STIFFNESS AND WAVE REFLECTIONS ARE ASSOCIATED WITH PENILE DOPPLER FINDINGS IN PATIENTS WITH VASCULOGENIC ERECTILE DYSFUNCTION

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Background: Erectile dysfunction (ED) has been reported as the first sign of a generalized vascular disease. Aortic stiffness and wave reflections are independent markers and prognosticators of cardiovascular risk. The association between ED and measures of aortic stiffness and wave reflections has not been investigated.
Methods: A total of 107 men with ED were evaluated for penile vascular disease severity by penile Doppler ultrasound: 40 men (aged 61±9 yrs) with coronary artery disease (CAD) and 67 men (aged 59±11 yrs) without CAD. Aortic stiffness was evaluated with carotid-femoral pulse wave velocity (PWV) and wave reflections with augmentation index (AIx) of the aortic pressure waveform using high-fidelity pulse wave analysis.
Results: Patients with CAD had decreased peak systolic velocity (PSV) (27 vs 34 cm/s, $p = 0.001$), and increased PWV (9.0 vs 8.4 m/s, $p < 0.05$) and AIx (30 vs 24%, $p < 0.01$) compared with men without CAD. PSV was correlated with age ($r = -0.24$, $p < 0.05$), Framingham risk score ($r = -0.27$, $p < 0.05$), PWV ($r = -0.31$, $p = 0.001$) and AIx ($r = -0.33$, $p < 0.001$). In multivariate linear regression models adjusting for age, height, heart rate, mean pressure and cardiovascular risk factors (BMI, total cholesterol, HDL, logCRP, hypertension, diabetes and intensity of smoking), penile Doppler results were significantly associated with both AIx ($\beta = -0.265$, $p = 0.004$) and PWV ($\beta = -0.250$, $p = 0.009$).
Conclusions: Our study shows that aortic stiffness and wave reflections correlate significantly with increasing severity of penile vascular disease as measured by penile Doppler. This finding provides further insights into the pathophysiology of ED and may have implications for the cardiovascular risk in these patients.

P.032
CORRELATION OF AORTIC STIFFNESS WITH SEVERITY OF ERECTILE DYSFUNCTION

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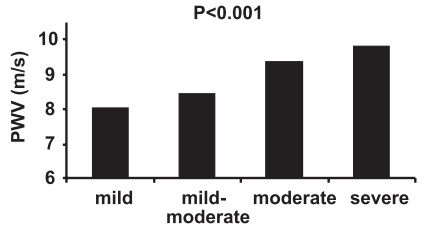
Background: Accumulating evidence suggests that erectile dysfunction (ED) may be an early manifestation of generalized vascular disease. Aortic stiffness is an independent marker and prognosticator of cardiovascular risk. The association of ED with aortic stiffness has not been defined.
Methods: A total of 164 men (mean age 59±9 yrs) affected by non-psychogenic and non-hormonal erectile dysfunction for more than 6 months were studied. All participants were invited to complete a 5-item form of the International Index of Erectile Function (IIEF-5) which is a validated and widely applied method for the evaluation of ED. ED was defined as mild (SHIM score 17–21), mild to moderate (11–16), moderate (8–10) and severe (7 or less). Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness using an automated non-invasive device (Complior®).



Results: There was a stepwise increase in PWV from mild ED, to mild-moderate and moderate ED and to severe ED ($p < 0.001$, figure). In univariate analysis, a negative correlation between PWV and IIEF-5 score was observed ($r = -0.37$, $p < 0.001$). Moreover, in separate backward elimination multiple regression model, PWV was significantly associated with IIEF-5 score ($b = -0.223$, $P = 0.006$, $R2 = 0.41$), after controlling for age, body-mass index, mean pressure, cholesterol, triglycerides, C-reactive protein, hypertension, diabetes, history of smoking, antihypertensive agents and statines.
Conclusions: ED is associated with impaired aortic elastic properties. This finding provides further evidence for the potential link between ED and cardiovascular risk.

