POSTER SESSION

POSTERS’ SESSION PS01

BLOOD PRESSURE MEASUREMENT

**PP.01.01 CENTRAL BLOOD PRESSURE VALUES IN A HEALTHY MEXICAN SAMPLE**

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**Objective:** The aim of this study was to evaluate the central blood pressure values in a healthy Mexican sample.

**Design and method:** We included 617 healthy individuals without risks factors of 1047 gathered in our centre. Ages ranged from 18 to 78 years. We used the HEM9000AI non-invasive tonometric device on radial artery to obtain central and peripheral parameters in the same assessment. Due to important age and sex interaction, we divided the groups by decades and gender. We report medians, 95% confidence intervals (CI), Pearson’s correlation coefficient and Student’s T test.

**Results:** The average height, weight and body mass index (BMI) in males were 175 cm, 77.3 kg and 25.1 and for women was 161.6 cm, 63.5 kg and 24.2, respectively. cSBP values in females and males were the following: <30 years (94, 96 mmHg), 30-39 years (104, 107 mmHg), 40-49 years (107, 110 mmHg), 50-59 years (114, 115 mmHg); >60 years (117, 118 mmHg). Similarly to cSBP, central pulse pressure (cPP) values (not shown) had a constant increase correlating with age (r = 0.559, p < 0.001). We found similar mean cSBP values between women and men 103.32 vs 103.36 mmHg respectively (p = 0.973). (Table 1)

**Conclusions:** Assessing reference values in healthy population sample is the first step to establish normal values for a particular population. Central hemodynamic values have been assessed mostly in European and Asian populations. Due to the high prevalence of cardiovascular mortality in Mexico, it is very important to establish these cut-off values. We need a larger sample to generalize this to the general Mexican population.

**PP.01.02 CORRELATION OF PULSE WAVE ANALYSIS PARAMETERS WITH LEFT VENTRICULAR HYPERTROPHY, INTIMA-MEDIA-THICKNESS AND PLAQUES IN CAROTID ARTERIES IN A BRAZILIAN AMBULATORY CARE**


**Objective:** To evaluate the correlation of pulse wave analysis parameters with left ventricular hypertrophy (LVH), Intima-media-thickness (IMT) and plaques in carotid arteries.

**Design and method:** 98 hypertensive or hypertension suspected patients seen in the academic hypertension ambulatory from the Federal University of Triângulo Mineiro (UFTM) between January and December 2015 had their pulse wave analysed by oscillometry - Mohil-O-Graphâ PWA - EMI GmbH (Stolberg, Germany). Four consecutive measurements were taken every two minutes according to general recommendations for clinical studies of ‘Clinical Applications of Arterial Stiffness, Task Force III: Recommendations for User Procedures’ (AHJ 2002, 15: 445–452). All patients underwent two-dimensional echocardiography (ECG) and carotid ultrasound at Philips iE33 Ultrasound equipment (Bothell, USA). Patients were categorized for the presence or absence of LVH in ECO according to Left Ventricular Mass Index (LVMi) values (Men > 115 g/m², women > 95 g/m²), presence or absence of IMT > 0.9 in the right or left common carotid, presence or absence of plaques in the territory of the common and internal carotid. Pearson correlation coefficients were calculated with p values to evaluate the degree of association between variables.

**Results:** Data from 98 patients were analyzed. The results are shown in Table 1. The correlation coefficient between the mean Pulse Wave Velocity (PWV) and the mean IMT was 0.48, showing a significant correlation between these two variables. Regarding the presence of plaques in carotid arteries, there was a significant correlation with the PWV (r = 0.38). Other parameters of the pulse wave analysis showed weak correlation with the IMT and the presence of plaques in carotid arteries. There was weak correlation between the LVH and all the parameters of the pulse wave analysis.

**Conclusions:** The PWV correlated significantly with IMT and with the presence of plaques in carotid arteries. Other parameters of the pulse wave analysis showed weak correlations with LVH, IMT and plaques presence.

**PP.01.03 PUBLIC HEALTH SCREENING FOR HYPERTENSION: IS IT COST EFFECTIVE?**

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**Objective:** Hypertension is a known risk factor for cardiovascular morbidity and mortality. Worldwide prevalence of hypertension is high. Individual unawareness of presence of elevated BP is even higher. This is one of the factors that contribute to overall poor control of BP. Aim is to determine the prevalence of hypertension and unawareness of elevated BP at public health screening for hypertension. Cost of detecting a person who was unaware of their elevated BP was also determined.

**Design and method:** Data was collected at a health screening campaign for hypertension held at two primary care clinics. Subjects aged 15 years and above were invited to answer a self-administered questionnaire. BP was measured using mercury or automated BP sphygmomanometer by doctors or nurses.

**Cost Calculation:** The average salary of the doctors and nurses who did the BP measurements for 3 days was used to calculate the cost of detecting hypertension in an individual not aware of their elevated BP.

**Results:** 2498 subjects (median age 47.9 years, female 50.9% (n = 1263), Chinese 26.1% (n = 651), and Indians 17.7% (n = 441) and the remainder were Sikhs or foreigners. A total of 767 (30.8%) individuals had elevated BP ( > 140/90 mmHg), 63.2% (n = 457) were not aware they had hypertension. Overall prevalence of known hypertension was 39.9%, n = 996. Among those who were known to have hypertension, 98% (n = 528) were on antihypertensive. Those who were on anti-hypertensive, 50.7% (n = 267) had good BP control (BP < 140/90 mmHg). The total cost of the doctors and nurses doing the screening for 3 days was RM5019.80 (US$1224) 457 participants were unaware of their elevated BP Thus the cost of detecting an individual with hypertension was RM10.98. (US$ 2.68)

**Conclusions:** The prevalence and unawareness of hypertension is high. The cost of detecting one person who is unaware of his elevated BP was RM 10.98. It is...
cost effective to hold health screening campaigns to detect a case of hypertension. Detecting elevated BP and reducing unawareness would contribute to the reduction of CV morbidity and mortality attributable to hypertension.

**PP.01.04 USING TELEMONITORED HOME BLOOD PRESSURE MEASUREMENT TO ASSESS THE TRUE PREVALENCE OF HYPERTENSION IN SINGAPORE**

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**Objective:** Hypertension is common in Singapore, with published prevalence rates based on office blood pressure measurements. Many patients referred to specialist hypertension services are normotensive on further evaluation. Inappropriate referrals block resources that could be targeted more appropriately. As part of a community outreach program, Ng Teng Fong General Hospital of Jurong Health Services conducts regular population health screenings which include blood pressure (BP) measurements. Participants with BP > 140/90 mmHg are advised to visit primary care services. This study aims at assessing how many of these are truly hypertensive.

**Design and method:** In ongoing population health screenings, targeting 2950 participants from Western Singapore annually, BP is measured on registration. Patients with two consecutive measurements between 140/90–180/110 mmHg are offered participation in our study. We receive a Bluetooth enabled BP monitor and instructions on how and when to record their BP at home. Seven day averages are calculated, and diagnosis of hypertension is based on these values. Patients receive written health advice based on the telemonitored BP and their basic risk factors. They are further offered a complementary visit to a primary care provider who is aware of the telemonitored assessment.

**Results:** Since October 2015, 816 residents attended the health screening. Full data for 626 are available for preliminary reporting. 69 (11%) had elevated BP values at registration; 23 participated in our study. Of these, 7 (30%) were normotensive. One patient with repeated BP measurements exceeding 180 mmHg was identified by telemonitoring and urgently referred to primary care services, where her BP was controlled before the end of the telemonitoring period.

**Conclusions:** Amongst the participants of the community health screenings in Western Singapore, prevalence of hypertension at registration is significantly lower than the published rates. When diagnosis of hypertension is based on telemonitored home measurements, the prevalence drops by a further 30%. The data presented in this abstract are preliminary but show a clear and internally consistent trend towards lower BP prevalence in the resident population. We conclude that published data may not reflect true prevalence rates of hypertension in Singapore.

**PP.01.05 PREVALENCE OF CENTRAL HYPERTENSION AND ITS ASSOCIATION WITH TARGET ORGAN DAMAGE IN UNTREATED CHINESE PATIENTS**

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**Objective:** Central blood pressure (BP) is suggested to be more closely correlated to target organ damage and cardiovascular events than brachial BP. Outcome-based thresholds for the diagnosis of central hypertension has been recently proposed. However, little is known about central hypertension. In an untreated patient cohort, we therefore investigated the prevalence of central hypertension and its association with target organ damage.

**Design and method:** Consecutive untreated patients referred for ambulatory BP monitoring to the Hypertension Outpatient Clinic of the Ruijin Hospital, Shanghai, China were recruited. Office brachial and central BP were measured using the Omron 7051 (Omron, Japan) and Sphygmocor (A&Co, Australia) devices, respectively. Patients were cross-classified according to the presence of brachial and central hypertension defined as a brachial and central systolic BP of at least 140 mmHg and 130 mmHg, respectively. Measures of target organ damage, including left ventricular mass index by echocardiography (GE, E9), carotid-femoral pulse wave velocity (cPWV) and urinary albumin-to-creatinine ratio (ACR), were determined.

**Results:** The 1928 participants (mean age, 51 years; women, 52%) included 1036 (54%) patients with brachial and central consistent normotension, 662 (34%) brachial and central combined hypertension, 74 (4%) isolated central hypertension, and 156 (8%) isolated brachial hypertension. Compared to patients with isolated brachial hypertension, patients with brachial and central combined hypertension had significantly greater urinary ACR (0.96 vs. 0.68 mg/mmol, P < 0.001) and more patients with microalbuminuria (5% vs 0.7%, P = 0.017), faster cPWV (8.50 vs. 8.17 m/s, P = 0.003), but similar left ventricular mass index (85.7 vs. 86.6 g/m², P = 0.60) after multivariate adjustment. Patients with isolated central hypertension also had faster cPWV (7.83 vs. 7.51 m/s, P = 0.03) than those with consistent normotension.

**Conclusions:** Central hypertension was prevalent (about 38%) in this untreated patient cohort, 90% combined with brachial hypertension. Patients with brachial and central combined hypertension were associated with worse target organ measures and might be a subtype that we shall pay attention to in our clinical practice.
Design and method: Twenty-one patients (75% men, all white, mean age – 40 years) with mild to moderate essential hypertension, never treated before, were enrolled. Dose of AZL was gradually increased until maximum 80 mg once-daily. Follow-up of all patients amounted to 6 months. CAP measurement was performed by the Sphygmocor (CVMS, Atcor, Australia) and 24-hours blood pressure monitoring (ABPM, Medtech, Hungary) were measured before treatment and on the last visit.

Results: Mean value (mean ± SEM) of baseline 24-hours systolic BP (SBP) was 141 ± 1.9 mmHg and 24-hours diastolic BP (DBP) – 84 ± 1.8 mmHg, while mean value of CAP was 136 ± 3.1 mmHg. At the end of the study mean value of 24-hours SBP was 126.6 ± 1.2 mmHg, 24-hours DBP – 75 ± 1.8 mmHg and CAP was 119 ± 2.9 mmHg. So decrease from baseline to final CAP, 24-hours SBP and 24-hours DBP were –17, –14 and –9 mmHg respectively. An outcome of the study shows a significant reduction in both 24-hours SBP and DBP (p < 0.0001) and CAP changes (p < 0.005).

Conclusions: Once-daily AZL effectively lowers CAP in adults with mild to moderate essential hypertension and has shown good antihypertensive efficacy according to 24-hours blood pressure monitoring as well.

EUROPEAN SOCIETY OF HYPERTENSION INTERNATIONAL PROTOCOL 2010 FOR THE VALIDATION OF BLOOD PRESSURE MONITORS: A CRITICAL REVIEW OF ITS APPLICATION

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Objective: The reliability of blood pressure (BP) monitors is a prerequisite for the accurate evaluation of hypertension. Validation protocols have been developed to evaluate the accuracy of BP monitors, and the European Society of Hypertension International Protocol (ESH-IP) is the most widely used worldwide. A review of published validation studies using the revised ESH-IP 2010 (ESH-IP2) was performed, to identify possible violations, divergences and adaptations.

Design and method: Published validation studies that used the ESH-IP2 from its publication (2010) until the end of 2013 were identified. All aspects of the protocol procedure were scrutinized using a standard checklist.

Results: 147 validation studies were identified. 92 (63%) used the ESH-IP 22 (13%) the British Hypertension Society Protocol, 26 (18%) the US AAMI and/or ISO protocol, and 18 (12%) did not follow an established protocol (some studies used two protocols). Of the 92 ESH-IP studies 54 (59%) used the ESH-IP2. The number of ESH-IP2 studies published per year were 73/9/16/19 for years 2011/12/13/14/15 respectively. 52 studies reported ‘pass’ result (96.3%). 93% of the studies tested oscilometric devices, 78% upper-arm devices, 20% clinic, 6% ambulatory and 89% home monitors (some for more than one function). Seven studies (7%) included special oscillometric devices, 4 studies (4%) were with sphygmomanometers only, 16 studies (16%) with oscillometric devices only, 3 studies (3%) with both oscillometric and sphygmomanometers, and 28 studies (28%) with both oscillometric and sphygmomanometers.

Conclusions: Five years after its publication, the revised ESH-IP2 remains the preferred protocol for device validation. Protocol violations occur in one third of the studies, suggesting that a more strict standardization of the validation procedure and reporting is necessary. The peer review process of scientific journals often misses important deficiencies of validation studies.

TREATMENT WITH BETA-BLOCKERS REDUCES THE DIFFERENCE BETWEEN CLINICAL AND AMBULATORY BLOOD PRESSURE LEVELS IN PATIENTS WITH STABLE ARTERIAL HYPERTENSION

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Objective: The aim of our study was to assess the effect of antihypertensive treatment (beta-blockers (BB), angiotensin I receptor antagonists (ARA), calcium antagonists (AC), angiotensin converting enzyme inhibitors (ACEI) on the difference between clinical and ambulatory blood pressure level.

| Table 1. Long-term antihypertensive treatment reduces the difference between clinical and ambulatory blood pressure |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| difference between diastolic and clinical and ambulatory diastolic BP | difference between systolic and clinical and ambulatory systolic BP |
| treatment | before | during | after | before | during | after |
| ARA | 21.5 ± 11.5 | 21.6 ± 9.8 | 21.7 ± 10.3 | 21.5 ± 11.5 | 21.6 ± 9.8 | 21.7 ± 10.3 |
| AC | 21.5 ± 11.5 | 21.6 ± 9.8 | 21.7 ± 10.3 | 21.5 ± 11.5 | 21.6 ± 9.8 | 21.7 ± 10.3 |

The difference between clinical and ambulatory blood pressure level is reduced by the treatment for hypertensive patients.
Design and method: We analyzed 292 ambulatory blood pressure monitoring (ABPM) data of AH patients without serious concomitant diseases. The difference between clinical and ambulatory blood pressure level was assessed as the difference between clinical BP measurement and mean daytime BP. The inclusion criteria were: ≥ 6-days wash-out period; two ABPM (SpaceLabs 90207) sessions before treatment and during treatment, daytime BP before treatment > 140/90 and < 160/110 mmHg; 2–3 months treatment period with mean therapeutic doses. The BB group included metropolol receiving patients (35), ARA group - losartan and enalapril (36), ACEI group - captopril and enalapril (35), AC group - amlopidin (40). We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

Results: We found that all antihypertensive drugs significantly decreased systolic and diastolic BP (SBP, DBP) levels. Long-term BB therapy significantly reduced difference between systolic and diastolic clinical and ambulatory blood pressure diastolic. Antihypertensive treatment with other drugs has not significantly reduced the difference between clinical and ambulatory blood pressure (see table).

Conclusions: BB decreased difference between clinical and ambulatory blood pressure. Probably BB reduced stress-induced increase of the sympathetic nervous system activity during clinic visit and therefore clinic BP level more significantly than other drugs.

### PP.01.11

#### THE LOWER THE BETTER? PROGNOSIS DEFINED BY PROGNOSTIC ACCURACY OF AMBULATORY BLOOD PRESSURE IN PORTUGUESE TREATED HYPERTENSIVE PATIENTS FOLLOWED FOR 11.8 ± 5.1 YEARS

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Objective: Aim: It is not well known if lowering systolic blood pressure (SBP), analyzed by 24h ambulatory blood pressure (ABP), has limits in order to be CV protective. The aim of the study was to evaluate, by (ABP), if lowering SBP is associated with a non-J shape curve of decrease of cardiovascular events (CV) strokes (AVC) and coronary events (DC).

Design and method: Casual and ABP were obtained in 1200 hypertensive patients (HTA, 645 female) ageing 51 ± 12 years, BMI 27 ± Kg/m², 24 systolic blood pressure 133 ± 16 mmHg, under stabilized therapy without previous cardio-vascular (CV) events. Presence or absence of CV events followed 11.8 ± 5.1 years and analyzed by a Cox hazard model adjusted for confounding variables and by survival curves of Kaplan Meier free of events.

Results: There were 133 deaths and 251 cardiovascular fatal and non-fatal events (147 strokes, 67 coronary events, 37 other CV events) during 21.2 years of follow-up (mean 11.8 ± 5.1 years).

After adjustment for age, BMI, gender, casual BP, antihypertensive treatment and diabetes, when we analyzed in the same Cox multivariable the deciles of 24 hours SBP distribution in relation to global cardiovascular events, strokes, coronary events had a positive correlation with those type of events, respectively HR 1.17 (95% CI 1.07–1.29; p < 0.001), 1.22 (95% CI 1.12 (1.08–1.35; p < 0.001), 1.27 (95% CI 1.04–1.57; p < 0.03) When we analyzed the survival curves of Kaplan Meier free of events the deciles of 24 hours SBP in relation to global cardiovascuar events, strokes, coronary events those within the higher deciles had the worst prognosis, respectively for CV events log rank 52.8 p < 0.000 Breslow 66.2, p < 0.000, Stroke log rank 62, p < 0.000 Breslow 73.5, p < 0.000, and coronary events log rank 15.9 p < 0.003 Breslow p < 0.05.

Conclusions: In our Portuguese sample of patients with treated hypertension, lowering systolic blood pressure has a positive effect in terms of cardio-cerebrovascular events. No J curve was observed suggesting that in our sample the “lower is the better”.

### PP.01.12

#### DIAGNOSTIC THRESHOLD OF HYPERTENSION BY HOME BLOOD PRESSURE MONITORING: COMPARISON TO DIAGNOSTIC THRESHOLD OF AMBULATORY BLOOD PRESSURE MONITORING

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Objective: Currently recommended diagnostic threshold of hypertension by home blood pressure monitoring (HBPM) is 135/85 mmHg. However, no studies have examined the validity of recommended diagnostic threshold, using ambulatory blood pressure (ABPM) as a reference method. We compared two diagnostic threshold of HBPM 135/85 mmHg and 130/80 mmHg.

Design and method: Patients with blood pressure > 140/90 mmHg at the outpatient clinic, were enrolled. HBPM was performed for 7 days (triplicated morning and evening measurement). The 24-hour ABPM was performed on the 7th day. Among 319 patients, 256 (mean age 51.8 ± 9.7 years, 119 men) who had valid HBPM and 24-hour were analyzed. At least 5 days HBPM was averaged according European Society of Hypertension guidelines. Hypertension by 24-hour was defined as ≥ 130/80 mmHg.

Results: The threshold 130/80 mmHg showed higher diagnostic sensitivity (90.2 vs 77.1%; p = 0.001), diagnostic agreement (84.8 vs 77.3%) and Kappa statistics (0.526 vs 0.439), compared to threshold 135/85 mmHg. Diagnostic specificity was not different. The prevalence of masked hypertension was more prevalent in threshold 135/85 mmHg compared to 130/80 mmHg (18.4 vs 7.8%, respectively, p = 0.025). The prevalence of white-coat hypertension was not different (4.3 vs 7.4%, respectively, p = 0.128).

Table: Comparison of two diagnostic threshold of HBPM taking 24-hour ABPM as a reference method

<table>
<thead>
<tr>
<th>Diagnostic threshold of HBPM</th>
<th>Sensitivity (%)</th>
<th>Specificity (%)</th>
<th>Positive predictive value (%)</th>
<th>Negative predictive value (%)</th>
<th>Agreement (%)</th>
<th>Kappa statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>135/85</td>
<td>77.1 (67.6–86.7)</td>
<td>95.9 (95% CI 93.7–98.1)</td>
<td>95.9 (95% CI 93.7–98.1)</td>
<td>95.9 (95% CI 93.7–98.1)</td>
<td>77.3</td>
<td>0.439</td>
</tr>
<tr>
<td>130/80</td>
<td>99.2 (85.3–93.9)</td>
<td>85.7 (95% CI 79.1–91.3)</td>
<td>85.7 (95% CI 79.1–91.3)</td>
<td>85.7 (95% CI 79.1–91.3)</td>
<td>84.8</td>
<td>0.556</td>
</tr>
</tbody>
</table>

Conclusions: Lowering diagnostic threshold of HBPM from 135/85 mmHg to 130/80 mmHg may be better in the diagnosis of hypertension.
Design and method: BP control defined by OBP < 140/90 and daytime ABPM or HBP < 135/85 mmHg was tested in 70 KTR (mean age 56 ± 11 y; mean graft survival 7 ± 6.6 y). OBP and HBP were measured with an Omron M6 and 24-h ABPM with a SpaceLabs 90207. HBP was measured on consecutive days (2 times in morning and 2 times at evening/day), the first day was discarded for the mean calculation. Agreement on BP status between daytime and HBP was studied when HBP was measured during 7, 5 or 3 days.

Results: BP was uncontrolled in 50% of the KTR based on OBP, in 61% according to daytime ABPM and even in 64% with HBP. Sensitivity (Sc) testing agreement between daytime ABPM and HBP decreased progressively when number of days of BP recordings was shortened: the highest Ssc was observed for a 7 days duration with 1st day discarded for mean calculation (86%). Specificity (Sp) fluctuated around 70% and was the highest for a 5 (73%) and 3 days schedule. However the 5 days schedule had higher Ssc (83%) than the 3 days (76%). Proportions of KTR correctly classified according to daytime ABPM were 79%, 79% and 78% with the 7, 5 or 3 days schedule, respectively.

Conclusions: HBP, easier and less restricting method than 24 h ABPM, is a good alternative to daytime ABPM as nearly 80% of treated KTR were similarly classified by both techniques. HBP recording period can be shortened to 5 days according to Sensitivity and Specificity. A 3 days schedule appears more risky reducing the chance to identify masked HT due to a decreased drug adherence.

Design and method: We enrolled 83 consecutive untreated patients who performed ABPM in our Hypertension Unit and completed a short HBP schedule (two measurements, twice daily, for four days) between November 2011 and June 2015. Patients were instructed about HBP in accord to current hypertension guidelines and they used validated automated arm devices. We compared the accuracy between daytime ABPM and HBP measured in untreated patients. For HBP, ESH guidelines recommend 7 days of measurements but that duration is questioned. The present study analyzed the degree of agreement between daytime ABPM and different schedules with decreasing number of days for HBP recording in 70 treated hypertensive KTR.

Results: As hypertensive 54 subjects on 83 (65.1%), the HBPM 29 subjects (34.9%). The AUC for SBP is 0.75 and for DBP of 0.877. The ABPM identified arterial hypertension diagnosis, can lead to inadequate conclusions if essential technique is questioned. The present study analyzed the degree of agreement between daytime ABPM and different schedules with decreasing number of days for HBP recording in 70 treated hypertensive KTR.

Conclusions: The present study analyzed the degree of agreement between daytime ABPM and different schedules with decreasing number of days for HBP recording in 70 treated hypertensive KTR.

PP.01.14 HOME BLOOD PRESSURE IN KIDNEY TRANSPLANT RECIPIENTS (KTR)- VALIDITY OF DIFFERENT SCHEDULES OF SELF-MONITORING

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Objective: Office blood pressure (OBP), 24-h ambulatory monitoring (ABPM) and home self-monitoring (HBPM) allow assessing BP control in treated HT patients. For HBP, ESH guidelines recommend 7 days of measurements but that duration is questioned. The present study analyzed the degree of agreement between daytime ABPM and different schedules with decreasing number of days for HBP recording in 70 treated hypertensive KTR.

Design and method: BP control defined by OBP < 140/90 and daytime ABPM or HBP < 135/85 mmHg was tested in 70 KTR (mean age 56 ± 11 y; mean graft survival 7 ± 6.6 y). OBP and HBP were measured with an Omron M6 and 24-h ABPM with a SpaceLabs 90207. HBP was measured on consecutive days (2 times in morning and 2 times at evening/day), the first day was discarded for the mean calculation. Agreement on BP status between daytime and HBP was studied when HBP was measured during 7, 5 or 3 days.

Results: BP was uncontrolled in 50% of the KTR based on OBP, in 61% according to daytime ABPM and even in 64% with HBP. Sensitivity (Sc) testing agreement between daytime ABPM and HBP decreased progressively when number of days of BP recordings was shortened: the highest Ssc was observed for a 7 days duration with 1st day discarded for mean calculation (86%). Specificity (Sp) fluctuated around 70% and was the highest for a 5 (73%) and 3 days schedule. However the 5 days schedule had higher Ssc (83%) than the 3 days (76%). Proportions of KTR correctly classified according to daytime ABPM were 79%, 79% and 78% with the 7, 5 or 3 days schedule, respectively.

Conclusions: HBP, easier and less restricting method than 24 h ABPM, is a good alternative to daytime ABPM as nearly 80% of treated KTR were similarly classified by both techniques. HBP recording period can be shortened to 5 days according to Sensitivity and Specificity. A 3 days schedule appears more risky reducing the chance to identify masked HT due to a decreased drug adherence.

PP.01.16 CENTRAL BLOOD PRESSURE ASSESSMENT WITH A NEW OSCILLOMETRIC DEVICE TEL-O-GRAFI®


Objective: Central blood pressure (CBP) measurement might precise the individual cardiovascular risk of the patient. We sought to evaluate the accuracy of the CBP calculation with a new oscillometric device Tel-O-GRAPH® (I.E.M., Stolberg, Germany) in different common clinical situations.

Design and method: 103 subjects were prospectively included in the study. The performance accuracy of Tel-O-GRAPH® was assessed in comparison to Sphygmocor® (ACCor Medical, West Ryde, NSW, Australia) using Bland-Altman approach. The robustness of the values with Tel-O-GRAPH® was evaluated in supine and seated positions as well as for experienced and inexperienced user.

Results: Mean age of the study population was 60 ± 17.9 years. 56.6% were male and mean BMI was 26.5 ± 4.9 kg/m². The mean systolic CBP was 126.7 ± 21.9 mmHg measured with Tel-O-GRAPH® and 126.6 ± 22.5 mmHg measured with Sphygmocor®. Good agreement between Tel-O-GRAPH® and Sphygmocor® for CBP could be shown (mean –0.3 ± 6.7 mmHg; Person’s r = 0.95; p < 0.0001). The mean difference of CBP with Tel-O-GRAPH® was 1.5 ± 6.8 mmHg (r = 0.9; p < 0.0001) and –1.4 ± 5.0 (r = 0.97; p < 0.0001) mmHg between supine vs. seated position and between experienced vs. inexperienced user respectively.

Conclusions: Tel-O-GRAPH® calculates CBP easy and quickly using “one button press” procedure. We observed a high CBP measurement accuracy compared to Sphygmocor®. Given stable brachial blood pressure measured CBP values seem to remain robust independent of body position or operator experience.
Conclusions: The findings indicate that blood pressure for normotensive pregnant women on the last trimester of pregnancy in the left lateral position presents lower values for the right arm. The values for systolic and diastolic blood pressure in the left arm were similar to the ones produced in the sitting position.

**PP01.18**

**COMPARISON OF A NEW FIRST-LINE TREATMENT VERSUS DIFFERENT FIRST-LINE STRATEGIES USING 24-HOUR AMBULATORY BLOOD PRESSURE MONITORING**

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**Objective:** 24-hour ambulatory blood pressure measurement (ABPM) is superior to office blood pressure measurement (OBPM) in assessing the blood pressure (BP) lowering efficacy of antihypertensive medication. ABPM was used to assess the efficacy of a new first-line treatment recently approved in Europe (perindopril/amlodipine (P/A) 3.5 mg/2.5 mg and P/A 7 mg/5 mg) versus a range of first-line monotherapy strategies.

**Design and method:** ABPM data were analyzed in 868 hypertensive subdivided into different therapeutic subgroups from three international, double-blind, parallel-group, randomized controlled trials. P/A 3.5/2.5 and 7/5 was compared to a range of first-line treatment strategies with an angiotensin receptor blocker (ARB) at 1 month and at 3 months, and with an angiotensin converting enzyme inhibitor (ACEI) at 2 months.

**Results:** In these comparisons, P/A demonstrated superior BP-lowering efficacy on ABPM. After 1 month, P/A 3.5/2.5 (n = 67) there was a greater reduction from baseline in mean 24-hour systolic BP (SBP)/diastolic BP (DBP): –11.3 ± 10.5/–6.4 ± 3.6 mmHg (P < 0.002), in comparison with irbesartan 150 mg (n = 77): –6.7 ± 8.4/–3.6 ± 5.2 mmHg (P = 0.006). After 2 months, P/A 3.5/2.5 (n = 174) there was a greater decrease in mean 24-hour SBP/DBP (–8.5 ± 11.8/–5.8 ± 8.3; P < 0.001) than perindopril 5 mg (n = 187) (–4.9 ± 12.2/–3.6 ± 7.8; P < 0.001), estimate of the difference: –3.8/–2.4 mmHg. After 3 months, the mean 24-hour SBP/DBP reduction was –13.3 ± 10.3/–8.1 ± 6.6 mmHg and –9.1 ± 10.2/–6.5 mmHg for patients on P/A 3.5/2.5 and on P/A 7/5 (n = 214) and for patients on valsartan 80 mg or valsartan 80 mg and 160 mg (n = 167), respectively (estimate of the difference –2.3; P < 0.001). When the treatment was prolonged to 6 months, the mean 24-hour SBP/DBP reduction was also significantly greater with the first-line single-pill strategy (–12.5 ± 11.1/–7.6 ± 7.3 mmHg vs. –9.2 ± 11.7/–6.2 ± 7.4 mmHg, estimate of the difference –1.9; P = 0.007). No difference in safety profile was observed with any of the different monotherapy strategies.

**Conclusions:** The new first-line single-pill perindopril/amlodipine strategy presents greater clinically relevant reductions in 24-hour SBP/DBP than various other first-line strategies, without any safety concern.

**ARTERIAL STIFFNESS AND NIGHT-TIME BLOOD PRESSURE REDUCTION IN HYPERTENSIVE PATIENTS AFTER TRANSIENT ISCHEMIC ATTACK**

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**Objective:** To examine arterial stiffness and night-time blood pressure (BP) reduction in patients (pts) with essential arterial hypertension (AH) after transient ischemic attack (TIA) on ABPM.

**Design and method:** The study included 80 pts with AH grade I-II. The main group included 40 individuals with AH after TIA in previous 1–6 months. Mean age of the pts was 59.0 ± 1.52 years. The control group consisted of the patients with uncomplicated AH (9.8 ± 0.4 mmHg/sev. 8.4 ± 0.11 mm/sec, p < 0.05). According to the blood lipid test differences were observed only on the levels of triglycerides between the two groups:1.9 ± 0.1 mmol/l in the group of pts with TIA and 1.4 ± 0.1 mmol/l in the control group of pts (p < 0.02).

**Conclusions:** Increased arterial stiffness and high level of triglycerides can be additional risk factor for TIA development in hypertensive pts.

**ZEROH HYPERTENSION BUT NOT NON-DIPPING PATTERN IS ASSOCIATED WITH NON-ALCOHOLIC FATTY LIVER DISEASE IN NORMOTENSIVE AND UNTREATED HYPERTENSIVE SUBJECTS**

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**Objective:** Objective: Recent studies have shown that patients with non-alcoholic fatty liver disease (NAFLD) presented significantly higher daytime and nighttime
blood pressure (BP) values than those with normal liver structure. However, the role of nocturnal hypertension and non-dipping pattern in patients with NAFLD remains unclear. Aim of our study was to investigate the association of nocturnal hypertension and non-dipping pattern with NAFLD in normotensive and untreated hypertensive subjects.

**Design and method:** Design and Method: A total of 240 consecutive never treated individuals referred for evaluation to the Hypertension Unit of our hospital underwent 24-h ambulatory BP monitoring and liver ultrasound. The degree of nocturnal systolic BP (SBP) dipping (%) was calculated as 100\[1 - nighttime SBP/daytime SBP]. Dippers were defined as subjects with nocturnal SBP fall > 10% and non-dippers as patients with nocturnal SBP fall < 10%. Nocturnal hypertension was defined as nighttime SBP > 120 mmHg or DBP > 70 mmHg. Patients with NAFLD were defined by the presence of hyperechogenicity of liver in contrast to the cortical portion of the right kidney and either vascular blurring or deep attenuation in the liver ultrasound. Statistical analysis was performed by means of independent-samples T test, x-square and ANCOVA.

**Results:** Results: 58% of the study population had nocturnal hypertension and 35% were non-dippers. The percentage of patients with NAFLD was 69%. The prevalence of NAFLD did not differ significantly between non-dippers (71%) and dippers (68%). In contrast, patients with nocturnal hypertension presented significantly (p = 0.033) higher prevalence of NAFLD (75%) than patients with nocturnal normotension (61%), even after adjustment for demographic characteristics and baseline risk factors.

**Conclusions:** Conclusions: Nocturnal hypertension but non-dipping pattern is associated with NAFLD in normotensive and untreated hypertensive subjects.
Objective: Hypertension guidelines recommend ambulatory (A) blood pressure (BP), central BP and pulse wave velocity (PWV) as parameters for estimating BP control and vascular impairment. Recent advances in technology made available devices allowing combined non-invasive estimation of these parameters over the 24-h during ABPM monitoring. However, at present, there is limited evidence on the usefulness of such an approach for routine hypertension management. We recently launched an investigator-initiated, international, multicenter, observational, prospective study aiming at: i) evaluating non-invasive 24-h ABP and arterial stiffness estimates (through 24-h pulse wave analysis, PWA) in hypertensive subjects undergoing an ABPM for clinical reasons; ii) assessing the changes in estimates following treatment; iii) weighing the impact of 24-h PWA on target organ damage and cardiovascular prognosis; iv) assessing the relationship between arterial stiffness, BP absolute mean level and variability, and prognosis; v) validating use of the technique for hypertension screening.

Design and method: Approximately 2000 subjects, referred to 20 hypertension clinics for routine diagnostic evaluation and follow-up of hypertension, will be recruited. Data collection will include ABPM, performed with a device allowing simultaneous non-invasive assessment of 24-h BP and arterial stiffness (BP-Lab), and clinical data (including cardiovascular outcomes). As recommended by current guidelines, each patient will be followed-up with visits occurring at regular intervals (ideally every 6 months, and not less than once a year) and ABPM recordings using SPSS 19.0. The results of the V ASOTENS Registry will help defining the normo tension; setting thresholds for current and future indices derived from 24-h PW A, according to outcome data. They will also provide supporting evidence for the inclusion of telemedicine system will allow standardized and centralized data collection. The use of the telemedicine system will allow standardized and centralized data collection, data validation by experts and counselling to remote centers, setup and maintenance of the telemedicine platform (THOLOMEUS) will be used for data collection. The use of the telemedicine system will allow standardized and centralized data collection, data validation by experts and counselling to remote centers, setup and maintenance of the Registry, and prompt data analysis.

Results: First follow-up results are expected to be available in the next 2 years.

Conclusions: The results of the VASOTENS Registry will help defining the normovascular thresholds for current and future indices derived from 24-h PWA, according to outcome data. They will also provide supporting evidence for the inclusion of such evaluation in recommendations on hypertension management.

PP.01.27 EARLY MORNING SURGE OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURE IS INVERSELY ASSOCIATED WITH THE DEVELOPMENT OF TARGET ORGAN DAMAGE IN HYPERTENSIVE SUBJECTS – A PRELIMINARY REPORT

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Objective: Hypertension (HTN) is a major risk factor for cardiovascular disease and the single most important risk factor for stroke. Diurnal blood pressure (BP) variations assessed by 24-hour ambulatory BP (ABP) monitoring have been shown to be closely associated with increased cardiovascular risk in hypertensives. The objective of this study is to evaluate the relationship between morning blood pressure surge (MBPS) and the development of target organ damage (TOD) in hypertensive subjects.

Design and method: Subjects with office BP (OBP) > 140/90 mmHg, under treatment with at least one antihypertensive medication were included in the study. Exclusion criteria were severe renal (eGFR < 25 ml/min/1.73m2), cardiac (left ventricular ejection fraction < 30%) or other systematic disease, or evidence of secondary HTN. A complete medical history was obtained from all participants. OBP was measured by a digital oscillometric BP electronic device (MicrolifeWatchBP Office). ABP and office measurements were taken on the same non-dominant arm using a validated MicrolifeWatchBP 03 device. MBPS was calculated as the difference between mean BP two hours after awakening and the mean BP two hours before awakening. Transthoracic echocardiogram for assessment of left ventricular mass index (LVMi), left ventricular hypertrophy (LVH), left atrial enlargement, diastolic dysfunction, and interventricular septum thickness, were performed in all patients. Urine albumin excretion (UAE) was measured and used as a risk factor for chronic kidney disease. Microalbuminuria was defined as a value of UAE of 30–300 mg/24 h.

Results: A total of 37 hypertensives (age 60 ± 14 years, 22 men) were studied. Morning surge in both systolic and diastolic BP was correlated with LVMI, with r = –0.42, p = 0.01 and r = –0.33, p = 0.04 respectively. Patients with concentric hypertrophy had lower systolic MBPS (5 ± 14 vs 16 ± 13 mmHg, p = 0.01), as well as diastolic MBPS (7 ± 6 vs 14 ± 6 mmHg, p = 0.01) than those without. Moreover, patients with microalbuminuria had lower systolic MBPS (3 ± 21 vs 12 ± 11 mmHg, p = 0.03); diastolic MBPS tended also to be lower (6 ± 14 vs 11 ± 7 mmHg, p = 0.4) in those patients, albeit not reaching statistical significance.

Conclusions: Early MBPS systolic and diastolic assessed by 24-hour ABPM is inversely associated with LVMI and microalbuminuria, further supporting the need for assessing MBPS in clinical practice.
Design and method: 60 patients (males – 40) with HT aged (59.5 ± 2.8) years were divided into 2 groups after 24 h ABPM. Patients with decrease BP during the night (night-day BP ratio < 0.9) defined as ‘dippers’, composed the 1st group (n = 33) and patients without sufficient nocturnal BP drop (nondippers) composed the 2nd group (n = 27). Using M-,2D- and speckle-tracking echocardiography with ultrasound scanner Apio Artida we studied LV hypertrophy (LVH), values of LV longitudinal global systolic strain (LGSS) and LGSS rate, also left atrium (LA) systolic deformation (SD), early diastolic deformation rate (EDDR) and late diastolic deformation rate (LDDR) as a parameters of accordingly LA reservoir, conduit and contractile function.

Results: In the 2nd as compared to the 1st group pts had more severe LVH: more common concentric (60.0% vs 40.0%) and eccentric (66.7% vs 33.3%) LVH. In the 2nd group we found 17.4 and 13.5% reduced absolute values of LGSS and LGSS rate accordingly (P < 0.05) as compared to the 1st group. The insufficient decline of nighttime BP was associated with a 21.0 % decrease of LA EDDR and 16.9 % decrease of LA SD (P < 0.05) in the 2nd vs the 1st group, this indicated the impairment in conduit and reservoir LA function in nondipper patients. The inverse correlation was found in the 2nd group between 24 h BP and values of LGSS (r = −0.44, p < 0.01) and LA SD (r = −0.43, p < 0.01) BP variability at nighttime.

Conclusions: In nondipper HT patients it was rotated more expressed decrease in LV global systolic deformation and impairment of LA reservoir, conduit and contractile function compared to the dipper pts. A strong relationship between ABPM indices, insufficient nighttime BP reduction and the structural and functional state of the left heart was found.

PP.01.29 ASSESSMENT OF UNCOMPlicated HYPERTENSION THERAPY EFFECTIVENESS IN REAL LIFE SETTING: HOME BLOOD PRESSURE SELF-MEASUREMENT AS AN ALTERNATIVE TO AMBULATORY 24-HOUR MONITORING

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Objective: Our aim was to compare the home blood pressure (BP) monitoring (HBPM) results with those obtained by ambulatory BP monitoring (ABPM) and office BP measurements before and after 6 month (M) algorithmic antihypertensive treatment of uncomplicated hypertension (UH) in longitudinal real-life BP control program.

Design and method: We analyzed BP measurement results of 76 consecutively recruited patients (pts) 55.7 ± 9.8 years, with new diagnosed (13,1%) or treated but uncontrolled UH, participants of PERFECT-BP prospective observational study (ISRCTN75706523). Pts were prescribed or switched to perindopril/amlopine FDC with successively adding, if needed, indapamid-SR, spironolactone, moxonidine or doxasosine. ABPM was performed within 2 days after visit 1 and before visit at M6. Office BP measurements were performed with standardized automatic Microlife BPW200 with universal cuff. Pearson’s linear correlation was used for analysis.

Results: By M6 office systolic BP (SBP) lowered from 164.9 ± 1.6 to 134.2 ± 1.3 mmHg, diastolic BP (DBP) – from 98.1 ± 0.9 to 83.2 ± 0.9 mmHg; home SBP – from 146.2 ± 1.6 to 131.6 ± 1.0 mmHg; DBP – from 91.3 ± 1.1 to 82.7 ± 0.8 mmHg. 24-hour SBP – from 150 ± 1.8 to 129.7 ± 1.2 mmHg. DBP - from 91.2 ± 1.2 to 81.4 ± 1.2 mmHg. day-time SBP – from 154.9 ± 2.3 to 134.0 ± 1.7 mmHg. day-time DBP – from 95.3 ± 1.5 to 84.3 ± 1.2 mmHg (all p < 0.001). HBPM showed a good correlation with office BP measurements and ABPM results at baseline and by M6 both for SBP and DBP (see in table). Masked hypertension at M6 was identified by ABPM in 17(22,4%) and by HBPM in 19 (25%) pts (p < 0.05).

Conclusions: HBPM is an acceptable tool for assessment of antihypertensive treatment efficacy for UH in real life setting.

PP.01.30 PSYCHOLOGICAL STATUS SCORES RELATED WITH LEFT VENTRICULAR MASS INDEX AND MEAN AMBULATORY BLOOD PRESSURE VARIABLES IN PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: The aim of our study was to determine correlations between psychological status and quality of life scores with left ventricular mass index and mean ambulatory blood pressure variables in patients with arterial hypertension (AH).

Design and method: We analyzed 76 ambulatory blood pressure monitoring (ABPM) data of AH patients. ABPM monitor (Spacelabs 90207) was applied after the washout period. After ABPM session patients completed the QL questionnaire “General Well-Being Questionnaire” (J.Siegrist et al.). Left ventricular mass index (LVMI) (L. Teichholtz et all., 1976) was measured using echocardiography (Acuson 128XP). We assessed the following QL scale scores: 1 - physical well-being, II - physical performance, III - positive psychological well-being, IV - negative psychological well-being, V - psychological performance, VI - social well-being, VII - social performance. Also, patients completed the psychological questionnaire “Minnesota Multiphasis Personality Inventory” (MMPI). We analyzed the following MMPI scales: L – lie scale, F – aggression scale, K – correction scale, 1 (Hs) – hypochondria, 2 (D) – depression, 3 (Hy) – hysteria, 4 (Pd) – psychopathy, 6 (Pa) – rigidity of affect, 7 (P) – psychasthenia, 8 (Sc) – schizothemia, 9 (Ma) – hypomania. We used Spearman Partial Coefficient for correlation analysis adjusted for age, sex and duration of AH.

Results: The mean ambulatory systolic BP (SBP) was 136.1 ± 11.2; diastolic (DBP) – 89.1 ± 9.0 mmHg (M ± SD). LVMI – 122.1 ± 24.9 g/m2. We found the following correlations: 1) 9 MMPI scale scores (energy, optimism, good mood) were negatively correlated with LVMI variables (r = −0.33, p < 0.05); 2) 9 MMPI scale scores had the negative relationships with clinical and ambulatory SBP levels (r = −0.23, r = −0.24 respectively, p < 0.05) and with SBP load variables (r = −0.25, p < 0.05). There were no significant links between QL scales scores and LVMI, ambulatory BP indices.

Thus, energy, optimism, good mood (9 MMPI scale scores) had a negative correlation with LVMI, also to SBP indices.

Conclusions: It was identified inverse correlation between energy, optimism, good mood and LVMI indices, also with clinical and ambulatory SBP variables of AH patients. There were no links between QL scores and LVMI, ambulatory BP indices.
POSTER SESSION

POSTERS’ SESSION PS02: AGEING

PP.02.01 CENTRAL AORTIC PRESSURE IS INDEPENDENTLY ASSOCIATED WITH DIASTOLIC FUNCTION IN CHINESE ELDER COHORT

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Objective: Study investigated the association between various noninvasive indexes of artery stiffness and left ventricular diastolic function.

Results: In the various indexes of artery stiffness, between the brachial and central blood pressure, only the cSBP and cPP were independent association with left ventricular diastolic function (E/Em) (p < 0.001, respectively). But the pulse wave velocity (PWV) and brachial hemodynamic was not significant association with E/Em in the stepwise multiple linear regression. In the multiple linear regression by adjusting for the central SBP, PP, AP and potential confounding covariates of LV diastolic function, only the central PP was independent related to the diastolic pressure (p < 0.001). All the results was similar in all the subgroup analyses by dividing into men, women, and untreated subject (without anti-hypertension treatment).

Conclusions: In the Chinese elderly cohort, the central hemodynamics was superior to the brachial and PWV in reflecting left ventricular diastolic function. Among the central hemodynamics (SBP, PP, AP), the central PP was most strongly associated to the diastolic function. This result suggested that the central PP maybe the better treating index in the diastolic heart failure treated.

PP.02.02 ATHEROSCLEROSIS AND AGEING: PREVALENCE OF CAROTID PLAQUE AND ROLE OF CARDIOVASCULAR RISK FACTORS IN A VERY ELDERLY POPULATION


Objective: Age is considered one of the main risk factors for cardiovascular disease and ageing seems to play a central role in the onset and progression of atherosclerosis. Aim: to compare the prevalence of carotid plaque in a very elderly population without history of peripheral arterial disease (PAD) and major adverse cardiovascular events (MACE), with the prevalence in a population of hypertensive adults.

Design and method: We studied 179 patients: 69 hospitalized very elderly (mean age: 88.5 ± 5.5 years) admitted to our Internal Medicine and Geriatrics Department, and 110 hypertensive adults (mean age: 53.3 ± 7.3 years) referred to our Hypertension Centre, affected by essential hypertension with or without other cardiovascular (CV) risk factors (gender, smoking, diabetes, dyslipidemia).

Results: There was no significant difference in the prevalence of carotid plaque between the two studied populations (51.8% in the hypertensive adults vs. 58.0% in the very elderly) despite an average difference in age of more than 35 years. In the hypertensive adults smoking was the main CV risk factor associated with the prevalence of carotid plaque (OR 2.41; p = 0.024), while in the very elderly the presence of hypertension had the strongest association (OR = 10.5; p ≤ 0.001). Indeed, excluding the hypertensives from the very elderly population, the prevalence of carotid plaque resulted significantly higher in the younger population (51.8% vs. 27.6%; p = 0.020).

Conclusions: Our results show that CV risk factors, especially hypertension, play a key role in atherosclerotic vascular disease, not only in the adult population, but also in the very elderly. Therefore ageing is not necessarily synonymous with atherosclerosis but the real determinants of arterial “bad aging” are the superimposed CV risk factors. Promoting a healthy lifestyle to prevent the onset of CV risk factors and treat them appropriately whenever present is probably the only way to obtain a healthy longevity.

PP.02.03 ASSOCIATION BETWEEN CARDIOVASCULAR RISK FACTORS, TELOMERE BIOLOGY AND VASCULAR AGING

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Objective: Telomere length has been identified as a marker for biological, cardiovascular aging and cardiovascular events risk. Telomerase activity (TA) may be regarded as a potential target for vascular rejuvenation. Increased arterial stiffness, intima-media thickness (IMT), plaque presence (PP) are the main signs of arterial aging. But the origin of the association between cardiovascular events risk and telomere biology is still unknown.

The aim of this study was to determine the role of telomere biology (a largely inherited component) and conventional cardiovascular risk factors (CVRF) (a largely acquired component) in vascular aging process.

Design and method: TL and TA were assessed by quantitative polymerase chain reaction in 302 patients free from established cardiovascular diseases, mean age 53.71 ± 1.64 years. IMT and PP were determined by ultrasonography in both left and right carotid arteries. Arterial stiffness was appreciated by aortic pulse wave velocity (PWV) measuring with the help of SphygmoCor (AtCor Medical). Smoking, arterial hypertension, obesity, dyslipidemia, high fasting glucose level were considered as CVRF.

Results: Table summarises the baseline information on PWV, IMT, PP (as mean ± m) in groups with and without conventional conventional cardiovascular risk factors, with “short” and “long” telomeres, with “high” and “low” telomerase activity.

Conclusions: 1. Conventional CVRF are associated with arterial stiffness and subclinical atherosclerosis. 2. Considering the tendency to increased PWV in patients with “short” telomeres, we suggest that arterial stiffness is the most associated with vascular aging sign. 3. The potential role of TA in vascular aging was not demonstrated in our study.

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PP.02:04 IN HYPERTENSION AGE MATTERS, DEPENDING ON AGE

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Objective: The aim of this study was to investigate gender inequality in age groups of hypertensive (HTN) patients admitted for severe HTN urgencies that were not controlled in the emergency department (ED).

Design and method: Starting from all hypertensive patients admitted to the Internal Medicine Clinic between December 2012 and December 2015 (5762 pts) we studied those admitted for severe HTN urgencies that did not respond to treatment in the ED and thus necessitated further observation/intervention to obtain blood pressure (BP) control. Patients with HTN emergencies – stroke, acute coronary syndromes (ACS), pulmonary edema, acute renal failure/acutely decompensated chronic renal disease (CRD), were excluded. This population was further evaluated for CV risk factors and comorbidities focusing on gender differences and age.

Results: See figure.

Conclusions: Females admitted with severe refractory HTN urgencies had a significantly higher CV burden – they were more frequently obese, diabetic, dyslipidemic and already had a more complex CV history. However, when comparing age groups, females were significantly more affected after 45 years of age, while the situation is reversed in the younger age group.

PP.02:05 IMPACT OF CARDIOVASCULAR COMORBIDITY ON ANAESTHESIA MANAGEMENT IN ELDERLY

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Objective: Increase the number of elderly patients is a serious problem for anaesthesiology. They are characterized by a severe comorbidities, especially cardiovascular disease. This increases the number of perioperative complications. Endothelin-1 determines endothelial function and is one of the marker cardiovascular disease. The goal of study was evaluate the structure of comorbidity and endothelial function in elderly in perioperative non-cardiac surgery.

Design and method: We prospective examined 200 patients aged 60 to 82 years for abdominal surgery. 55 patients were divided into 2 groups according to gender - a subgroup of women (n = 32) and men (n = 23). There were representative of the gender, age, ASA, BMI. Comorbidities were accounted for systems; identification of the prevailing pathology; identifying the causes of mortality. Patients with cardiovascular disease managed in accordance with ESC Guidelines (2014) and received treatment. Endothelin-1 in EDTA-plasma determined by enzyme immunoassay (set Biomedica). Data are presented as M ± m, significant value of p < 0.05.

Results: The severity of the patients corresponded to 58% of ASAII, 42% - ASAIII. Coronary artery disease and cardioclesorosis occurred in 30,6 and 58,4% patients. 42% of patients had multiple comorbidity. The level of Endothelin-1 in all patients was increased by 45% compared to the reference values up to 0,556 ± 0,013 fmol/ml. Increased levels of marker and 1 day after surgery. In a subgroup of men it was higher (0,698 ± 0,03 and 0,583 ± 0,9 fmol/ml, respectively). By the 5 day the level of Endothelin-1 in both groups significantly decreased to preoperative baseline to 0,582 ± 0,013 fmol/ml, but did not reach the reference values.

Conclusions: Comorbidity was found in 94% of elderly. The most frequently ones was cardiovascular (90%). In 42% of cases there is a multiple comorbidity. Prevalent cause of death was progression of chronic cardiovascular disease, development of acute cardiovascular disease. Elderly showed a significant increase in the level of Endothelin-1, indicating the presence of endothelial dysfunction. By the 5 day of the postop signs of endothelial dysfunction were reduced but did not disappear. Based on these data we can make the right choice of anesthesia and perioperative care.

PP.02:06 THE BEHAVIORAL PATTERNS IN ELDERLY HYPERTENSIVES

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Objective: The non-pharmacological treatment and the compliance to it are essential in high blood pressure. All hypertensive patients should be informed and counseled concerning the non-pharmacological measures imposed by guidelines. The aim of our study was to analyze the behavioral patterns in elderly patients with arterial hypertension.

Design and method: We included 64 consecutive patients with hypertension aged over 65years (medium age 72 ± 7 years) from The Department of Internal Medicine. The analysis of behavioral patterns was conducted based on a prepared questionnaire.

Results: Most patients (81.25%) had a long standing disease and treatment (over 5 years). Only 75% of elderly hypertensives were able to indicate the correct values of arterial blood pressure, and only 62.5% of them were able to measure their blood pressure rarely, 46.8% of the patients took their blood pressure at least once a day, and the rest took their blood pressure occasionally. Regarding treatment 64% of the patients declared that they took their antihypertensive drugs regularly. The obtained results revealed that our elderly hypertensives do not know they did not comply with advice concerning the non-pharmacological therapy of arterial hypertension. Our study confirms the necessity of implementing suitable educational programs in this group of elderly patients.
POSTER SESSION

POSTERS’ SESSION PS03:
CARDIOVASCULAR RISK FACTORS

**PP.03.01 SYSTOLIC ORTHOSTATIC HYPERTENSION AND MORTALITY: THE HOMO STUDY**

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**Objective:** To assess the impact of systolic orthostatic hypertension (SOHT) on all-cause mortality.

**Design and method:** 1176 subjects over 18 years were included in this ambispective study. The subjects included: 1) from Cardiovascular Department, Hospital La Paz, Madrid, SPAIN, 2) subjects referred by the PCPs following the guideline of the same hospital to perform a physical examination of patients.

**Results:** The mean age was 48.5 ± 18.5 years (range: 18-98 years). 3.1% (n = 37) individuals had SOHT. Those subjects with SOHT were older (p = 0.001), had significantly more diabetes (p = 0.028), antihypertensive treatment (p < 0.001), heart disease (p = 0.002) and arrhythmia (p = 0.021). BMI (p = 0.002) and systolic BP (p = 0.049) were also higher in this group. The mortality rate was 37.8%. A multivariate Cox proportional hazard model analysis demonstrated that current smoker (HR: 2.91; p = 0.002), peripheral artery disease (HR: 2.67; p = 0.009), atrial fibrillation (HR: 2.39; p = 0.002) and age (HR: 1.13; p < 0.001) were independent risk factors of all-cause mortality. SOHT at three minutes also was a predictor of all-cause mortality (HR: 2.39; p = 0.002) and age (HR: 1.13; p < 0.001) were independent risk factors of all-cause mortality.

**Conclusions:** SOHT is associated with all-cause mortality. The results of this study suggest that it could be useful to measure SOHT in the routine physical examination of patients.

**PP.03.02 EFFECT OF THE WEEKLY FREQUENCY OF ALCOHOL DRINKING ON VASCULAR STIFFNESS DETERMINED BY THE PULSE WAVE VELOCITY**

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**Objective:** The relationship between alcohol drinking and vascular stiffness was controversial. The INTERHEART study demonstrated that regular alcohol drinkers, and in those who drink “3 or more days per week” support once again a J-shaped curve between alcohol consumption and cardiovascular risk.

**Design and method:** We included 154 patients with moderate arterial hypertension (AH) (mean SBP 151.1 ± 2.3; mean DBP 92.4 ± 1.9) and 155 age- and sex-matched healthy controls. Blood pressure (BP) was measured with an automated device (Omron HEM-7200). The mean age was 48.5 ± 18.5 years (range: 18-98 years). 3.1% (n = 37) individuals had SOHT. Those subjects with SOHT were older (p = 0.001), had significantly more diabetes (p = 0.028), antihypertensive treatment (p < 0.001), heart disease (p = 0.002) and arrhythmia (p = 0.021). BMI (p = 0.002) and systolic BP (p = 0.049) were also higher in this group. The mortality rate was 37.8%. A multivariate Cox proportional hazard model analysis demonstrated that current smoker (HR: 2.91; p = 0.002), peripheral artery disease (HR: 2.67; p = 0.009), atrial fibrillation (HR: 2.39; p = 0.002) and age (HR: 1.13; p < 0.001) were independent risk factors of all-cause mortality. SOHT at three minutes also was a predictor of all-cause mortality (HR: 2.39; p = 0.002) and age (HR: 1.13; p < 0.001) were independent risk factors of all-cause mortality.

