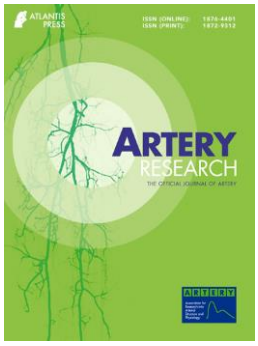

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# P5.26: 24 HOURS PULSATILE HEMODYNAMICS IN BORDERLINE VERSUS RESISTANT HYPERTENSIVES

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may warrant more intensive strategies in preventing further deterioration of their physiology.

### P5.23
### A MEDICAL CONFERENCE DINNER'S IMPACT ON CENTRAL BLOOD PRESSURE AND VASCULAR AGE

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Central blood pressure (BP) is recognised as a predictor of cardiovascular disease (CVD). Moderate alcohol consumption has been shown to have a beneficial effect on CVD. However, consumption of a lipid-rich meal may exert the opposite effect. Thus, the aim of the present study was to examine whether the immediate effect of a medical conference dinner was associated with reduced central BP and hence improved vascular age.
We examined attendees at a medical conference before and after the conference dinner which included a three course meal and wine menu. Participants had brachial and central BP measured. Central BP was measured in duplicate over the right radial artery using the Sphygmocor device (Atcor Medical, Sydney, Australia).
The cohort consisted of 60 attendees (43% women) with a median age of 40 years (IQR 35 − 54) and a mean follow-up period of 4 ± 1 hour. Only one attendee smoked, whereas six took antihypertensive medication. While heart rate increased, all measurements of brachial and central BP were reduced after the dinner (Table 1). Multiple regression showed that central systolic BP and augmentation index (AIx) was reduced after the dinner independently of age, gender, height, and baseline heart rate ($p = 0.008$ and $p = 0.01$). Furthermore, calculations of the slope of the regression lines between AIx@HR75 and age before and after the dinner revealed a reduction of 5.5 years in the vascular age.
In conclusion, central BP was reduced and vascular age improved by 5.5 years after intake of a medical conference dinner.

### P5.24
### EFFECTS OF IVABRADINE AND ATENOLOL ON CENTRAL AORTIC PRESSURE IN HYPERTENSIVE PATIENTS WITH STABLE ANGINA

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**The aim** of the study was to assess the effects of ivabradine (I) and atenolol (A) on central aortic pressure in patients with stable angina and arterial hypertension (AH).
**Methods**: The study was conducted on 31 hypertensive patients (57.1% male), mean age 61.9 ± 8.4 years, with angina pectoris of II-III functional class and without history of myocardial infarction and chronic heart failure. Two weeks before randomization all patients received nifedipine SR (30 mg o.d.) additionally to antihypertensive treatment. Then patients were randomly assigned to I ($n=15$) and A ($n=16$) dose up-titration for 2 weeks. Next 4 weeks doses of I and A were consistent. Mean doses were 14,4 mg for I and 137,5 mg for A. Heart rate, peripheral systolic (SBP) and diastolic blood pressure (DBP), central aortic systolic (CSP) and diastolic pressure (CDP), aortic pulse pressure (PP) were measured at baseline and at the end of the study.
**Results**: Heart rate (HR) decreased from 74.0 to 54.0 bpm with I and from 74.5 to 54.5 bpm with A (both $p=0.001$). SBP decreased from 132.0 to 129.5 mm Hg with I ($p=0.55$) and from 132.0 to 122.0 with A ($p=0.01$). DBP decreased from 80.0 to 79.5 mm Hg with I ($p=0.96$) and from 80.0 to 76.0 mm Hg mm Hg with A ($p=0.001$). CSP decreased by 6.9 mm Hg with I ($p=0.01$) and 8.0 mm Hg with A ($p=0.002$). DSP decreased by 3.0 mm Hg with I ($p=0.01$) and 4.0 mm Hg with A ($p=0.004$). PP decreased by 4.0 mm Hg after I ($p=0.64$), while PP increased by 5.0 mm Hg after A ($p=0.76$).
**Conclusion**: After achieving of target HR ivabradine without influence on peripheral BP decreased CSP compared with atenolol.

### P5.25
### DIURNAL VARIATION OF CARDIO-ANKLE VASCULAR INDEX IN INDIVIDUALS WITH AND WITHOUT HEART DISEASE

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**Background**: Clinical studies revealed age and pathological-related arterial stiffening. Arterial stiffening is associated with a higher risk of cardiovascular disease. Cardio-ankle vascular index (CAVI), which reflects both central elastic and peripheral muscular arterial stiffness, has been applied as a simple noninvasive method to evaluate the risk for cardiovascular events. However, whether it is necessary to standardize the time of the day when performing this measurement is unknown. We aim to examine the effect of daytime on CAVI in individuals with and without heart disease.
**Methods**: We investigated the daytime variation of CAVI using Vasera VS-1500N (Fukuda Denshi; Japan) in 23 healthy young individuals (28.3±4.7yr, HY), 22 healthy elderly individuals (61.1±9.0 yr, HE) and 25 patients with heart disease (63.9±11.5yr, HD).
**Results:** The effect of time on CAVI was shown to be significant in both univariate and multivariate analysis. Age was found as a significant determinant of CAVI ($p<0.001$). After adjustment for age, sex and MAP, CAVI was shown to be 4% (09:00 versus 13:00, $p=0.022$) and 5% higher (09:00 versus 17:00, $p=0.002$) in the morning than the following time points. Furthermore, the patterns of variation over the day showed no significant differences among groups in CAVI.
**Conclusion**: CAVI showed a significantly higher value in the morning, which provides further support to standardize the time for measurements of arterial stiffness using CAVI in routine clinical practice and longitudinal studies.