P.033
SELECTIVE CYCLOOXYGENASE-2 INHIBITION BY CELECOXIB ABROGATES THE ACUTE SMOKING-INDUCED VASCULAR DYSFUNCTION

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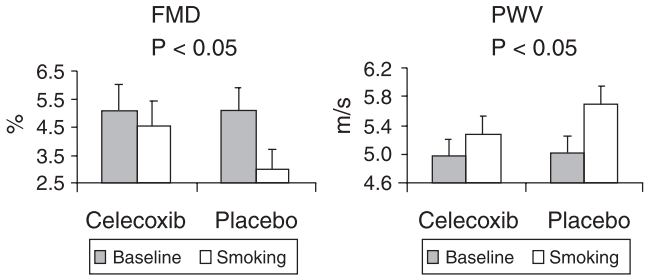
Background: The cardiovascular toxicity that is associated with cyclo-oxygenase-2 (COX-2) inhibitors is perhaps not a class effect, but may be rather limited to certain drugs in the class. Endothelial function and aortic stiffness are predictors of cardiovascular risk. The effect of celecoxib, a selective COX-2 inhibitor on acute smoking-induced vascular impairment is unknown.
Methods: We studied the effect of 200 mg of celecoxib in 12 healthy smokers (mean age 29.5 years) according to a randomized, double-blind, crossover fashion. Endothelial function and aortic stiffness were evaluated with flow-mediated dilatation (FMD) of the brachial artery and carotid-femoral pulse wave velocity (PWV) respectively. Measurements were done before celecoxib/placebo and immediately after a regular cigarette (tar 14 mg, nicotine 1 mg) that was smoked 3 hours after drug administration.
Results: Celecoxib blunted the smoking-induced increase in systolic BP ($p < 0.05$), but not in diastolic BP (p = NS). Celecoxib abrogated the smoking-related decrease in FMD (decrease by 2.1 vs 0.6%, $p < 0.05$, left figure). Moreover, the increase in PWV after smoking was significantly lower with celecoxib (increase by 0.69 vs 0.29 m/s, $p < 0.05$, right figure).



Conclusion. Selective COX-2 inhibition by celecoxib abolishes the endothelial dysfunction and aortic stiffening that is induced acutely by smoking. This finding provides further insights into the cardiovascular profile of this drug.

P.034
ERECTILE DYSFUNCTION IS RELATED TO ARTERIAL STIFFNESS AND MARKERS OF SYSTEMIC VASCULAR INFLAMMATION AND ENDOTHELIAL DYSFUNCTION IN PATIENTS WITH METABOLIC SYNDROME

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Background: Erectile dysfunction (ED) has been reported as the first sign of a generalized vascular disease. Arterial stiffness may be an early marker for vascular changes associated with metabolic syndrome (MetS). We evaluated associations between ED, arterial stiffness and markers of systemic vascular inflammation and endothelial dysfunction in patients with MetS.
Methods: Two groups of subjects with MetS were investigated: 39 men (mean age: 59 yrs) with ED of vascular origin and 30 men (mean age: 57 yrs) with normal erectile function. Aortic stiffness was evaluated with carotid-femoral pulse wave velocity (PWV) using high-fidelity pulse wave analysis. Plasma levels of interleukin 1β (IL-1β), tumor necrosis factor-α (TNF-α) and soluble vascular cell and intercellular adhesion molecules (sVCAM-1, sICAM-1) were measured with ELISA.
Results: The mean erectile function score (IIEF-5) was 13 (range 6–20) in men with MetS and ED and 23 (range 22–25) in men with MetS and normal erectile function. ED patients had increased PWV compared to patients

with normal erectile function (8.9 vs 8.3 m/s, $p < 0.05$). Compared with men without ED, ED patients had significantly higher levels of C-reactive protein (CRP), ($p < 0.05$), IL-1β ($p = 0.01$), TNF-α ($p < 0.01$), sVCAM-1 and sICAM-1 ($p < 0.05$ for both). IIEF-5 score was negatively associated with PWV ($r = -0.30$, $p = 0.01$), CRP ($r = -0.27$, $p < 0.05$), IL-1β ($r = -0.25$, $p < 0.05$), TNF-α ($r = -0.32$, $p < 0.01$), sVCAM-1 ($r = -0.24$, $p < 0.05$) and sICAM-1 ($r = -0.40$, $p < 0.001$).
Conclusion: ED and aortic stiffness are related in men with MetS and may contribute to their raised cardiovascular risk through impaired endothelial function elicited by an increased vascular inflammatory state.