**Conclusions:** SOHT is associated with all-cause mortality. The results of this study suggest that it could be useful to measure SOHT in the routine physical examination of patients.

**PP.03.03 ADDITIONAL FACTORS ASSOCIATED WITH LEFT VENTRICLE DIASTOLIC FUNCTION IMPAIRMENT IN PATIENTS WITH MODERATE HYPERTENSION**

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**Objective:** Not only hypertension but other factors influence diastolic dysfunction (DD) profile that also should be considered.

**Design and method:** We included 154 patients with moderate arterial hypertension (AH) (mean SBP 151.1 ± 2.3; mean DBP 92.4 ± 1.9) and 155 age- and sex-matched healthy controls. Blood pressure (BP) was measured with an automated device (Omron HEM-7200). The mean age was 48.5 ± 18.5 years (range: 18-98 years). 3.1% (n = 37) individuals had SOHT. Those subjects with SOHT were older (p = 0.001), had significantly more diabetes (p = 0.028), antihypertensive treatment (p < 0.001), heart disease (p = 0.002) and arrhythmia (p = 0.021). BMI (p = 0.002) and systolic BP (p = 0.049) were also higher in this group. The mortality rate was 37.8%. A multivariate Cox proportional hazard model analysis demonstrated that current smoker (HR: 2.91; p = 0.002), peripheral artery disease (HR: 2.67; p = 0.009), atrial fibrillation (HR: 2.39; p = 0.002) and age (HR: 1.13; p < 0.001) were independent risk factors of all-cause mortality. SOHT at three minutes also was a predictor of all-cause mortality in the adjusted model (HR: 2.31; CI 95%: 1.14-4.68; p = 0.020).

**Conclusions:** SOHT is associated with all-cause mortality. The results of this study suggest that it could be useful to measure SOHT in the routine physical examination of patients.

**PP.03.04 PREVALENCE AND PROGNOSIS OF ELECTROCARDIOGRAPHIC ABNORMALITIES IN NORMOTENSIVE AND HYPERTENSIVE INDIVIDUALS**

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**Objective:** To evaluate the association between WFAD and PWV, adjusted for baseline variables.

**Results:** In all, 1026 individuals were included (52% women, age 50.2 ± 15.2 years). Prevalence of hypertension was 38.8%, diabetes 10.5%, smoking 8.1% and dyslipidemia 37.9%. Mean PWV was 7.57 m/s (SD 1.8, range 4.1-15.0 m/s). Distribution of participants in WFAD categories was: 0; 39.9%; 1 or 2; 26%; 3 or 4; 10.8%; 5 or 6; 14.5%; and 7; 8.8%. PWV mean values were for WFAD categories: 0: 7.5 m/s; 1 or 2: 7.7 m/s; 3 or 4: 7.7 m/s; 5 or 6: 7.8 m/s; and 7: 8.8 m/s. All groups showed a p < 0.05 when compared with group of 1 or 2 dv. In the adjusted analysis, WFAD was significantly associated with PWV.

**Conclusions:** The weekly frequencies of alcohol drinking showed a significant positive association with vascular stiffness (PWV). Increased PWV in “no or unusual drinkers”, and in those who drink “3 or more days per week” support once again a J-shaped curve between alcohol consumption and cardiovascular risk.
Objective: Our objective was to define the prevalence and prognostic of electrocardiographic (ECG) abnormalities in hypertensive individuals. From a clinical point of view, this study could help physicians to take better advantage of ECG in the risk assessment of hypertensive patients.

Design and method: ECG, blood pressure and other cardiovascular risk factors were recorded in a nationwide population sample of 5800 Finns. The presence of 15 ECG abnormalities was evaluated. Participants were divided into categories by blood pressure and followed for coronary heart (CHD) and cardiovascular disease (CVD) events.

Results: Mean follow-up was 10.4 ± 2.2 years. The age- and gender-adjusted prevalence rates of ECG abnormalities were generally higher in the hypertensive participants than in normotensives. In multivariable-adjusted Cox models, the following ECG abnormalities predicted CHD in hypertensives: Left ventricular hypertrophy (LVH) by Sokolow-Lyon criteria (Hazard ratio (HR), 1.47; 95% CI, 1.07–2.01; P = 0.02), LVH with ST-depression and negative T wave (ST/T changes) (HR, 2.31; 95% CI, 1.20–4.43; P = 0.01), abnormal P-wave indices, left axis deviation and early repolarization pattern.

The whole population (HR, 1.50; 95% CI, 1.06–2.13; P = 0.02). Prolonged QT interval, abnormal P-wave indices, left axis deviation and early repolarization pattern were not associated with CHD or CVD.

Conclusions: We conclude that ECG abnormalities are highly prevalent in hypertensive individuals. LVH is still the cornerstone of cardiovascular risk assessment in hypertensive patients. However, the additional assessment of ST/T changes, AVR+ and poor R-wave progression in ECGs could improve risk prediction in hypertensives.
ACR (5.0 (IQ3.6–6.9) vs. 4.2 (IQ3.1–6.2), adiponectin (10.7 ± 4.1 vs. 16.5 ± 7.9), leptin (10.7 ± 6.0 vs. 8.1 ± 5.5), % of visceral obesity (47% vs. 31%), overweight (67% vs. 54%) and obesity (34% vs. 17%) all p < 0.05. Significant positive predictors of IHT were age, systolic BP and ACR.

Conclusions: Incident rate of new-onset HT is high, and those subjects were poorly treated. Subgroup of PH who developed IHT were older, had higher systolic BP, metabolic abnormalities and higher values of ACR. Lifestyle measures should be recommended to this subgroup early. Diagnostic and prognostic values of ACR for IHT in PHT should be further elaborated.

PP.03.08 THE ROLE OF BODY FAT AND FAT DISTRIBUTION IN HYPERTENSION RISK IN URBAN BLACK SOUTH AFRICAN WOMEN

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Objective: Developing countries are disproportionately affected by hypertension, with Black women being at greater risk, possibly due to differences in body fat distribution. The aims of this study were: (1) To examine how different measures of body composition are associated with blood pressure (BP) and incident hypertension, (2) to determine the association between baseline- or change in body composition and hypertension, and (3) to determine which body composition measure best predicts hypertension in Black South African women.

Design and method: The sample comprised 478 non-hypertensive women, aged 29–53 years. Body fat and BP were assessed at baseline and 8.3 years later. Body composition was assessed using dual-energy X-ray absorptiometry (DXA) and anthropometry. Hypertension was diagnosed based on a systolic/diastolic BP > or = 140/90 mmHg, or medication use at follow-up.

Results: All body composition measures increased (p < 0.0001) between baseline and follow-up. BP increased by > 20%, resulting in a 51% cumulative incidence of hypertension. Both DXA- and anthropometric-derived measures of body composition were significantly associated with BP, explaining only 3–5% of the variance. Baseline BP was the most important predictor of hypertension (adjusted OR 98–123%). Measures of central adiposity were associated with greater odds of hypertension. DXA measures of body composition do not add to hypertension prediction beyond anthropometry, which is especially relevant for African populations globally, taking into account the severely resource-limited setting found in these communities.

Conclusions: This study highlights that body composition is not a major driver of hypertension. DXA measures of body composition do not add to hypertension prediction beyond anthropometry, which is especially relevant for African populations globally, taking into account the severely resource-limited setting found in these communities.

PP.03.09 CARdiovascular risk PROFILE IN THE FRENCH CARIBBEAN: SEIRIOUS SOCIAL INEQUALITIES

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Objective: The French West Indies are affected by high levels of early mortality stemming from cardiovascular disease (CVD) and wide social discrepancies. However, the link between CVD risk and socioeconomic factors remains ambiguous in the Caribbean region. Our objective was to assess the relationships between overall CVD risk and socioeconomic level in a French Caribbean population.

Design and method: A multicenter cross-sectional study was conducted in Guadeloupe between July and December 2014. The source population consisted of all patients receiving a systematic periodic health examination funded by social security during the study period. The collection of socio-demographic, clinical and biological data was standardized. Education level was used as a proxy for socioeconomic status. Hypertension was defined as antihypertensive treatment or mean of three measurements of blood pressure > = 140/90 mmHg. Diabetes was defined by diabetes treatment or fasting plasma glucose > = 7 mmol/L, and glycated hemoglobin > = 6.5%, controlled diabetes by glycated hemoglobin < = 7%. Tobacco smoking was ascertained by self-report, abdominal obesity by measured waist circumference > = ESH thresholds. Global CVD risk was estimated with the Framingham Risk Score for Use in Primary Care (Agostino et al, 2008). Analyses focused on subjects aged 30–74 with complete data sets (n = 1764). Multilevel logistic regression was used.

Results: Regardless of center, age and education level, the risks of obesity and diabetes for women were twice as high as for men. Independently of center and age, low education level was associated with higher rates of obesity and diabetes in women, while higher education level was associated with hypertension in both sexes. The median global CVD risk was estimated at 5.3% (Q1 = 2.5%, Q4 = 10.5%). Among subjects with an education level lower than middle school diploma, 13.7% presented a global CVD risk > = 20%, compared with 5.5% among subjects with higher levels of education (center adjusted OR = 2.7, p < 0.001). Among high-risk subjects, 79% of subjects treated for hypertension and 72% of subjects treated for diabetes had uncontrolled conditions.

Conclusions: Reducing social inequalities in health requires a truly comprehensive approach to CVD risk. Prevention strategies should be differentiated by sex. A net improvement in quality of care is needed.

PP.03.10 ASSOCIATION BETWEEN DISEASE SEVERITY AND HYPERTENSION IN PATIENTS WITH OSTEoARTHritis

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Objective: Recent epidemiological data suggest that patients with osteoarthritis may exhibit higher rates of cardiovascular mortality and morbidity, potentially through increased prevalence of concomitant cardiovascular risk factors or pathways mediated by chronic low-grade inflammation. In this study, we aimed at investigating whether osteoarthritis severity is associated with hypertension, in a population of osteoarthritis patients seeking medical care in a tertiary rheumatology outpatient clinic.

Design and method: Consecutive patients with hip and/or knee osteoarthritis attending the Rheumatology Outpatient Clinic of our Department were recruited. Severity of the disease was assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), one of the most widely utilized self-report measures of lower extremity symptoms and function. Total score, function, stiffness and pain subscale scores were calculated and analyzed in respect to clinical and epidemiological data obtained from the medical history and clinical examination of the patients.

Results: A total of 91 patients, 86 females and 5 males, with a mean age of 61.8 ± 10.3 years, and median disease duration of 4 (2–9) years, were included in the study. 46.7% of the patients had hypertension, while mean systolic/diastolic blood pressure (SBP/DBP) was 135.7 ± 17.4/81.5 ± 9.7 mmHg. Mean WOMAC total score was 36.0 ± 17.6; mean pain, function and median stiffness subscale scores were 7.5 ± 4.2, 25.8 ± 15.1 and 3.0 (1–4), respectively. WOMAC total index was higher among patients with hypertension compared to those with normal blood pressure levels, but did not reach statistical significance (39.3 ± 16.9 vs 32.8 ± 18.0, p = ns). Likewise, pain, stiffness and function indices were comparable between hypertensive and normotensive patients. Neither WOMAC total score nor WOMAC pain and function scores significantly correlated with SBP/DBP; however, a significant association was observed with WOMAC stiffness index and DBP (r = 0.321, p = 0.030).

Conclusions: Although some evidence suggests that osteoarthritis patients may be at increased risk for hard cardiovascular outcomes, severity of osteoarthritis was not associated with hypertension in our population. Further studies are needed to clarify whether a straight-forward association exists between osteoarthritis and cardiovascular diseases.

PP.03.11 PREHypertENSION IS ASSOciATED WITH CHRONIC KIDney DISEASE IN EUROPEAN RURAL POPULATION- DATA FROM BRISgHELA HEART STUDY (ITALy) AND ENAH STUDY (CROATIA)

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Objective: To evaluate the association between chronic kidney disease (CKD) and hypertension in a rural population of European countries, and to compare this association with that in urban areas.

Conclusions: Hypertension was associated with a higher prevalence of CKD across all age groups, with a stronger association in rural areas. The prevalence of CKD was higher in rural areas, likely due to differences in socioeconomic status and access to healthcare. Further studies are needed to investigate the underlying mechanisms and to develop effective strategies to prevent and control hypertension in rural populations.

Keywords: Hypertension, Chronic Kidney Disease, Rural Population, Europe.
Objective: Chronic kidney disease (CKD) is a silent global epidemic. Hypertension and diabetes are major risk factors. As prehypertension (PHT) was associated with increased cardiovascular (CV) and renal risk, our aim was to analyze association of PHT with CKD in European rural continental population.

Design and method: In this international prospective long-term follow up study data on 5162 subjects (in 2387) from BrEna cohort formed from original cohorts of Brisighella Heart Study (Italy) and ENAHI study (Croatia) were analyzed. Them 3389 (in 1456) were eligible for further analyses, and 1335 (in 541) were followed up for average period of 100 months (IQ84–120); 11.337 person years. PHT was defined as eGFR < 60 ml/min (MRRD), HT as BP > 140/90 mmHg and/or taking antihypertensive drugs, and PHT according to ISCA-7 (PHT3) and ESH stratification (PHTIE). At the end of follow-up there were 236 new-onset CKD patients.

Results: Prevalence of PHT3 was 25.8% (vs. w. 28.4±23.9%; p < 0.05), PHTIE 7.8% (vs. w. 8.5±7.2; p > 0.05). Prevalence of CKD in the whole group was 12.1% (vs. w. 15.1±2.2; p < 0.01).

In the whole group prevalence of CKD increases across BP categories from optimal BP, PHTJ, PHTIE and HT (3.2 vs. 4.8 vs. 5.8 vs. 17.8, respectively, p < 0.01), as well in men (0.0 vs. 3.3 vs. 2.0 vs. 11.7, respectively, p < 0.05) and in women (4.1 vs. 6.1 vs. 8.9 vs. 22.5, respectively, p < 0.01). At baseline, in logistic regression adjusted risk (OR) for CKD was not significant comparing PHT vs. NT, and at the end of follow up PHT was not an independent predictor of new-onset CKD even in obese. In the group of new-onset CKD there was no difference in prevalence of PHT at start of follow-up.

Conclusions: In European rural population prevalence of CKD increases across BP categories. It is higher in PHT than in NT. PHT was not found to be an independent risk factor for new-onset CKD (3a stage) even in subjects with BMI > 30 kg/m2.

PP.03.12 PULSE WAVE VELOCITY CHANGES IN PATIENTS WITH ESSENTIAL HYPERTENSION AND DIFFERENT CATEGORY OF CARDIOVASCULAR RISK

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Objective: Research objective was studying of the PWV features at male patients with essential hypertension (EH) stage I-II and moderate and severe cardiovascular risk.

Design and method: It were surveyed 128 male patients with EH of 1–3 degrees. All patients were divided into 3 groups after stratification of risk factors for cardiovascular disease: 1A group (n = 22) – patients with EH stage I and moderate CV risk; 1B group (n = 22) – patients with EH stage I and high CV risk; 2 group (n = 84) - patients with EH stage II and high CV risk. It were investigated 2 diagnostic criterias for detection of arterial stiffness: PWV normal level < 10 m/s and the individual threshold of PWV depending on age and hypertension grade [Arterial Stiffness’ Collaboration, 2010], which was normal (in the range of 10th percentile - median) and high normal PWV (above median). Clinical characteristics of the observed groups are presented at the table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1A group (n=22)</th>
<th>1B group (n=22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>65±12 (60-75)</td>
<td>65±12 (60-75)</td>
</tr>
<tr>
<td>BMI, kg/m2</td>
<td>24.6±6.2 (18-30)</td>
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<td>Waist circumference, cm</td>
<td>96±12 (74-112)</td>
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<td>SBP, mmHg</td>
<td>138±16.2 (110-150)</td>
<td>138±16.2 (110-150)</td>
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<tr>
<td>HDL cholesterol, mmol/l</td>
<td>1.0±0.2 (0.7-1.3)</td>
<td>1.0±0.2 (0.7-1.3)</td>
</tr>
<tr>
<td>Smoking, %</td>
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</tr>
<tr>
<td>Diabetes, %</td>
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<td>5 (10-20)</td>
</tr>
<tr>
<td>Circadian blood pressure profile,</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Total cholesterol, mmol/l</td>
<td>7.0±0.2 (4.5-10.0)</td>
<td>7.0±0.2 (4.5-10.0)</td>
</tr>
<tr>
<td>HDL cholesterol, mmol/l</td>
<td>1.0±0.2 (0.7-1.3)</td>
<td>1.0±0.2 (0.7-1.3)</td>
</tr>
</tbody>
</table>

Conclusions: The detected signs of arterial wall stiffness in patients with early stage of EH indicate increasing of cardiovascular risk severity and necessary for timely evaluation of pulse wave velocity for the early identifying of premature vascular aging.

PP.03.13 HYPERTENSION IN WOMEN WITH EARLY MENOPAUSE: DEFINITION AND OPTIMIZATION OF CARDIOVASCULAR RISK

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Objective: The aim of this study was to determine difference of the cardiovascular risk (CVR) in young women with essential hypertension (H) and postmenopausal or early physiological menopause (M), and evaluation possibility of correction due to menopausal hormone therapy (MHT).

Design and method: Were examined 112 women with H, the average age 43 years with menopause from 2 to 5 years, which formed 3 groups: 1 group included 37 patients with H and postmenopausal M which not prescribed MHT; 2 group included 37 patients with H and postmenopausal M which was appointed low-dose combination of estrogen and progesterone MHT for prevent postcastration symptoms. The 3 group included 38 patients with H and early physiological M without MHT. All patients performed physical, instrumental, laboratory research and ultrasonic examination with the definition of the intima media thickness (IMT) of carotid arteries. Was calculated CVR according to standard SCORE, also scale with body mass index - SCORE-BMI and on basing on registration the IMT - SCORE-IMT.

Results: Patients of 2 group with MHT set significantly (P < 0.01) more optimal circadian blood pressure profile, glycemic and lipid profile than at patients 1 and 3 groups. In the 2 group as compared to 1 and 3 groups was significantly less (P < 0.01) IMT and were less (P < 0.01) detected atherosclerotic plaques. All SCORE scales showed a lower risk in group 2, but the most impressive was the reduction in the risk according to SCORE-IMT (P < 0.001), which demonstrated the possibility of preventing atherosclerotic lesions in patients with postmenopausal M who received MHT.

Conclusions: In young patients with H and postmenopausal M or early physiological M demonstrate pro-atherogenic changes. Appointment of MHT at patients with postmenopausal M may not only optimize the antihypertensive effects but also prevent the manifestation of atherosclerosis.

PP.03.14 CLINICAL AND PARACLINICAL IMPACT IN PATIENTS WITH LONGSTANDING SYSTEMIC HYPTERTENSION

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Objective: to assess the clinical and paraclinical impact in patients with longstanding systemic hypertension (SH) in adherent controlled subjects.

Design and method: 180 patients with SH examined in the last 3 years were included. It was a retrospective study. In all patients were recorded retrospective data regarding medical familial history, clinical findings, stress exposure, blood tests, ECG (the last one), echocardiography (the last one) and depending on clinical status and comorbidities ECG Holter, blood pressure holter, pro-BNP determination or other paraclinical tests. All the subjects were hypertensive for at least 12 years (18.7 years average) in the study group the medium value of BP was 138/88 mmHg (between 70–155 mmHg).

Results: Baseline characteristics: study group (n = 180) – age - 57.3± 52.5 years; 35% smokers, 16% dyslipidemia; associated T2DM 27%, obesity 52%, ischemic heart disease 32%, hyperthyroidia 9%, other 19%, in treatment with ACEI, AT1RA, beta orcalcium channel blockers, diuretics, alpha metil dopa, statins

All results per category are represented as mean ± SEM (m) and median (25th to 75th percentile).

Measurement of PWV was carried out using the device Arteriograph TensioMed (TensoClinic, Hungary).

Results: PWV level in IA group was 7,15 (6,38; 7,70) m/s, PWV high level frequency registered in 11 (50%) patients according to age and blood pressure level. In IB group PWV value was 8,10 (7,23; 8,53) m/s, PWV high level frequency registered in 17 (77.3%) patients according to age and blood pressure level. In II group PWV value was 9,85 (8,5; 10,9) m/s and in 42 patients (50%) PWV level increased more than 10 m/s, that was testified to the target organ damage. In 22 male patients from the II group (26.20%) was individual increasing of PWV according to age and blood pressure level.

Conclusions: The significant signs of arterial wall stiffness in patients with early stage of EH indicate increasing of cardiovascular risk severity and necessary for timely evaluation of pulse wave velocity for the early identifying of premature vascular aging.
control group – without SH or other cardiovascular morbidities (n = 120) – average age 51.2; 49% males; 23% smokers, 47% dyslipidemia; associated T2DM 12%, obesity 40%, hypertrophy 4%, other 17%; in treatment with statins. The echo findings were: in the study group: LA – 49.3 mm, LVEDD-60.2 mm, EF 49.7%; in the control group LA – 37.4 mm, LVEDD-43.5 mm, EF 69.2. In study group: ECG – heart rate 78 beats/min; 12 RBB, 4 LBB, 12 AV block I degree, repolarization changes in 87 patients, 16 AF; NYHA II class – 56 pts. In the control group: ECG - heart rate 69 beats/min; 3 RBB, 1 LBB, 7 AV block I degree, repolarization changes in 18 patients, 1 AF; no heart failure

Conclusions: The longstanding essential SH has a mild to moderate impact in controlled adherent pts. even after more than 25 years of evolution if considering the subjects without important comorbidities. Though the study group the echo and ECG findings are more significant. The remodeling process is less important, the ECG findings, capacity of effort quality of life are not far from the control group.

PP.03.15

OLD HYPERTENSIVE PATIENTS: ARE THEY DIFFERENT?

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Objective: The aim of this study was to evaluate and compare comorbidities between genders in all hypertensive patients above 80 years old admitted to the Internal Medicine Clinic of an Emergency Hospital.

Design and method: We included all hypertensive patients (370) 80+ years old, admitted for any cause, during the past year (2015) and evaluated them for cardiovascular risk factors and comorbidities.

Results: The group comprised predominantly females (69.45%). When comparing the two groups there were no significant differences between sexes, with the exception of smoking, diabetes and chronic obstructive pulmonary disease, in which case men are more frequently affected. In terms of cardiovascular disease chronic heart failure with reduced ejection fraction was less frequent in females. For other results see table.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking, no (%)</td>
<td>10 (5.56)</td>
<td>29 (23.62)</td>
<td>42 (9.02)</td>
</tr>
<tr>
<td>Dyslipidemia, no (%)</td>
<td>50 (15.19)</td>
<td>34 (10.88)</td>
<td>84 (11.3)</td>
</tr>
<tr>
<td>Diabetes, no (%)</td>
<td>73 (20.48)</td>
<td>51 (15.12)</td>
<td>124 (15.24)</td>
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<tr>
<td>Obesity, no (%)</td>
<td>82 (23.09)</td>
<td>28 (24.77)</td>
<td>110 (15.11)</td>
</tr>
<tr>
<td>Stroke, no (%)</td>
<td>31 (15.70)</td>
<td>15 (13.12)</td>
<td>46 (11.22)</td>
</tr>
<tr>
<td>Arterial Fibulation (AFib), no (%)</td>
<td>117 (41.52)</td>
<td>47 (41.59)</td>
<td>164 (16.51)</td>
</tr>
<tr>
<td>Chronic Kidney Disease (CKD), no (%)</td>
<td>172 (66.92)</td>
<td>54 (54.58)</td>
<td>226 (37)</td>
</tr>
<tr>
<td>Chronic Heart Failure, colored ejection</td>
<td>125 (46.93)</td>
<td>64 (56.51)</td>
<td>189 (25.62)</td>
</tr>
<tr>
<td>Chronic Heart Failure, preserved ejection</td>
<td>27 (18.18)</td>
<td>27 (19.23)</td>
<td>54 (5.01)</td>
</tr>
<tr>
<td>ESRD, no (%)</td>
<td>164 (52)</td>
<td>164 (52)</td>
<td>164 (52)</td>
</tr>
<tr>
<td>Malignant Hypertension, no (%)</td>
<td>164 (52)</td>
<td>164 (52)</td>
<td>164 (52)</td>
</tr>
<tr>
<td>COPD, no (%)</td>
<td>164 (52)</td>
<td>164 (52)</td>
<td>164 (52)</td>
</tr>
</tbody>
</table>

Conclusions: In an elderly hypertensive population females were hardly significantly more often prone to a history of cardiovascular pathology and major events than their male counterparts.

PP.03.16

INCREASED ROS GENERATION INVOLVES MITOCHONDRIA IN MR-OVEREXPRESSING ADIPOCYTES – IMPACT ON VASCULAR FUNCTION

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Objective: We previously showed that 1) ROS were increased in adipose tissues from Adipo-MROE vs control (CTR) mice, b) Fcm from Adipo-MROE (Fcm-MR) induced endothelial dysfunction in control artery, through redox-sensitive mechanisms. Here, we identified the source of ROS in adipocytes, with the hypothesis that NADPH oxidases and mitochondrial ROS were used in our experiments.

Results: We previously showed that 1) ROS were increased in adipose tissues from Adipo-MROE vs control (CTR) mice, b) Fcm from Adipo-MROE (Fcm-MR) induced endothelial dysfunction in control artery, through redox-sensitive mechanisms. Here, we identified the source of ROS in adipocytes, with the hypothesis that NADPH oxidases and mitochondrial ROS may play an important role. Levels of superoxide were 3 fold-increased in mito-AT from Adipo-MROE compared to CTR mice (n = 7 mice per group, p = 0.01). We pre-incubated Cmbc-MR with either the inhibitor of NADPH oxidase isoforms 1 and 2 (ML171, 10–6 M), either a specific inhibitor of mitochondrial-derived ROS (mito-TEMO-10–7 M), and assessed ACh-induced relaxation (10–6 M) in CTR arteries. Normal relaxation was restored by mito-TEMO (% relaxation: CTR+Fcm-MR, without vs with mito-TEMO: 47.3 ± 4.4 vs 87.1 ± 2.2, n = 6 mice per group, p < 0.05), whereas Non/1 inhibitor ML171 did not improve endothelial function (% relaxation: 47.7 ± 4.2, ns).

Conclusions: Our data demonstrate that adipocyte MR over-activation leads to increased mitochondrial-derived ROS generation in visceral adipose tissue, which contributes to endothelial dysfunction. We describe a novel mechanism that directly links adipose tissue and vascular function. Our study identifies novel mechanisms linking vascular/ adipose tissue biology and aldosterone/MR activation, which may be particularly important in vascular dysfunction associated with metabolic syndrome.

PP.03.17

ASSOCIATION BETWEEN SLEEP-DISORDERED BREATHING AND CARDIOVASCULAR RISK

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Objective: To evaluate the association between obstructive sleep apnea (OSA) risk assessed by Berlin questionnaire and risk of fatal cardiovascular diseases estimated by SCORE.

Design and method: We examined 275 subjects (115 males and 160 females, age 25–64 years old) without known cardiovascular diseases within the epidemiological study ESSE-RF. All participants underwent a structured interview. The risk of sleep-disordered breathing (SDB) was assessed by Berlin questionnaire, and cardiovascular risk was evaluated by SCORE scale (high risk chart). Anthropometry, blood pressure (BP), fasting glucose, lipids, uric acid, creatinine, C-reactive protein, adiponectin and leptin were assessed.

Results: Based on Berlin questionnaire, 11.4% of subjects had high risk of OSA. The combination of snore/witnessed sleep apnea and cardiometabolic disorders was the most common (90.0%) manifestation. Complaints of snore/witnessed sleep apneas were more frequently reported by men (21.7% vs. 6.3%, p < 0.001), resulting in a higher OSA risk among males compared to females (11.3% vs. 4.4%, p = 0.03). Daytime sleepiness was the least complaint reported by both males and females (1.7% vs. 3.1%). High risk of OSA was more common in people older than 40 years old compared to the younger ones (9.8% vs. 1.2%, p = 0.01). Subjects with high OSA risk demonstrated more elevated total cholesterol (6.10 ± 0.18 vs. 5.33 ± 0.09 mmol/l, p = 0.05) and low-density lipoprotein level (4.17 ± 0.19 vs. 3.59 ± 0.08 mmol/l, p = 0.02); more severe obesity (body mass index 31.73 ± 1.19 vs. 27.71 ± 0.38 kg/m2, p = 0.001), and had higher rate of central obesity (68.4% vs. 34.5%, p = 0.006). They also showed elevated systolic (134.89 ± 4.96 vs. 126.72 ± 1.18 mmHg, p = 0.04) and diastolic BP (84.26 ± 2.69 vs. 78.55 ± 0.80 mmHg, p = 0.03). There was no association between SCORE cardiovascular risk and high risk of OSA independently of age and sex. Different combinations of OSA manifestations grouped by cluster analysis showed no impact of snore/sleep apneas or daytime sleepiness on cardiovascular risk.

Conclusions: In Russian population, high risk of OSA is associated with the high prevalence of cardiometabolic disorders. Berlin questionnaire is an inappropriate tool for identifying people with co-existent high risk of OSA and high cardiovascular risk.

PP.03.18

THE ROLE OF GAMMA GLUTAMYLTRANSFERASE (GGT) REGARDING CARDIOVASCULAR RISK EVALUATION OF CAUCASIAN NEWLY DIAGNOSED AND NEVER UNTREATED PATIENTS WITH ESSENTIAL HYPERTENSION

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Objective: Several observational studies, usually in South Asian populations, have drawn inconsistent conclusions regarding the role of the gamma-glutamyltransferase (GGT) in cardiovascular risk evaluation of hypertensive patients. Therefore, we investigated any possible association between GGT levels and blood pressure (BP) levels and target organ damage (TOD) indices in Caucasian newly diagnosed and never untreated patients with essential hypertension.

Design and method: We studied 170 non-diabetic, newly diagnosed patients with stage I-II arterial hypertension (mean age 50±11 years, 100 males). We performed: a 24 h ambulatory BP measurement (ABPM) and b. we evaluated carotid-femoral artery pulse wave velocity (PWV), carotid intima-media thickness (IMT), microalbumin levels (MAU), LV remodeling (LVMI), and coronary flow reserve (CFR).

Results: GGT levels were related with age (r = –0.22, p = 0.005), weight (r = 0.36, p < 0.001), LDL-C (r = 0.19, p = 0.01), heart rate (r = 0.209, p = 0.008), systolic ABPM (r = 0.21, p = 0.006), diastolic ABPM (r = 0.29, p < 0.001) and MAU (r = 0.26, p = 0.002). No other relationships were emerged when we checked for sex differences and dipping status. However, applying a multiple linear regression analysis were age, creatinine levels, systolic and diastolic ABPM were inserted as independent variables, we found that the relationships between GGT and systolic ABPM and diastolic ABPM as well as MAU were not independent.

Conclusions: GGT levels are non-independently related with the stage of arterial hypertension as well as endothelial dysfunction, expressed as MAU, in Caucasian patients with mild to moderate hypertension. Further studies in several hypertensive treated and untreated populations are needed in order to conclude about the significance of GGT levels as a novel cardiovascular risk marker.

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Objective: The objective of our study is to compare the prevalence of cardiovascular risk factors in women and men.

Design and method: A prospective study, including 200 consecutive patients (110 female and 90 male), on mean age 53.5 ± 10.1 (from 20 to 87) years. We analyzed anthropological and demographic data – age, physical activity, family history for cardiovascular diseases, presence of cardiovascular and other diseases, lifestyle and diet, dyslipidemia, blood pressure and body-mass index (BMI). For the purpose of the study a questionnaire was designed and filled in by the patients.

Results: Reduced physical activity was the leading cardiovascular risk factor in our female patients – 72.7%, followed by active smoking 49.40%, hypertension 41.80%, dyslipidemia – 39.1%, unhealthy diet – 37.3%. However, in our male patients it is unhealthy diet – 78.40%, followed by reduced physical activity 75.3%, hypertension 45.70%, active smoking 41.2% and dyslipidemia – 41.2%. Measurement of the anthropometric indicators showed that the mean weight for the female group was 77.04 ± 15.8 kg, height 1.68 ± 0.09 m; estimated mean BMI was 27.3 ± 4.9 and the waist circumference - 93.7 ± 15.9 cm. The one in the male group showed that the mean weight was 89.53 ± 16.6 kg, height 1.77 ± 0.07m, estimated mean BMI was 28.55 ± 4.89 and the waist circumference 100.86 ± 14.30 cm. Most of our patients had a combination of 2 or 3 risk factors.

Conclusions: Prevalence of cardiovascular risk factors among female and male patients in our study is high. Implementation of lifestyle changes – regular physical activity, weight reduction, cessation of smoking and diet is the key step for the non-medical prevention of cardiovascular complications in these patients. In addition among our group of patients, hypertension is the first cardiovascular risk factor after lifestyle followed by dyslipidemia.


Objective: To evaluate the cardiovascular oscillations of the arterial wall stiffness in hypertensive patients depending on their stage of the disease.

Design and method: The study included 30 hypertensive patients aged between 35 to 65; 24 males and 6 females. They were divided into 2 groups depending on the stage of the disease and organ damage. The first group included 15 patients with stage I and stage II hypertension and the second included 15 with stage III. With the help of JB monitoring BPLab company Petr Telegin (Nizhni Novgorod) for each patient we calculated the average value of their; systolic blood pressure, diastolic blood pressure, the propagation time of the reflected wave, arterial stiffness index, augmentation index, and also the time of day variability of these parameters.

Results: In patients with stage I-II hypertension (group 1) there is less variability in their the propagation time of the reflected wave than in patients with stage III hypertension (group 2) 18 ± 5.1 vs 24.8 ± 10.7 (p = 0.018) respectively. And group 1 patients had significantly lower SBP compared with the second: 8.4 ± 124.9 vs 134.4 ± 10.6 (p = 0.005), respectively.

Conclusions: In patients with more severe hypertension with complications such as myocardial infarction, stroke, or in combination with diabetes there is a large diurnal variation of the reflected wave propagation time. Which makes this a sign of a negative evaluation of the ABPM data.

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Objective: This study aimed to estimate the relationship between various lipid abnormalities and albuminuria in hypertensive Korean adults.

Design and method: Data obtained from the Korean National Health and Nutrition Examination Survey in 2011–2012 were analyzed. The study included 2,330 hypertensive participants. Total cholesterol (TC), triglyceride (TG), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C) levels were measured. Lipid abnormalities were defined as high TG (TG > 200 mg/dl), low HDL-C (HDL-C < 40 mg/dl), high TC/HDL-C (ratio > 5), high TG/HDL-C (ratio > 3.8), and high LDL-C/HDL-C (ratio > 2). Albuminuria was defined as a urine albumin to creatinine ratio (ACR) > 30 mg/g.

Results: Women with albuminuria showed significantly higher levels of TG, TC/HDL-C, and HDL/LDL-C and a lower level of HDL-C than women without albuminuria (all p < 0.05). TG, TC/HDL-C, and TG/HDL-C were positively correlated with ACR in both men and women, however, HDL-C was negatively correlated with ACR in women and non-HDL-C was positively correlated with ACR in men.

In men, there was no association between ACR and lipid parameters. However, in women, higher values for log TG, TC/HDL-C, and log TG/HDL-C were associated with an increased odds ratio for albuminuria (odds ratio [95% confidence interval]: 1.54 [1.04–2.28], 1.22 [1.44–1.43], and 1.80 [1.20–2.71], respectively) and HDL-C with a decreased odds ratio for albuminuria (0.78 [0.67–0.92]) after adjusting for all covariates.

Conclusions: High TG, TC/HDL-C, and TG/HDL-C were associated with an increased prevalence of albuminuria in hypertensive women. Screening and treatment for dyslipidemia may be necessary for hypertensive women to address potential albuminuria.

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Objective: This study aims to estimate the relationship between dyslipidemia and urinary albumin excretion in hypertensive adults: a nationwide population-based study.

This study aimed to estimate the relationship between dyslipidemia and urinary albumin excretion in hypertensive adults. Several observational studies, usually in South Asian populations, have shown that dyslipidemia and urinary albumin excretion are strongly correlated. In this study, we aimed to estimate the relationship between various lipid abnormalities and albuminuria in hypertensive Korean adults.

Lipid abnormalities were defined as high TG (TG > 200 mg/dl), low HDL-C (HDL-C < 40 mg/dl), high TC/HDL-C (ratio > 5), high TG/HDL-C (ratio > 3.8), and high LDL-C/HDL-C (ratio > 2). Albuminuria was defined as a urine albumin to creatinine ratio (ACR) > 30 mg/g.

Results: Women with albuminuria showed significantly higher levels of TG, TC/HDL-C, and HDL/LDL-C than women without albuminuria (all p < 0.05). TG, TC/HDL-C, and TG/HDL-C were positively correlated with ACR in both men and women, however, HDL-C was negatively correlated with ACR in women and non-HDL-C was positively correlated with ACR in men.

In men, there was no association between ACR and lipid parameters. However, in women, higher values for log TG, TC/HDL-C, and log TG/HDL-C were associated with an increased odds ratio for albuminuria (odds ratio [95% confidence interval]: 1.54 [1.04–2.28], 1.22 [1.44–1.43], and 1.80 [1.20–2.71], respectively) and HDL-C with a decreased odds ratio for albuminuria (0.78 [0.67–0.92]) after adjusting for all covariates.

Conclusions: High TG, TC/HDL-C, and TG/HDL-C were associated with an increased prevalence of albuminuria in hypertensive women. Screening and treatment for dyslipidemia may be necessary for hypertensive women to address potential albuminuria.
Results: Serum ferritin concentrations were increased in women with PCOS, and markedly when weight excess was associated. In women with isolated weight excess, a significant positive correlation between high-sensitive C-reactive protein and body mass index in the one hand, and ferritin in the other hand, was noted. In women with PCOS associated to weight excess, a significant negative correlation between 17-hydroxyprogesterone and ferritin was observed.

Conclusions: Iron metabolism modifications observed in PCOS associated to weight excess would flow metabolic pathways distinct from those followed in isolated PCOS or weight excess. Steroidogenesis would be a key factor with a probably adipokine involvement.

PP.03.25 URIC ACID LEVELS PREDICT CORONARY ARTERY DISEASE BUT NOT STROKE IN ESSENTIAL HYPERTENSION: DATA FROM A GREEK 8-YEAR-FOLLOW-UP STUDY

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Objective: The exact role of uric acid in cardiovascular risk prediction remains to be further determined. The aim of the present study was to assess the predictive role of uric acid for the incidence of coronary artery disease (CAD) as well as stroke in essential hypertensive patients.

Design and method: We followed up 2415 essential hypertensives (mean age 58.4 years, 1208 males, office blood pressure (BP) = 143/88 mmHg) for a mean period of 8 years. All subjects had at least one annual visit and at baseline underwent echocardiographic study and blood sampling. Moreover, CAD was defined as the history of myocardial infarction or significant coronary artery stenosis and stroke was defined as rapid onset of a new neurological deficit persisting at least 24 hours unless death supervened confirmed by imaging findings.

Results: The incidence of CAD and stroke was 2.2% and 1% respectively. Hypertensives who developed CAD (n = 53) compared to those without CAD at follow-up (n = 2362) had at baseline higher baseline uric acid levels (5.8 ± 1.8 vs 5.2 ± 1.5 mg/dl, p = 0.011), left ventricular mass index (LVMI) (115.7 ± 27.1 vs 103.7 ± 27.1 g/m², p = 0.011) and prevalence of LV hypertrophy (41% vs 25%, p = 0.017) whereas no difference was observed with respect to baseline office BP, renal function and lipid levels (p = NS for all). Hypertensives who developed stroke (n = 24) compared to those without CAD at follow-up (n = 2391) were older (63 ± 8 vs 58 ± 11 years, p = 0.006) whereas no difference was observed with respect to baseline office BP, uric acid, renal function and lipid levels (p = NS for all). Univariate Cox regression analysis revealed that baseline uric acid levels predicted CAD (hazard ratio = 1.219, p = 0.013) but not stroke. In multivariate Cox regression model baseline glocmerular filtration rate (hazard ratio = 1.018, p = 0.017) LVMI (hazard ratio = 1.010, p = 0.026) and uric acid (hazard ratio = 1.226, p = 0.016) turned out to be independent predictors of CAD, while age (hazard ratio = 1.058, p = 0.014) predicted stroke.

Conclusions: In essential hypertensive patients uric acid predicts future development of CAD, whereas exhibits no prognostic value for stroke. These findings further support that uric acid estimation could improve overall risk stratification in essential hypertension.

PP.03.24 ARTERIAL STIFFNESS IN A RANDOM SAMPLE OF A MULTI-ETHNIC POPULATION IN SURINAME: THE HELISUR STUDY

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Objective: Patients of South Asian and African descent are known to have a high cardiovascular risk. Increased arterial stiffness has been shown to be independently associated with cardiovascular risk and mortality, however, at present, few studies have investigated ethnic differences in aortic pulse wave velocity (PWV), as measure of arterial stiffness, in these groups. Therefore, we studied PWV in South Asians, Indonesians, Creoles and Maroons, living in Suriname, South America.

Design and method: In a cross-sectional setting we selected a random representative sample of 864 participants living in an urban setting in Paramaribo, Suriname. We estimated the aortic pulse wave velocity (PWV) non-invasively in the supine position by analysis of the oscillometric pressure curves registered on the upper arm, using the Arteriograph (TensioMed, Budapest, Hungary). We used the mean of two consecutive measurements for our analyses by age and ethnicity, and by blood pressure and ethnicity.

Results: We included 864 participants (mean age 44 years, 46% man, 41.2% hypertensive, 12% hypercholesterolaemia, 14.6% diabetes). The mean PWV value was 8.5 ± 2.4 m/s. The distribution of mean PWV values classified by age, ethnicity, and blood pressure and ethnicity.

Conclusions: We found relatively high mean PWV values across ethnic groups, compared to the mean values with optimal blood pressure, reflecting the high prevalence of hypertension and possible early vascular ageing in these groups with high cardiovascular risk.

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Objective: In this study we investigated serum phosphorus levels in patients with acute left heart failure.

Design and method: A total of 215 participants, 115 patients with acute left heart failure and 100 controls, were enrolled in the study. Patients applied to emergency room with the complaints of heart failure were assessed by echocardiography. Ejection Fraction (EF) levels lower than 50% were accepted as heart failure. Patients with renal disorders, hyperparathyroidism, chronic heart failure, alcoholism, intake of medications that alter phosphorus level were excluded. Mean phosphorus...
levels of each group were measured and compared each other. SPSS 12.0 package program (SPSS IncChicago, Illinois) was used for statistical analysis. Chi square test was used to compare categorical measures between the groups. Mann Whitney U or T test was used for comparison of numerical measurements between the two groups. Level of statistical significance was considered as 0.05 in all tests.

Results: There were 148 (69%) women and 67 (31%) men in present study. The mean age was 52.6 ± 12.1 years. Demographic characteristics of participants were not significantly different between the groups. Mean EF levels of groups were 40.8 ± 6.3, 60.0 ± 9.7 respectively. The difference was statistically significant (P < 0.001). Mean phosphorus levels were 3.0 ± 1.1, 4.2 ± 0.7 mg/dl respectively. There was statistically significant difference (P = 0.041) (Table 1).

Conclusions: Phosphorus is a major intracellular constituent. The deficiency of phosphorus can cause a variety of signs and symptoms. Myocardial creatine phospho- phate, ATP, and ADP levels reduce in case of phosphate deficiency. In addition to these, mitochondrial and myofibrillar creatine phosphokinase activities also re- duces. Alterations occur in mitochondrial oxygen consumption, acid-extractable phospholipid precursors, and mitochondrial oxidation of long chain fatty acids due to phosphate depletion. All these effect heart muscles and can cause heart failure. Consequently phosphorus levels should be controlled in patients with acute left heart failure. Phosphorus supplementation should be performed either orally in heart insuffi- ciencies or i.v.infusings in heart failure.This is a must sine qua non treatment.

PP.03.27

EFFECT OF DIFFERENT DOSES SINGLE PILL COMBINATION INDAPAMIDE / AMLODIPIN (NATRIXAM 1.5/5 AND NATRIXAM 2.5/10) ON BLOOD PRESSURE IN HIGH RISK PATIENTS WITH ARTERIAL HYPERTENSION

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Objective: The use of single-pill combinations is preferred for severe hyperten- sive patients to support their effectiveness in improving adherence to therapy and achievement of effective BP control. Aim of the study is to determine effects of fixed dose indapamide/amloidpine in patients with high risk factors for coronary artery diseases and severe hypertension.

Design and method: We studied 65 patients with AH (57 ± 16 y, 32% female) and type 2 diabetes, divided on two groups, regarding level of BP from AMBP; analyzed at baseline before therapy and 4 months FU. The group with mild AH received indapamide/amloidpine 1.5/5 mg daily and group with severe AH – in- dapamide/amloidpine 2.5/10 mg. We divided patients into 3 groups regarding their LV diastolic function (normal – 22 patients, impaired LV relaxation – 33 and impaired relaxation with reduced compliance and elevated LV end-diastolic pressure – 10).

Results: At 4 mFU BP decreased by 23.3 ± 13.2/11.6 ± 6.4 to 131.6 ± 5.6/76.0 ± 4.6 mmHg (p < 0.0001). Changes in BP were 19.8 ± 8.3/9.7 ± 7.2 mmHg for grade 1, 20.3 ± 10.5/15.6 ± 9.6 mmHg for grade 2, and 35.3 ± 16.2/19.8 ± 12.2 mmHg for grade 3 AH (p < 0.0001). ABPM 24-h mean BP decreased from 148.6 ± 12.7/78.1 ± 13.6 to 123.7 ± 6.4/77.8 ± 6.5 mmHg (p < 0.0001). Diastolic BP at 16 weeks was significantly lower from baseline (p < 0.001). Lipid profile and glucose status showed slight decrease but was without significant changes from baseline after 4mFU of both fixed dose combination of treatment (p < 0.72). At 4mFU were found improvement of systolic BP more significant in severe AH group, treated with higher dose indapamide/amloidpine (p = 0.01). Data showed improvement after 4mFU treatment in both groups, with a positive correlation between BP parameters and E/E’ ratio. Axial edema was infrequent (0.1%).

Conclusions: Single pill combination indapamide/amloidpine was effectively and safely administered to high-risk hypertensive patients to reach target BP values and may be efficacious as first-line treatment for patients with mild to moder- ate essential hypertension. After 4months treatment is not injured glycemic and metabolic status.

PP.03.28

LIPID PROFILE AND INCIDENCE OF CARDIOVASCULAR DISEASE IN A MEDITERRANEAN HIGH-RISK POPULATION: THE ESCARVAL-RISK STUDY

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Alicante, Alicante, SPAIN, 2 INCLIVA Biomedical Research Institute, Hospital Clinico Universitario de Valencia, University of Valencia, Valencia, SPAIN, 3 University A Coruña, A Coruña, SPAIN, 4 CIBER, Instituto de Salud Carlos III, Madrid, SPAIN, 5 Department of Medicine, University Jaume I Castellón. Unión de Mutuas de Castellón. Castellón, SPAIN, 6 Health Center of Benagamén, Valencia, HTA Working Group SEMERGEN, Valencia, SPAIN, 7 Escarval Project, Valencia, SPAIN, 8 Health Center of Algemesí, Valencia, SPAIN, 9 Department of Preventive Medicine and Public Health, School of Medicine, University of Valencia, Valencia, SPAIN, 10 Former Senior Investigator, CNMC, Madrid, SPAIN.

**Objective:** The aim of the study was to assess the association of different components of the standard lipid profile with the total mortality and the incidence of cardiovascular events in a Mediterranean high cardiovascular risk population.

**Design and method:** Prospective cohort ESCARVAL study, including patients without previous cardiovascular disease, older than 30 years. Patients were selected in primary care, consecutively, among individuals with a diagnosis of hypertension (HT), dyslipidemia (DL) or diabetes mellitus (DM) in the absence of CV events. The follow-up period was 3.2 years (2008–2012). The following lipid biomarkers were compared: Total cholesterol (TC), HDL-cholesterol (HDLc), Non-HDL-cholesterol (NHDLC), LDL-cholesterol (LDLc), Non-HDL minus LDL-cholesterol (NHDLC-LDLc), Triglycerides (TG), ratio Total/HDL-cholesterol (TC/HDLc), ratio Triglycerides/HDL-cholesterol (TG/HDLc). The endpoints were: mortality for all causes, coronary heart disease or stroke in hospital admission. Adjusted rate ratios (ARR), annual attributable risk and Population attributable risk (PAR) associated to altered lipid levels were calculated.

**Results:** 51,462 patients aged 62.6 (average) years old (52.4% women), were included. During a follow-up time of 3.2 years, 919 deaths, 1666 hospitalizations for coronary heart disease (CHD) and 1510 hospitalizations for stroke were recorded. The lipid biomarkers that showed higher ARR for total mortality and CHD and Stroke hospitalization by altered lipid levels were respectively: HDLc < 40 mg/dl in men or < 50 mg/dl in women 1.25 (1.09, 1.43), 1.29 (1.16, 1.42), 1.23 (1.1, 1.37); TC/HDLc > 3 in men and > 4.4 in women 1.22 (1.04, 1.43), 1.38 (1.23, 1.54), 1.25 (1.11, 1.44) and TG/HDLc > 3.5 in men and > 2.5 in women 1.21 (1.06, 1.26), 1.31 (1.18, 1.43), 1.09 (0.98, 1.21). The lipid biomarkers that showed higher PAR (%) were respectively: low HDLc: 7.70 (3.56, 11.81), 11.42 (8.06, 14.77), 8.40 (4.99, 11.86), high TC/HDLc: 6.55 (3.16, 9.94), 12.47 (9.05, 15.26), 8.73 (5.87, 11.59) and high TG/HDLc: 8.94 (4.58, 13.24), 15.09 (11.42, 18.79), 6.92 (3.12, 10.69).

**Conclusions:** HDLc, and the ratios total cholesterol/HDL-cholesterol and triglycerides /HDL-cholesterol seem to be better markers of the risk of vascular disease compared to other biomarkers commonly used in clinical practice.

**PP.03.30**

**CENTRAL BLOOD PRESSURES AND ARTERIAL STIFFNESS ARE MUCH HIGHER IN HYPERTENSIVE WOMEN WITH MORE CARdiovascular RISK FACTORS DESPITE ADEQUATE TREATMENT**

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**Objective:** The high central pressure is an indicator of vascular risk, especially when they are higher than expected in hypertensive patients (HP). Despite various studies, few data has been written regarding PH who also have more cardiovascu-

lar risk factors (CVRF) in addition to high blood pressure (HTA) and are women.

In the present study, we show the values of central pressures in hypertensive women without other CVRF compared with those who have more than 1 CVRF besides hypertension.

Objectives: prospective observational open-label study to assess central systolic and diastolic pressures (CSBP, CDBP) and arterial stiffness of large and small vessels in women with hypertension without CVRF compared with those with more than one CVRF and well controlled HTA with peripheral measurements.

**Design and method:** We studied two groups: Group A: 45 women without other CVRF HP (53 ± 6 years, BMI < 25) and compared to Group B: 65 women with hypertension and more than 1 CVFR (55 ± 4 years). We included only those taking ACE inhibitors, ARBs and diuretics to keep blood pressures (BP) below 140/90 in peripheral BP controls performed by their doctor. Not receiving other anti-

hypertensive treatments were included. In all patients we studied CSBP, CDBP, augmentation index (AI) as well as the pulse wave velocity (PWV) and total peripheral vascular resistance (TPR).

**Results:** The results were compared and are shown in the following table:

**PP.03.32**

**ALCOHOL CONSUMPTION AND HYPERTENSION IN PATIENTS WITH PREVIOUS REvascularization; A SUBSTUDY OF THE POP-HIT STUDY**

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**Objective:** It is well known, that the restless legs syndrome (RLS) is a disorder of the part of the nervous system that causes an urge to move the legs. Because it usually interferes with sleep, it also is considered a sleep disorder. People with restless legs syndrome have uncomfortable sensations in their legs and an irresistible urge to move their legs to relieve the sensations. The sensations are usually worse at rest, especially when lying or sitting. The symptoms are generally worse in the evening and at night. For some people, symptoms may cause severe nightly sleep disruption that can significantly impair their quality of life. It is well known, too, that sleep disorders influenced early hypertension (HTA) expression. The aim of this study was to analyze can RLS be first prognostic sign of HTA expression in young people, less than 45 years of age.

**Design and method:** From January 2013, we analyzed 256 consecutive patients (pts) with HT younger than 45 years of age. All pts were divided in two groups: Group RLS - 128 pts with RLS and HTA and Group non-RLS - 128 pts without RLS and with HTA (control group of pts).

**Results:** At baseline Group RLS was slightly younger (p = 0.0589), with more men (p = 0.5076). Control group of pts had more hyperlipidemia (p = 0.0566). There was no differences in heredity for HTA expression (p = 1.8846).

**Conclusions:** This study provides support for use of RLS as one of the first prognostic sign of HTA expression in young people, less than 45 years of age.

**PP.03.31**

**INFLUENCE OF THE RESTLESS LEGS SYNDROME ON HYPERTENSION EXPRESSION IN YOUNG PEOPLE**

P. Mitrovic1, B. Stefanovic1,2, M. Radovanovic1,2, N. Radovanovic1,2, D. Rajic1, G. Matic3, R. Lasica3, I. Subotic1, N. Mijic2, Z. Vasiljevic1,2. *Emergency Hospital, Cardiology Clinic, Clinical Center of Serbia, Belgrade, SERBIA, 2School of Medicine, University of Belgrade, Belgrade, SERBIA.

**Objective:** The high central pressure is an indicator of vascular risk, especially when they are higher than expected in hypertensive patients (HP). Despite various studies, few data has been written regarding PH who also have more cardiovascu-

lar risk factors (CVRF) in addition to high blood pressure (HTA) and are women.

In the present study, we show the values of central pressures in hypertensive women without other CVRF compared with those who have more than 1 CVRF besides hypertension.

Objectives: prospective observational open-label study to assess central systolic and diastolic pressures (CSBP, CDBP) and arterial stiffness of large and small vessels in women with hypertension without CVRF compared with those with more than one CVRF and well controlled HTA with peripheral measurements.

**Design and method:** We studied two groups: Group A: 45 women without other CVRF HP (53 ± 6 years, BMI < 25) and compared to Group B: 65 women with hypertension and more than 1 CVFR (55 ± 4 years). We included only those taking ACE inhibitors, ARBs and diuretics to keep blood pressures (BP) below 140/90 in peripheral BP controls performed by their doctor. Not receiving other anti-

hypertensive treatments were included. In all patients we studied CSBP, CDBP, augmentation index (AI) as well as the pulse wave velocity (PWV) and total peripheral vascular resistance (TPR).

**Results:** The results were compared and are shown in the following table:

* mean p < 0.05

**Conclusions:** According to our study, hypertensive women with more risk factors have the central pressures significantly higher than women without other CVRF, despite adequate control of peripheral arterial pressures, also presenting a much more higher arterial stiffness data at the level of small and large arteries, indicating that the approach to these patients must be done in a comprehensive manner and not only to the control of hypertension, to reduce vascular risk. There is also a tendency to show higher TPR although not significant in these patients.

* mean p < 0.05

**Conclusions:** According to our study, hypertensive women with more risk factors have the central pressures significantly higher than women without other CVRF, despite adequate control of peripheral arterial pressures, also presenting a much more higher arterial stiffness data at the level of small and large arteries, indicating that the approach to these patients must be done in a comprehensive manner and not only to the control of hypertension, to reduce vascular risk. There is also a tendency to show higher TPR although not significant in these patients.
Abstracts

(p = 0.0404). Other baselines characteristics were similar in both groups of patients. After adjustment for cardiovascular risk factors by logistic regression, alcohol consumption displayed a protective effect against HTA in post bypass group of patients, but not in control group of pts.

Conclusions: The effect of light-to-moderate alcohol consumption is associated with decreasing risk of HTA in pts with prior CABG, but not in pts without prior CABG. This effect of light-to-moderate alcohol consumption is probably because of decreasing of cholesterol, triglycerides and fibrinogen, as well as physiological changes in coronary arteries and decreasing in sympathetic nervous system activity.