### P5.26
### 24 HOURS PULSATILE HEMODYNAMICS IN BORDERLINE VERSUS RESISTANT HYPERTENSIVES

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**Background**: Diurnal variations of brachial blood pressure have important prognostic implications. The aim of this study was to investigate differences in day- and night-time values of brachial and central hemodynamic parameters in two groups of borderline and resistant hypertensives.
**Methods**: We performed 24 hour pulse wave analysis, using a brachial cuff and validated ARCSolver algorithms. Central pressures were derived with a generalized transfer function using measured mean and diastolic pressure for calibration. 50 borderline hypertensives (BH; mean age: 52 years, mean 24h brachial blood pressure (bBP): 123/81 mmHg) and 25 resistant hypertensives (RH; mean age: 58 years, mean 24h bBP: 138/85 mmHg) were included in the study. Day-time was specified as 09:00-21:00 and night-time as 01:00-06:00.

| | | BH | RH |
|---|---|---|---|
| Brachial systolic BP (mmHg) | Day | 127* | 139$^{\$}$ |
| | Night | 113 | 135$^{\$}$ |
| Central systolic BP (mmHg) | Day | 128 | 144$^{\$}$ |
| | Night | 123 | 147$^{\$}$ |
| Brachial pulse pressure (mmHg) | Day | 41 | 51$^{\$}$ |
| | Night | 40 | 54$^{\$}$ |
| Central pulse pressure (mmHg) | Day | 41* | 54$^{\$}$ |
| | Night | 49 | 64$^{\$}$ |
| Heart rate (bpm) | Day | 72* | 69* |
| | Night | 59 | 60 |
| AIx | Day | 23* | 29*$^{\$}$ |
| | Night | 29 | 38$^{\$}$ |
| AIx@75 | Day | 22 | 25* |
| | Night | 20 | 30$^{\$}$ |
| Amplitude backward wave (mmHg) | Day | 16* | 22*$^{\$}$ |
| | Night | 21 | 28$^{\$}$ |
| Reflection magnitude | Day | 61* | 64* |
| | Night | 70 | 71 |

*$p<0.05$ day vs night; $^{\$}$ $p<0.05$ BH vs RH.

**Results**: With respect to bSBP, we observed a dipping phenomenon (decrease > 10%) in BH, but not in RH. In contrast, with respect to cSBP, no dipping was present in both groups, respectively. Heart rate was significantly lower at night-time in both groups. Daytime and night-time bPP did not differ in both groups, but cPP showed an increase at night-time in both groups. All measures of wave reflection increased at night-time in both groups.
**Conclusions**: Measuring 24h pulsatile central hemodynamic parameters using a cuff device is feasible and can lead to novel insights compared to brachial BP. Further studies should investigate the clinical value.

using the Rotterdam criteria. WI was assessed by simultaneous recording of diameter-derived pressure and flow velocity signals from the CCA. Local wave speed (by water-hammer equation) was used to separate forward and backward waves as previously described. Backward waves were indexed by the integral of the preceding forward wave to characterise reflections independently of energy originating in the LV. Other key measures included central pulse wave velocity (PWV) from radial applanation tonometry and LV systolic and diastolic function by echo.
**Results**: There were no between group differences in age, height, central PWV or echo measures of LV function.

| | Control (n=44) | IR (n=41) | Control vs. IR p-value | PCOS+IR (n=58) | IR vs. PCOS+IR p-value |
|---|---|---|---|---|---|
| Waist (cm) | 78.6 | 90.2 | <.001 | 97.8 | .012 |
| HOMA-IR | 1.2 | 3.5 | <.001 | 4.0 | .020 |
| Testosterone (nmol/L) | 1.0 | 1.1 | .370 | 1.6 | .002 |
| Heart rate (bpm) | 67.0 | 72.9 | .012 | 75.8 | .163 |
| FCW (W/m2) | 11.4 | 14.7 | <.001 | 13.1 | .089 |
| BCW/FCWint. (W/m2) | 40.9 | 46.1 | .037 | 39.8 | .005 |
| FEW (W/m2) | 2.3 | 2.9 | .002 | 2.5 | .020 |
| FEW duration (ms) | 71.7 | 84.4 | .031 | 76.8 | .256 |
| Time to FEW (ms) | 333.1 | 305.3 | .001 | 319.6 | .073 |