P.035
BENEFICIAL EFFECT OF LAUGHTER ON AORTIC STIFFNESS

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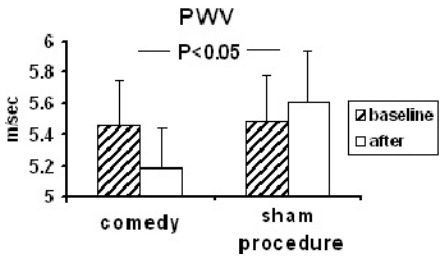
Background: Unfavourable psychogenic factors may increase the risk of cardiovascular outcomes. We have previously shown that mental stress has an acute detrimental effect on aortic stiffness, which is a determinant of cardiovascular performance and predictor of the corresponding risk. Aim of the present study was to evaluate the impact of laughter on aortic elastic properties.
Methods: Thirteen healthy volunteers (age 27±5 years) were enrolled in the study, which was carried out on two separate arms, one with viewing of a 30 minutes long segment of a comedy, and one with sham-procedure, according to a randomized, single-blind, cross-over design. During the sham-procedure arm the subjects rested for 30 minutes and nothing was projected. Carotid-femoral pulse wave velocity (PWV) was measured as an index of aortic stiffness using an automated, non-invasive device (Complior®), before (baseline) and shortly after the movie.
Results: No significant change in blood pressure and heart rate was observed after watching the comedy. However, comedy led to a significant decrease in PWV (decrease by 0.39 m/s compared to the sham-procedure, $P < 0.05$, figure), indicating a decrease in aortic stiffness.



Conclusions: This study shows for the first time that laughter has a favorable effect on aortic elastic properties. This finding provides valuable insights into the effect of laughter on the cardiovascular system, expanding the ways in which aortic stiffness can be decreased beyond pharmacological approaches.

P.036
ADMA – A SENSITIVE MARKER OF ENDOTHELIAL DYSFUNCTION IN CHILDREN WITH FAMILIAR HYPERCHOLESTEROLEMIA AND DIABETES MELLITUS TYPE 1

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Background: children with familiar hypercholesterolemia (FH) and diabetes mellitus type 1 (DM1) are considered to be high risk groups for the early manifestation of atherosclerosis. Endothelial dysfunction (ED) should be assessed in the preclinical stage, before clinical symptoms of vascular complications occur. Besides ultrasonographic methods there are many biochemical markers of ED whose varying sensitivity and specifity make diagnosis of ED in children difficult.
Methods: high selective CRP (hsCRP), oxidized LDL (oxLDL), malondialdehyde (MDA) and asymmetric dimethylarginine (ADMA) were assessed in three groups of children. FH group ($n = 29$, mean age 13.9 years, on a low-fat diet 17, statins 6, resins 6), DM1 group ($n = 22$, mean age 14.5 years, average duration 4.8 years) and a group of healthy controls ($n = 17$, mean age 15.3 years). Flow mediated dilation (FMD) and Deceleration index (DI) were measured simultaneously. Biochemical markers were then correlated with the ultrasonographic markers of ED.
Results: ADMA levels in the FH group were 0.97umol/l (SE 0.03), DM1 group 0.85 umol/l (SE 0.05) and in healthy controls 0.70umol/l (SE 0.04). Statistically significant differences were found between the FH group and healthy controls ($p < 0.00001$), and between DM1 group and healthy controls ($p < 0.01$). Differences in Hcy, hsCRP, OxLDL and MDA in these groups were not statistically significant. Interestingly both ultrasonographic methods used in this study did not show any significant difference between the study and control groups.
Conclusion: ADMA appears to be a more sensitive marker for the detection of ED than currently used ultrasonographic methods in children. Unlike other tested biochemical markers of ED, ADMA could be an important factor determining the treatment strategy. Nevertheless the combination of biochemical and ultrasonographic markers should continue to play an essential role in the treatment strategy in high risk children.