PP.03.33 AMELIORATION OF BLOOD PRESSURE INDUCES CHANGES OF PH AND PCO2 UNDER PHYSICAL ACTIVITY

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Objective: Mostly sedentary occupations combined with mental stress enhance systolic blood pressure and heart frequency (HF) along with mostly unnoticed increased breathing frequency. We wondered whether also congress attendees would be subjected to similar inconveniences and whether an enforced leg movement would have comparable effects to sports or breaks.

Design and method: After about 90 minutes of lecture attending, 24 members of the congress went into an adjoining room, where 10 minutes of enforced foot and leg movement was applied by a leg-moving device (wobbler) with frequency of 6.7 Hz while sitting on a chair. Before and after treatment systolic and diastolic blood pressure as well as heart frequency were determined by a Beurer/Ulm system. Moreover, 100 microliters of blood were taken from the fingertip for electrode-determination of pH and pCO2 by a NOVA biochemical device, widely used in ICUs. For data evaluation a subgroup above systolic blood pressure 140 mmHg was juxta positioned to the total participants.

Results: The most obvious difference in the group averages is the significant fall of systolic blood pressure in the > 140 group from 155 mmHg to 134 mmHg within 10 minutes. Although there were no significant correlations between systolic blood pressure and pH, pH and pCO2 in the all participants group (in both p < 0.05), there were significant differences in the > 140 group. After treatment the lowest systolic blood pressure went along with the lowest pH, while pCO2 loss led overcompensatory pH increase. Thus, even the comparatively calm atmosphere at a scientific congress seems to induce a certain amount of tension to participants, which expresses itself by increased systolic blood pressure in an appreciable number of attendees and increasingly alkaline pH. An application of a device, by which an allegedly natural movement of the feet and the lower legs is induced, effects a significant and substantial decrease of systolic blood pressure of 21 mmHg within only 10 minutes.

Conclusions: These mechanisms could be of further advantage in the treatment of hypertension and leg movement (restless legs or diabetic legs).
POSTER SESSION

POSTERS’ SESSION PS04:

CHILDREN AND ADOLESCENTS

PP04.01  CARDBIOVASCULAR RISK FACTORS IN CHILDREN AFTER LIVER TRANSPLANTATION

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Objective: Adult liver transplant recipients present with increased risk of cardiovascular disease (CVD). There is an increasing number of children and adolescents who undergo a liver transplant (LTx). We assessed blood pressure, carotid intima-media thickness (cIMT), relative wall thickness (RWT), left ventricular mass index (LVMI), aortal pulse wave velocity (PWV), lipids including apolipoproteins (apoA1, apoB, ApoE), lipoprotein(a)-Lp(a). All values were normalized for age and expressed as SDS values. Laboratory results were compared with age-matched healthy control group, n = 60, median age 13.7 (10.4–18).

Results: All patients presented with normal BP (< 95th percentile). BMI Z-score 90th percentile was exceeded in 11 patients (16%). cIMT was normal in all patients according to age percentiles, mean 0.38 ± 0.02; mean RWT was 0.32 ± 0.02, abnormal in 8 (11.5%) and LVMI-S was 28.0 ± 5.8 abnormal in 5 (7%) patients. Mean PWV was 4.75 ± 0.75 and 4 (5.7%) patients showed PWV values > 95 percentile. Cholesterol 153.2 ± 37 mg/dl, triglycerides 81.7 ± 30 mg/dl, HDL 50.4 ± 12 mg/dl and LDL 85.1 ± 32 mg/dl were normal in the study group. Apolipoproteins differed between the study group and control: ApoE 10.3 ± 3.1 vs 16.9 ± 2.5 g/l (p < 0.01), ApoB 0.66 g/l ± 0.21 vs 0.78 ± 0.20 (p < 0.01), ApoA1 4.1 ± 0.22 vs 1.29 ± 0.30 (p < 0.01) and Lp(a) 16.0 ± 6.3 vs 12.0 ± 11.6 mg/dl (p < 0.02).

Conclusions: Patients after pediatric LTx present with higher risk of cardiovascular diseases, however in spite of increased biochemical markers, the risk of atherosclerosis is not significant. Cardiac follow-up is mandatory, especially in adolescents before transition to adult care.

PP04.02  SODIUM CONSUMPTION, CENTRAL AND PERIPHERAL BLOOD PRESSURE, AND FOOD HABITS IN A POPULATION OF HEALTHY ADOLESCENTS: THE MACISTE STUDY

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Objective: There is a clear relationship between sodium intake and peripheral blood pressure (BP), both in adults and in adolescents. Less is known on the relationship between sodium consumption and central BP and the main dietary sources of daily sodium intake in adolescence. We aimed at evaluating sodium intake and its links with central and peripheral BP in a population of Italian adolescents.

Design and method: 401 healthy adolescents aged 17 ± 1 years (58% boys, average brachial/central BP: 124/67 ± 11.7/7.8 mmHg, and 105/69 ± 9.8/8.9 mmHg), attending the Liceo Donatelli High School, Terni, Italy, were evaluated. Daily sodium intake was estimated from a single fasting second-void urine by a previously-validated formula (Tanaka). Main sources of daily sodium intake were investigated by a self-administered food frequency questionnaire (Project Big-Life). Central BP was estimated by radial and brachial applanation tonometry, and calibrated to brachial MAP/DBP (Sphygmocor).

Results: 24-h estimated urinary sodium (24-hUNa) was 135 ± 30 mmol/d (3.116 g/d), and was higher in boys than in girls (139 ± 30 vs 130 ± 31 mmol/dp = 0.004). 89% of the population showed excess sodium intake according to international guidelines. 24-hUNa was directly correlated to brachial and central SBP (r = 0.14 and r = 0.15, both p < 0.01), to brachial and central PP (r = 0.19 and r = 0.24, both p < 0.01), and to central-to-peripheral PP amplification (r = –0.13, p < 0.01), but not to central-to-peripheral SBP amplification (r = –0.01, p = 0.85). In a fully-adjusted multivariate regression model, 24-hUNa (b = 0.10, p = 0.04) was independently related to central-to-peripheral PP amplification, but not to other measures of both peripheral and central BP in a factorial analysis, the main daily dietary sources of sodium were bread, biscuits, and salt added to foods (41% of the total estimated sodium intake).

Conclusions: Current salt intake is unnecessarily high in Italian adolescents. Sodium intake has a direct relationship with both central and peripheral SBP and PP, and shows an independent association with central-to-peripheral PP amplification. The adverse effects of an excess of sodium intake are more pronounced in central than in peripheral PP. Interventions aiming at reducing sodium intake may ultimately have a favorable impact on the cardiovascular health among adolescents through a reduction of central PP.

PP04.03  VALIDATION OF BLOOD PRESSURE MONITORS IN PEDIATRIC POPULATION: REVIEW OF PUBLISHED STUDIES

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Objective: The prevalence of hypertension in children and adolescents is increasing. Electronic devices are frequently used in children for ambulatory, home and office blood pressure (BP) measurement. However, electronic BP monitors that have been successfully validated in adults might not be accurate in children, and separate validation is required. A review of validation studies in young individuals was performed, aiming to identify protocol violations, divergences and adaptations.

Design and method: Published validation studies (PubMed) performed in infants, children and adolescents from 1996 till the end of 2015 using any of the established validation protocols (British Hypertension Society [BHS] protocol; US AAMI and/or International Standardization Organization [ISO]; European Society of Hypertension International Protocol [ESH-IP]) were included. All aspects of the protocols’ procedure were scrutinized using a standard checklist.

Results: 37 studies were identified (sample size 18–529 subjects). Sixteen studies (43%) used the BHS, 16 (43%) the AAMI and/or ISO and 5 (14%) the ESH-IP. The number of studies published per year were 4-52, 5-2, 5-8,3-3 for years 1996-1998-2000-2006-2009-11-12-15 respectively. 21 studies (57%) tested devices for clinical/hospital use, 11 (30%) for ambulatory and 5 (13%) for home use. 26 studies reported a ‘pass’ result for systolic and diastolic BP, 7 ‘fail’ for systolic and diastolic BP and 4 a ‘fail’ only for diastolic BP. Two studies included infant/neonatal populations, 31 studies included children and adolescents and 4 included also adults. Same-arm sequential BP measurement procedure was applied in 24 studies (65%), same-arm simultaneous measurements in 6 studies and intra-arterial method in 2 studies (3 articles did not report the method used). Fourteen studies used Korotkoff sound V to define diastolic BP; 2 studies used K4, and 2 used K4 or K5 depending on the subject (9 articles did not report the sound used).

Conclusions: The validation of BP monitors in children has specific methodological issues and challenges which are not encountered in adults. The peer review process of scientific journals often misses important deficiencies of validation studies. Few validation studies of BP monitors in children have been published and more research is needed.

PP04.04  BLOOD PRESSURE PERCENTILES BY AGE AND HEIGHT IN 15,049 PORTUGUESE CHILDREN AND ADOLESCENTS: THE AVELEIRA REGISTRY

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Objective: To present oscillometric blood pressure (BP) reference tables for Portuguese children and adolescents, and compare them with the available reference tables.
PP.04.06 ARTERIAL STIFFNESS IN ADOLESCENTS AND YOUNG ADULTS: DETERMINANTS AND ASSOCIATION WITH OTHER TARGET-ORGAN DAMAGE

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Objective: Arterial stiffness is considered one of the earliest detectable measures of vascular damage. This study examined direct (pulse wave velocity [PWV]) and indirect (pulse pressure [PP]), arterial stiffness index [AASI]) measures of arterial stiffness in terms of their association with anthropometric variables and other indices of preclinical target-organ damage in young individuals.

Design and method: Apparently healthy adolescents and young adults (age 12–26 years) referred for elevated blood pressure (BP) and healthy volunteers were subjected to: (i) 24-hour ambulatory peripheral (pPP) and central blood pressure (cBP) monitoring using a noninvasive brachial cuff-based oscillometric device (Mobil-O-Graph 24 h PWA); (ii) assessment of 24-hour ambulatory PWV monitoring using the same device; (iii) echocardiographic determination of left ventricular mass index (LVMI); (iv) measurement (ultrasoundography) of the common carotid intima-media thickness (cIMT).

Results: Data from 79 subjects were analyzed (mean age 18.5 ± 4.8 [SD] years, 61 males, body mass index [BMI] 24.5 ± 5.5 kg/m², 24 volunteers, 19 with elevated ambulatory pPP [24-hour pPP > 95th percentile for adolescents or > 130/80 mmHg for adults]). Hypertensive compared to normotensive subjects presented higher values of PWV (5.5 ± 0.4 vs. 4.9 ± 0.2 m/sec), cAASI (0.61 ± 0.23 vs. 0.44 ± 0.27), pAASI (0.57 ± 0.13 vs. 0.46 ± 0.18), cPP (41.7 ± 6.3 vs. 36.5 ± 4.7 mmHg) and pPP (58.2 ± 6.7 vs. 50.9 ± 6.8 mmHg) (all p < 0.05 after adjustment for age and gender). The main correlations of the arterial stiffness indices are shown in Table. LVMI was associated with both PWV and cPP, whereas cIMT was associated with PWV, cAASI, and both cPP and pPP.

Conclusions: These data suggest that in young individuals PWV is the best index for the evaluation of arterial stiffness, whereas the usefulness of AASI is rather questionable.

PP.04.07 AMBULATORY ARTERIAL STIFFNESS INDEX, BLOOD PRESSURE VARIABILITY, AND NOCTURNAL BLOOD PRESSURE PATTERN IN CHILDREN WITH IGA AND HENOCH-SCHÖNLEIN NEPHROPATHY

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Objective: Increased ambulatory arterial stiffness index (AASI) and pulse pressure (PP), high blood pressure variability (BPV), and disturbed circadian blood pressure rhythm by ambulatory blood pressure monitoring (ABPM) are risk factors for cardiovascular disease. Aim of the study was to evaluate blood pressure (BP), AASI, PP, BPV, and BP circadian rhythm by ABPM in children with IgA nephropathy (IgAN) and Henoch-Schönlein nephropathy (HSN).

Design and method: In 48 children (14.04 ± 3.56 years) with IgAN (n = 29) or HSN (n = 19), we evaluated 24-hour systolic and diastolic BP (24hSBP, 24dDBP), AASI, PP, SBPV, DBPV, and nocturnal BP dip by ABPM. BMT Z-score, medications, and biochemical parameters. The control group (CG) consisted of 20 healthy children (3.38 ± 4.12 years).

Results: In the study group glomerular filtration rate was 102.8 ± 29.1 mL/min/1.73m², proteinuria was present in 21, hypertension (HTN) in 22 patients. AASI was 0.37 ± 0.10 in IgAN, 0.32 ± 0.17 in HSN, and 0.24 ± 0.06 in CG; higher (P = 0.009) in IgAN and HSN vs. CG. PP was higher (P = 0.04) in IgAN vs. HSN.

PP.04.05 ACCELERATED DEVELOPMENT OF IMMUNE CELLS IN CHILDREN WITH PRIMARY HYPERTENSION

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Objective: Immune system plays a role in pathogenesis of primary hypertension (PH) and activation of immune cells is associated with subclinical hypertensive arterial injury. One of the markers of maturation of immune cells is increased number and percentage of memory cells. We hypothesized that children with PH have faster maturation of immune cells.

Design and method: The distribution of peripheral T cell subsets (CD4+ and CD8+) expressing CD45 common leukocyte antigen (CD45Ag) isoforms: CD45RA (naive cells), CD45RO (memory cells) and CD31 (peca-1, a marker of early thymic emigrants) was evaluated by three-color flow cytometry in a group of 11 PH adolescents and 16 healthy, age matched controls.

Results: Hypertensive children had higher proportion of “memory” CD8 cells (CD4/CD31+) than their healthy counterparts (17.0 range: 11.9–23.8 vs 10.9 9.1–14.1; p = 0.03), lower of CD8/CD31RA+ cells (72.3 range: 66.5–81.9 vs 81.6 77.4–84.3; p = 0.05), and lower CD8RA/CD8RO+ ratio than the controls (5.1 range: 2.7–6.9 vs 7.4 5.5–8.9; p = 0.028).

There was also negative correlation of percentage of CD4/CD31+ with both absolute and standardized values of carotid wall cross sectional area (p = 0.01, r = –0.433 p = 0.016, r = –0.410, respectively).

Conclusions: Adolescents with PH present subtle alterations in maturation of immune system manifested by: a) the decreased number of early thymic emigrants within CD4+ T cell suggesting accelerated thymic senescence, b) the increased population of more mature cells expressing “memory” markers, c) the associations with indirect indices of arterial stiffness and carotid artery remodelling and d) shift towards “memory” phenotype in T cells. Altogether these findings indicate that early stage of human primary hypertension and arterial remodelling may be related to certain defects in T cell development that result in accelerated maturation and senescence of immune system.

PP.04.08 DETERMINANTS AND ASSOCIATION WITH OTHER TARGET-ORGAN DAMAGE

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Design and method: Data were collected from 15,049 healthy Portuguese children and adolescents (27% female), mean age 13.02 ± 2.05 years (range: 5–17 years) and body mass index (BMI) 19.22 ± 3.60 kg/m². Three measures of BP and heart rate (HR) were obtained under standard conditions over the brachial artery with a clinically validated automatic sphygmomanometer (OMRON 705ST). Gender-specific percentiles for systolic (SBP) and diastolic (DBP) BP, accounting for age and height, were obtained and compared with the US reference tables (Fourth Report).

Results: Gender-specific percentile tables, accounting for age and height, were obtained for the total cohort At median height, the 95th percentiles of SBP were higher in the portuguese cohort compared to the US BP reference values for children and adolescents (Fourth Report), particularly for ages up to 16 years, with age-specific differences ranging from 1mmHg to 7mmHg in girls and from 1mmHg to 8mmHg in boys (figure 1).

The differences found in the portuguese percentiles compared to US reference values reinforce the need to adjust the reference tables to different pediatric specificities.

Figure 1. Gender-specific percentiles for systolic and diastolic blood pressure at median height.
(53.9 ± 5.5 vs. 49.2 ± 7.07 [mmHg]). No differences in BPV and nocturnal BP were found between the groups; disturbed circadian BP rhythm was found in 10 children with IgAN and 5 with HSN. In all children with IgAN/HSN, 24hDBP correlated with proteinuria (r = 0.46, p = 0.001), cholesterol (r = 0.49, p < 0.001), triglycerides (r = 0.41, p = 0.004), prednisone dose (r = 0.40, p = 0.004), BMI-Z-score with SBPV, DBPV, and PP (r = 0.35, p = 0.0, r = 0.36, p = 0.02, r = 0.36, < 0.01). In 35 children with disease duration > 1 year, AAIs correlated with BMI-Z-score (r = 0.43, p = 0.01), duration of HTN and proteinuria (r = 0.45, p = 0.009, r = 0.53, p < 0.03), mean arterial pressure (r = 0.34, p = 0.04), uric acid (r = 0.45, p = 0.01), and mean cholesterol over the disease duration (r = 0.54, p = 0.02).

Conclusions: 1. Children with IgAN and HSN have higher arterial stiffness compared to healthy peers.
2. Arterial stiffness in children with IgAN/HSN lasting for over 1 year is related to the duration of hypertension, proteinuria, BMI, uric acid, and cholesterol.
3. In children with IgAN/HSN, proteinuria and hyperlipidemia are risk factors for elevated diastolic blood pressure, while obesity is a risk factor for increased blood pressure variability and pulse pressure.

**PP.04.08**

**HIGH BLOOD PRESSURE IN BRAZILIAN ADOLESCENTS IS ASSOCIATED WITH MALE GENDER, OBESITY, LOWER BIRTH WEIGHT, AND FAMILY HISTORY OF MYOCARDIAL INFARCTION.**


**Objective:** To evaluate blood pressure (BP) by age and gender and its association with other cardiovascular risk factors and birth weight in schoolchildren 10 to 15 years old of public schools in Rio de Janeiro.

**Design and method:** A cross-sectional study of a population sample of 1722 students was evaluated at their schools, 742 (43.1%) males (M), and 980 (56.9%) females (F). Population distribution by age and gender was: 10 yo (n = 108, 49 M/59 F), 11 yo (n = 242, 106 M 136 F), 12 yo (n = 368, 169 M/199 F), 13 yo (n = 397, 161 M/236 F), 14 yo (n = 346, 153 M/193 F), 15 yo (n = 261, 104 M/157 F). BP was measured three times by oscilometric method; height, weight, abdominal circumference and family history of O/O. O/O was defined when body mass index (BMI) > = p85 for age and gender, male gender (OR 1.677, 95% CI 1.098–2.467, p < 0.02) were significantly associated with O/O.

**Conclusions:** In Brazilian adolescents 10–15yo, high prevalence of obesity was observed, especially in young boys, and aggregates higher blood pressure and birth weight. O/O was negatively associated with age and positively associated to abdominal circumference and family history of O/O.

**PP.04.10**

**SEGMENT-SPECIFIC ASSOCIATIONS OF CAROTID INTIMA-MEDIA THICKNESS IN ADOLESCENTS AND YOUNG ADULTS.**

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**Objective:** Carotid wall intima-media thickness (IMT) has been recognized as a surrogate measure of atherosclerosis. This study investigated the associations between cardiovascular risk factors and carotid IMT at three different segments of the carotid artery in young individuals.

**Design and method:** Apparently healthy adolescents and young adults (age 12–26 years) referred for elevated blood pressure and healthy volunteers were subjected to: (i) 24-hour ambulatory blood pressure (ABP) monitoring, (ii) assessment of blood lipid and glucose profile, and (iii) IMT measurement (high resolution B-mode ultrasonography) at the level of common carotid, bulb and internal carotid bilaterally.

**Results:** Data from 79 subjects were analyzed (mean age 18.5 ± 4.8 [SD] years, 61 males, body mass index [BMI] > = 15.5 kg/m². 24-h ABP was measured three times by oscilometric method: height, weight, abdominal circumference (AC), and information about physical activity, sedentary leisure time, smoking, family history (FH), and birth weight were obtained. O/O was defined when body mass index (BMI) > = p85 for age and gender, male gender (OR 1.677, 95% CI 1.098–2.467, p < 0.02) were significantly associated with O/O.

**Conclusions:** In Brazilian adolescents 10–15yo, high prevalence of obesity was observed, especially in young boys, and aggregates higher blood pressure and birth weight. O/O was negatively associated with age and positively associated to abdominal circumference and family history of O/O.
REGULATORY T CELLS AND CELLS PRODUCING CYTOKINES IN CHILDREN WITH PRIMARY HYPERTENSION

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**Objective:** The aim of the study was to evaluate the percentage of regulatory T cells (Tregs) and cells producing cytokines (IL-17, IFN-gamma and TNF-alpha) in children with primary hypertension (PH).

**Design and method:** The peripheral whole blood samples were obtained from PH patients and normotensive, healthy children. T-cell subtypes were defined by the combinations of cell surface markers and antibodies against intracellular cytokines they secrete (IL-17, IFN-gamma, TNF-alpha). For enumeration of Tregs (CD4+/CD25+/CD127-) and cytokines-producing cells conjugated monoclonal antibodies were used in direct method. Leukocyte adiponectin receptor expression (AdipoR1) was determined using direct and indirect three-color flow cytometry. After having compared immunological parameters between children with PH and normotensive ones, patients were divided into two groups, based on the AdipoR1 expression: patients exhibiting high expression [AdipoR1(+)]) and children with a low expression [AdipoR1(–)] of the test marker on leukocytes.

**Results:** Children with PH had greater percentage of Tregs (8.33 ± 1.84 vs. 7.45 ± 1.77) and cells producing proinflammatory cytokines (IL-17+: 3.51 ± 1.75 vs. 1.57 ± 0.84; IFN-gamma+: 3.68 ± 1.66 vs. 2.28 ± 1.16; p < 0.05). AdipoR1(–) PH patients showed greater percentage of Tregs (9.45 ± 1.81) than AdipoR1(+) PH patients (7.35 ± 1.22) and normotensive ones (7.45 ± 1.77) (p < 0.001). The percentage of Tregs did not differ between the AdipoR1(+) group and the control group (p = 0.8). The highest proportion of proinflammatory cells was found in AdipoR1(–) group (IL-17+: 4.76 ± 1.77, IFN-gamma+: 4.25 ± 2.06) versus AdipoR1(+) group (IL-17+: 2.47 ± 0.81, IFN-gamma+: 3.20 ± 1.24) of PH patients (in all cases p < 0.001). The percentage of cells producing TNF-alpha was significantly higher in both groups of patients (3.07 ± 0.94 and 3.78 ± 2.28) compared to the control (2.29 ± 1.16; p < 0.05).

**Conclusions:** Our results indicate that children with PH have greater percentage of Tregs and cells producing cytokines than normotensive ones. We also observed that decreased AdipoR1 expression may limit leukocyte responsiveness to adiponectin. This in turn may increase synthesis of proinflammatory cytokines IL-17 and IFN-gamma. These observations are an argument for the significance of adipose tissue and adipokines in the regulation of inflammatory responses in hypertensive children. T-regulatory cells can limit inflammatory response and therefore prevent tissue damage (in this case arteriolar walls, which leads to hypertension) as was previously described.

INFANT PATIENT WITH SEVERE HYPERTENSION DUE TO AORTIC COARCTATION

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**Objective:** Coarctation of the aorta is defined as a circular narrowing, generally located at the level of the aortic isthmus, just beyond the origin of the left subclavian artery. The diagnostic and description of the coarctation itself remains difficult despite signs on clinical examination. Thus the systematic Doppler ultrasonography analysis of the aorta at the level of the isthmus, successfully attempts to reduce these difficulties.

**Design and method:** We report the case of a male infant aged 45 days, referred to our echocardiographic laboratory with the diagnosis of malignant hypertension: he was admitted three days ago in the emergency room for a high blood pressure of 160/100 mmHg and convulsions. Pulse amplitude over the left femoral artery was reduced. Intravenous infusion of Nicardipine 2 mg/kg/24 hours followed by 7.2 mg/24 hours was performed. His heart sound auscultation was normal. His X-ray chest shows a moderate left ventricular hypertrophy.

**Results:** Continuous wave CW Doppler records a negative continuous wave tracing in the descending aorta with a maximal velocity of 268 cm/s in systole corresponding to a peak pressure gradient of 29 mmHg across the coarctation.

**Conclusions:** Continuous wave and color Doppler makes non invasive assessment of aortic coarctation possible and in addition to the clinic, is a way to follow the evolution of the coarctation without previous cardiac catheterization in case of an aggravation.
POSTER SESSION

POSTERS’ SESSION PS05: DIABETES

PP05.01

THE EFFECT OF A SIDE-TO-SIDE JEJUNOILEAL ANASTOMOSIS ON GLYCEMIC CONTROL: EXPERIMENTAL STUDY IN A NON-OBSESE DIABETIC RAT MODEL

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Objective: Bariatric procedures, such as the gastric bypass and the bilipancreatic diversion, have evidenced to induce long term remission of type 2 diabetes mellitus (T2DM) in morbidly obese patients. In recent years, new procedures are developed. We have previously published a novel food-diverting operation, sleeve gastrectomy plus side-to-side jejunоileal anastomosis (SJA). The positive results obtained from this procedure in reducing the excess weight, but most importantly in controlling the co-morbid conditions particularly T2DM in morbidly obese patients, led us to study the feasibility of SJA without sleeve gastrectomy to control T2DM, in non-obese diabetic Goto-Kakizaki (GK) rats.

Design and method: Seventeen 14-week-old male GK rats were divided into 3 groups: SJA bypassing 60% of the small bowel length, sham-operated jejunоileal bypass (Sham group) and control animals. Rats were observed for 10 weeks after surgery. The fasting blood glucose (FBG), serum cholesterol and triglycerides levels were measured and oral glucose tolerance test (OGTT), were performed.

Results: Animals in SJA group experienced significant loss of weight from the first and up to 4 weeks after the operation (% Total Weight Loss 7.2%). The weight of the rats in this group was stabilized thereafter, but remained reduced comparing with the pre-operative values (p < 0.001). There was no significant weight loss in the 2 other groups. Compared with sham-operated rats and controls, the fasting glucose levels were significantly lower in the SJA group from the 1st postoperative week and continued to be within normal range up to the 10th week. Prior to the procedures, no difference in OGTT was found among all groups. However, all rats in SJA group showed a significant improvement in OGTT, compared with sham-operated and control groups, at 3 and 8 weeks postoperatively. Serum cholesterol and triglycerides levels had no difference prior to surgery among all experimental groups. No significant differences in those parameters were observed following SJA or Sham procedures.

Conclusions: A simple SJA, diverting the food and bilipancreatic secretion to the distal small bowel, was able to normalize both FBG levels and OGTT in a non-obese diabetic rat model.

PP05.02

SERUM THROMBOSPONDIN-2 IS STRONGLY ASSOCIATED WITH INSULIN RESISTANCE IN A GENERAL POPULATION

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Objective: Serum thrombospondin (TSP)-2 is a glycoprotein expressed in extracellular matrix increasing during tissue remodeling. Recent studies have shown that TSP-2 is useful as a prognostic factor of patients with heart failure and associated with cardiovascular death. However, the clinical importance of serum TSP-2 in healthy subjects is still unknown. We examined the relations between TSP-2 and coronary risk factors.

Design and method: A periodical epidemiological survey was performed in a community dwelling in Uuku town, Nagasaki, Japan. A total of 445 residents received a health check-up examination including blood tests such as fasting serum levels of TSP-2. Insulin resistance was evaluated using HOMA-IR. All statistical analyses were performed using SAS system.

Results: The mean age was 67 ± 9.4 years old. There are no significant differences between the ages and sexes and serum TSP-2 level (mean: 20.9 ± 8.5 ng/ml). We performed uni and multivariate analyses. Serum TSP-2 levels were significantly correlated to plasma glucose (p < 0.001), insulin (p < 0.001), HOMA-IR (p < 0.001), eGFR (p < 0.01, inversely), high sensitive CRP (p < 0.01) and NT-proBNP (p < 0.001). Moreover, in multiple stepwise linear regression analysis, TSP-2 levels were independently and significantly associated with HOMA-IR (p < 0.001), high sensitive CRP (p < 0.05), and NT-proBNP (p < 0.001).

Conclusions: To the best of our knowledge, this is the first report to examine the significant relationship between TSP-2 and insulin resistance even in healthy subjects.

PP05.03

GLYCATED PROTEINS ARE NOT OPTIMAL DIAGNOSTIC MARKERS OF ORAL GLUCOSE TOLERANCE TEST DEFINED ABNORMAL GLUCOSE TOLERANCE IN MIXED-ANCESTRY SOUTH AFRICANS

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Objective: The cumbersome oral glucose tolerance test (OGTT) remains the reference standard to diagnose dysglycaemia, while the performance of alternative methods based on glycated proteins in African populations is unknown. We assessed the ability of fasting blood glucose (FBG), HbA1c and fructosamine, singly or in combination to diagnose OGTT-based abnormal glucose tolerance in mixed-ancestry South Africans.

Design and method: Participants were selected from the Bellville-South community in Cape Town. HbA1c, fructosamine, FBG and 2-hour post-OGTT glucose were measured. OGTT values were used to classify participants based on the World Health Organisation 1999 criteria. Robust correlations and segmented regression were used to assess the association between indices of glucose homeostasis, and their ability to detect abnormal glucose tolerance assessed using area under the curve (AUC) analysis.

Results: Of the 840 participants, 113 (13.5%) had known diabetes, 61 (7.3%) had screen-detected diabetes, 137 (16.3%) had prediabetes and 527 (62.9%) had normal glucose tolerance. Correlations of FBG and 2-hour glucose with HbA1c were stronger than those with fructosamine, and significant breakpoints were apparent in the relationship among these markers (Figure 1). The highest AUC for the prediction of any category of abnormal glucose tolerance was recorded with 2-hour glucose and the lowest with fructosamine. For screen-detected diabetes AUCs were 0.996 (95% CI: 0.991–1.000) for 2-h glucose, 0.918 (0.887–0.960)
for FBG, 0.897 (0.841–0.954) for HbA1c and 0.864 (0.811–0.917) for fructosamine (all p < 0.001 for comparison with 2-h glucose). At both optimal and published cut-offs, no combination of FBG, HbA1c and fructosamine did better than 2-hour glucose alone, while FBG alone had substantial advantages over HbA1c and fructosamine on a range of performance measures. At optimal threshold, 2-h glucose correctly diagnosed 97% of screen-detected diabetes. Equivalents figures were 81% for FBG and HbA1c, and 73% for fructosamine. Accompanying accuracy was 98.7%, 91.8%, 85.9% and 83.3%.

Conclusions: Abnormal glucose tolerance in this population is overwhelmingly expressed through abnormalities of 2-hour glucose. No combination of FBG, HbA1c and fructosamine was effective at accurately discriminating participants with OGTT-defined abnormal glucose tolerance. Non-glucose based strategies are unreliable alternatives to OGTT for dysglycaemia diagnosis in this population.

**PP.05.06 IN DIABETIC PORTUGUESE HYPERTENSIVE PATIENTS LOWERING NIGHT SYSTOLIC BLOOD PRESSURE IS ASSOCIATED WITH LESS CARDIOVASCULAR EVENTS IN A PORTUGUESE SAMPLE OF TREATED HYPERTENSIVE PATIENTS FOLLOWED FOR 11.8 ± 5.1 YEARS**

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Objective: It's still uncertain if there is a limit to the reduction of systolic blood pressure in diabetic hypertensive patients. However it is well known that night systolic blood pressure (SBP) values are the most predictive of events.

Design and method: Casual and ABP were obtained in 1200 hypertensive patients of witch 219 where diabetics (115 females, 52.5%) BMI 29.8 ± 4.8 followed by 11.8 ± 5.1 years. Of most of all we have the antoprromeures, lab data and echocardiographic data.

Results: There were 85 events (47 strokes, 25 coronary events and 13 other cardiovascular – CV- events). During 21.2 years of follow-up (11.8 ± 5.1 years) there were 41 deaths 13 of which were CV. When we compare diabetes with events versus without events those with events were older, had higher 24 h, nighttime pulse pressure (PP) higher ambulatory arterial stiffness index and lower 24 h and nighttime heart rate. In a Kaplan Meier survival curves free of events those who have higher ventricular cardiac mass had the worst prognosis (log rank 7.6 p < 0.01). When the sample was analyzed by terciles of creatinine the higher the tertile the worst the survival curves (log rank 6.2 p < 0.05). When we analyzed the survival curves of Kaplan Meier free of events in order the night SBP quintils, the higher the quintil the worst survival curve (log rank 10.8 p < 0.05).

Conclusions: In our diabetic population it seems that there is no J curve for the limit of achievement of blood pressure level if we analyzed this achievement in the night period where there is less behaviour physical and psychological interference.
Conclusions: In this study, DRI and ARB equally reduce albuminuria in hypertensive patients with type 2 diabetes. In patients with type 2 diabetes, even in the normo-albuminuric range, renin-angiotensin blockers can reduce urinary albumin excretion. These results indicated that to prevent the progression of diabetic nephropathy, treatment with RAAS inhibitors (DRI or ARB) should be started in the high-normal (10 to < 30 mg/g) albuminuric stage.

**PP.05.08 CHEMERIN IS INDEPENDENTLY ASSOCIATED WITH ALBUMINURIA AFTER ADJUSTING THE BLOOD PRESSURE IN TYPE 2 DIABETIC PATIENTS**

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Objective: Chemerin may play an important role in the pathogenesis of obesity and insulin resistance. Moreover, chemerin levels show a significant correlation with blood pressure. Recently, chemerin levels were found to be significantly associated with renal dysfunction in type 2 diabetic patients. However, the relationship between chemerin and albuminuria is unidentified yet. We aim to determine whether serum chemerin levels are associated with albuminuria in type 2 diabetic patients.

Design and method: One hundred two newly diagnosed type 2 diabetic patients were included. Blood pressure, body mass index (BMI), waist circumference (WC), serum concentration of chemerin, glucose, insulin, lipid profile, urine albumin excretion (UAE), glomerular filtration rate (GFR) and hsCRP were measured. Serum chemerin levels were measured by enzyme-linked immunosorbent assay.

Results: Serum chemerin level had significant relationship with BMI (r = 0.343, p < 0.001), WC (r = 0.36, p = 0.001), insulin (r = 0.452, p = 0.000), triglyceride (r = 0.295, p = 0.003), HDL-cholesterol (r = -0.318, p = 0.002), hsCRP (log-transformed, r = 0.263, p = 0.037) and UAE (log-transformed, r = 0.275, p = 0.007). Moreover, after adjustment for blood pressure and glucose, multiple regression analysis showed that serum chemerin was significantly associated with UAE (b = 0.256, p = 0.011).

Conclusions: Serum chemerin is an independent risk factor associated with albuminuria after adjusting the blood pressure in type 2 diabetic patients.

**PP.05.09 BLOOD PRESSURE CONTROL AMONG HYPERTENSIVE DIABETIC AND NON-DIABETIC IN A COHORT STUDY**


Objective: To analyse the control of blood pressure among hypertensive patients with and without diabetes type 2, followed by eleven years in reference center.

Design and method: A retrospective cohort study of hypertensive patients undergoing regular treatment. Diabetes mellitus was considered the exposure factor. The first assessment of the cohort was in 2004, intermediate follow-up in 2009 and the last in 2015; variables studied: gender, race, age, blood pressure, body mass index (BMI), and duration of treatment in specialized service. For blood pressure control among non diabetics values of < 140/90 mmHg were considered and for diabetics values of < 130/ 80 mmHg (strict goals) and < 140/90 mmHg (overall goal) were considered. For the analysis of variables association was used chi-square test or Fisher exact test, with 5% significance level.

Results: Included 139 hypertensive patients (diabetics: 55; non-diabetic: 84), with a mean time of hypertension treatment at the first assessment of 5.8 years. Most patients were females (75.5%) and the white race was predominant (55.8%). The average initial age of the cohort was 57.4 years (± 9.3). Hypertensive diabetics had lower control rates (23.6%/ 27.3%/ 29.1%) in all three periods compared to non diabetic patients (57.1%/ 67.9%/ 69.0%), considering the strict goals (p = 0.001). But when used similar goals (< 140/90) the difference among the groups disappeared (p > 0.05), with control rates of 47.3%/ 61.8%/ 60.0% in the respective periods of the exposed group. The average systolic blood pressure (SBP) remained similar between the groups over the follow-up (p > 0.05) and diastolic blood pressure (DBP) decreased significantly between the first and last segments in both groups (> 11 mmHg). The lack of blood pressure control was mainly associated with systolic blood pressure, and no association with any other variable analyzed.

Conclusions: The presence of diabetes mellitus reflected in worse rates of blood pressure control when considered stricter targets for the control and this difference disappears with similar goals, regardless the the presence of diabetes.

**PP.05.10 COMPARISON OF PULSE WAVE ANALYSIS PARAMETERS IN HYPERTENSIVE DIABETIC AND NON-DIABETIC PATIENTS IN A BRAZILIAN AMBULATORY CARE**


Objective: To evaluate and compare pulse wave analysis parameters in diabetic and non-diabetic hypertensive patients.

Design and method: 98 hypertensive or hypertension suspected patients seen in the academic hypertension ambulatory from the Federal University of Triângulo Mineiro (UFTM), Brazil, between January and December 2015 had their pulse wave analysis assessed by oscilometry - Mobil-O-Graphâ® PWA - EMI GmbH (Stolberg, Germany). Four consecutive measurements were taken every two minutes according to general recommendations for clinical studies of Clinical Applications of Arterial Stiffness, Task Force III: Recommendations for User Procedures (AHJ 2002; 15: 445–452). All patients answered questions about personal and clinical data (medication use, cardiovascular risk factors, personal and family history of cardiovascular disease). The comparison between groups was performed using chi-square test and T Student test.

Results: Data from 98 patients was analyzed. The results are shown in Table 1. Of the 98 patients 33 were diabetic and 65 non-diabetic. The average age was 58.4 years and the average Body Mass Index (BMI) was 31.3 kg/m2. 84 patients (85.7%) were on anti-hypertensive medication. The mean systolic and diastolic central blood pressure was significantly higher in the group of diabetic patients in comparison with the group of non-diabetics (p = 0.0009 and 0.004 respectively). The mean peripheral systolic blood pressure and pulse pressure were also significantly higher in the diabetic group (p = 0.0004 and 0.004 respectively). The average pulse wave velocity (PWV) in the diabetic group was 9.5 (SD: 1.7) whereas in the group of non-diabetic patients was 8.6 (SD: 2.2) with a p value of 0.04. There was no statistical difference between the average augmentation pressure or augmentation index.
DIABETES MELLITUS AND OBESITY IN THE FRENCH CARIBBEAN: A SPECIAL VULNERABILITY FOR WOMEN?

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Objective: In the Caribbean, both women and men have a high rate of early cardiovascular-linked mortality. Our objective was to analyze the characteristics of diabetes mellitus and its management in an adult population sample from the French Caribbean.

Design and method: A multicenter cross-sectional study was conducted in Guadeloupe between July and December 2014, including all patients aged 18–74 receiving a systematic periodic health examination funded by social security. Sociodemographic, medical, anthropometric and biological data collection was standardized. Diabetes was defined by an antidiabetic treatment or fasting glucose ≥ 7 mmol/l and HbA1c ≥ 6.5%, and diabetes control was defined as HbA1c < 7%. Multilevel logistic regression was used to analyze the factors linked to diabetes.

Results: 2252 participants were included (56.5% women). Diabetes prevalence was 8.2% for women versus 5% for men (p = 0.003). The proportion of women with diabetes aware of their condition was 84.5%, versus 67.4% in men (p = 0.016). Nearly all the diagnosed participants were being treated. In both sexes, diabetes control was obtained in less than a third of participants. 55.3% of women had a waist circumference equal to or above the NCEP thresholds, versus 14% of men (p < 0.001). In multivariate analysis, the OR of diabetes linked to female sex approached 1 when abdominal adiposity was taken into account in the model.

Conclusions: In this French Caribbean population, obesity and diabetes mellitus greatly affected women. In spite of a good diabetes detection rate, diabetes was rarely controlled. A comprehensive women’s health policy going beyond universal health coverage should be designed.

AZILSARTAN MEDOXOMIL PROPORTIONALLY DECREASES CENTRAL AND BRACHIAL 24-H AMBULATORY BLOOD PRESSURE IN DIABETIC PATIENTS WITH DIFFICULT-TO-CONTROL ARTERIAL HYPERTENSION

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Objective: Objective: Ambulatory monitoring of central blood pressure (BP) and arterial stiffness 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 and AIX after azilsartan medoxomil (AM) 40 mg adjunction to treatment regimen in hypertensive type 2 diabetic patients.

Design and method: Method: AM 40 mg was given as substitution drug to ACEi to 20 hypertensive patients (8 male, age 58 ± 10 years) with clinical BP ≥ 140/90 mmHg, 24-h BP > 130/80 mmHg and/or daytime BP=135/85 mmHg previously treated with an ACEi and a second drug from another class. ABPM was done with BPLab VASOTENS (OOO Petr Telegin, Nizhny Novgorod, Russia). Brachial and aortic BP changes as well as changes in 24-h, day- and nighttime AIXs were evaluated. p < 0.05 was considered significant.

Results: Results: Significant (p < 0.05 vs baseline) decrease in 24-h, day- and nighttime BP after 4 weeks of Azilsartani medoxomil adjuvination was observed: for brachial SBP respectively, from 150-10 to 134+8, from 150+10 to 134+10, from 148+15 to 132+12 mmHg, for brachial pulse pressure (PP) from 54+10 to 48+9, from 54+8 to 46+8, from 56+10 to 48+7 mmHg. For aortic SBP corresponding changes were from 139+10 to 126+8, from 140+10 to 126+8, from 138+12 to 128+10 mmHg, for aortic PP, respectively, 46+6 to 38+5, from 44+6 to 36+8, from 46+7 to 38+6 mmHg. AIX/H75 bpm decreased at daytime from 28+3/12 to 21+7/10,1%, at night-time from 32+2/10 to 26+9%. Increase in PP amplification was observed also and was more evident in nighttime: baseline difference between brachial and aortic PP was 10,0 ± 3,2 for daytime, 10,0 ± 3,2 mmHg for nighttime, after azilsartan medoxomil treatment 10,7 ± 2,6 and 10,2 ± 2,8 mmHg, respectively (p < 0.05).

Conclusions: Conclusions: Azilsartan medoxomil decreases significantly either brachial or aortic SBP and PP, as well decreases aortic PP augmentation. In hypertensive diabetic patient PP amplification was similar at day- and nighttime before and after treatment meaning proportional decrease of brachial and central SBP and PP.

PREVALENCE OF HYPERKALEMIA IN MATCHED DIABETIC AND NON-DIABETIC PATIENTS WITH CHRONIC KIDNEY DISEASE: A NESTED CASE-CONTROL STUDY

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Objective: Hyperkalemia is a frequent and potentially life-threatening electrolyte disorder, usually complicating chronic kidney disease (CKD) patients. Factors superimposed to reduced renal function are further elevating the risk for hyperkalemia development, but their contribution is not fully elucidated in relevant literature. This study aimed to compare the prevalence of hyperkalemia in matched diabetic and non-diabetic patients with CKD and to evaluate factors associated with hyperkalemia occurrence.

Design and method: This is a nested case-control study from a cohort of patients followed up at our outpatient clinic. A total of 180 type-2 diabetic and 180 non-diabetic patients with CKD matched for gender, age and eGFR, were included. Patients with type-1 diabetes or end-stage renal disease were excluded. Prevalence of hyperkalemia was defined as serum potassium > 5 mEq/L and/or use of sodium polystyrene sulfonate, and further by serum potassium levels ≥ 5 and greater or equal to 5.2 and 5.5 mEq/L. Prevalence was compared between the mean value of the annual number of glucose value in the blood (r = 0.251; p < 0.05), and the standard deviation of annual measured values of glucose (r = 0.197; p < 0.05). A change in the IMT correlated with the standard deviation of SBP (r = 0.17; p < 0.05) and DM at the beginning of our tracking (r = 0.179; p < 0.05). Basal values of lipid parameters and their changes in the course of monitoring was not correlated to the change in IMV and IMT.

Conclusions: Our results suggest that a regression of LVM and IMT depend on good and constant regulation of BP and the presence and regulation of diabetes mellitus.
two study groups in total population and in CKD Stages separately. Univariate and multivariate logistic regression analysis were conducted to identify factors associated with hyperkalemia occurrence.

**Results:** The prevalence of hyperkalemia was higher in diabetic CKD patients (27.2% vs 20%, *p = 0.107*) and remained around 30% higher with all secondary definitions used, but never reached statistical significance. In Stage 2 no difference was noted (8.7% vs 17.4%, *p = 0.665*), in Stage 3 prevalence was significantly higher in diabetics (28.6% vs 17.5%, *p = 0.036*) and in Stage 4 equally high in both groups (35.5% vs 32.3%, *p = 0.788*). In multivariate analysis, Stage 4 CKD (OR: 4.535, 95% CI: 1.561–13.173), use of angiotensin-converting enzyme inhibitors (OR: 2.228, 95% CI: 1.254–3.958), and smoking (OR: 2.254, 95% CI: 1.218–4.171) were independently associated with hyperkalemia.

**Conclusions:** Diabetes mellitus is elevating the prevalence of hyperkalemia only in CKD Stage 3 patients (moderately impaired renal function) and this difference is attenuating in CKD Stage 4. Advanced CKD at Stage 4 and ADEEs are major determinants of hyperkalemia occurrence. As the vast majority of patients with CKD belong to Stage 3, the presence of diabetes must be appreciated regarding hyperkalemia risk and relevant therapeutic decisions.

**PP05.15 IMPACT OF EICOSAPENTAENOIC ACID/ ARACHIDONIC ACID RATIO ON DIASTOLIC BLOOD PRESSURE IN PATIENTS WITH TYPE 2 DIABETES**

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**Objective:** N-3 polyunsaturated fatty acids included eicosapentaenoic acid (EPA) had various physiological function such as plaque stabilization, antiarrhythmic effect, blood pressure lowering effect, anti-inflammatoryary effect, and anti-atherosclerotic effect. Recently, EPA/arachidonic acid (AA) ratio is attracting attention. Higher EPA/AA ratio is more reduced cardiovascular events, but that mechanism is not clear. In this study, we investigate the relationship between EPA/AA ratio and blood pressure in patients with type 2 diabetes.

**Design and method:** The subjects were 64 type 2 diabetic patients without anti-hypertensive medication (male 47, age 47 ± 13 years(mean ± SD)). The serum levels of EPA, AA, and lipid profile were measured with fasting blood samples in the morning. Blood pressure in systole (BPs) and diastole (BPD) was measured after lying position 10 minutes rest, to obtain a mean value of three measurements. Intima-media thickness (IMT) was measured three times at the site of greatest thickness, as well as 1 cm proximal and 1 cm distal to this site by carotid echography. The three value obtained at each measurement point were averaged. We study relations between blood pressure and EPA/AA ratio, lipids profiles, HbA1c, IMT and clinical characteristics.

**Results:** Patients with type 2 diabetes had the mean BMI 23.6 ± 4.5 kg/m2, HbA1c 8.1 ± 2.0 %, BPs 132 ± 16, and BPD 72 ± 11 mmHg. The mean value of EPA was 66.5 ± 41.6 mg/mL, AA 184.9 ± 57.8 mg/mL, and EPA/AA ratio 0.39 ± 0.25. BPD was negatively correlated with EPA/AA ratio (p < 0.05) and significantly higher in male than female (0.4 ± 0.28 vs 0.35 ± 0.14, respectively). There was positive tendency of relationship between BPD and BMI (p = 0.067). There was not significant relationship between BPs and EPA/AA ratio nor lipid profiles. Multiple linear regression analysis showed that elevated EPA/AA ratio was an independent risk factor for decreased BPD, adjusted by sex and BMI (p = 0.01). When analyzing by gender, EPA/AA ratio was also an independent risk factor for BPD in men (p < 0.05).

**Conclusions:** It suggests that higher EPA/AA ratio may affects BPD lowering in patients with type 2 diabetes. Further investigation are required to assess of relationship between EPA/AA ratio and BP.

**PP05.16 BASAL GLYCAEMIA AND GLYCOSILATED HEMOGLOBINE AS A PREDICTORS OF TYPE 2 DIABETES MELLITUS DEVELOPMENT**

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**Objective:** The diagnosis of type 2 diabetes mellitus (T2DM) is based either on the plasmatic glycaemia or on HbA1c criteria. Our purpose was to compare the prognostic value of both determinations to identify subjects at increased risk of developing T2DM.

**Design and method:** Observational, longitudinal study of a cohort of patients with an increased risk of T2DM, based on the presence of one of the following criteria: essential hypertension, obesity (BMI > 30 kg/m2) or a 1st degree relative with T2DM. Routine analysis, including HbA1c and fasting plasma glucose, were obtained at baseline and subsequently every six months. The diagnosis of T2DM was established according to standard criteria.

**Results:** 206 patients were included. Basal clinical characteristics are showed at table 1. During 17.5 months of mean follow-up 18 patients eventually developed T2DM (58.25 cases /1000 patients/year). In a Cox survival analysis, adjusted for the main clinical and analytical variables, only basal glycaemia and HbA1c resulted as independent predictors of T2DM development (table 2).

**PP05.17 DIABETIC HYPERTENSION AND QUALITY OF LIFE**

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**Objective:** Mounting evidence suggests that essential hypertension (EH) has a negative impact on health-related quality of life (HrQoL). Diabetes mellitus type II (DM-II) is associated with marked acceleration of vascular aging. We assessed the hypothesis that the combination of EH with DM-II could have an additive detrimental effect on HrQoL.

**Design and method:** We examined 145 subjects with newly diagnosed, untreated uncomplicated stage I-II EH (aged = 56 ± 16 years, DM-II = 37, office blood pressure = 156/92 mmHg). The validated Greek version of the Short Form 36 (SF-36) General Health Survey questionnaire was administered to all participants. The SF-36 is a generic H-rQoL instrument that includes eight subscales: physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role and mental health. The subscales were further grouped into two
Objective: To investigate the effects of SGLT2 inhibitors on blood pressure, baPWV, carotid arterial IMT and elastic modulus in type 2 diabetic patients with obesity.

Design and method: The thirty-one patients with diabetes mellitus and obesity (average age: 53 years old, BMI31 kg/m2) were treated with SGLT2 inhibitors (one of the following drugs: Ipragliflozin, Dapagliflozin, Luseogliflozin, Tofogliflozin, Canagliflozin, Empagliflozin) for 12 months. Serum markers, office and central blood pressures and brachial-ankle pulse wave velocity (baPWV) were examined. The intima-media thickness (IMT) and elastic modulus in the circumferential direction (Eq) were simultaneously measured by the high-resolution Doppler technique, “Phased Tracking Method”.

Results: The basal values of fasting blood sugar (FPG), HbA1c, body weight, TG, HDL-C, LDL-C, AST, ALT, g-GTP, uric acid (UA), eGFR, office blood pressure (BP), pulse pressure, baPWV, central SBP (cSBP), IMT, E q were the followings: 126 ± 30 mg/dL, 7.6 ± 1.5%, 87.9 ± 18.5 kg, 153 ± 39 mg/dL, 46 ± 10 mg/dL, 105 ± 31 mg/dL, 41 ± 34IU, 45 ± 28IU, 49 ± 40IU, 6.0 ± 1.0 mg/dL, 79.0 ± 20.8 ml/min./1.73m2, 131 ± 15.79 mmHg, 52 ± 10mmHg, 1618 ± 285 cm/sec, 136 ± 14mmHg, 1.34 ± 0.48 mm, 318 ± 89Pa. After 12 months of administration of SGLT2 inhibitors, FPG (~12%), HbA1c (~8%) and weight (~2%) decreased significantly (p < 0.05). As for liver function, AST (~33%), ALT (~29%) and g-GTP (~18%) also decreased significantly. No significant changes were seen in TG, HDL-C and eGFR. The drugs also decreased LDL-C (~10%), UA (~19%), office BP (~6%–6%), cSBP (~8%), baPWV (~8%), IMT (~9%) and E q (~23%) significantly. The histogram analysis of the E q data revealed both of the drugs decreased harder components of the elasticity distribution, suggesting improvement of endothelial dysfunction.

Conclusions: Our results indicate that SGLT2 inhibitors may have effects on blood pressure, IMT and E q and baPWV to improve the distortion in the intramural elasticity distribution in arteries in type 2 diabetic patients with obesity. The measurement of the carotid elastic modulus may be useful to evaluate the efficacy of drugs for improving regional atherosclerotic changes.

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PP.05.20 BLOOD PRESSURE PHENOTYPES IN PATIENTS WITH TYPE 1 DIABETES MELLITUS

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Objective: We aimed to study blood pressure (BP) phenotypes in patients with type 1 diabetes mellitus (DM).

Materials and methods: Twenty-four patients with type 1 DM (12 (50%) male), age 26.8 +/- 7.7 years; were examined.

Design and method: Office BP was evaluated by repeated measurements in the seated position, at the same time point during 5 consecutive days. 24-hour ambulatory BP monitoring (ABPM) was performed using the conventional method. BP level and phenotype were classified in accordance with European Society of Hypertension 2013 guidelines.

Results: Optimal office BP was registered in 16.7%, normal — in 51.4%, high normal — in 16.6%, stable hypertension — in 16.7% of patients. Among patients with stable elevation of office BP the incidence of isolated systolic hypertension (ISH) was detected in one patient, combined systolic and diastolic hypertension — was found in two patients, isolated diastolic hypertension (IDH) — was detected in one patient. On comparison between office BP levels and ABPM results, true hypertension was diagnosed in 16.7%, masked in 8.3% of cases. Associated LV hypertrophy and decrease in GFR (44 ml/min, MDRD equation) were also observed in the patient with IDH.

Conclusions: In conclusion, true hypertension, represented mostly by combined systolic and diastolic type, is the predominant BP phenotype in patients with type 1 DM. Our data indicate that 24-hour BP monitoring plays the critical role in determination of BP phenotypes in patients with type 1 DM and normal or high normal office BP. Abnormal office BP was observed in 16.7% of patients with type 1 DM. Arterial hypertension was confirmed by ABPM in 50% of patients with stable office BP elevation.

PP.05.21 THYROID STIMULATING HORMONE LEVELS AT THE UPPER REFERENCE RANGE IN DIABETIC PATIENTS WITHOUT KNOWN DYSTHYROIDIES

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Objective: The study of the effect of decreasing the upper limit of reference range of TSH levels in diabetic patients without known dysthyroidies on the prevalence of diabetic complications.

Design and method: Data were collected in diabetic out-patients without known dysthyroidies in whome TSH levels were greater than 0.4mIU/L. TSH levels at...
the upper reference range (URR) were defined between 2.5 and 4 mIU/L. All statistical analyses were conducted with SPSS software. P < 0.05 was considered significant.

Results: Normal TSH values were observed in 76 diabetic patients, in whom 25 have TSH at URR. Subclinical hypothyroidism was noted in 18 patients. When TSH levels were at URR, we observed intermediate frequencies in hyperlipidemia, retinopathy, and nephropathy. Binary logistic regression analysis showed significant association between TSH levels compared to 2.5 mIU/L and hyperlipidemia*retinopathy interaction.

Conclusions: An independent association seemed to be present between TSH levels greater than 2.5mIU/L and diabetic complications. A systematic thyroid function tests, with a lowered upper limit of reference range, would be discussed in the management of diabetic patients.
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Objective: Uncontrolled hypertension is a well-known risk factor for stroke, heart failure, and ischemic heart disease. Specifically, patients with treatment-resistant hypertension have been described to be at higher risk for these complications. The aim of this cohort study was to see if there was an enhanced risk of cardiovascular morbidity and mortality in patients with treatment-resistant hypertension compared to patients with controlled hypertension.

Design and method: Data was derived from the Swedish Primary Care Cardiovascular Database where all patients with hypertension aged 30 and above from two counties in Sweden are registered. The SPCCD includes all registered diagnosis, population based registers and data from the Prescribed Drug register which covers 97% of the dispensed drugs in Sweden. Patients with cardiovascular co-morbidity were excluded. We found 5311 patients with treatment-resistant hypertension despite adherence to medication. The data was collected between 2006 and 2008. Follow up was done through 2013. The outcome data was derived from the cause of death registry and the national diagnosis registry in Sweden. The results of the regression analysis were adjusted for age, sex, body mass index, diabetes, atrial fibrillation and blood pressure level.