**P5.27**
**INDAPAMIDE SR EFFECTS ON AMBULATORY BRACHIAL AND AORTIC PRESSURE IN HYPERTENSIVE PATIENTS**

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**Aim**: Ambulatory monitoring of central blood pressure (BP) is a new technique for evaluation of antihypertensive drugs efficacy. The aim of the study was to assess changes in ambulatory brachial and central BP after indapamide SR adjunction to treatment regimen in hypertensive patients.
**Methods**: Indapamide SR 1,5 mg was added to 21 hypertensive patients (9 male, age 62 years) with uncontrolled hypertension (clinic BP >140/90 mmHg, 24-h BP >130/80 mmHg and/or daytime BP>135/85 mmHg) after 8 weeks treatment with combination of an ACE inhibitor and a calcium channel blocker. ABPM was done before and after 4 weeks of indapamide SR adjunction with BPLab VASOTENS ("OOO Petr Telegin", Nizhniy Novgorod, Russia) brachial oscillometric device which allows to derive aortic BP and augmentation index (AIx). Brachial and aortic BP changes were evaluated. p<0,05 was considered significant.
**Results**: Significant (p<0,05) decrease in 24-h, day- and nighttime BP after 4 weeks of indapamide SR adjunction was observed: for brachial systolic pressure, respectively, from 147±13 to 138±10, from 148±13 to 139±10, from 145±15 to 134±14 mmHg, for aortic systolic pressure, respectively, from 137±12 to 128±9, from 137±12 to 128±9, from 137±14 to 126±13 mmHg. AIx@HR75 bpm decreased significantly (p<0,05) also: 24-h AIx from 1,8±24,9 to -11,1±17,5%, daytime AIx from -2,3±25,6 to -15,7±18,1%, nighttime from 15,4±21,7 to 1,8±19,5%.
**Conclusion**: Indapamide SR adjunction to combination therapy with combination of an ACE inhibitor and a calcium channel blocker results in significant decrease in brachial and aortic systolic pressure as well as in decrease in aortic pulse pressure augmentation. Decrease in aortic pulse pressure augmentation is observed during both day- and night-time.

**P5.28**
**THE EFFECT OF INSULIN RESISTANCE ON VENTRICULAR-ARTERIAL COUPLING; INSIGHTS FROM SEPARATED WAVE ANALYSIS IN YOUNG WOMEN WITH AND WITHOUT PCOS**

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**Objective**: Polycystic ovary syndrome (PCOS) is characterised by obesity and a high prevalence of insulin resistance (IR) but this may not translate into increased cardiovascular events. The energy and timing of waves in large arteries may be quantified by separated wave analysis from wave intensity (WI) signals. This study characterised ventricular-arterial coupling (VAC) in three groups of young women (i) control (ii) IR (iii) PCOS+IR.
**Method**: 143 women (16-45y) free from cardiovascular disease and diabetes were studied. IR was diagnosed if HOMA-IR was ≥2. PCOS was diagnosed

**Conclusion**: In those without PCOS, IR was associated with increased amplitude forward compression (FCW) and expansion (FEW) waves actively generated by the LV and proportionally greater amplitude reflected waves (BCW/FCWint.). Proposed mechanisms include enhanced sympathetic nervous system activity by elevated endogenous insulin levels or obesity. PCOS+IR subjects had waves with amplitudes that more closely approximated control values, despite a worse risk profile.

**P5.29**
**MUSIC TO MY EARS, HEART AND AORTA: THE EFFECT OF MUSIC LISTENING ON ARTERIAL STIFFNESS AND AORTIC HEMODYNAMICS OF YOUNG, HEALTHY VOLUNTEERS**

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**Objectives**: Music has been correlated to cardiovascular health and used as additional therapy in patients with cardiovascular disease, however, few are known on the impact of music on arterial stiffness and central hemodynamics which are both predictors of cardiovascular risk. We investigated the effect of rock and classical music on arterial stiffness and wave reflections in young healthy people.
**Methods**: We studied 20 healthy individuals (22.5 ± 2.5 years, 10 males), free of cardiovascular risk factors except smoking (10%). Volunteers were studied on three different occasions and listened to a 30-minute music track (classical, rock or no music for the sham procedure). Carotid-femoral pulse-wave velocity (PWV) and pulse wave analysis were used to assess aortic stiffness and central hemodynamics. Measurements were made before, immediately after and 30 minutes after each track. Volunteers were classified as classical or rock music fans, according to their answers to a questionnaire.
**Results**: Augmentation index (AIx) and augmented pressure (AP) were significantly decreased by both music genres compared to sham procedure with a maximum decrease noted immediately post music by 8.3% and 1,56 mmHg, respectively (all p<0.001). Music had no significant effect on PWV. Classical and rock music led to a more potent response in classical and rock fans, respectively (figure).
**Conclusions**: Both classical and rock music decrease wave reflection indices whereas they have no effect on aortic stiffness. Given the influence of wave reflections on cardiovascular performance and cardiovascular disease risk, our findings may have important implications for human health.

**P5.30**
**PHYSICAL ACTIVITY, ARTERIAL STIFFNESS AND OBESITY**

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**Objectives**: To examine the role of physical activity in vascular stiffness and markers of adiposity and inflammation in "healthy" subjects.