P.037
INCREASED AORTIC STIFFNESS ALTERS THE LEFT VENTRICULAR ROTATION IN PATIENTS WITH NON-ISCHEMIC DILATED CARDIOMYOPATHY

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We hypothesized that altered proximal aorta stiffness may affect left ventricular (LV) rotation in patients with non-ischemic dilated cardiomyopathy (NIDC). Therefore, we examined 34 angiographically proven NIDC patients (aged 52.6±13.9 years) and 34 healthy volunteers. The proximal aorta (AO) pulse wave velocity (PWV) was assessed by echocardiography. The LV diastolic function was evaluated by pulsed-wave Doppler while tissue Doppler (TDI) velocities from the septal and the base lateral wall were obtained. The cardiac rotation and rotation rate were evaluated by speckle echocardiography (EchoPac, GE). Rotation and rotation rate were calculated as the average angular displacement of 6 myocardial regions (anterior, anteroseptal, lateral, posterior, inferior and septal).
Patients had increased PWV (6.7± 2.1 vs. 5.2±1.4 m/s, $p = 0.01$) and decreased systolic cardiac rotation (-2.6 ±2.5 vs. -4.7±1.7°, $p = 0.01$) compared to controls. Patients had decreased systolic rotation rate (-38.6±8.7 vs. -51.7±22.3°/s, $p = 0.04$), early (28.1±20 vs. 49.9±35.2°/s, $p = 0.01$) and late (24.9±13.2 vs. 39.7±10.8°/s, $p = 0.002$) diastolic untwisting rate compared to controls. LV ejection fraction showed no correlation with the LV rotation and rotation rate in patients. PWV was correlated with E' (mean TDI velocity of the septal and the lateral wall) ratio, with the segmental and averaged systolic ($r = -0.52$, $p = 0.001$) and the early diastolic ($r = 0.027$, $p = 0.05$) rotation rate in patients.
We conclude that NIDC patients had increased aorta stiffness which impaired the systolic LV rotation movement affecting thus the LV systolic and diastolic function. Destiffening therapeutic interventions may be beneficial in these patients.

P.038
SIMULTANEOUS DETERMINATION OF WAVE SPEED AND THE ARRIVAL TIME OF REFLECTED WAVES USING THE PRESSURE-VELOCITY LOOP

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We previously demonstrated that the linear portion of the pressure-velocity loop (PU-loop) corresponding to early systole could be used to calculate the local wave speed. In this work we extend the results of this method to show that determination of the time at which the PU-loop first deviates from the linearity provides a convenient way to determine the arrival time of the reflected wave.
Pressure and flow were measured in elastic tubes of different diameters, where a strong reflection site existed at known distances away form the measurement site. Pressure and flow were also measured in the ascending aorta of 11 anaesthetised dogs where a strong reflection site was produced through total arterial occlusion at 4 different sites. The arrival time of the reflected wave was determined using a new algorithm that detects the sampling point at which the initial linear part of the PU-loop deviates from linearity by comparing the relative difference of slopes to an empirically determined threshold.
In elastic tubes the arrival time of reflected waves detected using the PU-loop was almost identical to that detected using wave intensity analysis and foot-to-foot methods with a maximum difference of 5%. Arrival time of reflected waves detected using the PU-loop *in vivo* highly correlated with that detected using wave intensity analysis ($r^2 = 0.94$, $P < 0.001$).
We conclude that the new technique described in this paper is easy to use, its results are comparable to those of traditional techniques, and allows for the dynamic determination of wave speed and the arrival time of reflected waves, simultaneously.