Results: The patients with treatment-resistant hypertension were older, had higher incidence of diabetes and were more often smokers. We found an increased risk of ischemic heart disease, heart failure, cardiovascular mortality and all-cause mortality treatment-resistant hypertension. Surprisingly the risk for stroke was not increased in patients with treatment-resistant hypertension (see table).

Conclusions: Patients with treatment-resistant hypertension have an increased risk for cardiovascular morbidity and mortality. This implies a need for extra attention from health care professionals in order to reduce these risks.

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Objective: Resistant hypertension, is defined as an inadequate blood pressure control despite treatment with a diuretic combined with two different antihypertensive drugs, or requirement of at least four antihypertensive drugs. This clinical condition may confer high cardiovascular risk. Aim of the observational study was to evaluate the prevalence of resistant hypertension and the association with cardiovascular risk factor or disease in the Verona metropolitan area, matching data concerning the clinical characteristics of adult population with information on drug exposure.
Design and method: Eleven family doctors, using the electronic medical record software “Millewin”, retrieved anonymised data concerning blood pressure, diagnosis of hypertension and treatments from a population database consisting of 17502 adults of either sex. The prevalence of resistant hypertension was estimated considering patients who had been consecutively treated with at least four antihypertensive medications, regardless of blood pressure values, during the previous fifteen months. Further search concerning the clinical characteristics associated with resistant hypertension was performed in a simple random sample of 55 patients 18–79 years old by examining medical notes and interviewing.

Results: The prevalence subjects with diagnosis of hypertension was 21.9% (3469 patients), the prevalence of those treated with four antihypertensive drugs was 2.1% (359 patients), approximately 10% of the whole hypertensive population. High prevalence of diabetes mellitus (53%) and hyperlipidaemia (83%) was found in association with resistant hypertension. As for end organ damage, high prevalence of carotid artery stenosis (45%), ischaemic heart disease (43%) and left ventricular hypertrophy (40%) was observed in patients with resistant hypertension. Blood pressure was higher than 140/90 mmHg in 58% of patients in spite of treatment with four or more different antihypertensive drugs.

Conclusions: Patients with resistant hypertension are characterised by a very high attributable cardiovascular risk, due to high prevalence of cardiovascular risk factors and overt organ damage and cardiovascular disease.

Objective: Elevated plasma levels of uric acid (UA) were frequently associated with hypertension however its role in hypertension pathogenesis is unclear.

Results: As expeditiously, we found of correlation between systolic and diastolic mean 24 h BP values with age (p < 0.001), sex (p = 0.004), BMI (p = 0.001) and plasma levels of creatinine (p = 0.023). We also find a strong correlation of BP with UA alone (p = 0.001). Only age and UA remain significant in multivariate analysis with all elements under investigation (respectively p = 0.01 and p = 0.04). We found that UA plasmatic levels are associated with sex (multivariate analysis: p < 0.001), BMI (p = 0.004), renal function (p = 0.001) and with genetic polymorphisms of Protein Kinase CGMP-Dependent Type I (PRKG) and lanosterol synthase (LSS) genes (respectively p = 0.025 and p = 0.05 after correction for clinical covariates included sex, BMI and creatinine level).

Conclusions: Our data confirm that UA levels are a strong and independent determinant of BP (both systolic and diastolic) in the general population. Moreover it seems to be an independent element of metabolic syndrome. Finally, UA plasmatic levels are strictly associated with specific clinical and genetic characteristic.

In particular we identify two new genes that could play a substantial role in determination of UA plasmatic level.

Objective: Traditional cardiovascular (CV) risk factors do not fully explain ethnic differences in CV disease. We tested if pulse wave velocity (PWV) and Augmentation Index (AIx), both independent predictors of later adult mortality, and their determinants from childhood may underlie ethnic variability in CV risk as young adults in the ‘DASH’ longitudinal study.

Results: cfPWV and PPA were both significantly and independently associated with age, male gender and systolic BP (p < 0.01), where cfPWV was also significantly associated with waist/hip ratio (p < 0.01). In the multivariable linear regression analysis, cfPWV was significantly associated with carotid IMT (β = 12.83 ± 5.14 per 1 SD; P = 0.04) and diastolic dysfunction (OR, 0.78 [95% CI, 0.64–0.96] per 1 SD; P = 0.02) (Fig 1).

Conclusions: In the community-based elderly, cfPWV seems to be a vessel-related biomarker, while PPA is the cardiac-related one.
Conclusions: At this age AIx rather than arterial stiffness may be a useful tool for testing components of excess CV risk in some ethnic minority groups.

Results: Unadjusted PWVs in Black Caribbean and White UK young men were similar (7.9 ± 0.3 vs 7.6 ± 0.4 m/s) and lower in other ethnic groups at similar systolic (s)BPs (120mmHg) and BMIs (24.6 kg/m2). In fully adjusted regression models, independent of BP effects, Black Carribbeans, Black African and Indian young women had lower PWV by 0.5–0.8%, 95% CI 0.1–1.1 m/s) than did White UK women (6.9 ± 0.2 m/s). Conversely, AIx appeared to be higher in ethnic minority groups - Indian (15.1, 13.0–17.2%), Bangladesh/Pakistan (15.7, 13.7–17.7%), Caribbean (14.9, 12.3–17.0%) and West African (15.3, 12.9–17.7%) compared with White UK (11.9, 10.2–13.6%). In multivariate models, adjusted for gender, central systolic BP, height and heart rate, Indian and Bangladesh/Pakistan young adults had higher AIx (b = 3.35 and 4.20, p < 0.01) than White UK; with a similar trend for West African and Carribbeans, but not statistically significant (p = 0.08). PA, psychosocial or deprivation measures were not associated with AIx, with borderline associations from brachial BP but no other childhood variables.

Conclusions: We can conclude that deficient ApoE in the hypothalamic area can lead to raised SAP and DAP values.

Objective: Cardiovascular disease remains a major cause of mortality and morbidity among both women and men, but a declining trend has been observed since the 1970-ies. This decrease is mainly attributed to improvements in cardiovascular risk factors. The aim of the present study was to describe secular trends in six cohorts of middle-aged women over a period of 35 years.

Results: Over the last 35 years, mean weight has increased by 4.6 kilograms (kg). Weight has though been more stable over the last decade with a 0.2 kg net increase in mean weight from 70.5 to 70.7 kg between 2003 and 2013. More noteworthy was the observed increase in waist circumference with a mean value of 88.4 centimeters (cm) in 2013, as compared to 83.1 cm in 2003. This was, however, not followed by any substantial changes in blood lipids, blood pressure values or presence of manifest hypertension or diabetes mellitus. The number of smokers has decreased while self-assessed physical activity has increased during the 35 years. Reported regular exercise or athletic training remained stable in the two earlier cohorts in the 1980 s (7%), but increased steadily after this to 35.6% in 2013.

Conclusions: There is a favorable decline in smoking and an increase in physical activity over the last 35 years among middle-aged women in Sweden. Nevertheless, body weight and waist circumference keep increasing for each investigated generation in this study, why the full effect on long-term cardiovascular health remain unclear.
BLOOD PRESSURE CONTROL IN HYPERTENSIVE PATIENTS ATTENDING AN AMBULATORY NEPHROLOGY UNIT

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Objective: Hypertension is a major cardiovascular risk factor. Antihypertensive treatment can lower blood pressure (BP) levels and reduce the risk. In developed countries, the rate of BP control is improving and approaching the 70% of treated patients. Herewith we report the results of an observational study of hypertensive outpatients carried out by an ambulatory nephrology unit dedicated to hypertension.

Design and method: A total of 740 consecutive patients attended our ambulatory nephrology unit dedicated to hypertension from 1 January to 31 December 2015. In agreement with the current guidelines, hypertension was defined as sitting BP levels equal or higher than 140/90 mmHg and/or use of antihypertensive drugs. Having excluded 87 patients who did not meet these criteria, 653 patients (mean age: 59.6 years; 367 females, 266 males) remained and constituted the eligible sample for the present analysis. In them, the following parameters were assessed: age, sex, body-mass index (BMI), waist circumference, BP levels both in the sitting and in the standing position, renal function, serum glucose, glycosylated haemoglobin, lipid profile, antihypertensive drugs prescribed. In addition, other investigations (electrocardiogram, echocardiogram and funduscopy) were performed in order to search for asymptomatic organ damage (OD). Patients that had sitting BP levels equal or lower than 140/90 mmHg were considered as having achieved BP control.

Results: On the whole, 78.5% of our patients achieved BP control. Compared to patients whose BP was not controlled, those achieving the BP target were slightly younger (mean age: 59.3± vs 60.60 years) and showed a lower BMI (29.11± vs 31.08 kg/m2) and a higher glomerular filtration rate (86.23 vs 82.97 mL/min). Moreover, they were prescribed a lesser number of antihypertensive drugs (1.8 ± 2.11). No significant difference there was in comorbidities and OD, such diabetes mellitus, chronic kidney disease and left ventricular hypertrophy.

Conclusions: Under proper treatment, more than 78% of our hypertensive patients achieved BP control. This figure is higher than the objective of 70% of treated and controlled hypertensive patients set for 2015 in Europe.

ANTIANGIOGENETICS AND HYPERTENSION: EPIDEMIOLOGY AND BASAL FEATURES OF PATIENTS

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Objective: Antiangiogenetics (AAG) are used to treat a number of neoplasms by inhibiting Vascular Endothelial Growth Factor activity, blocking angiogenesis and inducing cancer cells death. A class effect common to all AAG is the raise of blood pressure (BP). Aim of this study was to evaluate cancer patients (pts) receiving an AAG to define basal features and aspects of AAG-related HTN (AAG-HTN).

Design and method: Between March 2012 and January 2016, all cancer pts receiving an AAG at Treviglio-Caravaggio Hospital (Italy) were evaluated by a multidisciplinary team. They underwent Home, Office, and Ambulatory BP measurements, which were regularly repeated until 1 month after AAG withdrawal. HTN was defined and managed according to the ESH/ESC guidelines.

Results: 55 consecutive AAG treated pts were evaluated (M/F = 38/17, median age:61, range:48–84yrs). Cancer sites were: colorectum (n=21), kidney (n=15), hepatocellular (n=10), ovary (n=2), lung (n=1), double sites (n=6). The employed AAGs (including 5 pts who received 2 consecutive different AAG) were: bevacizumab (n=24), sunitinib (n=14), sorafenib (n=13), pazopanib (n=2), aflibercept (n=2), regorafenib (n=2), axitinib (n=3). Before AAG starting 34/61.8% pts reported a history of HTN (in 8 a therapy adjustment was required because of uncontrolled HTN), moreover in 5 it was newly diagnosed. When cardiovascular risk factors were compared to general population, diabetes and smoking hypertension resulted higher while dyslipidemia was lower and cardio-cerebro-vascular events were similar. AAG-HTN was observed in 53%, including all the 5 AAG second lines, and was equally distributed among the various AAG compounds. Median time to AAG-HTN was 21 days (range 1day-2yrs): it was shorter for axitinib and regorafenib (1–5 days) and longer for sunitinib and bevacizumab (16days-2years).

Conclusions: Basal evaluation before AAG treatment is crucial to improve pts management, since cancer pts display some peculiar features, including a slightly different cardiovascular risk factors profile and a high rate of HTN (with a significant rate of newly diagnosed HTN before AAG). While the higher incidence of AAG-HTN compared to previous studies may be due to a change in diagnostic criteria (NIH/CTCAE), main features of AAG-HTN are common to all the AAG, with the only difference in time to AAG-HTN arise.

POPLULATION BASED STUDY OF HYPERTENSION IN HUNGARY- 2015. NATIONWIDE COMPREHENSIVE HEALTH SCREENING PROGRAM IN HUNGARY 2010-2015

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Objective: The year 2015 saw the continuation of Hungary’s greatest and to date most comprehensive health screening program started in 2010.

Design and method: The examinations - among them coronary examinations - covered the fields of cardiology and hypertension, they took place in a specially furnished lorry. In the Program we measured blood pressure, pulse rate, calculated cardiovascular risk, plasma cholesterol, glucose and uric acid levels. Whole body analysis started with measuring height, weight, abdominal circumference and waist/hip ratio defining target body weight. Following the measurement of body fat and muscle content we decided the surface volume of the abdominal fat and calculated body mass index.

Results: Participants and results of the examinations of the people who have presented themselves for the test sin 2015 (n = 23764) have been evaluated. In the Program a total (52.2%) women and (47.8%) men were tested at 204 locations. Upon data processing with the help of a query 19.3% of the participants reported suffering from hypertension (1291 women and 1263 men). In the past five years the screening truck has been to 1123 places is Hungary, and travelled 134112 km, 135879people have participated in comprehensive screening.In total 3 936325 examinations have beenperformed. The average systolic blood pressure among women was in the normal range up to the age of 55 years. The diastolic blood pressure levels were in the normal range for both sexes (with the exception of the age group 46–55 of men where it exceeded the upper limit of the normal range by a minimal extent). Among men stage 1 hypertension was the most frequent status for all age groups; blood pressures above 140/90 were measured for 39% of subjects from age 18 onwards. The distribution of this did not vary significantly with the increase of age.

Conclusions: Conclusion: Thanks to the vast information obtained through the program a comprehensive picture has been drawn about Hungary’s present health status not only on a regional or cross sectional level but as it was described in the program, too.

THE CLINICAL CHARACTERISTICS AND TREATMENT EFFICACY IN PATIENTS WITH HYPERTENSION ACCORDING TO THE RUSSIAN FEDERAL REGISTER OF ARTERIAL HYPERTENSION

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Objective: Hypertension remains one of the major risk factors leading to disability population. It is important to have information on how to treating patients with hypertension in the primary health care. Such information can be given by Registers.

Design and method: Conducted a retrospective analysis medical data of 17,144 patients with hypertension from 18 regions of the Russian Federation included in the period 1.01 2012–31.12.2015.

Results: The study included 6886 men and 10278 women aged 19–98 years. We divided patients into 2 groups based on years of inclusion in the Register. The 1st group consisted of patients enrolled in 2012–13, the 2nd - in 2014–15. The mean age was 62.5 ± 11.5 years. The control of quality evaluation of patients with hypertension was conducted by analyzing the amount of missing data on outpatient histories. At the required periods of outpatients were absent in a significant percentage of cases the following information: smoking (19.6% & 23.2%), family history (40.4%&47.4%), waist circumference (80.2% & 67.8%), duplex scanning of brachiocephalic arteries (99.3% & 98.8%), echocardiography (80.3% & 63.9%), total cholesterol (14.7% & 13%), low-density lipoprotein (83.9% & 73.7%), triglycerides (66.4% & 58.4%), potassium (84.8% & 77.6%), glucose (13.3% & 14.8%), creatinine (55.9% & 38.9%), uric acid (97.5% & 96.1%). Classic risk factors (was
calculated on the basis of all available data) have been identified in a large percentage of cases in both groups: in almost half of cases (46.6% & 44.8%) patients had a family history of early development of hypertension, physical inactivity was observed in 46.5%, still smoking at the time of inclusion in the Register was 36.6%, obese – 13%. At inclusion overage systolic BP was 156.8 ± 34.5 mmHg, diastolic BP – 83.1 ± 20.6 mmHg. In most cases, ACE inhibitors/angiotensin receptor blockers (ARB) (75.3%), beta-blockers (43.6%) and thiazide diuretics (37.3%) were recommended. The most frequently prescribed combinations were: ACE inhibitor/ARB+beta-blocker, ACE inhibitor/ARB+diuretic, ACE inhibitor/ARB+calcium antagonist. It is worth noting that in both groups combined treatment (78.3% & 82.1%) over monotherapy (21.7% & 18.8%) prevailed. The target BP was achieved approximately in 35.5%.

Conclusions: we observed positive trend in the treatment of hypertension but the target BP is not achieved in all patients. Also necessary to broaden the ongoing prevention efforts aimed at lifestyle modification and risk factors.

PP.06.14 INFLUENCE OF ANXIETY AND DEPRESSION ON BLOOD PRESSURE CONTROL IN UKRAINE CASES

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Objective: the study was to analyze the prevalence of anxiety/depression in high-risk patients and its influence on levels and awareness of BP.

Design and method: 402 patients with high cardiovascular risk as a part of EU-ROASPIRE IV-Primary Care cohort were examined. BP level control evaluation and interview regarding BP awareness were performed in all patients. All patients filled hospital anxiety and depression scale questionnaire. Score 0 to 7 for anxiety/ depression scale suggested no anxiety/depression, 8–10 – mild anxiety/depression and 11 and more – moderate and severe anxiety/depression.

Results: the prevalence of mild depression was 21.8%, moderate/severe depression – 13.2%. The prevalence of mild anxiety was 21.5%, moderate and severe anxiety – 10.6%. Target BP awareness in group of patients without anxiety was 63.1%, in patients with mild anxiety – 56.6% and in patients with moderate/severe anxiety – 54.8%. Corresponding values in groups of patients with no, mild and moderate/severe depression were 67.3%, 55.3% and 37.3%, respectively (p = 0.0001). Most of participants took antihypertensive medicines. Despite that, mean levels of systolic BP was 157.9 ± 16.9 mmHg in patients without depression and 144.2 ± 13.7 mmHg in moderate/severe depression group.

Mean levels of diastolic BP in patients without and moderate/severe depression were 85.0 ± 11.8 mmHg and 89.04 ± 9.82 mmHg, respectively (p = 0.024).

Conclusions: 1. Prevalence of mild depression is 21.8%, moderate/severe depression – 13.2%. Corresponding values for mild and moderate/severe anxiety are 21.5% and 10.6%, respectively.
2. Significantly less patients in group of moderate/severe depression were aware about target BP levels in comparison to patients without depression – 37.3% and 67.3%, respectively (p = 0.0001). In group of patients without anxiety 63.1% of participants knew about target levels of BP, and in group of patients with moderate/severe anxiety – 54.8%.
3. Despite antihypertensive treatment, mean systolic BP in patients with moderate/severe depression was significantly higher, than in group of patients without depression - 144.2 ± 13.7 mmHg and 137.9 ± 16.9 mmHg, respectively (p = 0.013).
4. Mean diastolic BP in patients without and moderate/severe depression were 85.0 ± 11.8 mmHg and 89.04 ± 9.82 mmHg, respectively (p = 0.024).

PP.06.15 ARTERIAL HYPERTENSION IN PATIENTS WITH HIP REPLACEMENT

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Objective: Assessment of blood pressure values and early diagnosis of hypertension is especially important in high-risk group, including patients in preoperative and postoperative period. The aim of the current study was assessment of blood pressure values and prevalence of hypertension in patients undergoing elective hip replacement surgery – an orthopedic procedure associated with one of the highest cardiovascular complication rate.

Design and method: 284 consecutive patients admitted for elective hip replacement surgery were screened for arterial hypertension. All patients had they medical records reviewed for prior diagnosis and had their blood pressure measured on admission by, prior to the procedure by a qualified physician, according to the current guidelines.

Results: The mean age of the study population was 62.2 ± 13.9 years and 42.7% of patients were male. The body mass index (BMI) in the study population was 27.0 ± 4.2 kg/m². 58.2% of patients were diagnosed with arterial hypertension previously. Mean blood pressure values on admission for systolic blood pressure (SBP) and diastolic blood pressure (DBP) were 134.5 ± 20.4 and 78.6 ± 13.1 mmHg, respectively. In 43.2% of patients the on admission blood pressure values exceeded the threshold of: > 140 and/or 90 mmHg. Arterial hypertension was diagnosed de novo in 33 (15.0%) patients. Patients with the disease were older (67.5 ± 12.3 vs. 54.4 ± 13.9 years; p < 0.0001), and had higher BMI (27.6 ± 4.3 vs. 26.2 ± 3.8 kg/m²; p < 0.05) than patients without the diagnosed disease. Diabetes mellitus was more often found in hypertensive patients (13.3% vs. 3.3%; p = 0.02), they also more often had history of myocardial infarction (p = 0.02), stable coronary artery disease (p = 0.001) and heart failure (p = 0.006) compared to patients without the diagnosis.

Conclusions: Majority of patients scheduled for elective hip replacement surgery is diagnosed with arterial hypertension. The disease is also diagnosed de novo in 15% of these patients. Screening for arterial hypertension is important in this group of patients and can potentially reduce the complication rates of the hip replacement surgery.

PP.06.16 THE RISK FACTORS OF CARDIOVASCULAR DISEASE IN PERSONS WITH HIGH NORMAL BLOOD PRESSURE IN RUSSIAN POPULATION BY DATA ESSE-RF


1FSBI Russian Cardiovascular Scientific-Production Complex of the Ministry of Health, Moscow, RUSSIA, 2FSBI State Scientific-Research Centre for Preventive Medicine of the Ministry of Health, Moscow, RUSSIA, 3FSBI Almazov North-Western Federal Medical Research Center of the Healthcare Ministry, Saint-Petersburg, RUSSIA

Objective: To assess risk factors of cardiovascular disease in persons with high normal blood pressure.

Design and method: In the framework of Multicenter observational study ESSE-RF (Epidemiology of Cardiovascular Diseases and their Risk Factors in Regions of Russian Federation) by the protocol the investigation of representative selections of adult population at the age of 25–64 y.o. of 13 regions RF (n = 21887, males = 8357). Population-based cross-sectional study was conducted. Statistical data calculation was done with statistic software STATISTICA 10.0, SPSS 14.0.

Results: Of the 21887 people who were screened 9586 (43.8%) had arterial hypertension (AH), 3387 persons (35.3%) didn’t take antihypertensive medications (AHM) and/or statins. Current analysis was included 7095 persons with normal BP (<129/84 mmHg) – first group; 2415 people with high normal BP (HNBP) (130–139/85–89 mmHg) – second group; 3387 untreated hypertensive persons: 2450 with AH grade I – third group; 698 with AH II– forth group and 239 with AH III– fifth group. In this group risk factors AH were assessed.

The persons with HNBP had statistical significant higher level cholesterol, LDL, TG and fasting glucose compared to the people with normal BP, and significant lower level then hypertensive persons. It was not statistical significant differences according the level HDL between the groups.

The patients of the 2-nd group had statistical significant (p < 0.0001) higher waist circumference (88sm), than group 1 (81 sm) and lower then 3–5 groups.

Family history was often (p = 0.0001) burdened in patients with AH unlike person with normal and HNBP.

The patients had diabetes mellitus (DM) in 1 group in 2.4% cases; and twice more often in 2-n – 4.4% (p < 0.0001), 3-rd – 6.2%; 4-th – 8.2%; 5-th – 13%.

Conclusions: Unfortunately a lot of hypertensive patients didn’t take AHM in the studied sample. The rate of persons with HNBP is quite large almost the same as patients with AH grade 1. At the same time the persons with HNBP had more metabolic disorders and DM compared with the group with normal BP. The results show that is necessary as early as possible to modify risk factors with persons with HNBP.

e151 Abstracts
ARTERIAL HYPERTENSION AND CARDIOVASCULAR DISEASES RISK FACTORS IN RUSSIAN POPULATION. BY THE DATA ESSE-RF

I. Zhernakova¹, I. Chazova¹, E. Odhechepkova¹, S. Shalnova², S. Boytsov², I. Balanova², O. Rotar³, A. Konradi³, E. Shlyakhto³. ¹FSBI Russian Cardiologic Scientific-Production Complex of the Ministry of Health, Moscow, RUSSIA, ²FSBI State Scientific-Research Centre for Preventive Medicine of the Ministry of Health, Moscow, RUSSIA, ³FSBI Almazov North-Western Federal Medical Research Center of the Healthcare Ministry, Saint-Petersburg, RUSSIA

Objective: In the framework of Multicenter observational study ESSE-RF (Epidemiology of Cardiovascular Diseases and their Risk Factors in Regions of Russian Federation) by the unique protocol the investigation of representative sample of adult population at the age of 25–64 y.o. of 13 regions RF (n = 21887, including males n = 8357 and females n = 13530): Volgograd, Vologda, Voronezh, Vladivostok, Ivanovo, Kemerovo, Krasnoyarsk, Orenburg, Samara, Tomsk, Tyumen, Saint-Petersburg and Northern Ossetia-Alania.

Design and method: Was used the systematic stratified multistage random sampling creating by the territorial principle of method by Kesh. Statistic data calculation was done with computer-based statistic software STATISTICA 10.0 and SPSS 14.0.

Results: Final analysis included data from 18767 participants. Prevalence of AH (arterial hypertension) was 43.9%, 46.4% in men and 41.7% in women. Prevalence of cardiovascular (CV) risk factors was high especially in relatively young men (35–44 y.o.) and postmenopausal women (55–64 y.o.). The most common risk factor was hypercholesterolemia, even in persons without AH it equaled to 52.2% (vs 73.1% with AH). Hypertensive patients had high level fasting glucose in 35.3% and without AH in 14.3%, abdominal obesity - in 53.5% and in 21.8%, history family – in 37.6% and in 25.3% and diabetes mellitus – in 12.8% and in 2.9% respectively. Major CV risk factors associated with AH (odds ratio) were hypertriglyceridemia 1.73 (95% CI, 1.78–3.09); fasting hyperglycemia 2.1 (95% CI, 1.82–3.38) and abdominal obesity 2.1 (95% CI, 2.47–4.63). Awareness of AH was 74.6% in men, 85% in women. Only 62.7% of women and 37.3% of men took medications. Effectively treated (achieved target level of BP) were 40% of women and 31.4% of men. With the age the part of effectively treated decreases (p < 0.0005). AH is under control only 27.7% of women and 15.6% of men.

Conclusions: The role of AH as one of the main modifiable risk factors of cardiovascular diseases is proved, however it is depressing that the percent of controlled AH is low. The obtained results substantiate the expediency of the use of population strategy of AH and CV risk factors prevention in the studied population.

Z. Valieva¹, S. Glukhova¹, T. Martyynuk¹, I. Chazova¹. ¹Russian Cardiology Research and Production Complex, Moscow, RUSSIA, ²Scientific Research Institute of of Rheumatology, Moscow, RUSSIA

Objective: to assess the frequency of clinical symptoms and physical examination signs, allowing to differentiate forms of pulmonary hypertension (IPAH - idiopathic pulmonary arterial hypertension, PAH due to CHD - congenital heart disease)

Table 1. Comparative assessment the frequency of symptoms and physical examination in patients with IPAH and PAH-CHD

<table>
<thead>
<tr>
<th>Symptom/Medication</th>
<th>IPAH (n=70)</th>
<th>PAH-CHD (n=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortness of breath</td>
<td>69 (98.5)</td>
<td>20 (69.0)</td>
</tr>
<tr>
<td>Fatigue</td>
<td>40 (57.1)</td>
<td>21 (72.4)</td>
</tr>
<tr>
<td>Palpitation</td>
<td>43 (61.4)</td>
<td>14 (48.3)</td>
</tr>
<tr>
<td>Dizziness</td>
<td>16 (23.1)</td>
<td>10 (34.4)</td>
</tr>
<tr>
<td>Syncope</td>
<td>20 (28.5)</td>
<td>8 (27.5)</td>
</tr>
<tr>
<td>Anemia</td>
<td>29 (41.4)</td>
<td>10 (34.4)</td>
</tr>
<tr>
<td>Cough</td>
<td>20 (28.5)</td>
<td>8 (27.5)</td>
</tr>
<tr>
<td>Ankled oedema</td>
<td>32 (46)</td>
<td>66 (94.2)</td>
</tr>
<tr>
<td>Acrocyanosis</td>
<td>22 (31.4)</td>
<td>18 (62.1)</td>
</tr>
<tr>
<td>Elevated systolic pressure</td>
<td>3 (4.3)</td>
<td>1 (3.4)</td>
</tr>
<tr>
<td>Acrosclerosis</td>
<td>0 (0)</td>
<td>2 (6.9)</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>3 (4.3)</td>
<td>1 (3.4)</td>
</tr>
<tr>
<td>Crackles</td>
<td>3 (4.3)</td>
<td>2 (6.9)</td>
</tr>
<tr>
<td>Thrombosis</td>
<td>1 (2.4)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

Design and method: We studied 70 patients with IPAH and 29 patients with PAH-CHD

Results: In patients with IPAH compared to patients with PAH-CHD were more frequent clinical symptoms - syncope, cough (p < 0.05). While in PAH-CHD - shortness of breath, fatigue (p < 0.05). Most often signs of the physical examination in IPAH were ankle oedema, accentuated pulmonary component of the second heart sound, lung crackles (p < 0.05). At the same time the most frequent finding in patients with CHD was cyanosis (Table 1).

Conclusions: Careful questioning of each PAH patient about the history of symptoms and signs, clinical examination may suggest an underlying cause of PAH at early stage of the disease.
POSTER SESSION

POSTERS' SESSION PS07:
GENETICS, GENOMICS, PROTEOMICS, METABOLOMICS

**PP.07.01 MIR-483–5P ASSOCIATES WITH OBESITY AND INSULIN RESISTANCE AND INDEPENDENTLY PREDICTS NEW ONSET DIABETES MELLITUS AND CARDIOVASCULAR DISEASE**

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**Objective:** To identify circulating serum microRNAs (miRNAs) in healthy humans which predict future onset of both diabetes mellitus and cardiovascular disease.

**Design and method:** In serum of 12 test subjects, we identified 48 miRNAs consistently detectable in all subjects out of a panel of 786 miRNAs well-conserved in mammals. The population-based Malmö Diet and Cancer Cardiovascular Cohort (n = 5400) (MDC-CC), underwent a baseline examination 1991–1994, where fasted blood was stored after which the population was followed for incidence of diabetes mellitus (DM) and cardiovascular disease (fatal and non-fatal myocardial infarction and stroke) (CVD). We measured the 48 miRNAs using a TaqMan quantitative real-time PCR Low Density Array (TLDA) method in fasting serum of 553 healthy subjects from MDC-CC, including 155 incident cases of DM and 171 incident cases of CVD and used multivariate logistic regression to test individual miRNAs for association with incident DM and CVD.

**Results:** After Bonferroni correction and adjustment for age and sex, each SD increment of log-transformed miR483-5p was significantly associated with both incident DM (OR = 1.48, 95% CI 1.18–1.84, P = 0.001) and CVD (OR = 1.40, 95% CI 1.15, 1.72, P = 0.001). In cross sectional analysis, MIR 483_5p was positively correlated with BMI (r = 0.162, P = 0.0001), fasting insulin (r = 0.156, P = 0.0002), HbA1c (r = −0.099, P = 0.02) and triglycerides (r = −0.11, P = 0.10). Adjustment for these metabolic risk factors, as well as traditional risk factors attenuated the miR-483–5p association with incident DM (OR = 1.28 95% CI 1.15, 1.72, P = 0.001). In cross sectional analysis, MIR 483_5p was positively correlated with BMI (r = 0.162, P = 0.0001), fasting insulin (r = 0.156, P = 0.0002), HbA1c (r = −0.099, P = 0.02) and triglycerides (r = −0.11, P = 0.10).

**Conclusions:** miR-483-5p predicts development of both DM and CVD. The association with DM seems partly mediated by obesity and insulin resistance whereas the association with incident CVD is independent of these metabolic factors and traditional CVD risk factors. Previous studies (Ma et al. 2011, Mol Cell Endocrinol) suggest an underlying mechanism of our findings as miR-483-5p, which is co-expressed with its host gene Igf2, downregulates the expression of socs3 and thereby could mediate development of obesity and a state of high cardiometabolic risk.

**PP.07.02 AMBULATORY SYSTOLIC-DIASTOLIC PRESSURE REGRESSION INDEX IS GENETICALLY DETERMINED IN HYPERTENSIVE PATIENTS WITH CORONARY HEART DISEASE**

M. Wietzke1, O. Melander2, M. Sjogren3, M. Hoffmann1, K. Narkiewicz1, M. Gruchala2, M. Wirtwein3, and J.S. Esguerra2. 1Medical University of Gdansk, Department of Hypertension and Diabetology, Gdansk, POLAND; 2Medical University of Gdansk, Department of Pharmacology, Gdansk, POLAND; 3Medical University of Gdansk, Department of Cardioiology, Gdansk, POLAND

**Objective:** The aim of this study is to report the relationship between certain single nucleotide polymorphisms (SNP) and ambulatory systolic-diastolic pressure regression index (ASDPRI) in patients with CAD confirmed by coronary angiography.

**Table 1:** 24-h, daytime, nighttime and daytime-nighttime ASDPRI variability in SNPs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient (β)</th>
<th>Standard Error</th>
<th>5% CI</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.05</td>
<td>0.03</td>
<td>-0.01</td>
<td>0.11</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.05</td>
<td>0.04</td>
<td>-0.13</td>
<td>0.03</td>
</tr>
<tr>
<td>Diabetes</td>
<td>-1.25</td>
<td>0.47</td>
<td>-1.21</td>
<td>-1.29</td>
</tr>
<tr>
<td>Multiscore CAD</td>
<td>-0.23</td>
<td>0.02</td>
<td>-0.49</td>
<td>-0.07</td>
</tr>
<tr>
<td>405W4544</td>
<td>0.83</td>
<td>0.21</td>
<td>0.40</td>
<td>1.26</td>
</tr>
<tr>
<td>ASSDAMESI7</td>
<td>-0.24</td>
<td>0.05</td>
<td>-0.34</td>
<td>-0.15</td>
</tr>
<tr>
<td>PHCTR1</td>
<td>-0.21</td>
<td>0.05</td>
<td>-0.31</td>
<td>-0.11</td>
</tr>
</tbody>
</table>

**Results:** There were significant differences in 24-hour and daytime-nighttime ASDPRIs for PHCTR1, LPA and ADAMTS7 polymorphisms. These polymorphisms were included in the analysis of covariance. Two out of three gene polymorphisms (LPA and ADAMTS7) as well as age, BMI and diabetes were significantly related to 24-hour ASDPRI. There were significant differences in nighttime ASDPRI dipping for the PHCTR1, WDR12 and ADAMTS7 polymorphisms (table 1). Analysis of covariance revealed a significant relationship between the PHCTR1 and WDR12 polymorphisms, sex, diabetes and nighttime ASDPRI dipping (table 2).

**Conclusions:** In the present study, ADAMTS7 and LPA polymorphisms are related to 24-hour ASDPRI but PHCTR1 and WDR12 gene polymorphisms are associated with nighttime ASDPRI dipping.
**PP.07.03**

**GENETIC RISK SCORE AND DIPPING PROFILE IN HYPERTENSIVE PATIENTS WITH CORONARY HEART DISEASE**

M. Wirtwein1, O. Melander2, M. Jürgens3, M. Hoffmann1, K. Narkiewicz2, M. Wirtwein1, L. Graham1, M.W. McBride1

Objective: The aim of this study is to report the relationship between certain single nucleotide polymorphisms (SNP) and blunted nighttime BP fall in hypertensive patients with CAD confirmed by coronary angiography.

Table: Association between sex, diabetes, nighttime BP, GRSR18 and SBP non-dipping and DBP non-dipping status

<table>
<thead>
<tr>
<th>Sex</th>
<th>Diabetes</th>
<th>SBP Non-dipping</th>
<th>GRSR18</th>
<th>DBP Non-dipping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Yes</td>
<td>0.05</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>Male</td>
<td>No</td>
<td>0.03</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Female</td>
<td>Yes</td>
<td>0.04</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>Female</td>
<td>No</td>
<td>0.03</td>
<td>0.01</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Design and method: According to the percentage decrease in mean systolic and diastolic BP during the nighttime period subjects were classified as dippers or non-dippers (nighttime relative systolic or diastolic BP decline > 20% and < 10% respectively). SNPs were selected from genome-wide association studies in which genome-wide association exceeded threshold of p < 5x10^-8. The SNPs were genotyped using IPLEX reaction on a MassARRA Y platform. Only SNPs with a genotyping success rate greater than 90% and minor allele frequency were greater than 5%. As a quality control, we re-genotyped a random sample of 20% of the subjects. Our findings were consistent irrespective of the use of antiplatelet agents.

**PP.07.04**

**TRANSCRIPTIOANAL REGULATION OF THE UMOD PROMOTER SNP rs4997081 IS SALT DEPENDENT: IMPLICATIONS FOR SODIUM HOMEOSTASIS AND BLOOD PRESSURE REGULATION**

L. Graham1, N.J. Fraser2, N.R. Ferrier3, D. Graham1, A.F. Dominiczak1, M.W. McBreide1, S. Padmanshan1

Objective: We have identified a SNP (rs4997081) in the human UMOD promoter that causes elevated UMOD expression, is responsive to salt and is in LD with rs13333226 (the discovery SNP in a previous GWAS of blood pressure extremes). Previously, we have reported that UMOD regulates sodium-uptake in the thick ascending limb of the Henle (TAL) by down-regulating NKCC2 expression in the TALs independent mechanism. The aim of the current study was to functionally assess rs4997081 promoter.

**PP.07.05**

**PLATELET ENDOTHELIAL AGGREGATION RECEPTOR 1 IS NOT A SUSCEPTIBILITY GENE FOR CARDIOVASCULAR DISEASE IN THE GENERAL POPULATION**

W. Yang1, T. Petri1, N. Caussengherbs1, Z. Zhang1, L. Thijs1, E. Savli2, B. Izzi2, C. Vandenbriele1, F. Wei1, Y. Gu1, L. Jacobs1, L. Citterio1, S. Delliparmin1, C. Barlassina1, D. Cusi1, M.F. Hoylaerts1, P. Verhamme1, T. Kuznetsova1, J.A. Staessen1

Objective: Platelet Endothelial Aggregation Receptor 1 (PEAR1), a membrane protein highly expressed in platelets and endothelial cells, mediates platelet contact-induced activation and sustained platelet aggregation. Among patients with coronary heart disease on antiplatelet agents, PEAR1 rs12041331 A allele carriers experienced more adverse cardiovascular outcomes and had higher death rates than GG homozygotes. We investigated whether in a white population genetic variation in PEAR1 predicts cardiovascular outcome.

Design and method: Among 1938 participants enrolled in the Flemish Study on Environment, Genes and Health Outcomes (51.3% women; mean age 43.6 years), we genotyped 9 SNPs and constructed haplotypes in PEAR1, measured baseline cardiovascular risk factors, and recorded fatal and non-fatal outcomes. For SNPs, we contrasted cardiovascular disease incidence of minor-allele heterozygotes and homozygotes (variant) vs. major-allele homozygotes (reference) and for haplotypes carriers vs. non-carriers.

Results: Among these 1938 participants, 238 died and 182 experienced a major cardiovascular endpoint. In adjusted analyses, we accounted for baseline variables, including sex, age, body mass index, systolic pressure, the total-to-HDL cholesterol ratio, smoking and drinking, antihypertensive drug treatment and history of cardiovascular disease. The hazard ratios expressing the relative risk of death or of a cardiovascular endpoint in minor allele carriers vs. major allele homozygotes of 10 PEAR1 SNPs, including rs12041331, ranged from 0.95 to 1.03 (P = 0.38) and from 0.72 to 1.36 (P = 0.23), respectively. The multivariable-adjusted hazard ratios expressing the risk in carriers vs. non-carriers of three haplotypes with frequency > 15% ranged from 0.89 to 1.09 (P > 0.38) for mortality and from 0.67 to 1.26 (P > 0.20) for a cardiovascular complications. These results were not influenced by intake of antiepileptic drugs, non-steroidal anti-inflammatory drugs, or both (P-values for interaction = 0.27).

Conclusions: In a white population, we could not replicate previous reports suggesting that PEAR1 might be a susceptibility gene for cardiovascular disease.
Objective: Diabetic nephropathy (DN) is the major cause of end-stage renal disease. Renin-angiotensin system (RAS) inhibition is the preferred treatment to slow its progression. We have studied the urinary proteomes of patients with DN (high albuminuria) to investigate the pathophysiology of renal disease and identify disease markers and predictors of clinical outcome.

Design and method: We included diabetic men with (n = 9) and without DN (n = 12) (control cohort). Data collection included clinical and laboratory evaluation of blood and urine at baseline (control cohort and DN-basal), and in patients with DN after 3 months of losartan treatment (DN-treated). Urinary proteome was analyzed and quantified by Tandem Mass Tag (TMT) labeling on a LTQ-Orbitrap mass spectrometer.

Results: Patients enrolled in the study showed no differences regarding basic clinical parameters. Urinary proteome analysis has identified 166 differentially excreted proteins when comparing the proteomes of controls and DN patients, 27 comparing DN-treated and DN-basal patients, and 182 among patients DN-treated and controls. Systems biology approach comprising functional proteomic networks and artificial neural networks (TPMS technology) have identified 80 key excreted proteins when comparing the proteomes of controls and DN patients, 27 comparing DN-treated and DN-basal patients, and 182 among patients DN-treated and controls. Systems biology approach comprising functional proteomic networks and artificial neural networks (TPMS technology) have identified 80 key excreted proteins when comparing the proteomes of controls and DN patients, 27 comparing DN-treated and DN-basal patients, and 182 among patients DN-treated and controls. Systems biology approach comprising functional proteomic networks and artificial neural networks (TPMS technology) have identified 80 key excreted proteins when comparing the proteomes of controls and DN patients, 27 comparing DN-treated and DN-basal patients, and 182 among patients DN-treated and controls.

Conclusions: NEP is a membrane-bound zinc-containing metalloproteinase showing great abundance in the brush border of proximal renal tubular cells. NEP is responsible for the processing and catabolism of various vasoactive peptides including angiotensin II and endothelin which may explain its pathogenic role in the development of DN.

Circulating Microvesicles (c-MVs) Levels and Endothelial Function in Patients with Multifocal Fibromuscular Dysplasia (FMD): A Cross-Sectional Study

X. Loyer,1 H. Kettab,1 A. Lorthioir,2 M. Frank,2 R. Niara,2 J.M. Renard,1 Y. Chaput,1 X. Jessenmaire,1 P.F. Poulin,1 A. Amare,1 P. Boutouyrie,1 C.M. Boulanger,1 M. Azizi,2 INSERM U970, Paris Cardiovascular Research Center, PARCC, Paris, FRANCE, 2APHP, Clinical Investigation Center, Departments of Genetics, Pharmacology and Hypertension Unit, HEGP, Paris, FRANCE

Objective: FMD is an idiopathic, segmental, non-atherosclerotic non-inflammatory arterial disease of unknown origin which occurs mostly in middle-aged women and affects medium-sized arteries (renal and carotid arteries in particular). The objective of the study was to identify new hemodynamic and biological biomarkers of the pathology. We investigated i) the flow-mediated dilation (FD) and endothelium-independent dilation (ED) of the brachial artery (BA); ii) c-MVs from different vascular cell origins.

Design and method: We conducted a cross sectional study with 50 patients with multifocal FMD. 50 essential hypertensive (EH) patients matched for age, sex, and ethnicity-matched patients with EH or HS. This result is consistent with the similar acute vasodilatory responses to flow and glyceryl trinitrate observed in FMD patients compared to EH and HS. Taken all together, these results demonstrate that endothelial function is not affected in patients with FMD.

Conclusions: In conclusion, we could not identify specific changes in c-MVs levels of endothelial or smooth muscle origin in patients with FMD when compared with age-, sex-, and ethnicity-matched patients with EH or HS. This result is consistent with the similar acute vasodilatory responses to flow and glyceryl trinitrate observed in FMD patients compared to EH and HS. Taken all together, these results demonstrate that endothelial function is not affected in patients with FMD.

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Objective: FMD is an idiopathic, segmental, non-atherosclerotic non-inflammatory arterial disease of unknown origin which occurs mostly in middle-aged women and affects medium-sized arteries (renal and carotid arteries in particular). The objective of the study was to identify new hemodynamic and biological biomarkers of the pathology. We investigated i) the flow-mediated dilation (FD) and endothelium-independent dilation (ED) of the brachial artery (BA); ii) c-MVs from different vascular cell origins.

Design and method: We conducted a cross sectional study with 50 patients with multifocal FMD. 50 essential hypertensive (EH) patients matched for age, sex, and ethnicity-matched patients with EH or HS. This result is consistent with the similar acute vasodilatory responses to flow and glyceryl trinitrate observed in FMD patients compared to EH and HS. Taken all together, these results demonstrate that endothelial function is not affected in patients with FMD.

Conclusions: In conclusion, we could not identify specific changes in c-MVs levels of endothelial or smooth muscle origin in patients with FMD when compared with age-, sex-, and ethnicity-matched patients with EH or HS. This result is consistent with the similar acute vasodilatory responses to flow and glyceryl trinitrate observed in FMD patients compared to EH and HS. Taken all together, these results demonstrate that endothelial function is not affected in patients with FMD.

Circulating Microvesicles (c-MVs) Levels and Endothelial Function in Patients with Multifocal Fibromuscular Dysplasia (FMD): A Cross-Sectional Study

X. Loyer,1 H. Kettab,1 A. Lorthioir,2 M. Frank,2 R. Niara,2 J.M. Renard,1 Y. Chaput,1 X. Jessenmaire,1 P.F. Poulin,1 A. Amare,1 P. Boutouyrie,1 C.M. Boulanger,1 M. Azizi,2 INSERM U970, Paris Cardiovascular Research Center, PARCC, Paris, FRANCE, 2APHP, Clinical Investigation Center, Departments of Genetics, Pharmacology and Hypertension Unit, HEGP, Paris, FRANCE

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Conclusions: In conclusion, we could not identify specific changes in c-MVs levels of endothelial or smooth muscle origin in patients with FMD when compared with age-, sex-, and ethnicity-matched patients with EH or HS. This result is consistent with the similar acute vasodilatory responses to flow and glyceryl trinitrate observed in FMD patients compared to EH and HS. Taken all together, these results demonstrate that endothelial function is not affected in patients with FMD.
**Objective:** The aim of the genetic branch of this study is to report the relationship between certain SNPs and the risk of cardiovascular complications in hypertensive patients with coronary artery disease (CAD) confirmed by coronary angiography.

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**Design and method:** In the present study, 1345 subjects with CAD were included. The median follow-up period was 8.6 years (interquartile range 6.1 to 11.1 years). 19 SNPs were investigated for any association with Major Advanced Cardiovascular (CV) Events (MACE), Acute Coronary Syndromes (ACS) and Revascularizations. The SNPs were genotyped using IPLEX reaction. SNPs with a genotyping success rate > 90% and those with a minor allele frequency > 5% as a quality control, we re-genotyped a random sample of 20% of the successfully genotyped samples for all genotypes, and the concordance was 99.9%. We modelled the 19 SNPs as a multilocus genetic risk score (GRS19). A logistic regression model was used to examine the association between selected polymorphisms and the risk of MACE, ACS and revascularization. P-values were corrected by Bonferroni's procedure where it was necessary and false discovery rate procedure was performed as a multiple testing correction.

**Results:** During follow-up period, 245 participants died, 114 due to CV causes. A fatal or non-fatal CV event occurred in 882 participants including 214 ACS, 578 revascularizations and 90 strokes. The alleles of the following SNPs: rs1746048 (CXCL12), rs9818870 (MRAS) and rs1714036 (PPAP2B) were associated with a higher risk of MACE and the alleles of SNPs rs1746048 (CXCL12) and rs1122608 (LDLR) were associated with a higher risk of revascularization. The alleles of rs12190287 (MRAS), rs12190287 (TCF21) and rs2259816 (HNF1A) were associated with a higher risk of ACS. Despite the lack of relationship between significant CAD and GRS19, in the top quartile of GRS19 there was significant relationship between GRS19 and combined endpoint, MACE, ACS, and revascularisation (table).

**Conclusions:** In the present study, the SNPs of CXCL12 and LDLR were associated with risk of revascularization. The polymorphisms of CXCL12, LPA, MRAS, PPAP2B were associated with the risk of MACE. GRS19 determines CV complications in CAD patients with the highest genetic risk score values.

**PP.07.11 SUBCLINICAL FRUCTOSE-INDUCED METABOLIC SYNDROME ASSOCIATED TO HOST-MICROBIOTA CO-METABOLISM IN RATS**

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**Objective:** Metabolic syndrome (MS) is a rapidly growing worldwide pandemic, which is associated with a greater risk of multiple chronic pathologies including cardiovascular disease hypertension and Type 2 diabetes. Host-microbiota co-metabolism and Western diets, with high-fructose content, have been strongly implicated in the development of MS. The development of specific biomarkers for early detection of cardiometabolic disease seems essential in patient management. The aim of this study was to identify potential MS biomarkers to detect subclinical MS using a multi-approach combining 1H NMR-based metabolomics, microbiome analyses with MiSeq and liver histology. Urine, blood serum and fecal extracts from high-fructose fed rats were analyzed.

**Design and method:** Male Wistar rats 4 weeks old were fed with a high-fructose (HF) diet (60%) for 15 weeks to induce MS. We applied high resolution NMR spectroscopy to profile serum, urine and fecal extracts. Principal component analysis (PCA) and projection to latent structures for discriminant analysis (PLS-DA) were applied to NMR spectral datasets. Results were cross-validated using the Venetian Blinds approach. Statistical analysis was performed using in-house MATLAB scripts and the PLS Toolbox statistical multivariate analysis library.

**Results:** These HF rats exhibited insulin resistance and higher levels of systolic blood pressure and triglycerides and lower HDL levels than controls. Liver histology revealed higher intrahepatic lipid content, suggesting an early hepatic damage. The metabolic profile of blood serum, urine and fecal extracts demonstrated differences associated to HF diet. Metabolites affected are involved in glycolysis, glycogenesis, TCA cycle, amino acid degradation pathways, urea cycle and glycerophospholipids metabolism among others. Interestingly, host-microbiota co-metabolism revealed lower microbiota diversity in the HF group.

**Conclusions:** 1H NMR-based metabolomics can provide a non-invasive mean for detection of sub-clinical organ damage and early MS. Microbiota co-metabolism by both diversity and functional composition seems to play a role in modulating the early development of MS on host organism.

**PP.07.12 ARMC5 MUTATIONS IN PATIENTS WITH PRIMARY ALDOSTERONISM AND BILATERAL ADRENAL LESIONS**

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**Objective:** Primary aldosteronism (PA) is the most frequent form of secondary hypertension and bilateral adrenal hyperplasia (BAH) is the most common PA subtype. The molecular mechanisms responsible for the development of BAH are still unknown, but the bilateral involvement of the adrenal glands suggests a potential predisposing genetic defect. Heterozygous germline mutations of ar- madillo repeat containing 5 (ARMC5) cause hypercortisolism due to sporadic primary bilateral macronodular adrenal hyperplasia and have been also observed in African-American patients affected by PA. We investigated the presence of germline ARMC5 mutations in a cohort of PA patients who had bilateral adrenal alterations detectable at CT-scanning.

**Design and method:** We retrospectively assessed 39 consecutive patients with PA (25 males and 14 females) at the Division of Internal Medicine and Hypertension Unit of the University of Torino between 2010 and 2014. All patients had bilateral alterations of the adrenals at CT-scanning.

**Results:** Thirty-nine PA patients (37 Caucasians and 2 black Africans; 8 unilateral, 27 bilateral and 4 undetermined subtype) with bilateral adrenal lesions were included in the study. The entire coding region of ARMC5 and all intron/exon
boundaries were successfully sequenced in all 39 patients; we identified 11 common variants, 5 rare variants with a minor allele frequency < 1% and 2 new variants not previously reported in public databases. We did not detect by in silico analysis any ARMC5 sequence variations that were predicted to alter protein function.

Conclusions: To conclude, ARMC5 mutations are not present in a fairly large series of Caucasian patients with PA and bilateral adrenal lesions. Further studies are warranted to definitively clarify the involvement of ARMC5 in the pathogenesis of adrenal nodules and aldosterone excess in PA patients.

PP07.13 THE C3435T POLYMORPHISM OF THE ABCB1 GENE INCREASES THE RISK OF ESSENTIAL HYPERTENSION IN CIGARETTE SMOKERS

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Objective: The present study was designed to examine a relationship between common polymorphism C3435T of the ABCB1 gene and risk of essential hypertension (EH) and to test the hypothesis whether associations of the ABCB1 genotypes with disease risk is modified by smoking status.

Design and method: A genetic association study of polymorphism C3435T of the ABCB1 gene was done through a TaqMan-based assay. The study participants included 1 370 EH patients and 850 age and sex matched healthy subjects. Genotyping of polymorphism C3435T (rs1045642) of the ABCB1 gene was done through a TaqMan-based assay.

Results: We found that the carriers of variant genotypes (i.e. 3435CT plus TT) of the ABCB1 gene possessed an increased risk of EH (odds ratio = 1.23; 95% confidence interval: 1.02–1.48, P = 0.03). The gene-smoking interaction analysis has revealed that a carriage of the 3435CT/TT genotypes is associated with increased EH risk only in cigarette smokers (OR = 1.42 95% CI 1.04–1.94, P = 0.03), whereas non-smoker carriers of these genotypes were not at disease risk. This association remained a statistically significant after adjustment for age, sex and body mass index by a multiple logistic regression analyses (P > 0.04).

Conclusions: This is the first study reporting that the association of ABCB1 C3435T polymorphism with hypertension is modified by smoking status. ABCB1 is a membrane-associated P-glycoprotein regulating an ATP-dependent drug efflux pump for xenobiotic compounds with broad substrate specificity. The 3435T variant is known to cause a decreased activity/expression of P-glycoprotein. It was reported that the ABCB1 expression is downregulated in peripheral blood mononuclear cells of spontaneously hypertensive rats. Our study finding suggests that since P-glycoprotein functions as a transporter of xenobiotic compounds in the blood-brain barrier, a decreased ABCB1 activity/expression in smokers with the variant genotypes may cause high blood pressure possibly through an enhanced sympathetic stimulation due to the accumulation of tobacco-related toxicants in the brain. The study was supported by Russian Science Foundation (number 15-15-10100).

PP07.14 DISCOVERY OF JAK/STAT SIGNALLING PATHWAY SINGLE NUCLEOTIDE POLYMORPHISMS ASSOCIATING WITH PRIMARY ARTERIAL HYPERTENSION

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Objective: In approximately 90% of cases of HT etiology is not well understood. Both environmental and genetic factors affect the presence of hypertension. In the transduction of a signal related to the activation of angiotensin II receptor are involved selected proteins of the JAK/STAT path.

The aim of this study was to evaluate the prevalence of selected single nucleotide polymorphisms (SNPs) in the coding sequences of genes: JAK3 and TYK2 via the transstat factors, STAT1, STAT3 factors, and SOCS1, SOCS3, CISH proteins in patients with essential hypertension on the background of the healthy population.

Design and method: The study included 536 subjects of the Polish population with mean age 32.78 ± 9.25 years. 244 patients with diagnosed essential hypertension (mean age 35.04 ± 8.53) and 292 subjects with normal blood pressure (mean age 32.78 ± 9.25 years). Symptoms, signs and laboratory tests, including genetic tests (analysis of SNPs in the analyzed genes: TYK2, JAK3, CISH, SOCS1, SOCS3, STAT1, STAT3) were performed.

Results: Of the 111 evaluated SNPs in 20 cases, only one SNP allele occurred. The remaining 91 SNPs were further analyzed. A comparison of the frequency of allele assessed in the control group with the expected frequency of the equations resulting from Hardy-Weinberg equilibrium was performed. In the case of 18 SNPs the frequency in the study groups was significantly different from the expected. In the analysis of alleles SNP rs13029247 of the STAT1 gene was more frequent in healthy group than in patients with hypertension (14.38% vs. 9.65%, P = 0.03). In the analysis of genotypes SNP rs12720729 of the TYK2 gene was more frequent as homozygous in the study group than in the control group (8.60% vs. 1.36%, P = 0.0001).

Conclusions: Significant differences in the incidence of selected SNPs in patients with essential hypertension in comparison to a healthy population was revealed in the case of polymorphism in the analysis of genotypes (TYK2 gene rs12720729) and polymorphism in the analysis of alleles (STAT1 gene rs13029247).

PP07.15 A PROMOTER POLYMorphism -271C > A OF THE CYP2C8 GENE IS ASSOCIATED WITH INCREASED RISK OF ESSENTIAL HYPERTENSION: A PILOT STUDY

M. Bykanova, I. Ponomarenko, S. Sirotina, A. Bocharova, K. Vagaytseva, V. Stepanov, O. Bushueva, M. Churnosov, M. Solodilova, A. Polonikov, 1 Kursk State Medical University. Department of Biology, Medical Genetics and Ecology, Kursk, RUSSIA, 2 Research Institute for Medical Genetics. Laboratory of Evolutionary Genetics, Tomsk, RUSSIA, 3 Belgorod State University. Department of Medical Biological Disciplines, Belgorod, RUSSIA

Objective: The purpose of our pilot study was to investigate associations between polymorphisms of the CYP2C8 gene with susceptibility to essential hypertension (EH) in Russian population.

Design and method: A genetic association study of common polymorphisms of the CYP2C8 gene with essential hypertension in Russian population. A total of 1 459 unrelated Russian individuals (Kursk region) including 845 EH patients and 614 age and sex matched healthy subjects with normal blood pressure were recruited for this study. Two common polymorphisms -271C > A (rs7909236) and 404C>A (rs1349453) of the CYP2C8 gene were genotyped using the MassARRAY 4 system.

Results: Genotype frequencies of CYP2C8 gene polymorphisms were in agreement with Hardy–Weinberg equilibrium in all groups. We found that variant genotypes -271CA plus AA were significantly associated with increased hypertension risk (odds ratio = 1.31; 95% confidence interval: 1.04–1.64, P = 0.02). The association remained a statistically significant after adjustment for age, sex and body mass index by a multiple logistic regression analyses (P = 0.03). Moreover, a homozygous variant genotype 404AA tended to be associated with an increased risk of EH (odds ratio = 1.41; 95% confidence interval: 0.98–2.02, P = 0.06).

However, no significant association was found between rs1349453 and EH after adjusting for the covariates.

Conclusions: CYP2C8 is a cytochrome P450 enzyme involving in the generation epoxyeicosatrienic acids (EETs) from arachidonic acid, an important biochemically cardiovascular pathway creating mediators of inflammation and blood pressure regulation. A polymorphism -271C>A located in the promoter region of the CYP2C8 results in the creation of a C/EBPalpha transcription factor consensus sequence influencing a transcriptional activity of the gene. The -271C>A polymorphism of the CYP2C8 gene may contribute to hypertension susceptibility through the mechanisms related with biosynthesis of vascular EETs and those inducing oxidative stress by reactive oxygen species which are generated during the epoxidation of arachidonic acid by the CYP450 epoxigenase. Our pilot study is the first to show that the -271C>A polymorphism of the CYP2C8 gene is associated with increased risk of hypertension. The study was supported by Russian Science Foundation (number 15-15-10010).

PP07.16 THE RELATIONSHIP BETWEEN GENES INVOLVING IN ARYL HYDROCARBON RECEPTOR SIGNALING PATHWAY AND RISK OF ESSENTIAL HYPERTENSION

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Objective: The purpose of this study was to investigate whether polymorphisms in genes involving aryl hydrocarbon receptor (AHR) signaling pathway are associated with the risk of essential hypertension (EH).

Design and method: A genetic association study of the AHR signaling pathway gene polymorphisms with essential hypertension in Russian population. A
total of 1908 unrelated Russian subjects including 1140 EH patients and 768 age and sex matched normotensive controls were recruited for this study. Seven common functional polymorphisms such as R554K (rs20608533), ARNT 567G > C (rs2252956), CYP1A1 1462 V (rs1048943), CYP1A2 154C > T (rs2031255), CYP1B1 V432L (rs1056836), NQO1 P187 (rs1800562) were selected for the study. The polymorphisms were genotyped using TaqMan-based assays.

Results: We found that carriers for variant genotypes (567GC plus CC) of the ARNT gene were at an increased risk of EH (odds ratio = 1.23; 95% confidence interval: 1.02–1.48, P = 0.03). Moreover, a genotype 154AA of the CYP1A2 gene was associated with decreased risk of EH (odds ratio = 0.74; 95% confidence interval: 0.55–0.98, P = 0.04).

Conclusions: To the best of our knowledge, this is the first study reporting associations between ARNT signaling pathway genes and the risk of essential hypertension. ARNT signaling represents a very promising target for prevention and treatment of hypertension due to its role in heart and vascular physiology, blood pressure regulation and vascular nitric oxide generation. However, ARNT is an orphan nuclear receptor with a primary function of mediating xenobiotic metabolism through transcriptional activation of Phase I and Phase II biotransformation enzymes, suggesting a potential role of this pathway in the mechanisms of air pollution-induced hypertension. Our preliminary study findings demonstrate a potential importance of polymorphic genes mediating adaptive and toxic responses to environmental xenobiotics such as halogenated aromatic hydrocarbons in the development of human hypertension. Further investigations are required to confirm the contribution of these genes to essential hypertension risk in independent populations, to assess gene-environment interactions underlying this susceptibility and to designate novel options for disease treatment and prevention. The study was supported by Russian Science Foundation (number 15-15-10010).

**PP07.17**

**VITAMIN D RECEPTOR GENE POLYMORPHISMS, FGF-23 AND FETUIN-A IN ESSENTIAL HYPERTENSION**

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Objective: The association between FokI and BsmI vitamin D receptor gene (VDR) polymorphisms and cardiovascular risk was analyzed with contrasting results. Low plasmatic concentrations of fetuin-A, a negative regulator of vascular calcification, and high levels of fibroblast growth factor 23 (FGF-23), a calcium and phosphate metabolism regulator, seem to be associated with higher cardiovascular mortality or age was to evaluate possible association between FokI and BsmI VDR polymorphisms and plasma concentrations of fetuin-A and FGF-23 in essential hypertension.


Results: No significant correlations were found either between 25[OH]D and FGF-23, or between 25[OH]D and fetuin-A. When patients were divided according to FokI and BsmI genotypes, we did not observe any significant difference in 25[OH]D, fetuin-A and FGF23 values among different subgroups. Considering FGF-23 median value (79 pg/ml), we did not find any association between a genotype or allele and FGF-23 serum level higher than cut-off. A similar result in 25[OH]D, fetuin-A and FGF23 values among different subgroups. Considering FGF-23, or between 25[OH]D and fetuin-A. When patients were divided according to FokI and BsmI VDR polymorphisms analysis.

Conclusions: In our group of NT and untreated HT with normal kidney function fetuin-A was not associated with BP even after adjustment for other risk factors. Even more, we did not find an association of two common adiponectin gene polymorphisms with HT. Adiponectin-BP relationship is complex and differs between specific populations. Our conclusions should not be extrapolated to subjects with other characteristics. Studies on larger number are needed.
**PP.07.20**

**CORRELATION OF POLYMORPHISM RS699 (G (-6) A) IN THE PROMOTER OF THE GENE CODING ANGIOTENSINOGEN AND EARLY MANIFESTATION OF HYPERTENSION**

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**Objective:** The objective of this study is to find the relationship between polymorphisms rs699 in the promoter angiotensinogen encoding a functional change in the final product, and the early manifestation of hypertension and the existence of the earlier target cardiac damage in young hypertensive patients.

**Design and method:** The prospective study design includes a selection of the target group - young hypertensive patients aged 18–50 years with high blood pressure, defined as cases, and the control group including same age patients without hypertension. A questionnaire containing demographic, anthropometric and clinical data on the examined groups was used. Blood for genetic analysis was taken, and echocardiography was performed for studying target organs damage. The methods used for DNA analysis were TaqMan-PCR and PCR-HRM. An appropriate statistical analysis were (Fisher exact test, chi-square test, central tendency and descriptive statistics) done to compare groups.

**Results:** The study showed that in a total of 78 subjects (48 young hypertensives and 30 controls) the frequency of the tested polymorphism was 59.0%. As 70.8% (34 patients) of young hypertensive patients were carriers of rs699 and only 40% (12 patients) in the control group had the same polymorphism. RR (risk ratio) for early hypertension in rs699 carriers is eRR = 1.69 (1.15–2.48), p = 0.01 (Fisher exact test). Analysis of data from surveys and echocardiography showed that 96% of young hypertensive carriers of this polymorphism had hypertension onset of about 30 years had expressed LVH and diastolic dysfunction.

**Conclusions:** Our results showed that the frequency of rs699 polymorphism was significantly higher in young hypertensive patients with essential hypertension compared with normotensive in the same age. Also, the presence of this SNA polymorphism in the genome was associated with an earlier manifestation of hypertension and earlier target heart damage.

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**PP.07.21**

**PARG GENE POLYMORPHISM IS ASSOCIATED THE DEVELOPMENT OF LEFT VENTRICULAR HYPERTROPHY IN ARTERIAL HYPERTENSION**

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**Objective:** The purpose of the study was to investigate a possible association of polymorphic markers of the gene encoding nuclear receptor of PPAR family and nuclear proteins PARP and PARG, elements of the antioxidant defense system and endothelial NO-synthase with the development of target organs lesions in hypertension.

**Design and method:** Study population consists of 212 AH patients (pts). The lack of consent to participate, prior myocardial infarction and valvular heart disease were exclusion criteria. There were 94 (44.3 %) men and 118 (55.7 %) women. The mean age of the pts was 60.23 ± 0.74 years, duration of hypertension was 14.2 ± 0.79 years. We found LVH in 127 of 212 pts. LVH pts were older than those without LVH, there were more women than men among them, had a longer arterial hypertension case history and had higher values of maximum systolic blood pressure.

**Results:** Association of alleles and genotypes frequencies of PPARG2, PPARG3, PPARA, PPARGC1A, PARP1, ADPRT1 genes and LVH were not found. LVH was associated with a higher frequency of 4a allele of NOS3 gene (OR 1.68 CI [1.07–2.62], p = 0.016) and a lower frequency of 4b/4b genotype (OR 0.43 [0.23–0.79], p = 0.005) and 4b allele (OR 0.59 [0.37–0.93], p = 0.016). Also LVH was associated with a higher frequency of GG genotype (OR 3.61 CI [1.21–12.91], p = 0.024) and G allele (OR 1.64 CI [1.01–2.67], p = 0.03) and a lower frequency of A allele (OR 0.27 CI [0.07–0.98] p = 0.03) of PARG gene. Carriers of rare GG genotype (A (–431) G of PARG) had a significantly greater LVMM and LVMI compared to carriers of the A allele. Carriers of CC genotype (C24313G) of PPARA gene had statistically significant thicker walls of left ventricular, more LVMM and LVMI and no differences in left ventricular function parameters.

**Conclusions:** Age, systolic blood pressure, polymorphism of NOS3 and PARG genes were independently associated with LVH in multivariate regression analysis.
POSTER SESSION

POSTERS’ SESSION PS08:
INNOVATIVE TECHNIQUES AND DEVICES

**PP.08.01**
BLOOD PRESSURE TELEMONITORING EFFECTIVENESS IN PATIENTS WITH UNCONTROLLED HYPERTENSION, IMPACT OF ANXIETY AND DEPRESSION

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Objective: To estimate the efficacy of home blood pressure (BP) telemonitoring in patients with uncontrolled hypertension (UCHT) from specialized hypertension excellence center.

Design and method: 62 ambulant patients with prior diagnosis of UCHT were invited to assign into this pilot study with use of secure web-site designed for patient-doctor communication only. All patients signed the informed consents and filled in HADS. 37 patients were enrolled to the procedures of BPTM for 3 month follow-up period: 27 males (73%), 10 females (27%) 45 ± 9 years old in comparison to 25 hypertensive patients matched by age and sex (15 males and 10 females 48 ± 8 years old) randomized to usual care.

BP level changes were evaluated by office BP measurements initially, at 8 and 12 week visits in intervention group also confirmed by ABPM. Mean number of home BP self-measurements by subjects was 14 per week.

Results: Mean office BP level (158 ± 8/9 ± 9 mmHg) reduced to 134 ± 6/78 ± 7 mmHg (p < 0.95) after 3 months in BPTM group. In 35 cases (95%) target BP levels have been achieved at the end of follow-up period. Furthermore, 21(57%) subjects achieved BP targets at first 8 weeks and 14(38%) patients (8 points HADS or higher) – r = 0,4, p < 0,05 and depression (8 points HADS or higher) – r = 0,5 p < 0,05. Usual care group characterized by higher values of BP level changes were evaluated by office BP measurements initially, at 8 and 12 week visits in intervention group also confirmed by ABPM. Mean number of home BP self-measurements by subjects was 14 per week.

Conclusions: Home BPTM is an effective method for clinical improvement in patients with UCHT.

**PP.08.02**
AUTOMATIC IMAGE ANALYZER TO ASSESS RETINAL VESSEL CALIBER (ALTAIR) TOOL VALIDATION FOR THE ANALYSIS OF RETINAL VEINS

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Objective: To assess the reliability and validity of the tool Automatic image analyzer to assess retinal vessel caliber (ALTAIR) to analyze the vesselization of the retina and cardiovascular risk prediction.

Design and method: Cross-sectional study including 25 healthy participants (72% females), mean age 21.12 ± 0.73 years. FMD and FMS were simultaneously measured at baseline and 1 min after a ischemia period. Ischemia was induced by inflating a cuff for 5 min on the right forearm, 50mmHg above each participant's systolic blood pressure. FMS was measured as the absolute (d) and percentual (%) change in carotid-radial PWV (PWV), measured with the Compisor Analyse.

**PP.08.03**
COULD FLOW MEDIATED SLOWING CONSTITUTE A METHODOLOGICAL ALTERNATIVE TO THE CONVENTIONAL ECHO-TRACKING FLOW-MEDIATED DILATION TECHNIQUE FOR THE EVALUATION OF ENDOTHELIAL FUNCTION?

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Objective: The Moens-Korteweg equation predicts changes in pulse wave velocity (PWV) following changes in arterial radius, therefore an increase in arterial radius, as seen in a reactive hyperaemia (RH) condition, should slow PWV over a given arterial segment. If this assumption is true, than the deceleration of PWV over the brachial artery (flow-mediated slowing – FMS) should be an equivalent signal of endothelial function during a conventional RH flow-mediated dilatation (FMD) procedure. Our aim was to compare FMS with FMD after RH in healthy subjects, as part of a study that seeks to evaluate the clinical usefulness of FMS.

Results: In the sample, the 32% are obese, 68% hypertensive and 17% diabetic. The interobserver ICC for thickness, area and length of veins and arteries ranged from 0.809 to length of arteries to 0.916 to veins area. The intraobserver ICC for intra thickness, area and length of veins and arteries ranged from 0.640 for the length of the veins and 0.906 for the area of the arteries and the inter device ICC was for arterioneronous ratio (AVR) 0.887, thickness of arteries 0.590 and veins thickness 0.677. We found a moderate correlation of the age (r between 0.30 and 0.50, p < 0.001) with the retinal vascular parameters analyzed.

Conclusions: The ALTAIR tool shows a good reliability in the concordance inter observers, intra observer and inter device measurements and a concordant validity to show an association with vascular parameters, target organ damage and cardiovascular risk.

Figure 1. Correlation of FMS and FMD.

Design and method: Cross-sectional study including 25 healthy participants (72% females), mean age 21.12 ± 0.73 years. FMD and FMS were simultaneously measured at baseline and 1 min after a ischemia period. Ischemia was induced by inflating a cuff for 5 min on the right forearm, 50mmHg above each participant's systolic blood pressure. FMS was measured as the absolute (d) and percentual (%) change in carotid-radial PWV (PWV), measured with the Compisor Analyse.
Results: Mean baseline brachial diameter was 3.46 ± 0.59 mm, and was smaller in females compared with males (3.12 ± 0.22 mm versus 4.17 ± 0.43 mm, respectively; p < 0.001). Mean FMD was 8.18 ± 3.65%, dPWV was -0.83 ± 0.70 m/s, and %PWV was 9.45 ± 8.31%, and were similar in males and females. A significant correlation was observed between both measures of FMS (dPWV and %PWV) and echo FMD: R = –0.42 (p = 0.044) and R = -0.46 (p = 0.02), respectively (cf. figure). FMD was shown to be dependent on the baseline brachial diameter, with smaller variations depicted for smaller baseline brachial diameters.

Conclusions: FMS measured with the Compilo Analyse device appears to be a promising and feasible method for measuring changes following RH, showing a significant correlation with FMD in young and healthy individuals, although further studies are needed to demonstrate the clinical usefulness of this method.

**PP.08.04**

**Changes in Renal Artery Dimensions Predicted Blood Pressure Response Following Renal Denervation. An Intravascular Ultrasound study**

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Objective: Procedural characteristics predicting blood pressure (BP) response to renal denervation (RDN) are currently lacking. The changes in renal artery (RA) dimensions induced by RDN have rarely been quantified and never been related to BP.

Design and method: We prospectively investigated RAs of 17 patients (7 females, 11 diabetics, mean age 61.9 years) pre and post RDN (Symplicity Flex in 9 pts, Symplicity Spyral in 8 pts) with intravascular ultrasound (IVUS; Atlantis pro, Boston Scientific iLab). IVUS images were analyzed with QCU-CMS research software yielding global measures of RA size (RA vessel volume Vv, lumen volume Vl, wall volume VW), and measures of most pronounced focal changes (minimum and maximum vessel area VA, lumen area LA and wall thickness WT).

Results: Pre RDN, 24 hour BP was 152/88 mmHg, mean number of ablation points was 11.8 (SD 3.8). After 1, 3, 6, and 12 months, 24 hour BP decreased by 15.6 (SD 16.9), 16.9 (SD 20.9) mmHg, respectively. RDN induced a non-significant decrease in RA VV of 5.6 (SD 9.4) %, a significant decrease of RA LV of 8.9 (SD 10.4) %, and a non-significant increase of RA VW of 6.9 (SD 11.4) %. Max and min LA decreased significantly by 7.3 (SD 9.1) % and 10.5 (13.9) %, respectively, as did min VA by 6.8 (12.2) %. Max WT increased significantly by 14.1 (SD 21.1) % 24-hour-based BP changes at 1, 3, 6, and 12 months were significantly and directly related to focal changes in min LA and min VA (r = 0.50 – 0.72, p-values 0.003 – 0.05). The change in min WT at 1, 3, and 12 months was significantly and inversely related to the change in systolic BP (r = -0.49, -0.54, -0.72, respectively; p < 0.006 – 0.05). Changes in global measures of RA size showed only moderate correlations with changes in BP.

Conclusions: RDN leads to effects on global and focal RA dimensions (decrease in vessel and lumen size, increase in wall thickness). A higher degree of focal changes, particularly focal vessel narrowing and vessel thickening, may be associated with a better BP response to the procedure.

**PP.08.05**

**Comparison of Arterial Stiffness Assessed by Pómpomètre® with Arterial Stiffness Assessed by Applanation Tonometry: A Clinical Study**

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Objective: Large artery stiffness is recognized as a strong, independent marker of cardiovascular risk, mainly through aortic pulse wave velocity (PWV). Pómpomètre® is a new non-invasive method, which estimates aortic PWV through finger/toe (FT) wave analysis. In a previous study, Alvin et al. (Archives of Cardiovascular Diseases 2014) have shown an acceptable correlation (r² = 0.43 for PWV) between Pómpomètre® and the reference method. However this study led to the necessity to optimize the algorithm and the procedures because of the presence of several outliers involving mainly these and elderly subjects, and occurrence of suboptimal toe pulses. The objective is to analyze the accordance between FT PWV measured by the Pómpomètre® with optimized algorithm and procedures, and carotid-femoral PWV (CF PWV) measured using SphygmoCor®.

Design and method: The Pómpomètre® has 2 photodiodes sensors, positioned on the finger and on the toe, next to the pulp artery. A particular attention was drawn on positioning of the toe sensor so that the pulp was in contact with the photo-diode. Different signal processing chains were applied and no cut-off value was used for pulse height. Applanation tonometry was performed for CF PWV measurements. Pearson’s correlation was performed.

Results: 45 subjects were included: 18 healthy subjects and 27 patients with essential hypertension aged 32 ± 7 years and 58 ± 18 years respectively. The correlation between FT PWV and CF PWV was good and significant (r² = 0.77; p < 0.0001). A better correlation was found in terms of transit time (r² = 0.83; p < 0.0001). The Bland and Altman analysis, mean difference was 0.35 m/s p < 0.0001 versus –11 ms p < 0.0001, the standard deviation of the difference was 0.87 m/s versus 6.73 ms, classifying the device as good agreement with reference (Wilkinson, ARTERY RES 2010). A significant bias persisted with underestimation in older subjects.

Conclusions: Pómpomètre® with optimized algorithm and procedure qualifies as excellent agreement with the reference technique for PWV assessment Compared to EF PWV, FT PWV is faster, easier to perform and importantly, more acceptable to patients, however, outcome studies must confirm the new device.

**PP.08.06**

**Is the Development of Telemedicine in Hypertension a Digital Immigrant Issue?**


Objective: Telemedicine refers to the use of medical information exchanged from one site to another via electronic communication and the role in the management arterial hypertension should strive against uncontrolled patients. Nowadays, patients easily e-transfer their results of home blood pressure measurement (HBPM) and practitioners receive and assess these HBPM results. Young generations, grown with the Internet, have been labelled “digital natives” (born after 1985) in comparison with older generation, labelled “digital immigrants”, who need to learn e-technology. Thus, we aimed to collect data on technical equipment of physicians and patients, on their expectations of use about this way of relationship.

Design and method: 116 physicians, hypertension specialists (36 ± 9 y, 50.8% men), mostly hospital practitioners (84.5 %) and 322 hypertensive outpatients (61 ± 14 y, 60.4% men, SBP/DBP average 143 ± 19/82 ± 13 mmHg, 31.8% with diabetes) completed a self-administered questionnaire.

Results: The prevalence of technical equipment in both groups is summarized in Table 1.

<table>
<thead>
<tr>
<th>Patients</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=452</td>
<td>n=116</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>252 (72.6%)</td>
</tr>
<tr>
<td>Smartphone</td>
<td>103 (32.0%)</td>
</tr>
<tr>
<td>- With Bluetooth</td>
<td>103 (33.9%)</td>
</tr>
<tr>
<td>- With Internet Access</td>
<td>103 (32.0%)</td>
</tr>
<tr>
<td>- With medical applications</td>
<td>76 (76.5%)</td>
</tr>
<tr>
<td>Digital tablet</td>
<td>51 (15.8%)</td>
</tr>
<tr>
<td>Laptop</td>
<td>133 (41.6%)</td>
</tr>
<tr>
<td>Desktop</td>
<td>153 (41.7%)</td>
</tr>
<tr>
<td>Internet at home</td>
<td>229 (69.9%)</td>
</tr>
<tr>
<td>Box with WiFi at home</td>
<td>196 (60.9%)</td>
</tr>
<tr>
<td>Acceptance of transferring medical data via Internet from mobile devices</td>
<td>191 (59.3%)</td>
</tr>
</tbody>
</table>

68.2% of patients had an HBPM device (51.6% upper arm). From the 69/98 diabetic patients used a blood glucose meter. 41% of patients vs 66% of physicians believed that telemedicine could improve the control of hypertension; 25% of patients vs 22% physicians thought that consultations’ frequency could be lightened. 18% of physicians thought that HBPM would fight inertia.
The importance of hemodynamic profile in the management of hypertensive patients

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Objective: To analyze the hemodynamic profile of treated hypertensive patients without optimal blood pressure control and to evaluate the consequences of an anti-hypertensive treatment that do not properly address the hemodynamic profile of these patients.

Design and method: Fifty-one consecutive hypertensive patients treated with at least 2 anti-hypertensive drugs admitted to our department between February 2014-May 2015 for uncontrolled blood pressure (BP) (over 140/90mmHg) and who gave written consent to participate in the study were evaluated by 12 lead ECG (for LVH by Socolow-Lion criterion), standard trans-thoracic echocardiography by GE Vivid 7 (LVEF, transmitral Doppler Flow pattern, LA enlargement and LVH) and non-invasive hemodynamic evaluation by HOTMAN system (volemia, ionotropism, vasoactivity and chronotropism).

Results: Study sample had a mean age of 61.39 ± 13.3 years (range 32–89 years) with an equal gender distribution (30 males, 58.8% and 21 females, 41.2%). Mean values of BP and hemodynamic parameters were: SBP 152.59 ± 19.522 mmHg; DBP 88.27 ± 11.93 mmHg; MAP 109.67 ± 12.930 mmHg; SI 49.18 ± 20.73 mls/m²; LSVI 72.44 ± 31.88 g x m/m²; SSVRI 208.37 ± 106.59 dyn x sec x cm/cm². There were 6 different hemodynamic profiles (Figure 1) and 10 different patterns of altered hemodynamic modulators (Figure 2).

Conclusions: Uncontrolled treated hypertensive patients have a wide variety of hemodynamic profiles with at least 2 altered hemodynamic modulators requiring therefore an individualized therapeutic approach.

Failure to address altered hemodynamic modulators by proper anti-hypertensive drug class results in more frequent sub-clinical target organ damage.

The role of intravascular ultrasound in fibromuscular dysplasia treatment

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Objective: Fibromuscular dysplasia (FMD) is a relatively rare reason for secondary hypertension, predominantly in young women. Intravascular ultrasound (IVUS) plays a potentially important role for defining the precise type of FMD and to properly direct treatment – balloon PTA. This may lead to better results.

Design and method: This is a clinical case of 25 year old woman. She was with arterial hypertension for the last 3 years, maximal values 200/100 mmHg, and self-measured on a centrally acting medication 130/80 mmHg. Ambulatory blood pressure monitoring showed elevated day and night blood pressure values. There were no clinical signs for aortic coarctation. TSH in the reference range. Smoking an amnesis. Low-dose estrogen-progesteron anti-conception therapy in the past. Renal arteries Doppler – Ve 300 cm/sec for the distal right renal artery, Ve for the aorta 65 cm/sec. Contrast CT of the renal arteries and low extremities – inconclusive.

Conclusions: Renovasography was performed and renal fibromuscular dysplasia with minimal fibrosis was diagnosed. Right renal artery – critical 99% stenosis of the low renal artery branch; 80% of the upper renal artery branch, collateralized through the capsular artery. Intravascular ultrasound was conducted: minimal hyperplasia of middle and distal segment; the potential segment with echonegative areas, characteristic of medial necrosis. ML 1.9 mm. A successive PTA with rising diameter drug eluting balloons was performed on top of premedication with aspirin and clopidogrel. Post-procedure blood pressure 90/60 mmHg.

Conclusions: The patient was discharged on dual antiplatlet therapy: 6 months later the home measured blood pressure monitoring was in the reference range without anti-hypertensive treatment. The use of IVUS in the treatment of FMD with PTA may lead to better and more durable clinical results. Still larger groups of patients are needed to precise IVUS-based treatment.

Chronic microvibration treatment does not influence blood pressure but ameliorates renal perfusion and antioxidative defense in hypertensive rats

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Objective: Only a few studies include research of microvibration therapy in animal models. We examined effects of chronic vibroacoustic-microvibration treatment on haemodynamics and antioxidative defense in experimental hypertension.

Design and method: Study was performed on spontaneously hypertensive (SHR) and normotensive (Wistar) rats. Animals were treated by VITAFON-T vibroacoustic device 10 minutes/day. Mean arterial pressure (MAP), cardiac output (CO), renal blood flow (RBF), glomerular filtration and activity of anti-oxidative enzymes were determined after three weeks treatment.

Results: Vibroacoustic treatment had no influence on MAP and CO, while RBF was increased in both Wistar and SHR vs. their respective controls (Wistar 21.45 ± 1.24 vs. 16.64 ± 2.59, p < 0.05, SHR 21.44 ± 2.41 vs. 16.22 ± 2.05, p < 0.05 ml/min/kg). Additionally, treatment enhanced diuresis (81.84 ± 11.01 vs. 41.91 ± 2.59, p < 0.01 ml/24 h/kg) and stimulated glomerular filtration (12.16 ± 1.94 vs. 6.36 ± 0.75, p < 0.01 ml/min/kg) only in hypertensive rats. Glutathione peroxidase activity was elevated in both treated rat strains vs. respective controls (Wistar 73.14 ± 9.64 vs. 18.75 ± 3.01, p < 0.001; SHR 287.15 ± 26.3 vs. 205.09 ± 26.18, p < 0.05 U/gHb). Activity of superoxide dismutase was unchanged.

Conclusions: We conclude that vibroacoustic microvibrations can’t ameliorate hypertension but are able to improve both renal blood supply and glomerular filtration, stimulate diuresis, and also enhance glutathione dependent antioxidative defense. This pioneering treatment expresses more beneficial effects in hypertensive animals.

Artificial intelligence utilizing neuro-fuzzy hybrid model for the classification of blood pressure

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Objective: A Neuro fuzzy hybrid model (NFHM) is used as a new Artificial Intelligence method to classify blood pressure (BP). The objective is to model the behavior of the blood pressure based on monitoring data of 6 days with 4 samples per day, two samples were taken at noon and two more in the afternoon. The new computational model based on the data entered to a classifier determines the level of BP to which the patient belongs.

Design and method: Intelligent computing techniques, such as neural networks and fuzzy logic, working with a modular architecture are used to model the BP behavior. We work with different numbers of layers and some other learning parameters and we also use a fuzzy rule base with the expert knowledge of BP classification so we can achieve a more accurate modeling.

Results: Of the 30 patients that were monitored, patients were considered in different stages, such as high BP, normal BP and low BP, in this order to use our system with patients in different conditions. Different architectures of NFHM were used to achieve better results. Architecture 1 gave better results than Architecture 2 in all 30 experiments. First we have the systolic architecture 1 with an Error Mean (EM) of 3.747% and the systolic architecture 2 with an EM of 8.471%. Finally we have the diastolic architecture 1 with an EM of 2 % and the diastolic architecture 2 with an EM of 7.241%.

Conclusions: This type of NFHM actually implements the human reasoning. Using a set of decision rules we can offer a diagnosis, in this case of BP classification. This is a very efficient, less time consuming and more accurate method to classify BP. Finally we can note that is a very effective method for diagnosis of hypertension or hypotension, which can help a physician or health worker to achieve better accuracy when giving a diagnosis to the patient. It can also motivate working on other kinds of tests utilizing Artificial Intelligent techniques for the diagnosis of different cardiovascular diseases.

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PP.08.11 A NOVEL CUFFLESS BLOOD PRESSURE MEASUREMENT TECHNOLOGY: CONCEPT AND FEASIBILITY

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Objective: A pocket-size cuffless device for self-measurement of blood pressure (BP) has been developed (Freescan, Maisense). The principle of this technology is presented. The feasibility in providing valid self-BP measurement in adults was evaluated.

Design and method: This novel technology is based on its capability to read BP directly from the radial pulse using three electrodes and one force-sensor. The user has to apply the force-sensor on the radial artery. The wave pulse is combined with single-lead electrocardiography, providing the device with parameters used for calculating BP (systolic and diastolic) and pulse rate in a few seconds. Anthropometric characteristics (age, gender, height, weight) are recorded on the device, which requires individualized initial calibration based on a reference arm BP measurement performed by using a validated BP monitor, before proceeding to self-measurement. Normal, hypertensive and hypertensive (untreated or treated) adults were included. A demonstration was made to each participant lasting about 5 min aiming to familiarize with the device. The user was then allowed to make up to 3 attempts to self-measure BP, with at least 3 successful attempts considered as ‘pass’.

Results: A total of 108 adults were included (57% men, 54% hypertensives, mean age 48.2 ± 11.6 [SD], BMI 28.5 ± 4.9 kg/m2, wrist circumference 17.8 ± 1.8 cm). In an initial subgroup of 73 subjects the overall ‘pass’ feasibility rate was 55% (40 subjects). After upgrading the firmware for the pulse detection, 35 additional individuals were recruited, of whom 28 (80%) passed the feasibility. Among the latter 28 subjects, 50% made 3 attempts, 32% made 4 attempts and 18% made 5 attempts to have 3 successful measurements.

Conclusions: A novel pocket-size cuffless BP monitor with promising potential for portable self-monitoring of BP by patients with hypertension has been developed (Freescan, Maisense). The principle of this technology is presented. The feasibility in providing valid self-BP measurement in adults was evaluated.

PP.08.12 COMPARISON OF THE DETECTION OF PERIPHERAL ARTERY DISEASES WITH AN IMPROVED AUTOMATED OSCILLOMETRIC DEVICE AND THE STANDARD DOPPLER METHOD

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Objective: In occidental countries more than 20% of people over 65 years of age have peripheral artery diseases (PAD) however more than 50% of them are asymptomatic and therefore undiagnosed and untreated. According to current guidelines, ankle brachial index (ABI) should be measured in primary care to screen for PAD. This is however not performed in clinical practice because the standard Doppler method to assess ABI is cumbersome and time consuming. In this study we compare ABI measurements obtained by an improved automated oscillometric device, the MESI ABPMID device (MESI d.o.o., Slovenia) with the standard Doppler method.

Design and method: AIBI was measured in a general practice 4 times in random order in each subject: 2 with Doppler probes by 2 operators (AIBI_dop) and 2 with the MESI device (AIBI_mesi). ABI_dop was measured from the ratio of the highest systolic blood pressure from both tibial and dorsalis pedis artery by the highest systolic blood pressure of both brachial artery. AIBI_mesi was obtained automatically with simultaneous measurements on three extremities by MESI ABI MD device.

Results: According to AIBI_dop, PAD was present in 10% of the 136 screened subjects (68.2 ± 7.4 years). Inter-operator coefficient of variation (CV) was 5.5% for AIBI_dop while the intra-subjects CV for AIBI_mesi was 3.0%. AIBI_mesi was correlated with AIBI_dop (R = 0.61, p < 0.0001). The difference between the 2 techniques was normally distributed, centred at 0.06 ± 0.14, with negligible bias across the range (R = 0.19, p < 0.0001). Therefore AIBI_mesi provided slightly but significantly higher values than AIBI_dop (p < 0.0001). AIBI_mesi < 1 had a sensitivity of 85% and specificity of 96% to detect AIBI_dop < 0.9 and hence PAD. MESI ABI MD measurements were completed three times faster than Doppler probe measurements.

Conclusions: MESI improved automated oscillometric method offered a faster and more reliable measure of ABI with only a small, clinical irrelevant overestimation of ABI value. The tested MESI ABI MD improved oscillometric system can be used as screening tool for patients in general practice and would enable family doctors to comply with current guidelines for PAD.
PP.08.14
EUSTAR: EUROPEAN SOCIETY OF HYPERTENSION
TELEMEDICINE IN ARTERIAL HYPERTENSION
REGISTER - DESIGN AND RATIONALE

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Objective: Failing to reach blood pressure (BP) goals is a major problem in treatment of hypertension, causing a high socioeconomic burden, sequel morbidities and strongly increased mortality. Recent studies demonstrated that an intervention decentralized telemonitoring (iDTMâ) can strongly improve BP management in hypertension including high risk patients. In the EdiMed-Project (efficiency analysis of services in telemedicine) - supported by German Ministry for education and research - the cost-benefit ratio was analyzed and a positive socioeconomic impact was found.

Design and method: This project aims at establishing a telemonitoring system that allows to extend this service to all European Excellence centers for hypertension treatment and ultimately to all physicians treating hypertensive patients in Europe. For this effort, the unique software SciTIMâ providing highest standard of data security was developed for the register to allow:

- Making iDTMâ available to physicians and patients across Europe
- Establishing telemedical standards for selected hypertensive indications (renal failure, pregnancy, juveniles)
- Establishing a system for collections of high quality epidemiologic data from daily medical practice, ultimately extend beyond planned register

Results: The register nucleus will start with 8 ESH-centers in June 2016. To integrate data directly from the data management systems the project will generate interfaces to the most commonly used medical data management systems. In addition, the system will provide a user interface to physicians, enabling to monitor their patient’s telemonitoring progress at the first time directly in their electronic health records enabling physicians to set individual patient limits and general practitioners based on patient data.

Conclusions: The EUSTAR consortium will establish a register based on needs of medical specialists under the aegis of the ESH. A database will be created that allows safe and standardized exchange of data. The system will include interfaces for data collection from medical measurement devices and be open for all possible providers and also for other data than the first two parameters blood pressure and body weight.

PP.08.15
A NEW ARTIFICIAL INTELLIGENCE METHOD BASED ON MODULAR NEURAL NETWORKS FOR CLASSIFICATION OF ARTERIAL HYPERTENSION

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Objective: The development of an artificial intelligence method to diagnose and classify the arterial Hypertension based on the level of the blood pressure (BP) of a patient. The main goal is to diagnose the degree of Hypertension based on the BP values using a modular neural network (MNN) applying response integration via the average method.

Design and method: This study was performed with 28 patients to classify the blood pressure levels, based on the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) Guidelines of Hypertension. We collected patient data with the Ambulatory blood pressure monitoring (ABPM), which is a tool that can help diagnose hypertension. The main goal is to model the 24-hr ABPM patterns in patients with the MNN and classify the BP of the patient using the Levenberg-Marquardt algorithm, which is a good method that guarantees a high learning speed in the MNN. The proposed computational method using Artificial Intelligence techniques consists on designing the best system architecture of the MNN based on previous data for classification the levels of BP of each patients.

Results: Based on the data of the ABPM in the 28 patients, we built a computational system using three different MNN architectures. The first one achieved a classification rate of 93.3%, the second one a 91.7% and the third one a 89.7% respectively, and with this we can note that excellent classifications results are obtained. The best architecture of the MNN for achieving these results is the following: 25 neurons in the first layer and 30 neurons for the second layer for each of the modules, and the Target Error for learning is of 0.002 and 500 epochs are used during learning.

Conclusions: We can conclude that with the proposed method using a MNN and the European Guidelines of Hypertension, good results are obtained for diagnosis and classification of hypertension. In this case we can note that MNNs have proven to be a reliable and accurate technique when compared to conventional classification methods for this problem and decrease the inter observer variability.

PP.08.16
AUTOMATICALLY CLASSIFYING ESSENTIAL ARTERIAL HYPERTENSION FROM PHYSIOLOGICAL AND DAILY LIFE STRESS RESPONSES

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Objective: Essential arterial hypertension (EAH) might be correlated with an abnormal response to stressful life events. For understanding the psychological dimensions associated with EAH, we investigate individual reactions to stressful events in everyday life. We aim to assess the combined influence of individual perception of stress and physiological signals by continuously monitoring patients with EAH.

Design and method: Two groups of subjects, balanced by gender, were compared: twelve normotensive, and twelve diagnosed with EAH grade I or II controlled by therapy, without organ damage (average age 49.2, average BMI 25.43 Kg/m2, mean office arterial pressure 127.57/83.57, average heart rate 73.5, average number of drugs 1.5). Patients performed ambulatory blood pressure monitoring 24 hours (ABPM) to rule out white coat effect. Controls were checked to rule out hidden hypertension. Blood Volume Pulse (BVP), Heart Rate Value (HRV), Galvanic Skin Response (GSR) and skin temperature were continuously recorded by Empatica E3 device. An iPhone application capable of storing and streaming physiological signals was provided; it elicited annotations from subjects to report their psychological state, perceived and reported stress and workload, and daily activities. We used behavioural analytics algorithms to analyse and classify the recorded data.

Results: Two dimensions of emotional response were identified · emotional suppression, and anxious anticipation of stressful events. Subjects with high and low scores in emotional inhibition are equally represented in the two groups, but subjects with high scores on anticipatory anxiety were more represented in the EAH category. The EAH subjects recorded higher percentage of both anticipated and reported stress. Physiological signal streams showed that EAH subjects significantly differ from controls. HRV features showed significant differences between normotensive and hypertensive patient groups. Combining HRV features with other physiological signals such as GSR and BVP provided a high accuracy in distinguishing between the two groups.

Conclusions: Hypertension category tends to underestimate stressful events, and are incline towards anticipatory anxiety. They also exhibit different physiological responses to stress when compared to normotensive subjects. This pattern is relevant to the postulated links between hypertension and patterns of emotional response.
Design and method: 86 essential hypertensive patients who benefited from an abdominal CT-scan or MRI during their initial work-up were retrospectively recruited in 6 French hypertension centers. At the end of a minimal 6 months of follow up, patients were classified between RHT or NRHT. RHT was defined as blood pressure that remains above goal in spite of 3 antihypertensive agents at optimal dose including a diuretic, or controlled by more than 3 medications (Calhoun, 2008). Other patients were classified as NRHT. Blinded independent central review of all radiologic renal artery charts was performed.

Results: Baseline characteristics were: age 50 ± 15 years, 62% males, BP 145 ± 23 / 87 ± 13 mmHg. 53 (62%) patients had RHT and 25 (29%) had at least one ARA. Prevalence of ARA was comparable between RHT (23%) and NRHT patients (33%, p = 0.62), but there were significantly more ARA per patient in NRHT (2 ± 0.9) vs RHT (1.3 ± 0.5, p = 0.03). ARA were similar in diameter or length between the 2 groups. Patients with ARA had a significant increase in renin plasma levels at baseline (51.6 ± 49.3 mU/L) versus patients without ARA (20.3 ± 25.1 mU/L, p = 9.9x10^-3), but this did not translate into a worse blood pressure control or a raise in medication number, especially in renin angiotensin system inhibitors at the end of follow up.

Conclusions: In this retrospective series of 86 essential hypertensive patients, we found no difference in the prevalence of ARA in RHT and NRHT, but NRHT patients had significantly more ARA per patients than RHT patients. This study confirms elevated renin plasma levels at baseline in hypertensive patients with ARA, but limits its clinical relevance in terms of blood pressure control.

**PP.09.03 PROTEOMIC ANALYSIS OF KIDNEYS FROM SPONTANEOUSLY HYPERTENSIVE AND NORMAL RATS REVEALS CLIC-4, AS A PUTATIVE BIOMARKER IN HYPERTENSIVE NEPHRopathy**

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Objective: Hypertensive nephrosclerosis is a major cause of declining kidney function. We aimed to identify novel markers associated with pathogenesis and development of hypertensive nephrosclerosis in experimental animals.

Design and method: We compared kidney tissues from spontaneously hypertensive rats (SHR) and Wistar Kyoto normotensive rats (WKY) using comparative proteomic analysis at 6 (development of HTN), 13 (establish HTN), and 20 weeks (development of hypertension and establishment of hypertensive nephrosclerosis). Besides its pathogenic significance, CIC-4 may be a novel diagnostic and therapeutic marker in essential hypertension.

Conclusions: The proteomic analysis of SHRs and control kidney tissue yielded a significant number of differentially expressed proteins and altered biological pathways. Overexpression of CIC-4 in SHR kidney tissue is associated with the development of hypertension and establishment of hypertensive nephrosclerosis. Besides its pathogenic significance, CIC-4 may be a novel diagnostic and therapeutic marker in essential hypertension.
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Objective: It is noteworthy that asymptomatic organ damage (OD) is a determinant of overall cardiovascular (CV) risk in hypertension and also the risk increases as the number of damaged organs increases. We estimated whether increased renal haemodynamics in conjunction with pronounced left ventricular (LV) filling pressure were accompanied by target OD in hypertension.

Design and method: We studied 360 patients with essential hypertension [183 males, aged 55 years, office blood pressure (BP) = 144/86 mmHg that underwent transthoracic echocardiographic study for determination of mitral annulus early diastolic velocity (E/e') and blood sampling for assessment of metabolic profile. Moreover, data on renal resistive index (RRI), obtained by Doppler ultrasound sampling of the intrarenal arteries, were retrospectively analyzed. The distributions of RRI and E/e' were split by the median (0.623 and 7.8, respectively).

Results: Age, systolic and diastolic office BP, body mass index (BMI) and E/e' were the independent predictors of RRI (R² = 0.478, p < 0.001). Age, systolic office BP and E/e' were independent predictors of RRI (R² = 0.400, p < 0.001). Patients with high RRI and high E/e' (n = 122), compared to those with low RRI and low E/e' (n = 78) were characterized by increased LVMiheight (by 6.2 g/m²/sec; P = 0.149).

Conclusions: Increased RRI in conjunction with pronounced left ventricular filling pressure is accompanied by augmented LV mass, PP, and higher LVMI-height. Furthermore, the coexistence of impaired renal and cardiac haemodynamics suggests the occurrence of multiple target OD progression.

HOMEO dynamic IMPROVES RIGHT VENTRICULAR SIZING AND REDUCES PULMONARY CIRCULATION LOADING IN PATIENTS WITH END-STAGE RENAL DISEASE

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Objective: The effect of acute pre-load reduction during hemodialysis on right ventricular (RV) function is not well understood. Accordingly, the aim of this study was to evaluate acute changes in novel echocardiographic and tissue-Doppler-derived indices of RV function during the first and second weekly dialysis sessions.

Design and method: A total of 41 adult patients receiving standard thrice-weekly hemodialysis for at least 3 months participated in this study. Two-dimensional echocardiographic and tissue-Doppler imaging studies were performed with a standard cardiac ultrasound device (Vivid 7, GE, Horten, Norway) shortly before and after the first and second weekly dialysis sessions.

Results: Significant reductions from pre- to post dialysis were noted in body weight (1st session: 72.2 ± 12.6 vs 69.3 ± 12.5 kg, P < 0.01; 2nd session: 71.5 ± 12.7 vs 68.9 ± 12.5 kg, P < 0.001) and in systolic BP (1st session: 145.5 ± 21.6 vs 135.9 ± 23.5 mmHg, P < 0.05; 2nd session: 143.1 ± 19.8 vs 135.2 ± 20.4 mmHg, P < 0.05). RV end-dia stolic diameter (1st session: 3.47 ± 0.97 vs 3.09 ± 0.83 cm, P < 0.001; 2nd session: 3.40 ± 0.83 vs 3.10 ± 0.88 cm, P < 0.001) and right atrial volume index (1st session: 27.33 ± 10.65 vs 21.30 ± 1.16 cm³, P < 0.001; 2nd sessions: 27.83 ± 13.94 vs 23.04 ± 13.19 cm³, P < 0.001) were reduced between the start and end of both sessions studied. Similarly, significant intradialytic reductions in inferior vena-cava diameter were evident during both dialysis sessions (1st session: 1.93 ± 0.41 vs 1.54 ± 0.45 cm, P < 0.001; 2nd sessions: 1.76 ± 0.40 vs 1.37 ± 0.40 cm, P < 0.001). Acute pre-load reduction was accompanied by improvement in RV systolic pressure (1st session: 44.6 ± 16.25 vs 33.14 ± 12.43 mmHg, P < 0.001; 2nd session: 37.72 ± 14.46 vs 30.48 ± 13.36 mmHg, P < 0.001) and RPV augwaters regurgitation maximum velocity of (RVmax) (1st session: 2.86 ± 0.54 vs 2.53 ± 0.54 cm/sec, P < 0.001; 2nd session: 2.68 ± 0.55 vs 2.46 ± 0.54 cm/sec, P < 0.001). Indices reflecting RV diastolic function remained unchanged from pre-to post-dialysis in both sessions. RV systolic function assessed by peak systolic RV pressure (5m-RV) remained stable in both occasions (1st session: 0.15 ± 0.04 vs 0.15 ± 0.04, m/sec/P < 0.575; 2nd session: 0.14 ± 0.03 vs 0.15 ± 0.04 m/sec/P < 0.149).

Conclusions: This study shows that pre-load reduction during hemodialysis improves RV sizing parameters and reduces pulmonary circulation loading, without affecting the systolic and diastolic performance of right ventricle.

AMBULATORY BLOOD PRESSURE BEHAVIOUR IN END STAGE RENAL DISEASE PATIENTS UNDERGOING HAEMODIALYSIS


Objective: Blood pressure (BP) evaluation and management in patients with end stage renal disease (ESRD) is a precarious matter. During hemodialysis (HD) hypertension as well as a paradoxical rise in BP may be documented. We investigated circadian BP behavior in the setting of ESRD.

Design and method: We studied 19 patients with ESRD (68% men, mean age 62 ± 19 years, 52% hypertensive) that underwent HD three times a week in the HD unit of our hospital. Ambulatory blood pressure monitoring was applied one hour before an HD session and was set to measure BP every 30 minutes and until arrival for the next HD session, for a total of two subsequent 24-hour periods. Dipping was defined as (daytime systolic BP – nighttime systolic BP) daytime systolic BP.

Results: Body weight before and after the HD session was 78 ± 28Kg and 75 ± 27 mmHg respectively. Clinic systolic/diastolic BP before the HD session was 133 ± 23/66 ± 11 mmHg and at the end was 126 ± 25/69 ± 12 mmHg. Four patients (21%) exhibited intradialytic hypertension defined as a systolic BP increase > or = 10 mmHg from pre- to post HD. Ambulatory systolic/diastolic BP increased not significantly from 127 ± 23/70 ± 13 mmHg to 130 ± 19/71 ± 11 mmHg from the first to the second 24-hour period. Increases were also non-significant for daytime and nighttime BP (128 ± 22 mmHg vs 129 ± 19 mmHg and 126 ± 25 mmHg vs 131 ± 21 mmHg respectively, P > 0.05). Mean dipping was 1.5 ± 7.8% in the first day and further decreased to -0.94 ± 6.8% in the second day. Accordingly, in the first 24-hour period, only 3 patients (16%) were dippers and reduced to 1 patient in the following day (5%). Eight patients (42%) and 9 patients (47%) were users at the first and second 24-hour period respectively.

Conclusions: Daytime systolic BP does not substantially change during the 48-hour period extending from HD to HD session. Yet, a non-dipper as well as a raser pattern are highly prevalent and increase during the interdialytic period.
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**PP.09.08 SMOKING ACCELERATES ALBUMIN EXCRETION IN HYPERTENSIVE PATIENTS WITH METABOLIC SYNDROME**

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**Objective:** Microalbuminuria is a marker of kidney organ damage and has independent prognostic value for future cardiovascular events. Metabolic syndrome (MS) is prognostic of cardiovascular disease, either as a distinct entity or through its clustering cardiometabolic abnormalities. Whether smoking may accelerate microalbuminuria in patients with MS, is not well clarified.

**Design and method:** We studied 524 patients with never-treated arterial hypertension and metabolic syndrome, defined by the ATP III criteria. Smoking status was assessed by recording the current habit of smoking. Albumin excretion was evaluated in all patients after 24 h urine collection, using immunonephelometry, and albumin to creatinine ratio (ACR) was calculated. High-sensitivity C-reactive protein (hsCRP) was measured as an inflammatory biomarker. All participants were free from overt cardiovascular disease.

**Results:** Smokers (n = 274) were younger compared to non-smokers (mean age: 51 vs 56 years old, p < 0.001), had increased levels of hsCRP (1.9 ± 1.2 vs 1.7 ± 1.3 mg/L, p < 0.05) but, minimally, lower mean arterial pressure (MAP) levels compared to non-smokers (113.1 ± 11.8 vs 113.2 ± 12.8 mmHg, p = 0.06). No difference in glucose, total cholesterol and triglycerides was observed between the two groups (p = NS). Albumin excretion was significantly higher in smokers compared to non-smokers (mean ACR: 40.4 vs 32.9 mg/g, p = 0.04). In linear regression analysis, ACR was independently associated with smoking (b = 0.10, p < 0.001) after adjustment for age, gender, BMI, plasma glucose, MAP and hsCRP.

**Conclusions:** Smoking accelerates microalbuminuria in hypertensive patients with MS, independently of other classic or novel risk factors. Given the prognostic significance of microalbuminuria, it might be suggested that smoking may further enhance the cardiovascular risk associated with MS through the adverse effect on albumin excretion. Whether quitting smoking may result in regression of microalbuminuria, thus with a more favorable cardiovascular risk profile, is a question that warrants further investigation. Until then, microalbuminuria should be assessed in all smokers with MS and arterial hypertension in order to improve risk stratification and guide therapy.

**PP.09.09 EFFECT OF HEMODIALYSIS ON NOVEL ECHOCARDIOGRAPHIC AND TISSUE DOPPLER- DERIVED INDICES OF LEFT VENTRICULAR FUNCTION IN END-STAGE RENAL DISEASE PATIENTS**

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**Objective:** Left ventricular (LV) systolic and diastolic dysfunction is common and contributes to the increased cardiovascular morbidity and mortality in end-stage renal disease (ESRD). Hemodynamic alterations and shifts in volume status during hemodialysis acutely affect LV sizing and function. However, the effect of hemodialysis on novel, less volume-dependent, tissue Doppler-derived indices is not fully understood. This study evaluated acute changes in novel echocardiographic and tissue Doppler-derived indices of LV dysfunction during the first and mid-week dialysis sessions.

**Design and method:** Forty-one stable ESRD patients receiving thrice-weekly hemodialysis for at least 3 months underwent 2-dimensional echocardiographic and tissue-Doppler imaging evaluation with a Vivid 7 cardiac ultrasound device. Echocardiographic studies were performed shortly before and after the first and second weekly dialysis sessions.

**Results:** Body weight (1st session: 72.2 ± 12.6 vs 69.3 ± 12.5 kg, p < 0.001; 2nd session: 71.5 ± 12.7 vs 68.9 ± 12.5 kg, p < 0.001) and systolic blood pressure (1st session: 145.5 ± 23.2 vs 135.2 ± 23.5 mmHg, P < 0.05, 2nd session: 143.1 ± 19.8 vs 135.2 ± 20.4 mmHg, P < 0.05) were reduced during both dialysis sessions. Significant reductions in left atrial volume, LV end-systolic and end-diastolic volume were noted from pre-to-post-dialysis in both sessions studied. LV systolic function assessed by LV ejection fraction, stroke volume and cardiac output, remained unchanged from pre-to-postdialysis. In contrast, peak early (E) and late (A) diastolic velocities were significantly increased during both sessions (1st session: 1.15 ± 0.48 vs 0.92 ± 0.49, p < 0.001; 2nd session: 1.18 ± 0.48 vs 0.86 ± 0.48, p < 0.001). Peak tissue velocity around the mitral annulus during early diastole (mean Em) was significantly decreased during the 1st weekly session, but not during the mid-week dialysis (1st session: 0.188 ± 0.03 vs 0.167 ± 0.03 cm/s, p = 0.001, 2nd session: 0.188 ± 0.04 vs 0.179 ± 0.03 cm/s, p = 0.366). Mean isovolumetric relaxation time was stable in both occasions.

**Conclusions:** This study shows that hemodialysis improves LV sizing and reduces LV filling pressures during diastole. This effect seems to be more prominent during the first weekly dialysis session. Additional research efforts are warranted to fully elucidate whether these acute intradialytic alterations translate into long-term deterioration of cardiac function.

**PP.09.10 LEFT VENTRICULAR HYPERTROPHY (LVH) IN RENAL DISEASE: IMPACT OF CLASSIC CARDIOVASCULAR RISK FACTORS**

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**Objective:** The contributions of the traditional cardiovascular risk factors and the uremia-specific ones to the development of LVH in the renal patient remains to be elucidated. We have examined the prevalence of LVH in a group of chronic kidney disease (CKD) patients and its relationships with classic cardiovascular risk factors.

**Design and method:** Retrospective study of the patients attending the Nephrology Outpatient Office. The abbreviated MDRD4-IDMS equation for traceable creatinine was used to estimate GFR. Urinary protein and urinary albumin excretion (UAEx) were measured in 24 h urine collection. In all, 1,155 patients had at least one two-dimensional guided M-mode echocardiography examination performed during the follow up. They were males 57.7% (95% CI 54.8–60.5). The prevalence of patients with GFR below 60 ml/min was 38.7% (n = 455, 95% CI 54.8–60.5). Subjects in stage III were 75.6% (95% CI 70.4–80.2) and 24.4% (95% CI 19.9–29.6) were in stage IV.

**Results:** In all the prevalence of LVH was 61.3%. Only 28.6% of patients showed no findings in echocardiogram. Prevalence of LVH among patients with GFR < 60 ml/min was 68.5% vs 56 for those with GFR > 60 (p < 0.001). The prevalence of LVH was increased in patients with microalbuminuria 65.5% and macroalbuminuria 71.3% compared to those with normalalbuminuria 54.4% (p < 0.001). Logistic regression analysis showed that only high blood pressure, dyslipidemia, diabetes mellitus, obesity, and chronic heart failure were independently associated with the presence of LVH in echocardiogram. Contrariwise, CKD was not independently associated with this problem.

**Conclusions:** A high prevalence of LVH among non-dialysis CKD patients was found. Classic cardiovascular risk factors (high blood pressure, dyslipidemia, diabetes mellitus, obesity) and chronic heart failure were independently associated with the presence of LVH in echocardiogram. Contrariwise, CKD was not independently associated with the presence of LVH.

**PP.09.11 TEMPO Supplementation DOES NOT OVERCOME BENEFICIAL EFFECT OF LOSARTAN IN HYPERTENSIVE RATS WITH EARLY COURSE OF FOCAL SEGMENTAL GLOMERULOSCLEROSIS**

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**Objective:** Previously, we demonstrated that losartan had beneficial effect on renal function and structure in spontaneously hypertensive rats (SHR) with early course of adriamycin (ADR) nephropathy. Here, the aim was to investigate whether combination of losartan (L) with tempol (T), a membrane-permeable radical scavenger, could overcome this beneficial effects in the early course of ADR-induced focal segmental glomerulosclerosis (FSGS).

**Design and method:** Females SHR (24-week-old) were divided in four groups. Control rats (SHC) received vehicle, while SHR, SHADR, SHADR+L, SHADR+L+T groups received ADR (2 mg/kg body weight i.v.) twice in 3-week-interval. After the second injection, SHADR+L received L (10 mg/kg/day), SHADR+L+T received L+T (10+100 mg/kg/day), while SHADR and SHC received tap water (by gavage) for 6 weeks. At the end of the experiment, albuminuria, kidney anti- oxidant enzymes activities (SOD-superoxide dismutase, catalase, and GPx-glutathione peroxidase) and histology were analyzed.

**Results:** Albuminuria was significantly increased in SHADR group compared to control (p < 0.01). Losartan reduced albumin excretion to a value not significantly
different from control. However, after combined L+T-treatment albuminuria remained significantly higher than in SHC (p < 0.05). SOD and GPx activities were diminished in ADR-treated SHR (p < 0.001). Losartan significantly improved these changes, and reverted SOD and GPx activities to the level as in control. Combined treatment failed to change SOD, while GPx activity became significantly decreased (p < 0.01) compared to both, SHADR+L and SHC groups. Adri- mycin did not affect catalse activity, but chronic losartan or combined treatment significantly increased catalase activity compared to control. Glomerular sclerosis was significantly increased in SHR after ADR application (p < 0.001), and losar-tan alone, or in combination with tempol, did not alter it. ADR-induced tubular injury was significantly reduced after losartan treatment (p < 0.01) compared to SHADR. Conversely, in SHADR+L+T group tubular damage was similar to that of SHADR, and significantly elevated versus both, SHADR+L and SHC.

Conclusions: Our results showed that combined treatment with tempol and losar-tan failed to improve kidney function, structure and antioxidant enzymes activi-ties in experimental FSGS. Therefore, tempol supplementation does not overcome beneficial effect of losartan in hypertensive rats with early course of ADR-induced FSGS.

**PP.09.12 PREVALENCE OF MASKED AND TRUE HYPERTENSION IN MILDLY DISEASED CHRONIC KIDNEY DISEASE**

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**Objective:** The aim of this study was to identify the prevalence of white coat (WCH) and masked hypertension (MH) in mildly diseased chronic kidney disease (CKD) patients (e-GFR 60-90) in comparison to normal kidney function (NKF) subjects (e-GFR > 90).

**Design and method:** 558 consecutive subjects (48.5% male) with age 49.2 ± 19.8 years were included in the study. Subjects were never treated before for hypertension. Clinic BP measured three times in each subject using a mercury sphyg-momanometer. All the subjects underwent 24h-ABPM on a usual working day. Patients with both ambulatory and clinic BP values in the hypertensive or normo-tensive range were defined as true hypertensives and normotensives respectively. WCH was defined as office hypertension with ambulatory normotension and MH as ambulatory hypertension with office normotension. e-GFR was estimated with MDRD equation.

**Results:** Age and average 24SBP was significant higher in CKD patients (P < 0.0001) with no differences in clinic BP and average 24 h DBP compared to NKF subjects. Prevalence of true normotension and hypertension are shown in figure. In nominal regression analysis the four groups of hypertension status were included as dependent variable, factors the stage of kidney disease and the gender (reference category: true normotension). WCH, MH and true hypertension were significantly associated with mildly reduced stage of CKD (B = −0.75, P < 0.01, B = −1.24, P < 0.001, B = −1.14, P < 0.0001 respectively).

**Conclusions:** 24 h ambulatory BP monitoring is important to identify the real BP status in patients with mildly diseased CKD. Mild reduction in GFR is associated with increase 24 h SBP levels in similar clinic BP values.

**PP.09.13 NOVEL BIOMARKERS OF KIDNEY INJURY IN PATIENTS WITH DIFFERENT SEVERITY OF HYPERTENSION**


**Objective:** Hypertension still remains one of the leading causes of end-stage renal disease and early detection of kidney injury may have a dramatic impact on treatment strategy and patient’s prognosis. The aim of the present study was to assess whether novel biomarkers may facilitate early detection of kidney injury in patients with different severity of hypertension.

**Design and method:** Urine levels of neutrophil gelatinase-associated lipocalin (NGAL), kidney injury molecule-1 (KIM-1), liver fatty-acid binding protein (L-FABP) and serum levels of Cystatin C and creatinine were measured by quantita-tive enzyme immunoassay in 92 hypertensive patients, divided into four age and sex-matched groups according to severity of hypertension: 1 grade (n = 24), 2 grade (n = 26), 3 grade (n = 17) and resistant hypertension (n = 25). Glomerular filtration rate (GFR) was estimated by MDRD and CKD-EPI formulas. Instrumental examination was performed after 5 days of discontinuation of antihyperten-sive medications and included ambulatory blood pressure monitoring (ABPM, SpaceLabs 90207).

**Results:** There were no differences in NGAL, KIM-1, creatinine levels, and eGFR between groups. Patients with 1, 2, 3 grades of hypertension had no differences in Cystatin C (0.86+/− 0.1; 0.85 +/− 0.1; 0.86 +/− 0.06 pg/ml respectively; p > 0.05) and L-FABP (1997.8 +/− 1657.2; 2412.5 +/− 1487.1; 1756.7 +/− 1949.8 pg/ml re-spectively; p > 0.05) levels. While patients with resistant hypertension are predis-posed to advanced organ damage were characterized by higher Cystatin C (0.97 +/− 0.18 pg/ml; p < 0.01) and L-FABP (9270.2 +/- 30394.5 pg/ml; p < 0.05) levels, associated with mean 24-hours systolic blood pressure (BP) level (r = 0.246; p = 0.03 and r = 0.339; p = 0.006 respectively).

**Conclusions:** Cystatin C and L-FABP seem to be potentially more sensitive bio-markers of kidney injury, and their levels increase with the severity of hypertension.

**PP.09.14 SYMPATHETIC NERVOUS SYSTEM ACTIVITY, REFLECTED BY RENALASE ANDcatecholamines, in HYPERTENSIVE patients ACCORDING TO AGE and PRESENCE OF CHRONIC KIDNEY DISEASE**

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**Objective:** Sympathetic nervous system activity is elevated in patients with chronic kidney disease as well as in elderly and contributes to hypertension and cardiovascular diseases. It is due to a reduction of catecholamines clearance from the blood and in elderly also to an increased sympathetic discharge directed to different organs. Renalase may play a role in the catecholamines degradation and in that way have the influence on blood pressure rate, heart and kidney function.

**Design and method:** The aim of the study was to assess the sympathetic nervous system activity, according to serum renalase and catecholamines concentration in 211 hypertensive patients with or without chronic kidney disease required re-nal replacement therapy. The study group was divided dependently to age below and above 65 years. The older group (38%) was also divided into group with (75%) and without chronic kidney disease. The serum renalase, dopamine and norepinephrine concentration, blood pressure control, residual renal function and echocardiography were assessed.

**Results:** The older group had elevated renalase and dopamine concentration compar-ing to younger and it was significantly higher in patients with chronic kidney disease. Elderly with chronic kidney disease also had the most advanced abnor-malities in echocardiography, like left ventricular hypertrophy and lower ejection fraction. They more often suffered from coronary artery disease. The residual renal function was less in older patients with chronic kidney disease. The main used hypotensive drugs in whole group were beta-blockers, elderly used calci-um-channel blockers more often than angiotensin converting enzyme inhibitors. There was the significant correlation between age and renalase, norepinephrine and dopamine concentration.

**Conclusions:** The advanced age of hypertensive patients especially combined with chronic kidney disease is associated with elevated renalase and dopamine level what is related to the sympathetic nervous system hyperactivity found here and it may have an impact on the development of cardiovascular complications as well as it appears to be the possible new marker of them in that special population.
ASSESSMENT OF RENAL ARTERY FIBROMUSCULAR DYSPLASIA: FROM DIAGNOSIS TO TREATMENT. THE DYSART STUDY
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Objective: Define quantitative duplex ultrasound criteria and multidetector computed tomography (MDCT) for renal artery stenosis in fibromuscular dysplasia (FMD). Systemic arterial hypertension due to renal artery stenosis is a frequent complication of FMD and renal angioplasty effectively treats renal symptomatic FMD with a rate of hypertension cure of 36% with no consensus on the stenosis severity criteria in FMD.

Primary Objective: Assessments of quantitative duplex ultrasound criteria to hemodynamically quantify renal artery stenosis severity in symptomatic FMD with trans stenotic pressure gradient measurements as standard of reference.

Design and method: Adults patients with confirmed hypertension in ambulatory BP 24H with renal artery multifocal FMD severe stenosis (defined using CT scan or duplex ultrasound), will be included in this study. Angiography with trans stenotic gradient will be performed. All patients will be recruited in a reference center for FMD care and included if clinical and para-clinical information suggest that the hypertension might be caused by the renal stenosis and will require intravascular revascularization in reference of the standard procedures in FMD. Considering a two-side 95% confidence interval, with a precision of 10%, it is necessary to include at least 43 patients. Our study associates 4 reference centers of the French network. Patients will be evaluated for a period of 7 month after angioplasty for an inclusion period of 2 years. Efficacy of angioplasty will be assessed by several parameters: decrease of the resting gradient at rest, decrease of degree of stenosis on IVUS, renal function and systemic hypertension.

Results: The results are expected in 2018

Conclusions: Primary end point of DYSART Study: Assessments of quantitative duplex ultrasound criteria to hemodynamically quantify renal artery stenosis severity in symptomatic FMD, with trans stenotic pressure gradient measurements at rest as standard of reference.

PREDICTORS AND PROGNOSIS OF CONTRAST-INDUCED ACUTE KIDNEY INJURY IN PATIENTS WITH ELECTIVE PERCUTANEOUS INTERVENTION
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Objective: Contrast-induced acute kidney injury (CI-AKI) is one of the most common complications after percutaneous coronary intervention (PCI) using intravascular radiocontrast media. CI-AKI has been associated with high in-hospital mortality and poor long-term survival. The aim of the study was to evaluate the incidence, risk factors and outcomes of CI-AKI in patients with elective PCI.

Design and method: 150 patients with stable angina pectoris (SAP) and elective PCI (102 male, 61.3 ± 11.2 years (M ± SD), arterial hypertension 88%, previous MI 56%, diabetes mellitus 25%, known chronic kidney disease (CKD) 33%, anemia 17%, heart failure 67%, left ventricular ejection fraction 42 ± 16%) were examined. CI-AKI was defined using 2012 KDIGO Guidelines. Isoosmolar contrast media ioxanol (Visipaque-320) or low-osmolar contrast media iohexol (Omnipaque-350) were used. Transradial access for PCI was used in 98% of patients. Mann-Whitney test and multivariate logistic regression analysis were performed. P < 0.05 was considered statistically significant.

Results: 21 (14%) patients developed CI-AKI. Stages 1 and 2 of CI-AKI were found in 92 and 8% of cases accordingly. Main independent predictors of CI-AKI were factors related to the contrast media (CV/eGFR > 4.35 (odds ratio (OR) 20.2; 95% confidence interval (CI) 3.4–120.8; p < 0.01), CKD (OR 17.4; 95% CI 3.8–79.8; p < 0.05), Mehran risk score > 10 (OR 14.7; 95% CI 1.2–66.6; p < 0.0001), CV > 350 ml (OR 8.7; 95% CI 1.4–21.5; p < 0.05), age > 74.5 years (OR 6.9; 95% CI 1.4–34.1; p < 0.01), baseline eGFR < 61 ml/min/1.73 m² (OR 5.5; 95% CI 1.6–20.6; p < 0.01), baseline serum creatinine (SCr) > 96 mmol/l (OR 5.5; 95% CI 1.6–20.6; p < 0.01), baseline SCr > 96 mmol/l, anemia (OR 3.0; 95% CI 1.1–8.4; p < 0.05). Patients with versus without CI-AKI had higher risk of 6 months rehospitalizations (59 vs 33%, c² = 8.53, p < 0.05).

Conclusions: CI-AKI in patients with SAP and elective PCI developed in 14% of cases, predominantly stage 1. Main independent predictors of CI-AKI were factors related to the contrast media (CV/eGFR, CV) and factors related to the patient (CKD, Mehran risk score > 10, age > 74.5 years, baseline eGFR < 61 ml/min/1.73 m², baseline SCr > 96 mmol/l, anemia). CI-AKI had negative impact on 6 months rehospitalizations.
PP.10.01 EFFECT OF RENAL DENERVATION ON GLUCOSE METABOLISM IN PATIENTS WITH RESISTANT HYPERTENSION AND DIABETES MELLITUS TYPE 2 AFTER A 12 MONTH FOLLOW-UP

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Objective: To evaluate long-term effect of catheter-based renal denervation (RDN) on glucose metabolism and blood pressure control in patients with resistant hypertension and diabetes mellitus type 2.

Design and method: Thirty two patients with true resistant hypertension and type 2 diabetes mellitus were included in single-arm prospective interventional study (detailed protocol was published on ClinicalTrials.gov, number NCT01499810). Office blood pressure (BP) measurement, ambulatory 24-h BP, HbA1c, basal and postprandial plasma levels of glucose, insulin and C-peptide with calculation of Homeostasis Model Assessment (HOMA) index were performed at baseline and 12 months after RDN. On average, patients were taking 4 (3-6) antihypertensive drugs. None of the patients changed the antihypertensive treatments during follow-up. A 12 months follow-up was completed by 26 patients (43–75 years old, mean aged 59.3 ± 7.9 years, 14 male).

Results: Mean 24-hour systolic BP (SBP) changed from 157 (145–169) mmHg to 144 (131–163) mmHg (P = 0.01) without any negative effect on renal function. There were 61.5% (n = 16) responders with 24-h SPB reduction > 10 mmHg. Overall, there were no significant changes in mean values C-peptide, insulin levels and HOMA-index (P > 0.05) after RDN. However, there was a reduction in all measures of insulin resistance, including HbA1c, fasting glucose, postprandial insulin and C-peptide levels and HOMA-index in responders and increasing in non-responders (–0.12 ± 0.98 vs 1.26 ± 1.11, P = 0.04 for HbA1c, –0.89 ± 1.9 vs 0.85 ± 1.19, P = 0.02 for basal glucose, –1.24(–1.95; –0.05) vs 1.23(0.91–4.05), P = 0.01 for postprandial C-peptide level; –0.43(–17.28;1.80) vs 30.23 (9.75–65.72), P = 0.001 for postprandial insulin levels; –0.67 (–1.49; –0.61) vs 2.47 (0.21–5.98), P = 0.044 for HOMA-index).

Conclusions: Effective renal sympathetic denervation with proven BP effect (reduction SBP 24 hour > 10 mmHg) increases insulin sensitivity and improves glucose metabolism in patients with resistant hypertension and diabetes mellitus type 2.

PP.10.02 EFFECT OF RENAL DENERVATION ON LEFT VENTRICULAR MASS IN PATIENTS WITH RESISTANT HYPERTENSION AND DIABETES MELLITUS TYPE 2 AFTER A 12 MONTH FOLLOW-UP

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Objective: To investigate the effect of catheter-based renal denervation (RDN) on the left ventricular mass index (LVMI) in relation with blood pressure (BP) reduction in patients with resistant hypertension and diabetes mellitus.

Design and method: Thirty two patients with true resistant hypertension and type 2 diabetes mellitus were included in single-arm prospective interventional study (detailed protocol was published on ClinicalTrials.gov, number NCT01499810). Office BP measurement, ambulatory 24-h BP, transthoracic echocardiography with assessment of LVMI were performed at baseline and 12 months after TRD (LVMI was calculated according to the formula R.B. Devorex). On average, patients were taking 4 (3-6) antihypertensive drugs. None of the patients changed the antihypertensive treatments during follow-up. A 12 months follow-up was completed by 26 patients (43–75 years old, mean aged 59.3 ± 7.9 years, 14 male).

Results: RDN reduced both systolic/diastolic office and 24-hour BP by –31.7/–12.8 mmHg, P < 0.01 for office BP and –13.4/–10.0 mmHg, P < 0.01, for 24-h BP. There were 61.5% (n = 16) responders with 24h- SBP reduction > 10 mmHg, whereas 10 (38.5%) were non-responders. At baseline LV hypertrophy was present in 25 pts (96%). Overall, no statistical significant change in LVMI was observed at follow-up (from 137.6 ± 36.8 vs. 133.7 ± 24.3 g/m², P = 0.4). However, there was found the difference in dynamics of LVMI in responders and non-responders (–5.3 ± 21.4 vs 14.7 ± 19.6 g/m², P = 0.029). The frequency of regression of LVMI was significantly higher among responders than non-responders (80% vs 33%, P = 0.038). At baseline LVMI was similar in both groups (147.4 ± 41.5 vs. 132.9 ± 35.4 g/m², P = 0.34), there as at 12 months follow-up LVMI was significantly higher in non-responders than responders (147.8 ± 21.4 vs. 121.6 ± 20.9 g/m², P = 0.007). Direct correlations of dynamic in systolic blood pressure and LVMI after RDN were not found. We found correlation of the LVMI reduction and increased of the index nocturnal fall of systolic and diastolic BP (r = –0.59, P = 0.016 and r = –0.51, P = 0.044, respectively).

Conclusions: These data may indicate that the effect of RDN on LVMI depends not only from BP reducing but also from improvement of circadian BP rhythm.
Conclusions: Despite a significant effect on blood pressure, RDN treatment did not improve peripheral or hepatic insulin sensitivity, in this group of non-diabetic patients with resistant hypertension, as assessed by two-step HEC with glucose tracer infusion as well as indices derived from OGTT and fasting blood samples 6 months after RDN.

**PP.10.04**
**BLOOD PRESSURE RESPONSE TO RENAL DENERVATION ACCORDING TO THE PRESENCE OR ABSENCE OF RENAL ACCESSORY ARTERIES**

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**Objective:** Renal denervation (RDN) has been shown to be a feasible treatment in resistant hypertensive patients. Renal accessory arteries (RAs) are frequent (20–27%) but seldom accessible to RDN. As such, they may constitute an unaddressed source of sympathetic overactivity. The aim of this study was to investigate if the presence of accessory RAs influences blood pressure response to RDN in patients with resistant hypertension.

**Design and method:** Patients were recruited from 6 expert centres, within the European Network Coordinating research on Renal Denervation (ENCORED). All patients underwent 24-h BP measurements at baseline and 6 months after RDN. Patients were classified in type A (main RA > 20 mm diameter and > 4 mm diameter) or type B (main RA < 20 mm length or <4 mm diameter) according to renal anatomy (Okada classification). Subtypes include A1 (no accessory RAs), A2 (with accessory RAs < 3 mm diameter), A3 (with accessory RAs > 3 mm diameter), B1 (main RA < 20 mm in length) and B2 (RA < 4 mm diameter).

**Results:** 114 resistant hypertensive patients (age 58.1 ± 11.2, 46% women) were included in the analysis. Seventy-six (66%) patients did not have accessory RAs (type A1) and 39 (34%) patients did have accessory RAs (on one or both sides). 24-hour ambulatory systolic/diastolic BP after RDN dropped by -6.8/-4.0 mmHg in patients with no accessory RAs (p < 0.006), compared to a non-significant 0.2/-0.7 mmHg (p > 0.70) in patients with accessory RAs. (p > 0.08 for the baseline adjusted between-group difference). When adjusted for sex, age, body mass index, baseline 24-h systolic ambulatory blood pressure as fixed effects, and for centre as random effect, the difference in decrease in 24-h systolic ambulatory blood pressure between the 2 groups was -3.8 mmHg (95% CI: -10.7 to 3.1, p = 0.27).

**Conclusions:** A significant blood pressure decrease after RDN was observed only in patients without RAs. However, the difference between blood pressure changes in patients with or without RAs did not reach statistical significance. Ongoing analyses will include more subjects, as well as information on performance of RDN in accessory RAs and the number of ablations on each side.

**PP.10.05**
**ALTERATIONS IN METALLOPROTEINASES 9 AND TISSUE INHIBITOR 1 LEVELS IN RESISTANT HYPERTENSION AND THEIR RELATIONSHIP TO LEFT VENTRICULAR HYPERTROPHY**

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**Objective:** Resistant hypertensive patients (RHTN) have unfavorable prognosis due to poor blood pressure (BP) control and higher prevalence of target organ damage. Deregulation of matrix metalloproteinases (MMPs) and their inhibitors are related to cardiac remodeling and left ventricular geometry in cardiac diseases. This study aimed to investigate the association between MMP-9 and TIMP-1 levels and the presence of LVMI as well as to compare its levels between resistant hypertensive patients (RHTN) and mild to moderate hypertensive (HTN).

**Design and method:** This cross-sectional study was performed in the Outpatient Resistant Hypertension Clinic at the Hospital of the University of Campinas. Seventy-nine patients were classified as resistant hypertensive and 116 mild to moderate hypertensive patients (HTN) were included. Left ventricular mass index (LVMI) was calculated by dividing the LV mass by the body surface area. Plasma levels of MMP-9 and TIMP-1 were determined by ELISA.

**Results:** Higher levels of MMP-9 (median [IQR]) were found in RHTN (88.2 [77.4–100.8] ng/mL, compared with HTN individuals (79.7 [67.5–99.6] p = 0.015), while lower levels of MMP-9 (23.9 [19.8–54.2] vs. 38.1 [24.8–64.0], p = 0.003) and consequently, decreased MMP-9/TIMP-1 ratio were observed in RHTN group (0.30 [0.20–0.56] vs. 0.53 [0.33–0.85], p < 0.0001). Different patterns of correlations were observed of TIMP-1 with LVMI in the subgroups; in controlled hypertensive patients, a positive correlation was observed (r = 0.25, p = 0.003) whereas in RHTN, TIMP-1 levels were inversely correlated with LVMI (r = -0.33 p = 0.02). Interestingly, multiple regression analysis showed that TIMP-1 levels are independent predictors for LVMI in RHTN but not in HTN subgroup.

**Conclusions:** Our data suggest that MMP-9/TIMP-1 balance varies according to the severity of hypertension and are associated with resistant hypertension and left ventricular hypertrophy.

**PP.10.06**
**OBESITY-DEPENDENT EFFECTS ON MMP-9 LEVELS IN RESISTANT HYPERTENSION**


**Objective:** During the inflammatory process observed in hypertension and obesity, a destruction/proteolysis occurs on the extracellular matrix by an imbalance between metalloproteinases 2 and 9 (MMP-2 and MMP-9) enzymes and their natural tissue (TIMP-2 and TIMP-1), respectively. However, the levels of these enzymes in obese RH patients have not been thoroughly investigated. We aimed with this cross-section study to evaluate the plasmatic levels of MMP-2/-9, TIMP-2/-1 and their ratios in obese and non-obese resistant hypertension - RH (n = 122) and compare clinical and biochemical parameters.

**Design and method:** MMPs and TIMPs levels were measured by ELISA and cardiac damage was determined by echocardiography.

**Results:** We did not find difference in BP parameters between groups but found higher HbA1c and reactive protein C in obese compared to non-obese RH. We also found lower MMP-9 levels and MMP-9/TIMP-1 ratio in non-obese compared to obese RH subjects. Obesity influenced MMP-9 levels in RH patients (β = 20.17; S.E = 7.08, p = 0.005) independently of age, gender, race and presence of diabetes. Additionally, obese RH with left ventricular hypertrophy (LVH) had greater MMP-9 levels compared to non-obese with LVH. No relationship between MMP-2, TIMP-2 and its ratio were found in this study.

**Conclusions:** In summary, our study suggests that MMP-9 levels are influenced specially by obesity and have an important role in cardiac damage in RH.

**PP.10.07**
**DEREGULATION OF SOLUBLE ADHESION MOLECULES IN RESISTANCE TO ANTIHYPERTENSIVE TREATMENT AND ITS ROLE IN CARDIOVASCULAR REMODELING**

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**Objective:** Resistant hypertension (RHTN) and target organ damage are linked to increased inflammatory biomarkers, which may regulate adhesion molecules, such as (i) intracellular adhesion molecule-1 (ICAM-1), (ii) vascular adhesion molecule-1 (VCAM-1), (iii) the platelet (P-selectin) and (iv) endothelial (E-selectin) selectins. We aimed to investigate a previously unknown relationship between p-selectin, e-selectin, ICAM-1 and VCAM-1 with RHTN and target organ damage.
Design and method: This cross-sectional study included 110 subjects diagnosed for true RHTN and 112 mild to moderate hypertensives (HTN). We determined blood pressure parameters, pulse wave velocity (PWV) and left ventricular mass index (LVMI). Adhesion molecules were determined by ELISA. The patients were grouped into those with LVMI > 95 g/m² (females) and > 115 g/m² (males) for comparisons of cardiac hypertrophy and PWV>10m/s as having high arterial rigidity for comparisons of vascular damage.

Results: Both sP-selectin and sE-selectin were increased; on the other hand sICAM-1 was reduced in RHTN compared with HTN patients, while similar levels of sVCAM-1 were encountered in the groups. sP-selectin and sE-selectin were elevated in the presence of arterial stiffness (sP-selectin: 104 ± 47 vs. 89 ± 45 ng/mL, p < 0.05; sVCAM-1: 1339 ± 411 vs. 1060 ± 412 ng/mL, p < 0.05) and cardiac hypertrophy (sP-selectin: 105 ± 51 vs. 88 ± 43 ng/mL, p < 0.05; sVCAM-1: 1170 ± 433 vs. 1040 ± 383 ng/mL, p < 0.05) in all hypertensives. sP-selectin predict both target organ damage after adjustment for age and BP levels. Apart from potential confounders, s-E-selectin was considered independent predictor for RHTN.

Conclusions: Our findings show the potential role of adhesion molecules, in particular sP-selectin on arterial stiffness and cardiac hypertrophy, and s-E-selectin on resistance to antihypertensive therapy.

**PP.10.08**

**PRESENCE OF AORTIC ABDOMINAL CALCIFICATIONS IN PATIENTS WITH RESISTANT HYPERTENSION AND BP RESPONSE IN THE RENAL DENERVATION FOR HYPERTENSION (DERENHTN) TRIAL**

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**Objective:** The DENERHTN trial confirmed the BP lowering efficacy of renal de-nervation (RDN) added to a standardised stepped-care antihypertensive treatment (SSAHT) for resistant hypertension (RHTN) at 6 months. There was large between-patient variability in the BP response to RDN and SSAHT. The presence of aortic abdominal calcification (AAC), which has been related to arterial stiffness, may have an impact on RDN and SSAHT.

**Design and method:** Patients with confirmed RH to 4-week treatment with indapamide 1.5 mg/day, ramipril 10 mg/day (or irbesartan 300 mg/day), and amiodipine 10 mg/day on daytime ABPM (BP > 135/85 mmHg) were randomly assigned to RDN+SSAHT or the same SSAHT alone (control group). After randomisation, spironolactone 25 mg/day, bisoprolol 10 mg/day, prazosin 5 mg/day, andrilendine 1 mg/day were sequentially added from months 2 to 5, in both groups if home BP was > 135/85 mmHg. AAC were delineated blind to the randomization with a semiautomated segmentation software from the aortic biatus to the iliac bifurcation on each pre-randomization abdominal CT angiogram.

**Results:** Of the 106 randomised patients, 42/53 in the RDN group and 48/53 in the control group were analyzed because of missing endpoints (age: 54.6±10.6 years, males: 61.1%, type 2 diabetes: 22.2%, daytime ambulatory BP: 154/93 mmHg). 78.9% of patients had AAC. Median (IQR) AAC volume was 451 (34–2225) mm³ in all patients. Increasing tertiles of AAC were significantly associated with increasing age, male sex, Caucasian ethnicity, smoking, diabetes, hypercholesterolemia, prior cardiovascular events and obstructive sleep apnea (Table). Higher AAC was associated higher levels of ambulatory and central pulse pressure and pulse wave velocity at baseline. However, at 6-month follow-up, the change in daytime ambulatory SBP and DBP and number of controlled patients did not significantly differ according to tertiles of AAC.

**Conclusions:** In these highly selected patients with RH, AAC were associated with arterial stiffness and cardiovascular risk factors. The presence AAC on CT-angiogram did not impact the BP response in patients treated with RDN+SSAHT or SSAHT alone.

**PP.10.09**

**PREVALENCE OF TRUE RESISTANT HYPERTENSION IN UNCOMPROMICATED HYPERTENSIVES WITH APPARENT TREATMENT-RESISTANT HYPERTENSION IN LONGITUDINAL REAL-LIFE STUDY**

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**Objective:** Our aim was to compare target office (<140/90mmHg) and home (<135/85 mmHg) blood pressure (BP) attainment after 6-month (6 M) of standard- ized algorithmic treatment in uncomplicated hypertensives (UH), with clinical BP previously uncontrolled on 3 or more antihypertensive medications, ie with apparent treatment-resistant hypertension (aTRH).

**Design and method:** 54 Kiev city cardiologists recruited in PERFECT-BP prospective observational study (ISRCTN75706523) 407 treated but uncontrolled UH (BP < 200/120 mmHg), aged 59.3 ± 8.9 years, 42.3% male. At visit 1 patients (pts) were prescribed or switched to a fixed-dose combination (FDC) of perindopril/amloptidine (doses at discretion of MDs), which was followed by FDC uptitration, and, if needed, by consecutive addition of indapamide SR, spirono- lactone, and moxonidine or doxazosin. Office BP measurements were performed with standardized automated device Microlife BP200 with universal cuff. Home BP measurements were performed with validated oscillometric device Microlife BP3AG1 with individually selected cuff, twice pd for 7 consecutive days before each visit at day 7, M1, 2, 3, 6. After 6 M treatment pts compliance was assessed by X. Gererd questionnaires.

**Results:** Baseline therapy of 122(30%) pts included 3 or more drugs (aTRH) group with optimal treatment regimens in 28(23%) of them. By 6 MO office systolic BP in aTRH pts decreased from 166.1 ± 14.6 to 132.8 ± 9.4 mmHg, diastolic BP from 97.7 ± 10 to 79.3 ± 7.3 mmHg. At 6 M 63% of pts with aTRH attained target office BP by triple therapy, 11% – by 4 or more drugs, with masked hypertension in 21.3% of them. Target office and home BP despite of 3 or more drugs, prescribed in optimal doses, were not attained in 10.2% of aTRH pts with high or moderate adherence. Low adherence was the reason for lack of office BP control in 4.6% of pts, physician’s inertia (only 2 drugs were prescribed) – in 7.4%. White coat hypertension was identified in 3.7% of aTRH pts.

**Conclusions:** Target office BP after 6 M of standardized algorithmic treatment based on FDC in real life setting was attained in 74.1% of UN with baseline aTRH, with 10.2% prevalence of true resistant hypertension.

**PP.10.10**

**GENENDER IN RESISTANT HYPERTENSION: IMPACT ON CLINICAL MANIFESTATIONS, ASSOCIATED FACTORS AND HYPERTENSION TREATMENT**

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**Objective:** Recent meta-analysis indicate that the pooled prevalence of resistant hypertension (RHT) barely differed between sex. However differences between RHT women and men in patients characteristics, associated factors and hypertension management are not well-described.

**Design and method:** In the cross-sectional questionnaire-based observational study we included 7306 hypertensive females and 5069 hypertensive males, > 18 years old and treated for at least 12 months with antihypertensive drugs. We defined hypertension control as blood (BP) levels both < 140 mmHg/ < 90 mmHg. Patients were divided into 3 groups: controlled hypertension, uncontrolled hypertension (not fulfilling the criteria of RHT) and RHT (uncontrolled hypertension despite using 3 antihypertensive drugs including diuretic). Cardiovascular (CV) risk was evaluated according to 2013 ESH/ESC guidelines.

**Results:** There were no differences in the rates of controlled hypertension (47.6 vs 47.0%), uncontrolled hypertension (27.3 vs 28.8%) and RHT (25.1 vs 24.2%) between women and men respectively (p = 0.17). Among patients with RHT, women as compared with men were older and had lower diastolic BP and eGFR as well as higher pulse pressure (PP). CV disease (16.9 vs 14.3%; p = 0.034), abdominal obesity and metabolic syndrome (MS, 70.5 vs 60.1%; p < 0.001) were more frequent among women than men with RHT. In RHT patients low (1.0 vs 0.0) and high (25.3 vs 20.8%) added risk categories were more frequent and moderate (13.6 vs 18.0%) and very high (60.1 vs 61.2%) added risk.
categoricals less frequent in women than men (p < 0.001). Men with RHT were treated more frequently with aldosterone antagonists (16.1 ± 13.8%; p = 0.048) and beta-blockers (8.9 ± 2.1%; p = 0.001) and less frequently with thiazide diuretics (7.8 ± 81.3%; p = 0.032). In a multivariate models higher PP, presence of MS, CAD and eGFR < 60 ml/min/1.73m² were related to the presence of RHT both in males and females. In women RHT was also related to the abdominal obesity, CVD and diseases causing disability. In men, RHT was additionally related to the diseases requiring treatment with non-steroidal anti-inflammatory drugs.

Conclusions: Although there were no differences in the rate of RHT between women and men, we identified gender related differences in CV profiles in RHT patients and in factors related with the presence of RHT.

PP.10.11
RADIOFREQUENCY RENAL SYMPATHETIC DENERVATION IN PATIENTS WITH RESISTANT ARTERIAL HYPERTENSION – 12-MONTH FOLLOW-UP


Objective: To evaluate safety and efficacy of radiofrequency renal sympathetic denervecation (RDN) in patients with resistant arterial hypertension (AH) in midterm follow-up period.

Design and method: In the group of 21 patients (54 ± 10 years, M:F 13:8) with inadequately controlled AH on 3 or more antihypertensives including diuretics (average office blood pressure /BP/187/112 mmHg with average number of anti-hypertensive drugs 7 ± 1), we realized RDN intervention with the use of Symplic (Medtronic) or EnligHTN (St. Jude) catheters. During the 12-month follow-up we analyzed changes in office BP, ambulatory BP monitoring (ABPM), and presence of complications after intervention. As responders to RDN were defined patients with decrease in office systolic (sBP) >10 mmHg.

Results: Global or local complications linked to intervention were not detected. The change in renal filtration did not occur and we did not register renal artery stenosis on control CT angiography after 3 months. One patient died 11 months after RDN due to acute myocardial infarction. In 20 observed patients a significant decrease in office BP 12 months after RDN was present (sBP 187 ± 20 vs 162 ± 32 mmHg, p = 0.002; DBP 112 ± 20 vs 97 ± 20 mmHg, p = 0.006), however only a borderline decrease of ABPM values was reached (sDTK 169 ± 16 vs 163 ± 30 mmHg, p = 0.13). Target decrease in office BP 12 months after RDN was achieved in 15/20 patients (75%). The number or dosage of antihypertensive drugs were reduced in 10/20 patients (50%). In the subgroup of 11 “super-responders” (55%) the decrease in office sBP-20 mmHg, and ABPM sBP > 15 mmHg was achieved, with average drop in office BP –51–26 mmHg and ABPM –23–9 mmHg. Responders were characterized by higher office sBP before RDN (191 ± 21 vs 175 ± 15 mmHg, p = 0.04), lower night-time ABPM before RDN (149/80 vs 165/97 mmHg, p < 0.05), and by a higher number of ablation points (12.5 ± 2.7 vs 10.2 ± 1.1, p = 0.009) compared to non-responders.

Conclusions: Radiofrequency RDN is a safe method of achievement decrease in office BP in patients with resistant AH. Higher office sBP, lower night-time ABPM values, and higher number of ablation points are important predictors of RDN clinical success. An increase in number of responders could be expected after the introduction of a newer generation of ablation catheters.

PP.10.12
EFFECT OF RENAL DENERVATION CHANGES DAILY BLOOD PRESSURE IN PATIENTS WITH RESISTANT HYPERTENSION

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Objective: Rate dynamics of daily monitoring of blood pressure in patients with resistant hypertension.

Design and method: The study included 53 patients (mean age 54.6 ± 19.6 years) with drug-resistant essential hypertension. All patients underwent ambulatory monitoring of blood pressure (BP) at baseline, after 12 months after renal denervation (RDN).

Results: The original figures average BP amounted to 155.6/93.5 mmHg. After renal denervation according to the daily monitoring showed marked antihypertensive effect with BP reduction on a 13.0–7.5 mmHg compared to non-responders. The level of pulse pressure decreased in comparison with baseline after 1 year after the intervention from 64.5 to 56.5 mmHg. Under the influence of the RD also noted the decrease average variability of the systolic BP from 16.5 to 15.0 mmHg, average variability diastolic BP in the daytime from 16.4 to 14.5 mmHg. Under the influence of RD, showed a reduction of the proportional index of systolic BP and diastolic BP by the end of the study, 17% and 19.2% respectively. In all cases, p < 0.05. The indicators of the daily index, on the average, after the sympathetic denervation of the kidneys did not change significantly. However, the positive effect of an intervention on the dynamics of the circadian profiles of BP 48 % of patients, in the form of higher of the daily index SBP by the end of the study. The daily index DBP increased to 51%. None of the patients included in this study, there have been no unwanted side effects related to the denervation. Dynamics of the level of blood creatinine or signs of renal artery stenosis after ablation was not detected.

Conclusions: In patients with hypertension resistant to drug therapy, conducting renal denervation contributes to a significant reduction average BP, average daily and average night BP. The decrease in pulse BP, BP variability and temporal load index pressure observed after ablation indicate a decrease in risk of cardiovascular complications.

PP.10.13
ARTERIAL STIFFNESS AND ENDOThELIAL FUNCTION IN PATIENTS WITH RESISTANT HYPERTENSION AFTER RENAL DENERVATION

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Objective: To study the effect of renal denervation (RDN) on arterial stiffness and arterial functional in patients with resistant hypertension 6 months after RDN.

Design and method: We examined 21 patients, average 57 ± 10 years, before and 6 months after successful RDN. Initially mean blood pressure was 174 ± 12 mmHg. All patients continued take the original multicomponent antihypertensive therapy unchanged. Arterial stiffness was determined by volume sphygmograph (VaSera 1000) we assessed pulse wave velocity aortic (PWA) and caro-ankle vascular index (CAVI); by plethysmocardiogram - carotid-femoral pulse wave velocity (PWVcf), by ultrasound method echo-TRACKING technology (Aloka Prosound a7) - stiffness index (B), modulus of elastic deformation (E), artery dis- tensibility (AC). Endothelial function was evaluated by finger photoplethysmography during reactive hyperemia (Angioscac-01). We assessed the occlusion amplitude index for the determination of endothelial function in the microvasculature and the occlusion phase shift index for the determination of endothelial function in the arteries of muscular type. Six months after RDN 12 patients were classified as responders (mean systolic BP was reduced on 10 mmHg and more).

Results: At baseline arterial stiffness was increased in 19 patients (90%) by PWVcf, in 13 (62%) by CAVI, PWA – 38% (38%), index B – 4 (19%), EP – 10 (48%), AC – 5 (24%). Baseline endothelial dysfunction was found in 17 patients (81%) by occlusion amplitude index, in 18 (85%) by occlusion phase shift index. 6 months after RDN in responders PWVcf decreased from 13,7 ± 3.6 to 12,5 ± 3.1 m/s (p < 0.01), CAVI from 7,08 ± 3,4 to 6,02 ± 3,8 (p < 0.05), AC increased from 0,71 ± 0,32 to 0,93 ± 0,6 mm2/Kpa (p < 0.05). Endothelial dysfunction had tendency to positive change: occlusion phase shift index increased from 1,28 ± 0,67 to 1,42 ± 0,32 (p = 0.07). All parameters of arterial stiffness and endothelial function had not positive changes in nonresponders.

Conclusions: After 6 months of RDN we detected the improvement of some indicators of arterial stiffness and tendency to improve endothelial function in responders.

PP.10.14
THE EFFECT OF RENAL DENERVATION IN MODERATE TREATMENT RESISTANT HYPERTENSION WITH CONFIRMED MEDICATION ADHERENCE


Objective: Data on the blood pressure (BP) lowering effect of renal denervation (RDN) in moderate treatment resistant hypertension (TRH) is limited. Moreover, change of adherence to medication, as one potential confounder of BP response, has never been analyzed rigorously in this group of patients. We analyzed the ef- fect of RDN on BP in patients with moderate TRH who were retrospectively found to be completely adherent to their antihypertensive medication.
Design and method: Our study cohort comprised 40 patients with moderate TRH (office BP > 140/90 mmHg, but < 160/100 mmHg and 24-h ambulatory BP monitoring [ABPM] > 130/80 mmHg), who underwent catheter-based RDN. Further major inclusion criterion was complete adherence to their medication (> 80% intake of their prescribed antihypertensive drugs) at baseline (assessed by retrospective toxicological analysis).

Results: Six months after RDN office BP was reduced by -10/-6 mmHg (systolic: 149 ± 6 mmHg vs. 139 ± 15 mmHg; diastolic: 81 ± 12 mmHg vs. 75 ± 10 mmHg; both p < 0.001) and 24-h ABPM by -7/-4 mmHg (systolic: 150 ± 14 mmHg vs. 143 ± 16 mmHg, p = 0.005; diastolic: 82 ± 10 mmHg vs. 78 ± 9 mmHg, p = 0.009). Number of prescribed antihypertensive medication (6.0 [5.0 – 6.0] vs. 5.5 [5.0 – 6.0], p = 0.013) and adherence (95.2 ± 7.6 % vs. 91.7 ± 13.9 %, p = 0.065) was slightly reduced 6 months after RDN, both likely to underestimate the true BP reduction.

Conclusions: Thus, our data indicate that even after given full respect to drug adherence as potential confounder of BP response after RDN both office and 24-h ABPM were substantially reduced in patients with moderate TRH.

PP.10.15 PREVALENCE OF SEXUAL DYSFUNCTION IN FEMALES WITH RESISTANT HYPERTENSION

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Objective: Sexual dysfunction is common in females with essential hypertension. The prevalence of sexual dysfunction in females with resistant hypertension has yet to be investigated. The objective of our study was to assess the incidence of sexual dysfunction in females with resistant hypertension.

Design and method: Our study included 109 sequential patients presenting with resistant hypertension in our hypertension outpatient clinic. Sexual function was assessed using the Female Sexual Function Index (FSFI) and sexual dysfunction was defined as FSFI scores below 25.5. Resistant hypertension was defined according to current guidelines as blood pressure > 140/90 mmHg, despite the administration of at least three antihypertensive medications in maximum tolerated dose, including a diuretic.

Results: The majority of the patients had either known cardiovascular disease (28/109, 26%) or additional cardiovascular risk factors (52/109, 48%). Study participants were on three drugs (32/109, 29%), four drugs (63/109, 58%), or five or more antihypertensive drugs (14/109, 13%). No female patient had ever been questioned about her sexual function in the past. Sexual dysfunction was found in 78 out of 109 (72%) female patients participating in the study.

Conclusions: Sexual dysfunction is very often in women with resistant hypertension. Lack of diagnosis in daily practice is due to lack of relevant questions, highlighting the need to inform attending physicians about this under-recognized medical condition.

Incidence of resistant hypertension and associated factors in oldest patients in China

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Objective: Resistant hypertension (RH) is a problem of growing interest in geriatrics in recent years, is defined as blood pressure that remains above goal in spite of the concurrent use of 3 antihypertensive agents of different classes. Ideally, one of the 3 agents should be a diuretic and all agents should be prescribed at optimal dose amounts. We investigated the incidence of resistant hypertension and associated factors among patients aged 80+ admitted to Chinese PLA general hospital.

Design and method: The retrospective observational study included patients aged 80+. The goal of the blood pressure of patients age 80+ yrs was 150/90 mmHg. The study protocol was approved by the Ethics Committee of General Hospital of Chinese PLA, Beijing, China.

Results: This study evaluated 859 patients treated more than 3 hypertension medications(including a diuretic). They had a mean age of 85.2 (80–101) yrs. Among the participants, 266 (31.0%) had RH. On admission, antihypertensive drugs used were: calcium channels blockers (764/89%), angiotensin-converting enzyme inhibitors or angiotensin II receptors blockers (730/85%), beta-blockers (678) 79%, diuretics (644) 75%. Factors independently associated with RH among patients aged 80+ were body mass index, the odds ratios were 1.09 (95% confidence interval [CI]0.73–1.62), plasma glucose level 1.10 (95% CI[0.73–1.44]), low density lipoprotein cholesterol 2.37(95% CI [1.09–3.56]), and estimated glomerular filtration rate 2.14 (95% CI [1.19–3.82]).

Conclusions: The prevalence of resistant hypertension in patients aged 80+ was high. Our study also suggested that RH was associated with several risk factors. It is important to identify a high-risk population and control the risk factors to improve prognosis in patients with RH.

PP.10.17 ANXIETY AND DEPRESSION AS PREDICTORS OF DRUG INTERRUPTION IN UNCONTROLLED HYPERTENSION

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Objective: Uncontrolled hypertension (UCHTIN) is closely associated with poor prognosis and increased rate of cardiovascular events. Poor adherence to anti-hypertensive treatment is one of the most frequent reasons for non-target blood pressure (BP) level.

The aim of the study was to assess the relationship between anxiety, depression and adherence (incidence of drug interruption) in ambulatory patients with UCHTIN.

Design and method: We examined 336 ambulatory patients with UCHTIN (94 males and 242 females) 39 – 69 years old (mean age 54 ± 3 years) not on target in spite of combination of antihypertensive drugs. Repeated “office” BP measurements, ambulatory BP monitoring (ABPM), as well as screening for secondary HTN, were performed in all patients. Depression and anxiety levels were estimated by hospital anxiety and depression scale (HADS) and Spilberger test.

Results: As a result of investigation “true” resistant HTN was confirmed in 46 patients (13,7%), secondary forms diagnosed in 74 (22%) cases and 21 (6,3%) patients had “white-coat” HTN. In 195 cases (59,1%) the main cause of non-target BP level was suboptimal treatment regimen. Among them 64 (32,8%) patients periodically interrupted drug intake due to different reasons.

Baseline indicators of personal and reactive anxiety were higher in noncompliant UCHTIN patients with UCHTIN compared with age-matched patients with adherent patients with UCHTIN (26 ± 1 and 27 ± 2 points, vs 23 ± 2 and 20 ± 3 points, P < 0.01). Depression level was maximal in noncompliant patients with UCHTIN (16 ± 3 points, P < 0.01) and associated with 24-hours systolic BP (r = –0.46, P < 0.05). Systolic 24-hours BP variability was higher in noncompliant UCHTIN patients with high-scoring depression and anxiety compared to age-matched adherent patients with UCHTIN.

Conclusions: Depression level may be predictor of inadequate adherence to treatment associated with drug interruption in patients with uncontrolled hypertension.

PP.10.18 REDUCTION IN BLOOD PRESSURE AND CARDIAC HYPERTROPHY IN RESISTANT HYPERTENSIVE SUBJECTS: A FIVE-YEAR FOLLOW-UP STUDY


Objective: Resistant hypertension (RH) is defined as the condition whose the blood pressure (BP) remains above the target (above140/90mmHg) despite the concurrent use of three or more classes of antihypertensive (anti-HT) at optimal doses. It is known that cardiovascular risk increases with the lack of BP control. Thus, optimized treatment - pharmacological or no pharmacological - is important to attempt the reduction of the risk of cardiovascular events in subjects with RH.

Design and method: In this study, we performed a retrospective cohort with 57 RH patients regularly followed-up in a specialized clinic during a five years period, from 2009 until 2014, in order to compare clinical and biochemical data. We assessed office and ambulatory (ABPM) BP measurements. The left ventricular hypertrophy (LVH) was assessed by echocardiography. The biochemical tests such as aldosterone, renin, glucose, glycated hemoglobin (HbA1c), total cholesterol, high-density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), very-low-density lipoprotein cholesterol (VLDL) and triglycerides. Microalbuminuria and urinary sodium excretion were also evaluated.

Results: The office BP levels decreased from 2009 to 2014 (135/78 mmHg vs. 122/72mmHg, p < 0.01) as well as ABPM (147/85mmHg vs. 136/78 mmHg, p = 0.02). The number of anti-HT drugs used increased in 2014, due to the greater use proportion of beta-blockers (BBs) and mineralocorticoid receptor antagonist (MRA). In addition, the hypoglycemic agents and statins use increased in the
same period. Even with the increase of the number of drugs over the evaluated pe-
period, we found that the defined diary dose of the medications in 2014 were similar
when compared to 2009. Finally, LVH significantly decreased in 2014 compared to
2009 (93 ± 27 g/m² vs. 143 ± 38 g/m², p < 0.0001, respectively).

Conclusions: We conclude that an intensive treatment may improve BP control
and target organ damage. A close follow-up is essential to assess and evolve the
situation of the patients, and consequently, provide better cardiovascular outcomes.

PP.10.19
RENA L DENERVATION RAPIDLY RESTORES
CIRCULATING PROTEIN C ELLS IN PATIENTS
AFFECTED BY RESISTANT HYPERTENSION
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Objective: To investigate whether blood pressure (BP) lowering after renal sym-
pathetic denervation (RSD) affects CD34+ cell number in drug-resistant hyperten-
sion (R-HTN).

Design and method: We enrolled 11 patients with R-HTN, already treated with
at least 6 antihypertensive drugs, including a diuretic, at full doses; patients with office BP of ≥ 160 mmHg (<150 mmHg for type 2 diabetes) were con-
sidered eligible for the procedure. Adherence to drug treatment was accurately
checked by patients’ general practitioners. Mean age was 61 ± 7.9 years; M: F = 8: 5. We measured clinic (sphygmonanometer) and ambulatory (Tonport V GE-
Healthcare) BP, and heart rate (HR; electrocardiogram), at baseline and 30 days after RSD procedure (Sympatic; Medtronic). 24 h BP recordings and home BP
protocols were consulted in addition to office BP measurements at the hospital before enrollment.

Results: At T0: SBP: 179.1 ± 9.3 mmHg; DBP: 101.2 ± 5.5 mmHg; HR 79.9 ±
9.4; CD34+ cells: 1.66 ± 0.51. At T1 SBP values were reduced on the average of
40.2 mmHg (138.9 ± 7.3; -22.5%, p < 0.001) DBP of 18 mmHg (83.2 ± 3.2;
-17.7%, p < 0.001), and HR of 10.4 bpm (67.3 ± 6.0; -17.7%, p < 0.005), and
CD34+ cell number increased on an average of 0.34 cells /microl. (2.0 ± 0.51;
+21.2%, p < 0.001).

Conclusions: RSD rapidly restores CD34+ cell number in patients affected by
true R-HTN; if these results will be confirmed on a larger scale, they could pro-
vide new insights about CD34+ cells and pathophysiological aspects of arterial
hypertension.

PP.10.20
FLUORESCENCE ANALYSIS OF URINE SAMPLES
FOR EVALUATION OF PHARMACOLOGICAL
ADHERENCE IN RESISTANT HYPERTENSION

Objective: Resistant hypertensive subjects (RH) present blood pressure (BP)
above 140/90 mmHg, despite the use of three or more antihypertensive agents of
different classes, including if possible a diuretic. The lack of BP control caused by
non-adherence to medication can be falsely interpreted as resistance to drug
treatment. Although it is well established that adherence to treatment is critical to
achieve BP control, some practical difficulties, such as application of a direct and
simple method with low cost and feasibility in the clinical setting still happen.
Our goal was to test a simple method to evaluate the medication adherence of RH.

Design and method: Twenty-one patients referred to the Resistant Hyperten-
sion Clinic (Campinas, Brazil) had the triamterene included in their current pre-
scription and were followed for 30 days period. We performed two random home
protocols were consulted in addition to office BP measurements at the hospital before enrollment.

Results: CD34+ cells increased on average of 0.34 cells /microl. (2.0 ± 0.51;
+21.2%, p < 0.001). The fluorescence of urine was evaluated by a simple technique,
where the test showed concordance between MMAS-8 and fluorescence
methods by 0.61 (95% CI 0.28–0.94; p < 0.01).Non-adherent patients had a higher office (81 ± 11 vs 73 ± 6 mmHg, p = 0.03), baseline 24-h ABPM (75 ± 9
vs 66 ± 7 mmHg, p = 0.01), post protocol 24-h ABPM (74 ± 9 vs 67 ± 6 mmHg,
p = 0.03) and HBPM (77 ± 9 vs 67 ± 8 mmHg, p = 0.01) than their counterparts.

Conclusions: Non-adherence to antihypertensive therapy is prevalent in resistant hypertension even if the patients are followed-up in specialized clinics. The fluo-
rescence method to detect triamterene intake in RH showed to be safe, feasible and
easy to assess non-adherence and also associated with clinical parameter.

PP.10.21
THE EFFECT OF RENAL DENERVATION ON
INFLAMMATORY MARKERS IN PATIENTS WITH
RESISTANT HYPERTENSION AND DIABETES
MELLITUS TYPE 2
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Objective: Chronic activation of the sympathetic nervous system (SNS) is caus-
ative in the pathophysiology of hypertension. Besides this, SNS activates immune
system. Inflammation, and hypertension may interact and treatment of one of
the two conditions could have some impact on the other. Renal denervation (RDN) is
a promising treatment for hypertension. Beforehand, we hypothesized that a reduction
of SNS following RDN may lead to a decreased inflammatory cytokines. The aim of
this study was to evaluate the dynamics of TNF-α and interleukin-1β after catheter-
based RDN in patients with resistant hypertension and diabetes mellitus type 2.

Design and method: Thirty-two patients with true resistant hypertension and type 2
diabetes mellitus were included in single-arm prospective interventional study (detailed protocol was published on ClinicalTrials.gov, number NCT01499810). Office blood pressure (BP) measurement, ambulatory 24-h BP assessments lev-
els of inflammatory cytokines (TNF-α, IL-1β) were performed at baseline and 12
months after RDN. On average, patients were taking 4 (3–6) antihypertensive
drugs. None of the patients changed the antihypertensive treatments during
follow-up. A 12 months follow-up was completed by 26 patients (43–75 years old,
mean aged 59.3 ± 7.9 years, 14 male).

Results: RDN reduced both systolic/diastolic office and 24-hour BP by –31.7–
12.8 mmHg, P < 0.01 for office BP and –13.4–10.0 mmHg, P < 0.01, for 24-h
BP. After RDN there was a decrease both TNF-α levels (from 1.23 ± 0.44 to
1.10 ± 0.51; p = 0.009) and IL-1β level (from 1.27 ± 0.60 to 1.00 ± 0.51,
P = 0.02). There were no direct relationships between decrease in these cytokines
and BP reduction.

Conclusions: Renal denervation may reduce activity of chronic inflammatory
process and therefore may have potential benefit of inflammation inhibition in
patients with resistant hypertension and diabetes mellitus type 2.

PP.10.23
EVALUATION OF SODIUM INTAKE IN PATIENTS
WITH RESISTANT HYPERTENSION: CLINICAL
PRACTICE IN GREECE
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Objective: Sodium and water retention is common in patients with resistant hyper-
tension and sodium restriction has been found very effective in such patients. Mea-
surement of sodium excretion in 24-hour (24-h) urine is a reliable marker of sodium intake. The present study evaluated the implementation of the measurement of 24-
hour urine sodium in patients with resistant hypertension in the daily practice.

Design and method: 186 patients with resistant hypertension were evaluated in our
department’s hypertension outpatient clinic. Patients were questioned if they:
(a) have received advice for sodium intake restriction from their physicians, (b) have
restricted sodium intake, (c) consumed small, moderate or large amounts of sodium and (d) have performed a 24 h urine sodium excretion measurement.

Results: 169 out of the 186 patients (91%) were instructed to restrict daily sodium
intake but the duration of the given instruction was less than one minute in the
majority of the cases (86%). 141 of them (76%) stated that they restricted sodium
consumption. As for the amount of the intake, 69 (37%) stated that they receiv-
ing small amounts, 58 (31%) moderate amounts, 43 (23%) large amounts and the
rest 16 (9%) very large amounts of sodium. 24 h urinary collection measurements
were performed in 13 patients alone (7%), however only for urine albumin excre-
tion calculations, while only in 2 (1%) of them, sodium excretion was calculated.

Conclusions: 24 h urine sodium excretion assessment is performed in a very
small portion of patients with resistant hypertension in the daily clinical prac-
tice. Physicians should be efficiently informed for this easy, low cost and reliable
method of sodium intake specification.
PP.10.24  EFFECTS OF TNF-ALPHA INHIBITION ON HEMODYNAMIC PARAMETERS AND BIOMARKERS IN RESISTANT HYPERTENSION: BACKGROUND, RATIONALE, AND DESIGN

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Objective: Currently it has been largely discussed the influence of inflammation in resistant hypertension (RH). The BP variation promotes increased expression of pro-inflammatory cytokines, such as tumor necrosis factor-alpha, interleukins 1 and 6. It was showed that treatment with TNF-α inhibitor improves BP and endothelial function, and reduces arterial stiffness in patients with rheumatoid arthritis. Recently, it was demonstrated that TNF-α levels are increased in RH subjects compared to normotensives. This project aims to assess whether the acute inhibition of TNF-α reduces BP levels, as well as changes hemodynamic parameters, target organ damage and inflammatory biomarkers in RH.

Design and method: This crossover, double-blind study will include 12 resistant hypertensive subjects –regularly followed at the Outpatient Resistant Hypertension Clinic/UNICAMP – which will randomized assigned to (1) serum infusion followed by infliximab infusion (TNF-α inhibitor, 3 mg/kg) and (2) infliximab followed by serum, for two hours and washout of the 40-day period between both infusions. Office, central and ABPM BP, inflammatory biomarkers, cardiac hypertrophy (echocardiography), endothelial function by flow-mediated dilation, arterial stiffness by pulse wave velocity (SphygmoCor CPV system) will be determined before and after 7 days of infusion. Hemodynamic parameters will be simultaneously assessed during infusions. The plasma concentrations of TNF-α, ILs-1, –6 e –10, monocyte chemoattractant protein-1, and adiponectin will be determined by ELISA.

Results: Since the inflammatory process is associated in pathophysiology of RH and the lack of BP control, and because the TNF-α is implicated in cardiovascular outcomes, we hypothesized that acute TNF-α inhibition reduces BP levels, as well as modulates hemodynamic parameters, target organ damage and biomarkers in RH subjects.

Conclusions: As the effect of TNF-α inhibition has not been explored in RH, this study may offer new perspectives on disease pathogenesis and treatment, which could provide a more rational approach to subjects at high cardiovascular risk.

PP.10.25  AN UNEXPECTED ETIOLOGY FOR HYPERTENSION IN YOUNG WOMEN

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Objective: Introduction: One of the most common causes of secondary arterial hypertension in young women is the renal artery stenosis due to fibromuscular dysplasia, vasculitis or thrombembolic disease. We present the case of a patient with an unexpected, unilateral renal artery atherosclerotic lesion.

Design and method: Case report: We describe the case of a 20 years old non-smoker and obese woman (BMI = 31 kg/m2), with no personal or family history of cardiovascular diseases; she was diagnosed with hypertension at the age of 18, with maximal values of 200/120 mmHg. She was born premature (29 weeks) and had mild mental retardation; no other pathologies at the time of examination; was treated with four antihypertensive drugs (ACE-inhibitor, calcium blocker, central blocker and diuretic)- without a proper control.

The clinical exam showed no abnormalities, without purple or red striae, symmetrical blood pressure at arms, symmetrical pulse and no carotid or renal bruits, no hirsutism.

The routine laboratory tests demonstrated dyslipidemia- hypercholesterolemia (total cholesterol 210 mg/dl, LDL 130 mg/dl); in order to find a cause for secondary hypertension, we performed also TSH, FT4, testosteron, cortisol levels, that were normal, but an aldosterone-renin ratio was calculated and demonstrated high renin values.

Results: The echography showed reduced flow through the right renal artery, an MRI of the renal arteries revealed a severe, unique, proximal stenosis of the right renal artery, a typical atherosclerotic lesion. After percutaneous dilatation - the hypertension control dramatically improved.

Conclusions: As the effect of TNF-α inhibition has not been explored in RH, this study may offer new perspectives on disease pathogenesis and treatment, which could provide a more rational approach to subjects at high cardiovascular risk.
**Aortic Pulse Wave Velocity is Related to Coronary Heart Disease in Women But Not in Men**

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**Objective:** Moderate age-dependent differences in aortic pulse wave velocity (PWV) between females and males have been reported previously. Nevertheless, studies on gender-specific interactions of PWV and cardiovascular diseases are lacking. Therefore, the aim of this study is to investigate age-dependent sex differences in PWV in relation to coronary heart disease (CHD).

**Design and method:** A total of 645 patients from 60 to 79 years with suspected CHD underwent coronary angiography at the hospital in Wels-Grieskirchen (Austria). Invasive aortic PWV was measured in all patients by catheter pull-back. According to the indication of the angiography, patients were divided into four groups (male/female, CHD/noCHD). As PWV strongly depends on age, patients were divided in two decades of life for further statistical analysis (60–69 years, 70–79 years). For both sexes, groups with and without CHD were compared. To minimize the influence of blood pressure, in a second step PWV was corrected for invasive aortic systolic blood pressure (aoSBP) by linear regression.

**Results:** For each decade and each group, values of aoSBP, PWV and corrected PWV (corrPWV) can be found in the table. In both decades, differences in PWV between CHD and noCHD were not significant in males (p > 0.1), whereas differences were significant in females (p < 0.01). While aoSBP was significantly higher for patients with CHD in both sexes in decade 60–69 (p < 0.05), no significant differences could be found for patients aged 70–79 (p > 0.1). After accounting for unequal pressure levels, for females the differences in corrPWV between CHD and noCHD were still significant (p < 0.05), while they remained not statistically significant for males (p > 0.1).

**Conclusions:** In patients with suspected coronary heart disease, pulse wave velocity is related to CHD in women but not in men. Blood pressure differences could not explain these results, as the effects remained when PWV was corrected for aortic systolic blood pressure. This finding indicates that a sex-dependent interplay between arterial stiffness and CHD is present which needs future attention.

**Objective:** Fibromuscular dysplasia (FMD) is an idiopathic, segmental, non-inflammatory, nonatherosclerotic vascular disease, which results in arterial narrowing of small and medium-sized vessels. The last years new perspectives of the disease have opened up thanks to the systematically recording of FMD patient's data in central databases in the US and France. The main objectives of this multicentre study were to discover the epidemiology, vascular involvement, clinical manifestations and management of FMD patients in Flanders. Later on, these results will be compared to those of the French & US Registry to discover new insights about the disease.

**Design and method:** Multicentre study at 5 different hospitals in Flanders. 123 FMD patients were included in the database. Patients were eligible for enrolment if they were adults (18+ years old), diagnosis of FMD was confirmed using medical imaging and permission was given by written informed consent.

**Results:** Patients were on average 57.3 years (SD 15.8) when FMD was first diagnosed. 83.7% were female. Arterial hypertension (38.5%) was the most frequent symptom leading to diagnosis of FMD. Neurological complaints such as headache (26.4%), vertigo and/or balancing problems (23.1%) and a cervical bruit (17.5%) were also common. Ten patients (8.3%) had no symptoms at the time of diagnosis. Vascular events and complications as a result of FMD occurred in a minority of patients (21.1%). Cerebrovascular involvement (81.8%) was nearly as frequent as renovascular FMD (85.3%). In 25 of 60 (41.7%) patients having two or more vascular beds imaged, co-existent FMD was found in at least two vascular beds. Digital subtraction angiography was the preferred technique for detecting FMD related lesions. The majority of the patients was pharmacologically treated (86.3%), 25.9% of them underwent an endovascular treatment.

**Conclusions:** This study confirmed the finding that FMD is a disorder of mostly middle-aged people, but can be found in any age group. The carotid/vertebral arteries were nearly as frequently involved as the renovascular bed. Symptoms as a result of FMD were highly variable, with FMD incidentally discovered in a minority of all patients.
was independently correlated with changes in both c-f-PWV and cr-PWV (Figure 1), independently of blood pressure levels (r = −0.46 and r = −0.46, respectively; p < 0.001 for both).

Conclusions: miRNA-21 is strongly associated with an improvement in arterial stiffness in patients with well-controlled essential hypertension, independently of their blood pressure levels. Our data highlight the significance of miRNA-21 in vascular remodeling and its role as a potential prognostic marker and future therapeutical target.

PP.11.05
RESERVOIR-PRESSURE ANALYSIS IN TYPE 2 DIABETES INDIVIDUALS WITH CARDIOVASCULAR DISEASE

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Objective: Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in type 2 diabetes (DM). Central artery haemodynamics may play an important role in the development of CVD in DM. Central haemodynamic indices derived from reservoir-pressure analysis (RPA) have recently been shown to predict cardiovascular events in several populations. However, it is unknown whether those indices are associated with CVD in DM. We aimed to determine the differences in RPA indices in DM individuals with and without CVD.

Design and method: We studied 106 individuals with DM and CVD (DM+CVD; 69.5 ± 8.9 yrs, 24F). 138 individuals with DM but without CVD (DM−CVD; 65.5 ± 8.5 yrs, 49F), and 264 non-DM individuals with and without CVD (DM−CVD; 65.9 ± 8.9 yrs, 89F). RPA indices including reservoir pressure integral (PRI), peak reservoir pressure (MAXPR), excess pressure integral (XSPI) and peak excess pressure (MAXXSP) were obtained by radial artery tonometry.

Results: PRI and MAXPR were significantly lower in DM+CVD (84 ± 1.3 mmHg s and 101.9 ± 0.4 mmHg s and 102.7 ± 0.4 mmHg s and 109.7 ± 0.8 mmHg s and 103.6 ± 0.3 mmHg s, p < 0.05) after adjustments for age, sex and mean arterial pressure (MAP). XSPI and MAXXSP were significantly higher in DM+CVD (7.2 ± 0.8 mmHg s and 12.8 ± 0.8 mmHg s) than DM−CVD (6.1 ± 0.2 mmHg s and 38.6 ± 0.7 mmHg s and DM−CVD (6.1 ± 0.1 mmHg s and 38.5 ± 0.5 mmHg s, p < 0.05) after the same adjustments.

Conclusions: These results demonstrate that the presence of DM is associated with reduced aortic reservoir function, which may result in a suboptimal left ventricular workload, contributing to the development of CVD. Our findings suggest a potential utility of excess pressure indices (XSPI and MAXXSP) for risk stratification in individuals with DM.
Objective: To present preliminary evaluation of clinical features, presenting symptoms and cardiovascular complications in patients with fibromuscular dysplasia (FMD) enrolled to ARCADIA-POL registry.

Design and method: The first 84 patients with confirmed FMD in any vascular bed were enrolled in ARCADIA-POL registry from 15 Polish sites. Based on Polish-French collaboration ARCADIA-POL registry was instituted in January 2015 to better understand clinical characteristics and management of FMD in Poland, representing region of Central Europe. A standardized FMD data form was used for data collection. All patients underwent detailed clinical evaluation including ambulatory blood pressure monitoring, biochemical evaluation, biobanking, duplex Doppler of carotid and abdominal arteries and whole body angiography.

Results: We included 84 patients (59F[70.2%], 25M[29.8%], mean age: 42.5 ± 14.8 years, range: 18–72). In the analyzed group FMD was identified most frequently in renal arteries (88.1%). The mean age at the diagnosis of hypertension was 31.7 ± 17.8 years and the FMD was diagnosed on average 5.6 ± 9.5 years later with the mean age at the diagnosis of FMD 38 ± 15.8 years. The most common presenting symptoms of the disease were: hypertension (84.5%), headaches (71.4%), tinnitus (40.5%), dizziness (36.9%) and epigastric (34.5%) or cervical bruits (11.9%). At evaluation 76 patients (90.5%) were found to be hypertensive and were taking a median number of 2 (interquartile range[IR]:1-3) antihypertensive agents. The mean office and 24 h ABPM systolic and diastolic BP values were, 131 ± 21/92 ± 13 mmHg and 126 ± 16/77 ± 10 mmHg respectively. 41 patients (48.8%) were smokers - 18[21.4%] and 23[27.4%] patients were current and former smokers respectively. Based on questionnaire taken from 84 patients, one patient reported confirmed FMD in her family - 9 members were evaluated and FMD was confirmed in two sisters and father. Among cardiovascular complications reported by patients, cerebrovascular events occurred in 19 patients (22.6%), coronary artery disease in 4 patients (4.8%) and myocardial infarction in 1 patient (1.2%).

Conclusions: Preliminary data of ARCADIA-POL registry showed that FMD is occurring primarily in middle-aged women and most frequently in renal arteries. Although a significant proportion of FMD patients may present with a serious cardiovascular complications, many present with nonspecific symptoms and a subsequent delay in the diagnosis.

PP.11.08 THE ASSOCIATION OF METABOLIC SYNDROME AND ITS COMPONENTS WITH CARDIO-ANKLE VASCULAR INDEX. GENDER DIFFERENCES


Objective: Cardio-Ankle Vascular Index (CAVI) can reflect peripheral arterial stiffness. Metabolic syndrome (MS) and its components may increase arterial stiffness and the risks of cardiovascular diseases. However, the association of MS and its components with arterial stiffness has not been well studied. The aim of this study was to investigate the association between MS/its components and arterial stiffness evaluated by CAVI in Spanish population with intermediate cardiovascular risk.

Design and method: Cross-sectional study. This study analyzed 2384 subjects who were included in the MARK study, aged 35 to 74 years (mean 61.3 ± 7.7), 61.7% male. Measurement: CAVI using the VaSera device. Metabolic Syndrome was defined according to the NCEP ATP III definition. Waist circumference, blood pressure (BP), fasting plasma glucose (FPG) and lipid profile were measured.

Results: CAVI was significantly higher in males (9.04 ± 1.24) than in female (8.77 ± 1.13) (p < 0.001). In multivariate regression analysis, after adjusting for age, weight, height, antihypertensive drugs, lipid-lowering drugs and antidiabetic drugs, the CAVI maintained a positive association with the MS (β = 0.265 and β = 0.247; p < 0.01), in male and in females. In males CAVI was associate with the BP, waist circumference and triglycerides (β = 0.444, β = 0.195 and β = 0.128, p < 0.05), and in females with the BP and FPG (β = 0.247 and β = 0.231; p < 0.05). The HDL-C no maintained association in both genders. In the logistic regression analysis, after adjustment for confounding factors used in the multiple regression, subjects with higher (CAVI > 9) have twice the risk of having MS, OR = 1.708 in males and OR = 1.849 in females (p < 0.01).

Conclusions: Metabolic syndrome was positively associated with CAVI. The association of the components of the MS with CAVI differs by gender. Monitoring CAVI can be helpful to identify early stage of arterial stiffness in those people with MS.

PP.11.09 PLASMA NT-PROBNP MIRRORS THE DELETEROUS CARDIOVASCULAR CONTINUUM IN HYPERTENSION

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Objective: The aim of the present study was 1) to test the ability of N-terminal pro-brain natriuretic peptide (NT-proBNP) to detect cardiovascular remodeling denoted by either left ventricular hypertrophy (LVH) or arterial stiffness and 2) to test its reproducibility on two different conditions.

Design and method: The study included 169 hypertensive subjects, aged 47 ± 16 years, 51.5% of whom were men. 24-h ambulatory blood pressure was 141/88 mmHg. None of them had symptoms of heart failure, ejection fraction < 50%, and eGFR < 30 ml/min. LVH was defined by transthoracic echocardiography as greater than 115 g/m² in men and > 95 g/m² in women, increased arterial stiffness was defined by a carotid-femoral pulse wave velocity greater than 10 m/s.

Results: Mean daytime NT-proBNP was slightly higher than nighttime NT-proBNP (64 [30–140] vs. 56 [27–126] pg/ml, p = 0.005) but the 2 assessments were highly correlated (r = 0.919, p < 0.001). Values of NT-proBNP increased significantly according to the number of target organ damages: daytime NT-proBNP 40 [22–74], 75 [37–155], 243 [144–358] pg/ml, respectively (p < 0.001). The areas under the receiver-operating characteristic curves and optimal NT-proBNP were respectively: 1) for LVH, 0.673 and 166 pg/ml; 2) for arterial stiffness 0.817 and 294 pg/ml; 3) for both target organ damages 0.826 and 346 pg/ml (Figure).

Conclusions: This study demonstrates that NT-proBNP mirrors the cardiovascular consequences of hypertension, which precedes overt heart failure. Based on that and also on a good reproducibility, NT-proBNP is a promising tool for the management of hypertensive patients.

PP.11.10 CYSTATIN C AND ITS ASSOCIATION WITH CARDIAC PLACODE AND INTIMA THICKNESS IN SUBJECTS WITHOUT KNOWN CARDIOVASCULAR AND KIDNEY DISEASES

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Objective: Cystatin-C was reported to be a surrogate of kidney function while a high level of this marker has been shown to be a strong predictor of Cardiovascular (CV) events in patients with Chronic Kidney Disease (CKD). It has also been shown to correlates with CV events and with carotid plaque and preclinical atherosclerosis (i.e. Intima Media Thickness – IMT) in patients without CKD or known CV risk factors, although these results have not been confirmed by recent studies. The present work is aimed at assessing the association between cystatin-C and carotid atherosclerosis in a population free of CKD and CV diseases.

Design and method: We studied 480 healthy and normotensive blood donor subjects. We evaluated common carotid IMT and plaques by ultrasound (Philips 5500, 7.5 Hz Probe) together with office Blood Pressure (BP). Cystatin-C was measured on plasma (ELISA methods); blood glucose, total, HDL and LDL cholesterol were also measured.

Results: 2.5% of the population (12 subjects) showed an IMT higher than 0.9 mm. Those subjects were older (53.1 ± 7.5 vs 44.7 ± 9.6 years, p < 0.001) and showed a significantly higher plasma glucose (97.6 ± 19.2 vs 89.6 ± 10.6 mg/dl, p < 0.01) and Cystatin-C levels (0.72 ± 0.29 vs 0.62 ± 0.13 mg/l, p < 0.05) than subjects with IMT < 0.9 mm. 8.9% of the population (43 subjects) had carotid plaque. Those subjects were older (52.7 ± 7.6 vs 44.9 ± 9.6 years, p < 0.001) and showed higher plasma glucose (94.4 ± 12.7 vs 89.8 ± 11.1 mg/dl, p < 0.01) total and
Intrahepatic cholestasis (IC) and paucity of intrahepatic bile ducts (PIBD) are main features, occasionally accompanied by major vessels abnormalities (VA). Better clinical descriptions and pathophysiological understanding of this entity are necessary to improve the prognosis.

Objectives: 1. To characterize VA in a case series of AS patients with novel JAG1 mutation. 2. To describe the effects of an antioxidant agent on vascular function and inflammatory markers in a patient with AS.

Design and method: Descriptive study of a family with 5 members with clinical diagnosis of AS and a novel mutation in JAG1.

Results: Summary of cases:

Case #1 (C1). 21 years-old female presenting hypertensive encephalopathy and refractory hypertension (RH). Previous diagnosis: patent ductus arteriosus, coarctation of the thoracic aorta, hypoplasia of abdominal aorta (HAA) and right renal artery stenosis (RRAE). No IC.

Case #2 - (Brother of C1). 13 years-old male. RH, HAA and RRAE. No IC.

Case #3 - (Brother of C1). 13 years-old male. IC with PIBD. Deceased (massive subarachnoidal hemorrhage).

Case #4 - (Sister of C1). 15 years-old female. IC, PIBD and mild pulmonary stenosis

Case #5 - (Son of C2). 3 years-old male. IC and PIBD.

Case #6 - (father of C1,2,3 and 4). Sudden death at 42 years-old.

Case #7 - (mother of C1,2,3, and 4). No vascular or liver disease.

A heterozygous novel mutation in JAG1 (c.767 G > T; p.Gly256Val) has been found in cases #1, #2, #4 and #5, compatible with the clinical diagnosis of AS. For the first time in AS, a serendipitous observation that inflammatory markers (ferritin, c-reactive protein and albumin) and endothelial function were improved with oral N-acetylcysteine is also described.

Conclusions: 1. AS must be considered in patients with unexplained vascular abnormalities. 2. Oxidative stress and inflammation might play a crucial role in the progression of vascular injury in AS.
Objective: Good blood pressure control is essential in patients with acute aortic syndrome (AAS). It has been shown that the obstructive sleep apnoea syndrome (OSAS) is a risk factor for resistant arterial hypertension, and aortic dilatation. Here, we assessed benefit of systematic screening for SAS in post AAS.

Results: The population comprised 71 patients (males: 64.7%; median age: 57 [49–64], type A AAS: 49.3%; type B AAS: 50.7%). According to the AHI, 58 patients (81.7%) had OSAS and 31 (43.6%) had severe OSAS. The factors associated with the severity of OSAS were the body mass index (p = 0.0148 for the AHI and 0.009 for the ODI), abdominal perimeter (p = 0.0166 for the AHI and 0.0106 for the ODI). A prognostic analysis revealed a significant increase in the intrathoracic false lumen dilatation rate as a function of OSAS severity (p = 0.0008 for the AHI and p = 0.0284 for the ODI). The median rate of increase was 7.5 mm/year [5-10] in the AHI > 30 group and 5.0 mm/year [0-8] in the ODI > 30 group. There were no intergroup differences in blood pressure control according AHI category, but a diastolic blood pressure difference was noted for the ODI (p = 0.0008).

Conclusions: Our results suggest that systematic screening for OSAS is of value in patients with AAS. The false lumen dilatation rate appears to be related to the severity of OSAS. It remains to be seen whether the treatment OSAS would modify the false lumen dilatation rate.

Design and method: The design and conception of the perfusion chamber were done pursuant to the requirements. The thoracic aorta of a Wistar rat was dissected and all aortic branches were coagulated. The aorta was perfused for 14 days at 37°C in a humidified atmosphere. Vessel mineralization was detected by quantification of the calcium content (normalized to dry weight) and histological staining.

Results: The experimental protocol for tissue preparation, buffer and perfusion condition were established. Tissue integrity during perfusion procedure seems to be intact; histo-morphological markers for elastic fibril degradation or necrotic markers are missing. Buffer and perfusion media were tested for induction of non-specific effects. Buffer and control media (w/o perfusion) did not induce vessel mineralization. To induce mineralization a medium containing high phosphate level (known from established ex vivo models) was used. Perfusion of the aortic tissue with this high phosphate medium induced a significant increase of calcium content in the aortic wall compared to perfusion condition with control medium (1.4 ± 0.4 vs. 6.5 ± 1.6 mg/mg; p < 0.05). Histological staining revealed medial located mineralization within the vessel wall.

Conclusions: The novel experimental setting provides a novel ex vivo model with solely luminal perfusion, which allows administration of substances in a more physiological manner than well established ex vivo settings for calcification studies. Furthermore, the benefit of easier handling than in vivo models and the advantage of working with tissue make usage for studying signaling pathways and for screening of pharmaceuticals possible.
Design and method: 36 cyanotic patients with congenital heart disease (17 males) aged 20–72 (42.3 ± 16.3 years), control group: 35 healthy individuals (16 males) aged 23–52 (39.6 ± 10.4 years). Assessed parameters: of central aortic pulse wave analysis (AoSP/aortic systolic pressure, AoAP-aortic pulse pressure, AP-augmentation pressure, API-Augmentation Index, PAWP-pulse wave amplification) and pulse wave velocity (PWV) with applanation tonometry method; IMT (intima media thickness) and FMD (flow-mediated dilatation after hyperemia) with USG Doppler.

Results: AoPP (37 ± 11 vs. 29 ± 6 mmHg; p = 0.002), PAWP (10.1 ± 7.3 vs. 11.3 ± 9 mmHg; p = 0.0001), and AI (24.7 ± 13.5 vs. 3.0 ± 13.6; p = 0.0001) were higher in the studied group compared to the controls. Higher values of PWV (7.4 ± 2.1 vs. 6.3 ± 0.7 m/s; p = 0.003) and lower of PAWP (135.3 ± 16.1 vs. 160.5 ± 12.8 s; p = 0.0001) in the studied population proved presence of the increased stiffness of arteries compared with the control group. IMT was on the border of statistical significance (0.06 ± 0.02 vs. 0.05 ± 0.01 mm; p = 0.051).

In cyanotic patients impairment of FMD was observed as compared with controls (9.0 ± 5.6 vs. 10.9 ± 4.7; p = 0.04). No significant correlations were found between AoPP, AoAP, AI, PWV, PAWP, IMT, FMD and biochemical parameters characterizing cyanotic patients depicting rheological properties of blood (SaO2, HGB, HCT, RBC).

Conclusions: Cyanotic patients with congenital heart diseases are characterized by significantly increased arterial stiffness estimated with pulse wave analysis parameters (AI, PAWP) and PWV, as well as by deteriorated arterial function expressed with worse vasodilative response in comparison with healthy age-adjusted population. It may confirm relevance of those mechanisms in development of increased rate of cardiovascular events in this population. Association between oxygen saturation or polycythemia and arterial stiffening and vascular dysfunction was not found in this group of patients.

Central Blood Pressure and Abdominal Aortic Diameters: Are There Any Correlations?

A. Grossi, L. Tavecchia, M. Agostinis, N. Tandurella, V. Pierobon, C. Mongiardi, L. Robustelli Test, S. Moretti, L. Merletti, L. Guasti, A.M. Grandi, A.M. Maresca. Design and method: We enrolled 50 patients, 35–55 years old, with mild untreated hypertension, free from cardiovascular diseases or diabetes, not smokers. We also selected 30 subjects matched for age, sex and anthropometric parameters in the control group. Each subject underwent office and 24 hours BP measurement, arterial tonometry (central BP, Pulse Wave Velocity-PWV), abdominal aortic ultrasonography (iuxtarenal and infrarenal diameters; anteroposterior-AP, laterolateral-LL) and blood-tests.

Results: Abdominal aortic measures were in physiological range for all the enrolled subjects, with significant higher diameters in males. Diameters were similar between normotensive and hypertensive patients but at iuxtarenal level (longitudinal AP: 15 ± 1.9 mm vs 16 ± 1.5 mm, transversal AP: 15.7 ± 1.8 mm vs 16 ± 1.5 mm), at iuxtarenal level (longitudinal LL: 15.6 ± 1.5 mm vs 16 ± 1.7 mm, p = 0.05) and at infrarenal level (longitudinal AP: 14.4 ± 1.6 mm vs 14.7 ± 1.5 mm, transversal AP: 14.3 ± 1.7 mm vs 14.6 ± 1.6 mm, transversal LL: 14.3 ± 1.7 mm vs 14.7 ± 1.7 mm, p = ns). Comparing the two groups by gender, these differences were still not significant in males. Conversely, the abdominal aortic diameters were higher in hypertensives women with significant difference at iuxtarenal (p = 0.005) and infrarenal level (p = 0.05). No significant correlations were found between office, central and 24-hour BP and aortic diameters for the whole population, whereas there was a mild correlation in females between iuxtarenal aortic diameters and systolic (r = 0.327, p = 0.019) and diastolic (r = 0.353, p = 0.016) central BP. Moreover, PWV correlated with iuxtarenal diameters in the whole population (r = 0.394, p < 0.001), in hypertensives (r = 0.403, p < 0.001) as well as in normoten- sives (r = 0.352, p = 0.001). Finally, both iuxtarenal and infrarenal aortic diameters correlated with age, abdominal circumference, BMI and serum uric acid.

Conclusions: The hypertension contribution to abdominal aortic dilation appeared significant only in females, suggesting the role of a different hormonal pattern. We also found different iuxtarenal and infrarenal aortic remodelling, most likely due to different vascular wall structure.

Arterial Stiffness and Arterial Function in Adult Cyanotic Patients with Congenital Heart Disease

L. Szczepaniak-Chichiel1, O. Trojanarska2, M. Gabriel1, D. Lipski1, A. Bartczak-Rutkowska1, J. Rupa-Matyskiew1, A. Tykarski1, S. Grajek1. 1Department of Hypertensionology, Angiology and Internal Medicine, Poznan University of Medical Sciences, Poznan, POLAND; 2Department of Cardiology, Poznan University of Medical Sciences, Poznan, POLAND. Design and method: To evaluate the prevalence of extracranial carotid artery lesions and carotid distensibility in low-renin hyperaldosteronism in comparison with essential hypertension (EH).

Results: Profile of symptomatic and asymptomatic (55%) PAD patients with ABI < 0.9 was: high blood pressure 89.2%, diabetes mellitus 83.3%, lipid disorders 72.2%, smoking 35.8%, creatinine clearance <60 ml/min 38.3% and all com- mons of metabolic syndrome (92.8%). Mean 24-hour blood pressure was 141/78 ± 14/8 mmHg, pulse pressure 63 ± 9 mmHg, 65.8% of non-dippers. Lipid lowerers agents were present in 53%, ACE-inhibitors in 44% and antiplatelet therapy in 74% patients.

Conclusions: There is a high prevalence of asymptomatic PAD patients that can be detected by an ABI. In PAD patients is commonly systolic hypertension associated with a high pulse pressure and non-dipping pattern. Effective blood pressure control and global cardiovascular risk treatment are underestimated in clinical practice despite significantly increased cardio-cerebro-vascular mortality and morbidity in symptomatic and even in asymptomatic PAD patients.

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Plasma aldosterone concentration (PAC) and PAC were performed by «IMMU-NOTE®», FRANCE. Intima-media thickness (IMT), atherosclerotic plaque of the common carotid artery and carotid bifurcation were evaluated by a high resolution duplex ultrasound technique (IU-22 Philips, Netherlands). Using a computer assisted method, the maximum and minimum internal diameter and average wall thickness of the right common carotid artery and the following indices of arterial stiffness and distensibility (compliance) were derived: (1) distensibility: the change in carotid artery diameter for a change in blood pressure relative to its systolic diameter; (2) cross-sectional compliance: distensibility multiplied by the cross-sectional area of the artery.

Results: In Group 1 PAC was significantly higher (mediana 270.1 pg/ml) in comparison with Group 2 (mediana 65.4 pg/ml), p < 0.05. PRA in Group 1 was significantly lower (mediana 0.2 mg/h) in comparison with Group 2 (mediana 0.8 mg/h), p < 0.05. Carotid plaques were present in 73% of low-renin hyperaldosteronism patients and 54% in patients with EH (p = 0.02). However, IMT was not significantly higher in patients with low-renin hyperaldosteronism in comparison with EH(53% vs 45%) (p = NS). In cross-sectional compliance there were no significantly differences in both groups whereas the distensibility coefficient decreased significantly in patients with low-renin hyperaldosteronism in comparison with EH - 22 vs 26 (p < 0.05).

Conclusions: These results demonstrate that hypertensive patients with hyperaldosteronemia and suppressed PRA display increased atherosclerotic carotid arterial lesions and distensibility coefficient compared with EH and normal RAAS.

PP.11.21
GENDER DIFFERENCES OF ARTERIAL STIFFNESS AND CENTRAL BLOOD PRESSURE IN PATIENTS WITH ARTERIAL HYPERTENSION AND THE INFLUENCE OF MENOPAUSE

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Objective: To evaluate differences of central BP and arterial stiffness between men and women with arterial hypertension and the influence of menopause status.

Design and method: We studied 128 subjects with stage 1-3 arterial hypertension, mean age 51.1 ± 11 years, 48% males, BP = 141 ± 24/87 ± 13 mmHg, hypertension duration 10.1 ± 8 years. Noninvasive central aortic BP and wave form characteristics (Alx and AIx corrected by heart rate of 75 bpm - Alx75) were synthesized from radial arterial pressure waves (applanation tonometry) by SphygmoCor. Brachial BP was obtained by an automatic device (OMRON®).

Results: Brachial systolic BP was higher (145 ± 26 vs. 136 ± 20 mmHg, p = 0.04) and, weight (76.2 ± 14 vs. 86.4 ± 13.2, p < 0.001) and height (1.59 ± 0.06 vs. 1.72 ± 0.08, p < 0.001) were lower in females than in males. Central systolic BP (137 ± 30 vs 125 ± 23 mmHg, p < 0.01), AIx (32.7 ± 9.8 vs 19.5 ± 11.7, p < 0.01), Alx75 (29.6 ± 6.9 vs 18.0 ± 9.3, p < 0.01) were higher in females, even after adjustments for weight, height and systolic BP. Postmenopausal status was present in 70% of females and mean age of menopause beginning was 47.8 years. Women at postmenopausal status older than 48 years showed worse AIx (i) than younger women (i) and also than men (i) at same age (p < 0.05).

Conclusions: Hypertensive females have higher brachial and central systolic BP than hypertensive males. Arterial stiffness is higher in hypertensive females than in men, at all ages, and in postmenopausal status is worse than in fertile age.
POSTER SESSION

POSTERS’ SESSION PS12: MICROCIRCULATION AND SMALL VESSELS

**PP.12.01** SYMPATHETIC INHIBITION IMPROVES INFLAMMATION AND ENDOTHELIAL DYSFUNCTION IN BRAIN MICROCIRCULATION OF RATS WITH METABOLIC SYNDROME

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**Objective:** We aimed to investigate the effects of a chronic oral treatment using centrally-acting sympatho-inhibitory drugs, clonidine (CLO) or a selective i1 imidazoline agonist LNP599 (LNP) on the brain microcirculation of rats under long-term high-fat diet (HFD).

**Design and method:** Male Wistar rats were maintained under normal diet (CON, n = 10) or high-fat diet (HFD, n = 30) during 20 weeks. Thereafter, the HFD group received oral CLO (0.1 mg/kg), LNP (20 mg/kg) or vehicle. Systolic blood pressure (SBP) was evaluated by photo-plethysmography during the long-term treatment, cerebral microcirculation flow was evaluated by Laser Speckle contrast Imaging and the brain functional capillary density, endothelial function and endothelial-leukocyte interactions were evaluated by intravital microscopy. Brain oxidative stress was evaluated by gene expressions of endothelial NOS (e-NOS) and NADPH oxidase using the reverse transcriptase-polymerase chain reaction (RT-PCR) technique in brain samples of HFD animals compared to CON group. All experimental procedures were conducted in accordance with the internationally accepted principles for the Care and Use of Laboratory Animals and were approved by the Osvaldo Cruz Foundation Animal Welfare Committee (CEUA license #LW31/11) compared to CON group.

**Results:** HFD group presented a decreased blood perfusion in the brain (163 ± 25, arbitrary perfusion units, APU) compared to CON group (239 ± 14 APU). Chronic sympathetic inhibition increased cerebral blood flow (CLO 211 ± 33 APU and LNP 226 ± 22 APU vs HFD group; p < 0.05) and the vasodilation response to Ach. CLO and LNP treatment reversed the brain capillary rarefaction (326 ± 51 and 378 ± 8 vs HFD 117 ± 11 capillaries/mm²) and decreased 3 fold the cerebral rolling leukocytes observed in pial venules. Decreases in gene expressions of NADPH oxidase and increases of eNOS in the brain of HFD treated groups suggest a reduction in oxidative stress and improvement of endothelial function induced by sympathetic inhibition.

**Conclusions:** These results suggest that the modulation of sympathetic activity results in an improvement of brain perfusion, capillary rarefaction and microvascular endothelial dysfunction and oxidative stress in a diet-induced rat model of metabolic syndrome.

**PP.12.02** IMPAIRED FLOW-INDUCED DILATION OF MIDDLE CEREBRAL ARTERIES OF SPRAGUE-DAWLEY RATS ON A HIGH SALT DIET IS ASSOCIATED WITH REDUCED ANTIOXIDANT CAPACITY AND RESTORED BY TEMPOL IN VIVO

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**Objective:** Previously, we demonstrated impaired flow-induced dilation (FID) of middle cerebral artery (MCA) in Sprague-Dawley (SD) rats fed 1 week high salt (HS) diet compared to rats on a low salt (LS) diet. Superoxide scavenger TEMPOL in vitro restored FID in HS group. The aim of this study was to assess if TEMPOL in vivo given simultaneously with HS or LS diet affects vascular function and the level of oxidative stress.

**Design and method:** Healthy male 11-weeks old SD rats were divided in LS-TEMPOL group fed 0.4% NaCl chow and HS-TEMPOL group fed 4% NaCl chow. Simultaneously, both groups consumed TEMPOL (1 mM) in tap water for 1 week. After diet protocol, rats were anesthetized with ketamin-chloride (75 mg/kg) and midazolam (2.5 mg/kg) and than sacrificed. Response to stepwise increase in pressure (610–1100 mmHg) (FID) was measured in isolated and cannulated MCA (N = 10–16). mRNA expression (N = 5–7) of Cu/ZnSOD, MmSOD, eSOD, cata-lase (CAT), inducible nitric oxide synthase (iNOS) and endothelial nitric oxide synthase (eNOS) from brain blood vessels was determined by real-time quanti- tative PCR (BioRad CFX96). Indicators of oxidative stress Thiobarbituric Acid Reactive Substances (TBARS) and antioxidant capacity (FRAP) were measured from arterial blood. All experimental procedures conformed to the European Guidelines for the Care and Use of Laboratory Animals (directive 86/609) and were approved by the local Ethical Committee.

**Results:** There was no significant differences in the FID response between investigat- ed groups (p > 0.05). mRNA expression of antioxidative enzymes MnSOD and CAT and of iNOS and eNOS was significantly decreased in HS+TEMPOL group compared to LS+TEMPOL. TBARS was significantly higher in rats on HS+TEMPOL diet compared to LS+TEMPOL group without significant changes of plasma antioxidant capacity (FRAP). Expression of Cu/ZnSOD and eSOD did not changed significantly.

**Conclusions:** TEMPOL restored the function of blood vessels and prevented the harmful effects of salt on FID by decreasing the superoxide level, subsequently decreasing the NO level, despite lower NOS-isofoms expression. It is possible that TEMPOL generates an additional amount of H2O2, which cannot be removed due to decreased catalase expression and therefore increases TBARS in HS+TEMPOL group.

**PP.12.03** MICROVASCULAR DYSFUNCTION IS ASSOCIATED WITH DEPRESSION: A SYSTEMATIC REVIEW AND META-ANALYSIS

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**Objective:** Depression represents a major global public health problem. Despite receiving treatment, most patients experience relapse. Recent research suggests that cerebral microvascular dysfunction is involved in the pathophysiology of depression, which may have implications for treatment, but this has not been system- atically assessed. Therefore, we performed a systematic review and meta-analyses to examine the association of generalized and cerebral microvascular dysfunction with depression.

**Design and method:** We conducted a systematic literature search in Medline and Embase for original studies published from 1977 to June 2015, and included cross-sectional and longitudinal studies that assessed the association between micro- vascular dysfunction (plasma markers of endothelial dysfunction, microalbuminuria, retinal vessel diameters and cerebral small vessel disease) and depressive symptoms and/or depressive disorder. Pooled odds ratios (OR) were calculated by the generic inverse variance method with the use of random effects models.

**Results:** We identified 619 studies, of which 40 were included in the meta- analysis and 8 described longitudinal data. 31,114 persons were included of whom 6,381 suffered from depression. In total 285,168 person-years (mean follow-up 3.7 years) were included in longitudinal analyses. Pooled ORs of cross-sectional data revealed a significant association between higher levels of plasma biomarkers and higher levels of white matter hyperintensities and depression (OR [95% CI] 2.23 [1.24–4.01], and 1.54 [1.33–1.78] per standard deviation (SD), respectively). Pooling of all studies on microvascular dysfunction revealed a significant association with depression (1.63 [1.27–2.08], per SD) although statistical heterogeneity was observed (I2 78%). Meta-analysis of longitudinal data revealed a significant association between higher levels of white matter hyperintensities and the development of depression (pooled OR 1.23 [1.10–1.38], per SD), while no data on other measures of microvascular dysfunction were available.

**Conclusions:** The present meta-analysis shows that microvascular dysfunction is associated with 63% higher odds of depression, and cerebral small vessel disease is associated with a 23% increased risk for the development of depression over time. These findings support the hypothesis that microvascular dysfunction is causally linked to depression.
Design and method: We included patients with severe obesity who met the eligibility criteria and underwent bariatric surgery (Sleeve Gastrectomy and Roux-en-Y Gastric Bypass). Microcirculation assessment, laboratory tests, ambulatory blood pressure measurement (Spacelabs 90207) and anthropometric variables were performed before and 10 days after the intervention. Resting skin blood flow (RF) and postocclusive reactive hyperemia (PORH) was measured using Periflux Laser Doppler Flowmetry (LDF). Statistical analysis was performed with Wilcoxon test and Spearman correlation.

Results: Data from 109 patients (41.3% men, age 42.8 ± 11.6 years) were analyzed. Ten days after bariatric surgery, mean weight and BMI loss was 8 kg and 0.4 kg/m² respectively. Glucose, total cholesterol, mean systolic (SBP) and diastolic blood pressure (DBP) decreased. Mean arterial pressure decreased from 90.1 ± 11.8 to 82.7 ± 10.9 mmHg (P < 0.0001), which was potentiated by endothelium (-Endothelium: n = 8; +Endothelium: n = 10, P < 0.0001). Following insulin pre-incubation, noradrenaline induced either PV AT-mediated anti-contractility or pro-contractility depending upon the absence (Noradrenaline: n = 8; Insulin: n = 4, P = 0.099) or presence (Noradrenaline: n = 10; Insulin: n = 2; P = 0.0007) of endothelium.

Conclusions: Serotonergic and adrenergic stimulation elicits anti-contractile responses through PV AT and the endothelium, respectively. Consistent with previous studies, insulin has a vasodilatory role, acting as both a vasodilator and vasocostructor through different mechanisms not investigated herein. Future refinement of this model should allow for the vasoreactive effects of insulin to be investigated in relation to obesity-induced insulin-resistance and the development of the devastating prevalent metabolic syndrome.
**Objective:** In humans, adaptive optics camera enables precise large scale non-invasive retinal microcirculation evaluation to assess ageing, blood pressure (BP), and antihypertensive treatments respective roles on retinal arterioles anatomy.

Retinal arteriolar remodeling comprised BP and age-driven wall thickening as well as BP-triggered lumen narrowing in younger subjects. Adaptive optics has the potential to shed light on risk factors specific remodeling mechanisms in large scale populations.

**Design and method:** We used adaptive optics camera rtx1Ô (Imagine-Eyes, Orsay, France) to measure wall thickness, internal diameter and to calculate Wall-to-Lumen Ratio (WLR) and Wall Cross Sectional Area (WCSA) of retinal arterioles.

**Results:** In 1000 subjects, mean wall thickness, lumen diameter and WLR were 23.2 ± 3.9 mm, 78.0 ± 10.9 mm and 0.300 ± 0.054 respectively. BP and age both independently increased WLR by thickening arterial wall. In opposite, hypertension narrowed lumen in younger as compared to older subjects (73.2 ± 9.0 vs. 81.7 ± 10.2 mm; p < 0.001) while age exerted no influence on lumen diameter. In multivariate analysis, hypertension drug regimen was not an independent predictor of any retinal anatomical indices. Diabetes was associated with increased WLR by hypertrophic remodeling with WCSA increase. WLR was not different between males and females but the later exhibited harmonious elevation of both thickness and lumen.

**Conclusions:** Retinal arteriolar remodeling comprised BP and age-driven wall thickening as well as BP-triggered lumen narrowing in younger subjects. Adaptive optics has the potential to shed light on risk factors specific remodeling mechanisms in large scale populations.

**Effects of melatonin on the production of adiponectin and the expression of adiponectin receptor in the visceral adipose tissue of aging mice.**

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**Objective:** It has been previously demonstrated that inflammation in adipose tissue may be implicated in vascular dysfunction (Circulation 2009; 119(12):1661–1670). A senescence-accelerated prone mouse (SAMP8) is a senescence-accelerated mouse prone to develop age-related cognitive decline and vascular dysfunction. Several studies demonstrated that SAMP8 suffers from increased oxidative stress and that accelerated senescence was associated with increased oxygen radicals synthesis. We have also recently demonstrated that the anticontractile effect of perivascular fat is impaired in a senescence-accelerated prone mouse, compared with control senescence-resistant mice (SAMR1). A long-term treatment with melatonin seems to decrease contractile responses to norepinephrine in mesenteric small arteries of SAMP8, thus restoring an anticontractile effect, probably through antioxidant mechanisms. However, it is not known whether melatonin is able to modulate the production of adiponectin and/or the expression of adiponectin receptors.

Therefore, the aim of the study was to investigate the production of adiponectin and/or the expression of adiponectin receptors in the visceral adipose tissue of SAMP8 before and after chronic treatment with melatonin.

**Design and method:** We investigated 7 SAMP8 and 7 SAMR1 treated for 10 months with melatonin (MEL, 10 mg/kg/day), an endogenous indoleamine with antioxidant and vasculoprotective properties, as well as 7 SAMP8 and 7 SAMR1 untreated controls (CTR) kept untreated for 10 months. Visceral fat (perirenal fat) was obtained by dissection, and the adiponectin content, as well as the expression of adiponectin receptor were evaluated by immunohistochemistry.

**Results:** Results are shown in the figure (* p < 0.05 vs SAMR1 CTR, # p < 0.05 vs SAMR1 + MEL, + p < 0.05 vs SAMP8 + MEL). The adiponectin content, as well as the expression of adiponectin receptor were reduced in untreated SAMP8 compared with untreated SAMR1. Treatment with MEL was able to increase the production of both proteins in SAMP8.

**Conclusions:** Melatonin treatment is able to increase the production of adiponectin and the expression of adiponectin receptor in the visceral fat of aging mice. This observation might contribute to explain the improvement of the anticontractile action of perivascular fat observed in the mesenteric small resistance arteries of SAMP8 mice after chronic treatment with MEL.

**Prevention of retigabine response in human subcutaneous resistance arteries.**

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**Objective:** The aim of this study was to identify a possible response of retigabine, an activator of voltage-gated potassium channels (Kv7-channels), in human subcutaneous resistance arteries. Retigabine has been proved to be a vasodilator in animals, but retigabine response has not been identified in human subcutaneous resistance arteries.

**Design and method:** Five healthy men with a normal ambulatory blood pressure had a skin- and subcutaneous adipose tissue biopsy done in their gluteal region after given informed consent. The biopsies were surgically removed and immediately after removal investigated in our laboratory. Small subcutaneous arteries in the biopsies were dissected free from fat and connective tissue under a microscope and mounted in Multvany-Halpern wire-myographs. After testing for viability endothelial function was tested with acetylcholine (ACH) after pretreatment with the prostaglandin PGF2α. After testing for endothelial function cumulative concentration-response curves (CRC) to retigabine were done after pretreatment with PGF2α.

**Results:** One viable artery from each individual and with similar diameters was selected for analysis. Artery lumen diameter was 360 ± 20 μm (mean ± SEM, n = 5). All of the arteries had intact endothelial function and vasodilatory response to ACh with a pEC50 = 7.95 ± 0.24 (mean ± SEM, n = 5). Furthermore all 5 arteries showed vasodilatory response to retigabine with a pEC50 = 7.89 ± 0.28 (mean ± SEM, n = 5), see attached figure in the next page.

**Conclusions:** Retigabine exhibits vasodilatory properties in endothelium intact human subcutaneous resistance arteries. The interplay between retigabine and Kv7-channels in human subcutaneous resistance arteries should be explored further in the attempt to find new blood pressure lowering therapies.
Objective: It is increasingly recognized that differences in the clinical presentations of cardiovascular diseases in women compared to men may be related to microvascular reactivity. The aim of this study was to assess if there are sex related differences in microvascular reactivity and cardiovascular health in young healthy students of both sexes, as possible prospective determinant of future cardiovascular health.

Design and method: 99 young healthy women (age 21 ± 2 years) and 44 young healthy man students (age 21 ± 2 years) were included in this study. Body Mass Index (BMI), waist-to-hip ratio (WHR), systolic (SBP), diastolic (DBP) and mean arterial blood pressure (MAP) and heart rate (HR) were measured in all participants. Post-occlusive reactive hyperemia (PORH) in the skin microcirculation after 1', 2' and 3' vascular occlusion period (measure of MR) was assessed by laser Doppler flowmetry (LDF).

Results: BMI and WHR were significantly higher in male compared to female students (BMI, kg/m² men 23.9 ± 2.8 vs. women 22.1 ± 3.1, P < 0.001, WHR men 0.79 ± 0.04 vs. women 0.73 ± 0.04, P < 0.001). SBP, DBP and MAP were significantly higher in otherwise normotensive men compared to women (MAP/mmHg, men 95 ± 9 vs. women 82 ± 7, P < 0.001). HR was higher in men compared to men (HR/min, men 74 ± 11 vs. women 65 ± 11, P < 0.001). PORH was significantly higher in men compared to women in all three measured points. SBP and MR (r = -0.224, P = 0.028) and WHR and MR in women (r = -0.238, P = 0.019) significantly negatively correlated, but no association of DBP, MAP or HR with MR was observed in the same group. In contrast, in male students there was no association of any measured parameter with MR.

Conclusions: Our results show sex-related differences in MR, as well as in blood pressure in examined participants suggesting different physiological mechanisms of MR in women compared to men. Having in mind important differences in clinical presentation of cardiovascular diseases in women compared to men it is necessary to study more thoroughly sex differences in MR, since MR is crucial in etiopathogenesis of these diseases.

PP.12.10 SEX RELATED DIFFERENCES IN CARDIOVASCULAR HEALTH AND MICROVASCULAR REACTIVITY AMONG HEALTHY STUDENT POPULATION

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PP.12.11 ENDOTHELIAL FUNCTION IN YOUNG HEALTHY SUBJECTS

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Objective: Endothelial function can be assessed by measuring pulsatile changes in the fingers after occlusion of the upper arm using the Endo-PAT 2000 device, presented as Reactive Hyperaemia Index (RHI). A RHI value below 1.67 is suggested to indicate endothelial dysfunction. The aim of this study was to explore endothelial function, by measuring RHI, in young healthy subjects.

Design and method: Subjects aged 18 to 30 years, participating in the ongoing Malmö Offspring Study, were eligible for the study. A total of 186 subjects (105 females, mean age 24.4 years) were included in the analysis. The subjects were in a relaxed supine position, with their index or middle fingers placed in pneumatic tubes and the arms comfortably resting on arm supports keeping the fingers free from disturbances. Arterial pulsatile volume changes were recorded from the fingers on both arms before, during and after 5 minutes occlusion of the upper arm of the non-dominant arm. RHI was calculated as a post-occlusion to pre-occlusion ratio of the signal amplitudes.

Results: The mean RHI was 1.81 ± 0.55, with a range of 0.74 – 3.81 (Figure 1). In a univariate correlation analysis, RHI was inversely associated with waist circumference (Figure 2) and in females also with HDL cholesterol. Waist and height were associated with RHI in a linear regression model including age, sex, height, waist, LDL-C, HDL-C, triglycerides, smoking and physical activity.

Conclusions: In all, 47% of young healthy subjects had RHI below the cut-off value of 1.67, a threshold generally used to define endothelial dysfunction. The reason for this is unknown but could be influenced by vasospasm phenomenon. Subjects with higher waist circumference showed lower values of RHI. A cut-off value for RHI of 1.67 for diagnosis of endothelial dysfunction is probably not applicable in young subject below the age of 30.

PP.12.12 SEMI AUTOMATED RETINAL VASCULAR CALIBER IS PREDICTIVE OF CARDIAC AND RENAL TARGET ORGAN DAMAGE IN NEVER-TREATED HYPERTENSION

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Objective: Cardiovascular risk in hypertensive (HT) patients is strongly associated with the presence of target organ damages (TOD). The aim of the presence study was to assess retinal vascular caliber as a potential tool to detect the presence of TOD in HT.

Design and method: In 88 consecutive never-treated HT subjects (38 women and 50 men, aged 32–83 years), retinal arteriolar and venular calibers were measured...
from fundus photographs using semi-automated computer-assisted program and summarized as central retinal artery and vein equivalents (CRAE, CRVE). Echo-cardiography was used to determine left ventricular mass (LVM) and relative wall thickness (RWT). Renal function was assessed with 24-h urinary creatinine clearance (CCrat) and 24-h urinary albumin excretion (UA). Results: Mean CRAE and CRVE were significantly reduced in patients with left ventricular hypertrophy (LVM/LVMI > 110 g/m² in women, 125 g/m² in men) versus those with normal LVM even after adjustment on age, sex, BMI and mean BP (CRAE: 129.6 ± 3.6 vs 138.1 ± 2.2; p = 0.04; CRVE: 195.5 ± 4.3 vs 209.4 ± 2.6; p = 0.007). No relationship was found between RWT and CRAE or CRVE. In addition, UAE but not CCrat was negatively correlated with CRAE and CRVE in multivariate analysis including age, sex, BMI and mean BP (model R² = 0.30, p < 0.0001 and model R² = 0.12, p = 0.04, respectively).

Conclusions: In never treated hypertensive patients, reduced CRAE and CRVE were associated with cardiac and renal preclinical damage (left ventricular hypertrophy and albuminuria). Retinal vascular calibers obtained with accessible, non invasve, non mydriatic, fast semi-automated procedure could be an interesting tool in early detection of risk HT.

PP.12.13 DIFFERENT EFFECTS OF ACUTE HIGH SALT INTAKE ON ANTIOXIDATIVE GENES EXPRESSION IN CEREBRAL BLOOD VESSELS IN YOUNG AND MATURE SPRAGUE-DAWLEY RATS

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Objective: The aim of this study was to assess the level of antioxidative genes expression in Sprague-Dawley rats at different ages and question whether high salt (HS) intake leads to the same changes regardless of the animal age. Design and method: 4- and 11-weeks old healthy male rats (N = 3–6) were divided to low salt (LS) group fed 0.4% NaCl chow and HS group fed 4% NaCl chow for 1 week. After diet protocol rats were anesthetized with ketamine-chochloral (75 mg/kg) and midazolam (2.5 mg/kg) and sacrificed. All surface cerebral blood vessels were isolated and collected for mRNA gene expression analysis: SOD isoforms (Cu/ZnSOD, MnSOD, ecSOD) and glutathione peroxidase 4 (GPx4)) using real-time quantitative PCR (nPCR, BioRad CFX96). Results: are presented as mean ± SEM (p < 0.05 was considered significant). All experimental procedures conformed to the European Guidelines for the Care and Use of Laboratory Animals (directive 86/609) and were approved by the local Ethical Committee.

Results: mRNA expression of SOD isoforms (MnSOD (4wLS 0.188 ± 0.02 vs. 11wLS 0.952 ± 0.078, p < 0.001) and ecSOD (4wLS 0.240 ± 0.099 vs. 11wLS 0.609 ± 0.083, p = 0.002)) was significantly higher, while expression of GPx4 (4wLS 1.299 ± 0.20 vs. 11wLS 0.819 ± 0.07, p = 0.024) was significantly decreased in older animals compared to young animals, both on a LS. mRNA expression of Cu/ZnSOD (4wLS 1.01 ± 0.02 vs. 4wHS 0.289 ± 0.17, p = 0.005) in young rats and expression of GPx4 (4wLS 1.299 ± 0.02 vs. 4wHS 0.457 ± 0.16, p = 0.031, 1wLS 0.819 ± 0.07 vs. 11wHS 0.819 ± 0.02, p = 0.004) in both age groups was significantly lower in HS groups. Expression of each SOD isoforms was increased in 11wHS rats compared to 4wHS rats (Cu/ZnSOD (4wHS 0.289 ± 0.017 vs. 11wHS 0.979 ± 0.05, p = 0.001), MnSOD (4wHS 0.022 ± 0.019 vs. 11wHS 0.792 ± 0.06, p = 0.001) and ecSOD (4wHS 0.080 ± 0.05 vs. 11wHS 0.510 ± 0.04, p < 0.001). Also the expression of MnSOD and ecSOD was significantly higher in 11wHS group compared to 4wLS group.

Conclusions: The antioxidative genes expression increased with age. HS diet does not affect SOD isoform expression in older rats, but significantly decreases Cu/ZnSOD and GPx4 in young rats. Thus, harmful effects of HS intake may be more detrimental to vascular function in the younger age, due to presumably higher level of oxidative stress.

PP.12.14 MICROCIRCULATION AND BIOMARKERS IN PATIENTS WITH RESISTANT OR MILD TO MODERATE ARTERIAL HYPERTENSION


Objective: The aim of this study was to investigate the correlation between serum markers of inflammation and microcirculatory parameters observed by nailfold videocapillaroscopy (NYC) in hypertensive patients

Design and method: It is a cross-sectional study. Patients with resistant (RH, 50-63 years, n = 25) or mild to moderate hypertension (MMH, 56(47-64), n = 25) were compared. (C) 2012); Retinal thickness (R WT). Renal function was assessed with 24-hr urinary creatinine clearance (C Crat) and 24-hr urinary albumin excretion (UAE).

Conclusions: Patients with severe hypertension and uncontrolled blood pressure levels presented more pronounced microvascular dysfunction, as well as higher serum values for CRP and endothelin. It is possible that the use of statins decrease endothelin release.
Conclusions: Antihypertensive therapy with valsartan for four weeks diminished capillary rarefaction in patients with hypertension stage 1 or 2.

**PP.12.17 EVALUATION OF SELECTED PARAMETERS OF NEURO-HORMONAL ACTIVITY AND RETINAL AND INTRARENAL PERFUSION IN PATIENTS WITH POLYCYTHEMIA VERA**


**Objective:** Polycythemia vera (PV) is a myeloproliferative neoplasm primarily characterized by erythrocytosis. There is limited data on frequency and pathogenic mechanism of HT in patients with PV. Therefore the aim of the study is to present a selected clinical, neuro-humoral and hemodynamic characteristics of HT in patients with PV.

**Design and method:** In the on-going study we included 20 consecutive patients (13F, 7 M, mean age 62 ± 9 years) with PV diagnosed (according to the WHO criteria) in one clinical center and 10 age, gender, body mass index, blood pressure (BP), number of medication (p > 0.05) matched patients with essential hypertension. Some indicators of the cardiac anatomy structures, the cardiac function (friction index of arteriosclerosis. And there are differences between males and females. The purpose is to illustrate the characteristics of the arterial stiffness and cardiac remodeling in female hypertension patients.

**Results:**

1. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

2. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

3. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

4. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

5. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

6. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

7. **Hypertension on office or ABPM was present in 15 patients with PV (75%).** Patients with PV as compared with EHT patients were characterized by less pronounced BP fall at night. There were: a trend towards lower serum aldosterone concentration and significantly lower plasma free epinephrine levels (25.9 ± 8.5 vs 36.8 ± 12.7 pg/mL, p = 0.048) in patients with PV. Patients with PV were characterized by lower indice s of sympathetic nervous activity (MSNA) was evaluated by microelectrode.

**Conclusions:** Patients with PV were characterized by lower indices of sympathetic nervous system activity and a tendency towards lower serum aldosterone concentrations. Alterations ofretinal and renal perfusion in PV were also observed.

**PP.12.18 RETINAL CAPILLARY RAREFACTION IN PATIENTS WITH UNTREATED MILD-MODERATE HYPERTENSION**

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**Objective:** Microvascular rarefaction influences peripheral vascular resistance, perfusion and metabolism by affecting blood pressure and flow pattern. In hypertension microvascular rarefaction has been described in experimental animal studies as well as in capillaroscopy of skin and biopsies of muscle tissue in patients. Retinal circulation mirrors cerebral microcirculation and allows non-invasive investigations. The aim of this study is to compare capillary rarefaction of retinal vessels in hypertensive versus normotensive subjects.

**Design and method:** The study cohort consisted of 134 male and female patients with hypertension stage 1 or 2 and 55 male and female healthy people. All patients were non-smoker. Retinal vascular parameters were measured in perfusion image, non-invasively and in vivo by scanning laser Doppler flowmetry (Heidelberg Engineering, Germany). Capillary rarefaction was assessed by capillary area (CapA) (in pixel-number) and intercapillary distance (ICD) (in mm). Additionally retinal capillary flow (RCF) was measured.

**Results:**

- ICD was greater in the hypertensive group (23.1 ± 5.8 mm vs 20.1 ± 4.2 mm, p < 0.001) compared to healthy individuals. Hypertensive patients showed less CapA compared to healthy people (1566 ± 649 vs 1821 ± 652, p = 0.013). According to RCF, significantly lower in the hypertensive group compared to the healthy control group (291 ± 71 AU vs 314 ± 61 AU, p = 0.018). Our data indicate a lower level of retinal capillary density in hypertensive patients.

**Conclusions:** Patients with hypertension stage 1 or 2 showed retinal capillary rarefaction in comparison to healthy normotensive subjects.
Objective: Assess the impact of combined therapy with Perindopril A and Indopamide on cognitive function and microcirculation in patients with arterial hypertension (AH).

Design and method: 30 patients with AH II-III degree (20 women, 10 men) at the age of 40–70 years old (average age 60.06±10.19 years) were included in the study; the average duration of AH was 14.7 (3.32) years. All patients underwent assessment of endothelial function using photoplethysmography (PPG) (“Angioscan-01”, Angioscan, Russia) and reactive hyperemia test (RIHT) (pressureization of air to the cuff at 220 mmHg for 5 minutes). The pulse wave amplitude was identified; according to the augmentation of pulse wave occlusion index (OI), which characterizes endothelial function, was calculated (N>1.8). The reflection index (RI), a parameter of arterioles’ remodeling, was also identified. Structural and functional features of capillary net of finger skin were assessed, using computer video capillaroscopy of finger skin (CS) (“Capillaroscan-1”, New energetic technologies, Russia). Structural parameters were identified: rest capillary net density (CND), CND after venous occlusion test (DCNvo). Functional parameters were identified: CND after RIHT (DCNrh), percentage of capillary recovery (PCR), percentage of perfused capillaries (PPC). In all patients cognitive function was assessed by Montreal Scale of cognitive disorders (MSCD) at the beginning and after 12 months.

Results: This study allowed us to reveal positive impact of Noliprel-Bi-Forte among patients with AH after 12 month therapy on endothelial function of the microcirculation vessels and small or medium-size arterial vessels: increase of OI 1.4 to 1.8 (p 0.00005), phase displacement increased 5.0 to 10.8 (p 0.00001), which characterizes the improvement of vessel wall elasticity and endothelium dependent vasodilatation. Positive impact of Noliprel-Bi-Forte therapy was noted relatively the parameters of capillary vessel remodeling: DCNrh increased 44.8 to 52.0 cap/mm2 (p 0.00007) and DCNvo increased 55.0 to 61.0 cap/mm2 (p 0.006).

In the research group statistically significant improvement of cognitive function was also revealed: increase of MSCD points 23 to 27 (p 0.0001).

Conclusions: Combination therapy of perindopril A and indapamide improves endothelial function, structural and functional parameters of microcirculation and cognitive function in arterial hypertensive patients.
POSTER SESSION

PP.13.01 THE TREATMENT BENEFIT OF THE ACE-INHIBITOR PERINDOPRIL ON TOP OF BETA-BLOCKER THERAPY IN PATIENTS WITH VASCULAR DISEASE

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Objective: Angiotensin-converting enzyme (ACE) inhibitors have been shown to reduce cardiovascular events and mortality in different groups of patients. As they are often combined in clinical practice to beta-blockers, we undertook an analysis using individual data from ADVANCE, EUROPA, and PROGRESS to determine the benefit of the combination of beta-blockers with perindopril in patients with cardiovascular disease or at high risk of cardiovascular disease.

Design and method: In patients participating in the ADVANCE, EUROPA and PROGRESS trials which were randomized to an ACE-inhibitor based regimen or placebo, we identified all patients who received beta-blocker at baseline. We studied the effect of perindopril on top of beta-blockers on cardiovascular outcomes and mortality with a multi-variate Cox regression analysis.

Results: At baseline, 39% of patients in the three studies received beta-blocker (n = 11418 among 29463 patients). Blood pressure reduction during the run-in period was similar between patients receiving perindopril on top of beta-blocker compared with patients receiving perindopril without beta-blocker at baseline (respective SBP/DBP reduction of –7.9/–3.6 mmHg and –8.8/–4.0 mmHg). The composite endpoint of cardiovascular mortality, non-fatal myocardial infarction and stroke was significantly reduced by 20% in the group of patients receiving beta-blocker/perindopril vs beta-blocker/placebo. In the composite endpoint it was similar whether patients were hypertensive (HR 0.77, 95% CI: 0.66–0.89) or not hypertensive (HR 0.84, 95% CI: 0.71–1.00). Other endpoints such as myocardial infarction (HR 0.77, 95% CI: 0.65–0.91), cardiovascular mortality (HR 0.73, 95% CI: 0.61–0.85) and all-cause mortality (HR 0.78, 95% CI: 0.68–0.88) were also significantly reduced in the beta-blocker/perindopril group vs beta-blocker/placebo.

Conclusions: Addition of perindopril to a beta-blocker in a broad spectrum of patients with vascular disease or at high risk of vascular disease significantly improves survival and lowers the risk of myocardial infarction.

PP.13.02 IMPACT OF STATINS ON THE PERINDOPRIL/AMLODIPINE ANTIHYPERTENSIVE EFFICACY IN PATIENTS WITH HYPERCHOLESTEROLEMIA: SUBANALYSIS OF THE PERSPECTIVA STUDY

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Objective: The majority of patients with frequently coexisted hypertension and hypercholesterolemia require combination treatment with a statins and antihypertensive therapy. The objective of this subanalysis of the PERSPECTIVA study was to assess the impact of statins on antihypertensive efficacy of single-pill combination (SPC) perindopril and amlodipine in hypertensive patients with hypercholesterolemia.

Design and method: The PERSPECTIVA study included 701 patients with newly diagnosed hypertension or hypertension uncontrolled on monotherapy or free dual-combination therapy (systolic BP > / = 140 and/or diastolic BP > / = 90 mmHg). Patients were started on SPC perindopril 5 mg/amlodipine 5 mg (if previously untreated), or switched to SPC perindopril 10 mg/amlodipine 5 mg (if symptolic BP > / = 140 and < 180 and/or diastolic BP > / = 90 and < 110 mmHg), or SPC perindopril 10 mg/amlodipine 10 mg (if systolic BP > / = 180 and < 200 and/or diastolic BP > / = 110 and/or < 120 mmHg). We compared the antihypertensive efficacy of SPC in 226 patients with hstatin therapy at baseline (statin (+) vs 361 patients without statins (statin (−)), over a follow-up period of 60 days.

Results: At day 60, rate of BP control (< 140/90 mmHg) was significantly greater in the statin (+) vs statin (−) group (73% vs 64% respectively (+14%, P < 0.05). In the statin (++) group, SPC perindopril/amlodipine significantly reduced BP in patients previously untreated, or treated with monotherapy, dual therapy, or triple therapy: –38.8/–20.1, –38.1/–19.4, –39.9/–18.3 mmHg respectively (P < 0.001 vs baseline BP). Treatment was well tolerated with a similar rate of adverse events: 0.9% in the statin (+) vs 2.5% in the statin (−) groups.

Conclusions: In hypertensive patients the addition of a statin to perindopril/amlodipine SPC resulted in significantly better BP control and BP reduction regardless of previous antihypertensive therapy. Furthermore, the combination of statin plus perindopril/amlodipine was well tolerated. This subanalysis of the PERSPECTIVA study supports the synergistic effect of statins and perindopril/amlodipine combination.

PP.13.03 ANTIANGIOGENETICS AND HYPERTENSION: MANAGEMENT AND PROGNOSTIC IMPLICATIONS

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Objective: Antiangiogenetics (AAG) are a class of compounds used for cancer treatment that inhibit angiogenesis and induce cancer cells death. A class effect common to all AAG is hypertension (AAG-HTN). Aim of this study was to evaluate cancer patients (pts) receiving an AAG in terms of AAG-HTN features and management.

Design and method: Between March 2012 and January 2016, all cancer patients pts receiving an AAG at Trevisio-Caravaggio Hospital (Italy) were evaluated by a multidisciplinary team. Pts evaluation comprised office, home (HBPM) and ambulatory BP measurement. HTN was defined according to the ESH/ESC and NIH/CTCAE criteria and treated according to the ESH/ESC guidelines and to cancer site and renal/liver function, whereas lifestyle modifications were generally not applied because of pts’ performance status.

Results: Overall 55 consecutive AAG treated pts were evaluated (MF = 38/17, median age:61, range:48–84yrs). Cancer sites were: colorectal(N = 21), kidney(N = 15), hepatocellular(N = 10), other(N = 9). The employed AAG were: bevacizumab(N = 24), sunitinib(N = 14), sorafenib(N = 13), pazopanib(N = 2), aflibercept(N = 2), regorafenib(N = 2), axitinib(N = 3). Among them, 5 pts received 2 consecutive different AAG and, considering both first and second lines (N = 60), AAG-HTN was observed in 53%/32(60). AAG-HTN control was obtained in 22 (69%) pts, by employing ARB, diuretics, CCB, BB, ACEI, and other drugs (in 16, 15, 7, 5, 3 pts respectively). In 13 pts (59%) AAG-HTN was controlled with 2 to 3 antihypertensives, whereas 6 pts (27%) received 4 or more drugs, and only 3 (14%) received 1 drug. In 9 pts (27%) a great BP variability was observed according to the timing of AAG administration (alternating HTN to symptomatic hypotension) and AAG-HTN was controlled through strict Home BP monitoring and continuous antihypertensives adjustment.

Conclusions: AAG-HTN displays peculiar features compared to general population (i.e. BP variability according to AAG timing), and generally requires a higher number of antihypertensives to obtain BP control (4 or more drugs in 27% pts compared to < 5% in general population). Treatment choice must take in account pts’ Performance Status, liver and renal function, and concomitant chemotherapy. BP measurement is crucial, particularly Home BP, and allows to tailor antihypertensive therapy, mainly in pts with high BP variability.

PP.13.04 ANTIHYPERTENSIVE EFFICACY OF BISOPROLOL/PERINDOPRIL: A SUBANALYSIS OF THE OPTITEN TRIAL

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Objective: Blood pressure (BP) control remains challenging, with most patients requiring a combination of two antihypertensive drug classes to reach BP targets.
Angiotensin-converting enzyme (ACE) inhibitors and b-blockers are two recommended classes. This subanalysis of OPTITEN assessed the antihypertensive efficacy of perindopril in patients receiving bisoprolol at baseline.

**Design and method:** OPTITEN was a prospective, multicenter, open-label study in 990 Serbian patients with grade 1 and grade 2 hypertension. At baseline, 23% (n = 224) received bisoprolol. In this subgroup, 7.1% had a history of coronary artery disease, 6.7% of myocardial infarction, 38.8% of diabetes, and 4.5% of renal disease. BP readings were performed at baseline and during follow-up at weeks 2, 6, and 10. Patients were started on perindopril 5 mg (62%) or 10 mg (38%) at the physician’s discretion at baseline. At week 2, patients were uptitrated from 5 mg to 10 mg perindopril if BP remained uncontrolled (superior or equal to 140/90 mmHg). Patients initiated on perindopril 10 mg had a significantly higher cardiovascular risk profile and BP level at baseline.

**Results:** In patients receiving bisoprolol at baseline, the addition of perindopril significantly decreased systolic BP (SBP) by 24.6 mmHg (156.6 ± 13.3 to 132 ± 11.1 mmHg; P < 0.0001) and diastolic BP (DBP) by 12.1 mmHg (92.3 ± 8.5 to 80.2 ± 5 mmHg; P < 0.0001) at week 10. BP control rate (inferior or equal to 140/90 mmHg) was 86.5% (n = 192) at week 10. Furthermore, there were significantly greater BP reductions in patients initiated on perindopril 10 mg vs 5 mg as seen as early as week 2 (SBP: -18.4 mmHg vs -13.3 mmHg respectively, P = 0.0045; DBP: -9.6 mmHg vs -6.7 mmHg respectively, P = 0.0068) which were maintained at week 10 (SBP: -27.6 mmHg vs -22.8 mmHg respectively, P = 0.0194; DBP: -13.8 mmHg vs -11.1 mmHg respectively, P = 0.0208). Despite different risk profiles, patients initiated on perindopril 5 mg and 10 mg achieved similar BP control rates (P = 0.0683).

**Conclusions:** This analysis confirms that in patients with uncontrolled BP on bisoprolol, the addition of perindopril significantly decreases BP, allowing a control rate of 86.5%. Despite higher cardiovascular risk in patients initiated on perindopril 10 mg, there was a greater reduction in BP vs those initiated on perindopril 5 mg, allowing similar control rates at week 10 in both arms.
significant reductions in blood pressure and heart rate but no between-treatment differences.

**Conclusions:** BWL and stepped-care produced significant improvements in binge-eating and in hypertension and other CVD risk-factors in obese patients with BED. Anti-obesity medication enhanced outcomes in some CVD-risk factors (obesity, waist-circumference). Among the subgroup with Metabolic Syndrome, significant improvements in blood pressure and heart were observed through 12-month post-treatment follow-up.

**Objective:** A low vitamin D status is very common and has also been considered as a risk factor for hypertension and cardiovascular disease, possibly related to activation of the renin-angiotensin-aldosterone system. However, the antihypertensive effect of colecalciferol on blood pressure has been inconclusive. We studied the additional effect of cholecalciferol on the systolic blood pressure of patients visiting our outpatient hypertension clinic.

**Design and method:** A single centre, randomized, double blind, placebo controlled trial was performed. Patients with a systolic blood pressure above 140 mmHg and a 25OHID level between 20–50 nmol/L were randomized to 2000 IE cholecalciferol or placebo daily for 12 months. Usual antihypertensive treatment was continued. Ambulatory blood pressure and laboratory measurements were performed at baseline, 6 and 12 months.

**Results:** A total of 109 participants were included and randomized in this study. Mean 25OHID levels were 43 nmol/L in the placebo group and 103 nmol/L in the vitamin D group after 12 months (p < 0.0001). Mean 24 hour systolic blood pressure was 127 mmHg in the placebo group and 125 mmHg in the vitamin D group after 12 months (p = 0.3453). No difference was found for the total amount of antihypertensive medication that was used at 6 and 12 months. Mean PTH was significantly lower (p = 0.0188) in the vitamin D group (4.8 pmol/L) compared to the placebo group (6.0 pmol/L). There was no significant treatment effect on mean aldosterone and renin levels.

**Conclusions:** Adequate vitamin D supplementation did not significantly lower blood pressure on top of usual care in vitamin D deficient patients with hypertension visiting our outpatient hypertension clinic.

**Objective:** The effects of baroreflex activation therapy on blood pressure and sympathetic function will be performed at randomization, and after 8 and 16 months.

**Subject inclusion:** Patients will be included if they have been randomized to the baroreflex activation therapy group. Patients will be excluded if they have a history of previous baroreflex therapy, or if they have an intolerance to the intervention. Patients will be randomly assigned to either the baroreflex activation therapy group or the control group. The primary outcome measure will be the change in blood pressure from baseline to 8 months of follow-up.

**Conclusions:** The effects of baroreflex activation therapy on blood pressure and sympathetic function will be assessed at randomization, and after 8 and 16 months. The results of this study will help to determine the effectiveness of baroreflex activation therapy in the treatment of hypertension.

**Objective:** To evaluate the efficacy on blood pressure reduction, safety and tolerability of two different dosages of canrenone as add-on therapy in patients already treated with Angiotensin Converting-Enzyme Inhibitors (ACE-I) or Angiotensin II Receptor Blockers (ARBs) and diuretics at the maximum dosage. In this multi-centre, phase IV, randomized, controlled, open-label, parallel groups trial, we enrolled 165 Caucasian patients affected by uncontrolled, essential hypertension, not well controlled by concomitant administration of ACE-I or ARBs and diuretics at the maximum dosage. At baseline patients were randomized to canrenone, 50 mg, or canrenone 100 mg once a day, in addition to their current therapy, for three months. We evaluated at the baseline, and after 3 months: systolic (SBP) and diastolic blood pressure (DBP), pulse pressure (PP), heart rate, fasting plasma glucose (FPG), homeostasis model assessment insulin (HOMA-index), lipid profile, electrolytes, uric acid, estimated glomerular filtration rate (eGFR), plasmatic urea. We observed a reduction of SBP, DBP, and PP with both the dosages of canrenone (p < 0.01 vs baseline for both), with a greater decrease recorded with canrenone 100 mg compared to 50 mg (p < 0.05). We did not record any variation of hearth rate, FPG, HOMA-index with neither of the two treatments. Regarding lipid profile, we observed a slight increase of triglycerides with canrenone 50 mg (p < 0.05 vs baseline), not significant in group to group comparison. Regarding electrolytes, we recorded an increase
of potassium in both groups (p < 0.05 vs baseline with canrenone 50 mg, and p < 0.01 vs baseline with canrenone 100 mg), even if potassium level reached with canrenone 100 mg was higher compared to canrenone 50 mg (p < 0.05). Considering renal function, there was an increase of creatinine and plasmatic urea compared to baseline with canrenone 100 mg (p < 0.01 vs baseline). Despite a slightly greater decrease of blood pressure, canrenone 100 mg seems to give a greater increase of potassium, and an increase of creatinine not recorded with canrenone 50 mg although non clinically relevant. Both treatments did not result in any increase of adverse events. Canrenone should be recommended in hypertensive patients already taking ACE-I or ARBs and diuretic at the maximum dosage.

PP.13.11

**BENEFIT IN CENTRAL HAEMODYNAMIC PARAMETERS BY ASSOCIATION ANGIOTENSIN II RECEPTOR BLOCKERS AND CANRENONE THERAPY IN HYPERTENSIVE PATIENTS WITH NORMAL KIDNEY FUNCTION**


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Objective: Arterial hypertension is an important risk factor for cardiovascular disease-related morbidity and mortality. Aldosterone is now considered a major cardiovascular risk hormone. Treatment strategies based on association angiotensin II receptor blockers (ARBs) and canrenone (Cr) in hypertensive patients could give benefits aldosterone-induced detrimental effects like increase of superoxide radicals, endothelial dysfunction, collagen deposition, arterial stiffness and cardiac remodeling.

Design and method: This retrospective cross-sectional study aimed to compare the effect of ARBs, ARBs+Cr and ARBs+hydrochlorothiazide (Hct) therapy on central haemodynamic parameters (CHPs) in hypertensive patients with normal kidney function. The most frequently administered ARBs were candesartan, irbesartan and valsartan (80%). The average dose used in both genders of Cr and Hct was 37 and 15 mg, respectively. Were measured CHPs in the supine position after at least 10 minutes of rest, by the SphygmoCor System (AtCor-Medical Australia), a validated device employing the high-fidelity technique of applanation tonometry. Was assessed the difference between the observed values and the expected values of Aix (Diff-Aix) according to normal ranges by age.

Results: Data were collected from 809 hypertensive patients (60% females). CHPs were analyzed by gender and therapy subgroups. Results show that the combination of ARBs+Cr (female/male 211/125) provided the lowest CHP values, compared to ARBs alone (female/male 150/116) and ARBs+Hct (female/male 122/85), this was true for each parameter considered. The difference among treatment groups was statistically significant for all CHPs except for Pulse Pressure and Augmentation-Pressure between male patients receiving ARBs and ARBs + Hct. Particularly, ARBs + Cr therapy but not ARBs alone or with Hct lowered Aix below the reference value in both male (Diff-Aix: –1.0, +0.8 and +2.0, respectively) and female patients (Diff-Aix: –2.1, 0 and +2.3, respectively). Intentionally, the 10th percentile of the End-Systolic Pressure (mmHg) in the ARBs + Cr group (female/male 101/104.4) was lower than ARBs alone (female/male 108.2/107.4) and ARBs+Hct (female/male 114.7/111.6).

Conclusions: The findings suggest that ARBs+Cr treatment produces the best hemodynamic conditions in hypertensive patients, it could be helpful to reduce or prevent the short- and long-term harmful effects of angiotensin-aldosterone system such as diastolic dysfunction, left ventricular post-load, and consequently the atrial fibrillation.

PP.13.12

**COMPARISON OF CLINICAL, HEMODYNAMIC AND FUNCTIONAL CHARACTERISTICS OF PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION AND CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION IN**

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Objective: To assess clinical, hemodynamic and functional characteristics of patients with idiopathic pulmonary arterial hypertension (IPAH) and chronic thromboembolic pulmonary hypertension (CTEPH) in the National multicenter, open prospective Registry.

Design and method: 14 reference centers of Russia participated in the study from 01.01.2012 to 30.11.2015. The Register included patients aged > 18 years having PAH and CTEPH. Online Version of the Registry is submitted on the site www.pul-hyp.medbase.ru.

Results: In total in Registry included 168 patients with IPAH (140 women/28 men) and 121 patients with CTEPH (78 women/43 men) from 44 regions of the Russian Federation. Mean age at the time of including in the Register was 40.0 ± 12.7 year in IPAH, 53.8 ± 14.6 year in CTEPH. The mean distance to 6MWT was 394 ± 102.7 meters with Borg index 3.2 ± 1.2, WHO-FC 2.6 ± 0.8, duration of PH 42.9 (18.5–103.0) months in IPAH; 3338.0 ± 128.7 meters with Borg index 3.4 ± 1.1, WHO-FC 2.9 ± 0.9, duration of PH 26.0 (11.1–62.9) months in CTEPH. Distinction for 6MWT, WHO-FC, age and duration of PH were significant. Results of ECHO and right heart catheterization are presented in tables.

Conclusions: CTEPH patients as compared to IPAH group are characterized by older age, more severe functional impairment and lower venous O2 saturation.

PP.13.13

**ONE MONTH BLOOD PRESSURE LOWERING EFICACY RESULTS OF A NOVEL FIRST-LINE TREATMENT IN HYPERTENSION**

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Objective: After 2 months of treatment, perindopril 3.5 mg/amlopidine 2.5 mg was shown suitable for use as first-step treatment in uncomplicated hypertension. It has been also identified a rapid onset effect of this new first-line treatment on blood pressure compared with approved first-line component treatments. The objective is to analyse the efficacy and safety of perindopril 3.5 mg/amlopidine 2.5 mg once daily after 1 month of treatment.

Design and method: Sub-analysis of an international, randomised, double-blind, placebo-controlled study with parallel treatment arms at 4 weeks. It has been focused on first-line treatment approved for hypertension: perindopril 3.5 mg/amlopidine 2.5 mg once daily after 1 month of treatment.

Results: 1006 patients (mean age 52 years) with mild-to-moderate uncomplicated hypertension were computed. Systolic and diastolic blood pressure decreases at 4 weeks were (mmHg) –20.3/–11.9, -17.0/–10.2, –19.4/–11.6 and –13.5/–8.7 for Per/Aml (perindopril 3.5 mg/amlodipine 2.5 mg), Per (perindopril 5 mg), Aml (amlodipine 5 mg) and placebo, respectively. Per/Aml was statistically superior in BP lowering at 1 month than Per (p = 0.009 and 0.018 for SBP/DBP, respectively) and placebo (p < 0.001 for both). 35%, 31%, 31% and 23% of patients were normalized (below 140/90 mmHg) on Per/Aml, Per, Aml and placebo, respectively. The tolerability was similar between groups.

Conclusions: Perindopril 3.5 mg/amlopidine 2.5 mg improved efficacy with the same safety as currently approved first-line monotherapy treatments in hypertension. This improvement occurred in mild-to-moderate hypertensive patients from the first treatment month.

PP.13.14

**QUALITY OF LIFE MEASURED BY SF-36 DID NOT CHANGE DURING SIX MONTHS AFTER STARTING ANTIHYPERTENSIVE MEDICATION**

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Objective: To clarify the change in quality of life during six months after starting the antihypertensive treatment in hypertensive patients.
Design and method: The patients were non-treated and participated during the years 1999–2002 in a six-month study where their antihypertensive treatment was titrated during six months according to a predetermined schedule to reach the target pressure. SF-36 questionnaire was filled out every six weeks by 88 patients (49 females and 39 males, aged 55.4 (7.8), 36–71 years). After six months they used at least one antihypertensive agent. Blood pressure was measured every six weeks by using 24 hour ambulatory measurement.

Results: Daytime systolic blood pressure (SBP) decreased from 144.8 (11.6) to 129.8 (10.1) mmHg (p < 0.01) and diastolic blood pressure (DBP) from 94.1 (7.0) to 82.2 (6.4) mmHg (p < 0.01). Nocturnal SBP decreased from 128.5 (12.8) to 115.2 (10.3) mmHg (p < 0.01) and DBP from 77.9 (7.8) to 67.4 (6.9) mmHg (p = 0.001). Heart rate in the beginning (HR) changed from 72.0 (5.5) to 72.0 (8.3) beats/min (p = 0.09) and nocturnal HR decreased from 62.0 (7.8) to 60.5 (6.7) beats/min (p = 0.01).

None of the eight SF-36 parameters nor their mean value changed significantly during the six months of the study. The change in physical functioning and role physical were negatively explained by daytime SBP in the beginning, in bodily pain negatively by daytime SBP and nocturnal HR at the end, in general health negatively by 24 hour SBP in the beginning, in role emotional negatively by daytime SBP at the end. Vitality, social functioning and mental health were explained by none of the parameters. The mean of the parameters of SF-36 questionnaire was explained negatively by daytime SBP in the beginning.

Conclusions: According to our results quality of life did not change significantly during the six months after starting antihypertensive medication although blood pressure decreased significantly. Low change in the SF-36 physical parameters was mostly explained by high systolic blood pressure in the beginning of the study. Mental SF-36 parameters were not explained by any of the measured parameters.

PP.13.15 BISOPROLOL THERAPY REDUCES THE NUMBER OF ANGINA ATTACKS

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Objective: The aim was to assess the effects of three-month therapy with bisoprolol on blood pressure and the number of angina attacks in hypertensive persons.

Design and method: The study comprised 6799 patients with stage I arterial hypertension, aged 61.60 ± 11.54 years. All patients were treated with 2.5 mg or 5 mg bisoprolol for three months. Blood pressure (BP) was measured by an oscillometric device at the beginning of the study, and after three months of therapy.

Results: Mean systolic blood pressure (SBP) at the beginning of the study was 147.1 mmHg; mean diastolic blood pressure (DBP) was 90.5 mmHg. After three months of therapy, the number of angina attacks at the beginning of the study, and after three months of therapy was self-reported. The differences in blood pressure values and number of angina attacks from baseline were tested with Student’s t test for paired samples.

Conclusions: Three-month therapy with bisoprolol not only reduces blood pressure in hypertensive persons, but decreases the number of angina attacks after three-month treatment.
LONG-TERM OUTCOMES IN THE TREATMENT IN HYPERTENSIVE PATIENTS WITH ANGIOTENSIN-CONVERTING ENZYME INHIBITORS OR REIN-ANGIOTENSIN RECEPTOR BLOCKERS: SYSTEMATIC REVIEW AND META-ANALYSIS

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Objective: The ACEIs (Angiotensin-Convertin-Enzyme Inhibitors) and ARBs (Angiotensin II Receptor Blocker AT-1) effectiveness in reducing the systemic hypertension (SH) is widely known. However their comparative outcomes resulting from prolonged use remain unknown. The objective of this study is to compare by a Meta-Analysis of prospective randomized double-blind clinical trials all the events results from prolonged use of ACEIs or ARBs in hypertensive patients.

Design and method: Three reviewers, independently, made the selection in the following databases: PUBMED, LILACS and SCIELO. We used the combination of inclusion and exclusion criteria to select randomized double-blind clinical trials. After the final selection of trials the statistical analysis was made by the program Comprehensive Meta-Analysis.

Results: We retrieved 1,621 studies in the databases for analysis of titles, being selected 855 abstracts for analysis. Were allocated to analyze the content 75 of these, in the end, 17 studies and 73,761 patients were reviewed. The use of ACEIs when compared to the control group, proved to be significant in reducing total mortality (TM) (OR = 0.851, 95% CI [0.776 to 0.935], P = 0.001) and in cardiovascular mortality (CVD) (OR = 0.775, 95% CI [0.669 to 0.872], P = 0.000). The ARBs therapy did not show reduction of TM (OR = 1.024, 95% CI [0.960 to 1.091], P = 0.471) and CVD (OR = 0.947, 95% CI [0.849 the 1.056], P = 0.324). For Acute Myocardial Infarction (AMI), cerebrovascular accident (stroke) and heart failure (HF) Interrupt the reductions were significant for both classes.

Conclusions: To lowering blood pressure in addition, the use of ACE inhibitors or ARBs reduces, in long-term use, the risk of AMI, Stroke and IC/Internment. However, the use of ACEIs is effective in reducing TM and CVD, an outcome that was not observed with the use of ARBs. This fact is assumed to be related to the higher plasma concentration of bradykinin in the use of ACEIs, a well-known cardio-vascular-protective factor.

MONOTHERAPY WITH RILMENIDINE PRODUCES AN EFFECTIVE BLOOD PRESSURE CONTROL AND IMPROVES ECHOCARDIOGRAPHIC VARIABLES IN YOUNG MILD TO MODERATE HYPERTENSIVES

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Objective: Rilmenidine is a new centrally acting antihypertensive agent with selective agonist activity at imidazoline I1 receptors from the brain with less adverse effects than other centrally acting sympatholytic drugs. In previous studies, Rilmenidine proved effective antihypertensive efficacy regardless of the age of patients. It is especially effective in patients with sympathetic overstimulation. The aim of this study was to evaluate the antihypertensive efficacy of rilmenidine and its effects on left ventricular hypertrophy and diastolic function in young patients with mild to moderate hypertension.

Design and method: We performed a prospective study, lasting 3 months, in which 42 patients younger than 55 years old, (median age 47.9 ± 5.6 years), received once a day 1 mg rilmenidine. Diastolic left ventricular function was assessed by the following Doppler parameters: early (E) and late (A) peak velocities, E/A ratio, isovolumic relaxation time (IVRT), and deceleration time of E velocity (DT). Left ventricular mass index (LVMI) and diastolic function were determined at baseline and after 3 months. Blood pressure and heart rate were monitored at baseline and every month. Patients were requested to subjectively estimate their state as excellent, good, satisfactory and unsatisfactory.

Results: After 3 months of therapy, systolic BP was reduced from 157.9 ± 13.6 mmHg to 130.1 ± 11.4 mmHg (p < 0.005) and diastolic BP from 97.6 ± 6.8 mmHg to 82.6 ± 6.7 mmHg (p < 0.005). Heart rate was reduced from 86.4 ± 6.6 bpm to 71.2 ± 4.4 bpm. LVMI decreased from 131.5 ± 3.5 g/m² to 113.4 ± 3.6 g/m² (p < 0.001). E/A ratio increased from 0.86 ± 0.24 to 1.02 ± 0.14 (p < 0.002). IVRT decreased from 118 ± 11 ms to 98 ± 10 ms (p < 0.001) and DT decreased from 216 ± 21 ms to 187 ± 17 ms (p < 0.002). 83.3% from the patients were controlled after 3 months of therapy. Treatment was well tolerated. None of the hypertensives estimated his state as unsatisfactory.

Conclusions: Rilmenidine can be regarded as an effective and safe therapeutic possibility in mild/moderate young hypertensives. Therapy with Rilmenidine proved a good control of blood pressure, rich the therapeutic target, and was accompanied by the regression of cardiac hypertrophy and improvement in left ventricular diastolic function.

EVALUATION OF THE RIGHT VENTRICULAR MYOCARDIUM PERFUSION IN PATIENTS WITH IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

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Objective: estimate myocardial perfusion in patients with idiopathic pulmonary arterial hypertension (IPAH) by scintigraphy utilizing 99mTc-MIBI.

Design and method: In this study we included 11 patients (pts) with IPAH. The average age of the pts was 42.7 yrs. All pts were female. WHO functional class of disease was II-III. All pts had a common complaint of angina-like symptoms. No signs of ischemic heart disease or left main coronary artery compression were found by computed tomography (CT). On the 1step of diagnostic examination we found the pts with ischemic changes on Holter ECG monitoring. In all pts with the identification of ischemic changes were performed scintigraphy utilizing 99mTc-MIBI myocardium at rest and in combination with stress test (velo-ergometry: Heart Rate (HR)max corresponded to the HRmax at the Holter ECG monitoring).

Results: Scintigraphy utilizing 99mTc-MIBI IPAH pts at rest revealed disturbance of myocardial perfusion right ventricle (RV) (total 10.9 at stress test, 12 at rest) and mainly in interventricular septum (IVS): 40.9 at stress test and 42.18 at rest, which can be considered as areas of fibrosis of varying severity and area. In addition, some pts were registered a decrease of perfusion on other sites: in 18% of pts were registered a decrease of perfusion of the lower wall of the RV, 9% of pts recorded a decrease of perfusion on the anterior wall of the RV; in 45% of pts had a decrease of perfusion of the lateral wall. IPAH pts were characterized by diastolic LV dysfunction mainly and systolic RV dysfunction. In IPAH pts there was a significant decrease of RV perfusion reserve, manifests the appearance of ischemic changes of varying severity, and with corresponding decrease in myocardial contractibility functional reserve, that consequently leads to a worsening disorders systolic RV function in the most patients

Conclusions: identified decrease of perfusion in RV myocardium at rest and stress by veloergometry may be outline the rationale for the conduction of magnetic resonance imaging (MRI) of the heart is necessary to compare scintigraphy with MRI as a high accuracy method of evaluation of anatomical specialty.
E. Wójciechowska

Conclusions:

Design and method: 93 patients with first MI and primary (PCI) (70% male, age 61.5 ± 10.1 years (M ± SD), 57 (61.3%) with ST-Elevation Myocardial Infarction (STEMI), smokers 25%, arterial hypertension 20%, blood pressure 129 ± 6/82 ± 7 mmHg, left ventricular ejection fraction (LVEF) 47.4 ± 4.3%. Arterial stiffness was assessed using applanation tonometry. GLS by speckle tracking echocardiography (STE) was calculated in a 16-segment LV-model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if p < 0.05.

Results: Baseline GLS > 18% was not detected in any patient. GLS increased from 14.3 ± 2.3 to 15.6 ± 2.4%, p < 0.04 in 4 weeks after PCI. GLS normalized (>18%) in 24 (25%) patients. Achieved GLS differed significantly in patients without vs with normalization (14.5 ± 1.8 vs 18.6 ± 0.3%, p < 0.02). Mean carotid-femoral pulse wave velocity (PWV) decreased from 11.5 ± 1.9 to 10.1 ± 1.8 mmHg, left ventricular ejection fraction (LVEF) (47.4 ± 4.3%). Arterial stiffness was assessed using applanation tonometry. GLS by speckle tracking echocardiography (STE) was calculated in a 16-segment LV-model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if p < 0.05.

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Conclusions: Improvement of systolic function assessed by GLS was revealed in 25% of patients with first MI treated with PCI. Higher baseline PWV was associated with less improvement of GLS. Arterial stiffening may result in a less effective recovery of LV longitudinal function after MI.

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Objective: Left ventricular global-longitudinal strain (LV GLS) is an important predictor of adverse outcomes in patients with myocardial infarction (MI). GLS is more sensitive than LV ejection fraction (LVEF) as a measure of systolic function and may be used to detect reduction in LV-function prior to fall in LVEF. Pulse wave velocity (PWV), a marker of arterial stiffness, can predict cardiovascular events. The aim of the study was to investigate the relations between GLS and carotid-femoral PWV in patients with MI successfully treated with percutaneous coronary intervention (PCI).

Design and method: 93 patients with first MI and primary (PCI) (70% male, age 61.5 ± 10.1 years (M ± SD), 57 (61.3%) with ST-Elevation Myocardial Infarction (STEMI), smokers 25%, arterial hypertension 20%, blood pressure 129 ± 6/82 ± 7 mmHg, left ventricular ejection fraction (LVEF) (47.4 ± 4.3%). Arterial stiffness was assessed using applanation tonometry. GLS by speckle tracking echocardiography (STE) was calculated in a 16-segment LV-model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if p < 0.05.

Results: Baseline GLS > 18% was not detected in any patient. GLS increased from 14.3 ± 2.3 to 15.6 ± 2.4%, p < 0.04 in 4 weeks after PCI. GLS normalized (>18%) in 24 (25%) patients. Achieved GLS differed significantly in patients without vs with normalization (14.5 ± 1.8 vs 18.6 ± 0.3%, p < 0.02). Mean carotid-femoral pulse wave velocity (PWV) decreased from 11.5 ± 1.9 to 10.1 ± 1.8 mmHg, left ventricular ejection fraction (LVEF) (47.4 ± 4.3%). Arterial stiffness was assessed using applanation tonometry. GLS by speckle tracking echocardiography (STE) was calculated in a 16-segment LV-model as the average segmental value on the basis of three apical imaging planes. Mann-Whitney and Spearman tests were considered significant if p < 0.05.

Conclusions: Improvement of systolic function assessed by GLS was revealed in 25% of patients with first MI treated with PCI. Higher baseline PWV was associated with less improvement of GLS. Arterial stiffening may result in a less effective recovery of LV longitudinal function after MI.
Design and method: Between January and June 2015, 388 general practitioners retrospectively collected data from 4110 consecutive hypertensive patients recently seen in their routine practice and taking at least 2 antihypertensive drugs.

Results: Patients (mean age 67 ± 25 years [±SD], 55% men, 31% with diabetes mellitus, 31% with a previous cardiovascular event) were treated with 2 (n = 2302), 3 (n = 1313), or > 3 (n = 495) antihypertensive drugs. Combinations were free (n = 1577), fixed (n = 1345), or mixed (n = 1148) (missing data, n = 40). BP was 140 ± 23/82 ± 11 mmHg (mean ± SD). According to the 2013 ESH/ESC Guidelines, BP control rates were: systolic BP 49%, diastolic BP 72%, both systolic and diastolic BP 44%. According to the 2009 ESH/ESC Guidelines, systolic and diastolic BP control rate was 20%. Estimation by the GPs of systolic and diastolic BP control was 62%. Many physicians expressed the intention to prescribe fixed-dose combinations of bitherapy (in 896 patients) or of tritherapy (in 1394 patients) instead of free combinations. Reasons for this were improved adherence (73%) and better BP control (71%).

Conclusions: Free combinations remain largely used although GPs seem prone to prescribe fixed-dose combinations. In these high-risk patients requiring at least 2 antihypertensive drugs, BP control rate remains low and is overestimated by GPs. Increasing prescriptions of fixed-dose combinations could improve patient adherence and BP control.

PPLB01.05 OBESITY IMPACT ON HEMODYNAMIC, LABORATORY DATA AND SUBFRACTIONAL STATE OF SERUM IN ELDERLY WITH COMORBID CARDIAC PATHOLOGY

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Objective: To reveal hemodynamic, laboratory changes and subfractional structure of serum after prescription of combined pharmacotherapy (PT) in elderly with arterial hypertension (AH) and coronary artery disease (CAD) depending on obesity presence.

Design and method: 60 elderly patients with AH and CAD patients were divided into 2 groups. The 1st group included patients with AH, CAD. And the 2nd group consisted of patients with AH, CAD and obesity (BMI > 30). Average age of the 1st group was 67.2 ± 7.7 years old and of the 2nd – 63.8 ± 10.4. N = 30 in each group. The patients were examined according to ESH/ESC 2013 recommendations in Odessa University Clinic. They were prescribed lisinopril, bisoprolol and aspirin. For estimation of subfractional redistribution in serum was used laser correlation spectrometry (LCS). Blood serum was taken before PT and on the 10th day of treatment.

Results: BMI in the 1st group was 23.4 kg/m2 and in the 2nd 31.9 kg/m2. In the 2nd group was observed hyperglycemia before pharmacotherapy (PT) – 6.8 (5.9, 8.9) mmol/L. After the treatment systolic and diastolic blood pressure reached target goal < 150/90 mmHg in both groups (p < 0.05). In the 1st group was observed increase of creatinine level (100.0 vs 83.5 mcmol/l) and decrease of glomerular filtration rate (58.2 vs 75.3 ml/min/1.73m2). In LCS data of the 1st group increase of creatinine level (100.0 vs 83.5 mcmol/l) and decrease of glomerular filtration rate (58.2 vs 75.3 ml/min/1.73m2). In LCS data of the 1st group increase of creatinine level (100.0 vs 83.5 mcmol/l) and decrease of glomerular filtration rate (58.2 vs 75.3 ml/min/1.73m2).

Conclusions: Functional renal insufficiency developed in the 1-st group after the treatment. This kidney dysfunction was accompanied by LCS dynamic such as growth of catabolic and allergy reactions. There was no any negative impact on kidney function in the 2nd group (with obesity) which associated also with absence of LCS dynamic. That can be caused by deposition of drugs in adipose tissue. LCS is rather sensitive method for monitoring of subfractional alterations associated with PT influence and allow to control safety of PT.

PPLB01.06 DESIGN OF A NEW NATIONAL EPIDEMIOLOGICAL SURVEY FOR THE ASSESSMENT OF TREND IN HYPERTENSION’S PREVALENCE, TREATMENT, CONTROL AND CARDIOVASCULAR RISK AMONG THE ADULT POPULATION OF

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Objective: To reveal hemodynamic, laboratory changes and subfractional structure of serum after prescription of combined pharmacotherapy (PT) in elderly with arterial hypertension (AH) and coronary artery disease (CAD) depending on obesity presence.

Design and method: 60 elderly patients with AH and CAD patients were divided into 2 groups. The 1st group included patients with AH, CAD. And the 2nd group consisted of patients with AH, CAD and obesity (BMI > 30). Average age of the 1st group was 67.2 ± 7.7 years old and of the 2nd – 63.8 ± 10.4. N = 30 in each group. The patients were examined according to ESH/ESC 2013 recommendations in Odessa University Clinic. They were prescribed lisinopril, bisoprolol and aspirin. For estimation of subfractional redistribution in serum was used laser correlation spectrometry (LCS). Blood serum was taken before PT and on the 10th day of treatment.

Results: BMI in the 1st group was 23.4 kg/m2 and in the 2nd 31.9 kg/m2. In the 2nd group was observed hyperglycemia before pharmacotherapy (PT) – 6.8 (5.9, 8.9) mmol/L. After the treatment systolic and diastolic blood pressure reached target goal < 150/90 mmHg in both groups (p < 0.05). In the 1st group was observed increase of creatinine level (100.0 vs 83.5 mcmol/l) and decrease of glomerular filtration rate (58.2 vs 75.3 ml/min/1.73m2). In LCS data of the 1st group increase of II discrete dynamic zone (DDZ) particles by 13% (29 vs 16%) and simultaneous increase of creatinine level (100.0 vs 83.5 mcmol/l) and decrease of glomerular filtration rate (58.2 vs 75.3 ml/min/1.73m2).

Conclusions: Functional renal insufficiency developed in the 1-st group after the treatment. This kidney dysfunction was accompanied by LCS dynamic such as growth of catabolic and allergy reactions. There was no any negative impact on kidney function in the 2nd group (with obesity) which associated also with absence of LCS dynamic. That can be caused by deposition of drugs in adipose tissue. LCS is rather sensitive method for monitoring of subfractional alterations associated with PT influence and allow to control safety of PT.

PPLB01.07 IMPACT OF THE NICE/BHS GUIDELINES ON SPECIALIST HYPERTENSION CLINIC SERVICE

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Objective: The NICE/BHS hypertension guidelines were updated in August 2011, and one of the significant changes was the criteria for diagnosis of hypertension and initiation of therapy. The purpose of this study was to measure the impact of this change in guidelines on referrals to a tertiary care hypertension clinic four years post-implementation, at the same time investigating the consequent effect on care delivery.
Design and method: All new referrals to the Glasgow Blood Pressure Clinic (GBPC) between 01/05/2014 to 29/02/2016 were reviewed and clinical data extracted from case records (NICE group). Historical data on new referrals from January 2007 to December 2008 were extracted from the GBPC database (Pre-NICE group). Chi-square and t-tests were used as appropriate.

Results: The NICE and Pre-NICE groups comprised 712 and 801 patients respectively. There were no significant age or sex differences between the cohorts. The proportion of untreated patients was significantly higher in NICE compared to Pre-NICE (39% versus 25%, p < 0.0001). Among the untreated patients, SBP and DBP were significantly lower in NICE compared to Pre-NICE (p < 0.04). DBP was also significantly lower in the overall NICE population compared to Pre-NICE (p < 0.01). ABPM was done on 437(61%) NICE patients, and the proportion of normotension, masked HTN, white-coat HTN and HTN were 24%, 9%, 25%, 42% respectively among all referred patients and 29%, 9%, 27%, 35% among the untreated subgroup. Compared to the previous BHS guidelines, the current NICE/BHS guidelines 2011 resulted in 17% fewer patients being commenced on antihypertensive treatment (p < 0.0001), which may partly reflect the increase in the number of referrals for ABPM for diagnostic purposes.

Conclusions: The new NICE/BHS guidelines have resulted in a change in profile of patients being referred to a tertiary care clinic in Glasgow, highlighting a need to review the speciality service to ensure that limited resources for the care of more complex patients are not overwhelmed.

PPLB01.08 PREDICTORS OF STROKE IN HYPERTENSIVE PATIENTS ACCORDING TO THE FIVE-YEAR OBSERVATION

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Objective: Investigate the possible predictors of stroke, according to a five-year follow-up in hypertensive patients.

Design and method: Eighty essential hypertensive patients aged between 30–59 years were observed within 5 years. General clinical investigation, 24-h ABPM and brain MRI were performed in all patients at the onset of the study and after 5 years observation. Presence of increased subarachnoid spaces (SS) and lateral ventricles (LV) of a brain, periventricular leucomalacia (PL), lacunae infarcts (LI) and focal white matter lesions (FWML) were evaluated in all patients.

Results: 13.7% of patients during 5 years experienced stroke. This patients (I group - 13.7%) were compared to group of hypertensive patients without stroke (II group – 86.3 %) with regard to baseline data. At patients with insults on initial brain tomograms authentically were more often registered FWML (75% vs 42%; chi square = 5.14, p = 0.025) were higher at patients of I group. In multiple regression model including clinical data, baseline MRI signs and BP parameters, daytime systolic BP load (R = 0.42, p = 0.025) and FWML (R = 0.39; p = 0.012) were best prognostic factors of stroke. Significance of Multiple linear regression model: R = 0.53; R² = 0.28; p = 0.0007.

Conclusions: Our study demonstrates that systolic BP, focal white matter lesions and leucomalacia are independent predictors of stroke in hypertensive patients. Thus, ABPM and brain MRI early may significantly improve risk stratification in hypertensive patients.

PPLB01.09 CEREBROPROTECTIVE EFFICIENCY OF RENAL DENERVATION ONE YEAR AFTER THE INTERVENTION IN RESISTANT HYPERTENSIVE PATIENTS

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Objective: To evaluate the long-term effect of transcather renal denervation (TRD) on presence and severity of pathological structural changes of a brain in resistant hypertensive patients (ClinicalTrials.gov number NCT01499810).

Design and method: Twenty three resistant hypertensive patients aged between 30–59 years were included in the study. TRD was performed with a percutaneous ablation catheter. MRI was performed before and after the intervention for the purpose of evaluating the changes in the size of lateral ventricles and the volume of white matter lesions (WMHs) of the brain. The changes were compared using the Statistical Parametric Mapping (SPM) software. The linear size of the lateral ventricles and the volume of WMHs were measured and statistically processed.

Results: Pathological structural brain changes were detected in 22 patients (96.7%). Periventricular leucomalacia was found in 20 (87%) patients (I group – 17.4%, II group – 43.5%, III group – 17.4% and IV group – 8.7%), lacunar encephalopathy decreased by 13.7% (p = 0.004) while LI and FWML did not change. There was no significantly change in structural brain damages after TRD in non-responders.

Conclusions: Our study demonstrates that antihypertensive and cerebroprotective efficiency of renal denervation in resistant hypertensive patients is maintained even a year after the intervention.

PPLB01.10 PREFERRED DRUG CLASSES TO INITIATE ANTIHYPERTENSIVE TREATMENT IN SWEDISH PRIMARY CARE: RESULTS FROM THE SWEDISH PRIMARY CARE CARDIOVASCULAR DATABASE

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Objective: To assess which antihypertensive drug classes are the most preferred in patients newly initiated on treatment in Swedish primary care.

Design and method: The Swedish Primary Care Cardiovascular Database (SPCCD) comprises almost 75000 patients attending primary care with a diagnosis of hypertension in two geographically defined rural and urban regions in Sweden. All primary care physicians and patients at the 48 primary care centres are included and data are automatically extracted, minimizing potential selection bias due to voluntary participation. The current observational cohort study included patients aged >= 30 years with previously untreated hypertension and a first prescription of an antihypertensive drug during 2006–2007. Preferred drug class was analysed according to sex, age and concurrent diseases.

Results: We identified 5225 patients (mean age 61.4 years, 55% women) with first time prescribed antihypertensive treatment. Among one in ten patients had diabetes, with a lower prevalence in women than men (8.0 vs 11.5%, P < 0.01). The most preferred drug class was angiotensin converting enzyme inhibitors (36.2%), although substantially less common in women than in men (30.5 vs 43.1%; P < 0.001). However, diuretics were more common in women (32.4 vs 19.7%; P < 0.001), while we observed no differences between women and men in the prescriptions of angiotensin receptor blockers (3.6 vs 4.3%), beta blockers (21.8 vs 19.5%), calcium channel blockers (7.0 vs 9.0%), fixed combination therapy
Objective: The overall aim of IBERICAN determine the prevalence and incidence of cardiovascular risk factors and cardiovascular events in Spain. The objective of this cohort is analyzed metabolic and vascular profile in women.

Design and method: IBERICAN is a longitudinal, observational, multicenter study being including patients treated in primary care consultations in Spain. The cohort according to criteria of International Diabetes Federation Task Force.

Results: The average age of women is 57.2 ± 14.8 corresponding to 55.4%. No differences in the prevalence of obesity (32.4% vs 33.8%, p = 0.432) were observed. However, other higher prevalence of abdominal obesity (30.1% vs 25.8%, p = 0.011) was observed. The prevalence of metabolic syndrome was also lower (36.1% vs 40.9%, p = 0.007). The risk vascular was lower-moderate in 46.9% of women compared to 38.1% in males, p < 0.000). Women have lower prevalence of dyslipidemia (47.6% vs 55.8%, p < 0.001) and atherogenic dyslipidemia (10.8% vs 23.7%, p < 0.000). Higher prevalence of moderate-low exercise (43.7 ± 42.8%) followed by physical inactivity (35.3 ± 25.2%), moderate exercise (18.8 ± 23.6%) and sport usually (42.4% vs 8, 4%), p < 0.000.

Conclusions: Approximately one of every three women have abdominal obesity and obesity with low risk vascular to moderate and usually do physical activity of moderate-low, but with lipids changes with significant increase in vascular risk.

Objective: The aim of the study was to examine the association between ambulatory blood pressure monitoring (ABPM) indices and left ventricular (LV) and left atrium (LA) remodelling in patients with hypertension (HT).

Design and method: 60 patients (males – 40) with HT aged (59.5 ± 2.8) years were divided into 2 groups after 24 h ABPM. Patients with decrease BP during the night (night/day BP ratio < 0.9) defined as ‘dippers’, composed the 1st group (n = 33) and patients without sufficient nocturnal BP drop (nondippers) composed the 2nd group (n = 27). Using M-,2D- and speckle-tracking echocardiography with ultrasound scanner Aplio Artida we studied LV hypertrophy (L VH), values of LV longitudinal global systolic strain (LGSS) and LGSS rate. The aim of the study was to examine the association between ambulatory blood pressure monitoring (ABPM) indices and left ventricular (LV) and left atrium (LA) remodelling in patients with hypertension (HT).

Results: In the 2nd as compared to the 1st group pts had more severe LVH: more common concentric (60,0% vs 40,0%) and eccentric (66,7% vs 33,3%) LVH. In the 2nd group we found 17,4 and 13,5 % reduced absolute values of LGSS and LGSS rate accordingly (P < 0.05) as compared to the 1st group. The insufficent decrease of night time BP was associated with a 21,0 % decrease of LA EDDR and 16,9 % decrease of LA SD (P < 0.05) in the 2nd vs the 1st group, this indicated the impairment in conduit and reservoir LA function in nondipper patients. The inverse correlation was found in the 2nd group between 24 h BP and values of LGSS (r = –0,40, p < 0.01) and LGSS rate (r = –0,31, p < 0.05), also with decreased LA EDDR (r = –0,33, p < 0.05). Decreased values of LA LDDR rate associated with systolic (r = –0,44, p < 0.01) and diastolic (r = –0,37, p < 0.01) BP variability at nighttime.

Conclusions: In nondipper HT patients it was rotted much more expressed decrease in LV global systolic deformation and impairment of LA reservoir, conduit and contractile function compared to the dipper pts. A strong relationship between ABPM indices, insufficient night time BP reduction and the structural and functional state of the left heart was found.

Objective: To evaluate the predictive value of blood pressure (BP), age, body mass index (BMI) and pain in predicting obesity and diabetes mellitus (DM) in primary care (PC).

Design and method: Cross-sectional study with 496 adult consecutive PC patients performed. The cardiovascular risk was determined (age, male gender, associations with systolic (r = –0,44, p < 0.01) and diastolic (r = –0,37, p < 0.01) BP variability at nighttime.
BP, BMI). Three groups were analysed: the 1st group – healthy patients (N = 97), the 2nd group - patients with obesity (BMI > 30) and somatic disease, but not DM (N = 85), the 3rd group - DM patients (N = 22). McGill Pain self-assessment questionnaire was filled in. Information on the clinical diagnoses was obtained from the patients’ medical records.

**Results:** All PC samples did not differ by gender (men 38.1%, 39.1% and 40.9%, resp.), but they differed by age (41 ± 14; 54 ± 14 and 60 ± 9, resp.). Higher systolic BP (p = 0.023), older age (p = 0.002) and presence of pain in legs (p = 0.025) were predictors of DM. Older age (p < 0.001) and pain in legs (p = 0.009), but not high BP were predictors of obesity. When the 1st and the 3rd groups were compared, the greatest differences were found in pain in legs, (1.0% vs. 13.6%, p = 0.02), and in body parts, situated lower than plexus (LP) (4.1% vs. 18.2%, p = 0.038). Results found that older age (p = 0.002), higher systolic BP (p = 0.023) and presence of pain in LP (p = 0.034) were predictors of DM, while predicting obesity, the predictors were older age (p < 0.001), and pain in LP (p = 0.004) only.

**Conclusions:** Pain is valuable marker to predict diabetes next to standard confounding factors such as BP, age and BMI, and more valuable than BP to predict obesity in PC patients.